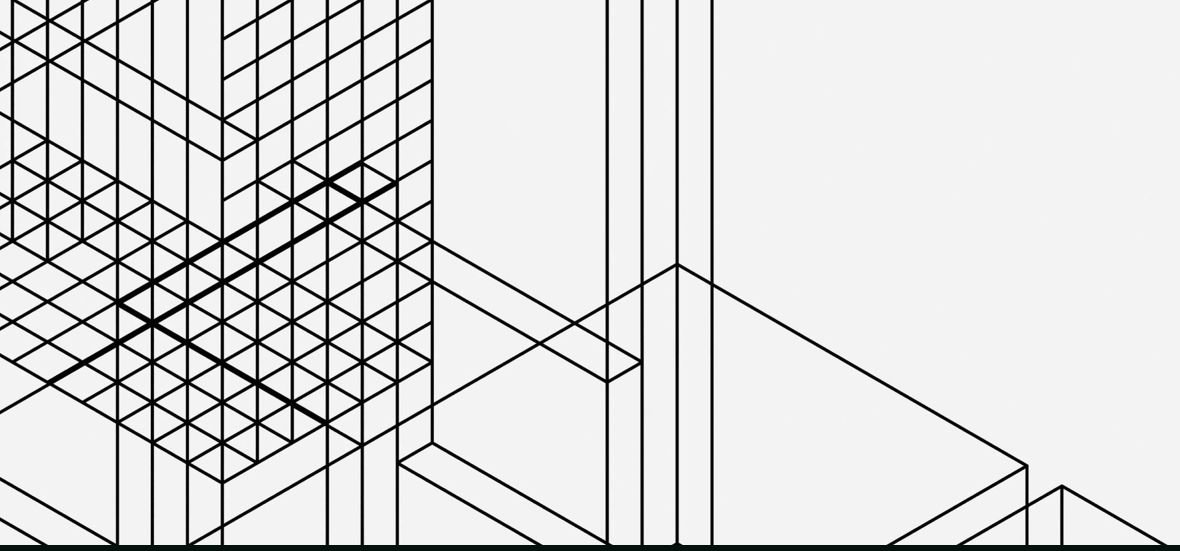
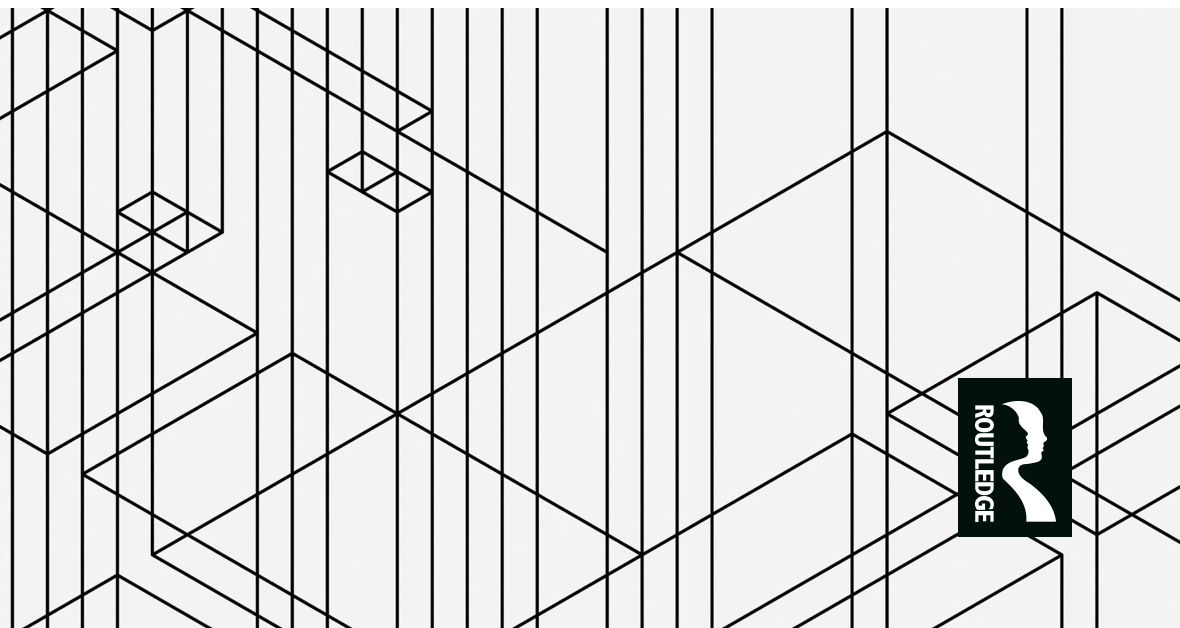


Routledge Studies in Energy Policy

CONSTITUTIONAL DISCUSSIONS ON NUCLEAR ENERGY IN GERMANY

Robert Rybski



Constitutional Discussions on Nuclear Energy in Germany

This book analyses the German constitutional system's responses towards nuclear energy.

Robert Rybski begins with a presentation of energy security as a constitutional value and explores how it connects with nuclear energy. He also examines constitutional standards derived from the German Constitution, which directly regulates nuclear energy issues within the German system of power. The book presents the structure of sources of law that are binding in the area of security of nuclear installations and considers the impact that The European Atomic Energy Community had on the German constitutional system. The final part of the book is devoted to a novel judicial concept of the so-called Restrisiko – a risk that cannot be avoided – which has been developed in the jurisprudence of the Federal Constitutional Court. The essence of this concept is an assumption that as long as the legal framework regulating nuclear energy fulfils conditions formulated in that judgment, then each citizen has to accept risks resulting from the nuclear energy sector.

Covering the entire period of commercial usage of nuclear energy for power generation, this book will be of great interest to students, scholars and energy experts who are active in researching or adopting public policies related to the nuclear energy sector.

Robert Rybski is an Assistant Professor in the Faculty of Law and Administration at the University of Warsaw, Poland.

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Constitutional Discussions on Nuclear Energy in Germany

Robert Rybski

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Preparation of the doctoral thesis was preceded by a Master's degree at the Law Faculty of the Humboldt-Universität zu Berlin, where I defended my master's thesis under the following title: "Constitutional Aspects of the Nuclear Energy in Germany. Models of an Entry and of an Exit" (original: "Verfassungsrechtliche Aspekte der Kernenergie in Deutschland. Modelle des Ein- und Ausstiegs"). Thus, I would like to express my gratitude also to the promoter of the master's thesis – Prof. Dr. Marcus Schladebach – for his kind consent to become a promoter for this socially difficult subject in Germany and for all of his efforts and support. Defending a master's thesis (38 pages long) at a German university under a concurrent title enabled me to precisely develop a structure of the future doctoral thesis as well as to identify key issues that were then analysed in the doctoral thesis (444 pages long).

My doctoral thesis was prepared during six years of doctoral studies at the Faculty of Law and Administration of the University of Warsaw and I would like to express my gratitude towards all the administrative staff who supported me a lot, especially our librarians.

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Glossary

Atomausstieg I Nuclear phase-out act of the Parliament from 2002

Atomausstieg II Nuclear phase-out act of the Parliament from 2011 (13Amendment to the Atomic Law)

Atomgesetz Atomic Law

Atomic Law Federal German Atomic Energy Act (*Atomgesetz*)

BAnz an acronym for *Bundesanzeiger,* a federal gazette promulgating (publishing) internally binding laws

BASE Federal Office for the Safety of Nuclear Waste Management *(Bundesamt für die Sicherheit der nuklearen Entsorgung*)

BGBl An acronym for *Bundesgesetzblatt*, a federal promulgating (publishing) generally binding laws

BGBl. 1997 II S. 131 A traditional notation system which refers to gazette (*BGBl.*), its part (*II*) and page number on which a particular legal act starts.

Bundestag Lower chamber of the German Parliament

Bundesrat Higher chamber of the German Parliament

BUM *Bundesumweltministerium*

Bundesumweltministerium Federal ministry that in 1986 started to be responsible (at federal level) also for the safety of nuclear reactors. Its current official name is Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection

BVerfGE An abbreviation for the official gazette that publishes judgments and some of the rulings of the German Federal Constitutional Court in Karlsruhe (*BundesverfassungsgerichtsEntscheidungen*).

BVerfGE 104, 238, p. 239 Within this book, I copy the manner of referring to particular fragments of judgments of FCC as it is the manner within the German constitutional law doctrine or how FCC does that. First number stands for the volume of BVerfGE in which that particular judgment was published. Second number stands for the first page in that particular volume on which that judgment is printed. Third number

refers to particular fragment of a judgment (in a way that was published in BVerfGE).

CJEU Court of Justice of the European Union

Commission on Radiological Protection *Strahlenschutzkommission*

Deutschmarks German currency that has been replaced by the Euro

disposal facility Any facility or installation the primary purpose of which is radioactive waste disposal. Its aim is to permanently seal radioactive waste from the environment

EAEC Euratom

Energiewende A process that mirrors *Atomausstieg I*. It is a phase-out of all fossil fuels (including uranium and plutonium) in Germany. It started with the *Atomausstieg I* as a way to transform the German energy system.

ESK An acronym for *Entsorgungskommission*, the Nuclear Waste Management Commission

Euratom European Atomic Energy Community

GDR German Democratic Republic

German Democratic Republic Eastern Germany. In 1990 it accessed the Federal Republic of Germany

GMBl An acronym for *Gemeinsames Ministerialblatt*, a gazette used by federal ministries for promulgating (publishing) purposes

Grundgesetz The German Constitution adopted in 1949 under the name of Basic Law of the Federal Republic of Germany. The English translation of this act comes from the public service provided by the German Federal Ministry of Justice. Authors of the translation are: Prof. Christian Tomuschat, Prof. David P. Currie, Prof. Donald P. Kommers and Raymond Kerr, in cooperation with the Language Service of the German Bundestag.

IAEA International Atomic Energy Agency

KTA An acronym for *Der Kerntechnische Ausschuss*, The Nuclear Safety Standards Commission

Land One of the 16 federal states in Germany

Länder Federal states within the constitutional system of the Federal Republic of Germany

Laufzeitverlängerung Parliamentary decision from 2010 (11th Amendment to the Atomic Law) to modify *Atomausstieg I* and to further prolong operating of commercial nuclear reactors in Germany

Laufzeitverlängerung II Parliamentary decision from 2022 (19th Amendment to the Atomic Law) to prolong the operation of remaining three nuclear reactors (Emsland, Isar 2 and Neckarwestheim 2) for 3.5 months

MP Member of the German Parliament

Orig Quoting original name

Publ Published in

RSK An acronym for *Reaktor-Sicherheitskommission*, the Reactor Safety Commission

spent fuel Nuclear fuel that has been irradiated in and permanently removed from a reactor core

SSK *Strahlenschutzkommission*

Strahlenschutzkommission Commission on Radiological Protection, advisory body to the Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection on protection against the dangers of ionising and non-ionising radiation

Statistisches Bundesamt Federal Statistical Office of Germany

TEAEC Treaty establishing the European Atomic Energy Community

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Introduction

This book presents and analyses the German constitutional system's responses towards nuclear energy. The number of constitutional discussions that nuclear energy triggered in Germany in the last 70 years is surprisingly high (considering that the German Constitution has scarcely since 1959 directly regulated nuclear energy in a dedicated and detailed manner). The time for those analyses covers the entire commercial usage of nuclear energy for power generation. This broad perspective of nearly 70 years allows for unwrapping and explaining those perplexing legal and social issues related to nuclear energy. Approaching nuclear energy from this non-obvious perspective deserves to be comprehensively presented in a separate volume. All this allows us to achieve the primary objective of this book: presenting those universal issues of nuclear energy along with the German measures to readers from other legal systems than the German legal system. The second objective of the book was to analyse and present how the public task of ensuring security, especially energy security, has been coupled with the nuclear power sector in the German legal and constitutional system.

It is crucial to start by explaining in the first place why (and for whom) the German experience with nuclear energy is universal. For three reasons, those nearly 70 years can greatly interest an audience outside Germany. Firstly, universality means easiness in the reception of the German experience in other democracies with the established rule of law and the nuclear energy sector present (or planned). Because of the central role of the German Federal Constitutional Court, developments within the German constitutional system (and public debate on those issues, including numerous judgments and even more peer-reviewed literature) are of interest not only for the legal systems with the continental legal system but also in common law countries. Secondly, similar legal issues arise in all countries that developed their own nuclear sectors (or intend to develop). Those issues concern the full life cycle of nuclear installations (or nuclear material) at the investment and disinvestment phases, policy, or governance level. Thirdly, those jurisdictions that do not have (or do not plan to develop) a nuclear energy sector share similar issues in the area of radiological protection (including consequences of military application of nuclear energy).

Approaching those legal issues from a constitutional perspective offers new approaches to sometimes "unsolvable" dilemmas. From a legal point of view,

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a constitutional perspective will always prevail, and considering the social significance of the nuclear sector, applying the constitutional perspective might be an attractive path for other legal systems to follow while resolving legal issues in the area of nuclear energy. What's more, approaching nuclear energy issues from a constitutional perspective and including constitutional arguments in those discussions strengthens liberal democratic systems, so stakeholders in other democratic countries with an established rule of law might also be willing to approach arising nuclear energy issues from a constitutional perspective to strengthen liberal democracy in their own countries. Thirdly, there are issues concerning nuclear energy that are constitutionally highly relevant. This is related to the circumstance that nowadays, constitutions regulate three thematic blocks: I. principles and norms that the constitutions use to build their own constitutional identities; II. fundamental rights/human rights; III. structure of the government and of the political system. Taking all three thematic blocks into account, all actions undertaken by the public authorities and their officials (from all the branches of the government) are constitutionally relevant. However, some of those actions taken by public authorities concerning nuclear energy are constitutionally highly relevant – sometimes because they are highly characteristic (e.g. in comparison to the treatment of other energy sources). Universality also within this dimension is clearly visible – because constitutions regulate similar thematic blocks, and the nuclear energy technology is similar, constitutional standards set within the German legal system will be highly relevant to other legal systems.

The central research objective of this book was to analyse how the public task of ensuring security, especially energy security, has been coupled with the nuclear power sector in the German legal and constitutional system. Particularly interesting is a verification of whether ensuring security (including energy security) kept its high priority during different phases of developing the nuclear energy sector in Germany (including two nuclear phase-out regulations in 2002 and 2011, and two operation extensions in 2010 and 2022). The structure of this book follows this idea. The first chapter analyses and presents developments in the German legal system concerning strategic decisions on nuclear power. The second chapter depicts constitutional dimensions of energy security (and security more broadly) and its links with nuclear energy. The third chapter extends the constitutional dimension of nuclear energy by presenting the core constitutional framework that regulates various aspects of nuclear energy and how the German constitutional system developed new (unwritten) standards concerning the nuclear power sector. The fourth chapter presents a fundamental judicial concept of the so-called *Restrisiko* that enhances ensuring energy security by the nuclear power sector. The German Constitutional Court developed this concept, which obliges citizens to endure unavoidable risks associated with the nuclear energy sector.

Finally, three surprises await the reader. Firstly, this book does not concentrate solely on the German nuclear phase-outs (from 2002, 2011 and 2023), but it rather starts with the nuclear phase-in in the 50s., then analyses

different issues related to daily usage of nuclear energy, two operations extensions (2010 and 2022) and finally analyses also nuclear phase-outs. Secondly, the issue of radioactive waste might be perceived as missing out. This was a deliberate step because my previous book (R. Rybski, *German Radioactive Waste. Changes in Policy and Law*, Routledge 2022) concerns the issue of radioactive waste management from the perspective of the German legal system. It analyses how lawmakers have responded to the problem of radioactive waste over the last (almost) 70 years. This new book is complementary because it concerns all the other issues besides radioactive waste. Thirdly, no other book comprehensively deals with constitutional developments in the German legal system regarding nuclear energy and presents it in English (… or in German). Taking into account that the book from the very outset appears as an open access book, this will (hopefully) allow to achieve the – already mentioned – primary objective of this book: presenting those universal issues of nuclear energy along with the German constitutional measures to readers coming from diversified legal systems.

This book reconstructs and presents solutions from only one legal order – the Federal Republic of Germany. This maintains the uniformity of the presented description of solutions. Furthermore, this increases the possibility of the reception of German solutions – it is very easy to determine the origin of the theses presented, to place them in a specific constitutional context and, if necessary, to extract them from this context. Finally, this approach allows for a unique application of the theses presented – in any democratic state with a well-established rule of law that has used, is using or intends to use nuclear energy.

The EU aspects of nuclear energy, in the form of the compulsory participation of Member States in Euratom, are present in the legal order of each of these EU Member States. This is due, for example, to the fact that all nuclear fuel in the European Union is owned by Euratom, and individual nuclear power plant operators are merely holders of nuclear fuel (and not owners). Even for the EU Member States that do not have their own nuclear power plants, there is a wealth of EU legislation, particularly on the safety of nuclear installations and nuclear material, which is regularly revised.

The subject of this book is the peaceful use of nuclear energy for the commercial generation of power, so the issue of the application of nuclear energy in branches of the economy other than power generation (such as medicine) has been omitted. However, the issue of the possible military use of nuclear energy is included. Finally, attention should be paid to the issue of accidents and other disturbances in the operation of nuclear installations – these are dealt with in the German literature within the framework of disaster regulations and not constitutional law (except for that part of constitutional law which has to do with disasters). This is also the approach to the peaceful use of nuclear energy presented in this publication.

The structure of the book has been subordinated to its primary purposes: (1) to bring together the findings of German constitutional law scholarship

and the case law of the German constitutional court on the basic phases of the peaceful use of nuclear energy and to analyse them; (2) to analyse how has the public task of ensuring security, especially energy security, been coupled with the nuclear power sector in the German legal and constitutional system. The book consists of an introduction, four chapters, and concluding remarks.

The first chapter analyses developments in the German legal system concerning strategic decisions on nuclear power. The chapter analyses legal constructs used in the laws introducing nuclear phase-outs.

The second chapter is devoted to analysing energy security as a value protected by the German Basic Law (*Grundgesetz*). In constitutional terms, seven main themes are discussed: (1) the provision of energy security in the jurisprudence of the Federal Constitutional Court in Karlsruhe; (2) the impact of the lack of energy supply on the ability of the modern constitutional state to fulfil basic public tasks; (3) the provision of energy security as a public task entrusted to private actors; (4) the constitutional framework for the provision of state aid for the realisation of energy security; (5) the constitutional admissibility of expropriation on the grounds of the public interest in the form of the provision of security of energy supply from the perspective of the protection of life and health of the population and the protection of the environment; (6) the statutory termination of commercial nuclear reactors and the constitutionally admissible forms of expropriation; (7) sources of law and structure of state bodies responsible for the safety of nuclear installations.

The third chapter presents the embedding of nuclear energy issues in the *Grundgesetz*. The provisions discussed refer explicitly to nuclear energy. Although they only regulate questions of competence, developed constitutional court case law, literature, and constitutional practice have given these provisions a rich normative content, which will be reconstructed in this chapter.

The fourth chapter discusses the concept of the so-called *Restrisiko*, or unavoidable risk, which the FCC has developed in its nuclear jurisprudence. The discussion of this concept is extended by presenting the theory of risks operating in economic science and applying this theory to the analysis of the concept developed by the Federal Constitutional Court.

This book takes into account the legal status as of 8 December 2023.

1 Setting the scene

40 Years of nuclear phase-outs in Germany

In 1905, Albert Einstein concluded that mass (m) is a form of energy (E).[1] He expressed this in the most famous equation: $E = mc^2$. It would follow, for example, that four tonnes of any matter conceals enough energy to supply the entire world's annual energy requirements. However, this is only a theoretical potential, as the technology does not exist to release the energy from, for example, water.[2] Today, nuclear reactors offer the only commercially available technology to harness energy concentrated in mass.[3] The fission of the nuclei contained in one kilogram of uranium-235 can release the same amount of energy as is released by burning about 2,000 tonnes of oil or 3,000 tonnes of coal.[4] At the same time, the initial mass (1 kg) of uranium will be reduced by only one gram.[5] Such a negligible reduction in initial mass shows the enormous potential of nuclear technology.

Nuclear power as an energy generation technology and its ability to release energy in huge quantities are also characterised by the absence of (direct) greenhouse gas emissions.[6] However, nuclear power is associated with a serious risk of catastrophes, and their consequences can lead to permanent contamination of large areas and the loss of health and life of large numbers of people.[7] A permanent side effect of the use of nuclear power is radioactive waste.[8] High-level radioactive waste must be separated from the biosphere and stored for five hundred to over a million years.[9] Even before nuclear energy was first used as a weapon for military purposes in 1945, the consequences of the military use of this technology were known.[10] This explains the amount of public law regulation of this technology – including acts at the constitutional level. Hence, nuclear energy is a constitutionally relevant issue.

On the one hand, this is due to the specific character and importance of nuclear energy, the impact of which affects many areas. On the other hand, relevance is due to the fact that the *Grundgesetz* itself refers explicitly to nuclear energy issues on two occasions. Finally, it is also due to the scale of the prevalence of nuclear reactors on German territory – both experimental and large-scale reactors used commercially to generate power.

The peaceful use of nuclear energy has been the subject of intense public debate in Germany for over 50 years.[11] On the technical side, the great importance of nuclear power in Germany was due to the significant number

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of commercial and experimental reactors. The discussion on various aspects of nuclear power in the context of their constitutionality is also present in German legal literature and jurisprudence.[12] The debate was revived after the accidents at Three Mile Island[13] (USA, 1979), Chernobyl[14] (Ukraine, 1986) and Fukushima (Japan, 2011).

In particular, the public debate was stimulated by successive legal acts that were relevant from a constitutional perspective. In August 1984, the Bundestag received a draft "law on the immediate shutdown of nuclear installations in the Federal Republic of Germany" (the so-called *Atomsperrgesetz*).[15] The act, authored by the Green parliamentary club, provided for repealing the Atomic Law, the immediate shutdown of all nuclear installations, and explicitly excluded the award of any compensation.[16] On 10 December 1986, the draft was rejected by the Bundestag.[17] At the same time, a draft resolution of the Bundestag, tabled by the SPD parliamentary club, calling for a substantial revision of the Atomic Law to put a medium-term end to the commercial use of nuclear energy for power generation was rejected.[18]

Also in December 1986, the Bundestag received a draft "law on the termination of the commercial use of nuclear energy for energy purposes and on the technically safe handling of nuclear energy during the transitional period" (the so-called *Kernenergieabwicklungsgesetz*).[19] The draft by the SPD parliamentary club referred to the nuclear disasters at Three Mile Island and Chernobyl and the allegedly existential risks associated with nuclear energy.[20] The draft provided for the termination of research, development, and use of nuclear power for energy purposes, regulated the transition period and managed the consequences of past use.[21] On the other hand, the SPD draft provided for the state's obligation to compensate the operators of nuclear installations subject to decommissioning.[22] Because this draft was not considered before the end of the Bundestag's term of office and because, under the principle of the discontinuation of parliamentary work, the same act, the *Kernenergieabwicklungsgesetz,* was again submitted to the Bundestag in February 1987.[23] The Bundestag finally rejected this draft on 22 June 1990.[24] In parallel, two further attempts were made. The first was an initiative by one particular state (*Land*) – the Free and Hanseatic City of Hamburg.[25] In May 1987, it requested the Bundesrat (nota bene Hamburg is its member) to use its legislative initiative to bring *Kernenergieabwicklungsgesetz* to the Bundestag.[26] This request was rejected in a meeting of the Bundesrat on 26 June 1987.[27]

Another initiative was related to the project to enact a (new) Constitution for Germany (after the German Democratic Republic accessed the Federal Republic of Germany in 1990) on the basis of Article 146 of the *Grundgesetz*:

> This Basic Law, which, since the achievement of the unity and freedom of Germany, applies to the entire German people, shall cease to apply on the day on which a constitution freely adopted by the German people takes effect.

This draft Constitution, authored by the PDS/Linke coalition in 1994, provided in Article 163 for the termination of the production and use of nuclear energy within ten years of the entry of the new Constitution into force. At the same time, the proposed Article 163 left the regulation of further details to a federal law.[28] The above-mentioned draft Constitution was never made effective. The 1949 *Grundgesetz* – considered temporary at its enactment – is still in force today.

The cited acts (as well as the laws passed later) were based on the solution anchored in the Atomic Law. §7 of the Atomic Law (as amended since its enactment in 1959) made the operation of nuclear power plants conditional on granting an indefinite licence to operate[29] (nuclear power plant operator). The prerequisites for granting the licence included the reliability and qualifications of the persons employed, compliance with technical standards, liability requirements, safety standards, and the suitability of the location of the nuclear power plant.[30] In turn, the provision of §17(1) of the Atomic Law provided for the possibility that, in order to achieve the objectives indicated in §1 of the Atomic Law, it was possible to limit the licence already granted or to impose additional requirements on the nuclear power plant operator. It is worth noting that the aforementioned catalogue of objectives included, at times, quite distant objectives: (1) to research, develop and use nuclear energy for peaceful purposes; (2) to protect the life and health of people and their property from the dangers of nuclear energy as well as from the harmful effects of ionising radiation as well as to compensate for damage caused by nuclear energy or by ionising radiation; (3) to prevent the internal or external security of the Federal Republic of Germany from being endangered by uses of nuclear energy or by its release; (4) to guarantee the fulfilment of Germany's international obligations on the grounds of nuclear energy and radiation protection.

Furthermore, the provisions of §17(2)–(4) allowed for the revocation of the licence granted if certain conditions materialised.[31] At the same time, §18 of the Atomic Law provided in principle for a compensation obligation in the event of the revocation of a licence or in the event of the subsequent imposition of additional obligations (expenditures)[32] on plant operators. Subsequent amendments to the Atomic Law did not change this basic concept of a compensation obligation linked to the granted authorisation.[33]

However, political developments over the last 30 years no longer had the status of mere legal acts. First, let's mention the *Atomkonsens I* (Nuclear phase-out I). This resulted from negotiations started by the federal government (SPD-Green coalition) in 1998 with the operators[34] of nuclear installations of a plan to phase out all nuclear power plants. In the middle of 2000, the text of an agreement was worked out,[35] and it was signed on 11 June 2001.[36] The parties to the agreement agreed to limit the future use of available nuclear power plants.[37] At the same time, while maintaining high safety standards and the requirements of nuclear law, the uninterrupted operation of the nuclear power plants was guaranteed for the remaining lifetime.[38]

Table 1.1 Electricity volume remaining to be generated at individual nuclear power plants in Germany[43]

Installation	*Remaining volume of power from 1 January 2000 (TWh[44] net)*[45]	*Commencement of commercial operations by the installation concerned*
Obrigheim	8,70	1 April 1969
Stade	23,18	19 May 1972
Biblis A	62,00	26 February 1975
Neckarwestheim 1	57,35	1 December 1976
Biblis B	81,46	31 January 1977
Brunsbüttel	47,67	9 February 1977
Isar 1	78,35	21 March 1979
Unterweser	117,98	6 September 1979
Philippsburg 1	87,14	26 March 1980
Grafenrheinfeld	150,03	17 June 1982
Krümmel	158,22	28 March 1984
Gundremmingen B	160,92	19 July 1984
Philippsburg 2	198,61	18 April 1985
Grohnde	200,90	1 February 1985
Gundremmingen C	168,35	18 January 1985
Brokdorf	217,88	22 December 1986
Isar 2	231,21	9 April 1988
Emsland	230,07	20 June 1988
Neckarwestheim 2	236,04	15 April 1989
Total	**2516,06**	
Mülheim-Kärlich[46]	107,25	
Total	**2623,31**	

For each plant (i.e. nuclear reactor) the agreement determined the maximum amount of power each plant could produce after 1 January 2000 – it was referred to as electricity (power) volumes (orig. *Elektrizitätsmenge*) or cut-off allowances (orig. *Reststrommenge*[39]). The volumes were determined based on the factor that the standard operating lifetime of a large-scale nuclear reactor should be 32 years on average.[40] This is the period of operation in which each nuclear reactor should depreciate and earn an appropriate profit for the owner.[41] Therefore, based on how much power a given nuclear reactor would have produced in the past, the amount of power it would still have left over to reach the level it would have supplied to the grid for 32 years of operation was determined.[42] This is clearly visible in Table 1.1.

It is clear from the table above that the last three (and largest) nuclear units started operating in 1988 and 1989. The *Atomausstieg I* agreement was therefore concluded only 11 and 12 years after the last three nuclear reactors started operating.[47]

Information on the level of using the *Reststrommenge* volume is subject to public communication through announcements by the Federal Ministry responsible for reactor safety.[48] As of the end of 2022, 60.5 TWh remains to

be used[49] (out of 2,623 TWh). While this represents approximately 2.2% of the total volume of *Reststrommenge*, it is worth pointing out that with the wholesale electricity price, which in the 24-hour band (BASE) was EUR 234.49 in Germany in 2022,[50] this represents a value of just over EUR 14 bn. Considering the generation of 6.7 TWh of power by nuclear plants in H1 2023,[51] the remaining total volume of *Reststrommenge* was still more than 50 TWh.

The 2000 agreement also provided for the transferability of *Reststrommenge* volumes from older reactors to newer reactors and from smaller reactors to larger reactors.[52] The reasons behind the introduction of such a solution are quite clear. The mechanism for transferring *Reststrommenge* from older to newer reactors was to ensure that older reactors could be closed down more quickly. For the reactor operators, it was an advantage because of the newer plants' lower generation costs, thus ensuring a higher economy of fleet utilisation. Enabling the transfer of *Reststrommenge* from smaller generating units to larger generating units was also linked to safety considerations (faster shutdown of smaller generating units, which were usually also older reactors), as well as to the higher economy of the project (economies of scale also occur in power generation). In addition to these obvious assumptions behind the transferability of *Reststrommenge* volumes between nuclear reactors, the essence of this solution can be fully understood after analysing the ownership structure of the particular nuclear reactors (Table 1.2).

The arrangements of the 2000 agreement were then anchored in the Atomic Law in the 2002 amendment.[53] Some authors have already referred to this event as the Nuclear phase-out (orig. *Atomausstieg I*), i.e. the abandonment of the commercial use of nuclear energy for power generation.[54] Due to its conciliatory nature, however, the term *Atomkonsens I* has become accepted (although some authors recall that the atmosphere back then resembled more a "voluntary pressure"[55]).

Another key political development was the 2010 legislature's decision[56] to extend reactor operation (orig. *Laufzeitverlängerung*).[57] The *Laufzeitverlängerung* resulted in a significant extension of the lifetime of nuclear reactors compared to the 2000 agreement (and the 2002 Amendment). Indeed, the explanatory memorandum to the draft amendment to the Atomic Law presented by the Federal Government (CDU/CSU-FDP coalition) in 2009 described nuclear power as a transitional technology.[58] The amendment to the Atomic Law retained the *Reststrommenge* (cut-off allowances) mechanism. Moreover, extending the lifetime of nuclear power plants was based precisely on the *Reststrommenge mechanism*. Indeed, separate, additional *Reststrommenge* volumes were designated for individual reactors, making it possible to extend their power generation by an average of 12 years.[59] This represented an increase in operating time of more than a third (relative to the 32 years of operation coordinated under *Atomausstieg I)*. In absolute terms, on the other hand, the additional *Reststrommenge* volumes per nuclear installation were increased by around 70% (Table 1.3).

Table 1.2 The ownership structure of particular nuclear reactors and their capacity

#	*Name of nuclear reactor*	*Installed nuclear reactor power (net, MWe)*	*Name of the energy operator*	*Equity stake in a nuclear reactor operator company (%)*
1	Biblis A	1,167	RWE	100
2	Biblis B	1,240	RWE	100
3	Brokdorf	1,410	EON	80
			Vattenfall	20
4	Brunsbüttel	771	EON	1/3
			Vattenfall	2/3
5	Emsland	1,340	EON	12,5
			RWE	87,5
6	Grafenrheinfeld	1,275	EON	100
7	Grohnde	1,360	EON	5/6
			Stadtwerke Bielefeld	1/6
8	Grundremmingen B	1,284	EON	25
			RWE	75
9	Grundremmingen C	1,284	EON	25
			RWE	75
10	Isar 1	878	EON	100
11	Isar 2	1,410	EON	75
			Stadtwerke München	25
12	Krümmel		EON	50
			Vattenfall	50
13	Neckarwestheim 1		EnBW	100
14	Neckarwestheim 2		EnBW	100
15	Philippsburg 1		EnBW	100
16	Philippsburg 2		EnBW	100
17	Unterweser		EON	100

Source: compiled on the basis of P. Becker *Aufstieg und Krise der deutschen Stromkonzerne*, Bochum 2011, p. 369 and *Bericht der Bundesrepublik Deutschland für die Fünfte Überprüfungstagung im April 2011*, p. 204.

Different terms are also used for the *Laufzeitverlängerung* – for instance, that event is sometimes referred to as *Atomkonsens II*, (Second Nuclear Consensus) because, once again, only the nuclear reactor operators were partners in the talks with the federal government. Another term is *Ausstiegsverzögerung*, i.e. delaying the departure from nuclear power, as the decision of the 2010 legislature did not overturn the 2002 legislature's directional decision to move away from nuclear power but rather postponed its implementation by extending the permitted operating period of the reactors.

Another key development was the 2011 legislature's decision[62] to move away from nuclear power following the disaster at Japan's Fukushima-Daiichi nuclear power plant (*Atomausstieg II*). Contrary to some media reports, this decision was by no means new. It involved returning to Atomausstieg I and

Table 1.3 The volume of power remaining to be generated at individual nuclear power plants in Germany under the 2010 *Laufzeitverlängerung*[60]

Installation	*Remaining volume of power from 1 January 2000 (TWh net)*	*Commencement of commercial operations by the installation concerned*	***Additional power volumes (TWh net)***
Obrigheim	8.70	1 April 1969	-
Stade	23.18	19 May 1972	-
Biblis A	62.00	26 February 1975	**68.617**
Neckarwestheim 1	57.35	1 December 1976	**51.000**
Biblis B	81.46	31 January 1977	**70.663**
Brunsbüttel	47.67	9 February 1977	**41.038**
Isar 1	78.35	21 March 1979	**54.984**
Unterweser	117.98	6 September 1979	**79.104**
Philippsburg 1	87.14	26 March 1980	**55.826**
Grafenrheinfeld	150.03	17 June 1982	**135.617**
Krümmel	158.22	28 March 1984	**124.161**
Gundremmingen B	160.92	19 July 1984	**125.759**
Philippsburg 2	198.61	18 April 1985	**146.956**
Grohnde	200.90	1 February 1985	**150.442**
Gundremmingen C	168.35	18 January 1985	**126.938**
Brokdorf	217.88	22 December 1986	**146.347**
Isar 2	231.21	9 April 1988	**144.704**
Emsland	230.07	20 June 1988	**142.328**
Neckarwestheim 2	236.04	15 April 1989	**139.793**
Total	**2,516.06**		
Mülheim-Kärlich[61]	107.25		
Total	**2,623.31**		**1,804.278**

even tightening the then-directional decision.[63] The legislator reversed the decision to extend the reactors from 2010 by deleting the additionally granted *Elektrizitätsmenge/Reststrommenge* volumes.[64] The 2002 arrangement was reverted to. The transferability of *Reststrommenge* between individual reactors was maintained. There were two basic elements of this tightening. Firstly, the definitive calendar date for moving away from nuclear power (missing from the 2000 decision) was 31 December 2022. Secondly, shutdown dates were set for each specific nuclear reactor[65] (Table 1.4).

For these reasons, the event was also referred to as the "Slowdown of the Transition away from Nuclear Power 2011."[68] The legislature's decision was preceded by a short (and constitutionally controversial[69]) moratorium on the use of nuclear power for stress testing the load on nuclear installations in Germany (so-called stress tests), introduced by the federal government (CDU/CSU-FDP).

Finally, just before the expiry date of the last three nuclear reactors (which was scheduled for 31 December 2022), another U-turn took place. The federal government (SPD-Green-FDP coalition) passed a law on 19 October 2022 to

Table 1.4 Changes in the volumes of power remaining to be generated at individual nuclear power plants in Germany under *Atomausstieg II* from 2011[66]

Installation	*The remaining volume of power from 1 January 2000 (TWh net)*	*Commencement of commercial operations by the installation concerned*	~~*Additional power volumes (TWh net)*~~	*Expiry dates of the* Elektrizitätsmenge *for the installation in question*
Obrigheim	8.70	1 April 1969	-	
Stade	23.18	19 May 1972	-	
Biblis A	62.00	26 February 1975	~~68.617~~	6 August 2011
Neckarwestheim 1	57.35	1 December 1976	~~51.000~~	6 August 2011
Biblis B	81.46	31 January 1977	~~70.663~~	6 August 2011
Brunsbüttel	47.67	9 February 1977	~~41.038~~	6 August 2011
Isar 1	78.35	21 March 1979	~~54.984~~	6 August 2011
Unterweser	117.98	6 September 1979	~~79.104~~	6 August 2011
Philippsburg 1	87.14	26 March 1980	~~55.826~~	6 August 2011
Grafenrheinfeld	150.03	17 June 1982	~~135.617~~	31 December 2015
Krümmel	158.22	28 March 1984	~~124.161~~	6 August 2011
Gundremmingen B	160.92	19 July 1984	~~125.759~~	31 December 2017
Philippsburg 2	198.61	18 April 1985	~~146.956~~	31 December 2019
Grohnde	200.90	1 February 1985	~~150.442~~	31 December 2021
Gundremmingen C	168.35	18 January 1985	~~126.938~~	31 December 2021
Brokdorf	217.88	22 December 1986	~~146.347~~	31 December 2021
Isar 2	231.21	9 April 1988	~~144.704~~	31 December 2022
Emsland	230.07	20 June 1988	~~142.328~~	31 December 2022
Neckarwestheim 2	236.04	15 April 1989	~~139.793~~	31 December 2022
Total	**2,516.06**			
Mülheim-Kärlich[67]	107.25			
Total	**2,623.31**		~~1,804.278~~	

extend the operation of the last three reactors by 3.5 months.[70] Such an extension of the reactors' operation was linked to the technical possibility of extending the fuel campaign on the nuclear fuel loaded so far.[71] It is also worth noting that although the relevant ministry publicly communicated about introducing a ban on the procurement of fresh nuclear fuel,[72] the law mandated the use of only those fuel elements that were (at the time the amendment came into force) in individual nuclear installations. The law was enacted on 4 December 2022.[73] It was a *Laufzeitverlängerung II*, but a rather minor one.

The provision of §7 (1e), added to the Atomic Law by the 19th Amendment, did four basic things. Firstly, the existing expiry date of the nuclear power generation licence was changed for the three nuclear reactors (Isar 2, Emsland and Neckarwestheim 2). The previous date of 31 December 2022 (end of day) has been changed to 15 April 2023 (end of day). Those mentioned above three nuclear reactors were in the last (sixth) group of reactors to be decommissioned (see §7(1a) sentence 1 in fine). Therefore, the aforementioned nuclear reactors were still in operation at the time of the enactment of the 19th Amendment, which would have even made it possible to prolong their operation on the fly (rather than, for example, only bringing previously decommissioned units back into service). Secondly, the 19th Amendment allowed power generation as part of the extension of the operation of the last three reactors to be carried out regardless of whether the reactors still had *Reststrommenge/Elektrizitätsmenge* to be used at all (or as part of a transfer from other installations). This marked a departure from the *Reststrommenge/Elektrizitätsmenge* system, the use of which, however, has been strictly adhered to by the legislator for the last 30 years (also within the framework of the *Laufzeitverlängerung)*.

By the time this book went to press, no further direction had been taken. Therefore, on 15 April 2023, the last three nuclear reactors ceased operation. This brought to an end almost 70 years (i.e. since the synchronisation with the grid of the first nuclear power plant in 1961) of the industrial use of nuclear energy for power generation in Germany. In addition, the problem of managing high-level radioactive waste remains unsolved to this day, but as this is beyond the scope of this book, I can refer to the 2022 book in this regard.

All of these political developments concerned almost exclusively various (controversial) aspects of nuclear power, which were analysed through the prism of constitutional standards. The key to understanding such an extensive use within the German legal and political system of arguments of a constitutional nature concerning nuclear power is related to the idea (which is anchored in German public law) that administrative law is a concretisation of constitutional law.[74]

Based on the German experience, recommendations can be formulated for legislators and lawmakers in other countries. Also, stakeholders from other countries can, based on the material presented in this text, formulate recommendations and guidelines that can be applied in their legal systems (or even formulate alternative solutions after reviewing the German experience

presented). The range of countries concerned ranges from those that are just entering the field of nuclear power (such as Poland), those that are using it (such as the United States, United Kingdom, Canada or India), to countries that intend to move away from nuclear power in the future or have already done so (such as Austria, Spain or Italy). From the point of view of a democratic state with a well-established rule of law, the prospect of a constitutional assessment of individual aspects of nuclear energy will mean a strengthening of the national constitutional order. Such an important sphere of legislation, state administration activity and public debate must be subject to constitutional scrutiny of its aspects. National constitutional orders cannot remain indifferent to nuclear energy – this applies both to the physical aspects of the technology, to the enormity of the regulation within public law concerning this matter, and to nuclear energy as a social phenomenon.

The effect of showing such a broad impact of nuclear energy makes it addressed not only to German readers but also to an international readership. Regarding its content, this title might interest those researching and studying in the wider fields of administrative, constitutional and general energy law, as well as people with a particular interest in nuclear law. This thematic dimension will also interest readers interested in public policies (general energy policy, nuclear policy, and, to some degree, environmental policy) because of possible constitutional constraints that might influence existing policies (or those that are planned).

Why is it advisable for lawyers as well as political stakeholders (including policymakers) to take an interest in Germany's example? The same three reasons I chose the Federal Republic of Germany for the analysis apply here. Firstly, it is an example of a modern democratic state based on the rule of law, so its choice is appropriate in order to be able to study the impact of nuclear power on the functioning of the constitutional system (and vice versa). Secondly, the political events of recent years were decisive. The sensitivity of the German legal system to both the advantages and disadvantages of nuclear energy was also important. Dependence on nuclear energy (characteristic for e.g. France) blocks a constructive debate on the possibility of change. In Germany, meanwhile, a "professional public opinion" has emerged[75] critical of nuclear power. The point is that public opinion in Germany showed considerable interest in knowing about various aspects of nuclear power and treated nuclear power as a public matter. At the same time, public opinion was characterised by criticism of the information provided by both the energy companies and the authorities. This was due to their awareness of their links with the power plant operators and the fact that nuclear power was part of the state industrialisation programme. This attitude characterising German public opinion was reflected in the legal literature. It should also be noted that Germany has a long tradition of using nuclear technology. Modern nuclear power exists (among other things) thanks to the German[76] physiochemist Otto Hahn (1879–1968). In 1938, the future Nobel laureate (1944) carried out (together with F. Strassmann and L. Meitner) the first nuclear fission reaction.[77]

Public office holders decided Germany's entry into the field of nuclear energy within the democratic system. The constitutional majority of the German Bundestag and Bundesrat carried out an amendment to the Basic Law (*Grundgesetz*) in 1959. Henceforth, the Federal Republic of Germany was given a constitutional basis and competence to act in the area of nuclear energy (including nuclear power). The legal and political discourse around nuclear energy thus took place in a clear constitutional context from then on. The economic activity of generating power from a single, specific, non-renewable energy source gained constitutional status. It also became a major issue involving public authorities, the legislature, the executive, and the judiciary in equal measure. As a result, it is possible to trace and analyse both the very entry into the peaceful use of nuclear energy, the everyday use of nuclear power, and the departure from it on 15 April 2023. This has created a unique research situation that has made it possible to analyse all stages of the development of nuclear power in Germany, including the actions of the first, second and third authorities.

The peaceful use of nuclear energy in Germany involves many issues under strict state control. The most frequently mentioned problems are the safety of the reactors; the authorisation and supervision of radiation exposure activities; the interim and final storage of radioactive materials; the transport of radioactive materials, including the import and export of fissile material from the country; the maintenance of a compulsory compensation fund, as well as additional state guarantees for such a fund; how strict control of the power plants is exercised; and the protection of the reactors, for example from terrorist attacks,[78] or acts of war.

The topical character of the subject matter has not lost its relevance with the specific parliamentary decisions in 2002 and 2011 to move away from nuclear power. Three of the four operators of nuclear installations claimed damages from the Federal Republic of Germany for the decision to terminate nuclear power.[79] In the case of the first two constitutional claims brought by the energy companies E.ON and RWE, the sum claimed was €15 bn.[80] On the other hand, Vattenfall AB claimed nearly €1 m for each day its two nuclear power plants were shut down.[81] The energy companies assessed the legislature's decision to move away from nuclear power as an expropriation carried out by the legislature without due compensation.[82] The FCC's judgment on these constitutional complaints was handed down on 6 December 2016. The case was followed up by the FCC's judgment of 29 September 2020.

The international investment arbitration proceedings against the Federal Republic of Germany were another stage of the legal dispute arising from the German legislator's decision to move away from nuclear power. Bilateral or multilateral international agreements provided the legal basis for the conduct of the dispute. These submit to international arbitration cases in which foreign investors consider that the actions of a state (legislative, executive or judicial) have led to a violation of property rights. The clauses to submit the activities of sovereign states to private law arbitration are particularly

controversial. Indeed, mere actions of the legislature, such as increasing environmental protection, can be qualified as a form of indirect expropriation.[83] In connection with the move away from nuclear power, the Swedish operator[84] Vattenfall AB brought a case against the Federal Republic of Germany before the International Centre for Settlement of Investment Disputes (ICSID) in Washington.[85] The case alleged that the German state had effectively expropriated this energy company from its property rights in nuclear power plants in Germany.[86] In the context of these cases, the 2016 and 2020 FCC judgments were handed down.[87] Finally, on 9 November 2021, the proceeding before the ICSID was discontinued on a joint request of both parties,[88] who concluded an agreement on 25 March 2021.[89]

The development of constitutional thought in Germany makes it possible to analyse many often new aspects of reality in the matter in question. The public law literature on Article 74(1)(14) of the Basic Law alone, one of the two provisions of the German Constitution relating to nuclear energy, still in 1994 numbered more than 1,100 items.[90] The cited literature summary on the subject does not include later developments: *Atomkonsens I*, *Atomkonsens II* and *Atomausstieg*, which triggered a heated legal dispute in the public law literature.

Public discussion in Germany today focuses on the issue of interim and final storage of spent nuclear fuel. There are currently 17 interim storage sites for spent nuclear fuel in Germany – most of them have been built close to nuclear reactors.[91] There is still no permanent storage site for high-level radioactive waste in Germany. Moreover, the search for a permanent storage site for high-level radioactive waste that will take over the waste accumulated in the interim radioactive waste repositories has been going on for decades.[92]

The end on 15 April 2023 of the commercial use of nuclear energy in Germany for power generation does not at all mean the end of the constitutional-legal discussions related to the operation of nuclear plants. In addition to the aforementioned court and arbitration proceedings concerning certain nuclear facilities, the last three nuclear reactors have just been put away.[93] That means that dozens of large-scale nuclear reactors that remain are either undergoing decontamination or are yet to be decontaminated. Equally, the issue of radioactive waste will remain topical for many generations to come. Moreover, the discussion on nuclear power will continue through the vital issue of the transboundary impacts of foreign nuclear installations. Indeed, large-scale nuclear reactors in neighbouring countries will continue operating even after Germany fully abandons their nuclear power.[94]

Notes

1 V. Smil, *Energy*, London 2013, p. 7.
2 Ibid.
3 Ibid.
4 E. Bohne, M. Speyer, *Staat und Konfliktbewältigung bei Zukunftstechnologien*, "Neue Zeitschrift für Verwaltungsrecht" 1999, p. 3.
5 V. Smil, *Energy...*, p. 7.

6 E. Bohne, M. Speyer, *Staat und Konfliktbewältigung...*, p. 3.
7 Ibid.
8 See R. Rybski, *German radioactive waste. Changes in policy and law*, Oxford 2022, p. 3 et seq.; R. Fox, *Natural uranium and enrichment: the politics of supply and access* [in:] K. Kaiser (ed.), *Reconciling energy needs and non-proliferation. Perspectives on nuclear technology and international politics*, Bonn 1980, p. 106.
9 E. Bohne, M. Speyer, *Staat und Konfliktbewältigung...*, p. 3.
10 Explicitly in R. Fox, *Natural uranium and enrichment...*, p. 106.
11 For a historical overview – cf. A. Kirchhof, H. Trischler, *The history behind West Germany's nuclear phase-out* [in:] A. Kirchof (ed.), *Pathways into and out of Nuclear Power in Western Europe. Austria, Denmark, Federal Republic of Germany, Italy and Sweden*, Munich 2020, pp. 126–157.
12 W. Bischof, *Kommentierung von Art. 74 Absatz 1 Nr 11a,* [in:] R. Dolzer, K. Vogel (eds.), *Bonner Kommentar zum Grundgesetz*, Heidelberg 1994.
13 See N. Evans, Ch. Hope, *Nuclear power. Futures, costs and benefits,* Cambridge 1984.
14 See G. Petrangeli, *Nuclear Safety,* Oxford 2006, pp. 279–284; H. Wagner, *Kein Ausstieg aus der Kernenergie durch Gesetzesauslegung*, "Neue Juristische Wochenschrift" 1987, p. 411 et seq.; K. Lange, *Rechtliche Aspekte eines "Ausstiegs aus der Kernenergie"*, "Neue Juristische Wochenschrift" 1986, p. 2459 et seq.
15 W. Bischof, *Kommentierung von Art. 74* …, p. 67.
16 Ibid.
17 Ibid.
18 Ibid.
19 Ibid.
20 Ibid.
21 Ibid.
22 Ibid.
23 Ibid, pp. 67–68.
24 Ibid, p. 68.
25 Ibid.
26 Ibid.
27 Ibid.
28 Ibid.
29 BVerfGE 143, 246, p. 254.
30 Ibid.
31 Ibid.
32 Ibid.
33 Ibid.
34 The operator is the entity that deals with the day-to-day management of the nuclear installation and it is the operator who has the responsibility to ensure the safe operation of the installation. The operator of a nuclear installation will not always be the sole owner of a nuclear installation or nuclear power plant.
35 Orig. "Vereinbarung zwischen der Bundesregierung und den Energiever sorgungsunternehmen vom 14. Juni 2000". The text of the agreement is currently only available at the archived address: <https://web.archive.org/web/20110915165358/http://www.bmwi.de/BMWi/Redaktion/PDF/V/vereinbarung-14-juni-2000,property=pdf,bereich=bmwi,sprache=de,rwb=true.pdf>.
36 BVerfGE 143, 246, p. 255.
37 Ibid.
38 Ibid.
39 FCC uses both terms. See BVerfGE 155, 378.
40 BVerfGE 155, 378, p. 380.
41 BVerfGE 155, 378, p. 380.

42 BVerfGE 155, 378, p. 380.
43 Prepared on the basis of Appendix No. 3 (to §7(1a)) of the Federal Atomic Energy Act in the version in force with the entry into force of the Act of 22 April 2002 on the Orderly Termination of the Use of Nuclear Energy for the Commercial Generation of Electricity (BGBl 2002 I No. 26, pp. 1351–1359).
44 It is worth pointing out that 1 TWh of power is equal to 1,000,000 MWh, or 1,000,000,000 kWh.
45 The term "net" refers to the amount of power generated by a nuclear installation less the amount of power consumed for the installation's own use.
46 The allocated output capacity of the Mülheim-Kärlich nuclear power plant of 107.25 TWh can be transferred to the Emsland, Neckarwestheim 2, Isar 2, Brokdorf and Gundremmingen B and C nuclear power plants.
47 This was also indirectly pointed out by the FCC in its 2016 judgment: BVerfGE 143, 246, p. 254.
48 The latest available announcement is: BASE *Bekanntmachung der erzeugten, übertragenen und verbleibenden Elektrizitätsmengen nach §7 Absatz 1c des Atomgesetzes - Jahresmeldung 2022* of 1 March 2023 (publ. BAnz AT 17.04.2023 B4); the announcement is also available at: <https://www.base.bund.de/SharedDocs/Downloads/BASE/DE/berichte/kt/elektrizitaetsmenge-2022.html;jsessionid=C656E5B82CE99371948F48F1BCEC2B67.internet992>.
49 Ibid.
50 See press release of the Bundesministerium für Wirtschaft und Klimaschutz *Der Strompreis,* <https://www.bmwk.de/Redaktion/DE/Artikel/Energie/strompreise-bestandteile.html>.
51 See press release no. 351 of 6 September 2023. *Statistisches Bundesamt*: https://www.destatis.de/DE/Presse/Pressemitteilungen/2023/09/PD23_351_43312.html
52 BVerfGE 143, 246, p. 256.
53 This occurred with the Act of 22 April 2002 on the Orderly Termination of the Use of Nuclear Energy for the Commercial Generation of Electricity (BGBl 2002 I No 26, pp. 1351–1359); original name: *Gesetz zur geordneten Beendigung der Kernenergienutzung zur gewerblichen Erzeugung von Elektrizität vom 22. April 2002*.
54 See e.g. M. Kloepfer, D. Bruch, *Die Laufzeitverlängerung im Atomrecht zwischen Gesetz und Vertrag*, "Juristen Zeitung" 2011, p. 377.
55 M. Kloepfer, *Rechtsfragen zur geordneten Beendigung gewerblicher Kernenergienutzung in Deutschland – Umkehrbarkeit und Strommengenübertragungen beim Atomausstieg*, "Deutsches Verwaltungsblatt" 2007, p. 1191.
56 This occurred with the 11th Amendment to the Atomic Law of 8 December 2010. (BGBl 2010 I No 62, pp. 1814–1816).
57 See M. Kloepfer, *Verfahrene Atomausstiegsverfahren? - Verfahrensfragen bei der Ausstiegsgesetzgebung im Atomrecht*, "Umwelt und Planungsrecht" 2012, no. 2, p. 41.
58 BVerfGE 155, 378, p. 381.
59 BVerfGE 155, 378, p. 381.
60 Prepared on the basis of Appendix No. 3 (to §7(1a)) of the Atomic Energy Act in the version established by the 11th amendment of 8 December 2010. (BGBl 2010 I No. 62, pp. 1814–1816).
61 The allocated output capacity of the Mülheim-Kärlich nuclear power plant of 107.25 TWh can be transferred to the Emsland, Neckarwestheim 2, Isar 2, Brokdorf and Gundremmingen B and C nuclear power plants.
62 This occurred with the 13th Amendment Act to the Atomic Energy Act of 31 July 2011 (BGBl 2011 I No. 43, pp. 1704–1705).
63 Explicitly in BverfGE 143, 246, p. 254.
64 BVerfGE 155, 378, p. 381.

65 BVerfGE 155, 378, p. 381.
66 Prepared on the basis of §7 (1a) and Appendix No. 3 (to §7 (1a)) of the Atomic Energy Act as amended by the 13th amendment of 31 July 2011 (BGBl 2011 I No. 43, pp. 1704–1705).
67 The allocated output capacity of the Mülheim-Kärlich nuclear power plant of 107.25 TWh can be transferred to the Emsland, Neckarwestheim 2, Isar 2, Brokdorf and Gundremmingen B and C nuclear power plants.
68 See M. Kloepfer, *Verfahrene Atomausstiegsverfahren?...*, p. 41.
69 cf. i.a. W. Durner, *Der Gesetzesvollzugsanspruch des Gesetzgebers gegenüber der Exekutive*, "Juristen Zeitung" 2015, p. 158; T. Schmitt, S. Wohlrab, *Haftung des Bundes in der Auftragsverwaltung am Beispiel des so genannten "Moratoriums" für Kernkraftwerke* "Neue Zeitschrift für Verwaltungsrecht" 2015, p. 932 et seq.; U. Battis, M. Ruttloff, *Vom Moratorium zur Energiewende – und wieder zurück. Zur Bedeutung der Moratoriums-Urteile des VGH Kassel für die Energiewende*, "Neue Zeitschrift für Verwaltungsrecht" 2013 p. 817 et seq.; M. Rebentisch, *"Kernkraftwerks-Moratorium" versus Rechtsstaat. Recht unter Moratorium* "Neue Zeitschrift für Verwaltungsrecht" 2011, p. 533 et seq.; K. Schwarz, *Rechtsstaat und Energiewende*, "Bayerische Verwaltungsblätter" 2013, p. 67.
70 See Bundesministerium für Wirtschaft und Klimaschutz & Bundesministerium für Umwelt, Naturschutz, nukleare und Verbraucherschutz, *Gemeinsame Pressemitteilung vom 19 Oktober 2022: Kabinett beschließt Novelle des Atomgesetzes*, available online at: < https://www.bmwk.de/Redaktion/DE/Pressemitteilungen/2022/10/20221019-kabinett-beschliesst-novelle-des-atomgesetzes.html>.
71 Ibid.
72 Ibid.
73 This was the 19th amendment of 4 December 2022 (BGBl 2022 I, No. 48, p. 2153) to the Atomic Law.
74 F. Werner, *Verwaltungsrecht als konkretisiertes Verfassungsrecht*, "Deutsches Verwaltungsblatt" 1959, p. 527 et seq.
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79 See the applicants' analysis of possible success/opportunity: J. Schlömer, *Zur Verfassungsmäßigkeit des beschleunigten Atomausstiegs*, "Zeitschrift für Neues Energierecht" 2014, p. 363 et seq.
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83 See N. Calamita, *International human rights and the interpretation of international investment treaties: constitutional considerations* [in:] F. Baetens (ed.), *Investment Law within international law. Integrationist Perspectives*, Cambridge 2013, p. 167, especially W. Alschner, E. Tuerk, *The role of international investment agreements in fostering sustainable development* [in:] F. Baetens (ed.), *Investment Law within international law...,* pp. 219–221 and 229–230. See also in the context of conflict with EU law: H. Wehland, *Intra-EU investment agreements and arbitrations: is European Community law an obstacle?*, International and Comparative Law Quarterly 2009, vol. 58(2), pp. 297–299.
84 The energy operator Vattenfall AB is a company owned by the Swedish state. The other operators of nuclear installations in Germany are also companies under private law, but control over them (either through majority ownership, appropriate corporate governance or through a golden share) is exercised by the German Federal Government or the states (*Länder*).
85 It is an international arbitral tribunal at the World Bank.
86 *Vattenfall AB and others v. Federal Republic of Germany*, ICSID Case No. ARB/12/12; more online: <https://icsid.worldbank.org/ICSID/FrontServlet>. See also press coverage:
A.Endres, L. Koschnitzke, *Wie Konzerne Staaten vor sich hertreiben*, 27 March 2014, „ZEIT Online", available online at: <https://www.zeit.de/wirtschaft/2014-03/investitionsschutz-klauseln-beispiele>.
87 Opinions were raised that this duality could have a significant impact on this arbitration proceeding – cf. D. Paez-Salgado, *A Battle on Two Fronts: Vattenfall v. Federal Republic of Germany*, "Kluwer Arbitration Blog" of 18 February 2021, available online at: <https://arbitrationblog.kluwerarbitration.com/2021/02/18/a-battle-on-two-fronts-vattenfall-v-federal-republic-of-germany/>.
88 See International Centre for Settlement of Investment Disputes, *Order of the Tribunal Taking Note of the Discontinuance of the proceeding Vattenfall AB and others v. Federal Republic of Germany*, 9 November 2021, ICSID Case No. ARB/12/12, available online at: <http://icsidfiles.worldbank.org/icsid/ICSIDBLOBS/OnlineAwards/C2220/DS16921_En.pdf>.
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92 See R. Rybski, *German Radioactive Waste...*, pp. 80–116.
93 These are the nuclear power plants *Isar* (operator: E.ON), *Brokdorf* (E.ON), *Phillippsburg* (EnBW), *Grohnde* (E.ON), *Emsland* (RWE), *Neckarwestheim* (EnBW), *Grafenrheinfeld* (E.ON), *Gundremmingen C* (*RWE*), *Gundremmingen* (RWE).
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2 Energy security as a constitutionally protected value

As a branch of the economy, the energy sector's task is to produce and supply energy to its users. Nowadays, the users of the services provided by the energy sector are all people and all economic entities, and the functioning of the state is also based on them. The specific character of this sector of the economy stems from the trust that energy will be supplied uninterruptedly and in the amount that users need. The continuous realisation of this trust by the energy sector from the perspective of end users is referred to as ensuring energy security. The phrase 'ensuring energy security" encompasses elements of physical energy generation and supply and the reliability of energy supply.

Ensuring energy security is the focus of public law doctrine, constitutional court jurisprudence and public opinion in the Federal Republic of Germany. Its energy policy sets Germany apart from other countries.[1] Furthermore, the legal discourse on energy security is special in Germany as it draws extensively on the jurisprudence of the Federal Constitutional Court (FCC) in Karlsruhe.

Within the subject of energy security from a constitutional perspective, several key threads can be distinguished: 1) the provision of energy security in the jurisprudence of the Federal Constitutional Court in Karlsruhe; 2) the impact of the lack of energy supply on the ability of the modern constitutional state to fulfil basic public tasks; 3) the provision of energy security as a public task entrusted to private actors; 4) the constitutional framework for the provision of state aid to the energy sector; 5) the constitutional admissibility of expropriations on the grounds of public interest in the form of the provision of security of energy supply from the perspective of the protection of life and health of the population and the protection of the environment; 6) the statutory termination of commercial nuclear reactors and the constitutionally admissible forms of expropriation; 7) sources of law and structure of state bodies responsible for the safety of nuclear installations. The frequency of occurrence of these issues in German literature and in the practice of the legal system differs, but – undoubtedly – each of these issues is not only interesting but also extremely relevant for the functioning of the state and society.

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2.1 Ensuring energy security in the jurisprudence of the Federal Constitutional Court in Karlsruhe

The primary way to analyse the concept of "ensuring energy security" will be to look at it in the context of the constitutional value of energy security.[2] Due to the very systematics of the German Basic Law (*Grundgesetz*), the relevance of this principle will be derived from the so-called principle of unity of the Constitution (*Einheit der Verfassung*). According to the jurisprudence of the Federal Constitutional Court in Karlsruhe (from now on referred to as the FCC), every provision of the *Grundgesetz* must be interpreted and reconstructed in such a way that it is compatible with all constitutional values and directional decisions taken by the legislature.[3] In particular, this compatibility must include the constitutional fundamental rights and the system of values expressed in the Basic Law.[4] In the Court's view, the main method of interpreting the Basic Law is to be the unity of the Constitution[5] achieved by means of both logical and purposive (teleological) interpretation.[6] The justification for this approach is contained in the essence of the Constitution.[7] The construction of the Constitution is based precisely on the fact that it is possible to work out a coherent system enabling the functioning of the state community both in the political and social spheres.[8]

This legal status of constitutional values means that understanding energy security as a recognised constitutional value has the effect that the content of energy security will be equally co-determined by constitutional legal norms. It will also have the opposite effect: energy security will influence other constitutional legal norms. For example, when interpreting fundamental rights (e.g. the impact of nuclear power on them), it will be advisable to consider the constitutional value of energy security, too.

Initially, it is important to point out the important terminological differences regarding energy security in Germany compared to other countries. In most of its decisions, the Federal Constitutional Court in Karlsruhe refers to the problem of security of energy supply (*Sicherheit der Energieversorgung*).[9] Meanwhile, for instance, the Polish administrative law literature (following the Energy Law of 10 April 1997[10]) distinguishes between the security of energy supply and the state's energy security.[11] However, the FCC's understanding of the concept of energy security is broader: it includes both the security of energy supply and energy security of the state as well as elements of an individual's legal status (primarily energy security as an essential element of ensuring a dignified life), as well as certain aspects of social policy. For the sake of simplicity, in this book, the terms "security of energy supply" and "energy security" will be treated interchangeably, and they will refer to the FCC's broad understanding of the issue.

Security of energy supply is understood as the continuous availability of adequate energy.[12] This availability determines the viability of the economy in general.[13] In the 1980s, the FCC went even further, stating that energy supply security is necessary to ensure basic living conditions.[14] At the same

time, this type of benefit is indispensable for ensuring the living conditions necessary for a dignified existence.[15]

The Federal Constitutional Court regards the security of energy supply primarily as a social interest (*Gemeinschaftsinteresse*) of the highest order,[16] which confirms the importance of the significance of energy security. The Court already put forward this point in its 1968 judgment.[17] The accuracy of this position is confirmed by a study of a technical nature for the German Bundestag, which unequivocally shows that the result of a long-term lack of power supply is the fall of the state.[18]

Since its establishment, the Federal Constitutional Court has emphasised that the energy sector is subject to state regulation. The Court considered interference by the legislature in the freedom to practise a profession, which is constitutionally protected under Article 12 of the *Grundgesetz*, to be justified if the interference serves a social interest in energy security.[19] The justification for such interference by the legislature would be a situation in which the inaction of the legislature would seriously threaten (the social interest of) energy security.[20] It follows that it is incumbent on the legislature to take remedial measures.[21]

Such remedies were also introduced and in force at the time of the Court's judgment in the 1968 case.[22] When the FCC decided this case 56 years ago, the memory of the ration card system in the post-war period in the American, British and French occupation zones was still fresh. This type of card economy primarily rationed access to food. Perhaps for this reason, the FCC has equated the security of ensuring energy supply with ensuring that the population is fed.[23] The significance of this comparison is universal. It applies both to the 1950s and 1960s as well as to the present day. Allocating the same level to securing energy supply and feeding the population is all the more valid as it concerns commodities with a relatively short shelf life. This is particularly evident in the case of power, which can (and has to) be consumed at the very moment it is produced. At the same time, these are basic necessities and the ability to produce them is limited by the physical conditions of the machinery and natural forces. Therefore, it may sometimes be necessary to ration them so that they are distributed according to needs.[24] A manifestation of the FCC's allowing the legislature to be significantly involved in regulating the energy sector is the juxtaposition of the security of the provision of energy supplies against the possibility of applying the same measures that were previously applied to the provision of food for the population.[25] Subsequently, similar observations have emerged in the literature, indicating that concerns about future energy supply are not exaggerated.[26] Indeed, international energy markets are similar to food markets in that demand can be met by offering a higher price and reducing supply.[27] In the case of food products, a reduction in supply involves collective malnutrition, famine and, as a result, death by starvation.[28] In the case of energy, a sudden reduction in supply leads to similar processes, resulting in economic collapse.[29]

The juxtaposition made by the FCC and the conclusion about the equal importance of energy and food supply must be assessed as accurate. The

Court has succeeded in capturing these raw materials' indispensability and vividly illustrating this. Only such a juxtaposition makes it possible to understand the high rank of energy security in the hierarchy of constitutional values.

From a state policy perspective, energy security is also a premise that determines today's prosperity, social security and political stability.[30] For this reason, the security of energy supply is an "absolute" common good in a community, independent of current policy.[31] By the concept of "absolute" common goods, the FCC understands such goods that are universally recognised and represent common values, irrespective of current politics in a given society.[32] In this way, the Court has demonstrated the universal character of the issue of energy security and has put the issue into an appropriate constitutional framework.

At the same time, in an important ruling on the Kalkar nuclear power plant,[33] the FCC commented on a new type of nuclear reactor that had caused controversy. The Court stated that, even if the provision of a sufficient energy supply is a common good ranking high in the hierarchy of constitutional values, there is no justification in the value order of the *Grundgesetz* for permitting such technical systems that would jeopardise the basic decision of the Basic Law to place human life as the highest legally protected good.[34] This clear position resulted from the industrial use of a new prototype reactor model (FBR – Fast Breeder Reactor) at the Niederrhein power plant (near Kalkar). The Court first drew attention to the extreme probability of a reactor explosion due to the plutonium used in it.[35] In the event of an improbable accident and the release of radioactive material, the situation would become a national catastrophe.[36] In its explanatory memorandum, the FCC explicitly pointed out that, solely as a result of inhaling plutonium particles, 40,000 cases of lung cancer, more than 10,000 cases of bone cancer, and more than 1,000 irreversible genetic changes would be expected.[37] Equally significant areas of the country would be contaminated and unusable.[38] The Court pointed out that the scale of the possible threat obliges the legislature to take the necessary safeguards and to set limits to the acceptable risk.[39] The FCC then ruled unequivocally that the legislature had not fulfilled that obligation.[40]

A slightly different understanding of energy security appears in the literature. Ensuring energy security is also explicitly referred to as a constitutional imperative.[41] The public authorities are the natural addressees. The jurisprudence of the constitutional court confirms this. The FCC clearly points out the obligation to act and make political decisions, which is incumbent on both the legislature and the government.[42]

In the Court's view, ensuring sufficient energy supply is a concrete and legitimate task for state economic policy.[43] This also applies to the market economy model.[44] According to the Court, the state's economic policy should be based on the state's responsibility for the undisturbed course of economic transactions.[45] Such clear wording shows that the Court has identified the state (and not, for example, the energy producers) as the entity primarily

responsible for energy provision. Let us assume that there is a country with a market economy system in which energy is not regulated. In such a country, ensuring an uninterrupted energy supply would lie only with the service providers, i.e. the energy producers.[46] In the jurisprudence of the German constitutional court, however, we are confronted with the FCC's explicit transfer of the burden of responsibility to the state. In the Court's view, the state's task does not come down to replacing private actors in energy supply. According to the FCC, the state's task is to act as a regulator in such a way that it can ensure (guarantee) energy supply. It is pointed out in the legal doctrine that this role of the state derives from the constitutional principle of the social state.[47] However, it is also allowed that the state itself can organise energy production and, more broadly, energy supply.[48] It is estimated that nowadays, the state has created a complex system of regulations for the energy sector corresponding to the rule of law, but the state itself has withdrawn from providing these services to the public.[49] The state only intervenes when there is a risk that these services will not be (or are not) properly provided by private actors.[50] The modern state has thus assumed the function of guarantor of certain standards (*Gewährleistungsstaat*).[51] In turn, the level of this minimum standard determines the assurance of an uninterrupted energy supply.

In the opinion of the FCC, the state's economic policy should also include planning and implementing measures which, in the case of individual energy carriers, consider ongoing technological developments and changes in the globalised world economy.[52] This point was formulated by the FCC in 1971. It is still relevant today due to the successive phases of the energy transition in Germany. This point of the FCC remains up-to-date also due to the EU's climate policy, which has focused primarily on the energy sector from the outset. This is because power generation is the sector that is responsible for the greatest emissions of greenhouse gases and other harmful substances into the environment. In turn, the state regulates the functioning of the energy sector to such an extent that it facilitates the implementation of climate policy objectives by influencing this sector of the economy. According to the FCC's point, the state's economic policy in relation to energy should be constantly updated and follow technological progress, which confirms the reactive nature of state policy. The Court did not indicate the possibility of stimulating technological progress in the energy sector through state economic policy. The FCC's point also implies an obligation to constantly update state economic policy so that new technologies and changes resulting from globalisation do not surprise the planning and subsequent implementation of state economic policy. Concerning nuclear technology, this means, for instance, that with the start of the commercial use of nuclear fusion, the economic policy of the German state should keep pace with technological developments in the field of nuclear energy. Regarding the global changes referred to in the FCC reasoning, it is possible to mention a clear example of the impact of such changes that economic policy should consider. This would be a situation where uranium, gas, oil or other energy resources are stopped (or significantly reduced). Indeed, such a

disruption in the supply of raw energy materials resulting from global trends can significantly undermine the security of the energy supply.

The importance of energy security justifies far-reaching interventions by public authorities.[53] For instance, in 1971, the FCC allowed for interference in the German oil market, weakening the competitiveness of mineral oil importers.[54] The Court stated that ensuring an orderly and long-term energy supply is a vital social interest.[55] Although the challenged regulation concerned only commercial entities importing mineral oils, the legislature's intervention was not excessive due to this very nature of the social interest.[56]

In assessing the material content of the security of energy supply, the FCC pointed out that energy security is subject to considerable weakening if it were necessary to import energy carriers.[57] There are numerous observations of a constitutional, geopolitical or economic nature behind this succinct communication by the Court. A country's energy security is weakened (or threatened) when it permanently depends on imports of strategic energy resources. The weakening of energy security consists, among other things, of the risk of security of supply associated with the transport of strategic raw materials over long distances; economic and political dependence on the supplier; significant transfer of financial resources abroad, significantly worsening the balance in, for example, the current account of the national economy; strategic raw materials intended for the country in question remaining in the hands of foreign public authorities; and the exchange rate risk of the currencies in which payments are made. Thus, when it criticised (in 1971) the need to import strategic raw materials, the FCC adopted as a model solution a system in which the total demand for energy (power/electric energy, heat and energy used in transport) is met by domestic resources. Germany's energy policy is thus based on the aim of total energy autarky (self-sufficiency) in power generation.[58] However, this assumption is not fully realised today, as all of the coal and uranium and most of the natural gas, i.e. the fuels used in Germany for power generation for decades, were imported. Germany's dependence on imports of energy carriers for energy production for subsequent use in transport and heat generation is even worse.

Naturally, the security of energy supply also concerns private energy producers and public authorities. The security of energy supply serves the general public's interest[59] – therefore, the circle of addressees on whom the FCC imposes additional obligations is so broad that it also includes private businesses. However, public ownership or co-ownership in respect of such entities will result in the impossibility of raising a violation of fundamental rights by these entities.[60] This, in turn, is an important factor, as the owners (controlling or co-owning entity) of many energy generation or supply companies are public authorities at various levels.

However, the most significant finding of the FCC in the area of energy security concerned the financial side. The Court observed that the interest in energy supply is as widespread as if it were the "daily bread."[61] Since the provision of energy supply serves the general interest, as a public task, it can

be financed through public tribute.[62] This indicates that the provision of energy supply is a public task and, at the same time, forms a constitutional basis for providing public aid. This implies that the state aid can be used for energy supply tasks.

The positive constitutional obligations of the state to guarantee this (common) legal good arise from the constitutional value of energy security. Energy policy decisions concerning the guarantee of a secure energy mix[63] do not have the character of the decisions that would have to take statutory form.[64] Without an absolute requirement for the statutory form, the FCC allows for the possibility that the current parliamentary majority will not shape energy policy. This may be the task of (smaller) governmental or parliamentary bodies whose remit includes energy policy.[65] However, such a position of the Court cannot be considered accurate. This is because it implies reduced transparency in formulating state energy policy. The addressees of energy policy in Germany have long since ceased to be just energy companies. The legislative bodies should make fundamental decisions on energy policy at the federal and state levels, while the government bodies (at federal and state levels) should implement them.

The division of competences between the (central) federal authority and the authorities of the individual states (*Länder*) is also interesting. The Federal Constitutional Court has indicated that it is the exclusive competence of the Federation and the states (*Länder*) to decide in the field of energy policy concerning which energy sources and in what proportion of the available energy sources they wish to ensure a reliable energy supply.[66] This means that, in this matter, the Court saw no space to assess the content of Germany's energy policy. Energy policy decisions, in the opinion of the FCC, depend on several factors, such as the security of supply when using a particular energy source; the costs for the economy and users; the impact of the energy source on climate protection and environmental protection; the impact on the labour market and the obligation to comply with EU and international obligations.[67] The Federation and the states (*Länder*) enjoy considerable discretion when assessing individual factors.[68] The Court emphasised that the strength of the impact of the individual factors also depends on the political decisions.[69] The FCC's mentioning of such a large set of assessment criteria is to be appreciated.

State energy policies are subject to review by the FCC only to a limited extent.[70] Fundamental decisions related to energy policies are subject to the Court's review only as to whether they are manifestly incompatible with constitutional values (expressed particularly in fundamental rights) or with the supreme principles of the state, in particular, the principle of environmental protection expressed in Article 20a of the Basic Law[71]:

> The state, with a sense of responsibility towards future generations, protects, within the framework of the constitutional order, the natural conditions of life and animals by legislation and, in accordance with the statutes and the law, by the executive and the judiciary.

However, such a control criterion formulated by the FCC cannot be practically applied, as it was constructed based on the facts of the Garzweiler mine. The case concerned an opencast lignite mine, the most intrusive and emission-intensive form of energy production. Since even in the case of a method of energy production which is so arduous for man and the environment (such as that from low-calorific lignite), the FCC saw no need to apply the criterion it formulated at the time; it is not easy to imagine when this test would nevertheless be applied in the field of energy policies. It may be noted here that in a judgment that is almost a decade younger (it was about climate policy), the FCC pointed out that the constitutional obligations to reduce greenhouse gas emissions (up to the point of climate neutrality) arising from the cited Article 20a of the *Grundgesetz* cannot be shaped in such a way that the burden of reduction is unilaterally imposed only on future generations.[72] Consequently, if one were to link energy policy decisions (to which the FCC referred in the Garzweiler case[73]) as climate policy decisions (and these are in any case highly relevant for climate policy), the element of the Garzweiler judgment test would be fulfilled (i.e. whether they are demonstrably incompatible with constitutional values[74]). Therefore, using the quoted points from the 2021 judgment,[75] it can be concluded that precisely allowing the continued use of lignite for power generation is demonstrably contrary to Article 20a of the Basic Law (*Grundgesetz*).

It is equally important to precisely define the discretion enjoyed by public authorities in that part of national energy policy, which serves more to ensure energy security. The assessment of serious risks to the people and the environment obliges constitutional values such as those set out in the provisions of Article 14(1) of the *Grundgesetz* ("The right to property and inheritance shall be guaranteed. Their content and limits shall be determined by laws") and Article 20a of the *Grundgesetz* ("The state, with a sense of responsibility towards future generations, shall protect, within the framework of the constitutional order, the natural conditions of life and animals by legislation and, in accordance with statutes and law, by the executive and the judiciary") fall within the political competence and discretion of the executive and the legislature.[76] The FCC has made it very clear that, with such a limited scope of review by the constitutional court, it is impossible to challenge decisions in the field of energy policy. Namely, these are the decisions that have been made by the competent state authorities and which serve to ensure energy supply.[77]

It is already in the course of the analysis of the constitutional value of energy security that the problem of assessing the constitutionality of a departure from nuclear energy in the power sector (Nuclear Phase-Out) arises. The departure from nuclear energy could only be assessed as constitutionally admissible (when assessing precisely the security of supply factor) if sufficient certainty of continued security of supply was guaranteed.[78] Failure to ensure the security of supply would, in turn, have to be qualified as an unquestionably unconstitutional solution. It is worth noting

here that the examination of the constitutional character of *Atomausstieg I* led Udo di Fabio to conclude that a move away from nuclear energy could only be considered constitutionally acceptable if it was linked to a real breakthrough in energy policy.[79]

Another important aspect of the constitutional approach when analysing the security of energy supply as a constitutional value is the requirement of general economic balance, which is contained in Article 109(2) of the *Grundgesetz* (as it stood prior to 2009[80]): "The Federation and the states (*Länder*) shall, in the execution of the budget, take into account the requirements of overall economic balance." By the term "budgetary requirement" as used here (it applies to both the Federation and the states/*Länder*), the FCC traditionally understands price stability, a high level of employment, and general economic equilibrium under conditions of steady and adequate economic growth.[81] The FCC also understands the concept of "general economic equilibrium" as an undefined constitutional concept to which the new findings of economic science have yet to be applied.[82] On the other hand, the literature emphasises that constitutional goods such as the constitutional imperative of safeguarding welfare or economic growth,[83] also come into play. These are constitutional goods from which the obligation to ensure a high level of employment and sustainable economic development arises.[84] Such an obligation, which is a positive obligation of the state, derives both from the principle of the welfare state expressed in Article 20(1) of the *Grundgesetz* ("The Federal Republic of Germany is a democratic and social federal state") and in Article 28(1) sentence 1 of the *Grundgesetz* ("The constitutional order of the states [*Länder* – R.R.] must correspond to the principles of a republican, democratic and social legal state within the meaning of this Basic Law") as well as from the requirement to ensure an economy-wide equilibrium that has been analysed.[85] Naturally, whether ensuring the security of energy supply only enables economic growth or even guarantees it should be left open, as this is indeed material for an in-depth macroeconomic analysis. Undoubtedly, if we made a simplification, it can be assumed that ensuring the security of energy supply should be understood, in general, as a basis enabling sustained and adequate economic growth. In turn, achieving an adequate level of economic growth would also make it possible to achieve the objective set, i.e. a high level of employment. This broader view of energy generation by the FCC is interesting as it shows how energy generation contributes to economic development. Ensuring energy security is an important element of a country's economic policy – it is such because it strengthens its economic activity. This, in turn, demonstrates the importance of the state's activity as a regulator of the energy sector.

Those arguments from the legal doctrine were originally formulated in a strictly defined context. The obligation of the state to ensure a high level of employment and sustainable economic development was understood by Alexander Roßnagel in the following way: that the desired results and objectives in this regard could supposedly only be achieved through the

development of a specific industry, i.e. nuclear power sector.[86] However, it is impossible to endorse how this point is formulated solely on one energy generation technology. First of all, there is no adequate legal justification for such a point of view. Moreover, the choice of a specific (it should be added: one) measure, i.e. nuclear energy, for the realisation of these constitutional goods remains in contradiction with the concept of the *Grundgesetz* as a normative act with the highest legal force, and thus standing at the top of the hierarchy of normative acts. The level of abstraction of constitutional regulations is so high that an intangible and *a priori* concretisation of constitutional regulation through one particular technology or related action must be excluded. Based on similar reasoning, the possibility of formulating a special fundamental right to live in a clean environment is ruled out, as the level of abstraction of constitutional law makes it impossible to set a target and benchmark level of environmental quality.[87] In reviewing the constitutionality of the legislature's actions, it will be possible to assess how constitutional goods are realised much better by applying the weighting of constitutional goods. The level of binding of the principles-structures of the state (the principle of the social state) goes as far as the guidelines envisage, but this does not include measures and actions to achieve and concretise constitutional goods.[88] All the more so, certain technologies, such as, for instance, the use of nuclear energy for power generation, cannot be considered as means to achieve specific constitutional goods.

Similarly, at a meeting of the (Bundestag) Committee on European Union Affairs on 21 March 2012 on Germany's possible withdrawal from the Euratom Treaty, one of the appointed experts demonstrated that nowadays, "special powers for a single energy source" cannot be justified any longer.[89] This approach also corresponds to the Euratom legal system's contemporary treatment of nuclear energy. A critical position on the subject has also been expressed in the German literature. Indeed, adopting such an interpretation would lead to the creation of such a legal situation for the nuclear power plant operator itself, which in doing so generates risks for the health and life of citizens and the environment (or is directly responsible for possible emissions) that it would not only be entitled to certain fundamental rights but would also pursue social interests, thus indirectly strengthening its legal position.[90]

The Federal Constitutional Court (FCC) also had the opportunity to rule on the general constitutional admissibility of the use of nuclear energy for the generation of power. This understanding of the issue led the FCC in the *Müllheim-Kärlich* case to conclude that "the fundamental decision – for or against the peaceful use of nuclear energy" should not be taken by the FCC, but by the legislature.[91] Here, the Court upheld the argument in the *Kalkar I* judgment.[92] In a situation of uncertainty, the political responsibility for making the right decision lies with the (federal) legislature and the (federal) government within their respective competences.[93] This position was upheld in a December 2016 FCC judgment.[94] In the *Kalkar I* judgment, the Court

reasoned that such a decision, due to its far-reaching impact on citizens, in particular on the extent of their freedom and equality, on general life relations, and due to the necessity of the related type and intensity of regulation, constitutes a fundamental decision within the meaning of the matter reserved by law.[95] This implies the formulation of such a requirement, which implies the necessity that the strategic decision on nuclear energy is taken in the form of a statutory regulation.[96]

It is worth tracing how the FCC arrived at such an unequivocal point in the *Müllheim-Kärlich* case (on the need for directional decisions in the form of statutory regulation). The Court pointed out that the positions of some participants in the proceedings included a demand to carry out a constitutional review of the admissibility of the use of nuclear energy for the generation of power.[97] They suggested that it should be verified whether the commercial use of nuclear reaction for the generation of power is constitutionally admissible at all due to the range of foreseeable risks, among them also serious ones, which have not been sufficiently resolved so far[98] (the problem of radioactive waste management is the best example of this[99]). The argumentation presented here involved the participants' use of reasoning as to whether there is a constitutionally admissible technique at all that does not allow for any errors. The argumentation analysed here was based on the indication that otherwise (i.e. if the commercial use of a nuclear reaction for power generation were allowed), there would be an extraordinary risk for future generations.[100]

Another aspect considered was the resistance of those potentially affected by the decision to erect a nuclear power plant.[101] The participants in the proceedings sought to persuade the FCC to introduce a test analysis that the erection and operation of a nuclear power plant should only be allowed if the analysis carried out showed that all other means of ensuring energy supply (other than the construction of a nuclear power plant) had been exhausted.[102] In addressing this issue, the Court has made it clear that in proceedings concerning the review of the constitutionality of norms, the FCC does not need to resolve all doubts raised by the participants in the proceedings.[103] The Court also noted in the *Müllheim-Kärlich* case that there were no explicit references (at the time) to jurisprudence or literature raising the fundamental unconstitutionality of the commercial use of nuclear power.[104] Instead, the judgment cites the publication[105] by A. Roßnagel, *Grundrechte und Kernkraftwerke*, published in 1979 in Heidelberg. It is worth mentioning here that A. Roßnagel was later one of the authors of a legal opinion demonstrating the constitutional admissibility of such a statutory solution based on which *Atomausstieg I* was carried out and, more recently, the author of an opinion on the possibility of amending the *Grundgesetz* by introducing into the text of the Basic Law a guarantee of the unalterability of the *Atomausstieg* decision.[106]

The constitutional admissibility of nuclear energy does not naturally exclude a review of the constitutionality of the statutory legal framework

governing the use of nuclear energy for power generation. The competence basis of Article 73(1)(14) is not on a *carte blanche* basis – it is subject to a constitutional follow-up evaluation.[107] The control of the constitutionality of norms is, however, limited by the impossibility of controlling the admissibility of nuclear power.[108] Indeed, the control is limited only to whether nuclear energy regulations are constitutionally admissible and whether they are applied consistently with the Constitution.[109] In contrast, the determination made by the legislature is not unalterable. In the Kalkar I judgment, the Court explicitly pointed out that if a determination was made by the legislature (in a law), it was based on specific factual circumstances at a specific time.[110] If, on the other hand, new circumstances arise which were not known at the time the determination was made (by the legislature), then the legislature may constitutionally be obliged to review whether the original determination expressed in the law is justified (and tenable) also in the new, changed circumstances.[111]

At the same time, the FCC in both the *Kalkar I* and the December 2016 judgment gave the Atomic Law a special position. This is because it was right there in the Act that the legislature's strategic (directional) decision on the intention to use nuclear energy to generate power was expressed.[112] The special position of this act provides an adequate justification for deviating from constitutional principles that are recognised under other areas of law.[113] The examples cited by the FCC as to the admissible derogations go back as far as those in the *Kalkar I* judgment, i.e. the lack of individual ownership of nuclear fuel, which Euratom owns, and the introduction of a ban on activities relating to the generation of power from nuclear energy. This prohibition can only be lifted upon receipt of the relevant licence to carry out such activities.[114]

On the other hand, the normative novelty was the FCC's explicit identification of a very high degree of regulatory freedom for the legislature in shaping the strategic determination about whether to use nuclear power and how to use it.[115] There may be some doubts about whether such a far-reaching statement does not constitute an attempt to limit the scope of the review of the constitutionality of the Atomic Law and its subsequent amendments and, consequently, whether it does not constitute an attempt to limit the flow of applications to the Court in such cases. Admittedly, the FCC has, at the same time, pointed out that such a high degree of regulatory freedom of the legislature does not entail the possibility of completely dispensing with the compensatory or indemnification solutions necessary in such situations.[116] In particular, it is a question of not violating the principle of trust deriving from the rule of law, which is the counterpart of the principle of protection of acquired rights. In its 2016 judgment,[117] the Court, in assessing the law implementing *Atomausstieg II*, ruled that it was unconstitutional concerning solutions that lacked adequate compensatory and indemnification measures implementing the principle of trust. The Court, in stating that the legislature had a wide margin of discretion in formulating the rules for the use of nuclear power, made it clear to the legislature that the political responsibility for decisions taken in the area of nuclear power rests with the legislature – to prevent

potentially frequent attempts by participants in the nuclear power dispute to get the FCC actually to act as a legislature in this area. If one considers the number of judgments of the Court on various aspects of nuclear energy and the circumstance of the considerable saturation of the nuclear energy matter itself with constitutional matters, one can accept the restraint as proposed by the FCC. The participants in the public debate are already so proficient in constitutional substance that there is no need for the Court to expand the area of possible intervention in this respect.

Undoubtedly, according to the FCC's view, energy security is a constitutional value. Qualifying energy security as a constitutional value makes energy security suitable (when necessary) to restrict fundamental rights or affect their normative content.[118] However, is it possible to draw a simple conclusion about the possibility of equating nuclear power with the provision of energy security? In order to answer this question, let us start by contrasting the statistical data with the attempt to equate energy security with a single energy generation technology, i.e. nuclear power. If, in the 1980s, nuclear energy met about a quarter of power demand, the importance of nuclear energy for the functioning of the state and society was great. Such a high share also made it possible to (cautiously) formulate arguments equating nuclear power with ensuring energy security. This is even more evident in the situation in which *Atomausstieg I* was enacted – it was the time of the historical peak of nuclear power's share of gross power generation (34.7% in 2000[119]). In 2011, i.e. when *Atomausstieg II* was adopted, the nuclear power share was 22.7%.[120] In the following years, the share developed in such a way that in 2019 nuclear-generated power accounted for 12.3% (75.1 TWh) of the gross power generated[121]; in 2021 it was 11.8% (69.1 TWh)[122]; in 2022 it was only 6.0% (34.7 TWh)[123]; and 4.3% in Q1 2023 (5.8 TWh)[124] – i.e. just before the last three nuclear reactors were shut down, and 2.9% in H1 2023 (6.7 TWh).[125] Because of this, it is clear how the technology of generating power from nuclear energy – when it provided (to a significant extent) the energy security of the country at the time of the *Atomausstieg I* and *Atomausstieg II* decisions – was deprived of this status (i.e. the equating of nuclear power with energy security) by a decision of the legislature. When constitutional goods are considered, the assessment of energy security should consider a diversified energy mix, i.e. one consisting of different types of generation sources. This does not take away the possibility of nuclear energy being the kind of investment that will allow constitutional rights and freedoms to be restricted under the proportionality test – but rather, the point is to draw attention to the fact that there should be no simple equation of energy security with nuclear energy.

Regarding the constitutional assurance of the security of energy supply, nuclear power should rather be treated as an important source of meeting energy needs. On the contrary, it is possible to reconstruct a constitutional imperative that the state should ensure (with a high degree of certainty) everything that it can ensure with nuclear power.

The question of whether ensuring the security of energy supply exclusively enables economic growth or even guarantees and ensures it, must, as already mentioned, be left open, as it is a matter for analysis of a macroeconomic nature. Rather, it is a matter of establishing connections between different, constitutionally relevant objectives and legal goods. Therefore, ensuring the security of energy supply should be understood as the basis for enabling sustained and sufficiently high economic growth and achieving a high level of employment.

2.2 The impact of a lack of energy supply on the ability of the modern constitutional state to fulfil its core public tasks

Public authorities are responsible for ensuring the security of supply (as one of dimensions of ensuring security). The element of trust on which the security of energy supply is based is particularly evident in a situation of its shortages. The problem of ensuring energy security can be viewed from a broader perspective, i.e. through the impact of a lack of energy supply on so-called high-risk infrastructure (commonly referred to as critical infrastructure).[126] This infrastructure determines whether a modern state and society can function at all. In German literature, the high-risk infrastructures on which modern society relies include the supply of basic goods, energy, transport and traffic, the management of hazardous substances, state institutions and administration, information and telecommunications technology, as well as maintaining the continuity of the financial, payment and insurance systems.[127]

The ability to ensure the uninterrupted operation of high-risk infrastructure (also in the event of a long-term energy supply shortage) reflects the question whether a modern society could function without energy, and it also reflects directly on the issue of the functioning and viability of statehood (also in the event of a long-term energy supply shortage). The fact that state institutions and the whole administration serving them are one element of the high-risk infrastructure is very much reflected in the fact that it is the state's public task to preserve and maintain the operation of the entire high-risk infrastructure. From this perspective, it is of the utmost importance that each of these sectors operate efficiently and have secured their business continuity – as the ability of society and the state to function depends on this. The findings of German non-legal science literature on the technical consequences of energy supply shortages, cited in the following paragraphs, play a crucial role in understanding the nature and importance of energy supply security. The understanding and meaning of both concepts used by the constitutional system should open up to the knowledge contained in engineering science.

The starting point for the technical analysis carried out for the German Bundestag was the belief that the quality of high-risk infrastructure determines the competitive character of a country's economy and its quality as an investment location in the age of the global economy.[128] This is a valid

assumption. At the same time, it should be noted that such infrastructure also consists of a set of factors that determine the continuity of the state itself in general and the fact that the state in question will not take the shape of a failed state. The most conspicuous example of one aspect of a failed state is the inability to ensure public order and internal security.[129] For these reasons, the effects of the lack of energy supply on the functioning of the state are of interest to (German) constitutional law.

The great vulnerability of the modern state to disruptions associated with a lack of power supply is very aptly illustrated by the fact that the result of the blockage of communication channels will be followed by the decline in the mobility of society, energy generation, production or the decline in consumption to archaic levels.[130] This means a relapse in many spheres of life – even to primitive times and pre-modern times. The sole reason for such a rapid regression is the impossibility of using any modern methods of communication.[131]

The rapid relapse of civilisation will have plenty of important consequences. Firstly, it will involve a significant reduction in the level of protection of individuals' constitutional rights and freedoms. The most obvious example will be the inability to protect citizens' health and life at the current level. Equally, the ability to ensure internal order (which is directly linked to the ability to ensure the protection of citizens' health and life) will be limited (or outright impossible). Secondly, it will lead to an economy's collapse with the model adopted today, i.e. based on the continuous growth of gross domestic product (GDP), i.e. the sum of products and services produced in the economy.

Consumption will not be driver of GDP growth in the case of a danger caused by a sudden forced change to a pre-modern way of life. In such circumstances, purchases will be limited to just the necessary items to survive the expected "difficult days," and the production of goods and services will virtually disappear. The complete inability to provide transport services, in turn, will derail the functioning of the German economic model based on the export of goods and services.[132] The damage to the economy as a whole is estimated (at prices in the first decade of the 21st century) at between €8 and €16 for every kilowatt hour not delivered.[133] This corresponds to a loss to the German national economy of between €0.6 and €1.3 bn for each hour of total blackout.[134] However, the list of costs associated with the blackout does not end there. Once the energy supply is restored, further costs will have to be incurred to repair the damage and restore all economic and societal processes to their previous (normal) mode.[135] Another consequence of the blackout is the inability of the state to function properly based on modern communication methods. Still another long-term and intangible consequence of the blackout is the loss of public trust towards public authorities and the energy sector.[136] As a result, the lack of power supply will also become a crisis of confidence in the state and the functions it performs today.

Despite this high risk, citizens, businesses and public officials do not regard power cuts as a serious threat.[137] Modern society (and the state itself) is subject to a paradox. Power cuts (short ones) hardly cause any particular

disruption, so all technical systems, as well as social behaviour, are based precisely on this reliability,[138] which is referred to as the "paradox of vulnerability" (*Verletzlichkeitsparadox*).[139] This paradox is based on the fact that the more the supply (in this case, the supply of power) runs smoothly, the more serious the consequences for production, consumption or the operation of businesses in the event of possible disruptions.[140]

When the power supply is disrupted, there comes an avalanche of damage.[141] This involves the occurrence of disruptions in other sectors that also cause damage.[142] This resembles a snowball effect. In addition, the disruption (and the damage that comes with it) increases with each passing minute of the blackout.[143] The lack of energy also causes disaster in other sectors, as the power supply is linked to the ability of other high-risk infrastructure to function.[144] The analyses show that the total lack of power would be extremely severe for the functioning of all sectors of the economy, as well as for the state and social life. In the event of a total lack of power supply over a longer period than one day, it is estimated that the ability of the state to fulfil its basic functions of ensuring public order and internal security, as well as supplying society with basic products,[145] would be significantly impaired. The prolonged lack of power supply would also result in a nationwide catastrophe because the society, the economic sector and the state are not prepared for such a prolonged lack of power supply.[146]

In order to try to assess the potential impact of a power supply disruption over a wider area of the country, a comprehensive technical study was prepared for the German Bundestag.[147] However, it should be emphasised that this study completely (but intentionally) ignored the analysis of possible causes that would lead to such a total lack of energy supply.[148]

The scale of the information ineffectuality resulting from the lack of power supply is illustrated by the example of mobile telecommunications. Mobile signal transmitters would lose backup power after just 15 minutes and, depending on the operator, can only connect (or transmit telecommunications data) for up to 8 hours.[149] After this time (i.e. between 15 minutes and 8 hours after the power supply has disappeared), mobile telecommunications will cease completely in the area affected by the power supply failure. For the entire IT and telecommunications sector, there is total dependence on power, and the backup power supply generally allows these systems to function only for a short time; when it is exhausted, there is complete information and telecommunications paralysis.[150] After losing power, the 112 emergency system can operate for a few minutes to a few hours.[151] The analysis for the Bundestag also shows that within a week, the health sector gets so bad that it is reasonable to assume that medical services and the supply of medicines cease to exist completely.[152]

The analysis clearly shows the inability of water and wastewater infrastructure to function without a power supply.[153] Both the supply of drinking water, its preparation and the associated water treatment need much energy – in other words, they are based on power consumption. Ensuring a continuous

drinking water supply will be one of the most important tasks.[154] According to a 2011 study, there were approximately 5,200 spare wells in Germany to serve in emergencies.[155] However, given the needed water volumes, they are unlikely to provide the entire supply. The study in case of this problem, unlike other problems, does not describe the possible course of events in the event of a water shortage (caused by a lack of energy supply) – presumably because it would be too catastrophic.

Similarly to the provision of water supply, the provision of food supply and its rightful distribution seems to be one of the most important tasks of the public administration during a shortage of power supply.[156] The analysis indicates directly that the life and health of the population and the restoration of public order will depend on the effectiveness of these measures.[157] Hence, ensuring access to food turns out to be an essential function of high-risk infrastructure.[158] The authors of the analysis emphasise that guaranteeing the distribution of food in a crisis derives from the state's obligation to protect citizens, as stipulated in Article 2(2) sentence 1 of the *Grundgesetz*: ("Everyone has the right to life and physical integrity").[159]

In the event of the lack of power supply, road transport will face a fundamental problem from the outset concerning the ability to stock up on liquid fuels (e.g. petrol, diesel), as petrol stations cannot function without power and do not usually have emergency supplies.[160] Cars that park in underground garages will have to stay there because entrance doors cannot open.[161] Traffic signals will cease to function from the start, which, due to the increased traffic caused by the emergency, will lead to an increase in accidents, often with fatal consequences.[162] At the same time, traffic jams and deteriorating communications will make it increasingly difficult for the relevant services to assist accident victims.[163]

Given all the numerous spheres of state administration, the analysis examined only the resilience of the prison system to the lack of power supply. After one week (at the latest), the penitentiary system will be unable to protect the public from those deprived of their liberty.[164]

The German financial system, on the other hand – according to the analysis carried out for the Bundestag – was supposed to be only partially prepared for power shortages. With the onset of power cuts, the banking system is overloaded with withdrawal orders for substantial amounts of cash.[165] Credit action freezes, and by the end of the first week, some banks already have liquidity problems due to the huge amounts of withdrawn cash.[166]

When looking at the surveyed sectors, only capital market infrastructure and aviation infrastructure appeared well prepared for the total power blackout. Both of these sectors have business continuity plans. They contain elements to sustain the uninterrupted operation of each of these sectors, for example, in the event of a terrorist attack, severe weather events or technical problems such as – precisely – the lack of power supply. The fact that both sectors are so well prepared is probably due to the similar detailed regulations

of their operations by public law. The constant state supervision exercised by the relevant authorities regarding the aviation sector and the capital market is also important – both at the federal level and at the level of the individual states. Therefore, a clear conclusion can be drawn from the technical analysis: for the high-risk infrastructure areas to function properly, they need appropriate detailed public law regulations and strict state supervision by an independent authority.

The analysis prepared for the Bundestag contains numerous recommendations for each of the sectors to prepare for a possible long-term shortage of power supply.[167] From the point of view of the proper functioning of the state, regaining credibility and rebuilding public trust can occur by establishing communication channels at local, regional and national levels.[168] In addition, the need to increase public awareness of the risks involved has been mentioned in society's increasing dependence on high-risk infrastructure. It is also necessary to have business continuity plans in place for each high-risk infrastructure sector, including a scenario for a long-term power supply shortage. At the same time, the state supervision exercised over these sectors should not only require developing business continuity plans in the event of a power supply shortage. State supervisors should also control the quality of the business continuity plans, their application and regular (at least annual) simulations of their use.

The technical analysis for the Bundestag also predicts that the regulations in force in Germany will not prevent the negative effects of a possible long-term power supply shortage covering a large area of the country.[169] The legal regulations for preventing and dealing with disasters and crises are inadequate because they are so general that it is impossible to implement certain provisions in an emergency situation involving a lack of power supply.[170] At the same time, it is not the case that the provisions explicitly indicate the obligation of specific actions to help resolve the crisis and counteract its effects. It would, therefore, be necessary to introduce a separate legal regime related to the lack of power supply and set out appropriate actions.

The state bodies and the administration serving them are the high-risk infrastructure elements. This underlines the momentous character of the impact of the obligation to preserve and maintain all high-risk infrastructure on the performance of the (remaining) core public tasks of the state. Without a functioning high-risk infrastructure, public administration cannot function, and since public administration is also part of the high-risk infrastructure, the absence or poor functioning of the administration will also affect the malfunctioning of the high-risk infrastructure. From this perspective, it is crucial that each of these sectors operates efficiently and has business continuity because the ability of both society and the state to function depends on this. In the event of a shortage of power supply, each of the sectors that make up the high-risk infrastructure will cease to function (fully or partially).

Consequently, if the state cannot carry out such a basic public task as properly functioning the high-risk infrastructure in each area, this will

prevent the state from fully (or partially) carrying out other public tasks. At the same time, the state's very functioning depends on energy supply. For example, the failure to provide access to education will result from problems with food, water, heat, or transport supply, which will be a direct result of the lack of power supply). There is no need to analyse the feasibility of every single public task incumbent on a modern constitutional state to verify how a lack of energy supply will affect the fulfilment of a given task. The modern level of energy dependence is so great (also on the part of state bodies and administration) that a lack of energy supply leads to a kind of chain reaction. The lack of energy supply adversely affects the functioning of each high-risk infrastructure sector, and this translates into all spheres of the state's functioning, making it partially or fully impossible to fulfil individual public tasks. Taking into account the results of the analysis of individual sectors, it is legitimate to say that in a modern state, the lack of power supply prevents the fulfilment of the basic public tasks of the state to such a significant extent that it causes a disruption (or even decay) of the social and state order.

2.3 Ensuring energy security as a public task entrusted to private actors

In Germany, around 80% of high-risk infrastructure is privately owned.[171] As for the power supply, this ownership is dispersed among more than 1,100 entities.[172] The consequence is that the performance of public tasks has been entrusted to private actors to a large extent. At the same time, there is a very clear tendency in German public law to prevent public administration (more broadly, public authorities) from resorting to private law[173] (so-called *keine "Flucht ins Privatrecht"*). This tendency was also taken into account by the constitutional legislature (*Verfassungsgeber*) in the wording of the provision of Article 33 (4) of the Basic Law: "The exercise of sovereign powers as a permanent task should, as a rule, be delegated to public servants bound by a public-law relationship and a duty of loyalty." One of the reasons for the escape of the administration from public law rigour into private law rigour may be the desire to circumvent, among other things, the obligations arising from fundamental rights.[174] While such an action may be considered controversial, it is not an action that will always be judged constitutionally inadmissible by the courts.[175] A more lenient approach characterises more recent FCC jurisprudence.[176] The public nature of the provision of energy supply, even considering the guarantees of energy supply arising from the principle of the social state, does not entail that the state itself must produce and supply energy.[177] On the contrary, the FCC makes it very clear that energy supply is among the public tasks of supplying individuals (people and other subjects entitled based on constitutional freedoms and rights), which is incumbent on local self-government bodies.[178]

Energy supply is included in supplying the population with basic living needs.[179] As a result of liberalisation processes in the 1980s, the private sector

was also widely admitted to the energy sector.[180] There is now a tendency for these public tasks to be the responsibility of municipalities[181] (again), which is particularly true in energy distribution.[182] There are also voices in favour of de-commercialising some of the services related to energy provision and considering them as "public services."[183]

The assessment by legal scholars of the entrustment of the public task of energy supply to private parties varies, and there are also assessments formulated categorically. The model currently practised (in which the state has adopted the already-cited formula of guarantor of energy supply – *Gewährleistungsstaat*) is assessed as acceptable.[184] However, one can also see the positions (presented in the legal doctrine) based on an undisguised opt for the earlier situation of substantial state involvement in the performance of this public task.[185] A much more conservative approach points out that the involvement of private actors in the performance of public tasks is even an anomaly that requires an explanation.[186] This is supposed to be because in a democratic state under the rule of law, which protects fundamental constitutional rights, the basic operation model is the performance of public tasks by public authorities.[187] This is because, according to the conservative position, there is supposed to be a justified fear that the excessive involvement of private actors in performing public tasks will, in fact, deprive the state of its responsibility.[188] Moreover, this may already raise legitimate constitutional questions.[189]

For this reason, it is supposed to follow from the principle of democracy expressed in the Basic Law[190] that it is prohibited to entrust private actors with competences that are crucial for the state.[191] In addition to such an unequivocal position, there is also a different view in the literature that all tasks undertaken in the public interest do not necessarily have to be performed by the state itself.[192] Also, the most basic tasks of the state, such as ensuring internal security, can be performed with the participation of private actors.[193] Among the numerous examples,[194] it is worth recalling the initial idea of establishing a final repository for spent nuclear fuel by private entities. However, the assessment of whether a final radioactive waste repository can be entrusted to a private actor is ambiguous.[195] (and this approach was abandoned).

In a democratic state ruled by law, the private actors' responsibility for the common good must be adequately detailed at the statutory level.[196] The principle of the separation of powers, which is fundamental in a state governed by the rule of law, also applies here.[197] It follows from this principle that if state authorities entrust certain public competences to private actors, appropriate state supervision is also required over the private entity entrusted with these selected public competences.[198] At the interface between the free market and the state, and especially when private actors are entrusted with performing public tasks, as in the case of energy production, state supervision is a must.[199] At the same time, the duty to "re-regulate" is more important than state supervision itself: the demand included in the phrase *bringing the*

state back in.[200] Here, the supervision is understood as "the total of all state actions aimed at bringing and maintaining the supervised object in conformity with a fixed benchmark."[201] Of the many different types of state supervision, the so-called economic supervision[202] will be appropriate concerning the energy sector. This type of state supervision treats private and public actors uniformly (when they operate under the principles of free competition) and "aims to harmonise participation in economic trade on their responsibility with the rules of law in force in this respect."[203] A distinction must be made between state economic surveillance and state economic policy. The fundamental difference between economic surveillance and state economic policy is that surveillance is not responsible for setting criteria or rules but for ensuring they are observed.[204] The primary purpose of economic surveillance is to protect individual participants in a given sector from unfair competitors, for example, those who violate common law standards.[205] However, the most important objective appears to be minding the public interest. In the case of the energy sector, the public interest consists of a "reliable, cost-effective and environmentally sound energy supply."[206]

Among contemporary trends also present in Germany is a drive to change the functioning of the administration[207] – above all, within the framework of the so-called *New Public Management* concept.[208] However, there are areas in which the state cannot forget its responsibility, guaranteeing and cushioning when performing its core tasks.[209] These include ensuring internal security, protecting the environment and ensuring a market economy with free competition.[210] The state supervision of the energy sector covers precisely these areas.[211] This shows all the more the importance of supervision. Among its desirable features, W. Kahl includes centralisation, co-operationalisation combined with informalisation, cost-effectiveness, a realisation of the principle of efficiency as a general constitutional principle, and balancing between excessive activity and reduction to a minimum of strictness of supervision.[212] The expected state supervision model combines the existing protective and control functions with a consensual model based on dialogue and mediation.[213]

There is an even more detailed concept of a model state supervision for, among others, the energy sector, as presented by A. Voßkuhle.[214] It is supposed to consist of:

- strengthening the preventive elements of supervision, as well as cooperation with supervised entities, e.g. through the introduction of mandatory pre-consultations, the creation of advisory councils and, in addition, the compulsory preparation of development plans/concepts by supervised entities[215];
- expansion of internal control systems in supervised entities carried out through auditing, compliance officers, quality management systems as well as sector's best practices[216];
- establishment of parallel control structures, for example, by requiring private entities to take out private liability insurance[217];

- introduction of third parties into the exercise of oversight, e.g. through the right of access to information[218];
- empowerment of supervisory authorities by creating specialised substantively independent regulatory bodies.[219]

Furthermore, M. Heintzen points out that if, at the statutory level, how private entities operate has not been adequately clarified, then simple supervision of compliance with the law is insufficient and expert supervision is needed.[220] Here, there is a call for the general principles concerning the exercise of state supervision, common to many supervisory authorities, to be partially codified.[221]

These standards have been developed in the findings of German public law. They place additional requirements on the legislature when entrusting the task of ensuring the security of supply to private entities. These standards naturally represent additional requirements to those arising from the security of supply and energy security more broadly.

2.4 The constitutional framework for providing state aid to ensure energy security

One possible measure to prevent energy security problems is to provide state aid to the energy sector. A starting issue for representatives of the legal doctrine is the question of whether economic state intervention in a democratic state ruled by law is constitutionally admissible at all.[222] The constitutional framework for providing state aid follows the reconstruction of the constitutional principles of the social state and the rule of law.[223] At the same time, well-established FCC jurisprudence has prejudged the neutrality of the *Grundgesetz* concerning the economic policy.[224] This implies the obligation to develop economic relations to be fair to all.[225] On the one hand, this can be achieved by means of planned measures and, on the other hand, by *ad hoc* interventions of the administration in economic relations.[226]

The content of the provision of Article 15 of the *Grundgesetz* corresponds to the tasks of the administration understood the way it has been reconstructed above: "Lands, natural resources and means of production may be converted for socialisation into social ownership or other forms of social economy by a law which determines the type and extent of compensation. Article 14, paragraph 3, sentences 3 and 4 shall apply *mutatis mutandis* in the matter of compensation." At the same time, Article 14(3) sentences 3 and 4 of the Grundgesetz states: "Compensation shall be determined on the basis of a fair assessment of the interests of the general public and the persons concerned. Disputes about the amount of compensation shall be subject to legal action before the ordinary courts."[227] The provision of Article 15 of the *Grundgesetz* is not a constitutional imperative to socialise private property but indicates one way of practising economic policy. The economic policy is the responsibility of the public authorities.[228] One form of this is the provision of public assistance.[229]

The essential features of state aid, already under the 1949 *Grundgesetz*, included its gratuitous nature and its direct effect on the beneficiary through an increase in wealth.[230] On the other hand, what is important for public authorities granting such aid is that it is intended to serve a specific public purpose.[231] Furthermore, it is irrelevant whether the aid granted is direct (in the form of cash transfers) or indirect (in the form of support consisting of privileged access to goods or infrastructure, such as credit guarantees, export allowances, and tax exemptions[232]).

In order to provide public assistance, the Federation needs a statutory basis.[233] However, a specific and explicit competence basis in the *Grundgesetz* is unnecessary.[234] This implies the freedom of the federal legislature (within the limits of constitutional fundamental rights) to create a statutory basis to provide state aid, even if it may be incompatible with a competitive market's principles.[235]

Because of this, the scope of judicial review comes down to two elements. The first one is to check whether it is possible to administer public funds due to the obligation in this respect.[236] The second one is as follows: if there has been a refusal to grant state aid, it will be assessed whether the statutory objectives have been complied with and whether the principle of equality has not been violated.[237]

Providing state aid obviously places beneficiaries in a more favourable position against competitors. The competitors of a beneficiary are also entitled to constitutional protection. One of the essential elements of the admissible granting of state aid is that it should serve a public purpose.[238] The Federal Constitutional Court noted that any economic stimulus measures constitute an interference with free market rules and the state of competition resulting from them.[239] However, as long as such measures are constitutionally admissible, they cannot be constitutionally inadmissible simply because they interfere with the activities of competing economic actors.[240] If it were possible to formulate an inference of arbitrary interference with the interests of other constitutionally protected entities, it would be possible to declare the constitutional inadmissibility of the state aid in question.[241] Therefore, it is very clearly emphasised that state aid is not an area that would be excluded from constitutional protection stemming from fundamental rights.[242] A subsidy (state aid) may constitute an infringement of the freedom of competition between economic operators, which is protected under Article 2 of the *Grundgesetz*:

1 Everyone has the right to the free development of their personality as long as they do not violate the rights of others and do not contravene the constitutional order or moral precepts.
2 Everyone has the right to life and personal inviolability. Personal freedom is inviolable. Interference with these rights is only permitted by law.

Indeed, the freedom referred to in Article 2 of the *Grundgesetz* also includes the protection of fundamental rights so that public authorities may not put

competing business entities at a disadvantage without adequate justification arising from the constitutional order.[243]

Another consequence of the provision of state aid highlighted by German academics is the shrinking of the private sphere at the expense of the public sphere.[244] Parallel to this process, there is also a shift from private law institutions to public law.[245] This is the opposite process to the flight of public administration to private law. It does not nullify this process but shows that part of the administration's activities are taking place under legal principles, which, from the point of view of the tasks of public administration, could be questioned.[246]

One area considered particularly attractive to provide state aid is the industry.[247] Energy, in turn, is one of the classic industries. However, for the state to intervene – not from the regulatory side, but by directly distorting the conditions of competition by granting state aid – an appropriate reason (such as a material prerequisite) is required. The most clear-cut prerequisite justifying state intervention in the framework of the energy sector could be the desire to stop importing energy resources from abroad.[248]

The development of German legal doctrine and jurisprudence on state aid law was intensive only up to a certain point. The development of German state aid law quickly began to follow the path of a rapidly progressive Europeanisation.[249] This was due to the enormous development of the European Union's competence to decide on state aid's shape and admissible dimension. Today, in the EU Member States, constitutional reflection and constitutional discussions regarding providing state aid are not of primary importance. The EU state aid rules constitute a comprehensive body of law, with extensive jurisprudence of the EU courts and numerous decisions of the European Commission, as well as growing jurisprudence of EU courts in this area. The energy sector, in turn, even has separate state aid rules. At the same time, it is an effectively enforced branch of law, as state aid is incompatible with EU state aid law, which generally entails an obligation to return it.[250] For example, the assessment of tax relief for capital reserves written off by energy companies to dispose of radioactive waste and the closure of nuclear power plants in Germany were dealt with precisely based on EU state aid law.[251]

2.5 Constitutional admissibility of expropriation on the grounds of public interest in the form of ensuring the security of energy supply versus protection of life and health of residents and protection of the environment

One form of action by public authorities to ensure the security of the energy supply is expropriation. These may be necessary to construct facilities intended for high-risk infrastructure (such as transmission lines). More broadly, expropriations may also be necessary for certain investments in generation facilities, such as nuclear power plants or nuclear installations. In the case of the classic fossil fuel economy, this applies in particular to expropriation from areas

essential for the extraction of energy resources, such as opencast lignite mine sites. The constitutional standards to which expropriations are subjected, discussed here, will be related to those expropriations that serve the public interest in ensuring energy supply security.

The opposite situation is one in which there is an (actual) expropriation of investors from their property rights, making it impossible for them to carry out certain economic activities. The constitutional justification in such situations will be, for example, the consideration of the public interest in the protection of life and health of residents or the protection of the environment. Such constitutional considerations for state action were at the heart of the law enacting *Atomausstieg II* in 2011, as confirmed by the Court in its judgment of 6 December 2016.[252] For the sake of clarity of the argument, the issue of how the statutory termination of the operation of commercial nuclear reactors (*Atomausstieg I and II*) relates to constitutionally admissible forms of expropriation will be discussed in the next subsection.

The Federal Constitutional Court understands the institution of expropriation in the context of the purpose and function of expropriations.[253] The FCC clarifies that expropriation is in no way an instrument vested in the State for the acquisition of property.[254] The purpose of expropriation is not to take away property rights and have them acquired by the State or local authorities.[255] The real purpose of expropriation is to enable the performance of certain public tasks, while expropriation itself is merely to achieve this purpose.[256] Moreover, this purpose gives the institution of expropriation sufficient social legitimacy.[257] Hence, the deprivation of property rights and their acquisition by the state or local authority is only a means to achieve such an objective.[258]

In a democratic state governed by the rule of law, the energy sector's needs and how investments are made must be compatible with constitutional regulation – particularly constitutional freedoms and rights. The FCC commented on such a conflict of values in connection with the case of the construction of the Garzweiler opencast lignite mine.[259] In its earlier jurisprudence, the FCC stated that the constitutional concept of expropriation also applies to situations where goods of importance to the state are achieved through undertakings connected with the performance of public tasks.[260] In the case of the expansion of the Garzweiler mine, where lignite would be mined opencast, the FCC assessed whether such a circumstance (performance of a public task) could arise.[261] In contrast, a case in which the FCC assessed the admissibility of expropriation of property rights by preventing their enjoyment was a 2016 judgment[262] and a 2020 judgment[263] on the constitutional complaints of nuclear power plant operators brought in connection with the 2011 amendment of the Atomic Law introducing *Atomausstieg II*.

The provision of Article 14(3) of the Grundgesetz sets the constitutional requirements for expropriation: "Expropriation shall be admissible only for the public good. It may be effected only by or according to a law determining

the nature and extent of compensation. The compensation shall be determined based on a fair assessment of the interests of the public and the persons concerned. Disputes over the amount of the compensation shall be subject to legal action before the ordinary courts." For the assessment of expropriations, it is also important to determine the scope of constitutional protection of property and other property rights. This is determined by the provisions of Article 14(1) and (2) of the *Grundgesetz*:

1 The right to property and inheritance shall be guaranteed. Their content and limits shall be determined by laws.
2 Ownership is an obligation. The use of property should, at the same time, serve the common good.

It follows from the wording of the provision in Article 14 (1) and (2) of the *Grundgesetz* that the legislature's role is to determine the content and limits of ownership.[264] The regulatory freedom of the legislature has its limits.[265] The legislature is obliged to ensure that the sphere of freedom of the individual entitled under the property in question remains in appropriate proportion to the general good.[266] This is because the common good is not only a landmark but also sets the limits of property.[267] At the same time, according to the Court, the dimension of the admissible link between property and its impact on society is to be derived from the type of property itself.[268] The guarantee of ownership in Article 14(1), first sentence, of the *Grundgesetz*, the regulation order for the legislature in Article 14(1), second sentence, of the *Grundgesetz* and the obligations arising from the social dimension of ownership in Article 14(2) of the *Grundgesetz* are inextricably linked.[269] However, the power of the legislature to determine the content and boundaries of the property is all the broader the stronger the social dimension of the subject of property in question.[270] It follows from the FCC's jurisprudence that the social dimension is to be determined by the properties and functions of the property in question.[271] Economic and social relations determine the scope of the legislature's freedom in this respect.[272]

According to the Court's jurisprudence, the purpose required by the first sentence of Article 14(3) of the *Grundgesetz*, which is essential for the public good, is, in any case, an essential material condition for the constitutional admissibility of expropriation.[273] From the constitutional perspective, expropriation is admissible only if and to the extent and only as long as it serves the common good.[274] At the same time, the necessity to achieve the objectives relevant to the common good may require expropriation.[275] It is up to the legislature to indicate the objectives relevant to the common good that may justify the carrying out of expropriation. The Court has pointed out that it is precisely the task of the democratically legitimate parliamentary legislature to identify the objectives of particular importance for society.[276] At the same time, the legislature is given considerable freedom in choosing these objectives, and the FCC's scope of review is limited here.[277] In the Court's view, it is impossible to

establish unequivocally, on the basis of the Grundgesetz, universal objectives relevant to the common good that could justify expropriation.[278]

Nevertheless, the Court has identified such expropriation purposes that would not be constitutionally admissible. First and foremost, an expropriation that exclusively serves the interests of a private entity[279] would be inadmissible. Nor can expropriation merely increase the resources in public property (at the expense of private property).[280] In particular, an expropriation cannot serve only fiscal purposes.[281] Likewise, expropriation cannot serve purposes that the Constitution does not accept.[282] The Court used the term "Constitution" (and not "Basic Law" – the *Grundgesetz*) in the cited passage of the judgment. It should be pointed out that in the text of the *Grundgesetz* of 1949 the term "Constitution" appears only in the provision of Article 146:

> This Basic Law, once the unity and freedom of Germany, binding on the entire German people, has been realised, shall cease to have effect on the day on which a constitution adopted by a free decision of the German people comes into force.

In using the term "Constitution," the FCC departs exclusively from the text of the Basic Law, indicating the need to draw on the entire German constitutional acquis when dealing with the issue of expropriation.

To supplement the FCC's argumentation, attention should be drawn to the purposes which the Basic Law literally or unambiguously leaves out of its scope, thus indicating constitutional purposes incompatible with it. Two types of regulations can be identified, i.e. those that are directly applicable and those that indicate objectives that are not acceptable to the Basic Law. Attention should first be drawn to the passage in the Preamble to the Basic Law, which indicates the peaceful purpose of the Federal Republic of Germany:

> Being aware of its responsibility [...] to serve world peace as an equal member of the united Europe, the German people, by virtue of its constitutional power, adopted this Basic Law. [...].

Therefore, any activity that does not match this objective will not be reconcilable with the principles of the *Grundgesetz*.[283] Another provision of the *Grundgesetz* from which it is possible to reconstruct the purposes of expropriation that will not be compliant with the Basic Law is the provision in Article 1(1) of the *Grundgesetz* placing human dignity as the basis of fundamental rights, the basis of the Basic Law, and ordering it to be respected and protected by the state authorities:

> Human dignity is inviolable. Its respect and protection is the duty of all state authorities.

Another type of purpose incompatible with the Basic Law will be against the constitutional order, as expressed in Article 2(1) of the *Grundgesetz*:

> Everyone has the right to develop their personality freely, as long they do not violate the rights of others or do not go against the constitutional order or moral precepts.

Another purpose of expropriation that would not be reconcilable with the Basic Law is the one that would violate the prohibition of discrimination in Article 3(3):

> No one shall be discriminated against or privileged on the grounds of sex, birth, race, language, homeland and origin, denomination, religious or political opinion. No one may be discriminated against on the basis of their disability.

Another unambiguous provision of the Basic Law indicating actions that are not compatible with the *Grundgesetz* is the prohibition of censorship in Article 5(1), sentence 3:

> There shall be no censorship.

Similarly unambiguous wording is found in Article 5(3) of the *Grundgesetz*, which indicates that the limit of freedom of teaching remains the duty of fidelity to the Basic Law:

> Freedom of arts and sciences, research and teaching shall be ensured. Freedom of teaching does not exempt from fidelity to the constitution.

The provision of Article 5(3) of the *Grundgesetz* is specific but, at the same time, extremely characteristic of the Basic Law of 1949 due to its unambiguous designation of prohibited activities, which was primarily based on experience from the Third Reich regime. A similarly unambiguous regulation is contained in the provision of Article 9(2) of the *Grundgesetz*, which delimits the scope of outlawed organisations:

> Organisations whose aims or activities contravene criminal laws, are directed against the constitutional order or the idea of agreement between nations are prohibited.

A similarly unambiguous ban, which only in sublime cases could have used some expropriation purpose but which reflects well this specific character of the 1949 Basic Law, is the provision of Article 10(2) concerning exceptions for violations of postal and telecommunications confidentiality:

1 Confidentiality of correspondence as well as postal and telecommunications confidentiality are inviolable.
2 Restrictions may be ordered only on the basis of a law. If the restriction serves the protection of the free democratic system or the protection of the existence or safeguarding of the Federation or any of the states (*Länder*), the law may provide that the restriction shall not be made known to the person concerned and that a review by bodies appointed by the people's representation and subsidiary bodies shall take the place of a judicial procedure.

A similarly unambiguous prohibition is also expressed in the provision of Article 11(2) of the *Grundgesetz* on admissible restrictions on the freedom of movement of any German citizen within the federal territory:

1 All Germans shall enjoy freedom of movement throughout the Federation.
2 This right may be restricted only by (or pursuant to) a law and only in cases where a sufficient basis of existence is lacking and special burdens would thereby be imposed on the public, or where it is necessary to avert a danger threatening the existence or the free and democratic system of the Federation or of a Land, to combat the danger of epidemics, natural disasters or particularly grave accidents, to protect the young from neglect or to prevent criminal acts.

Similarly, the provision of Article 12 of the *Grundgesetz* contains a prohibition on forced labour, except for an individual court decision:

1 All Germans have the right to freely choose their profession, place of work and place of vocational training. The exercise of a profession may be regulated by (or on the basis of) a law.
2 No one shall be compelled to do a particular job outside the customary, universal and equal obligation of public service for all.
3 Forced labour is permitted only in the case of a judicially imposed deprivation of liberty.

The Basic Law contains similarly unambiguous prohibitions concerning military service obligations. For men, the Basic Law has provided in Article 12a(2) the right to perform alternative service to the obligation to serve in the armed forces, in the Federal Border Guard or in a civil defence unit as expressed in Article 12a(1):

1 Men over the age of eighteen may be required to serve in the armed forces, in the Federal Border Guard or in a civil defence unit.
2 Whoever, for reasons of conscience, refuses military service with arms in hand may be obliged to perform alternative service. The duration of alternative service may not exceed that of military service. The details shall be regulated by a law, which must not infringe on freedom of conscience and must also

> provide for the possibility of alternative service not connected in any way with units of the armed forces or the Federal Border Guard.

In contrast, Article 12a(4) of the *Grundgesetz* provided an absolute prohibition for the introduction of compulsory military service for women while at the same time setting out the scope and prerequisites for the possible introduction of compulsory service for women in the form of assistance to the armed forces:

> If, in a state of defence, the need for civilian public services in the civilian sanitary and health service and in stationary military hospitals cannot be covered on a voluntary basis, women between the ages of eighteen and fifty-five may by or under the law be called up for such public services. In no case may they be obliged to serve with weapons in their hands.

Similarly, the clear-cut prohibition in Article 16(1) of the Basic Law extends to the deprivation of German nationality, except for persons with multiple nationalities:

> No one may be deprived of German citizenship. The loss of German nationality can only take place on the basis of a law, and against the will of the person concerned only if he does not become stateless as a result.

In addition, the Basic Law explicitly provided in Article 18 for the FCC to take away certain fundamental rights when freedom of expression is abused to fight against the "free democratic order":

> Whoever abuses the freedom of expression, in particular the freedom of the press (Article 5(1)), the freedom of teaching (Article 5(3)), the freedom of assembly (Article 8), the freedom of association (Article 9), the secrecy of correspondence, post and telecommunications (Article 10), the right to property (Article 14) or the right of asylum (Article 16a) to fight against the free democratic order, shall forfeit the said fundamental rights. The loss of rights and the extent of this loss shall be decided by the Federal Constitutional Court.

Similarly, in the provisions of Article 20(1)–(3), the Basic Law provided for fundamental constitutional principles while granting in Article 20(4) a subsidiary right of resistance against anyone who attempts to subvert any of the elements of the constitutional order:

> 1 The Federal Republic of Germany is a democratic and social federal state.
> 2 All state power derives from the people. It is exercised by the people through elections and votes and through special legislative, executive and judicial bodies.

3 The legislature is bound by the constitutional order and the executive and judiciary by statutes and law.
4 In the face of anyone attempting to overthrow this order, all Germans have the right to resist if no other means of counteraction is possible.

Similarly, the provision of Article 21(2) of the *Grundgesetz* contains a prohibition of functioning for those political parties whose aims or whose activities are aimed at violating or subverting the free democratic constitutional order or threatening the existence of the Federal Republic of Germany:

> The parties that, through their objectives or the behaviour of their supporters, aim to violate or subvert the free democratic political order or threaten the existence of the Federal Republic of Germany are unconstitutional. The Federal Constitutional Court shall decide on unconstitutionality.

Similarly, it would be contrary to the provisions of the Basic Law under Article 26(1) to wage an offensive war or even to carry out preparations for one:

> Actions that are likely to disrupt the peaceful coexistence of nations and are undertaken with such intent, in particular preparations for offensive warfare, are unconstitutional. They are subject to punishment.

Similarly, in order to preserve the uniform application of constitutional standards, the Basic Law places several requirements on the constitutional order of the states (*Länder*) in Article 28(1):

> The constitutional order of the states [*Länder* – R.R.] shall conform to the principles of a republican, democratic and social state governed by the rule of law within the meaning of this Basic Law. In the states [*Länder*], districts and municipalities, the people shall have representation derived from universal, direct, free, equal and secret elections. In elections in the states [*Länder*] and municipalities, persons who, in accordance with the law of the European Communities, hold citizenship of one of the member states of the European Communities shall also be eligible to vote and be elected. In municipalities, the elected body may be replaced by a municipal assembly.

This means that the purposes of an expropriation that does not comply with the Basic Law will be the same at the federal level as at the level of the individual states (*Länder*), regardless of which authorities carry out the expropriation. This is unambiguous from the wording of Article 28(3) of the *Grundgesetz*, which requires that the activities of the States (*Länder*) must comply with the fundamental rights guaranteed by it:

> The Federation shall ensure that the constitutional order of the states [*Länder*] complies with the fundamental rights and the provisions of clauses 1 and 2.

A similarly explicit regulation is contained in the provision of Article 33(3) of the *Grundgesetz*, which prohibits treating anyone less favourably based on his or her affiliation or (lack of) affiliation to a particular religion or belief, which public authorities could also use in the context of carrying out expropriation as well as for assessing the purposes of expropriation:

> The enjoyment of civil and civic rights, access to public office as well as rights acquired in the public service are independent of religious belief. No one may be treated less favourably on the grounds of belonging or not belonging to a religion or belief.

According to the FCC, the purpose chosen by the legislature, which is important for the general good, must be of sufficient importance to justify the use of expropriation.[284] In addition, the FCC recalled that any expropriation substantially infringes the constitutional right to protection of property, and therefore, this objective must be of particular importance, of great significance for the common good.[285] At the same time, not every public interest will be sufficiently momentous to meet the requirements of the FCC.[286] Therefore, the law constituting the basis for expropriation decisions must specify in detail the criteria for selecting the expropriation purpose, its conditions and the type of project that will condition the possibility of expropriation.[287]

The jurisprudence of the FCC does not imply an absolute prohibition of expropriations for the benefit (and advantage) of private entities.[288] Rather, this type of expropriation is subject to specific and detailed requirements: it is required to define the intended purpose to formulate (in statutory terms) the prerequisites and conditions for the validity of such expropriation.[289] It is incumbent upon the public authorities to carefully examine whether the expropriation will be useful for the private entity, whether it is based on the public interest that the given expropriation is supposed to realise, and whether it has been specified.[290] The constitutional standard regarding expropriations in favour of private entities presupposes that the public authorities supervise whether the private entity that benefits from the expropriation pursues an objective relevant to the public interest.[291] At the same time, the FCC requires that this objective be relevant to the common good, which the private entity is to pursue through expropriation, and should be determined by the state.[292]

For this reason, the FCC requires that there should be a regulation to make sure that the private party which will benefit most from the expropriation will allocate the advantage gained through the expropriation to the purpose essential to the public good which is to be realised through the expropriation.[293] If the undertaking in whose favour the expropriation has been carried out is private, in order to be able to take care of the realisation of the good essential for the common good on a lasting basis, according to the FCC, detailed guidelines must be established for this purpose.[294] Such detailed guidelines are intended to ensure

that the interests pursued by the private entity concerned are geared to the concern for the common good.[295] According to the FCC, the public authorities should be equipped with the competence to supervise and control the obligations incumbent on that private entity which benefits from the expropriation.[296] At the same time, the Court has made it very clear that as long as the entity in question benefits from the expropriation's effects, it is obligated to take care of the designated objective – relevant to the common good.[297]

The Court also distinguishes expropriations that serve the common good directly and those that serve the common good only indirectly. In the case of energy security measures, there is no doubt that the expropriation indirectly affects energy security. In the case of an opencast lignite mine, the seizure of real estate directly enables the extraction of energy minerals. Only when energy minerals are used for energy production is the objective relevant to the public good, i.e. energy security, achieved. This is all the more true for expropriations, which not only indirectly serve important public good but are also carried out for the benefit of private parties. The Court places high demands on the statutory regulation of expropriations as to their clarity and detail.[298] The relevant regulation (which has the status of universally binding law) should specify which projects such an expropriation may be applied to.[299] It is the responsibility of the public authorities to decide on the choice of property to be expropriated. Several important factors should be considered. First, it has to be determined which projects will contribute to the care of an important common good. Then, the most suitable property has to be identified, and, in addition, it has to be checked whether the expropriation in the given case will be proportionate.[300] The FCC allows the designated private entity to be active in this decision. However, the limit of this activity is that the public authorities must make the key decisions. Hence, the point is that the expropriation is not merely formally carried out by the public authorities but that a public authority body deals with the expropriation.[301]

2.6 Statutory termination of commercial nuclear reactors and constitutionally admissible forms of expropriation

The findings previously discussed cannot be automatically transferred to a situation in which there is such a restriction on the use of the property that the use of the property is prevented. Such a situation cannot be automatically equated with expropriation. In the meantime, each time – in the case of the laws implementing the *Atomausstieg I* (2002) and *Atomausstieg II* (2011) agreements – there was a statutory mechanism for the orderly termination of nuclear power plants (*Atomausstieg I* in 2002) or the restoration and tightening of the conditions of the original phase-out (Atomausstieg *II* in 2011). The 2010 law implementing the *Laufzeitverlängerung* also used the method of regulation provided for in *Atomausstieg I*. In contrast, the intervention of the 2022 legislature was merely an extension of the deadline for *Atomausstieg II* by 3–5 months. In assessing the applied statutory mechanism for the orderly termination of nuclear power plants

(*Reststrommenge*), the FCC concluded that the legislature's intervention was not an expropriation. This subsection will discuss why the FCC concluded that this regulatory action was not an expropriation.[302]

The main difference between these laws is, that only the 2011 law was directly assessed by the FCC in its judgments of 6 December 2016[303] and 29 September 2020.[304] However, given the reliance of all laws on the same *Reststrommenge* mechanism, the FCC's findings of 2016 and 2020 apply to all laws (including the December 2022 law).

First of all, the FCC was bound by the scope of the challenge in the cases concluded by the 2016 and 2020 judgments. The Court made it clear that none of the applicants had challenged the constitutionality of the phase-out of nuclear power in 2000.[305] The applicants only sought to challenge how the transitional provisions were framed.[306] Similarly, the *Atomausstieg I* itself was not challenged in the case concluded by the 2020 judgment. In the same way, an analysis of the explanatory memoranda to both judgments shows unequivocally that the FCC neither challenged nor suggested the possibility of challenging the constitutionality of the lawmaker's decision to make an orderly phase-out from nuclear energy. With the benefit of hindsight, it can be assessed that *Atomausstieg I* (2002) represented one of a kind of a constitutional compromise. Indeed, while the constitutionality of the statutory solutions was highly controversial, the very process of working out this constitutional compromise through the involvement of the nuclear power plant operators in direct negotiations (with the representative of the Federal Government), culminating in an agreement with the federal government, was also controversial on constitutional grounds.[307] None of the entities directly affected by *Atomausstieg I* (i.e. the owners or co-owners of the nuclear power plants listed in Table 4) challenged the provisions of the agreement reached and did not seek then the protection of the constitutional court. This course of the political process provided a great deal of legal certainty. It allowed the focus to be on the implementation of the so-called *Energiewende*, i.e. the policy of moving away from non-renewable fuels (including uranium) to renewable energy sources. When one juxtaposes this with the *Atomausstieg II* (2011), which was introduced quickly, without a mechanism for agreement with stakeholders, it is very apparent that an element of this legal certainty was missing with the *Atomausstieg II* until the FCC rulings of 2016 and 2020.

The case decided by the 2016 judgment challenged the law introducing *Atomausstieg II*, the so-called 13th Amendment, to the Atomic Law. This law was founded on three basic legal solutions. The first was to restore the legal status introduced by *Atomausstieg I* by reversing the effects of the so-called *Laufzeitverlängerung*. The second was to set individual termination dates for each nuclear installation (see Table 3). The third solution was to set an end date for the use of nuclear power for commercial nuclear power generation.

Atomausstieg I consisted of the "Agreement between the Federal Government and the energy companies of 14 June 2000" (*Vereinbarung zwischen der Bundesregierung und den Energieversorgungsunternehmen vom 14. Juni* 2000; hereafter, referred to as the "2000 Agreement")[308] on 11 June 2000.

The signatories of the 2000 Agreement agreed that the use of commercial nuclear power plants in Germany would be terminated (soon).[309] However, no date was indicated for this phase-out of using nuclear energy to generate power. The agreement was based on the achievement of several objectives. A high safety standard was to be maintained by respecting the requirements of the Atomic Law. This included the remaining permissible lifetime of nuclear power plants and the subsequent disposal of nuclear reactors.[310] For the signatories of the "2000 Agreement," the instrument used was to set an individual value for each nuclear installation for the maximum amount of power each nuclear reactor could produce after 1 January 2000 (so-called *Reststrommengen*).[311] The *Reststrommengen* value for each nuclear reactor was determined by establishing the total production volume for each nuclear reactor.[312] This was calculated based on the largest production of nuclear power plants over five years selected from 1990–1999.[313] It was assumed that each nuclear reactor would have normally operated for 32 years from when it was put into commercial service.[314] The operating time was based on an assumption made by the agreement signatories. According to this assumption, after such a period of commercial production, each nuclear reactor would have already depreciated, and an appropriate level of profit from the operation of the nuclear reactor would have been earned.[315] At the same time, the resulting production value was increased by 5.5% over the baseline.[316] It is worth noting that the hypothetical models of nuclear reactor operation have nothing to do with the actual data of the past, as the years with the highest production were selected from these data and still increased by 5.5%. No nuclear reactor could operate at such a load for its lifetime (or the assumed remaining 12 years). A mundane reason would be the fuel campaign cycle (the regular exchange of spent nuclear fuel for fresh nuclear fuel during which the nuclear reactor in question does not produce any power) – because of which sometimes these very periods might not have been fully included in these reference five-year periods. Another reason would be, for instance, the mandatory regular maintenance of a nuclear installation due to the limited technical service life of the individual equipment and components that make up each nuclear installation. Moreover, during the lifetime of each nuclear reactor, the technical standards in force at any given time change. This may entail fundamental changes to the nuclear reactors, which deviate from standard inspections and maintenance. Thus, as can be seen, the selection of five of the ten years with the highest power production and an additional 5.5% increase in this production represents a departure from market realities. If one takes into account the assumed (reference) operating period of 32 years for each nuclear reactor, which was supposed to ensure the total depreciation of these devices, such an exorbitance of their operating hours beyond market realities guarantees a high profitability (profitability) of the operation of each nuclear unit. This is due to the peculiarities of the cost structure of nuclear power plant operations. Namely, they consist of significant fixed costs (associated with large construction costs and then substantial maintenance costs) and significantly

smaller variable costs associated with fuel purchase. In fact, nuclear fuel is a small part of the costs, so the amount of fuel consumed does not significantly impact the plant's final operating cost. All this means that increasing the operating hours of each nuclear reactor, as under the 2000 Agreement, translates into a significant increase in the profitability of individual nuclear power plants. At the same time, the 2000 Agreement provided the possibility of transferring power production rights under the *Reststrommengen* mechanism from older nuclear reactors to newer ones and from smaller units to larger ones.[317] The first impression when assessing this solution may focus on the increased safety level since this solution facilitates the generation of power in younger nuclear reactors (where, as a rule, younger nuclear installations have been designed and built to newer safety standards and also the level of wear and tear of materials of these nuclear installations will be lower than for older nuclear installations). However, it cannot be overlooked that this provision of the 2000 Agreement ensured that the earnings performance of nuclear reactors was increased. In the energy field, the so-called "economies of scale," known from economic sciences, apply, i.e. a reduction in the cost per unit of power generated and thus an increase in the profitability of a given activity due to the increase in the scale of the generating activity. In this case, the transferability of *Reststrommengen* from smaller to larger units is another mechanism for increasing profitability over the remaining lifetime of nuclear reactors. Newer nuclear reactors will also typically allow for cheaper power generation. Having established the arrangements made under the 2000 Agreement to increase the profitability of nuclear reactors, it is important to try to discern the reasons for adopting arrangements so favourable to the power companies with nuclear power plants in operation. Not a single energy operator has sought the protection of the FCC in the almost 20 years since adopting the first law introducing *Atomausstieg I* and implementing the provisions of the 2000 Agreement. None of the nuclear reactor operators has attempted to challenge the constitutionality of the solution adopted in 2000 to terminate nuclear power in Germany after this route has produced a certain amount of power in nuclear reactors. Also, in the case of *Atomausstieg II,* the solutions adopted were not challenged by the FCC in 2016 (except for the use of *Reststrommengen*) – also in the case of the timeframe introduced, i.e. the end of 2022 as the end of the possibility to generate nuclear power in Germany – was not challenged. Therefore, it can be concluded that the energy companies (through the regulations and statutory solutions discussed) first developed in connection with the 2000 Agreement and then maintained in the context of *Atomausstieg II* – have received adequate compensation, which is an essential element in any use of expropriation. In this case, however, the relevant compensation to the nuclear power operators was not paid in cash, but they were granted certain rights (i.e. *Reststrommengen*), which had a certain asset value. While cash represents a highly liquid asset, the objective assessment of the entitlements arising from the *Reststrommengen* mechanism (i.e. administrative authorisations to generate certain volumes of power in certain nuclear-generating units) represents a highly illiquid asset. By contrast, to those four energy

companies selected, which were operators of nuclear reactors in Germany, the *Reststrommengen* represented a real asset value. Given the fact that the provisions of Article 15 of the *Grundgesetz* requiring compensation for expropriations do not set a standard for the form of payment of this compensation, nor do they even indicate whether the asset received as compensation should be liquid – nevertheless, given the very good fit between the form of compensation and the needs of these energy concerns, the form of the granted compensation cannot be questioned that easily.

Atomausstieg I was followed by the so-called *Laufzeitverlängerung*. After the 2009 Bundestag elections, the new federal government (a coalition of the CDU/CSU and FDP political parties) presented its own energy policy concept[318]: it assumed that a move away from nuclear power would be maintained in the future. However, this new energy policy was based on the assumption that nuclear power was a so-called "transitional technology" and that its admissibility should be extended accordingly.[319] The concept of a "transitional technology" is linked to the EU's climate and energy policy, which calls for the decarbonisation of the energy sector (i.e. maximum reduction of the level of greenhouse gas emissions from the production of each type of energy: power, heat and energy used for transport). The use of nuclear power as a "transition technology" was intended to enable Germany to move away from the use of carbon-intensive sources of energy generation – as soon as possible. A condition for the success of this transition was the widespread availability of low-carbon generation technologies. Widespread availability means technological availability, which already existed in 2009, and in terms of unit generation cost, it means that new generation sources are competitive with current high-carbon generation sources. The *Laufzeitverlängerung* began with the initiation of negotiations in 2010 between the Federal Government and the energy companies (owners of nuclear power plants) on the possibility of extending the lifetime of nuclear reactors (beyond that provided for in *Atomausstieg I*).[320] The *Laufzeitverlängerung* negotiations also addressed the expected level of safety protection of the nuclear reactors in connection with the planned extension of their operating life.[321] In addition, the negotiations included the question of the amount of fiscal "compensation" (to the state budget) by the energy companies for the extension of their nuclear reactors' operating life, as well as the postponement of the date on which a new type of public levy will have to be paid.[322] It has been pointed out that this new tax was intended to be a charge on the energy companies for the costs of perpetual storage of radioactive waste.[323] However, this is difficult to agree with, as charges for the perpetual storage costs of radioactive waste were levied at the time, and also, the new tax applied only to nuclear installations still in operation and did not take into account at all the volume of radioactive waste historically generated by all nuclear installations. It seems much more pertinent to refer to the new type of public levy as a form of internalisation of the so-called external costs of nuclear power and by charging this type of power generation source with a new type of public levy to level the playing field for other types of power generation in competition with nuclear-generated power.[324]

The ongoing negotiations resulted in the 11th amendment to the Atomic Law of 8 December 2010.[325] The amendment provided for a significant increase in the *Reststrommengen* that particular nuclear reactors could produce.[326] The size of the allocated *Reststrommengen* was to extend production by about 12 years on average.[327] In the case of nuclear reactors that started to work in 1980 or earlier, the extension was eight years.[328] As for the others, they were expected to operate for 14 years longer.[329] It should be noted that these are only estimates – because the *Reststrommengen* (i.e. the determination of allowable remaining production by the amount of power remaining to be generated and not by the expiry of the allowable time of continued operation) left the power companies with considerable freedom to use active nuclear reactors. The power companies were free to manage their production.

The restoration of *Atomausstieg I* and the undoing of the effects of *Laufzeitverlängerung* were accomplished by deleting additional volumes of power that could be used until the end of the operation of the nuclear reactor in question (so-called *Reststrommengen*). These additional power volumes in connection with *Laufzeitverlängerung* were allocated to each reactor in 2010.[330] This occurred within the 11th amendment of the Atomic Law of 8 December 2010.[331] The volumes of *Reststrommengen* allocated were associated with an extension of the lifetime of each reactor by an average of 12 years.[332] The provisions of the so-called 13th amendment to the Atomic Law of 31 July 2011 (i.e. *Atomausstieg II*), by withdrawing the previously allocated *Reststrommengen,* correspondingly shortened the permissible use of individual reactors.[333]

The second solution introduced under *Atomausstieg II* was to define individual end-of-life dates for each commercial nuclear reactor in Germany.[334] The nuclear reactors were divided into six groups. The first group of nuclear reactors, which included the longest-operating reactors, was shut down immediately. For the other five categories of nuclear reactors, the shutdown date was set at the end of 2015, 2017, 2019, 2021, and 2022, respectively. This solution represented a normative novelty (concerning *Atomausstieg I*), as an end date was set for the exit from nuclear power. Until 2011, energy companies had only exact limits of power that individual nuclear reactors were allowed to produce before their shutdown, dismantling and decontamination. This involved, for example, the possibility of operating nuclear reactors for a sufficiently long time by only making small use of the remaining production capacity allocated to them (*Reststrommengen*). Thus, *Atomausstieg II* introduced a specific end date for the use of nuclear power in Germany. Hence, the operators of nuclear power plants were significantly restricted in their freedom to use them, thereby limiting their freedom of economic activity.[335] The Federal Constitutional Court drew attention to the impossibility for energy companies to use certain production strategies, i.e. the freedom to plan the use of nuclear reactors taking into account periodic (mandatory) maintenance and overhaul or to deliberately reduce production (e.g. during

periods of lower power wholesale prices).[336] Such a statutory provision meant that production at nuclear reactors had to be intensified within the available remaining capacity (*Reststrommengen*). It simply ensured that the concrete asset value behind the available production capacity was not lost.

Atomausstieg II was introduced by the 13th Amendment to the Atomic Law of 31 July 2011. The essence of this amendment was the deletion of the additional *Reststrommengen* quantities introduced by the 11th amendment in Appendix 3 of the Atomic Law.[337] This meant undoing the effects of the *Laufzeitverlängerung* of extending the lifetime of each nuclear reactor by an average of about 12 years.[338] By amending Annex 3 of the Atomic Law, the additional *Reststrommengen* quantities of 1,804 TWh granted to the energy companies earlier under the *Laufzeitverlängerung* were taken away.[339] At the same time, the 13th Amendment specified the shutdown dates for individual nuclear reactors.[340] Interestingly, the Federal Constitutional Court, describing *Atomausstieg II* in its judgment, stated that the legislature promised 12 years of continued operation.[341]

In assessing the constitutionality of the 13th Amendment, the FCC pointed out that it interfered with the property rights of the applicant energy companies. However, the legislature's action did not constitute an expropriation (within the meaning of the *Grundgesetz*).[342] Indeed, the amendment did not lead to the withdrawal of independent (i.e. transferable) rights or the acquisition of any goods (by the State).[343] The Court pointed out that in connection with the 13th Amendment, establishing individual shutdown dates for particular nuclear reactors did not lead to a deprivation of ownership of such property rights by the applicant energy companies, which could then be traded.[344] The establishment of rigid timeframes for the termination of the operation of particular nuclear reactors may lead to the *Reststrommengen* granted in 2001, subject to possible transfer between nuclear reactors, not being fully usable. Although this leads to a deprivation of the free disposal of nuclear reactors, it does not constitute a deprivation of elements of the property right.[345] The Federal Constitutional Court qualified the legislature's action as a specification of the admissible forms of disposal of property arising from nuclear reactors.[346] At the same time, the Court pointed to the admissibility of interference with property by affecting the content and boundaries of that property, whereby it is essential for this admissibility that no other measure or action is available that would achieve the same effects and that would constitute a lesser interference with the right of property.[347] Concerning the 13th Amendment, the FCC, in this case, recognised the absence of any other measure or action that would constitute a lesser interference with property, which the legislature could have used to accelerate the move away from nuclear power and thereby simultaneously reduce the so-called *Restrisiko* associated with the commercial use of nuclear power.[348] The Court emphasised that the administrative measures available under the Atomic Law, such as revoking the licence to operate a nuclear installation, would not have made

it possible to achieve the objectives of the law introducing *Atomausstieg II* as quickly and comprehensively.

The FCC's findings on the broad powers of the legislature in determining the content and boundaries of property when there is a strong social dimension to the subject property in question,[349] the Court referred to two legal relationships in the field of nuclear law: the status of the licences for the erection and operation of a nuclear reactor in terms of constitutional property protection and the nature of property rights relating to nuclear installations themselves. The FCC pointed out that the administrative authorisations for the erection and operation of the nuclear installation in question referred to in the provision of §7(1) and (1a) of the Atomic Law do not in themselves constitute property rights protected under Article 14 of the *Grundgesetz*.[350] Such authorisations are like state approvals to which a preventive (or repressive) prohibition to carry out activities without having (previously) obtained the relevant authorisation is attached. Authorisations under the Atomic Energy Law cannot be compared to the subjective public law rights, which are entitled to constitutional protection of property according to the recognised jurisprudence of the constitutional court.[351] These subjective public law powers provide the entitled individual with a legal status corresponding to property. The legal status of these subjective public law rights is of such importance that depriving them of an appropriate equivalent will violate the constitutional principle of the rule of law.[352] The legal status of these subjective public law rights derives from the fact that they are characterised by at least limited availability and are subject to acquistion to a negligible extent based on the right holder's action.[353] The Court has indicated the absence of these features in the case of authorisations granted based on the Atomic Law.[354] The size of the capital expenditure incurred by the applicant in connection with the application for a licence (energy concern)[355] is irrelevant. The Court emphasised that if a licence under Sections 7(1) and 7(1a) of the Atomic Law was granted immediately after the operator of the installation had significantly invested in the property and in the nuclear installation itself, or if the granting of the licence was a prerequisite for such a capital expenditure – even then the licences granted do not acquire the property rights of the entity to whom they were granted.[356] The Court has made it clear that the holder of the authorisations may have a constitutionally protected trust, but this circumstance does not give rise to constitutionally protected property.[357] The provision of Article 14 of the *Grundgesetz* does not protect public authorisations as such but only protects property rights acquired under the granted licence.[358]

According to the FCC, in the case of nuclear installations, we are dealing with protecting property as a fundamental right, but to a limited extent.[359] Due to its characteristics and functions, this type of property is intended to serve the personal freedom of the individual (i.e. the entity owning the installation) in a rather limited manner.[360] The Court pointed out that in the

case of nuclear installations, the operator's property has a particular dimension of influence on society.[361] On the one hand, nuclear power generation ensures energy security for society.[362] However, nuclear power belongs to the category of high-risk technology, which involves, among other things, the risk of massive damage and the still unresolved problem of perpetual storage of radioactive waste.[363] Both of these dimensions of nuclear power shape the social dimension of nuclear power plant ownership.[364] This circumstance provides the legislature with a wide range of regulatory discretion in the area of the Atomic Law.[365]

In the reasoning cited above, the Court escaped from attempting to address the possible question of whether *Atomausstieg I* and *Atomauststieg II* constituted expropriation within the meaning of the *Grundgesetz* and, consequently, whether it was necessary to pay appropriate compensation to the energy companies because of the different legal status of both *Reststrommengen* as property rights and the nuclear reactors themselves as the object of the energy companies' ownership and using the Act. It should be noted that the relevant legal qualification was the main subject of dispute in the doctrine.[366] This led the FCC to escape from the discussion of whether the legislature's action constituted an expropriation and, if so, whether it was justified, or perhaps it was not an expropriation (which formally was not), but by all material legal elements it was an expropriation.

The Court recognised the constitutionality of the objective used by the legislature to justify the expropriation by the need to accelerate the move away from the commercial use of nuclear power for power generation (i.e. *Atomausstieg II*).[367] This aim was to reduce the non-excludable risks of various types associated with the commercial use of nuclear power for power generation (i.e. *Restrisiko*).[368] In the opinion of the FCC, the reduction of non-excludable risks (Restrisiko) was to take place both in terms of establishing a time limitation (for the occurrence of these risks) and in terms of the extent of the impact of nuclear power.[369] The time limitation consists of introducing an individual time horizon for the admissible lifetime of each commercial nuclear reactor in Germany. In contrast, the limitation of the scope of the impact of nuclear power is most likely meant to undo the effects of *Laufzeitverlängerung* and thus limit the scope of nuclear power in Germany. In discussing the subsequent regulatory objectives pursued by the legislature with the introduction of *Atomausstieg II*, the Court emphasised that the legislature has wide discretion in choosing objectives serving the common good.[370] Therefore, in accelerating the departure from nuclear power, the legislature was, in the opinion of the FCC, concerned with protecting the health and life of the inhabitants of the Federation, an objective that follows directly from Article 2(1) sentence 1 of the *Grundgesetz*.[371] Furthermore, the Court pointed out that the legislature, in carrying out the expropriations in question, was fulfilling the State's task under Article 20a of the Basic Law

to protect natural living conditions as part of taking responsibility for protecting future generations.[372]

The Court addressed the arguments of the opponents of *Atomausstieg II* about the negative consequences of an accelerated exit from nuclear power for Germany's energy security. The FCC pointed out that the purpose of the 11th amendment to the Atomic Law (*Laufzeitverlängerung*) was, among others, to increase energy security.[373] The 13th Amendment (*Atomausstieg II*) aimed to minimise the risks associated with the commercial use of nuclear energy.[374] Therefore, the Court considered the negative impact on energy security irrelevant to achieving the basic statutory objectives of the 13th Amendment to the Atomic Law.[375]

The Court's reasoning quoted here in the context of legal interpretation is correct but ignores the problem of the impact of the accelerated departure from nuclear power (i.e. *Atomausstieg II*) on national energy security. Due to Germany's very strong interconnection with other EU countries through cross-border power connections, the accelerated departure from the use of nuclear power for the generation of power affects the energy security of several EU member states. The first impression may be that it is difficult to require a constitutional court to inform in detail concerning threats to national energy security. However, given the possibility of reconstructing a constitutional value based on the *Grundgesetz*, precisely in the form of energy security, the FCC should have addressed this matter in its judgment on 6 December 2016.

2.7 Sources of law and structure of state bodies responsible for the safety of nuclear installations

Among the issues related to nuclear energy in Germany, the issue of the safety of nuclear installations is of particular value for research purposes. This is a result of the specificity of the catalogue of law sources regulating these installations' safety. This is primarily due to the federal structure of state bodies, as well as the involvement of the nuclear industry in the process of creating legal norms. However, ensuring the security of nuclear installations is directly connected with ensuring energy security for society and the economy. Without an appropriate level of security for nuclear installations, society will not be keen to support the deployment or further use of nuclear installations.

The structure of co-regulatory bodies consists of public authorities that belong to the first or second branch of the government (legislative or executive). Also, the third branch of the government (judicial authorities) plays an important role. However, it is important to note that a few organs and entities that do not fit into the separation of powers into these three branches of the government are also involved in the regulatory process. The number of actors involved in the regulatory process and the significant number of legal acts and their types are due to the special character of this

industrial sector, which is subject to very strict regulations. This special character is also reflected in the considerable detail and specialisation of the entire law-making process – the multiplicity of stages also ensures the presence of certain technocratic elements due to the admission of specialists from the nuclear energy sector to participate (but only at some level) as co-regulators. All this creates a multi-level normative system and an extensive structure of entities co-creating these regulations. It should be emphasised that this multiplicity of types of legal acts themselves (and the entities that co-create them) ultimately translates into a hierarchical and coherent system of legal acts. Furthermore, international law also intensively influences regulations in the safety of nuclear installations, so this international dimension needs to be taken into account, too.

A catalogue of sources of law in the area of nuclear installation safety will be presented in this section together with the characteristics of the various state authorities or other entities responsible for issuing them.

2.7.1 Structure of sources of law in the area of safety of nuclear installations

The regulations concerning nuclear reactors' safety – or, more broadly, nuclear installations – form a hierarchically structured set. This is due to the structuring of the sources of law in *Grundgesetz* concerning generally applicable legal acts. The position of those legal acts whose status is not directly regulated by the Basic Law can also be clearly identified within this uniform structure of sources of law in the area of nuclear installation safety.

The foundation of the structure of these sources of law in the area of safety of nuclear installations forms generally applicable legal acts (laws). The characteristic feature of this structure of sources of law in the area of safety of nuclear installations is that the generally applicable laws are supplemented by an even larger number of sources of internally applicable laws. At the same time, the sources of internally applicable law in the area of safety of nuclear installations also fit into this hierarchical structure. The generally applicable law consists of Basic Law, international laws, and federal laws and regulations. In contrast, internally applicable law in the area of nuclear installation safety consists of general administrative regulations; announcements of the Federal Ministry for the Environment, Nature Conservation and Reactor Safety (*Bundesumweltministerium*); RSK recommendations, SSK recommendations, ESK recommendations and RSK guidelines; KTA Rules, and Technical Standards.

The different types of legal sources in the area of safety of nuclear installations and the key legal acts within these categories will be discussed step by step according to their inherent legal force. The legal force of the different types of legal sources and the entities that adopt the respective national (German) regulations on the safety of nuclear installations have been presented in the following diagram [376,377] Figure 2.1:

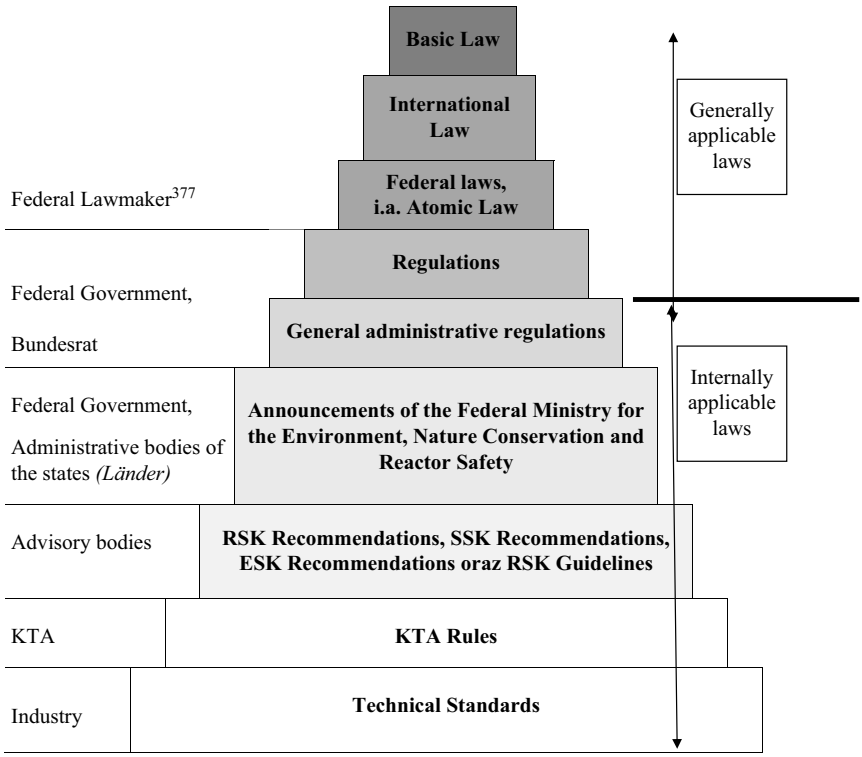

Figure 2.1 Structure of sources of law in the area of safety of nuclear installations.

2.7.2 **Grundgesetz** *as a source of law on the safety of nuclear installations*

The *Grundgesetz* (German Basic Law) is placed at the very top of the catalogue of sources of law. The German Basic Law designates the areas subject to legislative regulation by the Federation (as all others are subject to regulation by the federal states, i.e. *Länder*). The Basic Law also determines the institutional structure of public authorities in Germany. The substantive legal provisions of the Basic Law are also of great importance in the area of nuclear safety issues – above all, the constitutional regulation of fundamental rights and the principle of proportionality.[378] It is also solely within the remit of the federal legislature to make changes to the content of the *Grundgesetz*, which would affect the aforementioned relevant areas from the perspective of reconstructing the catalogue of sources of law relating to nuclear installations. Amending the *Grundgesetz* requires the involvement of both federal organs and the states (*Länder*). Indeed, according to Article 79 of the Basic Law, an amendment to the *Grundgesetz* may be made through a federal law adopted under the procedure provided for by the provisions of Article 76 et seq. contained therein.[379] According to paragraph (2) of Article 79 of the

Grundgesetz, such a law requires a two-thirds majority of the statutory membership of the Bundestag and a two-thirds majority of the Bundesrat. Since the Bundesrat is composed of members of the governments of the states (*Länder*) according to Article 51 (1) of the *Grundgesetz*, the states (*Länder*) have an equal say in amendments to constitutional matters (compared to the one of the Bundestag). It is also very easy to form a blocking minority in the Bundesrat. This is also because political party affiliations at the federal states (*Länder*) level are not of such importance because the interests (legal and actual) of the states (*Länder*) will often be different from those of the Federation (e.g. appropriate measures are undertaken to ensure that the powers of the states (*Länder*) will not be lost to the Federation). Besides, the interests of an individual federal state (*Land*) will often differ from those of other federal states (*Länder*). Since the elections to the parliaments of the particular federal states (*Länder*) are separate from the parliamentary elections at the federal level, the political composition of the Bundesrat does not necessarily reflect the current governmental majority (as elected by the Bundestag) in every case. For this reason, minority coalitions of the federal states (*Länder*) can often be formed in the Bundesrat, and they may block the government majority at the federal level.

The most important provision of the Basic Law concerning (possible) constitutional amendments in the context of nuclear energy is the wording of Article 79(3) of *Grundgesetz*: "An amendment to this Basic Law which would violate the division of the Federation into federal states, the essential interaction of states in legislation or the principles set out in Articles 1 and 20 shall not be admissible."[380] This means that the standard of protection derived from fundamental rights cannot be lowered by amending the Basic Law. This also follows directly from its Article 1(3) provision: "The following fundamental rights as directly applicable law shall bind the legislature, the executive, and the judiciary."

On the issue of setting the constitutional standard and, above all, on the issue of reconstructing the scope of protection, the Federal Constitutional Court (FCC) plays the most important role. Despite the lack of formal involvement of the German constitutional court in the process of amending the Basic Law, the case law of this constitutional court determines the actual level of protection of fundamental rights. The case law of the Court, maintaining the principle of the primacy of the *Grundgesetz* in the hierarchy of sources of law, makes it often indispensable to amend the *Grundgesetz* to introduce certain new regulatory solutions.

2.7.3 International law as a source of law in the area of safety of nuclear installations

An extremely interesting question is as follows: what relevance does the international law in nuclear energy have for constitutional standards? In the case of the constitutional status of the individual, which is based on the

universalism of human rights and the international protection of human rights, the impact of international standards on constitutional standards is significant. In the case of international nuclear law, however, the relationship to constitutional standards cannot be so easily and unequivocally established. For this reason, given the goal of strengthening democratic processes and the rule of law, it is important that constitutional standards are adhered to and that appropriate improvements are made in nuclear energy laws, too. The increasing number of regulations in international law (as well as in EU law) that concern nuclear energy does not necessarily lead to strengthening the constitutional standards. At first glance, the inflation of regulations already suggests the opposite (e.g. due to the reduction of legal certainty). There are three areas to which constitutional standards apply: procedure, content, and form. The development of detailed international regulations may procedurally occur in a way independent of existing and applicable democratic standards. Such a phenomenon may even lead to the exclusion of the application of constitutional regulation to a given matter of public law. This may contradict, for instance, the principle of universality of the Constitution and may undermine the democratic basis of the state system. The creation of very detailed regulations in the area of international law (as well as in the area of EU and Euratom law) in the event of their considerable size may cause problems as regards the possibility of substantive verification of their content due to the small number of specialists in this area.

However, it is worthwhile to find out if there are any mechanisms within international nuclear law to protect domestic constitutional standards (for instance, a sufficiently high level of protection of citizens' health and life by public authorities).

Even the state's highest level of protection of citizens, which is constitutionally guaranteed, will not adequately safeguard citizens if the state does not take appropriate actions concerning nuclear reactors located in neighbouring countries. The environment, after all, does not recognise national borders – for this reason, the area of influence of individual nuclear installations can often include neighbouring states (or even wider geographical areas). This is also the case if, due to its energy policy, a country, such as Germany, shifts away from the commercial use of nuclear sources for power generation.[381] Such a transboundary approach should also apply to nuclear installations other than nuclear reactors (such as interim storage facilities at nuclear power plant sites or perpetual storage facilities for radioactive waste). This is due to the transboundary impact of nuclear power, particularly if a nuclear installation were to release contamination. Environmental law as a separate branch of law has been developed precisely based on legal disputes concerning the transboundary impact of industrial installations. For this reason, the constitutional law literature was examined to answer the question of whether the German state, to ensure the constitutional freedoms and rights of individuals, is entitled to appropriate safeguards under international law.

First of all, the Federal Republic of Germany is a party to several bilateral international agreements with foreign states.[382] They primarily concern the

exchange of information at the earliest possible stage on installations that are located close to country borders.[383] The obligation to provide information covers the following elements: technical modifications of nuclear installations or modifications to nuclear installations requiring a licence that are located close to a border; experiences with the operation of installations, in particular incidents requiring reporting; reports on developments and changes in the field of nuclear policy and radiation protection; strengthening safety requirements through regulatory measures (in particular as regards exceptional protective measures in the event of serious accidents[384]).

So far, Germany has concluded bilateral agreements on the exchange of information on nuclear installations located close to national borders with seven of its nine neighbouring countries[385]: Netherlands, France, Switzerland, Austria, Czech Republic, Denmark, and Poland.[386] Germany has also established joint committees with five neighbouring countries for regular consultations in the areas of reactor safety and radiation protection[387] (Netherlands, France, Switzerland, Austria and the Czech Republic[388]).

Another type of bilateral agreement is related to assisting in the event of a nuclear disaster.[389] Such bilateral agreements have been concluded with Germany's neighbouring countries, Lithuania, Hungary, and Russia.[390] Based on these agreements, the mechanisms for the direct exchange of information between services responsible for acting in the event of a nuclear power plant disaster are in place at regional levels in areas that surround the nuclear power plants in the vicinity of national borders.

Multilateral agreements fall into another category of international law acts. Germany is a party to several international agreements of this kind. Chronologically, the first one was the Statutes of the International Atomic Energy Agency (IAEA), signed in New York on 26 October 1956.[391] Regulations adopted by the IAEA – primarily in connection with environmental protection – are intended to protect against the risks associated with the peaceful uses of nuclear energy.[392] Among the regulations developed by the Agency are safety standards for areas such as the safety of nuclear installations, uranium mining, and transport of radioactive material.[393] However, these regulations are of a *soft-law* nature,[394] i.e. they do not carry any specific legal force. The compliance of the addressees of these norms with the content of the standards results from the authority of the legislature concerned, as well as from the addressee's own decision to submit to (comply with) the regulation in question. In addition, fourteen multilateral international agreements have been developed under the guidance of the IAEA. These relate to the following areas: nuclear safety, nuclear damage liability, and interstate technical dialogue at a regional level.

From a constitutional perspective, the most relevant multilateral agreements address security concerns. The following international agreements should be included in such a set: Convention on Nuclear Safety, signed in Vienna on 20 September 1994[395]; Convention on Early Notification of a Nuclear Accident, signed on 26 September 1986[396]; Convention on the

Physical Protection of Radioactive Material, signed on 26 October 1979[397]; Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management, signed on 5 September 1997.[398]

It is worth focusing on the Convention on Nuclear Safety (1994) and analysing whether it regulates nuclear installations' safety by their location. Such an approach could provide a basis for influencing another state that is a party to the Convention regarding nuclear installations close to the border of another state – and, consequently, could provide some legal means to influence a neighbouring state considerably.[399] The Convention on Nuclear Safety refers explicitly in the provision of Article 17 to the issue of the siting of nuclear installations.[400] However, this provision does not provide a legal basis that would oblige any State Party to the Convention to choose a suitably safe location for a nuclear installation.[401] The mechanism provided by the Convention for verification of compliance with its provisions with periodic reports by States-Parties to the Convention does not provide a basis for making legally binding demands (from a neighbouring state) to improve the safety of nuclear installations located close to the border.[402] Even more so, the Convention on Nuclear Safety provisions do not provide a basis for demanding the relocation of a nuclear installation.[403]

Moreover, the Convention on Nuclear Safety does not provide a legal basis to formulate legally binding demands for the earliest possible information on nuclear accidents.[404] It is pointed out that the Convention on Environmental Impact Assessment in a Transboundary Context provides a much better legal basis, drawn up in Espoo on 25 February 1991,[405] the so-called Espoo Convention. The Espoo Convention stipulates that an environmental impact assessment must be carried out if a nuclear reactor (or another nuclear installation) is likely to cause significant harmful transboundary impact. According to Article 1(VIII) of the Espoo Convention, a transboundary impact "shall mean any impact, not exclusively of a global character, within an area under the jurisdiction of a Party caused by a proposed activity, the physical cause of which is situated wholly or in part within the area under the jurisdiction of another Party." The scope of installations regulated by the Espoo Convention is specified in paragraph 2 of Annex I, which identifies nuclear power plants and other nuclear reactors (except research installations for the production and maintenance of fissionable and fertile materials whose maximum power does not exceed 1 kilowatt of continuous thermal load) in the list of activities covered by this regulation. This means that the Espoo Convention covers all commercial nuclear power plants and the majority of research reactors, as setting the thermal power level at 1 kilowatt is a very low limit.

Furthermore, the scope of the Espoo Convention also includes other nuclear installations – it is clearly mentioned in paragraph 3 of Annex I: "Installations designed solely for the production or enrichment of nuclear fuels for the reprocessing of irradiated nuclear fuels or for the storage, disposal and treatment of radioactive waste." Including a project in the Espoo Convention implies the

need to run a procedure to assess the environmental impact of this nuclear installation project. Simultaneously, all those affected by the project should be notified in advance so that they can take part in the procedure to assess the environmental impact of the nuclear installation in question. If a nuclear installation already exists, Article 7 of the Espoo Convention mentions a "post-implementation analysis" – a mechanism that can be qualified as a form of follow-up supervision for nuclear installations falling within the scope of the Espoo Convention.

The last type of possible impact on nuclear installations located in neighbouring states is based on principles of customary international law and related principles of general public international law.[406] The starting point here is a 1941 judicial decision in a case known as Trail Smelter. It has established an international law principle of prohibition of significant transboundary environmental impairment, which has subsequently been reaffirmed in numerous judicial decisions and international agreements.[407] However, it should be noted that its application to nuclear power plants (and thus to the materialisation of such a threat) is much more complicated than for other industrial installations. In the case of nuclear power plants, we are only dealing with the threat of a significant harmful impact on the environment in a neighbouring country. In the event of a nuclear catastrophe (and thus in the event of the materialisation of such a threat), the principle will undoubtedly apply. However, legal certainty will normally be associated with the non-applicability of the principle of prohibition of significant transboundary environmental damage due to the unreliable preventive character of this principle concerning nuclear installations. The inability to apply this principle to cases of threatened adverse environmental impact in a neighbouring state is confirmed by the literature, which points exclusively to such an application of this principle.[408] A concept has been developed in the doctrine as a sort of attempt to counteract this situation.[409] According to this concept, the operation of a nuclear power plant, which may cause "significant, extraordinary damage by way of exception during normal operation, and certainly in the event of a reactor catastrophe," would have to be qualified as *ultra-hazardous activity*.[410] In the private law this would generate a shift from liability based on fault to risk-based liability.[411] As a result, one could conclude that there is an obligation to avoid such a transboundary environmental violation that the country of origin of the nuclear installation would bear.[412] However, it is not to be inferred from the findings of German public international law doctrine that it is possible to formulate a demand for a general ban on locating foreign nuclear power plants close to the country's borders.[413] While the literature formulates a demand that nuclear installations close to a border should be equipped with cutting-edge technology, this basis does not allow for formulating a general binding character of such a demand.[414] Under customary international law, it is possible to set a certain minimum standard based on the International Court of Justice (ICJ) judgment in *Pulp Mills on the River Uruguay*.[415] Indeed, the judgment imposes an obligation to conduct an environmental impact assessment.[416] In the event of a conflict over

the potential location of a future nuclear installation, environmental impact assessments can produce good results because of the need for public involvement in the form of participation in public consultations.

2.7.4 Federal laws as a source of law in the area of nuclear installation safety

Federal laws also relate to the safety of nuclear installations. Federal laws are enacted under a regular legislative procedure, which (depending on the matter) includes the participation of the Bundesrat. The Bundesrat comprises representatives of the states (*Länder*), who participate in developing legislation on the safety of nuclear installations at the level of federal laws. Some federal laws include matters that are within the exclusive legislative competence of the Federation.

Federal laws have a lower legal force than the *Grundgesetz* and ratified international agreements. Federal laws are also the basic legislation through which the Euratom directives are implemented into the German legal system. For this reason, it is worth taking a closer look at the federal laws of fundamental importance from the perspective of nuclear installation safety.

At the level of federal legislation, the German Atomic Energy Act (*Atomgesetz, AtG*) must be considered the most important in nuclear installation safety. This law was passed after the Federal Republic of Germany had given up its nuclear weapons.[417] It confirmed that the German state would focus on developing the peaceful use of nuclear energy. This was emphasised in its very title: The Act on the Peaceful Use of Nuclear Energy and Protection against its Dangers (*Gesetz über die friedliche Verwendung der Kernenergie und den Schutz gegen ihre Gefahren [Atomgesetz]*).

The Federation, in enacting the Atomic Energy Act, exercised its legislative competence expressed in Article 73(14) (Article 74(1) No. 11a in the old wording) of the Basic Law.[418] With the 2002 amendment to the Atomic Energy Act, which gave *Atomkonsens I* its statutory basis, the Atomic Energy Act now serves (according to the government declarations) only to, firstly, bring order to how the commercial generation of power from nuclear fuel is terminated.[419] Secondly, the Atomic Energy Act is intended to ensure adequate safety for the life and health of living beings and protect physical assets from the dangers of using nuclear energy and the harmful effects of ionising radiation.[420] If nuclear damage occurs, it is to be compensated based on statutory regulation.[421] The Atomic Energy Act also serves the purpose of ensuring that the use of nuclear energy does not endanger Germany's internal or external security.[422] This act also aims to enable Germany to fulfil its international obligations regarding nuclear energy and protect the German state and its citizens from radiation.[423]

The most representative chapter of the Atomic Energy Act is its second chapter: "Provisions on Supervision." It outlines the range of activities that are subject to supervision by state authorities, and it contains regulations that deal with licences for the import and export of nuclear fuel (§3); licences for

the transport of nuclear fuel outside the premises of the nuclear installation concerned (§4); the statutory obligation to hold financial security in connection with the transborder transport of nuclear fuel (§4a), as well as in other situations that require such an obligation to hold financial security (§4b); the entitlement to hold nuclear fuel and the state deposit in respect of nuclear fuel (§5); licences for the storage of nuclear fuel (§6); licences for the erection, operation and also the mere possession of nuclear installations (§7 cl. 1); date of the latest possible termination of operation of existing and operating nuclear power plants (§7 cl. 1a); maximum amount of electricity which can still be generated by individual existing and operating nuclear power plants (§7 cl. 1b in conjunction with Annex III); competence to include one of the shut-down nuclear power plants in the capacity reserve (§7 cl. 1a); authorisation to shut down the installation and to dismantle it in whole or in part (§7 cl. 3); preliminary decision (as a promise/a letter of intent) on the future location of a nuclear installation (§7a); limitation of the possibility of third parties to file objections with the issuance of a partial or preliminary decision (§7b); definition of the entity on which the obligation to maintain the safety of nuclear installations rests (§7c); definition of the relationship of the Atomic Energy Act to the provisions of the Federal Immission Control Act (*BImSchG*)[424] and the Product Safety Act (*ProdSG*)[425] (§8); authorisation for the treatment and processing of nuclear fuel outside licensed installations (§9); obligations concerning the means of management and disposal of radioactive waste, the means of interim storage of spent nuclear fuel (§9a); the obligation of the states to establish interim storage facilities for radioactive waste (§9a cl. 3); the Federation's obligation to guarantee the establishment of a perpetual storage facility for nuclear waste (§9a(3)); the obligation of those who possess radioactive waste to deliver it to either an interim or a perpetual storage facility for radioactive waste (§9a(2)); the stages of the licensing procedure for the launch of operation of a nuclear installation (§9b); the catalogue of conditions allowing expropriation for the purposes of the construction and operation of a final radioactive waste repository (§9d and §9e); the obligation of landowners so that they cease their activities relating to the licensing procedure for the construction of nuclear installations (§9f); the possibility of establishing, by means of regulations, exceptions to the regulations provided for by §3–§7 and §9 of the Act (§10); the authorisation for the Federal Government to issue regulations to define the elements of licences, notifications and general admissibility (§11) and protective measures (§12); authorisation for the Federal Government, with the consent of the Bundesrat, to issue regulations implementing the decisions of the European Nuclear Energy Agency (§12a); the manner of verifying that persons working on nuclear installations provide the guarantee that safety standards are duly met (§12b); the maintenance of a register of persons exposed to radioactivity (§12c); the maintenance of a register of sources of high-level radioactivity (§12d); the obligation to update the amount of financial security in connection with the statutory obligation to maintain

adequate financial security in the event of liability for damages (§13); the regulation of the priority of satisfaction of the statutorily required maintenance of adequate financial security (§15); the form and content of decisions to be issued (§17); the prerequisites for assessing the validity of a compensation claim for the operator of an installation in the event of the revocation or invalidity of a decision or amendment of regulations issued pursuant to the Act (§18); the scope of state supervision (§19); the scope of the obligation on nuclear installation operators to continuously improve these installations (§19a); the scope of the possibility of appointing experts in administrative licensing proceedings and in state supervision of nuclear installations; the specification of proceedings in which fees are charged (§21); the determination of fees and remuneration for the use of interim storage facilities for radioactive waste and a perpetual storage facility for entities obliged to supply radioactive waste (§21a); the possibility of financing a perpetual storage facility for radioactive waste and a facility for the safe storage of radioactive waste, through financial contributions by nuclear operators to this project (§21b).

The list of nuclear-related activity areas subject to state supervision is long. At the same time, to a large extent, the performance of state tasks in these areas has been delegated to the administration of the federal states (*Länder*). This is because Chapter Three of the Atomic Energy Act is very concise and identifies only a few federal administrative bodies as executors of state tasks in nuclear energy. Based on Article 87c of the *Grundgesetz*, the execution of the remaining administrative tasks was entrusted to the states (*Länder*).

Another federal law, the Precautionary Radiation Protection Act *Strahlenschutzvorsorgegesetz (StrVG)*[426] of 19 December 1986, deals with ways to protect the public from ionising radiation. The Precautionary Radiation Protection Act was enacted six months after the Chernobyl nuclear power plant accident. Prior to that disaster, German legislation had lacked such a comprehensive regulation. The 1986 law created the system for continuously monitoring radioactivity, both in the environment and, for instance, in food products or water. It also included the definition of values of acceptable levels of ionising radiation. State tasks in protecting the public against ionising radiation were allocated to both the Federation (§2 of the Act) and the states (*Länder*) – §3 therein. The 1986 act was replaced on 01 October 2017 by the Act on the Reorganization of the Law on Protection Against the Harmful Effects of Ionizing Radiation (*Gesetz zur Neuordnung des Rechts zum Schutz vor der schädlichen Wirkung ionisierender Strahlung*).

In the area of nuclear installation safety, another important federal act of 9 October 1989 – *Gesetz über die Errichtung eines Bundesamtes für Strahlenschutz*[427] – is the Act on the Establishment of a Federal Office for Radiation Protection (*Bundesamt für Strahlenschutz*). The office's responsibilities include carrying out the administrative tasks of the Federation concerning radiation protection, nuclear reactors' safety, transport of radioactive materials, disposal of radioactive waste (including the establishment and operation of a

federal facility for the safeguarding and perpetual storage of radioactive waste) based on the Atomic Energy Act (§2(1)). At the same time, the Act introduces a presumption of jurisdiction of the Federal Office for Radiation Protection whenever the jurisdiction of another public administration does not result from statutory regulations (§2(4)). The Office is part of the Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection (§1(1)), and its head office is located in Salzgitter (§1(2)). The establishment of the Federal Office for Radiation Protection (which is the federal supervisory authority in the area of nuclear installation safety) in 1989 was the consequence of the Chernobyl disaster. Before the establishment of the Federal Office for Radiation Protection, all administrative tasks in this area were performed by the administrative bodies of the states (*Länder*).

2.7.5 Federal regulations as a source of law in the area of nuclear installation safety

Regulations are another important legal source in the area of nuclear installation safety. They have the character of generally applicable legal acts and serve to implement the provisions of the Atomic Energy Act.[428] Nine federal regulations concerning security and safety measures for nuclear power plants are currently in force.

First of all, reference should be made to the Radiation Protection Ordinance *Strahlenschutzverordnung, StrlSchV* – 2018).[429] It regulates the basics of radiation protection, sets safety limits, requirements for the organisation of radiation protection procedures, standards for the protection of people, the environment, protection in the event of sudden events, determination of how accidents are to be dealt with, and the amount of compensation (should they occur).[430]

Another relevant piece of legislation is the Regulation of 18 February 1977 on the Procedure for the Licensing of Facilities in §7 of the Atomic Energy Act (*Verordnung über das Verfahren bei der Genehmigung von Anlagen nach §7 des Atomgesetzes* [*Atomrechtliche Verfahrensverordnung*]).[431] It regulates both the contents of the documents to be submitted in the licensing procedure for a nuclear installation as well as the public participation in such an administrative procedure, the conditions for the safe operation of nuclear installations, how the procedure is conducted and the criteria for making significant amendments to already granted licences and the corresponding public involvement.[432]

The next relevant piece of legislation is the Regulation on Financial Security under the Atomic Energy Act of 25 January 1977 (*Verordnung über die Deckungsvorsorge nach dem Atomgesetz* [*Atomrechtliche Deckungsvorsorge-Verordnung*]).[433] It regulates, for instance, the amount for the statutorily required financial security, the scope of this security and the information obligations in this respect.

Another piece of legislation is the Regulation on Nuclear Safety Officers and the Reporting of Incidents and Other Events of 14 October 1992 (*Verordnung*

über den kerntechnischen Sicherheitsbeauftragten und über die Meldungen von Störfallen und sonstigen Ereignissen [*Atomrechtliche Sicherheitsbeauftragten- und Meldeverordnung*]).[434] This regulation establishes the office of the Commissioner for Nuclear Safety and defines its tasks and responsibilities.[435] It also regulates how information on specific incidents occurring at individual nuclear installations is to be communicated.[436]

The regulation of 17 December 1981 regulation concerning the costs associated with the Atomic Energy Act and the Radiation Protection Act (*Kostenverordnung zum Atomgesetz und zum Strahlenschutzgesetz*)[437] regulates the issue of costs occurring in connection with administrative proceedings under the Atomic Energy Act and the Radiation Protection Act.

Another piece of legislation, commonly known as the Potassium Iodide Regulation of 5 June 2003 (*Verordnung zur Abgabe von kaliumiodidhaltigen Arzneimitteln zur Iodblockade der Schilddrüse bei radiologischen Ereignissen* [*Kaliumiodidverordnung*])[438] concerns the conditions for the preparation and distribution of potassium iodide therapeutic agents for iodine blockade in the event of radiological events.[439]

Equally important is the regulation of 30 April 2009 that governs the transportation of radioactive waste into, out of, and within Germany (*Verordnung über die Verbringung radioaktiver Abfälle in das oder aus dem Bundesgebiet* [*Atomrechtliche Abfallverbringungsverordnung*]).[440] It implements Council Regulation 2006/117/Euratom on the supervision and control of shipments of radioactive waste and spent fuel.[441]

Another regulation pertains to advance financial contributions for the establishment of federal facilities for the securing and final disposal of radioactive waste: *Verordnung über Vorausleistungen für die Einrichtung von Anlagen des Bundes zur Sicherstellung und zur Endlagerung radioaktiver Abfälle* [*Endlagervorausleistungsverordnung*] of 28 April 1982.[442]

2.7.6 General administrative regulations as a source of law in the area of safety of nuclear installations

In the hierarchy of sources of law, general administrative regulations (*Allgemeine Verwaltungsvorschriften)* have a lower legal force than federal regulations. These are the legal acts issued by superior administrative bodies to their subordinate organisational units; they serve to specify administrative activities more precisely and to shape these activities uniformly.[443] The authorisation to issue administrative regulations can be provided for in the text of a regulation.[444] Although general administrative regulations are internally binding,[445] they also have indirect effects externally if they form some basis for certain administrative decisions.[446]

Out of eight pieces of legislation that have been issued in the form of general administrative regulations in the field of nuclear installations safety,[447] it is vital to present two of them in the context of nuclear installations safety. The first are the general administrative regulations issued according to *Strahlenschutzverordnung*

concerning the determination of radiation exposure due to the release of radioactive matter from nuclear installations of 28 August 2012 (*Allgemeine Verwaltungsvorschrift zu §47 der Strahlenschutzverordnung (Ermittlung der Strahlenexposition durch die Ableitung radioaktiver Stoffe aus Anlagen oder Einrichtungen)*).[448] The second are the general administrative regulations on radiation doses of 20 July 2004 (*Allgemeine Verwaltungsvorschriften zu §40 Abs. 2, §95 Abs. 3 Strahlenschutzverordnung und §35 Abs. 2 Röntgenverordnung [AVV Strahlenpass]*).[449]

2.7.7 *Announcements of the Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection as source of law in the area of nuclear installation safety*

Announcements of the Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection (*Bundesministerium für Umwelt, Naturschutz, nukleare Sicherheit und Verbraucherschutz*) constitute another legal source. The Ministry issues them in consultation with the states (*Länder*).[450] The announcements have a variety of forms: recommendations,[451] sets of principles,[452] guidelines,[453] interpretations,[454] and manuals.[455] The announcements inform the general public of such findings on which there is a consensus on applying particular Atomic Energy Act provisions.[456] At the same time, this consensus should exist between the Ministry and the individual supervisory or licensing authorities for nuclear installations at the level of the individual states.[457]

In contrast to general administrative regulations (*Allgemeine Verwaltungsvorschriften*), the Ministry's announcements are not binding.[458] In practical terms, however, they are binding because their provisions are considered either in licensing specific nuclear installations or in connection with surveillance measures applied in specific situations.[459]

To date, the *Bundesumweltministerium* has issued more than 60 nuclear-related announcements.[460] These concern, among other things, the general safety conditions of nuclear power plants, the definition of the area of spread of radioactive contamination due to accidents, countermeasures in the event of a disaster in the vicinity of a nuclear installation, radiation protection during modernisation works and arrangements for periodic inspections of nuclear power plants.[461]

2.7.8 *Guidelines and recommendations of RSK, SSK, and ESK as a source of law in the area of nuclear installation safety*

In the government administration's structure dealing with nuclear reactors, two bodies, formed as committees, are worth mentioning. These are the Reactor Safety Commission (*Reaktor-Sicherheitskommission*, RSK) and the Commission on Radiological Protection (*Strahlenschutzkommission*, SSK). They have been established by the Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection to advise it

on issues arising in the context of administrative proceedings relating to the licensing of nuclear installations and in connection with supervision by the Ministry.[462] In 2008, another body was established: the Nuclear Waste Management Commission (*Entsorgungskommission*, ESK). The advisory function of the ESK, however, relates to issues defined by the Ministry, not necessarily to ongoing administrative proceedings. At the same time, all these bodies can also act on their initiative – such an option has been included in their Statutes.

The Reactor Safety Commission (RSK) consists of 12 members. The Commission's objectives derive from its statutes (*Satzung der Reaktor-Sicherheitskommission vom 22. Dezember 1988*), adopted on 22 December 1999.[463] The Commission may only be composed of individuals who guarantee substantive and objective advice to the Ministry (§3 sentence 3 of the statutes). Furthermore, the Commission's composition should be shaped so that the full spectrum of views on nuclear energy is represented. This requirement is formulated in such a way that the members' views of the Commission must be based on the state of science and technology (§3 sentence 4 of the statutes). Those who are sceptical about nuclear power or have a negative attitude towards it are also to be represented on the Commission. At the same time, as required by the statutes, the members of the Commission are independent and cannot be constrained by any instructions (e.g. from the entities or institutions in which they are employed). Participation in the Commission's work is decidedly personal, as it is impossible to replace its statutory members (§4 sentences 1 and 2 of the statutes). The statutes set out in detail all the obligations of Commission members if there is a need to exclude themselves from the work of the Commission if a conflict of interest arises (or is likely to arise).[464] At the same time, the members of the Commission are obliged to respect the professional qualifications of the other members, and the discussions to be held, according to the statutes, are subject to the rules of scientific discourse (§4 sentence 3 of the statutes). The term of office of a member of the Commission is three years, while the possibility of direct reappointment is limited to the next term only (§4 sentence 2 of the statutes). However, in exceptional, individual cases, when it is necessary to ensure the continuity of the Commission's activity, further extension of the term of office is permissible (§4 sentence 2 of the statutes *in fine*).

The provision of §9(1) sentence 1 of the statutes provides for the power of the Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection to assign the Reactor Safety Commission (RSK) with tasks to advise on a specific issue (designated by the Ministry). At the same time, the Commission may also independently establish certain issues as the subject of its work (§9(1) sentence 2 of the statutes). The meetings of the Commission are held behind closed doors (§13 cl. 1). On the instruction of the Ministry, representatives of other federal public authorities, as well as representatives of public authorities from the federal states (Länder), may be

invited to a meeting of the Commission (§13 cl. 2 sentence 1). The obligation to be invited to a meeting of the Commission arises when the subject of its discussion is an administrative proceeding concerning the licensing of a nuclear installation or the supervision falling within their area of competence (§13(2) sentence 2). Representatives of the competent public authorities are then entitled to speak and participate in the discussions concerning their activities (§13(2) sentence 2). The same regulation of participation in meetings of the Reactor Safety Commission also applies to experts who have participated in the relevant licensing or supervisory proceedings (§13(3)). The Commission adopts resolutions by a majority vote. In exceptional cases, decisions can be in voting by circulation (§16 cl. 1). A majority of at least two-thirds of the votes of the appointed number of members of the Commission is required for the RSK's adoption of recommendations which are to concern the site of a nuclear installation or the concept for such an installation, or the authorisation to operate a nuclear installation (§16 cl. 2). The votes of the individual members of the Commission shall have equal weight (§16 cl. 3 sentence 1). According to the statutes of the Commission, all members are jointly responsible for the decisions taken (§16 cl. 3 sentence 1). If a member of the Commission is outvoted, they are allowed to express a different opinion in the final minutes or in the publication of the respective recommendation or the respective position of the Commission (§16 cl. 3).

The Reactor Safety Commission is responsible for preparing technical or life science recommendations and preparing positions for the Ministry (§11 cl. 1 sentence 1). Both recommendations and positions must be justified in an understandable manner (§11 cl. 2 sentence 3). It seems that this provision in the statutes intended to avoid the use of scientific jargon by the Reactor Safety Commission, as such type of language is incomprehensible to the general public. Furthermore, the explanatory memorandum (of recommendations or positions) must specify in detail the subject matter of the Commission's investigations and contain information on the means used to establish and find out the facts, as well as on the methods used to develop them – in particular, those facts which formed the basis for the final conclusions (§11(1) sentence 4). Interestingly, the Commission cannot make any judgments of a legal nature – this has been made clear in the provision of §11 (1) sentence 2 of the statutes. If the Reactor Safety Commission does not see it fit to make a recommendation on a particular matter or to adopt a particular position, it may refrain from doing so by issuing an appropriate order with its justification for such a decision (§11(2) of the statutes). The subordination of the Reactor Safety Commission to the Federal Ministry of the Environment results from yet another provision of the statutes: it provides that the Commission may not, without the consent of the Federal Ministry, prepare any positions or provide information in connection with its advisory function (§11(5) of the statutes).

Attention should be drawn to the so-called RSK Rules among the legal acts issued by the Commission. They comprehensively cover the technical

safety requirements for nuclear power plants using pressurised water reactors.[465] In Germany, it is mainly this type of nuclear reactor that was in use. The RSK Rules have been revised several times, most recently in 1996.[466] For the administrative bodies of the individual states (*Länder*) which carry out administrative licensing procedures for individual nuclear installations, the RSK Rules form the basis for decisions if the location and safety concept of the nuclear installation in question have been determined after the entry into force of certain RSK Rules.[467] As far as installations licensed prior to the entry into force of the defined current RSK Rules are concerned, they serve as a reference for the further development of safety standards for installations.[468]

Another body that enacts normative regulations on reactor safety is the Commission on Radiological Protection (*Strahlenschutzkommission*, SSK). According to §2 of its statutes,[469] the task of the Commission is to advise the Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection on protection against the dangers of ionising and non-ionising radiation. If, on the other hand, an accident occurs at a nuclear installation or any other radiological emergency, then the Commission on Radiological Protection is transformed into a Crisis Emergency Team (§1 (2) of the statutes). The Commission on Radiological Protection comprises 14 members (§3 (1) sentence 1 of the statutes). At the same time, the statutes require that the members of the Commission on Radiological Protection represent all areas of knowledge necessary to perform an advisory function to the Ministry as well as a broad spectrum of views arising from the current state of knowledge and technology (§3 (1) sentence 1 of the statutes).

The Reactor Safety Commission (RSK) and the Commission on Radiological Protection (SSK) have jointly issued several normative acts. The most relevant piece of legislation is the Joint Statement of the two commissions on the criteria for alerting disaster protection authorities by operators of nuclear facilities.[470]

Another body is the newly established Nuclear Waste Management Commission (*Entsorgungskommission*, ESK). Under the provision of §2 of its statutes,[471] the Commission advises BUM on the disposal of radioactive waste. This includes, in particular, the issues of waste conditioning, interim and perpetual storage of radioactive waste, transport of radioactive materials, and decommissioning of nuclear installations (§2 sentence 2 of the statutes). The Nuclear Waste Management Commission has 11 members (§3 sentence 1). The statutes require that the members of this Commission represent all areas of knowledge necessary to perform an advisory function for the *Bundesumweltministerium* – these areas of knowledge can be qualified as professional and objective. The statutes also stipulate that the members of the Commission must represent the widest possible range of views supported by the current state of knowledge and technology (§3(1) of the statutes). When exercising its advisory function, the Commission develops guidelines of a scientific and technical nature or takes a position on specific matters (§11 cl. 1

sentence 1 of the statutes). However, the Commission is not allowed to make legal or political decisions, as is clear from the wording of the statute's second sentence of §11(1). An example of a regulation passed by the Nuclear Waste Management Commission is the Guidelines for Decommissioning Nuclear Facilities (*Leitlinien zur Stillegung kerntechnischer Anlagen*)[472] of 16 March 2015.

2.7.9 KTA Rules as a source of law in the area of safety of nuclear installations

The Nuclear Safety Standards Commission (*Der Kerntechnische Ausschuss*, KTA) was established by the Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection.[473] The first meeting of the Nuclear Safety Standards Commission (KTA) was held on 1 September 1972.[474] By the end of 2023, the Commission had met 74 times.[475] Seven sub-committees have been established within the Commission as working groups with jurisdiction over the issues identified for these individual working groups.[476]

Under the provision of §3 of the KTA statutes,[477] the composition of the Nuclear Safety Standards Commission consists of representatives of five groups (assemblies): (1) seven representatives of manufacturers of nuclear installations; (2) seven representatives of operators of nuclear installations; (3) seven representatives of experts and advisory organisations; (4) seven representatives of the supervisory authorities of the Federation and the states (*Länder*); (5) seven representatives of other public administrations and other public interest advocates (including The Federal Ministry for Economic Affairs and Climate Action (*Bundesministerium für Wirtschaft und Klimaschutz*), trade unions, insurance companies, the German Institute for Standardisation (*DIN Deutsches Institut für Normung e.V.*)).

According to §2 of the KTA statutes, its task is to adopt sets of rules containing universally recognised standards in nuclear technology. The Nuclear Safety Standards Commission (KTA) is to undertake such action when, based on experience, a unified expert opinion can be formulated from the bodies outlined above. According to §2 of the KTA statutes *in fine*, the role of the Nuclear Safety Standards Commission is to promote the application of the rules that have been set out.

Each of the five groups (assemblies) is entitled to 10 votes.[478] Adopting new regulations in the form of the so-called KTA Rules can only occur if the respective draft regulation receives the support of a majority of at least 5/6 of the 50 possible votes.[479] This arrangement is intended to ensure a compromise (instead of majority outvoting the rest).[480] It is stipulated in §7(1) of the KTA statutes that the KTA itself determines in which areas new technical safety regulations are needed in the form of KTA Rules. At the same time, if new KTA Rules are adopted, they are published in the Federal Gazette (i.e. the *Bundesanzeiger*). It is emphasised that the normative activity of the Nuclear Safety Standards Commission does not – in any way – limit the normative competence of the federal legislature or the freedom of action of the individual public administrations.[481] However, given the

possibility for the KTA to act *ex officio* (admittedly only in the area of the subject matter of the safety of nuclear installations), the strongly technocratic composition of this Commission and the lack of direct representatives of the individual chambers of the German Parliament, it is an open question whether the legislative activity of the Nuclear Safety Standards Commission does not restrict of the federal legislature.

The KTA Rules adopted so far concern the following areas[482]: organisational issues related to nuclear installations; protection of working conditions; construction technology; material issues and those related to measuring equipment; activity control. These KTA Rules, under point 5.2 of the KTA Rulebook on the organisation of development of KTA Rules,[483] are subject to regular review and possible amendment or repeal at least once every five years. The purpose is to ensure that the KTA Rules are continuously aligned with current knowledge and technology (*Stand von Wissenschaft und Technik*).[484] This implements the provisions of the Atomic Energy Act, which, in the provisions of §6 (2) (2) and §7 (2) (3), requires that a licence for the erection or operation of a nuclear installation should only be granted if the safeguards applied to the nuclear installation correspond to the state of the art. The so-called *Restrisiko* concept, developed in the jurisprudence of the Federal Constitutional Court, was also based on continuously adapting the requirements for existing and planned nuclear installations to the current state of knowledge and technology. Hence, KTA Rules are practical realisations of the concept developed by the Court.

KTA Rules do not have the force of universally applicable law.[485] However, due to their mode of adoption and level of detail, KTA Rules are of wide practical use.[486] As in the case of the SRK recommendations, the impact of the KTA Rules is achieved through their application in the content of granted authorisations or in connection with other supervisory measures applied.[487]

2.7.10 Technical standards as a source of law in the area of safety of nuclear installations

The last group of normative acts ranked lowest in the hierarchy of national sources of law in nuclear installation safety are the so-called Technical Standards. They exist both in the form of national standards (DIN), established by the German Institute for Standardisation (*DIN Deutsches Institut für Normung e.V.*), and in the form of international standards (ISO and IEC).[488] Technical Standards (*DIN-Normen*) are subsidiary to other sources of law in the area of nuclear installation safety. They set minimum standards for the construction and subsequent operation of nuclear installations.[489] Today, attention is drawn to the need to revise these standards, which date back to the 1970s and 1980s.[490] For this reason, it is also emphasised that the technical standards do not override other regulations on the safety of nuclear installations if they impose different or more far-reaching requirements.[491]

Notes

1 See, for instance, M. Schreurs, *Orchestrating a low-carbon energy revolution without nuclear: Germany's response to the Fukushima Nuclear Crisis*, "Theoretical Inquiries in Law" 2013, no. 14, pp. 83–108; T. Reisz, *The role of regions in the energy sector: past and future* [in:] I. Galarraga, M. Gonzalez-Eguino, A. Markandya (eds.), *Handbook of sustainable energy*, Northampton 2011, pp. 538–555.
2 See, for instance, A. Roßnagel, *Radioaktiver Zerfall der Grundrechte? Zur Verfassungsverträglichkeit der Kernenergie*, Munich 1984, p. 40 et seq. and U. di Fabio, *Ausstieg aus der wirtschaftlichen Nutzung der Kernenergie. Europarechtliche und verfassungsrechtliche Vorgaben*, Munich 1999, p. 79 et seq.
3 So FCC in its judgment of 23 October 1951, ref. 2 BvG 1/51, publ. Collection of Jurisprudence of the Federal Constitutional Court (*Entscheidungen des Bundesverfassungsgerichts*, abbreviated: BVerfGE), in vol. 1, from p. 14 onwards, the quoted passage is on pp. 32 and 33, i.e. BVerfGE 1, 14, pp. 32 and 33, and also in the judgment of 14 December 1965, ref. 1 BvR 413/60, publ. BVerfGE 19, 206, p. 220. Repeated citations of the same judgment will be made in the German abbreviated notation system indicated here.
4 See the judgment of the FCC of 15 January 1958, ref. 1 BvR 400/51, publ. BVerfGE 7, 198, p. 205, as well as BVerfGE 19, 206, p. 220.
5 This is explicitly stated by the FCC in its judgment.
6 BVerfGE 19, 206, p. 220.
7 Cf. BVerfGE 19, 206, p. 220.
8 BVerfGE 19, 206, p. 220.
9 FCC judgment of 16 March 1971, ref. 1 BvR 52, 665, 667, 754/66, publ. BVerfGE 30, 292, p. 323.
10 Journal of Laws 2017, item 220 as amended.
11 See e.g. M. Czarnecka, T. Ogłódek, *Prawo energetyczne. Komentarz*, Warsaw 2012, pp. 8, 48, 418–427.
12 See BVerfGE 30, 292, p. 323.
13 See BVerfGE 30, 292, p. 324.
14 Explicitly in FCC in its judgment of 20 March 1984, ref. 1 BvL 28/82, publ. BVerfGE 66, 248, p. 258.
15 Cf. BVerfGE 66, 248, p. 258; BVerfGE 25, 1, p. 15; BVerfGE 30, 292, p. 323; BVerfGE 53, 30, p. 58; BVerfGE 66, 248, p. 258; BVerfGE 91, 186, p. 206.
16 See BVerfGE 30, 292, p. 323; BVerfGE 66, 248, p. 258.
17 BVerfGE 25, 1, p. 16.
18 T. Petermann, H. Bradke, A. Lüllmann, M. Poetzsch, U. Riehm, *Was bei einem Blackout geschieht. Folgen eines langdauernden und großräumigen Stromausfalls. Studien des Büros für Technikfolgen-Abschätzung beim Deutschen Bundestag, 33*, Berlin 2011.
19 BVerfGE 25, 1, p. 16.
20 BVerfGE 25, 1, p. 16.
21 BVerfGE 25, 1, p. 17.
22 BVerfGE 25, 1.
23 BVerfGE 25, 1, pp. 16–17.
24 BVerfGE 25,1, pp. 16–17.
25 BVerfGE 25,1, pp. 16–17. In addition, the FCC also considers the dangers of an excessive concentration of large mills only in the vicinity of large urban centres in the event of warfare (see BVerfGE 25, 1, pp. 16–17). However, this kind of perspective will not be analysed in this study.
26 I. Smart, *Conclusions for securing energy and improving the non-proliferation regime* [in:] K. Kaiser (ed.), *Reconciling energy needs and non-proliferation. Perspectives on nuclear technology and international politics*, Bonn 1980, p. 188.

27 Ibid.
28 Ibid.
29 Ibid.
30 A. Roßnagel, *Radioaktiver Zerfall...*, p. 43.
31 Explicitly FCC in: BVerfGE 30, 292, p. 323.
32 Explicitly FCC in its judgment of 17 July 1961, ref. 1 BvL 44/55, publ. BVerfGE 13, 97, p. 107. They require protection, and an example of such an "absolute" common good is public health (BVerfGE 13, 97, p. 107).
33 FCC judgment of 8 August 1979, ref. 2 BvL 8/77, publ. BVerfGE 49, 89.
34 BVerfGE 49, 89, p. 116.
35 BVerfGE 49, 89, p. 116.
36 BVerfGE 49, 89, p. 116.
37 BVerfGE 49, 89, p. 116.
38 BVerfGE 49, 89, p. 116.
39 BVerfGE 49, 89, pp. 116–177.
40 BVerfGE 49, 89, p. 117.
41 U. di Fabio, *Ausstieg aus der wirtschaftlichen Nutzung...*, p. 79 et seq.
42 See FCC judgment of 17 December 2013, 1 BvR 3139/08, 1 BvR 3386/08, publ. BVerfGE 134, 242.
43 So BVerfGE 30, 292, pp. 311–312.
44 BVerfGE 30, 292, pp. 311–312.
45 BVerfGE 30, 292, pp. 311–312.
46 Simplification is intentional here, as power/electricity supply comprises four elements: electricity generation, electricity transmission, electricity distribution, and electricity sales.
47 F. Säcker [in:] F. Säcker (ed.), *Berliner Kommentar zum Energierecht. Energierecht, Band 1*, Berlin 2014, p. 23.
48 Ibid.
49 Ibid, p. 26.
50 Ibid.
51 Ibid, pp. 26–27.
52 BVerfGE 30, 292, p. 312.
53 BVerfGE 30, 292, p. 323.
54 See FCC judgment of 16 March 1971, ref. 1 BvR 52, 665, 667, 754/66, publ. BVerfGE 30, 292.
55 BVerfGE 30, 292, p. 323.
56 BVerfGE 30, 292, p. 323.
57 BVerfGE 30, 292, p. 321.
58 F. Säcker [in:] F. Säcker (ed.), *Berliner Kommentar zum Energierecht. Energierecht, Band 1*, Berlin 2014, p. 9.
59 See FCC judgment of 11 October 1994, ref. 2 BvR 633/86, publ. BVerfGE 91, 186, p. 195 (commonly known as *Kohlepfennig*). The FCC uses the term "energy carrier" as used in the energy industry. See also the reading of the *Kohlepfennig* judgment in the context of *Atomausstieg I* and *Laufzeitverlängerung*: M. Martini, *Die Kernbrennstoffsteuer - ein steuerrechtlicher Störfall? Offene verfassungs- und unionsrechtliche Fragen*, "Zeitschrift für Umweltrecht" 2012, p. 220.
60 See, for example, the FCC's order of 18 May 2009, ref. 1 BvR 1731/05, BVerfGH 15, 484, as well as: M. Heintzen, *Beteiligung Privater an der Wahrnehmung öffentlicher Aufgaben und staatliche Verantwortung* [in:] H. Schulze-Fielitz (ed.), *Leistungsgrenzen des Verfassungsrechts. Veröffentlichungen der Vereinigung der Deutschen Staatsrechtslehrer. Band 62. Berichte und Diskussionen auf der Tagung der Vereinigung der Deutschen Staatsrechtslehrer in St. Gallen vom 1. bis 5. Oktober 2002*, Berlin 2003, p. 248.

61 BVerfGE 91, 186, p. 206.
62 BVerfGE 91, 186, p. 206.
63 The FCC explicitly uses the term "energy mix." This commonly used term refers to the structure of the energy sources from which energy is produced in a country; this can include both primary energy demand and in specific sectors (power/electricity, heating, transport).
64 BVerfGE 134, 242, p. 339.
65 Ibid.
66 BVerfGE 134, 242, p. 338.
67 Ibid.
68 Ibid.
69 Ibid.
70 BVerfGE 134, 242, p. 339.
71 Ibid.
72 See BVerfGE 157, 30, p. 135 et seq.
73 BVerfGE 134, 242, p. 339.
74 Ibid.
75 BVerfGE 157, 30, p. 135 et seq.
76 BVerfGE 134, 242, pp. 342–343.
77 BVerfGE 134, 242, pp. 342–343.
78 Explicitly in U. di Fabio, *Ausstieg aus der wirtschaftlichen Nutzung...*, p. 79 et seq.
79 ibid.
80 The current wording of the Basic Law refers to Article 109(2) *in fine*.
81 Explicitly in FCC in its judgment of 17 January 1989, ref. 2 BvF 1/82, publ. BVerfGE 79, 311, p. 338.
82 See BVerfGE 79, 311, p. 338.
83 Ibid.
84 Ibid.
85 Explicitly in A. Roßnagel, *Radioaktiver Zerfall...*, p. 44.
86 Ibid.
87 Explicitly in W. Erbguth, S. Schlacke, *Umweltrecht*, Baden-Baden 2011, p. 60.
88 H. Maurer, *Staatsrecht I, Grundlagen, Verfassungsorgane, Staatsfunktionen*, Munich 2007, ch. 6, para. 12.
89 See press release. Available online: <http://www.bundestag.de/presse/hib/2012_03/2012_152/01.html>.
90 R. Wulfhorst, *Der Schutz "überdurchschnittlich empfindlicher" Rechtsgüter in Polizei- und Umweltrecht*, Berlin 1994, p. 111.
91 BVerfGE 53, 30, p. 56.
92 BVerfGE 49, 89.
93 Explicitly in FCC in its judgment of 20 December 1979, ref. 1 BvR 385/77, publ. BVerfGE 53, 30.
94 See BVerfGE 143, 246, p. 351.
95 BVerfGE 49, 89, p. 130.
96 See K. Schwarz, *Kommentierung von Art. 87c* [in:] T. Maunz, G. Dürig (eds.), *Grundgesetz. Kommentar*, München 2015, §7.
97 BVerfGE 53, 30, p. 55.
98 BVerfGE 53, 30, p. 55.
99 See in more detail R. Rybski, *German radioactive waste. Changes in policy and law*, Oxford 2022, p. 3 et seq.
100 BVerfGE 53, 30, pp. 55–56.
101 BVerfGE 53, 30, p. 56.
102 BVerfGE 53, 30, p. 56.
103 BVerfGE 53, 30, p. 56.

104 BVerfGE 53, 30, p. 56.
105 BVerfGE 53, 30, pp. 56–57.
106 See A. Roβnagel, *Kurzgutachten Verankerung des Atomausstiegs im Grundgesetz*, Kassel 2016. The document is available at: www.bundestag.de/blob/423522/d3058f11bea5ebff1f36bf09dd6eb7e7/kmat_62-data.pdf.
107 R. Sannwald, *Kommentierung von Art. 73* [in:] B. Schmidt-Bleibtreu, H. Hofmann, H. Henneke (eds.), *Kommentar zum Grundgesetz*, Cologne 2008, §165.
108 Ibid.
109 BVerfGE 53, 30, p. 57.
110 BVerfGE 49, 89, p. 130.
111 BVerfGE 49, 89, p. 130.
112 Cf. BVerfGE 49, 89, p. 146; BVerfGE 143, 246, p. 351.
113 See BVerfGE 49, 89, p. 146; BVerfGE 143, 246, p. 351.
114 See BVerfGE 49, 89, p. 146; BVerfGE 143, 246, p. 351.
115 So FCC in BVerfGE 143, 246, p. 351.
116 Ibid.
117 BVerfGE 143, 246.
118 A. Roßnagel, *Radioaktiver Zerfall...*, p. 43, and the literature indicated therein.
119 Bundesministerium für Wirtschaft und Technologie, *Energie in Deutschland. Trends und Hintergrűnde zur Energieversorgung*, Berlin 2013, p. 20.
120 *Op. cit.*
121 See *Strommix in Deutschland 2015*, Agentur für Erneuerbare Energien. Available online: <https://www.unendlich-viel-energie.de/mediathek/grafiken/strommix-in-deutschland-2015>.
122 See Statistisches Bundesamt, *Pressemitteilung No. 090 vom 9 Marz 2023*, available online: https://www.destatis.de/DE/Presse/Pressemitteilungen/2023/03/PD23_090_43312.html.
123 See data from the German Federal Statistical Office: https://www.destatis.de/DE/Themen/Branchen-Unternehmen/Energie/Erzeugung/Tabellen/bruttostromerzeugung.html
124 See Statistisches Bundesamt, *Pressemitteilung No.* 220 *vom 7 Juni 2023*, available online: https://www.destatis.de/DE/Presse/Pressemitteilungen/2023/06/PD23_220_43312.html.
125 See Statistisches Bundesamt, *Pressemitteilung No. 351 vom 6 September 2023*, available online: https://www.destatis.de/DE/Presse/Pressemitteilungen/2023/09/PD23_351_43312.html
126 Critical infrastructure "means an asset, system or part of infrastructure located in the territory of Member States which is essential for the maintenance of vital societal functions, health, safety, security, material or social well-being of people, and the disruption or destruction of which would have a significant impact in a Member State as a result of the loss of those functions" [Article 2(a) of Council Directive 2008/114/EC of 8 December 2008 on the identification and designation of European critical infrastructures and the assessment of the need to improve their protection (OJ L 345, p. 75)].
127 T. Petermann et al, *Was bei einem Blackout...*, p. 33.
128 Ibid.
129 See the analysis on the functioning of the penitentiary system during a blackout [in:] T. Petermann et al, *Was bei einem Blackout...*, pp. 189–194.
130 Ibid, p. 33.
131 Ibid, p. 33.
132 BBK *Nationales Krisenmanagement im Bevölkerungsschutz. Band 1*, Spangenberg 2008, p. 18, quoted in T. Petermann et al, *Was bei einem Blackout...*, p. 209.

133 D. Bothe, C. Riechmann, *Hohe Versorgungzuverlässigkeit bei Strom wertvoller Standortfaktor für Deutschland*, "Energiewirtschaftliche Tagesfragen" 2008, no. 58, p. 33, quoted in T. Petermann et al, *Was bei einem Blackout...*, p. 67.
134 The calculation refers to a working day during the winter period. D. Bothe, C. Riechmann, *Hohe Versorgungzuverlässigkeit bei Strom wertvoller Standortfaktor für Deutschland*, "Energiewirtschaftliche Tagesfragen" 2008, no. 58, p. 33, quoted by T. Petermann et al, *Was bei einem Blackout...*, p. 67.
135 T. Petermann et al, *Was bei einem Blackout...*, p. 67.
136 Ibid.
137 Ibid, p. 37.
138 Ibid.
139 Ibid, p. 36.
140 Ibid.
141 C. Unger, *Die Bedeutung der Kritischen Infrastrukturen für die Funktionsfähigkeit von Wirtschaft, Gesellschaft und Staat*, presentation of a lecture given at the AFCEA conference "Sicherstellung der IKT-Versorgung bei einem längerfristigen Stromausfall" on 3 June 2009 in Brühl. Available online: <https://www.afcea.de/fileadmin/downloads/Fachveranstaltung/BOS-Tagung%2003.06.09/Unger.ppt> [accessed 14 October 2015], quoted in T. Petermann et al, *Was bei einem Blackout geschieht...*, p. 35.
142 I. Steetskamp, D. von Wijk, *Stromausfall. Die Verletzlichkeit der Gesellschaft. Die Folgen von Störungen der Elektrizitätsversorgung*, The Hague 1994, p. 8, quoted in T. Petermann et al, *Was bei einem Blackout geschieht...*, p. 67.
143 I. Steetskamp, D. von Wijk, *Stromausfall. Die Verletzlichkeit der Gesellschaft. Die Folgen von Störungen der Elektrizitätsversorgung*, The Hague 1994, p. 8, quoted in T. Petermann et al, *Was bei einem Blackout...*, p. 67.
144 T. Petermann et al, *Was bei einem Blackout...*, p. 35.
145 G. Reichenbach, R. Göbel, H. Wolff, S. Stokar von Neuforn, *Risiken und Herausforderungen für die Öffentliche Sicherheit in Deutschland. Schenarien und Leitfragen. Grünbuch des Zukunftsforums Öffentliche Sicherheit*, Berlin 2008, p. 27, quoted in T. Petermann et al, *Was bei einem Blackout...*, p. 35.
146 op. cit., p. 36.
147 This refers to the already cited T. Petermann, H. Bradke, A. Lüllmann, M. Poetzsch, U. Riehm, *Was bei einem Blackout...*.
148 Ibid, p. 41.
149 Ibid, p. 86.
150 Ibid, p. 82.
151 Ibid, p. 86.
152 Ibid.
153 Ibid, p. 211.
154 Ibid, p. 137.
155 Ibid.
156 Ibid, p. 154.
157 Ibid.
158 Ibid, p. 216.
159 So T. Petermann et al, p. 216.
160 M. Beck, S. Vannier, *Stand der Information über die Notstromversorgung der Tankstellen (Juni 2008). Anhang zum Grünbuch des Zukunftsforums Öffentliche Sicherheit*, Berlin 2008, quoted in T. Petermann et al, *Was bei einem Blackout*, p. 103.
161 T. Petermann et al, *Was bei einem Blackout...*, p. 103.
162 Ibid.
163 Ibid.
164 See ibid, pp. 190–194

165 Ibid, p. 176.
166 Ibid, p. 179.
167 See ibid, pp. 210–212, 216–218, 222, 231–233, 235–239.
168 Ibid, p. 232.
169 T. Petermann et al, *Was bei einem Blackout...*, p. 74.
170 Ibid.
171 Ibid, p. 43.
172 Ibid, p. 227.
173 See H. Ipsen, *Öffentliche Subventionierung Privater*, Berlin 1956, p. 12; S. Grabherr, *Flucht ins Privatrecht vorm Asylantenstrom? - Die neuen Pflichten der Luftfahrunternehmen nach dem Ausländerrecht*, "Neue Zeitschrift für Verwaltungsrecht" 1989, p. 39 et seq.; H. Schild, *Die Flucht ins Privatrecht. Zur Anwendung des Hessischen Datenschutzgesetzes auf juristische Personen des privaten Rechts*, "Neue Zeitschrift für Verwaltungsrecht" 1990, p. 339.
174 See the judgment of the Federal Supreme Court (*Bundesgerichtshof*) of 6 November 2009, ref. V ZR 63/09, publ. "Neue Zeitschrift für Verwaltungsrecht" 2010, p. 533 et seq.
175 See judgmentBVerfGE 30, 292; FCC judgment of 17 February 1977, ref. 1 BvR 33/76, publ. BVerfGE 44, 103; judgment of the Federal Administrative Court (*Bundesverwaltungsgericht*) of 12 December 1972, ref. I C 30/69, publ. BVerwGE 41, 261; judgment of the Administrative Court in Karlsruhe of 21 October 2008, ref. 8 K 4194/07, unpublished;
176 See order of the FCC of 18 May 2009, reference 1 BvR 1731/05, publ. BVerfGK 15, 484.
177 Ibid, paragraph 9.
178 Ibid, para 13, ibid.
179 A. Voßkuhle, *Beteiligung Privater an der Wahrnehmung öffentlicher Aufgaben und staatliche Verantwortung* [w:] H. Schulze-Fielitz (ed.), *Leistungsgrenzen des Verfassungsrechts. Veröffentlichungen der Vereinigung der Deutschen Staatsrechtslehrer. Band 62. Berichte und Diskussionen auf der Tagung der Vereinigung der Deutschen Staatsrechtslehrer in St. Gallen vom 1. bis 5. Oktober 2002*, Berlin 2003, p. 286.
180 Ibid.
181 J. Roberts, F. Bodman, R. Rybski, *Community power: Model legal frameworks for citizen-owned renewable energy*, London 2014, pp. 75–77.
182 Ibid.
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186 M. Heintzen, *Beteiligung Privater* …, p. 222.
187 Ibid.
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195 See in more detail M. Schmidt-Preuß, *Das neue Atomrecht*, "Neue Zeitschrift für Verwaltungsrecht" 1998, pp. 557–559; H. Koch, A. Roßnagel, *Neue Energiepolitik und Ausstieg aus der Kernenergie*, "Neue Zeitschrift für Verwaltungsrecht" 2000,

pp. 8–9; J. Kuhbier, U. Prall, *Errichtung und Betrieb von Endlagern für radioaktive Abfälle durch Beliehene?* "Zeitschrift für Umweltrecht" 2009, No. 7–8, pp. 360–364.
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199 W. Kahl, *Gwarantowanie wykonywania zadań przez podmioty publiczne i prywatne poprzez "nadzór państwa"* [in:] H. Bauer, P. Huber, Z. Niewiadomski (eds.), *Ius Publicum Europeum. Dwunaste Polsko-Niemieckie Kolokwium Prawników-Administratywistów, Warszawa, 20–22 września 2001 r.: referaty i głosy w dyskusji*, Warsaw 2003, p. 193.
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211 A. Voßkuhle, *Beteiligung Privater...*, p. 322, takes a similar view.
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215 Ibid, p. 322.
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217 Ibid, p. 324.
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221 A. Voßkuhle, *Beteiligung Privater...*, p. 327.
222 U. Scheuner, *Die staatliche Intervention im Bereich der Wirtschaft. Rechtsformen und Rechtsschutz* [in:] U. Scheuner, A. Schüle, W. Weber, H. Peters (eds.), *Staatliche Intervention im Bereich der Wirtschaft: Rechtsformen und Rechtsschutz. Die Gegenwartslage des Staatskirchenrechts. Verhandlungen der Tagung der Deutschen Staatsrechtslehrer zu Marburg am 16. und 17. Oktober 1952*, Berlin 1954, p. 6.
223 H. Ipsen, *Öffentliche Subventionierung...*, pp. 9–10.
224 First, this is precisely what the FCC did in its judgment of 20 July 1954, ref. 1 BvR 459, 484, 548, 556, 623, 651, 748, 783, 801/52, 5, 9/53, 96, 114/54, BVerfGE 4, 7, pp. 17–18, and then confirmed e.g. in the following judgments: judgment of 11 June 1958, ref. 1 BvR 596/56, publ. BVerfGE 7, 377, p. 400; judgment of 3 July 1962, ref. 2 BvR 15/62, publ. BVerfGE 14, 19, p. 23; BVerfGE 30, 292, p. 315; judgment of 1 March 1979, ref. 1 BvR 532, 533/77, 419/78, BvL 21/78, publ. BVerfGE 50, 290, p. 338; judgment of the Federal Administrative Court in Leipzig (*Bundesverwaltungsgericht*) of 18 April 1985, ref. BVerwG 3 C 34.84, publ. BVerwGE 71, 183, p. 195; similarly U. Scheuner, *Die staatliche Intervention...*, pp. 19–20.

225 H. Ipsen, *Öffentliche Subventionierung...*, p. 10.
226 Ibid.
227 Transl. ibid.
228 Ibid, p. 13.
229 Ibid. In terms of historical development, see A. Schüle *Die staatliche Intervention im Bereich der Wirtschaft. Rechtsformen und Rechtsschutz* [in:] U. Scheuner, A. Schüle, W. Weber, H. Peters (eds.), *Staatliche Intervention im Bereich der Wirtschaft: Rechtsformen und Rechtsschutz. Die Gegenwartslage des Staatskirchenrechts. Verhandlungen der Tagung der Deutschen Staatsrechtslehrer zu Marburg am 16. und 17. Oktober 1952*, Berlin 1954, pp. 94–98.
230 H. Ipsen, *Öffentliche Subventionierung Privater*, p. 7.
231 Ibid.
232 Ibid.
233 So FCC in its judgment of 20 July 1954, 1 BvR 459, 484, 548, 556, 623, 651, 748, 783, 801/52, 5, 9/53, 96, 114/54, BVerfGE 4, 7, p. 15.
234 Ibid.
235 See BVerfGE 4, 7, p. 18.
236 Judgment of the Higher Administrative Court (*Oberverwaltungsgericht*) in Münster of 24 September 1981, ref. 8 A 1718/79, "Neue Zeitschrift für Verwaltungsrecht" 1982, p. 381.
237 Judgment of the Federal Administrative Court (*Bundesverwaltungsgericht*) of 26 April 1979, ref. 3 C 111/79, publ. BVerwGE 58, 45. cf. judgment of the Higher Administrative Court (*Oberverwaltungsgericht*) in Münster of 24 September 1981, ref. 8 A 1718/79, "Neue Zeitschrift für Verwaltungsrecht" 1982, p. 381.
238 Judgment of the Federal Administrative Court (*Bundesverwaltungsgericht*) of 30 August 1968, ref. VII C 122/66, BVerwGE 30, 191.
239 BVerfGE 4, 7, p. 24.
240 BVerfGE 4, 7, p. 24.
241 Judgment of the Federal Administrative Court of 30 August 1968, ref. VII C 122/66, publ. "Neue Juristische Wochenzeitung" 1969, p. 523; cf. also BVerfGE 4, 7, p. 24.
242 H. Ipsen, *Öffentliche Subventionierung...*, p. 20.
243 See judgment of the Federal Administrative Court of 30 August 1968, ref. VII C 122/66, "Neue Juristische Wochenzeitung" 1969, p. 523; judgment of the Federal Constitutional Court of 8 January 1959, ref. 1 BvR 425/52, publ. BVerfGE 9, 83, p. 88; see also U. Scheuner, *Die staatliche Intervention...*, pp. 38–40.
244 H. Ipsen, *Öffentliche Subventionierung...*, p. 12.
245 Ibid.
246 Ibid.
247 Ibid, p. 27.
248 Ibid, p. 28.
249 See A. Dickersbach, *Die Entwicklung des Subventionsrechts seit 1984*, "Neue Zeitschrift für Verwaltungsrecht" 1993, pp. 846–854; A. Dickersbach, *Die Entwicklung des* Subventionsrechts *seit 1993,* "Neue Zeitschrift für Verwaltungsrecht" 1996, pp. 962–970; M. Oldiges, *Die Entwicklung des Subventionsrechts seit 1996. Teil 1: Gemeinschaftsrechtliche Beihilfeaufsicht und innerstaatlicher Rechtsrahmen für Subventionen*, "Neue Zeitschrift für Verwaltungsrecht" 2001, pp. 280–287; M. Oldiges, *Die Entwicklung des Subventionsrechts seit 1996. Teil 2: Rückabwicklung fehlgeschlagener Subventionierung*, "Neue Zeitschrift für Verwaltungsrecht" 2001, pp. 626–636.
250 M. Oldiges, *Die Entwicklung des Subventionsrechts seit 1996. teil 2: Rückabwicklung fehlgeschlagener Subventionierung*, p. 627 et *seq.*

251 See D. Reich, M. Helios, *Do reserves for the disposal of nuclear waste and shutdown of nuclear power plants in Germany constitute state aid?*, "European State Aid Law Quarterly" 2002, no. 2, pp. 207 et seq.
252 See BVerfGE 143, 246, p. 347 et seq.
253 See judgment of the FCC of 12 November 1974, ref. 1 BvR 32/68, publ. BVerfGE 38, 175, p. 179 et seq.
254 Explicitly judgmentBVerfGE 38, 175, p. 179.
255 Explicitly in: BVerfGE 38, 175, p. 179.
256 BVerfGE 38, 175, pp. 179–180.
257 BVerfGE 38, 175, pp. 179–180.
258 BVerfGE 38, 175, p. 180.
259 Judgment BVerfGE 134, 242, p. 289. See further R. Rybski, *JudgmentWyrok Federalnego Trybunału Konstytucyjnego z dnia 17 grudnia 2013 r. (sygn. akt: 1 BvR 3139/08, 1 BvR 3386/08) dotyczący bezpieczeństwa energetycznego jako przesłanki dopuszczającej wywłaszczenie w celu budowy odkrywkowej kopalni węgla brunatnego*, "Przegląd Sejmowy" 2015, No. 5.
260 Explicitly, FCC in its judgment of 22 May 2001, ref. 1 BvR 1512, 1677/97, publ. BVerfGE 104, 1, p. 10.
261 BVerfGE 134, 242, p. 289.
262 See BVerfGE 143, 246.
263 See BVerfGE 155, 378.
264 BVerfGE 143, 246, p. 324.
265 Ibid.
266 Ibid.
267 Ibid. See also the FCC judgment of 15 January 1969, ref. 1 BvL 3/66, publ. BVerfGE 25, 112, p. 118.
268 BVerfGE 143, 246, p. 324. See also FCC judgment of 17 November 1966, ref. 1 BvL 10/61, publ. BVerfGE 20, 351, p. 361; BVerfGE 50, 290, p. 340.
269 BVerfGE 143, 246, p. 324.
270 Ibid. See also FCC judgment of 12 January 1967, ref. 1 BvR 169/63, publ. BVerfGE 21, 73, p. 88; FCC judgment of 7 July 1971, ref. 1 BvR 765/66, publ. BVerfGE 31, 229, p. 242; FCC judgment of 15 January 1974, ref. 1 BvL 5, 6, 9/70, publ. BVerfGE 36, 281, p. 292; FCC judgment of 23 April 1974, ref. 1 BvR 6/74 and 2270/73, publ. BVerfGE 37, 132, p. 140; FCC judgment of 15 June 1976, ref. 1 BvL 19/75, 20/75, 1 BvR 148/7, publ. BVerfGE 42, 263, p. 294; BVerfGE 50, 290, p. 339 et seq.; FCC judgment of 2 March 1999, ref. 1 BvL 7/91, publ. BVerfGE 100, 226, p. 241.
271 BVerfGE 143, 246, p. 324. See also BVerfGE 21, 73, p. 88; BVerfGE 31, 229, p. 242; BVerfGE 36, 281, p. 292; BVerfGE 37, 132, p. 140; BVerfGE 42, 263, p. 294; BVerfGE 50, 290, p. 339 et seq.; FCC judgment of 2 March 1999, ref. 1 BvL 7/91, publ. BVerfGE 100, 226, p. 241.
272 So FCC in BVerfGE 143, 246, p. 324. See also FCC judgment of 18 December 1968, ref. 1 BvR 638, 673/64 und 200, 238, 249/65, publ. BVerfGE 24, 367, p. 389; judgment of 20 March 1979, ref. 1 BvR 111/74, 1 BvR 283/78, publ. BVerfGE 51, 1, p. 30; FCC judgment of 19 June 1985, ref. 1 BvL 57/79, publ. BVerfGE 70, 191, p. 201; FCC judgment of 7 December 2004, ref. 1 BvR 1804/03, publ. BVerfGE 112, 93, p. 110; FCC judgment of 21 July 2010, ref. 1 BvL 8/07, publ. BVerfGE 126, 331, p. 360.
273 BVerfGE 134, 242, p. 292.
274 So BVerfGE 24, 367, p. 403; BVerfGE 38, 175, p. 180; FCC judgment of 10 March 1981, ref. 1 BvR 92/71, publ. BVerfGE 56, 249, p. 259 et seq.
275 Explicitly in BVerfGE 56, 249, p. 261 et seq. See also FCC judgment of 16 December 1986, ref. 1 BvR 1046/85, publ. BVerfGE 74, 264, p. 285.

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279 BVerfGE 74, 264, p. 284 et seq.; BVerfGE 134, 242, p. 293.
280 BVerfGE 38, 175, p. 180.
281 See BVerfGE 38, 175, p. 179 et seq.; BVerfGE 134, 242, p. 293.
282 BVerfGE 134, 242, p. 293.
283 See in this respect also Chapter II, paragraph 6, entitled "The military use of nuclear energy under the Basic Law." "Military use of nuclear energy under the Basic Law."
284 BVerfGE 134, 242, p. 293.
285 Ibid.
286 See BVerfGE 74, 264, p. 289.
287 See BVerfGE 56, 249, p. 261; BVerfGE 74, 264, p. 285.
288 See BVerfGE 66, 248, p. 257; BVerfGE 74, 264, p. 284; BVerfGE 134, 242, pp. 294–295.
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290 Explicitly in BVerfGE 66, 248, p. 257; BVerfGE 74, 264, p. 284; BVerfGE 134, 242, p. 295.
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292 Ibid.
293 See BVerfGE 38, 175, p. 180; BVerfGE 74, 264 p. 286; BVerfGE 134, 242, p. 295.
294 See BVerfGE 38, 175, p. 180; BVerfGE 74, 264 p. 286; BVerfGE 134, 242, p. 295.
295 See BVerfGE 74, 264, p. 285; BVerfGE 134, 242, p. 296.
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297 Ibid.
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305 BVerfGE 143, 246, p. 328.
306 Ibid.
307 See eg. M. Kloepfer, D. Bruch, *Die Laufzeitverlängerung im Atomrecht zwischen Gesetz und Vertrag*, "Juristen Zeitung" 2011, p. 377.
308 BVerfGE 143, 246, p. 255.
309 Ibid.
310 Ibid.
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312 See BVerfGE 143, 246, pp. 255–256.
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315 Ibid.
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317 Ibid.
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323 Explicitly in M. Martini *Die Kernbrennstoffsteuer - ein steuerrechtlicher Störfall? Offene verfassungs- und unionsrechtliche Fragen*, "Zeitschrift für Umweltrecht" 2012, p. 220.
324 M. Martini *Die Kernbrennstoffsteuer - ein steuerrechtlicher Störfall?...*, p. 220.
325 See BVerfGE 143, 246, p. 260.
326 Ibid.
327 Ibid.
328 Ibid.
329 Ibid.
330 Ibid.
331 Publ. BGBl I p. 1814.
332 BVerfGE 143, 246, p. 326.
333 Ibid.
334 BVerfGE 143, 246, p. 267.
335 BVerfGE 143, 246, pp. 326–327.
336 BVerfGE 143, 246, pp. 326–327.
337 BVerfGE 143, 246, p. 326.
338 Ibid.
339 BVerfGE 143, 246, pp. 349–350.
340 BVerfGE 143, 246, p. 267.
341 BVerfGE 143, 246, p. 326.
342 BVerfGE 143, 246, p. 339.
343 Ibid.
344 BVerfGE 143, 246, pp. 339–340.
345 Ibid.
346 Ibid.
347 Explicitly FCC in BVerfGE 143, 246, p. 349. See also FCC judgment of 30 July 2008, ref. 1 BvR 3262/07, 402, 906/08, publ. BVerfGE 121, 317, p. 354; BVerfGE 126, 331, p. 362.
348 BVerfGE 143, 246, p. 349.
349 BVerfGE 143, 246, p. 324. See also judgmentBVerfGE 24, 367, p. 389; FCC judgment of 20 March 1979, ref. 1 BvR 111/74, 1 BvR 283/78, publ. BVerfGE 51, 1, p. judgment30; BVerfGE 70, 191, p. 201; BVerfGE 112, 93, p. 110; judgment BVerfGE 126, 331, p. 360.
350 See BVerfGE 143, 246, pp. 328–329. These findings were also upheld in the 2020 judgment, as the FCC relied on them – cf. BVerfGE 155, 378, pp. 408 et seq.
351 Ibid.
352 See FCC judgment of 9 June 1975, ref. 1 BvR 2261, 2268/73, publ. BVerfGE 40, 65, p. 83, as well as BVerfGE 143, 246, pp. 328–329.
353 See FCC judgment of 11 October 1962, ref. 1 BvL 22/57, publ. BVerfGE 14, 288, pp. 293 et seq.; BVerfGE 18, 392, p. 397; BVerfGE 30, 292, p. 334; FCC judgment of 28 February 1980, ref. 1 BvL 17/77, 7, 9, 14, 15, 16, 37, 64, 74, 78, 100/78, 5, 16/79 and 1 BvR 807/78, publ. BVerfGE 53, 257, pp. 291 et seq.; FCC judgment of 16 July 1985, 1 BvL 5/80, 1 BvR 1023, 1052/83 and 1227/84, publ. BVerfGE 69, 272, p. 300; FCC judgment of 12 February 1986, ref. 1 BvL 39/83, publ. BVerfGE 72, 9, p. 19 et seq.; FCC judgment of 13 May 1986, ref. 1 BvR 99, 461/85, publ. BVerfGE 72, 175, p. 193; FCC judgment of 3 December 1997, ref. 2 BvR 882/97, publ. BVerfGE 97, 67, p. 83; BVerfGE 143, 246, pp. 328–329.
354 Explicitly FCC in BVerfGE 143, 246, pp. 328–329. These findings were also upheld in the framework of the 2020 judgment, as FCC relied on them – cf. BVerfGE 155, 378, pp. 408 et seq.
355 Ibid.

356 Explicitly FCC in BVerfGE 143, 246, p. 329; see also BVerfGE 17, 232, p. 247 et seq. This issue has been openly resolved in FCC chamber judgments – see BVerfGK 16, 473, p. 478 et seq.; BVerfGK 17, 88, p. 94 et seq.
357 See BVerfGE 143, 246, p. 329.
358 Ibid.
359 Ibid.
360 Ibid.
361 Ibid.
362 Ibid.
363 Ibid.
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365 Ibid.
366 See, e.g. M. Kloepfer, *13. Atomgesetznovelle und Grundrechte*, "Deutsches Verwaltungsblatt" 2011, vol. 23, pp. 1437 et seq.; Wallrabenstein A., *Die Verfassungsmäßigkeit des jüngsten Atomausstiegs*, "Humboldt-Forum Recht" 2011, nr 11, p. 1 et seq.; F. Ossenbühl, *Verfassungsrechtliche Fragen eines Ausstiegs aus der friedlichen Nutzung der Kernenergie*, "Archiv des öffentlichen Rechts" 1999, vol. 124, pp. 5 et seq.; A. Komorowski, *Rechtsfragen des Atomausstiegs*, "Jura" 2001, z. 1, p. 17 et seq.; H. Koch, *Der Atomausstieg und der verfassungsrechtliche Schutz des Eigentums*, "Die Neue Juristische Wochenschrift" 2000, p. 1529 et seq.; M. Schmidt-Preuß, *Atomausstieg und Eigentum*, "Die Neue Juristische Wochenschrift" 2000, p. 1524 et seq.; H. Dederer, *Atomausstieg und Art 14 GG*, "Juristische Arbeitsblätter" 2000, p. 819 et seq.
367 BVerfGE 143, 246, pp. 339–340.
368 Ibid.
369 Ibid.
370 See BVerfGE 121, 317, p. 350; BVerfGE 134, 242, p. 292 et seq.; BVerfGE 143, 246, p. 347.
371 Cf. BVerfGE 143, 246, p. 347.
372 Ibid.
373 Cf. BVerfGE 143, 246, p. 348.
374 Ibid.
375 Ibid.
376 Source: own creation on the basis of: Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit, *Übereinkommen über nukleare Sicherheit. Bericht der Bundesrepublik Deutschland für die Sechste Überprüfungstagung im März/April 2014*, Bonn 2013, s. 22.
377 There is no distinction in the German constitutional system between a law-maker and Constitution-maker, that is why a Federal Lawmaker covers in this diagrom also amendments at constitutional level.
378 Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit, *Übereinkommen über nukleare Sicherheit. Bericht der Bundesrepublik Deutschland für die Fünfte Überprüfungstagung im April 2011*, Bonn 2010, p. 22.
379 R. Schmidt, *Staatsorganisationsrecht sowie Grundzüge des Verfassungsprozessrechts*, Grasberg 2007, p. 393.
380 The provision of Article 1 of the *Grundgesetz* states as follows:

> "1. Human dignity is inviolable. Its respect and protection is the duty of all state authorities.
> 2 The German people therefore recognise inviolable and inalienable human rights as the basis of every human community, peace and justice in the world.
> (3) As directly applicable law, the following fundamental rights bind the legislature, the executive and the judiciary."

In contrast, the provision of Article 20 of the *Grundgesetz* states as follows:

"1. The Federal Republic of Germany is a democratic and social federal state.
2. All state power derives from the people. It is exercised by the people through elections and votes and through special legislative, executive and judicial bodies.
3. The legislature is bound by the constitutional order, and the executive and judiciary by statutes and law.
4. In the face of anyone attempting to overthrow this order, all Germans have the right to resist if no other means of counteraction is possible."

381 Thus, in the context of the German move away from nuclear power, K. Faßbender, *Atomkraftwerke aus umweltvölker- und nachbarrechtlicher Sicht*, "Zeitschrift für Umweltrecht" 2012, no. 5, p. 267.
382 See K. Faßbender, *Atomkraftwerke aus umweltvölker...*, p. 267. Full list available in: *Übereinkommen über nukleare Sicherheit...*, pp. 229–232.
383 *Übereinkommen über nukleare Sicherheit...*, p. 149.
384 Ibid.
385 Ibid.
386 Ibid.
387 Ibid.
388 Ibid.
389 Ibid, p. 139.
390 Ibid.
391 cf. Bundesminister des Auswärtigen, *Bekanntmachung über das Inkrafttreten der Satzung der Internationalen Atomenergie-Behörde vom 21. Dezember 1957*, Bonn 1957, publ. BGBl. 1958 II, S. 2. IAEA Statutes were published at BGBl. 1958 II, S. 4.
392 K. Faßbender, *Atomkraftwerke aus umweltvölker...*, p. 267.
393 See Safety Standards developed by IAEA – available online: < https://www.iaea.org/resources/safety-standards>.
394 Explicitly in K. Faßbender, *Atomkraftwerke aus umweltvölker...*, p. 267.
395 Publ. BGBl. 1997 II S. 131.
396 Publ. BGBl. 1989 II S. 434.
397 Publ. BGBl. 1990 II S. 326.
398 Publ. BGBl. 1998 II S. 1353.
399 K. Faßbender, *Atomkraftwerke aus umweltvölker...*, p. 268.
400 The provision of Article 17 of the Convention on Nuclear Safety (as per OJ 1997, No. 42, item 262) reads as follows:
"Each Party shall take appropriate steps to ensure that appropriate procedures are developed and implemented to:

I assessing all relevant site-related factors that may affect the safety of a nuclear installation throughout its projected lifetime;
II assessing the likely impact of the proposed nuclear facility on the safety of persons, society and the environment;
III reassessing, as necessary, all relevant factors referred to in subparagraphs (I) and (II) to the extent necessary to ensure the continued safety credibility of the nuclear facility;
IV to consult with Parties neighbouring the proposed nuclear installation if they are likely to be affected by its existence, and to submit, on request, to such Parties the information necessary for them to make their own assessment of the possible impact of the nuclear installation on the safety of their own territory."

401 Critical of the content of Article 17 of the Convention on Nuclear Safety: K. Faßbender, *Atomkraftwerke aus umweltvölker...*, p. 268.
402 Critically K. Faßbender, ibid.
403 K. Faßbender, ibid.
404 Explicitly in K. Faßbender, *Atomkraftwerke aus umweltvölker...*, p. 270.
405 Publ. BGBl. 2002 II S. 1407.
406 Explicitly in K. Faßbender, *Atomkraftwerke aus umweltvölker...*, p. 270.
407 W. Erbguth, S. Schlacke, *Umweltrecht …*
408 Ibid.
409 See K. Faßbender, *Atomkraftwerke aus umweltvölker...*, p. 271.
410 Ibid.
411 Ibid.
412 Ibid.
413 Ibid.
414 Ibid.
415 Judgment of 20 April 2010. Relevant documents concerning this case are available online: < https://www.icj-cij.org/case/135>.
416 See K. Faßbender, *Atomkraftwerke aus umweltvölker*, p. 272, together with the literature indicated therein.
417 Explicitly in *Übereinkommen über nukleare Sicherheit...*, p. 22. In addition to this document of the German Federal ministry, historical studies also point to this: J. Radkau, *Aufstieg und Krise der deutschen Atomwirtschaft 1945–1975. Verdrängte Alternativen in der Kerntechnik und der Ursprung der nuklearen Kontroverse*, Reinbek 1983; E. Kraus, *Von der Uranspaltung zur Göttinger Erklärung. Otto Hahn, Werner Heisenberg, Carl Friedrich von Weizsäcker und die Verantwortung*, Würzburg 2001; M. Knoll, *Bedeutete die Erklärung Bundeskanzler Adenauers von 1954 einen bindenden Verzicht der Bundesrepublik auf Atomwaffen?*, Mannheim 2005; in addition, studies in political science: M. Huber, *Der Einfluss der CSU auf die Westpolitik der Bundesrepublik Deutschland von 1954–1969 im Hinblick auf die Beziehungen zu Frankreich und den USA*, Munich 2008.
418 B. Schmidt-Bleibtreu, *Kommentierung von Art. 74* [in:] B. Schmidt-Bleibtreu, F. Klein (eds.), *Kommentar zum Grundgesetz*, Berlin 1995, p. 986.
419 *Übereinkommen über nukleare Sicherheit...*, pp. 22–23.
420 Ibid.
421 Ibid, p. 23.
422 Ibid.
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3 Nuclear energy in the German Constitution

Nuclear energy is a constitutionally relevant issue. This is due to its specific character and importance. It has an impact that affects numerous areas. However, the relevance arises first and foremost from the fact that the *Grundgesetz* itself explicitly refers twice to issues specifically related to nuclear energy.

This chapter will discuss the understanding and meaning of the two provisions of the Basic Law that refer directly to nuclear energy. A characteristic feature of the German constitutional solution is that both provisions deal exclusively with the issue of using nuclear energy for peaceful purposes. Their scope includes not only the use of nuclear energy for power generation but also concerns the entire life cycle of nuclear fuel and the use of nuclear energy in industry or medicine.

It is also possible to use nuclear energy for military purposes. This use of nuclear energy has a longer history than the peaceful use of nuclear energy (for power generation or in medicine). Therefore, the classification of the possible military use of nuclear energy under the 1949 Basic Law will also be analysed.

3.1 The Basic Law of 1949 in the German constitutional order

When analysing the Basic Law today, it has to be seen in the context of over 60 amendments and more than 160 volumes of case law of the Federal Constitutional Court in Karlsruhe (FCC).[1] Indeed, the German legal system has come a long way from a succinct (and assumed to be provisional) constitutional regulation (i.e. Basic Law of 1949) to the creation of a fully-fledged substantive Constitution, which – in addition to the *Grundgesetz* itself, its amendments and the case law of the German Federal Constitutional Court – consists of constitutional practice. This is evidenced, for example, by the fact that the Federal Constitutional Court often uses the term "Constitution" (*Verfassung*) rather than "Basic Law" (*Grundgesetz*) in its rulings. Such reference to the concept of the Constitution (when the Basic Law has been in force since 1949) is broader, as it refers to the entire constitutional body of laws.[2] The legal doctrine emphasises that in the public

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consciousness, the Basic Law today already functions as the "Constitution of the Federal Republic of Germany."[3]

The Federal Constitutional Court in Karlsruhe has gone through a difficult path to reach its current uncontested constitutional status. Initially, it was not obvious what position the Federal Constitutional Court would take in the new (viewed as temporary) system introduced by the Basic Law.[4] This was evidenced, for example, by the delay of several years in enacting the Federal Constitutional Court Act – it was only adopted on 12 March 1951. This was also not helped by the public statements made by Chancellor Konrad Adenauer in the early days of the FCC, in which he argued that there was no basis in the Constitution or in any federal law for one of the first FCC judgments, which caused controversy.[5] However, the status of the Court has persisted, which allows the entirety of the case law of the Federal Constitutional Court to be taken into account.

To determine the status of nuclear power in German constitutionalism, one should look at the whole body of the regulations, at least since 1949. This will consist of both the provisions of the Basic Law that explicitly refer to nuclear energy and constitutional values. These include, above all, energy security, constitutional principles, fundamental rights, international regulations and the legislation of the European Atomic Energy Community (Euratom). This is naturally complemented by the German constitutional court's rather rich and consistent case law on nuclear energy.

It is a phenomenon of the German legal system that constitutional law doctrine and constitutional court jurisprudence have taken a broad interest in nuclear energy. This is due to the considerable politicisation of nuclear power issues. It was also the result of the FCC's role as guardian of the Constitution in German public life since the beginning of the Basic Law. It should also be noted that jurisprudence and legal doctrine have shown a particular interest in the constitutional aspects of nuclear power from its inception in the 1950s. According to the most monumental commentary on the German *Grundgesetz*, these constitutional aspects of nuclear power include i.a.: liability for nuclear damage, the level of admissible radiation, the juridification of technical norms and standards, requirements related to the definiteness of undefined legal concepts, the guarantee of the protection of fundamental rights through the proper design of procedures, the conduct of administrative proceedings with even mass participation of stakeholders, the participation of the public, the participation of foreigners in German administrative proceedings, the obligation to strengthen safety systems, the dynamic protection of legally protected assets, waste disposal, long-term risk management and issues related to the handling of plutonium.[6] All measures related to the aforementioned aspects of nuclear energy – implemented through legal measures based on and in accordance with the *Grundgesetz* – are intended to ensure that the various risks associated with nuclear technology and radiation are covered.[7]

Given the breadth of this body of jurisprudence and doctrine, it is possible to state that nuclear regulation in Germany embodies the concept of F. Werner that administrative law is a concretisation of constitutional law.[8]

3.2 Explicit constitutional regulation of nuclear energy in the Basic Law

Two provisions in the *Grundgesetz* refer to nuclear energy in their literal wording. The first of them is Article 74(1)(11a) in the wording prior to the 2006 federal reform (the so-called *Föderalismusreform*), which is now designated as Article 73(1)(14) of the *Grundgesetz*. Because the constitutional outputs (and achievements) based on these provisions (i.e. prior to the federalism reform) developed in parallel, they were continued. This clearly shows that substantive legal arrangements were extensively developed based on the two constitutional provisions that literally dealt with questions of competence.[9] Therefore, these provisions of the *Grundgesetz* (i.e. Art. 74(11a) and Art. 73(1)(14) of the *Grundgesetz*, respectively) will be discussed together without distinguishing between the period before and after the federal system reform (*Föderalismusreform*). The basic provision of Art. 74(11a) was moved to Art. 73(1)(14) *Grundgesetz* without any changes concerning its content.[10] Practical reasons backed this reform – *Länder* legislation played no role in this area[11] and Euratom legislation played an increasing role.[12] This was thus a modification of the type of legislative competence vested in the Federation (*Föderalismusreform*). There was no substantive change to the wording of this provision of the *Grundgesetz*. The second provision of the Basic Law containing a reference to nuclear energy is Article 87c therein. In the case of Article 87c of the *Grundgesetz*, too, there was a change in its content in connection with the aforementioned reform of the German federal state system. However, the reform has not undermined the existing case law or literature that was developed based on Article 74(1)(11a) or Article 87c of the *Grundgesetz*. For this reason, the passages containing references to case law or literature on the subject which discuss issues relating to Article 74(11a) *Grundgesetz* will refer to Article 73(1)(14) *Grundgesetz*, as its normative significance has been fully maintained. In the case of Article 87c Grundgesetz, on the other hand – although the amendment concerned only the replacement of "Article 74(1)(11a)" by "Article 73(1)(14)" in its text, taking into account the reform as a whole, the amendment concerning Article 87c *Grundgesetz* was fundamental.

The first constitutional provision (Article 73(1)(14)) concerns the conferral of powers to the Federation to deal with this specific matter. On the other hand, the second provision (Article 87c) divides the tasks of performing public administration duties in nuclear energy between the Federation and the federal states (*Länder*). It might seem that no significant normative content emerges from those competence provisions. However, this is not the case here. An analysis of the Federal Constitutional Court case law and the literature on the subject brings valuable research material in this regard.[13] The literature points to the importance of the systematic nature of the Basic Law. Provisions that, for instance, affect the legal status of the individual, which is determined by the scope and content of the fundamental rights expressed in the provisions of Articles 1 to 20 of the Basic Law, may be derived from the wording of Article 73

(1) (14) itself.[14] In the constitutional assessment of the statutory regulation of nuclear energy issues, the state's positive obligations concerning the protection of fundamental rights, particularly those arising from Article 2 (2) sentence 1 of the Basic Law,[15] are of particular importance. The fundamental problem with the peaceful use of nuclear energy as a modern technology is that it represents "a combination of the highest harmfulness with the highest utility."[16] This leads to a complete discrepancy between the economic use of the generated power and the potential extent of the damage that can be caused by the power generation using nuclear energy.[17]

3.3 History of the introduction of nuclear energy into the *Grundgesetz*

Until 5 May 1955 (i.e. the revocation of occupied state status[18]), the Federal Republic of Germany was not allowed to regulate the use of nuclear power on a constitutional level.[19] This is because it remained the *domaine réservée* of the military occupation authorities[20] (i.e. three Allies of World War II: France, United Kingdom and the United States). Hence, adding the provisions of Article 74 point 11a and Article 87c to the *Grundgesetz* in 1959 is referred to as "catching up"[21] or "making up" legislation.[22] Some authors claim that sovereignty rights (*Souveränitätsrechte*) that Germany retrieved in 1955, were soon handed over to supranational entities.[23] That was the case in regard to civil applications of nuclear energy.

Given these considerations, it will come as no surprise that the most practical reason underlying the decision to extend the provisions of the Basic Law was European integration, namely the accession of the Federal Republic of Germany to the two new European Communities (the three organisations preceding the European Union) on 25 March 1957. One of the European Communities was the European Atomic Energy Community (EAEC or Euratom). To this day, Euratom is an independent international organisation[24] creating its legislation, and each Member State of the European Union is obliged to be its member. In 1958, it was important to implement the provisions of Articles 30 and 33 of the Treaty establishing the European Atomic Energy Community, which obliged Member States to introduce national radiation protection regulations:

> Article 30. Basic standards shall be laid down within the Community or the protection of the health of workers and the general public against the danger sarising from ionizing radiations.
>
> The expression 'basic standards' means:
>
> a maximum permissible doses compatible with adequate safety;
> b maximum permissible levels of exposure and contamination;
> c the fundamental principles governing the health surveillance of workers.

> Artcle 33. Each Member State shall lay down the appropriate provisions, whether by legislation, regulation or administrative action, to ensure compliance with the basic standards which have been established and shall take the necessary measures with regard to teaching, education and vocational training.
>
> The Commission shall make appropriate recommendations for harmonising the provisions applicable in this field in the Member States.
>
> To this end, the Member States shall communicate to the Commission the provisions applicable at the date of entry into force of this Treaty and any subsequent draft provisions of the same kind.
>
> Any recommendations the Commission may wish to issue with regard to such draft provisions shall be made within three months of the date on which such draft provisions are communicated.

Meanwhile, while it was possible to reconstruct partial legislative powers for the Federation from the individual provisions giving the legislative competence to the Federation, this would have led to regulatory gaps.[25] For example, while the provision of Article 74(11) of the *Grundgesetz*:

> 74 (1) Competing legislation shall cover the following areas:
>
> […]
>
> 11) economic legislation (mining, industry, energy, handicrafts, business, trade, banks and stock exchanges, private insurance) with the exception of legislation on the operating hours of shops, restaurants, casinos, acting performances, fairs, exhibitions and markets;

could provide a basis for regulating the economic aspects of energy production from nuclear fission, but it would not provide a basis for supporting research work in this area.[26] Only an unambiguous legislative basis for the Federation (determined directly at the level of the *Grundgesetz*) could have enabled Germany to fulfil the indicated obligation to introduce an appropriate legal framework into the national legal system.[27] The scope of this obligation did not only cover Euratom but also resulted from Germany's participation in international agreements[28] under the auspices of the International Atomic Energy Agency and OECD Nuclear Energy Agency.[29] Therefore, one of the reasons for the introduction of the regulation of nuclear energy into the Basic Law was to prevent a lack of competence on the part of the Federation to regulate this matter uniformly at the level of federal legislation.[30] As a result, Germany's membership of Euratom directly contributed to regulating nuclear energy at the level of the German *Grundgesetz* and in federal legislation (more in section 6).

Equipping the Federation with a complex legislative competence (in the area of nuclear energy) also made it possible to repeal the existing occupation laws.[31] Indeed, the (federal) Atomic Law repealed not only the seven laws on the peaceful use of atomic energy which the federal states had enacted for

their territories but also repealed the regulations of the Allied occupation armies, which were still in force after the abolition of the occupation status on 5 May 1955 . The occupation status[32] and the law created on its basis were linked to the signing of the Act of Surrender on 9 May 1945. From that point onwards, German territory was subject to the occupying power of the governments of the United States, United Kingdom, Soviet Union, and France.[33] In the territory of each of the four occupation zones, a regime of strict control of scientific research was introduced, which in particular covered the area of nuclear physics research, both in the area of basic research and applied science.[34] A regime of "total policing"[35] of research was introduced by Act No. 25 of 29 April 1946 on the regulation and supervision of research in the area of natural sciences.[36] Law No. 25 introduced an absolute ban on research in applied atomic physics (civil and military applications).[37] It also introduced an obligation to obtain prior permission from the military occupation authorities for research related to radioactivity for purposes other than medical.[38] One of the authors even underlines, in this context, that before the Second World War, Germany was leading in nuclear energy.[39] After the Act of Surrender, there was a continuous push[40] against Allied restrictions from the German Federal Republic chancellor Konrad Adenauer and Nobel prize physicist[41] Werner Heisenberg.[42]

At the time of the drafting of the *Grundgesetz*, the area of atomic physics and applications of nuclear energy for peaceful purposes was not subject to discussion because, as a security-related area, it still remained within the domain reserved for the Allied military occupation authorities.[43] This was expressed in several acts of the occupying military authorities. Provision 2(a) of the occupational statute of 10 April 1949 established the exclusive legislative and administrative competence of the three military occupation authorities in scientific research that contradicted the aim of disarmament and demilitarisation of Germany.[44] This was understood as explicitly extending the area of exclusive jurisdiction of the occupation authorities to the areas of nuclear research and the use of nuclear energy.[45] The deliberate control policy[46] was made more specific by the Agreement of 14 April 1949 between the military administrators of the American, British and French occupation zones on Prohibited and Restricted Industries.[47] In Article 4 of the agreement, the parties undertook to enact legislative measures relating to the manufacture, import, export, storage, use and possession of radioactive materials.[48] On the other hand, article 3 of the agreement prohibited the manufacture and production within Germany and ordered the removal of beryllium and atomic warfare agents from its territory.[49] For these reasons, the *Grundgesetz* entered into force on 24 May 1949 without any regulation of nuclear energy, the admissibility of its use, the competence of state authorities, or in terms of protection against ionising radiation.[50]

Meanwhile, the Allied authorities (as announced in the occupation statutes) on 12 September 1949 issued identical legislation on controlling scientific research in each occupied zone. According to this new regulation, the possibility of carrying out applied scientific research in radioactivity for

other than medical applications was only permitted with the written permission of the occupation authorities.[51] These control regulations were supplemented by the Allied High Commission's issuing Law No. 22 on 2 March 1950.[52] With effect from 1 April 1950, the aforementioned law introduced an unwaivable ban not only on the production of thorium, uranium, beryllium or deuterium but also prohibited the erection of nuclear reactors as well as the infrastructure for triggering and sustaining a nuclear chain reaction.[53] At the same time, the control of compliance and administrative tasks related to the regulations mentioned above was entrusted to the Military Security Office based in Koblenz.[54]

Negotiations were conducted in the early 1950s to grant full sovereignty to the Federal Republic of Germany. The effect of these efforts was the provision of Article 1 of the *Convention on Relations between the Three Powers and The Federal Republic of Germany of 26 May 1952 (as amended by Schedule I to the Protocol on the Termination of the Occupation Regime in the Federal Republic of Germany, signed at Paris on 23 October 1954)*[55] which, with the abolition of the occupation status, granted full sovereignty to Germany in its internal affairs and foreign policy. This meant that the organs of the Federation and the states (*Länder*), under the powers provided for in the *Grundgesetz,* were entitled to override the regulations issued by the military occupation authorities (unless otherwise provided by the *Convention on Relations between the Three Powers and The Federal Republic of Germany*).[56] After the abolition of the occupation status on 5 May 1955, the above-mentioned Act No. 22 remained in force, and the regulations issued on its basis formed the material legal basis of nuclear law in Germany.[57] This was the case until their repeal by the quoted provisions of the Atomic Law on 1 January 1960. Until then, the only essential change was setting up on 6 October 1955 of the Federal Ministry for Nuclear Issues (*Bundesministerium fűr Atomfragen*).[58]

Finally, it should be borne in mind that the provisions of Article 73(1)(14) and Article 87c of the Basic Law (originally) concerned only the matters within the competence of the authorities. In contrast, doctrine and jurisprudence later attributed specific normative content (i.e. additional substantive legal content) to these provisions. In this context, the reason for introducing the provisions in question may also have been to legitimise the peaceful use of nuclear energy for power generation. The fact of the unanimity[59] when the Bundestag passed the law of 23 December 1959 on the supplement to the Basic Law[60] appears to be relevant here (in terms of its possible legitimising function).

3.4 The normative content of the provisions of Article 74(1)(11a) and Article 73(1)(14) of the Basic Law introducing the legislative competence of the Federation in the field of nuclear energy

The 1959 amendment to the Basic Law raised to a constitutional level a new regulation explicitly referring to nuclear energy. The provision of Article 73 (1) (14) of the Basic Law provides:

> Article 73 (1) The Federation shall have exclusive legislative competence in the following areas: […]
>
> 14) Generation and use of nuclear energy for peaceful purposes, construction and operation of facilities for such purposes, protection against nuclear release or ionising radiation hazards and disposal of radioactive material.

The cited provision of the Basic Law concerns the division of legislative powers between the Länder and the Federation. The provision of Article 74a(1)(11a) of the Basic Law as it existed prior to the so-called 2006 Federation reform was added by Article 1(1) of the Act of 23 December 1959, supplementing the Basic Law.[61] From this point onwards, doubts about whether the Federation had the competence to regulate nuclear energy were dispelled by this parliamentary decision.[62] Although chronicle accuracy requires to emphasise that in the case of the basic piece of legislation for which the *Grundgesetz* was amended (the Atomic Law), some doubts arose[63] as to whether the correct use of this new competence basis had been made. The government's draft proposal of Atomic Law was submitted to the Bundestag on 17 December 1958.[64] The Bundestag passed the law at its meeting on 3 December 1959, which the Bundesrat subsequently approved on 18 December 1959.[65] Both the Atomic Law and the law amending the *Grundgesetz* (which only introduced the said Article 74(1)(11a) of the Basic Law) were signed by the Federal President on 23 December 1959 and were subsequently published in the Federal Official Gazette of 31 December 1959.[66] The final provisions of both published acts were provided for entry into force the day after their promulgation, i.e. on 1 January 1960.[67] This oft-criticised constitutional practice[68] was declared unconstitutional by the FCC in its judgment of 26 July 1972.[69] However, at that time, the FCC did not question the validity of the Atomic Law and the administrative acts issued on its basis.[70] To remedy this situation, the law passed on 25 March 1974 on the purification of procedural deficiencies in the issuance of certain laws[71] introduced the legal fiction that the Atomic Law had been issued on the day following the entry into force of the 1959 amendment to the *Grundgesetz*, i.e. on 2 January 1960.[72] At the same time, the above-mentioned 1974 Act maintained the previous moment of entry into force of the provisions of the Atomic Law (i.e. 1 January 1960).[73]

According to the provision of Article 74(1)(11a) of the Basic Law as it stood prior to the 2006 *Föderalismusreform,*[74] the legislative competence concerning the production and use of nuclear energy for peaceful purposes fell within the scope of so-called competitive legislation competence (*Konkurrierende Gesetzgebungszuständigkeit des Bundes*).[75] The distribution of competences within the competing legislation model is presented so that the states (*Länder*) only had normative competence if the Federation did not regulate the matter in question.[76] Since the *Föderalismusreform* came into force on 1 September 2006, this competence has been transferred to the category of so-called exclusive legislation competence of the Federation (*Ausschließliche Gesetzgebungskompetenz des Bundes*).[77] This represented an

extension of the Federation's nuclear energy competence (at the federal states' expense). This is because the federal states (*Länder*) only have regulatory competence if they are expressly authorised to do so in a federal law.[78] What is more, *Länder* are not entitled to suppress or replace the regulatory competence of the Federation in the area of peaceful nuclear energy application due to their considerations relating to their environmental policies.[79]

The reason for the modification of constitutional regulations in the form of changes in legislative competence was the legislative dynamics at the EU level. Indeed, there has been a significant increase in the number of EU (i.e. Euratom) regulations[80] and in their volume. Consequently, the space for different nuclear regulations at the level of *Länder* decreased significantly.[81] A need has, therefore, arisen to unify nuclear regulations at the federal level.[82] Another reason for the changes made is that the nuclear legislation of the states (*Länder*) has lost its importance.[83] This is because the space to introduce their local regulatory solutions has disappeared. In addition, the states (*Länder*) have also not made much use of their ability to adopt their regulations based on competing legislation due to the specific nature of nuclear power. From the perspective of a responsible legislator (at the state level), who does not make risky normative decisions, there was no room for adopting significantly different solutions (from those in force at the federal level or in other federal states). The essence of this dissimilarity may have consisted of adopting different (higher) safety standards in a given federal state than the federal regulation (if any) implied. The same is true of EU law. The increasing number of new EU regulations (and their growing volume) was precisely related to introducing new (higher) safety standards for nuclear installations and managing radioactive waste. The progressive Europeanisation of nuclear law only makes sense if it is, at the same time, uniformly implemented in legal systems throughout the European Union and in the individual EU member states, respectively. The use of nuclear energy in the energy field is based on a collective trust in the safety associated with this power generation technology. At the same time, this confidence extends to the entire Euratom area, irrespective of the borders of individual EU member states. Thus, if in the European Union, despite constantly improving safety standards for nuclear installations, there was to remain even one nuclear reactor which had not been adapted to these standards, for example, due to local regulatory specificities, the failure of such a reactor would in principle automatically undermine confidence in all other nuclear installations in the European Union. It should be added here that even these other nuclear reactors' incomparably higher safety standards would not matter. Therefore, the unification of safety standards for nuclear installations, specifically for nuclear power, throughout Germany is essential to ensure the safety of individual nuclear installations. The legislator's decision to transfer the matter in question from the area of competing legislation to the category of exclusive federal legislation must, therefore, be evaluated positively.

A characteristic feature of the very extensive provision of Article 73 (1) (14) of the Basic Law is using terms derived directly from nuclear physics.[84] For example,

Grundgesetz uses the term "nuclear energy" (which comes directly from physics), without defining it.[85] Two approaches are visible towards reconstructing the meaning of "nuclear energy", and all the other terms that come from physics and, as a result, towards the scope of Article 73 section 1 point 14 *Grundgesetz*. The first approach (presented by the Federal Constitutional Court) refers to the 1959 need[86] to broaden the legislative competences of the Federation so that the Federation could have adopted *Atomgesetz* in 1959.[87] The Court distanced itself outright from interpreting particular terms used in *Grundgesetz* through the meaning of those terms in statutes (i.e. *Atomgesetz*).[88] Nevertheless, it used this reasoning (as a starting point for including transportation issues in the scope of Article 73 section 1 point 14 *Grundgesetz*).[89] The second approach towards the term "nuclear energy" (and the scope of Article 73 section 1 point 14) is based on reconstruction through physics.[90] This approach assumes that the meaning of particular terms (that come from physics) should be understood as having a meaning just like in physics.[91] These two approaches do not exclude one another. Scope of Article 73 section 1 point 14 *Grundgesetz* covers energy released through fission, fusion or any other form of nuclei change[92] – whatever source this energy comes from.[93] Because Article 73 section 1 point 14 also covers possible future approaches, so it is being assessed as open for future developments.[94] It must be noted, however, that although nuclear fusion is covered under the federal regulatory scope of Article 73 section 1 point 14 *Grundgesetz*, taking into account different risks (much lower radiation, significantly lower amounts of nuclear material as well as of radioactive waste) this does not mean that nuclear sector based on nuclear fusion should be regulated in the same way as nuclear sector based on fission energy. Scope of Article 73 section 1 point 14 covers both artificial (devices and installations) and natural sources of radiation.[95] The terminology used by the legislature corresponds to ordinary legislation[96] related to the already presented misfortunate adoption on the same day of the Federal Nuclear Law, and appropriate changes to the *Grundgesetz* (that were to enable adopting the *Atomgesetz*). In historical legal terms, the introduction of Article 73(1)(14) into the Basic Law ensured that the Federation had the competence to enact such a regulation.[97] The amendment of the Basic Law was directly linked to the federal law of 23 December 1959 on the peaceful use of nuclear energy and protection against its dangers (Atomic Law) which was passed on the same day.[98] Lack of introduction of such a dedicated provision into the *Grundgesetz* would mean that the nuclear matters would have been regulated by the *Länder*, because of their competence in the area of safety.[99] Introduction in 1959 of Article 73 section 1 point 14 into *Grundgesetz* aimed at closing competence gaps of the Federation.[100]

The scope of legislative competence for the Federation – as expressed in Article 73(1)(14) of the Basic Law – extends to "the entire scope of the essence of nuclear energy."[101] Provision of Article 73 section 1 point 14 *Grundgesetz* is extensive.[102] It exhaustively covers all nuclear-relevant matters.[103] This exhaustiveness is easy to grasp because Article 73 section 1 point 14 is wordy.[104] More descriptively, it was described as a legislative competence relating to "all measures and actions having to do with radioactive materials,

the resulting radioactivity and released particles."[105] According to this understanding, the competence provision in question (i.e. Article 73(1)(14) of the *Grundgesetz*) functions as *lex specialis* for all general regulations that do not necessarily relate to the essence of nuclear energy, but should be shaped in relation to nuclear energy, such as regulations on the protection of working conditions or liability for nuclear damage.[106] As a result, Art. 73 section 1 point 14 allows intervening in those overlapping areas.[107] However, Article 73(1)(14) (in the numbering prior to the *Föderalismusreform* as Article 73(1)(11a) was not merely *lex specialis* to Article 73(1)(11) of the *Grundgesetz*, but created the basis for a new, independent area of legal regulation concerning nuclear energy and ionising radiation.[108]

This competence basis was given the form of a general clause.[109] The purpose of this provision of the *Grundgesetz* was that the Federation could regulate the entirety of nuclear energy issues.[110] In this way, the said provision of the *Grundgesetz* applies to all phases of the use of nuclear energy. In the first instance, it covers the fundamental settlement of the commencement of the use of nuclear energy by Germany in the power sector.[111] In contrast, the issue of the rationale for the entry into nuclear power was not addressed in the literature at the time. The decision to amend the Basic Law was not accompanied by a broad discussion in the literature on whether the amendments to the *Grundgesetz* are necessary, whether this is done appropriately and whether the scope of the amendments is appropriate. Therefore, undertaking such considerations today would be ahistorical, as it would be difficult to separate the constitutional requirements applied at that time from such requirements that, from a present-day perspective, could be attempted based on the Basic Law. Equally important is the fact that this amendment introduced the fundamental decision on the applicability of nuclear energy for peaceful purposes to the Basic Law. It was also a decision of a political nature, expressed by the actions of the legislature, which added the provisions of Article 74(1)(11a) and Article 87c to the Basic Law in 1959.

Whether the provision of Article 73(1)(14) *Grundgesetz* also includes the competence of the Federation to decide on the location of a nuclear power plant has been controversial.[112] If one takes into account that the provision of Article 73(1)(14) of the *Grundgesetz* provides for the competence to regulate matters relating to the "construction and operation" of a nuclear installation, it would seem that it would be natural also to have the competence to determine the location. However, due to the detailed nature of this provision of the Basic Law and the fact that the level of impact of a nuclear power plant (or, more broadly, a nuclear installation) primarily concerns the area of the federal state concerned (within the Federation), this blanket ceding of full competence to the Federation was challenged in court by the authorities of the federal states as well as by the local communities.[113] This is because such a specific competence of the Federation would mean interfering in spatial planning, which is a classic competence vested in the federal states (*Länder*). This cannot be denied, even if one considers the participation of the federal states (Länder) in enacting federal laws on the matter in question.

The scope of the Federation's competence under the provision of Article 73(1)(14) of the *Grundgesetz* includes the following matters over which the Federation is competent to adopt regulations: assessment of environmental impact,[114] authorisations of nuclear installations,[115] authorising operation of a nuclear installation,[116] the safety of operation of nuclear installations,[117] health and safety protection at the workplace,[118] liability[119] and the economic interests of users of nuclear installations,[120] and ongoing supervision.[121] Types of nuclear installations in the scope cover installations for production (with the exception of uranium mines[122]) and enrichment of nuclear material, as well as nuclear power plants.[123] This provision also covers the issue of transport and trans-shipment of nuclear fuel.[124] This reading of the Federation's competence scope is also not in doubt.[125] The Federation's regulatory authority over the next stage of the investment process also includes the decision on the further use of nuclear energy.[126] This includes, in particular, the decision on the extension of the operation of nuclear reactors and the adaptation of the existing legal order to new circumstances (e.g. the materialisation of new risks not previously taken into account). These include, for example, the series of stress tests to which nuclear reactors in Germany were subjected after the Fukushima disaster. The provision of Article 73(1)(14) of the *Grundgesetz* also includes the legislative competence for a directional decision on nuclear phase-out. This basis for competence in Article 73(1)(14) of the Basic Law has never been challenged.[127] As a result, Article 73 section 1 point 14 cannot be used as (word-for-word) "shield" against a nuclear phase-out.[128]

The constitutional regulation also allows the Federation to choose the concept of disposal of radioactive waste.[129] Indeed, the provision of Article 73(1)(14) of the Basic Law refers explicitly to radioactive waste: "The Federation shall have exclusive legislative competence in the following areas: […] 14) […] disposal of radioactive materials." The constitutional lawmaker intended to emphasise the special importance of the statutory regulation of the problem of securing and disposal of radioactive waste, as well as the tasks related to this (on the part of public authorities).[130] The importance of the radioactive waste management issues stems from the fact that the legislator in 1959 could, in terms of the content of the added provision of Article 73(1)(14) of the Basic Law, have stopped at indicating (at the level of the text of the Constitution) only the production of nuclear energy through nuclear fission and nuclear fusion.[131] Meanwhile, the legislative technique adopted was to list the most diverse areas of nuclear energy.[132]

Also, from the provision of Article 73(1)(14) of the Basic Law, the legislative competence of the Federation concerning the level of radioactivity arises: "The Federation shall have exclusive legislative competence in the following areas: […] 14) […] protection against the dangers of […] ionising radiation […]." Protection against dangers connected with ionising radiation affects dealing with radioactive material.[133] This competence goes beyond the application of nuclear energy for power sector purposes. Scope of Article 73

section 1 point 14 *Grundgesetz,* in this regard, covers obligations to report on the level of radioactivity in the environment.[134] This provision also includes the following elements: the establishment of data, the collection of data and the assessment in terms of the radioactivity level of the environment.[135] It also involves the power to set limit dose values for the level of radioactivity, i.e. the level that has been determined to be a safe limit.[136] It also involves the possibility of introducing measures such as restrictions on the transport of foodstuffs and food products, the issuing of recommendations and border controls.[137] It should be noted that the scope of influence of the Federation in question is not limited to the area in which the Basic Law applies.[138] Indeed, it applies to all hazards that arise from the release of nuclear energy or through ionising radiation – when the radiation source is located within the Federal Republic of Germany or beyond its borders.[139] Examples of potential sources for materialising such scenarios cover installations in which chain reaction takes place (nuclear reactors), and facilities reprocessing spent nuclear fuel, during transportation of nuclear material or during its storage.[140]

By covering radiation protection (except for non-ionising radiation) so comprehensively, Article 73(1)(14) of the *Grundgesetz* has established a legislative competence that extends beyond the field of the economy. It covers medicine, technology, science, industry, agriculture, commerce, and entrepreneurship.[141] From the perspective of the systematics of the Basic Law itself, this leads to the conclusion that Article 73(1)(14) of the *Grundgesetz* does not constitute a specific provision to Article 74(1)(11) of the *Grundgesetz,*[142] but constituted the constitutional basis for a new and independent branch of law, i.e. nuclear law, and radiation protection regulations.[143]

It is also important to understand the proper use of the word "hazard" in the provision of Article 73(1)(14) of the *Grundgesetz*. This provision indicates the exclusive competence of the Federation as to "protection against hazards associated with the release of nuclear energy or ionising radiation […]." It is pointed out that the concept of hazard at the time of the drafting of the indicated provision of the Basic Law (as well as of the Atomic Law) referred to the classical task of the state in the form of care by state authorities to preserve public order.[144] Nowadays, the scope of Article 73(1)(14) is understood in a way that it also contains defence against threats.[145] Meanwhile, the development of environmental protection has also led to a change in the understanding of protection against hazards.[146] How hazards are understood in isolation from the peaceful use of nuclear energy goes beyond policing because it also covers dangers that can occur due to unpeaceful production or usage of nuclear energy (or ionising radiation)[147] or dangers that have already occurred (materialised).[148] Indeed, it also includes general risk prevention (in the form of environmental pollution).[149] Based on the provision of Article 73(1)(14) of the *Grundgesetz*, the understanding of the term hazard has been accepted in such a way that the scope of the prescribed level of protection against hazards also includes those hazards which until recently were in the pre-field of protection against the given hazards.[150] This means that protection against hazards covers prevention and

those dangers that already materialised.[151] This is because, in the nuclear field, it is practically impossible to draw a clear distinction between a threat and the prevention of that threat.[152] Undertaking any activity that is related to the usage of nuclear material should always be built on this duality (managing those dangers that already materialised and at the same time preventing any new ones – quite often through the same measures).

The findings so far relating to the provision of Article 73(1)(14) of the Basic Law have dealt with issues in the institutional sphere, i.e. delimiting the scope of the regulatory powers (primarily legislative) granted to the Federation concerning the peaceful use of nuclear energy. In contrast, the provision of Article 73(1)(14) of the *Grundgesetz* also gives rise to a number of findings of a substantive legal nature,[153] which were developed directly by the courts. These are also the ones that contain the greatest added value for use in relation to the constitutional systems of other states. This is also because constitutional provisions concerning nuclear energy have only exceptionally appeared in some constitutions.[154] German constitutional solutions stand out here in a decidedly positive way (especially considering their level of detail). Self-restraint and caution are necessary[155] when reconstructing or interpreting this material content. However, a broad consensus supporting those findings is represented in the legal doctrine – also because some authors present those judicial theses as their own.

In assessing the constitutional relevance of Article 73(1)(14) *Grundgesetz*, the Federal Constitutional Court has, in each case, assumed that the Basic Law, in principle, permits the production and use of nuclear energy for peaceful purposes.[156] This was also the case in the most recent FCC's judgment on nuclear energy.[157] In turn, the Federal Supreme Administrative Court in Leipzig[158] (orig. *Bundesverwaltungsgericht*) expressed the same opinion based on the provisions of Article 74(1)(11a) of the Basic Law. Although the provision of Article 74(1)(11a) of the Basic Law was introduced in 1959, the FCC emphasised that the 1950s were still characterised by little recognition of the problem of the peaceful use of nuclear energy.[159] The nuclear power generation was much more positively perceived at that time.[160] The peaceful use of nuclear energy for power generation was also viewed positively at the time because of the context of the particularly controversial issue of Germany's possible use of nuclear energy for military purposes.[161] The aim of the 1959 constitutional amendment with its introduction of nuclear energy application into the competences of the Federation, served to underline an increasing significance of the peaceful application of nuclear energy.[162] This constitutional amendment even served back then as a "legitimacy function."[163] It should also be added that public awareness of the consequences of the peaceful use of nuclear energy and the risks involved did not break through more widely into the public consciousness until after the Chernobyl disaster in 1986 and then Fukushima – 25 years later. This historical perspective by no means alters the fact that the competence provisions of the *Grundgesetz* contain an authorisation for using nuclear energy to generate power.

On the other hand, the authorisation of the peaceful use of nuclear energy, expressed by the extension by the legislature of the content of the Basic Law with the provision of Article 73(1)(14), does not imply an obligation to use it. Indeed, no constitutional command exists to produce and use nuclear energy.[164] The German Constitution contains a basic message of a declared belief in the peaceful application of nuclear energy without any further requirements.[165] The Court expressed the view that the constitutionality of atomic energy "cannot be called into question based on other constitutional provisions."[166] Nor has this been challenged at any point in subsequent case law. The possibility of questioning the constitutionality of the use of nuclear energy for peaceful purposes through the use of horizontal constitutionality review was also expressed by the Federal Supreme Administrative Court.[167]

Moreover, the FCC also gave material legal significance to a simple amendment of the Basic Law in the form of the transfer of the legislative competence of the Federation from a competing one to a catalogue of exclusive competences under the so-called *Föderalismusreform.*[168] At the same time, the Court saw in these actions of the legislature in connection with the *Föderalismusreform* (consisting of the transfer of the competence of the federal legislature to the same substantive-legal extent as before from competing legislation to exclusive legislation) a confirmation of the original decision of the legislature that the Basic Law permits the peaceful use of nuclear energy for commercial power generation.[169] In the opinion of the FCC, this also constituted a confirmation by the legislature of the Court's case law on nuclear energy due to the lack of substantive interference by the legislature in the material legal content of the Basic Law in this respect.[170] Those judicial theses regarding *Föderalismusreform* should be seen in the context of the first decade of the 21st century. Despite turbulent political and legal debate concerning nuclear phase-out at that time, constitutional changes introduced with the *Föderalismusreform* have not interfered with the content of this constitutional clause (i.e. Art. 73 section 1 point 14).[171]

Interestingly, reconstructions in the legal doctrine were undertaken regarding what kind of material content does not result from Art. 73 section 1 point 14. This constitutional provision states that "The Federation shall have exclusive legislative competence in the following areas: […] 14) Generation and use of nuclear energy for peaceful purposes, construction and operation of facilities for such purposes, protection against nuclear release or ionising radiation hazards and disposal of radioactive material.", it might seem that none material content results from it.[172] This clause should not be understood e.g. in a way that the Federal Government has the order to stop dangers resulting from ionising radiation (and thus Federation should e.g. stop the development of nuclear installations). However, at the same time, it does not mean that the German Federal government is not obliged to protect its citizens against those dangers – it is – but a proper legal basis for such a continuous obligation is anchored in Article 2 section 2 of the Grundgesetz.[173]

3.5 The normative content of the provision of Article 87c of the Basic Law introducing optional commissioned administration in the field of nuclear energy

Another provision that directly relates to nuclear energy is the provision of Article 87c of the Basic Law:

> Laws enacted on the basis of clause 14 of paragraph (1) of Article 73 may, with the consent of the Bundesrat, provide that their enforcement shall be vested in the states (*Länder*) on the order of the Federation.

To the provision of Article 87c of the *Grundgesetz* generally applicable is the provision of Article 85 of the Basic Law:

> (1) Insofar as the states (*Länder*) execute federal laws on federal commission, the organisation of authorities shall be a matter for the states (*Länder*), insofar as federal laws requiring the consent of the Bundesrat do not otherwise provide. Federal laws may not delegate tasks to municipalities or associations of municipalities.
>
> (2) The Federal Government may, with the consent of the Bundesrat, issue general administrative regulations. It may regulate the uniform training of administrative officials and employees. The heads of intermediate authorities shall be appointed in agreement with it.
>
> (3) The authorities of the states (*Länder*) shall be subject to instructions from the competent highest authorities of the Federation. Instructions are to be addressed to the highest state (*Land*) authorities unless the Federal Government deems the matter urgent. The highest Land authorities shall ensure that the instructions are carried out.
>
> (4) The supervision of the Federation shall extend to the legality and expediency of execution. To this end, the Federal Government may demand reports and the submission of files and delegate plenipotentiaries to all authorities.

The regulation of Article 87c *Grundgesetz* also corresponds to the provision of Article 87 of the Basic Law:

> 1 The federal administration, through its own administrative bodies, shall administer foreign affairs, the federal financial administration and, pursuant to the provisions of Article 89, the administration of federal waterways and navigation. By a federal law, federal border guard authorities, central offices for police information and intelligence, for criminal police, for the collection of materials for the protection of the constitution, and for protection against endeavours within the Federation which, by the use of force or preparations made to this end, endanger the foreign interests of the Federal Republic of Germany, may be established.

2 Such social insurance institutions whose sphere of competence extends beyond the territory of a single *Land* shall be conducted as corporations under public law directly subordinate to the Federation. Social insurance institutions whose jurisdiction extends beyond the territory of a single Land but not more than three *Länder* shall, contrary to the provisions of the first sentence, be conducted as *Land* corporations under public law if a supervisory state is specified by the participating states (*Länder*).
3 In addition, autonomous higher federal authorities and new federal corporations and institutions under public law may be established by a federal law for matters over which the Federation has legislative power. If new tasks arise for the Federation in areas covered by federal legislation, federal authorities at intermediate and basic levels may be established, if necessary, with the consent of the Bundesrat and a majority of the members of the Bundestag.

In addition, the provisions of Articles 83 and 84 of the Basic Law also apply:

Article 83 The states (*Länder*) shall execute federal laws in their own right insofar as this Basic Law does not otherwise provide or permit.

Article 84 (1) Insofar as the execution of federal laws is a matter for the states (*Länder*) themselves, the states (*Länder*) shall regulate the organisation of their authorities and administrative procedure. If federal laws provide otherwise, the states (*Länder*) may regulate otherwise. If a *Land* has enacted a deviating regulation pursuant to paragraph (2) of this Article, subsequent federal regulations regarding the organisation of authorities and administrative procedure shall not enter into force in that Land until at least six months after their promulgation, unless otherwise provided with the consent of the Bundesrat. The third sentence of paragraph (3) of Article 72 shall apply accordingly. In exceptional cases the Federation may, on account of a special need for uniform regulation throughout the federal territory, regulate administrative proceedings without the possibility of different regulation in the states (*Länder*). Such laws shall require the consent of the Bundesrat. Federal laws may not delegate tasks to municipalities or associations of municipalities.

(2) With the consent of the Bundesrat, the Federal Government may issue general administrative rules.

(3) The Federal Government shall supervise the execution of federal laws by the states (*Länder*) in accordance with applicable law. For this purpose the Federal Government may delegate its plenipotentiaries to the highest *Land* authorities and, with their consent or, in the event of their refusal, with the consent of the Bundesrat, also to subordinate authorities.

(4) If deficiencies in the execution of federal laws ascertained by the Federal Government in the states (*Länder*) are not corrected, the Bundesrat, on application of the Federal Government or of a *Land*, shall

> decide whether the *Land* concerned has violated the law. The decision of the Bundesrat may be appealed to the Federal Constitutional Court.
>
> (5) To implement federal laws, the Federal Government may, by a federal law requiring the consent of the Bundesrat, be authorised to issue specific instructions in particular cases. These shall be addressed to the highest *Land* authorities, unless the Federal Government deems the case to be urgent.

When *Grundgesetz* entered into force, the competences to administer the production and usage of nuclear energy were not divided between the Federation and states (*Länder*).[174] This resulted from the already reiterated lack of empowerment for Germany to develop a nuclear energy sector in the initial years of the *Grundgesetz*. With the retrieval of Germany's sovereignty in nuclear power, the German state was willing to develop economic deployment of nuclear energy.[175] Because of all the risks for society that result from the usage of nuclear energy, it is a necessary duty of the government to supervise this activity.[176] As a result, there is a need for a constitutional regulation of the competences of administration regarding this state supervision.[177]

The provision of Article 87c of the Basic Law was added by Article 1(2) of the Act of 23 December 1959 on the amendment of the Basic Law.[178] This occurred with the addition of Article 74 (1) (11a) to the Basic Law and with the adoption of the Federal Law of 23 December 1959 Atomic Law,[179] the same reasons for which the constitutional lawmaker decided to introduce the issue of nuclear energy into the Basic Law apply to Article 87c in this respect. However, it is important to note several reasons for this constitutional lawmaker's decision.

The first legal act amending the Basic Law dealing with nuclear energy did not contain a regulation corresponding to Article 87c of the *Grundgesetz*.[180] The draft authored by the FDP parliamentary club on 28 February 1956 did not provide for a mechanism for the use of federally commissioned administration.[181] The first draft by the FDP parliamentary club stipulated that the administration of nuclear energy was to be uniform throughout Germany.[182] The proposal to introduce the current provision of Article 87c into the Basic Law was only put forward in the government draft of 14 September 1956 in the same wording as the current wording of Article 87c of the *Grundgesetz*.[183] The intention to introduce a new type of administrative task that would be delegated to the states (*Länder*) required an amendment to the Basic Law.[184] This was because the catalogue of tasks that the Federation could delegate to the states (*Länder*) was closed at the level of the Basic Law (and its possible expansion required an amendment to the Basic Law).[185]

In the explanatory memorandum to the government's draft amendment to the Basic Law, three possible ways of implementing the Atomic Law were identified[186]: (1) enforcement of the Atomic Law as an own task of the states (*Länder*) (Art. 83 *Grundgesetz*); (2) enforcement of the Atomic Law by a main

federal administrative body (Art. 87(3) of the *Grundgesetz*); (3) enforcement of the Atomic Law by the states (*Länder*) on the order of the Federation (this model somehow resembles outsourcing). If the legislature had not chosen to put in place an appropriate basis at the level of the Basic Law to commission the states (*Länder*) to enforce federal legislation (third scenario), the Federation would have enforced its laws (second scenario) and the states (*Länder*) would have enforced their laws (first scenario), respectively. Similarly, it would be the case if the federal legislature decided not to use the option to delegate the administration in the area of nuclear law to the states (*Länder*) in full (or in part). In such a case, the general principles would apply: the states (*Länder*) would enforce their laws, and the federal laws would be enforced under the rules laid down by the provisions of Articles 83 and 84 of the Basic Law.[187] Indeed, it follows from the general principles (Articles 30 and 83 of the Basic Law) that the execution of administrative tasks by the states (*Länder*) takes place independently.[188] This is particularly clear from the wording of Article 30 of the Basic Law.[189] This is because the principle is that the states (*Länder*) implement federal laws independently (i.e. without supervision by the Federation). Administration mandated by the Federation is an exception to this. For this reason, the nuclear-related provision of Article 87c of the Basic Law was introduced into the Basic Law, as it is an exception to the general rules under the provisions of Articles 83 and 84 of the Basic Law.[190]

The drafters of the amendments to the Basic Law opted for the last regulatory model (i.e. the third scenario). The choice of outsourcing optional administration to the federal states (*Länder*) by the Federation had several reasons.[191] In the first instance, the Federation sought to maintain uniform interpretation and application practices of the relevant international agreements.[192] After all, Germany was a member of Euratom, and it was therefore up to the Federal Government to ensure the implementation of these regulations.[193] Furthermore, the choice of optional administration delegated to the states (*Länder*) by the Federation was a way of working out a compromise within the already existing practice of separation of powers vested in the Federation and the states (*Länder*).[194] The Federation was given the opportunity to maintain the uniform application of law and economic unity. At the same time, the states (*Länder*) retained their traditional competences regarding space administration and the economy.[195] The idea was also that no new administrative bodies would be created.[196] It was planned to involve multiple administrative bodies due to the complexity of the nuclear licensing procedure, and it was also wished to keep the entire administrative procedure under one administrative body. Hence, the drafters of the amendments to the Basic Law on nuclear energy were convinced that the competent authority for issuing the licence should be the public administration at the level of individual states (*Länder*).[197] During the debate in the Bundestag, numerous objections were raised in this connection, including that there would be huge differences in how the individual states

(*Länder*) implemented this legislation.[198] This was not a groundless objection. The perspective of the more than 60 years that have elapsed since the enactment of the provisions of the Basic Law in question shows the crucial role played by nuclear safety, which prevents the establishment of local derogations as well as other regulations. It would therefore be beneficial to have a uniform application of these provisions, including licensing and supervision, for example, by a single federal authority competent to conduct licensing proceedings, as well as by a separate (or the same) supervisory authority monitoring the operation of nuclear installations on an ongoing basis, especially in the area of nuclear safety. In this respect, changes were only introduced in the second decade of the 21st century.[199]

The content of Article 87c of the Basic Law is understood as a confirmation by the constitutional lawmaker of the constitutional admissibility of the peaceful use of nuclear energy.[200] Next to the provision of Article 73(1)(14) *Grundgesetz*, this is the second provision of the Basic Law concerning nuclear energy. The literature points out that it constitutes a fundamental confirmation of the constitutional admissibility of the peaceful use of nuclear energy (for peaceful purposes, i.e. in energy or medicine).[201] In doing so, the additional legitimising function of Article 87c of the *Grundgesetz*[202] is pointed out. This does not mean, however, that based on the content of Art. 87c *Grundgesetz,* it would be possible to formulate any obligations or authorisations relating to the use of nuclear power or concerning the constitutional admissibility of abandoning nuclear power.[203] Likewise, the content of Art. 87c *Grundgesetz* does not allow for formulating a constitutional obligation to use nuclear energy.[204] The provision of Article 87c of the *Grundgesetz* leaves the assessment of the advantages and disadvantages of using nuclear energy (for peaceful purposes) to a political decision made by the competent body.[205] At the same time, Article 87c of the Basic Law does not contain any requirements for the form in which the relevant political decision should be taken.[206]

The provision of Article 87c of the *Grundgesetz* establishes the nature of the relationship and scope of jurisdiction of the shared administration between the Federation and the states (*Länder*).[207] The constitutional lawmaker has given the federal legislature the power to delegate tasks to administrative bodies at the level of the states (*Länder*).[208] A federal law is required for this, and the consent of the Bundesrat is required for its enactment.[209] The exercise of this power by the federal legislature is optional.[210] The reasons why the federal legislature may choose to use the regulation of Article 87c of the Basic Law are important. These are as follows: to achieve the objectives of the law issued according to Article 74(1)(11a) (currently Article 73(1)(14) *Grundgesetz*); intention to guarantee a sufficiently high level of protection arising from constitutional regulations, in particular, fundamental rights; to ensure uniform implementation of laws within the Federation; to ensure correct implementation and enforcement of obligations arising from EU and international law.[211] Using the competence under Article 87c of the Basic Law is possible in regards to only some federal

statutes.[212] If the Federation does not make use (or makes only partial use) of the option to delegate tasks, the federal administration's general rules on performing its own tasks and implementing federal laws pursuant to Articles 83 and 84 of the Basic Law shall then apply.[213] At the same time, the provision of Article 87c of the Basic Law has the character of a dispositive (i.e. relatively binding) provision.[214]

Based on section 87c in conjunction with section 73(1)(14) of the Basic Law, the implementation of the Atomic Law and the regulations issued thereunder has, with certain exceptions, been delegated to the states (*Länder*) by the Federation.[215] This is based on the provision of Section 24(1) of the Atomic Law in conjunction with the provisions of Articles 87c and 85 of the *Grundgesetz*.[216] The provision of Section 24(1) sentence 1 of the Atomic Law provides: "Other tasks of administration arising from Chapter Two and the regulations issued thereunder shall be performed by the states (*Länder*) on behalf of the Federation." It remains for the administration to be carried out at the federal level in matters relating to the supra-regional use of nuclear energy, such as, for example, licences for the import, export, storage, and transport of nuclear fuel or the permanent storage of radioactive waste.[217]

Under the provisions of Articles 85 and 87c of the Basic Law, the activities of the administrations of states (*Länder*) are subject to the supervision of the Federation concerning legality and purposefulness.[218] The administrative bodies of the states (*Länder*) are obliged to report to the Federation, at its request, on how they have implemented federal laws to the extent that they have been obliged to do so.[219] Conversely, the Federation has the authority to take (directional) decisions on a particular matter.[220] Even if the Federation exercises its power to intervene, implementing this sentence and the external representation of the federal state on the ongoing licensing procedure will still belong to the competent body of the federal state administration.[221]

Furthermore, under Article 87c of the Basic Law, administrative competence will implicitly remain with the Federation.[222] This applies to situations in respect of which the Federation's competence derives from the "substance of the matter"[223] or has a "factual connection to an explicitly expressed competence."[224] Despite this, the FCC refuses to allow the Federation to create a "shadow administration," i.e. a parallel administration to that already existing in the states (*Länder*), which would duplicate its tasks.[225] This could be done by regulating the implementation of laws on a case-by-case basis through external contacts with the concerned.[226] The Court emphasises that it is necessary to avoid constitutionally inadmissible dual jurisdiction of the administration.[227]

The Federation's most important legal means of action remains the ability of the Federation to issue instructions[228] (*Weisungen*) to the states (*Länder*) on matters in which administration has been delegated to the states (*Länder*).[229] Instructions are the primary instrument for the supervision exercised by the Federation over the administration delegated to the states (*Länder*).[230] The constitutional basis for issuing instructions is the provision

of Article 87c in conjunction with Article 85(3) of the Basic Law.[231] The instructions are like intra-administrative orders.[232] They contain binding content ordering a specific, within the administrative structure, lower authority to take certain actions (or not to do so).[233] This is the classic formula: *facere* or *non-facere*. On the basis of the instruction under Article 85 of the Basic Law, the Federation has general supervision over the administration in terms of compliance with the law.[234] The Federation also supervises in terms of expediency.[235] This follows directly from the wording of the provision of Article 85 (4) sentence 1 of the Basic Law: "The supervision of the Federation extends to the legality and purposefulness of execution."

At the same time, federal oversight is understood to mean the continuous supervision of the administration of the states (*Länder*) and the performance of the tasks entrusted to them by law.[236] Supervision can also consist of intervening and correcting certain decisions of the authorities of states (*Länder*) by means of supervisory measures available to the competent federal authorities.[237] From the outset, therefore, state (*Land*) administration must consider that the Federation may also begin to supervise them from the point of view of content.[238] The Federation's use of the authority to issue instructions should be effective and substantively justified. It is emphasised, however, that the use of instructions may ultimately lead to the negation of certain administrative moves by the respective federal state.[239] In addition, the content of the instruction cannot be arbitrary – it must address the issue of the administration's compliance with the laws and the purposefulness of implementing federal laws. Apart from this, there are no other restrictions on these instructions.[240] Concerning the content, a distinction is made between two types of instructions: those that are decisive in substance (*sachentscheidende Weisungen*) or those that affect the procedural dimension of the administration to be carried out (*verfahrenslenkende Weisungen*).[241] However, such a distinction is primarily doctrinal. Indeed, there is no limitation that both substantive and formal legal guidelines are contained in a single instruction.[242]

The great importance of the instructions lies in enabling a uniform interpretation of federal nuclear law and federal radiation protection law.[243] Moreover, it is pointed out in the literature that the institution of instructions (*Weisungen*) even guarantees such an interpretation.[244] The Atomic Law uses several vague terms, which could give rise to various interpretations. A good example of such a vague concept is, for example, the phrase "state of the art of science and technology" (*Stand von Wissenschaft und Technik*) – the provision of §7(2)(3) of the Atomic Law.[245] The literature indicates that the instructions of the Federation will serve precisely, among other things, to concretise such concepts as *Stand von Wissenschaft und Technik*.[246] In the meantime, the uniform application of nuclear law provides the basis to ensure adequate protection against ionising radiation.[247] In addition, the instructions are also intended to enable the Federal Republic of Germany to meet its international obligations regarding nuclear energy and

radiation protection.[248] This also includes EU legislation created in connection with Euratom.[249] It follows that the instructions (*Weisungen*) will ensure and guarantee the uniform application of nuclear legislation, regardless of whether the legislation in question is a matter of federal legislation, EU legislation, or international agreements. The scope of the instructions also applies to legal proceedings related to the commissioned (outsourced) administration executed by the states (*Länder*) based on Article 87c of the Basic Law.[250] In this respect, the content of the instructions will address all aspects of the litigation from the perspective of the state (*Land*) as a party to the litigation in question.[251]

The instructions of the Federation are binding on the addressee but have no legal effect vis-à-vis third parties,[252] i.e. vis-à-vis entities other than the Federation, the state (*Land*) concerned, which is the addressee of the instruction in question and the state authorities of that state (*Land*) (i.e. not only administrative authorities or, more broadly, executive authorities, but also legislative authorities and judicial authorities). Due to the lack of direct legal effect externally, instructions do not constitute administrative acts.[253] As for the legal form of the instructions referred to in Article 85(3) of the Basic Law, there is no further definition of this at the level of constitutional regulation.[254] The generally accepted principle is that instructions must be given in written form with appropriate justification.[255] Oral form (e.g. telephone conversation) is also permitted.[256] However, in cases where the instruction serves to resolve a particular dispute, the written form (with appropriate justification) is indicated as the most appropriate form.[257]

From the wording of the provision of Article 85(3) of the Basic Law, it follows that only the "highest authorities of the Federation" are permitted to issue instructions. By this term, Federation authorities mean such Federation authorities that are not subject to other authorities.[258] There is no possibility of transferring the power to issue instructions to another federal body, either under general authority (i.e. permanently) or in a specific situation.[259] Neither is the Federal Government entitled to assume the competence to issue instructions.[260] The doctrine, on the other hand, leaves no doubt that a resolution of the Federal Government could decide on the content that a given instruction should contain.[261]

On the other hand, in case of doubts about the designation of the competent authority, the German Chancellor shall designate it as the authority in charge of the Federal Government.[262] Practice in applying the law has shown that, within the institutional structure, the federal ministries were the competent authorities for issuing instructions.[263] Currently, the competent ministry for a large part of the matter is the Federal Ministry for the Environment, Nature Conservation, *Nuclear* Safety and Consumer Protection (*Bundesministerium für Umwelt, Naturschutz, Nuklearesicherheit und Verbraucherschutz*). The centralisation of competences within a single federal ministry barely occurred on 6 June 1986,[264] with the creation of the ministry responsible for all nuclear issues (and thus only established after the Chernobyl disaster).

Equally interesting is the question of whether the instructions are subject to the obligation of promulgation. However, since instructions do not have the character of generally applicable law, there is no obligation to publish them.[265] At the same time, the practice itself is not uniform.[266] Indeed, on more than one occasion, instructions will be subject to publication in various official journals – both in the Federal Monitor (*Bundesanzeiger*) and in the official journals of particular ministries.[267] As there is no compulsory promulgation, the point at which an instruction comes into force is not linked to the point at which it is officially promulgated. Indeed, the instructions become binding as soon as they are delivered to the relevant state (*Land*) authority, which is the addressee of the specific instruction.[268] In this respect, there is no need for any state (*Land*) body (e.g. parliament) to be involved in implementing the respective instruction.[269]

Concerning the instructions issued by the Federation, their legal boundaries are set very precisely.[270] Above all, the content of the instructions must comply with the applicable federal law and the law of the respective federal state.[271] In this respect, the compliance of the instructions with EU law and international law binding the Federal Republic of Germany must be verified. Furthermore, the instructions must comply with the content of valid court verdicts.[272] Under no circumstances may the instructions lead to a conduct that is subject to criminalisation.[273] A further limit to the instructions of the Federation is set by the regulation of Article 87c of the Basic Law[274] and other related constitutional provisions. The scope of what is substantively admissible in instructions (*Weisungen*) is connected with the scope of the Federation's legislative competence arising from the content of the provision of Article 73(1)(14) of the Basic Law.[275] Firstly, instructions may only relate to those matters that fall within the regulatory competence of the Federation and that the legislature has delegated to the states (*Länder*) as a delegated administration.[276] Secondly, the instructions may not encroach on the administrative authority which is exercised by the states (*Länder*) as their tasks based on the provisions of Articles 83 and 84 of the Basic Law.[277]

It is also necessary to indicate the reasons for the (possible) defectiveness of the instruction issued by the Federation. The primary reason for defectiveness is unconstitutionality, caused by exceeding the limits for instructions reconstructed based on the Basic Law.[278] In addition, the instruction may have been issued by the wrong authority.[279] The defectiveness of instruction may also manifest in the fact that the Federation demands an impossible action or one that is subject to criminalisation or contrary to good morals.[280] In such a case, the Land concerned is entitled to initiate a competence dispute with the Federation based on the provision of Article 93(1)(3) of the Basic Law[281]: "The Federal Constitutional Court shall rule: […] 3. in the event of a difference of opinion as to the rights and duties of the Federation and the states (*Länder*), in particular in the execution of federal law by the states and in the exercise of supervision by the Federation […]." Before deciding on the merits of such an application, the Land concerned may request an interim

order from the Federal Constitutional Court to replace such a defective instruction.[282]

There is no clear legal effect in the area of supervision exercised by the Federation. A further power of the Federation is the possibility of obliging the land administration to report on the status of the case.[283] In addition, the Federation is also entitled to demand the submission of the file of administrative proceedings[284] (based on Article 85(4) of the *Grundgesetz*[285]).

In addition to issuing instructions, another supervisory instrument is the possibility for the Federation to issue so-called administrative regulations (*Allgemeine verwaltungsvorschriften*).[286] This follows directly from the wording of the provision of Article 85(2), the first sentence, of the Basic Law, which reads: "The Federal Government may, with the consent of the Bundesrat, issue general administrative regulations." *Allgemeine verwaltungsvorschriften* are only such regulations that contain binding statements for an abstract number of cases that the administration deals with without having a direct legal effect on any entity other than the administration.[287] Concerning the execution of federal laws by the federal administration, the relevant constitutional basis is contained in the provision of Article 86 of the Basic Law: "Where the Federation enforces laws with the assistance of its own federal administration or federal corporations or institutions of public law, the Federal Government shall issue general administrative regulations, unless otherwise provided by law. Unless a law provides otherwise, they shall regulate the organisation of offices."

The administrative provisions serve the purpose of putting in place legal measures, legal mechanisms, and other instruments to enable the federal states (*Länder*) to be commissioned to implement the Atomic Law in the administration field.[288] The basic aim of issuing *Allgemeine verwaltungsvorschriften* is to guarantee a uniform execution of federal law.[289] All these mechanisms also serve the purpose of enabling the Federation to supervise the states (Länder) effectively in matters of delegated administration.[290] However, the mechanism of *Allgemeine verwaltungsvorschriften* should not be excessively idealised because before making usage of *Allgemeine verwaltungsvorschriften*, Federation has at its disposal many softer instruments that can achieve the same effect as *Allgemeine verwaltungsvorschriften* ("Recommendations," "Advice" or cooperation between the competent federal minister and the executive bodies of *Länder*).[291] *Allgemeine verwaltungsvorschriften* significantly differ from the instructions (guidelines) of the Federation,[292] because they apply to multiple case studies thanks to their abstract character.[293] Indeed, the instructions (guidelines) of the Federation are the strongest supervisory measure that the Federation can use in implementing federal substantive law by the states (*Länder*).[294] At the same time, administrative regulations are essential for the use (by the Federation) of the supervisory measure of instructions (guidelines), as administrative regulations establish criteria for the implementation of federal laws by the states (*Länder*).[295] *Allgemeine verwaltungsvorschriften* are easier to amend, and the abstraction level of those provisions is lower (than in the case of

federal statutes), so they are a good instrument to enforce the uniformity of execution of federal statutes[296] (like *Atomgesetz*). If these criteria expressed in administrative regulations are deviated from (by the *Länder*), the Federation may use the supervisory instrument precisely in the form of instructions (guidelines).[297]

The addressees of the administrative regulations are the states' (*Länder*) administrative bodies, which, in connection with the administration entrusted to them (by the Federation), implement the Atomic Law and the Radiation Protection Ordinance.[298] Adoption of *Allgemeine verwaltungsvorschriften* limits the right of *Länder* to adopt such regulations on their own.[299] Administrative regulations thus constitute internally applicable law but do not constitute statutory provisions in the material sense.[300] For this reason, the legal position of administrative regulations in the catalogue of sources of law is special. Indeed, administrative regulations do not have such legal force that they can derogate from federal states' (*Land*) legislation.[301] The absence (on the part of administrative regulations) of a derogatory power over state (*Land*) legislation is to be distinguished from the consequences of an inconsistency between federal administrative regulations and those of the *Land* concerned.[302] Federal *Allgemeine verwaltungsvorschriften* have a priority over statutes and *Allgemeine verwaltungsvorschriften* adopted by *Länder*.[303] In this case, the state (*Land*) in question must align the content of its regulations (laws, regulations and other acts) with the substantive content of the federal administrative rules.[304]

In the context of federal laws enacted based on Article 73 section 1 point 14 and Article 87c of the Basic Law, the obligation to enact laws with the consent of the Bundesrat, as explicitly provided for in Article 87c of the *Grundgesetz*, is also relevant. This solution plays a function of protecting *Länder* within the federal system.[305] States (*Länder*) have a general competence to administer – it is only changed if the Grundgesetz directly determines this or allows it.[306] Consent of the Bundesrat protects against changing the structure of the federal system just by adopting normal statutes.[307] It is sometimes even perceived as a form of compensating *Länder* for extended interference rights of the Federation in this form of commissioned (outsourced) administration.[308] This applies to such laws that regulate a matter for the first time and possibly lead by means of a specific amendment to establishing an administration on behalf of the Federation.[309] No approval of Bundesrat is required[310] when the statutory provisions that introduced the administration commissioned to *Länder* were lifted or limited – because then the competence of genuine administration of *Länder* kicks in.[311] Such an understanding of Article 87c results from the circumstance that the protective purpose ceases to apply.[312]

3.6 The impact of Euratom on the German Constitution and the impact of the German nuclear phase-out on Euratom

Since nuclear provisions were added to the German *Grundgesetz* partly in connection with the creation of Euratom and Germany's accession to that

organisation, it is worth outlining the characteristics and specificities of Euratom. After all, in the 1950s, a powerful international organisation dealing exclusively with nuclear energy was established, covering most of geographical Europe (and the entire European Union). The sheer level of specialisation of this organisation had the potential for a significant impact on the legal system of the Federal Republic of Germany concerning nuclear energy. Moreover, it is also interesting to note that events in Germany (i.e. Nuclear Phase-Out) influenced key decisions on the direction of development and the subsequent fate of Euratom.

One of the three European Communities that preceded the creation of the European Union was the European Atomic Energy Community. Today, Euratom is an autonomous international organisation,[313] and each member state of the European Union must join it. The organisation was established by the Treaties of Rome on 25 March 1957. One of the international agreements signed then was the Treaty establishing the European Atomic Energy Community (EURATOM).[314] It entered into force on 1 January 1958.[315] Unlike the other founding treaties, the substantive provisions of the TEAEC have remained almost unchanged since 1958, and any changes made to them have followed the institutional evolution of the European Communities (and subsequently the European Union).[316]

The basis for ensuring the interaction of the various Communities was the creation of unified institutional structures for all three organisations. This was done through the Agreement of 25 March 1957 on the Joint Bodies of the European Communities[317] as regards the Parliamentary Assembly and the Court of Justice.[318] The other organs of the various Communities, including the Euratom organs (Council and Commission), were subsequently merged based on the Agreement of 8 April 1965 on the establishment of a Joint Council and Commission of the European Communities.[319]

Unlike the European Coal and Steel Community Treaty, which determined in Article 97 for its existence 50 years, such a clause did not apply to Euratom. Moreover, each Member State of the European Communities also had to be a Party to the Euratom Treaty,[320] regardless of whether the country's national energy policy included using nuclear energy for power generation. In the Accession Treaties of the individual Member States before 2003, this was explicitly stated in the name of these international agreements, as they regulated simultaneous accession to the European Economic Community and the EAEC.[321] On the other hand, the 2003 Treaty of Accession of ten countries to the European Union provided that the countries "hereby become members of the European Union and parties to the Treaties on which the Union is founded, as amended and supplemented." At the same time, the 2003 Treaty referred to the "Treaty establishing the European Atomic Energy Community and the Treaties amending or supplementing them" as "Basic Acts of the European Union."[322] This was done similarly for the accession of Bulgaria and Romania in 2009[323] and Croatia in 2013.[324] This legislative technique has already made it possible to clearly emphasise the relevance of the TEAEC.

Mandatory membership of Euratom has never entailed an obligation to develop a nuclear power sector.[325]. Similarly, no obligation to continue using nuclear energy within the power sector results from participation in Euratom.[326] Admittedly, the Treaty establishing the European Atomic Energy Community provided from the outset that "It shall be the task of the Community to contribute to the raising of the standard of living in the Member States [… .] by creating the conditions necessary for the establishment and rapid development of a nuclear sector."[327] However, this was always understood as "an offer that can be accepted or rejected."[328] This is confirmed by the Accession Declaration of Austria and Sweden in 1995[329]:

> The Contracting Parties, having regard to the fact that the founding Treaties of the European Union apply to all Member States in a non-discriminatory manner and subject to the rules relating to the common market, recognise that it is for Member States to decide whether or not to produce nuclear energy in accordance with the choices made in their [energy] policies. With regard to the reprocessing of spent nuclear fuel, it is the responsibility of each Member State to define its own policy in this area.[330]

The freedom of each member state of the European Union to shape its energy policy as regards the so-called energy mix, i.e. the choice of power generation sources, is expressly provided for in the second sentence of Article 194(2) of the Treaty on the Functioning of the European Union. This Treaty guarantee covers three rights for Member States: 1) to determine the conditions for exploiting its energy resources, 2) their choice between different energy sources, and 3) their choice regarding the general structure of its energy supply. As a result, it is the sole competence of the Member States to decide whether they will use nuclear energy for the power sector and to what extent.[331] Likewise, participation in Euratom does not obligate Germany to continue using nuclear energy within the power sector.[332] Member States' decisions on nuclear phase-out (like Germany's *Atomausstieg I* & *Atomausstieg II*) are not within the realm of EU law, and thus, they cannot be assessed through EU fundamental rights.[333]

Even if Euratom owns the nuclear fuel used in the German nuclear reactors, it is irrelevant to Germany's decision on nuclear phase-out (*Atomausstieg I* & *Atomausstieg II*).[334] This court thesis is connected with one particular and very strong competence of Euratom. According to Article 86 of the Treaty establishing the European Atomic Energy Community – all special fissile materials are property of Euratom. The scope of Euratom's right of ownership extends to all special fissile materials produced or imported by a Member State, a person or an undertaking. Article 86 constitutes a strong interference in the legal systems of Member States, because special fissile materials have the status of *res extra commercium,* and when acquired by any EU entity, the ownership remains by Euratom. Article 97 of the Treaty establishing the European Atomic Energy Community

further regulates that "Member States, persons or undertakings shall have the unlimited right of use and consumption of special fissile materials which have properly come into their possession, subject to the obligations imposed on them by this Treaty […]." The Federal Constitutional Court stated that ownership regulations in Articles 86 and 87 of the Treaty establishing the European Atomic Energy Community do not prevail over the energy mix sovereignty clause in Article 194 section 2 paragraph 2 of the Euratom Treaty.[335] The relation is reversed – the EU rights of use and consumption of nuclear fuel are only to be used in individual cases as far as its use according to the legal system of a particular Member State effectively and legally is possible.[336] In this case, the role of Articles 86 and 87 of the Treaty establishing the European Atomic Energy Community remains accessory to the domestic regime.[337] Thus, for example, point 9 in the recitals of Council Directive 2009/71/Euratom of 25 June 2009, establishing a Community framework for the nuclear safety of nuclear installations,[338] provides: "Each Member State may decide on its energy mix in accordance with the relevant national policies."

The directive obliges EU Member States to introduce uniform nuclear safety standards. At the same time, it refers to the freedom of choice of energy sources. This best reflects the peculiar paradox that has existed for many years in the practical operation of the European Union's energy policy. Regardless of whether a Member State uses nuclear energy in the power sector, the Euratom rules will be applicable in that Member State's legal system, as Member States are subject to the obligation to transpose and implement them.[339] This makes it easy to understand why, according to the CJEU jurisprudence, it is the EU that is jointly responsible with the member states for nuclear safety under the Convention on Nuclear Safety (CNS), done in Vienna on 20 September 1994.[340] Since not all Member States are equally interested in the subject of nuclear regulation itself (but all countries are interested in radiological protection), it is the EU's task to ensure a sufficiently high and common standard of safety of nuclear installations – not least because this translates directly into radiological protection itself.

Many reasons have been identified for the establishment of Euratom in 1957. The primary reason for such a narrow focus of the Treaty was the turn towards economic integration of Western European countries after the failed attempt to establish a European Defence Community and a European Political Community.[341] Another political reason for the creation of Euratom was the desire to break the dominance of the United States and the USSR in nuclear research.[342] There was also a geopolitical reason – the crisis around the Suez Canal in 1956 and the associated difficulties in transporting oil necessitated the development of alternative primary energy sources to oil.[343]

Nevertheless, another reason for creating the European Atomic Energy Community Treaty was to promote the peaceful use of nuclear energy.[344] Thus, at the heart of the decision to create an EU/Euratom organisation focused on a single energy technology was the intention to implement the doctrine announced by Eisenhower to start using nuclear energy for power generation

instead of for military purposes[345] (Atoms for Peace). Another reason for the creation of Euratom was the desire to place nuclear energy under the supervision of competent institutions,[346] as well as the integration of the energy sector[347] at the Community (EU/Euratom) level. Moreover, such a narrowly defined energy policy area could be subjected to common (i.e. Community) supervision.[348] Unified (i.e. EU) supervision was to ensure "the safety conditions necessary to eliminate risks to the life and health of the population."[349] This was to be facilitated by the fact that, at the time of drafting the Euratom Treaty, no Community country except France had its own civil nuclear programme.[350] France also proved to be the greatest supporter of the conclusion of the Treaty establishing the Atomic Energy Community.[351] Indeed, a Community effort was to be – due to economies of scale and the pooling of scientific and material resources – not only cheaper but generally feasible.[352] This was expressed in the Preamble to the Treaty establishing the European Atomic Energy Community: "only a joint effort undertaken immediately can result in achievements commensurate with the creative potential of […] countries."[353] Finally, in the post-war period, there was a need to meet the rapidly growing demand for primary energy.[354] It was also about creating a new heavy industry – nuclear power sector – in the member countries.[355] The Treaty extended this idea as it called on Member States to establish "a strong nuclear sector providing broad access to energy resources, leading to the modernisation of technical processes,"[356] which was to ensure the "prosperity […] of the peoples" of the member states.[357]

The Treaty on the Establishment of the European Atomic Energy Community provides in Article 1 that the task of the Community is to contribute to raising the standard of living in the member states and developing relations with other States (i.e. third countries). This will be done "by establishing the conditions necessary for the establishment and rapid development of a nuclear sector" (Article 1 *in fine* TEAEC).

In order to perform the task indicated in Article 1, the measures and actions to be taken by Euratom are defined. First and foremost, the Community is to promote research and ensure "the dissemination of technical knowledge" (Article 2(a) TEAEC). Euratom also establishes "uniform safety standards to protect the health of workers and the general public" (Article 2(b) TEAEC). More importantly, the Community must ensure that the uniform safety standards established are applied (Article 2(b) TEAEC.). The TEAEC is also intended to facilitate investment, stimulate the activities of undertakings and ensure the establishment of the basic installations necessary for developing nuclear energy in the Community (Article 2(c) TEAEC). In addition, the Treaty obliges the Community to ensure that all users have a "regular and equitable supply of nuclear ores and fuels" within its framework (Article 2(d) TEAEC). This is extremely important as the basis of nuclear power is a non-renewable resource, of which the available resources are limited.

Euratom also ensures that nuclear material is not used for purposes other than those for which it is intended (Article 2(e), TEAEC). The Community is

thus to take care of, for instance, public safety by exercising appropriate supervision (Article 2 (e), TEAEC). In addition, the Community is to exercise "the right of ownership of special fissile materials granted to it" (Article 2(f), TEAEC). The Community is also to ensure "universality and marketability and access to the best technical solutions" (Article 2(g), TEAEC). This is to be done through "the creation of a common market in specialised materials and equipment, the free movement of capital for investment in the nuclear field, and freedom of employment for specialists within the Community" (Art. 2(g), TEAEC). Finally, the Community is to establish "relations with other States and international organisations permitting progress in the peaceful uses of nuclear energy" (Article 2(h), TEAEC). The scope of the measures and actions indicated is limited in that it can only be applied "under the conditions provided for in […] the Treaty" (Article 2, TEAEC).

Euratom's tasks were wide-ranging and set out ambitiously, but from the outset, the powers given to Euratom were quite small.[358] It should be noted that Euroatom was not given the competence to build or operate nuclear installations.[359] Originally, the Treaty establishing the European Atomic Energy Community did not cover the safety of nuclear reactors, and therefore, it burdened national legal systems[360] (this has, however, changed after the 1986 catastrophe[361]). Euratom was to focus primarily on securing the supply of uranium ore and nuclear fuel through a specially created agency.[362] Therefore, there are opinions that not all the tasks set for Euratom were fulfilled. In particular, this has to do with organising a common market for the nuclear sector, including the free movement of highly skilled workers.[363]

On the other hand, these assessments can be juxtaposed with demonstrating the importance of nuclear power in the European Union – also in connection with the German Nuclear Phase-Out. Even after *Atomausstieg I,* nuclear power played an important role in the European Union. The EU then had the largest number of nuclear power plants compared to the rest of the world.[364] At the time, the EU was also the world's largest producer of nuclear-generated power.[365] By contrast, in 2006, nuclear energy was the main source of primary power generation in the European Union (26%) and even overtook oil, natural gas or solid fuels.[366] After the *Atomausstieg II* decision, the EU remained the global leader in the number of operating nuclear reactors (132 reactors out of 437 – in 2012[367]). Also, just before the last three reactors in Germany were terminated, the EU had the highest number of nuclear reactors generating power (106 out of 437 – as of the end of 2021).[368]

An important element to consider is the impact of the changes in Germany's public law framework on Euratom. It was particularly evident in the case of Euratom's institutional reforms. The European Communities' abolition and the European Union's creation in the 21st century did not involve the simultaneous abolition of Euratom. Indeed, the organisational and legal distinctiveness of Euratom was maintained. The main changes to

the Euratom were introduced under Protocol 2 to the Lisbon Treaty. However, this did not result in the incorporation of the Treaty establishing the European Atomic Energy Community into the structure of the Treaty on the Functioning of the European Union and the Treaty on the European Union.[369] The merger of the ECT and the TEU, still implemented by the draft of the so-called Constitutional Treaty, also within the framework of the Lisbon Treaty, did not include the Euratom Treaty.[370] As a consequence, Euratom is today structurally linked to the European Union in the same way as it was linked to the European Community.[371]

Germany's strategic decision in 2000 to move away from nuclear energy (*Atomausstieg I*)[372] is cited as the reason for such a solution, i.e. to maintain the legal separation of Euratom from the other structures of the European Union. Lack of integrating Euratom as part of the subsequent institutional reforms of the European Union was directly linked to the success of the Federal Republic of Germany's ratification of the so-called Constitutional Treaty and then the Lisbon Treaty.[373] Leaving Euratom outside the European Union's structure offered the possibility of reforming or abolishing Euratom. This approach becomes obvious during the assessment of Declaration No. 54 attached to the Lisbon Treaty: "Germany, Ireland, Hungary, Austria and Sweden note that the main provisions of the Treaty establishing the European Atomic Energy Community have not been substantially amended since its entry into force and need to be brought up to date. They therefore support the idea of convening a Conference of the Representatives of the Governments of the Member States as soon as possible."[374] Originally, the declaration was still attached to the so-called Constitutional Treaty.[375] Arguably, the desire for an in-depth reform of Euratom must have been behind the inability to agree on the integration of Euratom into the structures of the European Union and to take into account the lack of active participation of some Member States in the development of nuclear power energy. Apart from the changes introduced by the Lisbon Treaty, the thorough institutional reform of Euratom called for in Declaration 54 by Germany, Ireland, Hungary, Austria and Sweden was not carried out.

However, the question of the possibility for a Member State to withdraw from Euratom and for that Member State to remain in the European Union simultaneously remains contentious in the literature.[376] This issue was already the subject of public debate in Germany after *Atomausstieg I*.[377] Germany's possible withdrawal from Euratom had been criticised on the grounds of possible loss of credibility in the field of science and technology, as well as loss of influence on shaping nuclear safety practice and the possibility to influence the safety of nuclear installations in neighbouring countries.

In turn, when analysing the impact of Euratom on German public law, four phases can be distinguished. The initial impact of Euratom on German constitutional law was enormous. Indeed, the 1959 amendment of the Basic Law to include nuclear energy was the result of Germany's accession to Euratom. Although the provisions introduced in the Basic Law that referred to nuclear energy concerned only institutional issues (the

introduction of legislative competence for the Federation in the field of nuclear energy and the possibility of administration delegated to federal states), they acquired a much broader normative content over time, with the development of constitutional court case law and the literature on the subject. Euratom cannot be credited exclusively with developing the FCC's jurisprudence and the doctrine of constitutional law in nuclear energy, as this was linked, among other things, to the intensification of investment in nuclear installations in Germany. However, Euratom was a factor that led to the constitutional change of introducing an explicit nuclear regulation into the *Grundgesetz* in two provisions. In particular, it should be emphasised that the constitutional changes were introduced thanks to Euratom (i.e. through Euratom) at a very early stage – even before the development of this economic sector and before the first nuclear installations were built. The creation of a constitutional regulation dedicated to the new branch of the economy even before its development also reflected a great mobilisation on the part of the state so that state bodies were prepared for it from a regulatory perspective. At the same time, the 1959 constitutional changes were dedicated to this new sector of the economy. From the perspective of the time that has elapsed since 1959, it can be noted that this is not a constitutional practice that would be followed later. Thus, this one-off systemic practice also constituted a form of solemn confirmation of the Federal Republic of Germany's accession to Euratom and the adaptation of the entire national legal system to Euratom regulations. The same reason for adapting national legislation to Euratom membership influenced the enactment of the Atomic Law.

The subsequent (until 2006) impact of Euratom on German public law was not so spectacular. The legislation created under Euratom did not impact German constitutional issues. This was related to the development of Euratom itself and the shape that this European community had taken. In contrast to the tasks that had originally been set for Euratom, the powers subsequently delegated by the member states to be exercised by Euratom alone and those shared with the member states did not make it possible to fulfil these tasks. Indeed, in the framework of ensuring the supply of uranium ore and nuclear fuel, building a common market for nuclear services and developing an EU-wide nuclear sector was difficult. The lack of reforms to increase the efficiency of Euratom over its lifetime was increasingly evident in the emphasis on the sovereignty of Member States to create their energy mixes in terms of power sources, which was also due to the (extremely) different approaches of national energy policies to nuclear power generation. Therefore, Euratom persisted within its originally developed remit (later extended to include energy security) and without institutional reforms. Moreover, it can be clearly pointed out that the German *Atomausstieg I* also influenced the *status quo* because the reform of Euratom was not undertaken at all. Thus, during this period, the impact of the changes in German public law (*Atomausstieg I*) on Euratom was most pronounced by blocking any fundamental changes and maintaining the status quo of Euratom.

Another period within which it is possible to identify a significant impact of Euratom on constitutional regulation in Germany are the amendments to the Basic Law related to the 2006 Federation Reform (*Föderalismusreform*). The legislative competence of the Federation in the field of nuclear energy was transferred to the category of the so-called exclusive competences of the Federation. This represented an extension of the legislative competences of the Federation at the expense of the federal states (*Länder*). At the same time, the rationale for the change also stemmed from the dynamics of Euratom legislation. Indeed, there was a significant increase in the number of regulations adopted by Euratom, which had to be implemented and enforced by the Euratom Member States.[378]

Consequently, the space for different nuclear regulations at the state level (*Länder*) diminished significantly,[379] and the need arose to unify nuclear regulations at the federal level.[380] While the dynamics of the EU legislation justified the need for constitutional changes, this was also due to the subject matter of the EU regulations, as they focused on the issue of safety standards (which was derived from the shape and development of Euratom itself). Although the circumstance that the states' (*Länder*) nuclear legislation had lost its relevance was cited as a reason for making changes to the Basic Law,[381] this resulted precisely from the issues that Euratom regulated. The establishment of uniform safety standards would only make sense if they were at the same time uniformly implemented throughout the European Union and in the individual Member States, respectively (and not, for example, with deviations within the individual federal states (*Länder*) within the Federal Republic of Germany). Thus, the shift of legislative competences in Germany at the level of the Basic Law from the federal states (*Länder*) to the Federation (exclusively) had to do with this limited shape of Euratom.

After the 2006 reform, it is possible to identify a fourth period covering the extension of the operation of nuclear reactors, the Fukushima disaster, and *Atomausstieg II* in Germany. The confirmation of the energy policy direction of a complete abandonment of the commercial use of nuclear energy to generate power by Germany, as in the case of the second period, impacted and will impact Euratom. Indeed, the changes made to public law in Germany will most likely inhibit any reform of Euratom. At the same time, Germany's withdrawal from Euratom (and thus the withdrawal from the Euratom legislation) is unlikely to be affected, as *Atomausstieg II* represents a move away from the commercial use of nuclear energy for power generation. Nuclear installations (experimental reactors, interim storage facilities and, in the future, a final disposal facility for spent nuclear fuel) will remain in Germany, which should be subject to common safety standards for nuclear installations, shaped and implemented precisely within the framework of Euratom, including direct supervision[382] of Euratom (e.g. on-site inspections[383] of nuclear installations undertaken by Euratom representatives[384]).

3.7 The military use of nuclear energy based on the *Grundgesetz*

The considerations presented so far have been devoted only to the peaceful use of nuclear energy. No provision of the Basic Law explicitly refers to the military use of nuclear energy. However, this does not mean that the Basic Law is indifferent to the military uses of nuclear energy.

The provision of Article 73(1)(14) of the Basic Law concerns the production and use of "nuclear energy for peaceful purposes [emphasis mine – RR]", as well as the "construction and operation of facilities for these purposes", i.e. the production and use of nuclear energy for peaceful purposes. The phrase "for peaceful purposes" is intended to mean that nuclear energy can be used in the fields of medicine, science and economic activities.[385] The use of nuclear energy is admissible to the extent, in such manner and in such forms as are permitted by the provisions of the Basic Law and international law[386] – in this regard, legal doctrine refers to the following international laws that bind Germany[387]: United Nations Charter, Protocol No. 3 on the Control of Armaments, signed on 23rd October 1954,[388] Treaty on the Non-Proliferation of Nuclear Weapons, signed on 1 July 1968.[389] However, Article 73(1)(14) of the *Grundgesetz* does not cover the military use of nuclear energy,[390] even including for self-defence purposes.[391] The Constitutional Court suggested that the 1959 choice of words "for peaceful purposes" was meant to differ civil application from the military application of nuclear energy because the first one was back then generally positively perceived (without intensive discussions around it) – in comparison to the latter one, which was controversial and intensively discussed (back then).[392] This choice of words ("for peaceful purposes") was meant to rule out any possibility of undertaking any military application based on Article 73 section 1 point 14 of *Grundgesetz.*[393] Similarly, Art. 87c of *Grundgesetz* should not be used for the execution of statutes that provide military application of nuclear power (and were because of that adopted on other basis than Article 73 section 1 point 14 of *Grundgesetz*),[394] because the military application of nuclear energy as well as protection against a military nuclear attack are covered under the constitutional competences for federally owned administration in Article 87b or Article 87 section 1 of *Grundgesetz.*[395] Moreover, the provision of Article 73(1)(14) *Grundgesetz* does not even provide a basis for the production and use of nuclear energy for defence purposes.[396] It is also not a basis to undertake protective measures against the deployment of nuclear weapons.[397] However, this wording of the provision of Article 73(1)(14) of the Basic Law (which does not include the military use of nuclear energy) does not mean that the use of nuclear energy for military purposes is immediately declared unconstitutional.[398] Indeed, the provision of Article 73(1)(1) of the *Grundgesetz* will apply in this respect[399]:

> The Federation shall have exclusive legislative competence in the following areas: […] foreign affairs and defence including protection of the civilian population

Certainly, the unconstitutionality of public authority actions related to the military use of nuclear energy can only be established if the limits set by Article 26 of the Basic Law are exceeded[400]:

1 Actions that may disrupt the peaceful coexistence of nations and are undertaken with such intent, in particular preparations for offensive warfare, are unconstitutional. They are subject to punishment.
2 Weapons intended for warfare may only be manufactured, transported and marketed with the approval of the Federal Government. The details are determined by a federal law.

Based on Article 26 of the Basic Law, the legislator explicitly excluded the possibility of an offensive war (*Angriffskrieg*).[401] The German *Grundgesetz* is compared to the Japanese Constitution of 1946,[402] as both were adopted as a result of the unconditional surrender in 1945 of Nazi Germany and Imperial Japan, respectively. The German *Grundgesetz* of 1949 does not exclude defensive warfare.[403] On the other hand, the Constitution of Japan explicitly prohibits any war,[404] and – consequently – defensive war. The scope of the provision of Article 26(1) of the *Grundgesetz* includes the preparation for an offensive war and the waging of an offensive war.[405] In order to distinguish an offensive war from a defensive war, it is assumed in the literature that it is the state that first commits an act of aggression that is the aggressor and, therefore, initiates the offensive war.[406] The very concept of offensive war is understood in the literature as any violent aggression that cannot be justified under international law.[407] At the same time, it does not matter against whom the act of aggression is directed.[408] This is because the provision of Article 26(1) of the *Grundgesetz* also includes offensive wars of a third state attacking another third state in its scope.[409] The latter understanding is particularly relevant from the perspective of the commitment of the Federal Republic of Germany to the North Atlantic Treaty Organisation (NATO), which is based on the principle of common defence against aggression against one of the members of this military treaty. However, exceptions are pointed out to the distinction between offensive and defensive war so understood.[410]

An example of this would be where the first act of aggression would be the only possible means of defence against another state's actions, but which do not yet have the characteristics of actions of a warlike nature, aiming at the destruction of another state.[411] It should be pointed out that the exception formulated in this way – while it undoubtedly leaves the public authorities the necessary leeway and some room for interpretation for possible defensive actions in the event of a possible escalation of tensions between states (manifested, for example, in a so-called arms race), it may provide too much leeway – in particular, such an understanding of the Basic Law could too easily provide a basis for the initiation of hostilities (with the use of nuclear energy) under the guise of conducting a defensive war (actually constituting a preventive war). This scope of the Basic Law's regulation may require furher clarification from the constitutional lawmaker.

Article 26 of the *Grundgesetz* must be read in the context of other constitutional provisions with which it is closely connected.[412] The Basic Law even formulates peacekeeping (*Friedensziel*) as a state objective.[413] The term "principle of peaceful coexistence with other nations" (*Prinzip des friedlichen Zusammelebens der Völker*) is also used.[414] The literature points out that this principle is reflected in the Preamble to the Basic Law ("[…] to serve the peace of the world […]") and in the provisions of Article 9(2) ("Organisations whose aims or activities are contrary to the criminal laws, are directed against the constitutional order or the idea of agreement between nations, are prohibited"), Article 24(2) of the *Grundgesetz* ("The Federation may, for the preservation of peace, join a system of mutual collective security; in doing so, it shall agree to such limitations on its sovereign rights as will contribute to and secure a peaceful and lasting order in Europe and among the peoples of the world"), as well as in the wording of Article 25 of the *Grundgesetz* ("General principles of international law shall be an integral part of federal law. They take precedence over laws and create rights and obligations directly for the inhabitants of the federal territory") and in the provision of Article 26 of the Basic Law, already cited.[415]

The provision of Article 26 of the Basic Law guarantees the peaceful conduct of the Federal Republic of Germany and its organs.[416] However, the prohibition expressed in Article 26(2) of the Basic Law does not extend to research and the development of weapons of war.[417] The provision of Article 26 of the *Grundgesetz* finds support and justification in the statutory obligation to report on ongoing scientific research, the results of which may pose a threat to peace.[418].The literature also points out that pursuing a policy based on aggression (*Gewaltpolitik*) would be incompatible with the Basic Law.[419] The scope of this policy would presumably include both domestic and foreign policy. What is distinguishable from this type of policy is the pursuit of a policy that would protect German interests and stay in line with international and EU law.[420] Such a policy would be compliant with the *Grundgesetz*.[421] So Article 26 of the Basic Law very clearly fulfils the conditions of a programmatic norm,[422] as it gives (even imposes) a certain content to the (domestic and foreign) policy of the German state. The provision of Article 26 of the Basic Law also has the additional function of being a directly applicable law.[423] The provision of Article 26 of the Basic Law means that no actor, including opinion-forming institutions, may take measures that disturb the peace.[424] For example, in 1955, the Federal Government discussed establishing a "Federal Ministry for Nuclear Issues" (*Bundesministerium für Atomfragen*); one of the dilemmas was its name because it might have suggested undertaking preparations also for military application of nuclear energy.[425]

The unconstitutionality is indicated as the legal effect of violating Article 26(1) of the *Grundgesetz*.[426] It would also entail legal ineffectiveness (*Rechtsunwirksamkeit*).[427] Such a legal effect will occur primarily if the state authorities – either through legislation or as a result of actions of the public

administration – violate the provision of Article 26(1) of the Basic Law.[428] In addition, the violation of Article 26 of the *Grundgesetz* is also subject to criminal liability. Although the provision of Article 26(1) sentence 2 of the *Grundgesetz* stipulates that such unconstitutional acts "shall be […] punishable", this section is understood as a "mandate to the federal legislature" to adopt appropriate statutory solutions in this respect.[429]

Other restrictions on the peaceful use and understanding of this peaceful character of German statehood (as developed within the constitutional system introduced by the Basic Law of 1949) are set by regulations of international law. The UN Charter[430] (in particular Article 51 and the provisions of Articles 11, 25, and 47 of the UN Charter) are indicated in this respect. It should be pointed out, however, that the accession of the Federal Republic of Germany to the UN Charter occurred only with the Federal Law of 6 June 1973 (*Gesetz zum Beitritt der Bundesrepublik Deutschland zur Charta der Vereinten Nationen*).[431] This did not happen immediately after the Basic Law came into force in 1949; it happened much later. The reason for the delayed accession of the Federal Republic of Germany were the problems of international recognition of the statehood of both the Federal Republic of Germany (so-called West Germany) and the German Democratic Republic (so-called East Germany).

In order to make a fully accurate assessment under the Basic Law of the military use of nuclear energy, reference is also made to the Treaty on the Non-Proliferation of Nuclear Weapons (*Vertrag uber die Nichtverbretung von Kernwaffen*).[432] National regulations on the military use of nuclear energy must comply with the provision of Article 26 of the Basic Law and the relevant regulations of international law,[433] such as the UN Charter or the Non-Proliferation Treaty.

Another provision of the Basic Law that needs to be analysed further is Article 73(1)(1):

> The Federation shall have exclusive legislative competence in the following areas: […] foreign affairs and defence including protection of the civilian population

Its scope will include the military use of nuclear energy. The literal wording of the provision in Article 73(1)(1) of the Basic Law covers four areas: foreign policy, state defence, protection of civilians, and federal legislation on protection against disasters.[434] Based on Article 73(1)(1) of the *Grundgesetz*, the federal legislator has issued, for instance, the following laws[435]: Disaster Protection Act (*Katastrophenschutzgesetz*), Civil Protection Act (*Zivilschutzgesetz*), and the Act Governing the Construction of Civil Defence Structures (*Schutzbaugesetz*).

Discussing the military use of nuclear energy is only possible when the state has its views on the subject (*Staatsauffasung*).[436] Meanwhile, in the case of the Federal Republic of Germany, the state very quickly ceased to be axiologically indifferent. The judgment handed down by the Federal Constitutional Court on

23 October 1952 in the case of banning the neo-fascist Socialist Reich Party[437] is considered a watershed moment. In addition, it should be noted that this was one of the first judgments of the FCC in general. Equally important was another judgment that dealt with the outlawing of the Communist Party of Germany (17 August 1956[438]).

Concerning the system of constitutional values under the 1949 *Grundgesetz*, Karl Jaspers regarded nuclear weapons as inevitable if the threat of communism had to be averted.[439] At the time, it was pointed out that weapons of mass destruction had a direct bearing on the question of sovereignty, as weapons of mass destruction could render sovereignty simply pointless.[440] As Carl Schmitt has pointed out:

> Technological and industrial development has turned the weapons at the disposal of humanity into weapons for the sole purpose of extermination. This has created an extraordinary imbalance between security and obedience: half of humanity has become hostage to the policy-makers representing the other half of humanity, who possess the means of mass destruction.[441]

It even led to the conclusion that it was, among other things, nuclear weapons that had so overcome the notion of time and space that nation states were supposedly going to disappear slowly.[442]

The position presented in the early 1960s did not hold. On the one hand, the reason may have been Germany's rejection of the military use of nuclear energy. On the other hand, the likelihood of nuclear war later decreased considerably compared to the 1960s. While nowadays, the awareness of the possibility of mass destruction has not disappeared, it is sometimes reduced to a statement that it is the responsibility of politicians to do everything possible to prevent the use of weapons of mass destruction.[443]

Germany abandoned military uses of nuclear energy fairly quickly after the Basic Law came into force. Although a fully unequivocal stance on abandonment was intended as early as 1954,[444] further discussions were held within the Federal Government in 1955,[445] 1956,[446] 1957,[447] 1958,[448] 1959[449] or 1960.[450] In 1958, the issue of equipping the German army with nuclear weapons was dealt with indirectly by the Federal Constitutional Court.[451] Indeed, on 25 March 1958, the Bundestag rejected motions by opposition parliamentary clubs to oblige the federal government to give up equipping the German army with nuclear weapons.[452] The opposition parliamentary clubs also demanded that the storage of nuclear weapons on German territory and the possible erection of nuclear (military) installations on the territory of the Federal Republic of Germany be prevented.[453] Finally, in November 1959 (just before its adoption), an exemption provision for nuclear weapons of the German *Bundeswehr* was deleted from the draft *Atomgesetz*.[454]

Giving up its nuclear weapons did not mean prohibiting the stationing of such weapons on German territory. Hence, the stationing of "foreign"

nuclear weapons on German territory is a much more topical issue today, for there are still stockpiles of American (tactical) nuclear weapons on the territory of the Federal Republic of Germany. Also, within the German armed forces, there are air force units[455] on constant alert for the transfer of US (tactical) nuclear weapons stored on German territory in Bűchel.[456]

Attempts were made to challenge the constitutional admissibility of stationing these weapons in Germany. The prejudicial argument was supposed to be that the decision to use them is taken directly by the US President[457] (and not by any constitutional organ of the Federal Republic of Germany). Nor is the decision to use weapons of mass destruction the competence of the relevant body of the North Atlantic Treaty Organisation.[458] Meanwhile, the Parliament gave the relevant approval for Germany's participation in NATO structures, and thus, there was a transfer of sovereign state competences to this international organisation.[459] Regarding the disposition by the US President of nuclear weapons present in the territory under the jurisdiction of the Basic Law, the relevant consent was not given, as this would have required the consent of the German Parliament each time.[460] This was supposedly because the legal status of the nuclear weapons present on German territory was not entirely clear, and the decision on their use was not up to the German authorities. In the present case, an attempt was made to use the test that the FCC had established in the Kalkar I case appropriately. That is, because of the far-reaching consequences associated with nuclear energy, the matter in question would require a decision by the legislature.[461] In the *Kalkar I* case, the FCC's thesis concerned the peaceful use of nuclear energy. In contrast, the applicants attempted to extend this Court conclusion to any use of nuclear energy, including primarily military use. The Court issued its judgment on 17 July 1984.[462] In deciding this case, the FCC did not share the cited argument about the need for a statutory determination. It pointed out that the required statutory basis was expressed in the consent of the legislature to the conclusion of an international agreement on the stay of foreign armed forces on the territory of the Federal Republic of Germany, in the status of the NATO troops themselves, and the relevant international agreements in this respect.[463] With regard to this legal status, the so-called Two-plus-Four Treaty of 12 September 1990 (*Zwei-Plus-Vier-Vertrag*), in principle, did not introduce any significant changes.[464] The international agreement of 1990 stipulated in Article 6 that a united Germany would retain the right to remain in such unions and organisations, with all the rights and obligations arising therefrom.[465] An example of such an obligation would be, for example, precisely, the obligation to tolerate weapons of mass destruction on its territory. On the other hand, it follows from the above-mentioned international agreement of 1990, from its Article 5(3), that foreign nuclear weapons, or even their delivery systems, may not be located on the former territory of the GDR, nor may they be deployed there.[466]

The level of difficulty surrounding the issue of the military use of nuclear energy is best illustrated by recent developments at the UN level regarding nuclear weapons. On 7 July 2017, the Treaty on the Prohibition of Nuclear

Weapons was adopted.[467] The parties to the Treaty undertook not to develop, test, manufacture or acquire nuclear weapons or any explosives containing radioactive material (Article 1.1(a)). The obligation of the parties to the Treaty also includes not permitting the stockpiling or deployment of any nuclear weapons on their territory (Article 1(1)(g)). States acceding to the Treaty should also abandon their weapons programmes and submit a plan for the destruction of their entire nuclear arsenal (Article 4). The Treaty entered into force on 22 January 2021. At the time of the typescript going to press, the Treaty had been signed by 93 states and 69 parties.[468] It is worth mentioning that none of the five states with veto power in the UN Security Council (i.e. China, France, Russia, the United States, and the United Kingdom), which themselves maintain an extensive arsenal of nuclear weapons, acceded to the Treaty. Germany has also not acceded to the Treaty, and there is a high probability that it will not. Indeed, the possibility of tactical use of nuclear weapons is one of the elements of deterrence tactics by the North Atlantic Treaty Organisation (NATO) states. For this reason, all NATO member states have withdrawn in collectively from the Treaty vote (except the Netherlands, which voted against it).[469] The NATO member states did not become parties to the Treaty, either.

Notes

1 cf C. Starck, *Ustawa zasadnicza po 60 latach. Niemieckie i europejskie perspektywy*, "Przegląd Sejmowy" 2009, no. 6, p. 18.
2 See, for example, BVerfGE 134, 242.
3 R. Grawert, *Ustawa Zasadnicza w świetle ujętych w niej praw zasadniczych*, "Przegląd Sejmowy" 2009, No. 6, p. 33.
4 See H. Laufer, *Typus und Status des Bundesverfassungsgerichts* [in:] K. Bracher, Ch. Dawson, W. Geiger, R. Smend (eds.), *Die moderne Demokratie und ihr Recht. Festschrift für Gerhard Leibholz zum 65. Geburtstag*, Bd 2, pp. 427–439.
5 P. Czarny, *Federalny Trybunał Konstytucyjny i ewolucja jego polityczno-ustrojowego znaczenia w Niemczech i w Europie (1951–2009)*, "Przegląd Sejmowy" 2009, no. 6, p. 113.
6 W. Bischof, *Kommentierung von Art. 74 Absatz 1 Nr 11a* [in:] R. Dolzer, K. Vogel (eds.), *Bonner Kommentar zum Grundgesetz*, Heidelberg 1994, pp. 29–30.
7 W. Bischof, *Kommentierung von Art. 74 Absatz 1 Nr 11a* …, p. 30.
8 F. Werner, *Verwaltungsrecht als konkretisiertes Verfassungsrecht*, "Deutsches Verwaltungsblatt" 1959, p. 527 et seq.
9 Cf. the cited literature in: W. Bischof, *Kommentierung von Art. 74 Absatz 1 Nr 11a* …, pp. 27–28.
10 Cf. R. Sannwald, *Kommentierung von Art. 73* [in:] H. Hofmann, H. Henneke (eds.), *Kommentar zum Grundgesetz*, Cologne 2021, p. 2117.
11 M. Heintzen, *Kommentierung von Art. 73* [in:] F. Klein, Ch. Starck (ed.), *Grundgesetz. Kommentar*, vol. II, Munich 2018, p. 1974.
12 R. Sannwald, *Kommentierung von Art. 73* …, p. 2117.
13 Similarly, W. Bischof, *Kommentierung von Art. 74 Absatz 1 Nr 11a* … ., p. 27.
14 W. Bischof, *Kommentierung von Art. 74 Absatz 1 Nr 11a* …, p. 27.
15 Ibid. p. 28. The provision of Article 2(2) sentence 1 of the *Grundgesetz* states: "Everyone has the right to life and personal inviolability."

16 W. Bischof, *Kommentierung von Art. 74 Absatz 1 Nr 11a … .*, p. 28.
17 Ibid.
18 This occurred by virtue of Article 3 of *Gesetz Nr. A-38 der Alliierten Hohen Kommission* of 5 May 1955, publ. Amtsblatt der Alliierten Hohen Kommission 1955, No. 126, p. 3271. In regards to the legal framework that was binding before that moment – see M. Stolleis, *Besatzungsherrschaft und Wiederaufbau Deutscher Staatlichkeit 1945-1949* [in:] J. Isensee, P. Kirchhof (eds.), *Handbuch des Staatsrechts der Bundesrepublik Deutschland*, vol. I, Heidelberg 2003, pp. 269–285.
19 This refusal concerned also as the issue of administration of air traffic. See G. Robbers, *Die Änderungen des* Grundgesetzes, "Neue Juristische Wochenschrift" 1989, p. 1330.
20 W. Bischof, *Kommentierung von Art. 74 Absatz 1 Nr 11a … .*, p. 39.
21 H. Hofmann, *Die Entwicklung des Grundgesetzes von 1949 bis 1990* [in:] J. Isensee, P. Kirchhof (eds.), *Handbuch des Staatsrechts der Bundesrepublik Deutschland*, vol. I, Heidelbert 2003, p. 381.
22 G. Robbers, *Die Änderungen des* Grundgesetzes, "Neue Juristische Wochenschrift" 1989, pp. 1326, 1329 and 1330.
23 H. Hofmann, *Die Entwicklung des Grundgesetzes …*, p. 379.
24 W. Kilb, *The European Atomic Energy Community and its Primary and Secondary Law* [in:] [in:] OECD Nuclear Energy Agency, *International Nuclear Law: History, Evolution and Outlook,* Paris 2010, p. 46; J. Barcz, *Zasadnicze eform strukturalne ustroju Unii Europejskiej* [in:] J. Barcz (red.), *Główne eform ustrojowe Unii Europejskiej*, Warsaw 2008, p. 61. This has not been changed by the Lisbon Treaty, either.
25 W. Bischof, *Kommentierung von Art. 74 Absatz 1 Nr 11a … .*, p. 26.
26 Ibid, p. 25.
27 W. Bischof, *Kommentierung von Art. 74 Absatz 1 Nr 11a …*, pp. 24–26.
28 H. Bull, *Kommentierung von Art. 87c* [in:] E. Denninger, W. Hoffmann-Riem, H. Scheider, E. Stein (eds.), *Reihe Alternativkommentare: Kommentar zum Grundgesetz für die Bundesrepublik Deutschland*, Neuwied 2001, p. 2.
29 Of course, referral here is made to its predecessor: European Nuclear Energy Agency.
30 Ibid.
31 Ibid, p. 27.
32 See further J. Wagner, *Der Parlamentarische Rat 1948–1949. Akten und Protokolle. Band 1 Vorgeschichte*, Boppard an Rhein 1957, pp. LXIX-LXXII; U. Enders, K. Reiser, *Die Kabinettsprotokolle der Bundesregierung. Band 1. 1949*, Boppard am Rhein 1982, pp. 27–32.
33 Ibid, p. 34.
34 Ibid.
35 This is explicitly the case in W. Bischof, *Kommentierung von Art. 74 Absatz 1 Nr 11a …*, p. 36.
36 Published in: "Amtsblatt des Kontrollrats in Deutschland" of 1946 No. 6, pp. 6 et seq.
37 A. Kirchhof, H. Trischler, *The History behind West Germany's Nuclear Phase-Out* [in:] A. Kirchof (ed.), *Pathways into and out of Nuclear Power in Western Europe. Austria, Denmark, Federal Republic of Germany, Italy and Sweden*, Munich 2020, p. 126.
38 Ibid.
39 H. Hofmann, *Die Entwicklung des Grundgesetzes …*, p. 381.
40 A. Kirchhof, H. Trischler, *The History behind West Germany's Nuclear Phase-Out* [in:] A. Kirchof (ed.), *Pathways into and out of Nuclear Power in Western Europe. Austria, Denmark, Federal Republic of Germany, Italy and Sweden*, Munich 2020, p. 126–128.

41 Presenting a list of all his writings forms a separate book – cf. D. Cassidy, *Werner Heisenberg. A bibliography of his writings*, New York 2001.
42 To enrich the context of this push – cf. P. Rose, *Heisenberg and the Nazi Atomic Bomb Project. A study in German culture*, Berkeley 1998. For the post-war developments – see C. Carson, *Building Physics After World War II: Lawrence and Heisenberg*, Berkeley 1997.
43 Ibid, pp. 38–39.
44 Published in: "Amtsblatt der Alliierten Hohen Kommission" of 1949 No. 1, pp. 2 et seq.
45 W. Bischof, *Kommentierung von Art. 74 Absatz 1 Nr 11a* …, p. 39.
46 Ibid.
47 Published in: "Verordnungsblatt für die britische Zone" of 1949, No. 58, p. 527 et seq.
48 Ibid.
49 Ibid.
50 W. Bischof, *Kommentierung von Art. 74 Absatz 1 Nr 11a* …, p. 39.
51 Ibid.
52 It was published in: "Amtsblatt der Alliierten Hohen Kommission" of 1950, No. 12, p. 122 et seq.
53 See W. Bischof, *Kommentierung von Art. 74 Absatz 1 Nr 11a* …, p. 41.
54 Ibid, p. 42.
55 Published in: BGBl. 1955 II, No. 8, pp. 301 et seq.
56 W. Bischof, *Kommentierung von Art. 74 Absatz 1 Nr 11a* …, p. 44.
57 Ibid, p. 44.
58 M. Hollmann, K. Jena, *Die Kabinettsprotokolle der Bundesregierung. Band 8. 1955*, Munich 1997, pp. 553–554.
59 Cf. W. Bischof, *Kommentierung von Art. 74 Absatz 1 Nr 11a* …, p. 24.
60 BGBl. I, 813.
61 Publ. BGBl. I, 813.
62 N. Pelzer, *Die Gesetzgebunszuständigkeit des Bundes über die Atomenergie*, "Die Öffentliche Verwaltung" 1959, p. 51 et seq. quoted in W. Bischof, *Komentarz do Art. 74 pkt 11a,* p. 24.
63 See W. Bischof, *Kommentierung von Art. 74 Absatz 1 Nr 11a* …, p. 52. See also the literature cited in: BverfGE 34, 9, p. 26.
64 Op. cit.
65 Op. cit.
66 op.cit.
67 op. cit.
68 cf. H. Hofmann, *Die Entwicklung des Grundgesetzes* …, p. 382. See also the literature indicated in BverfGE 34, 9, p. 26.
69 BverfGE 34, 9, pp. 21–27.
70 Cf. BverfGE 34, 9, p. 26.
71 Publ. BGBl. I, 769.
72 See W. Bischof, *Kommentierung von Art. 74 Absatz 1 Nr 11a …,* p. 53.
73 *Op. cit.*
74 The reform was introduced by the law of 28 August 2006 amending the Basic Law: "Gesetz zur Änderung des Grundgesetzes (Artikel 22, 23, 33, 52, 72, 73, 74, 74a, 75, 84, 85, 87c, 91a, 91b, 93, 98, 104a, 104b, 105, 107, 109, 125a, 125b, 125c, 143c)", publ. BGBl. I, 2034.
75 See in more detail on the competitive legislation of the Federation, e.g. J. Ipsen, *Staatsrecht I. Staatsorganisationsrecht*, München 2010, pp. 152–158; R. Schmidt, *Staatsorganisationsrecht sowie Grundzüge des Verfassungsprozessrechts*, Grasberg 2007, pp. 334–352.

76 D. Hesselberger, *Das Grundgesetz. Kommentar für die politische Bildung*, Munich 2003, p. 278.
77 See in more detail on the exclusive legislative competence of the Federation, e.g. J. Ipsen, *Staatsrecht …,* pp. 149–151; R. Schmidt, *Staatsorganisationsrecht …,* pp. 331–334.
78 R. Schmidt, *Staatsorganisationsrecht* …, p. 331.
79 BverfGE 160, 1, p. 31.
80 See Heintzen M., *Kommentierung von Art. 73* [in:] H. Mangoldt, F. Klein, Ch. Starck (eds.), *Kommentar zum Grundgesetz*, vol. II, Munich 2010, §133.
81 See ibid.
82 See ibid and the literature indicated there.
83 Ibid.
84 Ibid, §135.
85 A. Uhle, *Kommentierung von Art. 73* [in:] G. Dürig, R. Herzog, R. Scholz (eds.), *Grundgesetz. Kommentar*, Munich 2010, p. 267.
86 It was an argument made also during the cabinet meeting of the Federal Government in 1958 when it adopted the draft of *Atomgesetz* – cf. U. Enders, C. Schawe, *Die Kabinettsprotokolle der Bundesregierung. Band 11. 1958*, Munich 2002, pp. 355–356.
87 BverfGE 160, 1, pp. 29–30.
88 BverfGE 160, 1, pp. 29–30. Similarly – cf. M. Heintzen, *Kommentierung von Art. 73* [in:] F. Klein, Ch. Starck (ed.), *Grundgesetz. Kommentar*, vol. II, Munich 2018, p. 1975.
89 BverfGE 160, 1, pp. 29–30. Similarly – cf. M. Heintzen, *Kommentierung von Art. 73* [in:] F. Klein, Ch. Starck (ed.), *Grundgesetz. Kommentar*, vol. II, Munich 2018, p. 1975.
90 A. Uhle, *Kommentierung von Art. 73* …, p. 267.
91 M. Heintzen, *Kommentierung von Art. 73* [in:] H. Mangoldt, F. Klein, Ch. Starck (eds.), *Kommentar zum Grundgesetz*, vol. II, Munich 2010, §135.
92 C. Seiler, *Kommentierung von Art. 73* [in:] V. Epping, C. Hillgruber (eds.), *Grundgesetz. Kommentar*, Munich 2020, p. 1451.
93 R. Sannwald, *Kommentierung von Art. 73* …, p. 2117.
94 A. Uhle, *Kommentierung von Art. 73* …, p. 268.
95 C. Degenhart, *Kommentierung von Art. 73* [in:] M. Sachs (ed.), *Grundgesetz. Kommentar*, Munich 2021, p. 1383.
96 M. Heintzen, *Kommentierung von Art. 73* …, §135.
97 Ibid.
98 Orig. *Gesetz über die friedliche Verwendung der Kernenergie und den Schutz gegen ihre Gefahren (Atomgesetz)*, publ. unified text: BGBl. Of 15 July 1985 I 1565, as amended.
99 BverfGE 160, 1, p. 30.
100 BverfGE 160, 1, p. 30.
101 R. Sannwald, *Kommentierung von Art. 73* [in:] B. Schmidt-Bleibtreu, H. Hofmann, H. Henneke (eds.), *Kommentar zum Grundgesetz*, Cologne 2008, §133.
102 BverfGE 160, 1, p. 26.
103 BverfGE 160, 1, p. 26.
104 M. Heintzen, *Kommentierung von Art. 73* [in:] F. Klein, Ch. Starck (ed.), *Grundgesetz. Kommentar*, vol. II, Munich 2018, p. 1974.
105 K. Schnapauff, *Kommentierung von Art. 73* [in:] D. Hömig (ed.), *Grundgesetz für die Bundesrepublik Deutschland. Handkommentar*, Baden-Baden 2013, p. 502.
106 R. Sannwald, *Kommentierung von Art. 73* …, §158.
107 F. Wittreck, *Kommentierung von Art. 73* [in:] H. Dreier (ed.), *Grundgesetz. Kommentar*, vol. II, Tűbingen 2015, p. 1839.

108 W. Bischof, *Kommentierung von Art. 74 Absatz 1 Nr 11a* …, pp. 23–24.
109 M. Heintzen, *Kommentierung von Art. 73* …, §136.
110 B. Schmidt-Bleibtreu, *Kommentierung von Art. 74* [in:] B. Schmidt-Bleibtreu, F. Klein (eds.), *Kommentar zum Grundgesetz*, Berlin 1995, p. 986.
111 M. Heintzen, *Kommentierung* …, §136.
112 The existence of such a competence has been advocated by P. Kunig, *Kommentierung von Art. 74* [in:] P. Kunig (ed.), *Grundgesetz-Kommentar*, Bd 3, Munich 1996, p. 102; C. Degenhart, *Kernenergierecht: Schwerpunkte – Entscheidungsstrukturen – Entwicklungslinien*, Cologne 1982, p. 203 et seq.; W. Blümel *Die Standortvorsorgeplanung für Kernkraftwerke und andere umweltrelevante Großvorhaben in der Bundesrepublik Deutschland* "Deutsches Vervaltungsblatt" 1977, 301, p. 313 et seq. Against such competence: J. Listl, *Die Entscheidungsprärogative der Parlaments für die Errichtung von Kernkraftwerken*, "Deutsches Verwaltungsblatt" 1978, p. 15.
113 See BayVBl. 1993, 145, as well as OVG Munster, OVGE 39, 299.
114 BverfGE 84, 25, p. 32.
115 K. Schnapauff, H. Knobloch, *Kommentierung von Art. 73* [in:] H. Wolff (ed.), *Grundgesetz für die Bundesrepublik Deutschland. Handkommentar*, Baden-Baden 2022, p. 570.
116 B. Pieroth, *Kommentierung von Art. 74* [in:] Jarass H., Pieroth B. (eds.), *Grundgesetz für die Bundesrepublik Deutschland. Kommentar*, Munich 2004; M. Heintzen, *Kommentierung …,* §136.
117 M. Heintzen, *Kommentierung* …, §136.
118 A. Uhle, *Kommentierung von Art. 73* …, p. 267.
119 R. Broemel, *Kommentierung von Art. 73* GG [in:] J. Kämmerer, M. Kotzur (eds.) *Grundgesetz. Kommentar*, vol. II, Munich 2021, p. 86.
120 M. Heintzen, *Kommentierung* …, §136.
121 K. Schnapauff, H. Knobloch, *Kommentierung von Art. 73* …, p. 570; R. Broemel, *Kommentierung von Art. 73* …, p. 86.
122 A. Uhle, *Kommentierung von Art. 73* …, p. 265.
123 K. Schnapauff, H. Knobloch, *Kommentierung von Art. 73* …, p. 570.
124 BverfGE 160, 1, p. 27–28. For references to different views – see K. Schnapauff, H. Knobloch, *Kommentierung von Art. 73* …, pp. 570–571.
125 M. Heintzen, *Kommentierung* …, §136.
126 Ibid.
127 Explicitly in M. Heintzen, *Kommentierung* …, §136.
128 F. Wittreck, *Kommentierung von Art. 73* …, p. 1840.
129 See the FCC's judgment of 5 December 2001, ref. 2 BvG 1/00, publ. BverfGE 104, 238, p. 249.
130 W. Bischof, *Kommentierung vom Art. 74 pkt 11a* …, p. 23.
131 Ibid.
132 Ibid.
133 K. Schnapauff, H. Knobloch, *Kommentierung von Art. 73* …, p. 570.
134 B. Schmidt-Bleibtreu, *Kommentierung von Art. 74* …, p. 987.
135 Ibid.
136 Ibid.
137 Ibid.
138 Ibid.
139 Ibid.
140 A. Uhle, *Kommentierung von Art. 73* …, p. 272.
141 W. Bischof, *Kommentierung vom Art. 74 pkt 11a …,* p. 27.
142 The provision of Article 74(1)(11) of the Basic Law reads as follows:
"Competing legislation covers the following areas: […] 11. Economic

legislation (mining, industry, energy, handicrafts, business, commerce, banks and stock exchanges, private insurance) with the exception of legislation on the hours of operation of shops, restaurants, casinos, acting performances, fairs, exhibitions and markets […]."

143 W. Bischof, *Kommentierung vom Art. 74 pkt 11a …,* p. 24.
144 P. Kunig, *Kommentierung von Art. 74* …, p. 102.
145 R. Broemel, *Kommentierung von Art. 73* …, p. 87.
146 P. Kunig, *Kommentierung von Art. 74* …, p. 102.
147 A. Uhle, *Kommentierung von Art. 73* …, p. 272.
148 A. Haratsch, *Kommentierung von Art. 73* [in:] H. Sodan (ed.), *Grundgesetz. Beck'scher Kompakt-Kommentar*, Munich 2018, p. 509.
149 P. Kunig, *Kommentierung von Art. 74* …, p. 102.
150 Ibid.
151 D. Umbach, T. Clemens, *Kommentierung von Art. 74* [in:] D. Umbach, T. Clemens (eds.), *Grundgesetz. Mitarbeiterkommentar und Handbuch*, vol. II, Regensburg 2002, p. 608–609.
152 P. Kunig, *Kommentierung von Art. 74* …, p. 102.
153 Such a direct statement was also made by the Federal Constitutional Court – cf. BverfGE 160, 1, p. 28.
154 W. Bischof, *Komentarz do art. 74 pkt 11a …,* Part A, p. 26.
155 Similarly: F. Wittreck, *Kommentierung von Art. 73* …, p. 1840.
156 BverfGE 53, 30, p. 50.
157 See BverfGE 143, 246, p. 351.
158 See the judgment of the Federal Administrative Court (*Bundesverwaltungsgericht*) of 22 January 1997, ref. 11 C 7/95, publ. BverwGE 104, 36, p. 54.
159 BverfGE 53, 30, p. 56.
160 BverfGE 53, 30, p. 56.
161 BverfGE 53, 30, p. 56.
162 BverfGE 160, 1, p. 30.
163 A. Uhle, *Kommentierung von Art. 73* GG …, p. 274.
164 cf. B. Pieroth, *Kommentierung von Art. 74* …, p. 905, and BverfGE 160, 1, p. 28.
165 K. Schwarz, *Rechtsstaat und Energiewende,* "Bayerische Verwaltungsblätter" 2013, pp. 65–66.
166 BverfGE 53, 30, p. 56.
167 See the judgment of the Federal Administrative Court (*Bundesverwaltungsgericht*) of 22 January 1997, ref. 11 C 7/95, publ. "Neue VerwaltungsZeitung" 1998, pp. 627–628; see also the FCC's order of 12 November 2008, ref. 1 BvR 2455/06, publ. "Neue Zeitschrift für Verwaltungsrecht " 2009, p. 173, also available at: <https://www.bundesverfassungsgericht.de/SharedDocs/Entscheidungen/DE/2008/11/rk20081112_1bvr245606.html> [accessed 3 December 2017]; hereafter, references to specific passages of this judgment will follow the electronic version.
168 See the FCC's judgment of 12 November 2008, ref. 1 BvR 2456/06, §37.
169 Cf. the FCC's judgment of 12 November 2008, ref. 1 BvR 2456/06, §37.
170 Cf. the FCC's judgment of 12 November 2008, ref. 1 BvR 2456/06, §37.
171 Cf. M. Heintzen, *Kommentierung von Art. 73* [in:] F. Klein, Ch. Starck (ed.), *Grundgesetz. Kommentar*, vol. II, Munich 2018, p. 1974.
172 M. Heintzen, *Kommentierung von Art. 73* …, p. 1976.
173 M. Heintzen, *Kommentierung von Art. 73* …, p. 1976.
174 G. Hermes, *Kommentierung von Artikel 87c* [in:] H. Dreier (ed.), *Grundgesetz. Kommentar*, vol. III, Tűbingen 2018, p. 248.
175 D. Umbach, T. Clemens, *Kommentierung von Art. 87c* [in:] D. Umbach, T. Clemens (eds.), *Grundgesetz. Mitarbeiterkommentar und Handbuch*, vol. II, Regensburg 2002, p. 884.

176 K. Windthorst, *Kommentierung von Art. 87c* [in:] M. Sachs (ed.), *Grundgesetz. Kommentar*, Munich 2021, p. 1579.
177 Op. Cit.
178 BGBl. No. 56, p. 813.
179 See BGBl. Of 31 December 1959, no. 56, pp. 813, 814 et seq.
180 G. Zieger, W. Bischof, *Kommentierung von Art. 87c* [in:] R. Dolzer, K. Vogel, *Bonner Kommentar zum Grundgesetz*, Heidelberg 1994, p. 3.
181 G. Zieger, W. Bischof, *Kommentierung von Art. 87c* …, p. 3.
182 Ibid.
183 Ibid.
184 Ibid, p. 11.
185 Ibid.
186 Bundesrat print of 1956. 322/56a, p. 6 et seq. quoted in G. Zieger, W. Bischof, *Komentarz do art. 87c …,* p. 3.
187 G. Zieger, W. Bischof, *Kommentierung von Art. 87c …,* p. 12.
188 Ibid, p. 13.
189 The provision of Article 30 of the Basic Law reads as follows:
"The exercise of state powers and the fulfilment of state tasks shall be vested in the Länder, insofar as this Basic Law does not contain or permit a different regulation."
190 G. Zieger, W. Bischof, *Kommentierung von Art. 87c* …, p. 13.
191 Bundesrat print of 1956. 322/56a, p. 6 et seq. quoted in G. Zieger, W. Bischof, *Kommentierung von Art. 87c …,* p. 4.
192 Bundesrat print of 1956. 322/56a, p. 6 et seq. quoted in G. Zieger, W. Bischof, *Kommentierung von Art. 87c …,* p. 4. Similarly, K. Schwarz, *Kommentierung von Art. 87c* [in:] T. Maunz, G. Dürig (eds.), *Grundgesetz. Kommentar*, Munich 2015, §1.
193 Cf. G. Zieger, W. Bischof, *Kommentierung von Art. 87c* …, p. 7.
194 K. Schwarz, *Kommentierung von Art. 87c* …, §2. Cf. G. Zieger, W. Bischof, *Kommentierung von Art. 87c …,* pp. 6–7.
195 K. Schwarz, *Kommentierung von Art. 87c* …, §2.
196 G. Zieger, W. Bischof, *Kommentierung von Art. 87c …,* p. 5.
197 See ibid, pp. 5–6.
198 Ibid, p. 6.
199 R. Rybski, *German Radioactive Waste. Changes in Policy and Law,* Oxford 2022, p. 93 et seq.
200 See K. Schwarz, *Kommentierung von Art. 87c …,* §6.
201 Ibid.
202 Ibid.
203 See ibid and the literature indicated there.
204 Ibid, §8.
205 See ibid, §6.
206 See ibid.
207 G. Zieger, W. Bischof, *Kommentierung von Art. 87c …,* p. 11.
208 Ibid.
209 Ibid. See the controversy over the scope of the Bundesrat's consent: K. Schwarz, *Kommentierung von Art. 87c …* §31–42; M. Kloepfer, D. Bruch, *Die Laufzeitverlängerung im Atomrecht zwischen Gesetz und Vertrag*, "Juristen Zeitung" 2011, pp. 377–387; H. Gaβner, J. Kendzia, *Atomrechtliche Staatshaftung und die Zustimmungsbedürftigkeit der 11. AtG-Novelle,* "Zeitschrift für Umweltrecht" 2010, z. 12, pp. 583–586; O. Däuper, S. Michaels, R. Ringwald, *Die Zustimmungsbedürftigkeit einer Laufzeitverlängerung für den Betrieb von Kernkraftwerken nach Art. 87c GG,* "Zeitschrift für Umweltrecht" 2010, z. 10,

pp. 451–455; H. Papier, *Zustimmungsbedürftigkeit eines Gesetzes zur Verlängerung der Laufzeiten von Kernkraftwerken*, "Neue Zeitschftift für Verwaltungsrecht" 2010, pp. 1113–1117; R. Geulen, R. Klinger, *Bedarf die Verlängerung der Betriebszeiten der Atomkraftwerke der Zustimmung des Bundesrates?* "Neue Zeitschftift für Verwaltungsrecht" 2010, pp. 1118–1123.

210 K. Schwarz, *Kommentierung von Art. 87c …,*, §10. For other than obligatory delegation of administrative tasks to the federal states by the Federation, see G. Zieger, W. Bischof, *Kommentierung von Art. 87c …,* p. 11.
211 G. Zieger, W. Bischof, *Kommentierung von Art. 87c …*, pp. 11–12.
212 B. Schmidt-Bleibtreu, *Kommentierung von Art. 87c* [in:] B. Schmidt-Bleibtreu, F. Klein, *Kommentar zum Grundgesetz*, Berlin 1995, p. 1151; G. Zieger, W. Bischof, *Kommentierung von Art. 87c …,* pp. 12–13.
213 G. Zieger, W. Bischof, *Kommentierung von Art. 87c …,* p. 12.
214 B. Schmidt-Bleibtreu, *Kommentierung von Art. 87c …*, p. 1151; see also D. Hömig, *Kommentierung von Art. 87c …*, p. 596.
215 G. Zieger, W. Bischof, *Kommentierung von Art. 87c …,* p. 19.
216 Ibid.
217 B. Schmidt-Bleibtreu, *Kommentierung von Art. 87c …*, p. 1151.
218 Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit, *Übereinkommen über nukleare Sicherheit. Bericht der Bundesrepublik Deutschland für die Fünfte Überprüfungstagung im April 2011*, Bonn 2010, p. 20.
219 Ibid.
220 Ibid.
221 Ibid.
222 D. Hömig, *Kommentierung von Art. 87c …*, p. 596.
223 Orig. *Natur der Sache*. See the FCC's judgment of 10 May 1960, ref. 2 BvO 6/56, publ. BverfGE 11, 89, p. 98 et seq.; the FCC's judgment of 25 June 1969, ref. 2 BvR 128/66, publ. BverfGE 26, 246, p. 257; the FCC's judgment of 10 February 1976, ref. 2 BvG 1/74, publ. BverfGE 41, 291, p. 312.
224 Orig. *Kraft Sachzusammenhangs mit einer ausdrücklich zugewiesenen Regelungsmaterie*. See the FCC's judgment of 27 October 1998, ref. 1 BvR 2306, 2314/96, 1108, 1109, 1110/97, publ. BverfGE 98, 265, p. 299; the FCC's judgment of 24 October 2002, ref. 2 BvF 1/01, publ. BverfGE 106, 62, p. 115; the FCC's judgment of 3 March 2004, ref. 1 BvF 3/92, publ. BverfGE 110, 33, p. 48.
225 Explicitly in the FCC's judgment of 19 February 2002, ref. 2 BvG 2/00, publ. BverfGE 104, 249, p. 266.
226 D. Hömig, *Kommentierung von Art. 87c …*, p. 596.
227 Explicitly in BverfGE 104, 249, p. 266. Cf. also the FCC's judgment of 28 November 1973, ref. 2 BvL 42/71, publ. BverfGE 36, 193, p. 202 et seq.; the FCC's judgment of 19 October 1982, ref. 2 BvF 1/81, publ. BverfGE 61, 149, p. 204; the FCC's judgment of 9 October 1984, ref. 2 BvL 10/82, publ. BverfGE 67, 299, p. 321.
228 For instance content of those instruments has been extensively quoted in the following judgments of the Federal Constitutional Court: BverfGE 84, 25, pp. 27–28; BverfGE 81, 310, pp. 317–319.
229 D. Hömig, *Kommentierung von Art. 87c …*, p. 597.
230 G. Zieger, W. Bischof, *Kommentierung von Art. 87c …,* p. 55.
231 Ibid.
232 Ibid.
233 Ibid.
234 K. Schwarz, *Kommentierung von Art. 87c …*, §42a.
235 Ibid.
236 G. Zieger, W. Bischof, *Kommentierung von Art. 87c …*, p. 54.

237 Ibid.
238 K. Schwarz, *Kommentierung von Art. 87c* …, §42a.
239 Ibid, §43.
240 Ibid, §44.
241 G. Zieger, W. Bischof, *Kommentierung von Art. 87c* …, p. 59.
242 Ibid.
243 Ibid, p. 55.
244 Ibid, p. 55.
245 See further R. Nolte, *Rechtliche Anforderungen an die technische Sicherheit von Kernanlagen. Zur Konkretisierung des* §7 Abs. 2 Nr. 3 AtomG, Berlin 1984.
246 Ibid.
247 Ibid.
248 Ibid, pp. 75–76.
249 Ibid, p. 76.
250 Ibid, p. 75.
251 Ibid.
252 Ibid, p. 55.
253 Ibid, p. 56. See with regard to the catalogue of sources of law on the safety of nuclear installations Chapter III.
254 Ibid, p. 63.
255 Ibid.
256 Ibid.
257 Ibid.
258 Ibid, p. 64.
259 Ibid, p. 65.
260 Ibid.
261 Ibid.
262 Ibid, p. 64.
263 Ibid.
264 Ibid, p. 66.
265 Ibid, p. 63.
266 Ibid.
267 Ibid.
268 Ibid, p. 78.
269 Ibid.
270 Ibid, p. 76.
271 Ibid.
272 Ibid.
273 Ibid.
274 Ibid.
275 Ibid.
276 Ibid, pp. 76–77.
277 Ibid, p. 76.
278 Ibid, p. 80.
279 Ibid.
280 Ibid.
281 Ibid.
282 Ibid., p. 80.
283 K. Schwarz, *Kommentierung von Art. 87c* …, §44.
284 Ibid.
285 The provision of Article 85(4) of the Basic Law provides: "The supervision of the Federation shall extend to the legality and expediency of execution. To this end,

the Federal Government may demand reports and the submission of records and delegate plenipotentiaries to all bodies."

286 G. Zieger, W. Bischof, *Kommentierung von Art. 87c* …, p. 36.
287 Cf. BverfGE 100, 249, p. 258.
288 G. Zieger, W. Bischof, *Kommentierung von Art. 87c* …, p. 36.
289 BverfGE 11, 6, p. 18;
290 G. Zieger, W. Bischof, *Kommentierung von Art. 87c* …, p. 36.
291 G. Hermes, *Kommentierung von Art. 85* [in:] H. Dreier (ed.), *Grundgesetz. Kommentar*, vol. III, Tűbingen 2008, p. 103.
292 G. Zieger, W. Bischof, *Kommentierung von Art. 87c* …, p. 37.
293 G. Hermes, *Kommentierung von Art. 84* [in:] H. Dreier (ed.), *Grundgesetz. Kommentar*, vol. III, Tűbingen 2008, p. 69.
294 G. Zieger, W. Bischof, *Kommentierung von Art. 87c* …, p. 37.
295 Ibid.
296 G. Hermes, *Kommentierung von Art. 84* …, p. 69.
297 G. Zieger, W. Bischof, *Kommentierung von Art. 87c* …, p. 37.
298 Ibid.
299 D. Hömig, *Kommentierung von Art. 84* [in:] D. Hömig (ed.), *Grundgesetz fűr die Bundesrepublik Deutschland*, Baden-Baden 2013, p. 567.
300 G. Zieger, W. Bischof, *Kommentierung von Art. 87c* …, p. 37.
301 Ibid, p. 39.
302 Ibid.
303 G. Hermes, *Kommentierung von Art. 84* …, p. 71.
304 G. Zieger, W. Bischof, *Kommentierung von Art. 87c* …, p. 39.
305 G. Hermes, *Kommentierung von Art. 87c* …, p. 254.
306 BverfGE 75, 108, p. 150.
307 Cf. BverfGE 37, 363, pp. 379–380; BverfGE 48, 127, p. 178; BverfGE 55, 274, p. 319; BverfGE 75, 108, p. 150; BverfGE 114, 196, pp. 230–231; BverfGE 126, 77, p. 104.
308 K. Windthorst, *Kommentierung von Art. 87c* …, p. 1584. Similar statement, but on the basis of Article 85 section 2 sentence 1 *Grundgesetz* – cf. BverfGE 100, 249, p. 262.
309 D. Hömig, *Kommentierung von Art. 87c* …, p. 597.
310 Controversy over this issues exists in the legal doctrine. For a literature review in this regard cf. B. Remmert, *Kommentierung von Art. 87c* [in:] V. Epping, C. Hillgruber (eds.), *Grundgesetz. Kommentar*, Munich 2020, p. 1659.
311 G. Hermes, *Kommentierung von Art. 87c* …, p. 254.
312 K. Windthorst, *Kommentierung von Art. 87c* …, p. 1585.
313 W. Kilb, *The European Atomic* …, p. 46; J. Barcz, *Zasadnicze reform* …, p. 61. This has not been changed by the Lisbon Treaty either.
314 Publ. BGBl. 1957 II S. 1014.
315 On the history of the creation of Euratom, see Z. Doliwa-Klepacki, *Wspólnoty europejskie* …, pp. 161–163.
316 W. Kilb, *The European Atomic* …, p. 44.
317 Publ. BGBl. 1957 II, p. 1156; Orig. *Abkommen über gemeinsame Organe für die Europäischen Gemeinschaften*.
318 M. Kenig-Witkowska [in:] M. Kenig-Witkowska (ed.), *Prawo instytucjonalne Unii Europejskiej*, Warsaw 2008, p. 11.
319 Publ. BGBl. 1965 II, pp. 1454 et seq. Orig. *Vertrag zur Einsetzung eines gemeinsamen Rates und einer gemeinsamen Kommission der Europäischen Gemeinschaften.* See M. Kenig-Witkowska [in:] M. Kenig-Witkowska (ed.), *Prawo instytucjonalne …,* p. 11.
320 W. Kilb, *The European Atomic* …, p. 71.
321 These included the following international agreements:

- The treaty between the Kingdom of Belgium, the Federal Republic of Germany,

the French Republic, the Italian Republic, the Grand Duchy of Luxembourg, the Kingdom of the Netherlands (Member States of the European Communities) and the Kingdom of Denmark, Ireland, the Kingdom of Norway and the United Kingdom of Great Britain and Northern Ireland concerning the accession of the Kingdom of Denmark, Ireland, the Kingdom of Norway and the United Kingdom of Great Britain and Northern Ireland to the European Economic Community and the European Atomic Energy Community;
- Treaty concerning the accession of the Hellenic Republic to the European Economic Community and the European Atomic Energy Community;
- Treaty of Accession of the Kingdom of Spain and the Portuguese Republic to the European Economic Community and the European Atomic Energy Community.

322 Cf. Preamble to the Treaty of Accession.
323 The treaty concerning the accession of the Republic of Bulgaria and Romania to the European Union; publ. Official Journal of the EU of 2005, series L No. 157, p. 11.
324 The treaty concerning the accession of the Republic of Croatia to the European Union; publ. Official Journal of the EU of 2012, series L No. 112, p. 10.
325 W. Kilb, *The European Atomic* …, pp. 71–72.
326 G. Hermes, Kommentierung von *Artikel 87c* …, p. 249.
327 Article 1(2) TEAEC.
328 J. Grunwald, *Das Energierecht der Europäischen Gemeinschaften*, Berlin 2003, p. 194.
329 Publ. OJ C No. 241 of 29 August 1994, p. 382.
330 Own translation, based on W. Kilb, *The European Atomic* …, pp. 70–71.
331 H. Horn, *Kommentierung von Art. 87c* [in:] M. Huber, A. Voβkuhle (eds.), *Grundgesetz. Kommentar*, vol. II, Munich 2018, p. 299.
332 G. Hermes, Kommentierung von *Artikel 87c* …, p. 249.
333 G. Krings*, Kommentierung von Art. 87c* [in:] H. Hofmann, H. Henneke (eds.), *Kommentar zum Grundgesetz*, Cologne 2022, p. 2387.
334 BverfGE 143, 246, p. 332.
335 BverfGE 143, 246, p. 332.
336 BverfGE 143, 246, p. 332.
337 BverfGE 143, 246, p. 332.
338 Official Journal of the EU 2009, series L No. 172, p. 18 et seq.
339 W. Kilb, *The European Atomic* …, p. 71.
340 Cf. the judgment of the Court of Justice of 22 September 1988 in *Saarland and Others v Ministre de l'Industrie, des Postes et Télécommunications et du Tourisme*, ref. 187/88, publ. ECR1988/8/5013; EuGHE 1988, 5013; the judgment of the Court of Justice of 25 November 1992, ref. C-376/90, publ. ECR 1992/9/I-6153; the judgment of the Court of Justice of 10 December 2002, ref. C-29/99, publ. ECR 2002/12/I-11221.
341 P. Bogdanowicz, *Interes publiczny w prawie Unii Europejskiej*, Warsaw 2012, p. 31.
342 B. Nowak, *Wewnętrzny rynek energii w UE,* Warsaw 2009, p. 16; P. Bogdanowicz, *Interes publiczny …,* p. 31. Similarly, Z. Doliwa-Klepacki, *Wspólnoty europejskie* …, p. 161.
343 Explicitly in B. Nowak, *Internal market …,* p. 16 and Z. Doliwa-Klepacki, *Wspólnoty europejskie …,* p. 161.
344 P. Cameron, *Energy: Efficiency, Security and the Environment* [in:] M. Dougan, S. Currie (eds.), *50 Years of the European Treaties: Looking Back and Thinking Forward*, New York 2009, p. 261.
345 P. Cameron, *Energy: Efficiency, Security and the Environment* …, p. 261.
346 P. Craig, G. de Burca, *EU Law. Text, cases and materials*, Oxford 1998, p. 11.
347 B. Nowak, *Wewnętrzny rynek …,* p. 15.
348 P. Craig, G. de Burca, *EU Law* …, p. 11.

349 Par. 4 Preamble to TEAEC.
350 P. Bogdanowicz, *Interes publiczny* …, p. 31.
351 B. Nowak, *Wewnętrzny rynek …,* p. 15. In doing so, the author points out that Euratom was to be seen as a way of developing a market for French nuclear technology.
352 Z. Doliwa-Klepacki, *Wspólnoty europejskie* …, p. 161. The individual countries constituting the European Communities were disproportionately smaller than the USA or the USSR, whereas after the merger they became, as Z. Doliwa-Klepacki puts it, the "third power."
353 Par. 3 Preamble to TEAEC.
354 Z. Doliwa-Klepacki, *Wspólnoty europejskie* …, p. 161.
355 B. Nowak, *Wewnętrzny rynek …,* p. 15.
356 Par. 4 Preamble to TEAEC.
357 Ibid.
358 P. Bogdanowicz, *Interes publiczny* …, p. 32.
359 Ibid.
360 T. Leszczyński, Leszczyński T. *Energetyka jądrowa w państwach Unii Europejskiej*, "Biuletyn Urzędu Regulacji Energetyki" 2008, No. 5, p. 34.
361 See H. Horn, *Kommentierung von Art. 87c* …, pp. 299–300.
362 P. Bogdanowicz, *Interes publiczny …,* p. 32.
363 A. Pach-Gurgul, *Jednolity rynek energii elektrycznej w Unii Europejskiej w kontekście bezpieczeństwa energetycznego Polski*, Warsaw 2012, p. 64.
364 T. Leszczyński, *Energetyka jądrowa* …, p. 36.
365 T. Leszczyński, *Bezpieczeństwo energetyczne Unii Europejskiej do 2030 roku,* Warsaw 2009, p. 100.
366 Ibid.
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376 On the silence of the Treaty on this issue, see Z. Doliwa-Klepacki, *Wspólnoty europejskie …,* p. 169. See also D. Scheuing, *Der Atomausstieg aus der Sicht des Europarechts* [in:] W. Bayer P. Huber (ed.), *Rechtsfragen zum Atomausstieg,* Berlin 2000, pp. 87 *ff*; U. di Fabio, *Der Ausstieg aus der wirtschaftlichen Nutzung der Kernenergie: europarechtliche und verfassungsrechtliche Vorgaben,* Cologne 1999; B. Wegener, *Die Kündigung des Vertrages zur Gründung der Europäischen Atomgemeinschaft (EURATOM). Europa-, völker- und verfassungsrechtliche Optionen der Bundesrepublik Deutschland*, Legal opinion commissioned by the congressional faction Bündnis 90/Die Grünen in Bundestag, 2007, available online: <https://www.gruene-bundestag.de/fileadmin/media/_archivextern/ein_

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377 See the transcript of the discussion in the Bundestag Committee on the European Union on 21 March 2012 and the transcript of the meeting of the Bundestag Committee on Economics and Technology on 11 June 2012.

378 See A. Uhle, *Kommentierung von Art. 73* …, p. 277; M. Heintzen, *Kommentierung von Art. 73* [in:] H. Mangoldt, F. Klein, Ch. Starck (eds.), *Kommentar zum Grundgesetz*, vol. II, Munich 2010, §133.

379 See above.

380 See M. Heintzen, *Kommentierung von Art. 73* …, §133 and the literature indicated there.

381 Ibid.

382 G. Krings, *Kommentierung von Art. 87c* …, p. 2388.

383 G. Hermes, Kommentierung von *Artikel 87c* …, p. 249.

384 See further: Council Regulation (EU, Euratom) 2021/768 of 30 April 2021 laying down implementing measures for the system of own resources of the European Union and repealing Regulation (EU, Euratom) No 608/2014.

385 K. Schwarz, *Kommentierung von Art. 87c* …, §17; cf. K. Schnapauff, *Kommentierung von Art. 73* [in:] D. Hömig (ed.), *Grundgesetz für die Bundesrepublik Deutschland. Handkommentar*, Baden-Baden 2013, p. 502.

386 K. Schnapauff, *Kommentierung von Art. 73* …, p. 502. The phrase "for peaceful purposes" is to be understood e.g. through the perspective of the Treaty of 21 June 1973 on the Peaceful Uses of Nuclear Energy (*Abkommen zur friedlichen Nutzung von Kernenergie vom 21. Juni 1973*).

387 K. Schnapauff, H. Knobloch, *Kommentierung von Art. 73* GG [in:] H. Wolff (ed.), *Grundgesetz für die Bundesrepublik Deutschland. Handkommentar*, Baden-Baden 2022, p. 570.

388 BGBl. 1955 II, p. 266.

389 BGBl. 1974 II, p. 786.

390 M. Heintzen, *Kommentierung von Art. 73* …, §134.

391 A. Uhle, *Kommentierung von Art. 73* …, p. 269.

392 See BverfGE 53, 30, p. 56.

393 C. Degenhart, *Kommentierung von Art. 73* …, p. 1383; D. Umbach, T. Clemens, *Kommentierung von Art. 87c* …, p. 608; M. Bothe, *Kommentierung von Art. 74* [in:] E. Denninger, W. Hoffmann-Riem, H. Scheider, E. Stein (eds.), *Reihe Alternativkommentare: Kommentar zum Grundgesetz für die Bundesrepublik Deutschland*, Neuwied 2001, p. 17.

394 A. Haratsch, *Kommentierung von Art. 87c* [in:] H. Sodan (ed.), *Grundgesetz. Beck'scher Kompakt-Kommentar*, Munich 2018, p. 598.

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396 K. Schwarz, *Kommentierung von Art. 87c* …, §17.

397 G. Krings, *Kommentierung von Art. 87c* …, p. 2117.

398 Explicitly in P. Kunig, *Kommentierung von Art. 74* …, pp. 101–102.

399 R. Sannwald, *Kommentierung von Art. 73* …, p. 2117; A. Haratsch, *Kommentierung von Art. 73* …, p. 509; M. Heintzen, *Kommentierung von Art. 73* …, §134; B. Pieroth, *Kommentierung von Art. 74* …, p. 905; A. Uhle, *Kommentierung von Art. 73* …, p. 269; D. Umbach, T. Clemens, *Kommentierung von Art. 87c* …, p. 608.

400 P. Kunig, *Kommentierung von Art. 74* …, p. 502.

401 H. Jarass, *Kommentierung von Art. 26* [in:] Jarass H., Pieroth B. (eds.), *Grundgesetz für die Bundesrepublik Deutschland. Kommentar*, Munich 2004, p. 658.

402 D. Hesselberger, *Das Grundgesetz* …, p. 212. See also T. Ohgushi, *Die nuklearen Waffen und die Aufgaben der Staatsrechtslehre* [in:] K. Bracher, Ch. Dawson, W.

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403 D. Hesselberger, *Das Grundgesetz* …, pp. 212–213.
404 D. Hesselberger *Das Grundgesetz* …, p. 212. See also T. Ohgushi *Die nuklearen Waffen und die Aufgaben der Staatsrechtslehre* …, pp. 771–794.
405 H. Jarass, *Kommentierung von Art. 26* …, p. 658.
406 D. Hesselberger, *Das Grundgesetz* …, p. 212.
407 H. Jarass, *Kommentierung von Art. 26* …, p. 658.
408 Ibid, pp. 658–659.
409 Ibid, p. 658. Under criminal law, the regulation is limited to only two situations: the participation of German armed forces and the assault on Germany – see B. von Heintschel-Heinegg [in:] B. von Heintschel-Heinegg (ed.), *Strafgesetzbuch. Kommentar*, München 2010, p. 741.
410 D. Hesselberger, *Das Grundgesetz* …, p. 213.
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418 H. Jarass, *Kommentierung von Art. 26* …, p. 658. cf. BVerfGE 47, 327, p. 382.
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420 Ibid.
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4 The concept of unavoidable risk (*Restrisiko*) in the jurisprudence of the Federal Constitutional Court

Restrisiko is a key concept formed in the jurisprudence of the German Federal Constitutional Court with regard to nuclear power. It was formulated in the so-called *Kalkar* judgment.[1] This judgment concerned the authorisation for constructing a nuclear power plant located in Kalkar (North Rhine-Westphalia). The essence of this concept is to point out that as long as the legal framework for nuclear power meets the requirements formulated in this judgment, every citizen must tolerate the risks of nuclear power as the element of the social order which must be endured for the sake of living in society.[2] Although the *Restrisiko* jurisprudential concept is assessed in the literature as highly controversial,[3] the Federal Constitutional Court has upheld its validity in its nuclear-related jurisprudence, including in the most recent cases.[4]

Since the *Restrisiko* concept is based on risk theory from the economic sciences, this chapter will first provide a general introduction to the risk theory as understood by the economic sciences. In the remainder of this chapter, the Kalkar judgment and the reasoning used by the Court will be discussed. It will then be presented in the context of the theses of the December 2016 judgment, which relate both to the concept of *Restrisiko* and to the question of the different types of risks generated by nuclear power in general. The judgments of the Federal Constitutional Court of December 2016 and September 2020 arguably bring the issue of nuclear power to a definitive close in the FCC's jurisprudence.[5] This applies at least to the currently known problems and contentious issues. It must, therefore, be considered that the theses relating to nuclear power formulated so far will be upheld and will set the standard at the constitutional. Even if further FCC verdicts on nuclear energy were to appear in the future, it could be counted on with a fair degree of probability that the scenario to date will be repeated – i.e. that just as the FCC has continued a stable line of jurisprudence on the peaceful use of nuclear energy for almost 70 years, this will continue to be upheld in the future.

The entirety of the FCC's findings on the risks generated by nuclear power will be contrasted with this issue presented in the literature. The analyses of nuclear technology contained in the *Restrisiko* concept consider the latest or even cutting-edge technologies. It will thus be possible to see that the risks highlighted by the FCC are precisely due to the novelty of these technologies.

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4.1 The concept of risk in economic sciences

The concept of risk in legal science is more broadly used only in tort law and financial regulations. However, relating the concept in its legal sense to nuclear power would result in a significantly narrower understanding. This is because the risk does not only refer to liability in the event of nuclear damage (which is what the use of the concept of risk in legal science will generally boil down to). Meanwhile, there is a much broader understanding of risk in economic sciences than in legal sciences. The concept of risk in economic sciences, when applied to nuclear energy, will be concerned precisely with the everyday functioning of citizens in the environment of numerous nuclear installations. It also encompasses a methodology for identifying possible risks and for (daily) risk management, which means preventing and managing risks that have already occurred. For this reason, the economic sciences should be drawn upon to frame the concept of "risk" and possible ways of dealing with it.

In economic sciences, the starting point is to establish the everyday meaning of risk.[6] According to the dictionary definition, "risk" has three meanings.[7] The first is "the possibility that something will fail" and "an action with an uncertain result."[8] The second meaning is "daring to act with an uncertain result."[9] In the third meaning, a risk is "the probability of damage borne by the injured person regardless of his or her fault, if the contract or legal provision has not obliged another person to compensate for the damage."[10] From the perspective of economic sciences, only the first meaning is relevant.[11] This is because the second meaning relates to risk-taking, while the third meaning refers to the concept of risk used in insurance contracts.[12] It is, therefore, closest to the meaning of the risk used in the legal sciences. Hence, the risk should be treated more broadly than in legal science.

The dictionary meaning of risk as "the possibility that something will fail" corresponds to economic science's so-called negative concept of risk.[13] In this case, it refers to the failure to achieve the intended purpose of an activity.[14] This meaning of risk also includes the failure to achieve the intended effect,[15] which can also mean the possibility of a certain loss or damage.[16]

There is also a slightly different understanding of risk in economic science. The dictionary definition of risk as "an action with an uncertain result" corresponds to the so-called neutral risk concept.[17] This understanding of risk indicates that most decisions are made without complete and reliable information.[18] Therefore, it is indicated that "the outcome of any decision regarding finance (and beyond) is »certain«."[19] Based on certainty, such a clearly stated thesis comes from the fact that in the case of risk (in economic sciences) we know the probability distribution. In contrast, we are dealing with uncertainty if we do not know the probability distribution. An important difference between the dictionary understanding of risk and the way it is conceived in economic science is that, in a neutral concept, risk can represent both an opportunity and a threat.[20] Risk will include "any

deviation (both in plus and in minus) from the intended purpose" in such a concept.[21] In a neutral concept of risk, the outcome of an action is not known, but "the final result may be better or worse than the expected result."[22]

These concepts of risk have practical applications. When a business entity undertakes some risky business activity, having assumed a neutral risk concept, they are aware that it is possible to obtain a greater benefit.[23] At the same time, the business entity, relying on a neutral risk concept, will obtain a benefit that will include a premium for the risk that has been taken.[24] A well-known example of a business activity that relies on skilful risk management is banking[25] (or any other investment activity).

Risk refers to economic activity, which applies to virtually every human activity.[26] However, such a broad application of the concept of risk will often include only its negative side.[27] This applies to those fields and areas where it is possible to establish a baseline state (natural state, desired state), while risk is associated with its deterioration.[28] This is because there is no possibility of obtaining a better state than the original one.[29] For example, the literature cites environmental risk, which means "the possibility of deterioration of the natural state."[30] It seems that relating the negative concept of risk to this matter is due to the impossibility of restoring the original state of the environment. This understanding of risk (the so-called "ecological risk") will also be the most authoritative in assessing the impact of nuclear power on the natural environment and the environment understood as the place of human functioning.

It is common knowledge that nuclear power generation is an important business sector in Germany. The operators of particular nuclear power plants plan their activities with a risk-neutral concept in mind. This can be a profitable business activity, sometimes also a loss-making one. The reason for the losses may lie in economic unprofitability. In turn, it can be caused by the lack of competitiveness of this power generation technology vis-à-vis other technologies, such as gas-fired or hydroelectric power plants. Another source of loss can be the occurrence of nuclear damage and expenses resulting from this occurence. The so-called legal risk, i.e. the impact of regulations on business operations, cannot be excluded, either. Introducing legally binding safety standards (ever newer and stricter) will require unplanned financial outlays for nuclear power plant operators. The associated costs will reduce the bottom line. An extreme case of legal risk is the possibility of a total ban on power generation in nuclear reactors. Such a legal risk has occurred twice in Germany: *Atomausstieg I* in 2002 and *Atomausstieg II* in 2011. Over the last few decades, another significant risk for nuclear power plant operators in Germany has been the so-called market risk, i.e. the energy price risk. Parallel to *Atomausstieg I* was the German state's considerable support for developing alternative energy sources to nuclear power, above all renewable energy.[31] The support system for the development of these technologies and the completely different way power is generated,

and the resulting price incentives, have led to a permanent change in how the wholesale power price is structured.

A nuclear power plant constantly interacts with its surroundings. This applies not only to ionising radiation but to the most diverse factors associated with the operation of such a nuclear installation. These include noise, greenhouse gas emissions, water intake, wastewater generated and other waste (radioactive and non-radioactive), etc. The *Restrisiko* concept refers to ionising radiation and all its consequences. Sources of ionising radiation will include nuclear fuel, processes within the reactor (or outside the reactor in the event of an accident), irradiated infrastructure and radioactive waste (including spent nuclear fuel). The impact in the form of ionising radiation must be within legal limits. At the same time, these limits are set at a level which, according to the current state of knowledge, is not harmful to humans. Exceeding the legal limits for ionising radiation from a given nuclear installation will imply that its impact would go beyond "everyday" safe use. Whether analysing a situation of "everyday" impact or the impact of a nuclear installation exceeding safe limits, at least three parties are affected. The first are nuclear power plant operators. The second party are individuals, understood both as residents and any surrounding legal entities. The range of designations covered by the term "local residents" (and "surrounding legal entities") affected by a nuclear power plant will vary depending on whether it is a matter of daily safe operation or exceeding the legal limits for ionising radiation. In the event of exceeding limits, the range of subjects will expand significantly. Depending on developments (and the type of the affected nuclear installation), it may cover the entire federal state, part or all of Germany, and neighbouring countries. The concept of "surrounding legal entities" will also be relevant in the event of exceeding limits, as the impact will also affect the possibility of exercising the constitutional freedoms and rights of all legal entities (other than natural persons). The state should be identified as a third stakeholder. This is because nuclear activity may cause tangible damage in areas whose protection is part of the constitutional tasks of the state. These are the health and life of citizens, as well as the state of the environment and the environment in which citizens live. It will be possible to apply a negative risk concept to such risks. When assessing nuclear power activities through the prism of the negative risk concept, it must be said that nuclear power can only lead to damage to these assets. The occurrence of possible nuclear damage will entail irreparable harm to the health and life of citizens, to the environment and to the environment in which citizens live. Complicating the matter is the fact that the state's tasks, which fall under the negative risk concept, are not the only duties incumbent upon it and directly relate to nuclear power. The state's tasks include guaranteeing the security of energy supply, ensuring prosperity and social security. A further obligatory element of these duties is the requirement of an economy-wide balance under Article 109(2) of the Basic Law. By general economic equilibrium, the Federal Constitutional Court understands price stability, a high level of employment,

and a general economic equilibrium accompanied by steady and adequate economic growth.[32] The constitutional values presented, the realisation of which is the state's task, stand lower in the constitutional hierarchy than, for example, the protection of the health and life of citizens.

In the *Kalkar* judgment, the Court emphasised the inadmissibility of technical systems in Germany that would jeopardise the *Grundgesetz*'s fundamental decision to place human life as the highest legally protected good in the hierarchy of constitutional goods.[33] However, constitutional values relating to energy supply security, welfare provision and social security should not be overlooked. This perspective shows the difficulties in the functioning of any state, in that it must constantly reconcile conflicting interests and values. From the state's point of view, economic activity in the form of power generation in nuclear reactors is an important and stable source of tax revenue, creates jobs, ensures energy security, and increases the gross domestic product. These elements, in connection with a risk-neutral concept, will reflect the opportunities associated with risky activities. The basic element of the risk to the state is the circumstance that, in the event of nuclear damage, if its magnitude exceeds the financial capacity of the entity itself, as well as any safeguards that may have been established, then the necessity to implement remedial measures will fall on the state. The same is true of the risks associated with radioactive waste. In the perspective of several decades, the state may remain the sole financier of the costly process of radioactive waste disposal and its permanent storage. Concerning the state, nuclear power can be considered in the context of both negative and neutral risk concepts. At the same time, the *Restrisiko* concept, as shaped by the FCC's jurisprudence, refers to the regulatory activity of the state. A classification of the *Restrisiko* concept from the perspective of these two risk concepts will only be possible once the *Restrisiko* concept itself has been analysed.

However, the clarity of the outline of risk theory presented is disturbed by the fact that there is also the concept of uncertainty in addition to risk in the economic sciences.[34] The literature points out that the difference is that a probability distribution is known for risk, whereas it cannot be provided for uncertainty.[35] The probability distribution of individual nuclear risks can be subject to detailed calculations concerning the probability of an event.[36] It should, therefore, be assumed that the future possible events associated with nuclear power constitute risks.

4.2 The theory of risk management in economic sciences

To exhaust the description of the concept of risk from economic sciences, it is also necessary to present a risk management theory. Risk management is an attempt to deal with risk systematically. It consists of introducing risk theory from economic sciences into business activities. Risk management is widely used today, if only in finance.

Risk management undertaken by an entity is "making decisions and implementing actions that lead to that level of acceptable risk."[37] This understanding of risk management applies only to the neutral concept of risk. This is because risk management generally refers to entities conducting business. It has the character of a process and should, therefore, be continuously present in the activities of the entity concerned.[38] Another definition of risk management emphasises different elements and says it is a process "when managers identify, assess, monitor and control risks."[39] In addition, risk management also occurs through risk avoidance and risk-taking mitigation. Based on the definitions discussed, it can easily be established that risk management is the responsibility of managers employed in any business entity.

Translating the responsibility for risk management into the functioning of the modern state, and more specifically concerning nuclear power risks, it would seem that the main burden of day-to-day risk management should fall on the executive, with day-to-day supervision of individual nuclear reactors. In addition, the legislature also participates in the risk management process by issuing acts that set the regulatory standard. These have the character of generally applicable law. In turn, the participation of the courts (including the constitutional court) in risk management will take the natural form of judicial review of the actions of the executive and the legislature. However, this will be reactive to the actions taken by the first two authorities. In analysing *Restrisiko's* concept, it is important to see whether the jurisprudence of the Federal Constitutional Court has also moved in this direction, i.e. whether *Restrisiko's* concept incorporates elements of risk management.

Another definition of risk management that can be applied to the negative risk concept provides for "a scientific approach to dealing with individual risks by anticipating accidental losses and preparing and implementing procedures to minimise the occurrence of losses or the significance of those losses that have already occurred."[40] This definition makes it clear that although there are some overlaps between the different types of risk, each type is specific and, therefore, requires a different approach.[41] It also highlights the primary objective of risk management: minimise the frequency or amount of losses.

One element of risk management is the possibility of so-called risk transfer. This term is defined as a way to reduce acceptable risk. In particular, it refers to a situation where the level of losses incurred would exceed the financial capacity of a risk-taking entity.[42]

The importance of risk transfer in relation to nuclear power has to do with the fact that nuclear power plant operators cannot eliminate the risk of nuclear damage. In addition, significant nuclear damage will most often be an event of such magnitude that even the largest energy companies cannot bear the cost of covering it. Nuclear power generation is, therefore, characterised by the impossibility of reducing the real level of risk associated with this activity below a certain ceiling. Even the cessation of operations of a nuclear power plant does not guarantee the complete elimination of the risks associated with

power generation at the plant. It will still be necessary to decontaminate the entire nuclear installation and to address the management of spent nuclear fuel with its various risks. Safety improvement measures can only reduce this level of risk but will not eliminate the risk of nuclear damage. The risk transfer in question involves transferring a specific risk to an entity that assumes a certain level of risk, with the payment of a specific premium (the so-called risk premium).[43] The classic way of performing such a risk transfer is through insurance.[44] The economic essence of an insurance policy is the transfer of risk to an insurance company.[45] It is the entity that conducts the business of estimating risk and collecting a premium (insurance premium) in return for agreeing to transfer such risk. This type of risk transfer can also be applied to nuclear power.

In turn, it follows from the specifics of environmental risk that this way of transferring risk reduces the effectiveness of the transfer of this risk. However, it will be ineffective – either completely or at least partially. When the risk covered by such a transfer materialises, resulting in a deterioration of the environment, the entity to which the risk is transferred will provide money to cover the losses arising from the operation of the nuclear power plant. In contrast, there will be no possibility to completely restore to the initial state. Losses entail civil liability for damages, as well as liability enforceable under public law (i.e. administrative liability and criminal liability, both in fines and imprisonment). However, these will not be appropriate instruments, as no technologies are available to restore nature to its original state after nuclear damages occur. Only compensatory measures are commonly used when nature is damaged.

Suppose a nuclear disaster or radioactive contamination occurs in the area of environmental risk. In that case, risk transfer will primarily serve to maintain solvency and preserve the liquidity of the nuclear power plant operator. This means that primary (i.e. financial) risk transfer measures will no longer be an appropriate way to manage environmental risk. The only possible solution here will be the use of instruments of a preventive nature based on the *precautionary* principle expressed in Article 20a of the *Grundgesetz*. Nature compensation is not a solution that would be anywhere near as effective as, for example, other cases of risk transfer.

4.3 Nuclear power as an innovative technology

Another possible approach to nuclear power could be to analyse the circumstances of this technology's novelty. It should also be borne in mind here that the introduction of nuclear power in Germany occurred during a state monopoly in the energy sector. This monopoly was not only regulatory but also proprietary, including technology.[46] Nuclear power is presented as an example of a technology-driven conflict. This conflict is derived from the application of state policy in relation to the development of new technologies.[47] In simple terms, the two sides of this conflict are outlined as follows: one side

assumes that nuclear power is an extremely efficient source of energy, as it is possible to produce the same amount of energy from one gram of Uranium-235 in the form of nuclear fuel as from two tonnes of oil or three tonnes of coal.[48] Nuclear power plants are believed to use energy production technology that involves virtually no greenhouse gas emissions.[49] The other side of this argument draws attention to the dangers of nuclear power associated with radioactive contamination of large areas inhabited by people. A (severe) nuclear accident could result in thousands of deaths both immediately and in the future.[50] At the same time, there is no way to eliminate these risks – they can only be managed. This side of the argument draws attention to another negative factor: the need to permanently store radioactive waste and to ensure its physical separation from the biosphere.[51] It highlights the lack of technologies enabling its disposal (other than by physical separation from the biosphere). Permanent storage will also involve significant GHG emissions from the activities involved – even in the case of permanent containment; however, despite subsequent permanent monitoring, it will still occur.

In order to qualify a technology as an emerging technology, it must have the following characteristics[52]: (1) it is a practical application of fundamental, bio-natural or technological new discoveries; (2) it has the potential for widespread application; (3) its application entails high risks for the economy, the environment and social coexistence; (4) the development time required for the application of the technology on an industrial scale is more than 30 years (with considerable uncertainty about the possible effects).

In light of the criteria presented here, nuclear power can be classified as an emerging technology. Nuclear energy (including, but not limited to, nuclear power generation) developed rapidly as a technology with military applications, with subsequent development directed towards civilian applications. Nuclear power is a classic example of a technology with dual-use potential, i.e. the possibility of using the same technical equipment for both civilian and military purposes. For instance, the civilian use of nuclear power in Germany is underlined by the full name of the Atomic Law: Act on the Peaceful Use of Atomic Energy and Protection. This also applies to the wording of the provision in Article 73(1)(14) of the *Grundgesetz*: "the generation and use of nuclear energy for peaceful purposes." Among the technologies related to civil nuclear energy that have been developed and applied on an industrial scale, light water-cooled (H_2O) nuclear reactors dominated in Germany. An example of technological innovation was the fast breeder reactor technology (the so-called *Brutreaktor*). It was to be used at the Kalkar power plant, which in 1979 gave rise to the Federal Constitutional Court judgment of the same name.

Another innovative action used in nuclear power generation is storing radioactive waste, either temporarily or permanently. The new techniques that were applied in the case of the Gorleben nuclear waste repository[53] and the transport of radioactive waste to this location caused violent public protests. The examples of fast breeder reactors (Kalkar) or the permanent

storage of radioactive waste (Gorleben) show that nuclear power consists of various technological measures – that even today can be classified as new technologies – because they have not been introduced on an industrial scale. Light-water-cooled nuclear reactors are the permanent substrate with which nuclear power plants can be identified. This is the only nuclear power technology applied on an industrial scale.[54] Regarding the reprocessing of spent nuclear fuel concerning the French *La Hague* or British *Sellafield* nuclear installations, it is possible to speak of a corresponding industrial-scale effect. As far as Germany is concerned, following the abandonment of the *Wackersdorf* plant and the decommissioning of the Karlsruhe reprocessing plant, the technology for spent fuel reprocessing has not reached industrial scale in Germany.

Huge social conflicts in Germany arose primarily in connection with the construction or operation of certain nuclear installations. These mainly concerned six installations and related technologies.[55] These were: the pressurised water reactor at Wyhl (judgment of the *Bundesverwaltungsgericht* of 19 December 1985 ref. BVerwG 7 C 65.82[56]), the fast breeder reactor at Kalkar (judgment of the FCC of 31 January 1978, Ref. 2 BvL 8/77, so called *Schneller Brüter*[57]; the FCC's judgment of 8 August 1978, Ref. 2 BvL 8/77, so called *Kalkar I*[58]; the FCC's judgment of 22 May 1990, Ref. 2 BvG 1/88, so called *Kalkar II*[59]), pressurised water reactor in Mülheim-Kärlich (the FCC's judgment of 20 December 1979, Ref. 1 BvR 385/77, so-called *Mülheim-Kärlich*[60]), the reprocessing plant for spent nuclear fuel in Wackersdorf (the FCC's judgment of 7 June 1986, Ref. 1 BvR 647/86, so-called *Wackersdorf*[61]), the interim storage facility for radioactive waste in the former salt mine in Gorleben (e.g. the FCC's judgment of 5 December 2001, ref. 2 BvG 1/00, the so-called *Gorleben moratorium*[62]) and the transport of nuclear waste to the Gorleben repository (e.g. the FCC's order of 29 June 2016, ref. 1 BvR 1717/15[63]; FCC order of 18 April 2016, ref. 2 BvR 1833/12, 2 BvR 1945/12[64]). It appears that most of the conflicts taking place in Germany in parallel on legal, political, social or economic levels concerned just the brand new technologies that were attempted to be applied to nuclear power, a fairly new sector. This may have been because in the case of completely new technologies and a new type of nuclear installation, it was much easier for opponents of nuclear power to take action against specific new installations. Even if this point of view is adopted, these arguments would not have resonated so strongly if nuclear technologies considered new or innovative, had not caused real conflict in society. Also, the dispute over the permanent storage of radioactive waste, which continues to this day, is precisely about the necessity of selecting and using a new technology that has not yet been used in Germany (although, in this respect, no country has so far launched a deep geological final repository for high-level radioactive waste).

The literature has attempted to identify the factors based on which a state determines to use or refuse to use a particular new technology.[65] These are as follows[66]: (1) the use of a particular new technology promises significant

economic and social benefits (significant harm cannot be excluded either); (2) the long-term positive and negative effects of the use of a particular new technology cannot be predicted; (3) there are no uniform criteria for assessing the values underlying the conflict around a particular new technology, as each party to the dispute is convinced that it is right. It is clear from this enumeration that the first and second points are the legal equivalents of the neutral risk concept. The third criterion, on the other hand, precisely captures one of the primary functions of law: conflict resolution.

The first possible way of making a strategic decision on whether to allow (or not) a particular new technology is based on hierarchy, i.e. the subordination of all actors in the state to a statutory regulation (together with the apparatus of state coercion). This implies that the current parliamentary majority can decide on a given conflict independently.[67] Experience shows that this model of resolving social conflicts never resolves them but only temporarily quiets them.[68] The second way, on the other hand, is through the development of consensus and agreement.[69] Examples are *Atomkonsens I* (*Atomausstieg I*), *Laufzeitverlängerung* and *Atomkonsens II* (*Atomausstieg II*). These are, therefore, successive agreements reached between the Federal Government and the nuclear power plant operators in Germany regarding the time that nuclear reactors can operate in Germany in general (measured first with remaining outputs, and then additionally with calendar dates). In these cases, the discussions were conducted by the government side with the stakeholders, while the representatives of the social side were undoubtedly missing. An example of a successful attempt at consensus building was the establishment of a Commission on Future Nuclear Energy Policy in the Bundestag at the end of the 1970s.[70] This body was made up of supporters and opponents of nuclear power generation.[71] The solution presented in 1980 was to extend the use of nuclear power until 1990. It was assumed that renewable energy sources would be subsidised as much as possible by then. This was to develop a "fair competition" between nuclear power and renewable energy sources.[72] This model was applied in Germany in connection with *Atomausstieg I*, *Laufzeitverlängerung*, and *Atomausstieg II*. In the case of *Atomausstieg I,* the EEG (*Gesetz für den Vorrang Erneuerbarer Energien*) was adopted in 2000. The *Kernbrennstoffsteuer* was adopted along with the *Laufzeitverlängerung*. As far as *Atomausstieg II* is concerned, no such mechanism was used. However, at that time, the "energy revolution" (started by the enactment of the EEG), referred to as the *Energiewende,* was already underway, which involved a move away from the use of all non-renewable fuels (including uranium).

The third model for the state's treatment of new technologies is based on waiting.[73] The term used here (*waiting*) is understood as the opposite of taking an immediate decision on the future of nuclear power by both political stakeholders and representatives of the economy (no new investment decisions).[74] It is paradoxical that *Atomausstieg I*, the 2002 decision by the legislature to move away from nuclear power, is cited as an example of such action.[75] Although it introduced the question of ending the commercial use of nuclear energy in the power sector, this decision was nevertheless based on postponing the

moment of terminating the use of nuclear energy for an unspecified horizon of several decades.[76] The parliamentary majority's adoption of a decision that is supposed to come into force long after the end of the parliamentary term causes such a decision to be assessed in the literature as the one that is still open and that will only be taken in the future.[77] According to assessments that appear in the literature, it was *de facto* a matter of reaching a point where the further use of nuclear power was still unknown when the law introducing *Atomausstieg I* was adopted.[78] Although these predictions were expressed in 2002, they prove to be partly accurate in retrospect. Ten years later, however, the legislature decided to extend the time of use of nuclear reactors (i.e. *Laufzeitverlängerung*), which the Bundestag (with the same political composition) revoked six months later. The legislature's earlier decision to phase out nuclear power in 2022 was also revisited (*Laufzeitverlängerung II*). There were still several terms of the Bundestag left before this effect of decommissioning all commercial nuclear reactors came to fruition, so there was still uncertainty on this issue. The decision of the legislature in December 2022 to extend the operation of the last nuclear reactors by 3.5 months (*Laufzeitverlängerung II*) only confirmed this uncertainty. Nevertheless, due to the unanimity among the main parliamentary clubs in the Bundestag when passing the *Standortauswahlgesetz*[79] and 19th Amendment to the Atomic Law (*Laufzeitverlängerung II*), a political consensus can be said to have formed in Germany in the area of nuclear power.

In addition, it is worth noting that the *Grundgesetz* allows for formulating the principle of non-identification of the state with certain views (*Grundsatz der Nicht-Identifikation*).[80] This principle extends to a number of areas in terms of subject features: religion, faith, worldview, and scientific theories.[81] Regarding subjective characteristics, the principle also extends to areas such as: membership of a particular political party, race, social class or otherwise distinguished group of subjects.[82] It is pointed out that practical observation shows that such identification has led to dictatorships, totalitarian states or civil wars in the past.[83] The fact that in the case of nuclear power, there has been an identification of the state with a particular technology is pointed out by numerous authors.[84] It is possible to recognise this phenomenon in a number of fields. Firstly, there is the amendment of the German Constitution, which was deliberately made so that the Federation could acquire any powers in the field of energy and the regulation of public administration. Added to this are the considerable resources allocated by the public authorities to research in this field. These have helped commercialise the related technology, lower the investment risk, and reduce the cost of entry into this new technology. In addition, energy companies in Germany at that time were controlled by the state (either by the Federation or the co-owned *Länder* and by local self-governments). It is, therefore, difficult to argue that the corporations made investment decisions on their own, i.e. without the influence of the German state. On the regulatory side, the provision of §9a (1) No. 1 of the Atomic Law, which, as it stood until 1994, mandated that spent nuclear fuel had to be reprocessed, is cited as an example; few exceptions are also pointed

out.[85] Through this regulatory obligation, there was an identification with the technology, which forced the construction of spent nuclear fuel reprocessing facilities and fast breeder reactors.[86] The nuclear power sector received state support in at least three aspects: regulatory, financial and ownership.

4.4 Judgment of the Federal Constitutional Court in the *Kalkar I* case

Only after taking into account how risk is understood in economic sciences, how it is managed, and reconstructing the basic features of the new technology can the already announced analysis of the FCC's judgment of 8 August 1978, usually referred to as *Kalkar* or *Kalkar I,*[87] be made. The judgment was delivered based on the following facts. First of all, by order of 18 December 1972, the Minister for Labour, Health and Social Affairs and the Minister for Economic Affairs, Welfare and Transport of the Land of North Rhine-Westphalia granted permission for the construction of a nuclear power plant of the fast breeder reactor type (*Schneller Brüter*) in Kalkar.[88] One element of this authorisation was a statement about the site's suitability for constructing a nuclear power plant.[89] Another element was the approval of constructing a new type of nuclear power plant using the conversion of Uranium-238 into plutonium.[90]

In fact, this judgment concerned not only the fast breeder technology but also the concept of reprocessing spent fuel and the spent fuel reprocessing business in general. It also implies the mandatory reprocessing of spent nuclear fuel before the resulting radioactive waste is transferred to disposal.[91] Indeed, if there were to be a shortage of material to produce enriched nuclear fuel, this would immediately necessitate the management of significant quantities of highly radioactive Plutonium-239, with a half-life of nearly 25,000 years.[92] Consequently, the plant operation would involve a significant number of shipments of spent nuclear fuel containing plutonium.[93] Each such transport would be associated with various risks. Therefore, the greater the transport frequency, the more situations where the risk of a transport accident could materialise.

All power plant equipment was to be cooled using liquid sodium.[94] The heat generated was transferred to a conventional turbogenerator, generating power from steam.[95] The rated capacity of the power plant was 300 MW.[96] Due to this capacity, it would have to be classified as a medium-sized power plant. At the same time, due to the type of coolant (it was supposed to be cooled down with liquid sodium, i.e. a metal in liquid form), completely new risks are associated with this type of nuclear reactor compared to those associated with pressurised water reactors (PWRs). Namely, liquid sodium, used to cool the nuclear fuel, ignites if it comes into contact with water. This means that a possible accident would most likely have much more far-reaching consequences than if a "classical" pressurised water reactor (PWR) were to fail.

The authorisation for this nuclear installation was challenged before the administrative court by a farmer who lived one kilometre away from the planned location of the nuclear power plant.[97] After the complaint was dismissed, the farmer brought it to a higher administrative court, which, by the order of 18 August 1977, submitted a legal question to the FCC.[98] The essence of the legal question was the intention to test whether the provision of §7 of the Atomic Law, insofar as it allows for the authorisation of nuclear power plants of the fast breeder type (*Schneller Brüter*), complies with the *Grundgesetz*.[99] The Federal Constitutional Court limited the scope of the constitutionality review to the provisions of §7(1) and (2) of the Atomic Law. This was because the case concerns the validity of precisely these provisions in the underlying administrative proceedings.[100]

The provision of §7 of the Atomic Law was challenged.[101] According to the view of the questioning court, the provision of §7 of the Atomic Law violated the principles of the separation of powers (Article 20(2), sentence 2 of the *Grundgesetz*), representative democracy (Article 20(1) and (2) of the *Grundgesetz*) and the rule of law (Article 20(3) of the *Grundgesetz*).[102] The questioning court's argumentation regarding the unconstitutionality of the provision of §7 was based on the fact that its wording also allows for the authorisation of nuclear power plants of the fast replicating type (*Schneller Brüter*),[103] whereas, according to the questioning court, this provision should not allow for this.

The Federal Constitutional Court has declared the constitutionality of the provisions of §§7(1) and 7(2) of the Atomic Law.[104] However, confirmation of constitutionality of these provisions was subject to many requirements and findings by the Court, which will be outlined below. First of all, this concerned the question about the scope of the matters required to be decided by the Parliament in statutory form.[105] The Court pointed out that the primacy of Parliament and its decisions over other branches of government must be drawn from the principle of representative democracy.[106] Also, the circumstance that a matter is politically controversial does not imply the necessity to deviate from the division of competences provided for by the Constitution.[107] The provision of §7(1) and (2) of the Atomic Law do not violate the principle of exclusivity of statutory matter.[108] The principle of exclusivity of statutory matter is not derived directly from the *Grundgesetz* but from Article 20(3).[109] It includes the requirement that, in the event of a violation of fundamental rights, the lawmaker must state the relevant statutory basis for this.[110]

The constitutional character of the challenged provisions of the Atomic Law is also evidenced by the FCC's unequivocal determination that the normative fundamental decision in favour of (or against) the legal admissibility of the peaceful use of nuclear energy within the jurisdiction of the Federal Republic of Germany constitutes a fundamental and essential decision within the meaning of the obligation of ensuring the statutory form for this matter.[111] This is due to the magnitude of the impact of nuclear energy on

citizens, particularly on the sphere of their freedom and equality, as well as on the general level of living conditions.[112] This extent of interference requires an appropriate type and manner of regulation.[113] At the same time, in the opinion of the FCC, only the (statutory) lawmaker (Parliament) can introduce an appropriate regulation.[114] In doing so, the lawmaker bears political responsibility for the consequences of its decisions.[115] At the same time, no such constitutional standard requires the lawmaker to demonstrate and document the effects the regulation envisaged.[116]

The Court pointed out that the lawmaker, in its decision to support nuclear energy by enacting the Federal Atomic Law, also included in the Act the admissibility of the fast breeder type (*Schneller Brüter*) nuclear reactors.[117] In the opinion of the FCC, this does not follow directly from the content of the contested provisions but from the provisions of §2(1)(1a), which recognises plutonium-239 as nuclear fuel.[118] Thus, the lawmaker allowed plutonium-239 to be used as nuclear fuel on German territory. While this simple connotation could be consid4ered a truism, when one considers the specific regulatory character of the Atomic Law, one has to conclude that this is not the case. The Atomic Law prohibits any activity involving the commercial use of fissile material or causing ionising radiation (above the minimum admissible values), and it is only by obtaining a state licence that any related activity can occur. Thus, it was only with the recognition of plutonium-239 as an acceptable type of nuclear fuel that the public authorities gained an adequate statutory basis to authorise nuclear installations using e.g. plutonium-239. It should be added that in the Kalkar nuclear power plant case, the fuel rods were to consist of mixed oxide fuel (MOX fuel).[119] In the case of common light-water reactors, plutonium-239 is only a by-product.[120] However, fast breeder reactors are designed to fission plutonium-239 and produce energy in the process.[121] In the Court's view, the contested provisions meet the exclusivity requirement of statutory matter.[122]

However, it is unclear from the above who (whether the statutory lawmaker), how and at what point should be the last to decide on the legal prerequisites for the construction and subsequent operation of a fast breeder nuclear reactor (*Schneller Brüter*).[123] The lawmaker is constitutionally obliged to verify whether the original decisions also have a raison d'être in the new, changed circumstances.[124] The Court further pointed out that only the future will show whether the decision to use the fast breeder technique will do more good or harm.[125] However, the FCC's thesis that only the future will make it possible to fully assess the rightness of the decision to enter nuclear power demonstrates the Court's flight from the essence of the problem. Firstly, the Court's statement is based on leaving it to future generations to judge the investment programme already carried out and decide whether it should be continued. Secondly, this approach also had little to do with the concept of risk management. After all, leaving the decision to future generations by assessing the various risks associated with current strategic decisions (and their consequences) is precisely the opposite of what ongoing

risk management is for. Such elements, which are missing today (and in the past), include such basic matters as attempting to assess risks correctly and adequately pre-empting risks by, among other things, preventing the source of a given risk from arising.

According to the FCC, in a situation that is necessarily burdened with many uncertainties, the political responsibility of the statutory lawmaker and the government is to make appropriately balanced decisions within the scope of their powers.[126] It is, therefore, not the role of the courts to substitute their judgments for the political bodies appointed to do so,[127] as they lack the legal criteria to perform such tasks.[128] The Court's reasoning presented here very clearly relates to the concept of the negative lawmaker. It shows that it is not the constitutional court's role to overstep this boundary (in relation to its designated role). Indeed, the constitutional courts are not called upon to make decisions as "positive lawmakers" instead of "traditional" lawmakers (this also applies to other courts).

Should reasonable doubts arise as to whether the dangers pointed out by the higher administrative court will materialise, the state authorities and the legislator are to serve the welfare of the general public according to their constitutional duties.[129] In particular, the objective obligation relating to all authorities to protect human dignity, to take all measures to identify the dangers as early as possible and to prevent them through necessary and constitutionally appropriate measures or other means[130] arises from Article 1(1) sentence 2 of the *Grundgesetz*.[131] According to the position of the Court, if it should become apparent in the future that nuclear power stations of the fast breeder type (*Schneller Brüter*) are likely to be a source of danger, it would then, in the first instance, be the political responsibility of the authorities to make such an assessment and the legislature would be obliged to take new measures.[132]

The Court then assessed whether the provisions of §§7(1) and 7(2) of the Atomic Law violate the duty of statutory determinacy. Indeed, the challenged provisions contain several provisions that constitute general clauses. FCC pointed out that to allow discoveries and developments in knowledge and technology through the normative system in a way that keeps pace with progress, the lawmaker is, in principle, given several options.[133] However, all statutory solutions will always have one thing in common. Since they use undefined legal concepts, it is not easy to make the provisions bindingly concrete and to adapt them appropriately to scientific and technical progress, so they must be more or less placed at the level of application practice by administrative bodies.[134] If, on the other hand, there were legal disputes regarding the concretisation carried out by public administrations, then decisions would also have to be made at the judicial level in the context of the judicial review of administrative action.[135]

For this reason, the FCC pointed out that public administrations and the courts must compensate for regulatory shortcomings manifested at the normative level.[136] In this connection, the Court cited the example of the

provision of §3(1) of the Technical Standard for Work Tools Act, which refers to "generally recognised technical rules."[137] The positive dimension of linking technical issues with the law is that public authorities and courts can only limit themselves to establishing prevailing opinions on technical practice to decide whether a work tool can be used.[138] The negative consequence of such a solution is that a legal system with such a defined criterion of universally accepted rules will never be able to keep up with the constant technical developments.[139]

The Court pointed to avoiding a situation where the legal order lags behind technical progress. Such a state of affairs will be avoided when laws are based on the "state of technology" ("*Stand der Technik*").[140] The legal criterion for assessing what is permitted or prescribed will accompany the latest technological progress developments.[141] It follows that the decisive factor will not be the widespread recognition or the practical testing of some new technique[142] so that it can be regarded as valid. Using the "state of technology" formula will make it much more difficult for public administration bodies and courts to determine what corresponds to the "state of technology" and what does not. Consequently, public administration and courts will have to enter into disputes with representatives of technical sciences and examine what is technically necessary, appropriate, required, and avoidable (or advisable).[143]

The findings of the FCC discussed here were not formulated in isolation from the subject of nuclear energy – to the contrary, they correspond very clearly to the solutions adopted on the grounds of the Atomic Law. These court findings are key to understanding the specificity of the solutions provided by the Atomic Law. The provision of §7(2)(3) goes even further, as it is based on the criterion of the "state of science and technology"[144] (*Stand von Wissenschaft und Technik*). In the Court's view, by invoking the state of science, the legislator has put even more pressure on the legal solutions to keep up with scientific and technical developments as much as possible.[145] According to the latest scientific discoveries and findings, such safeguards against possible damage must be considered necessary.[146] If it is not technically possible to carry out a safeguard, then no administrative authorisation should be granted.[147] This means that the required level of security is not limited by what is technically possible today.[148]

The Federal Constitutional Court has pointed out that such a statutory formula creates even more problems for public authorities that must determine the state of knowledge and technology than a formula referring exclusively to the state of technology.[149] It forces the public authorities to take a position on disputed scientific issues, even though often the opinions of experts contradict each other.[150] According to the Court, the lawmaker has a certain degree of discretion in deciding whether to use undefined legal concepts in a given provision.[151] This discretion of the lawmaker is also influenced by considerations relating to the practical application of such provisions.[152] The FCC, regarding the provision of §7(2)(3) of the Atomic

Law, pointed out the reasons for using the vague legal concepts contained therein.[153] In the Court's view, the future-oriented wording of the provision of §7(2)(3) of the Act serves the dynamic protection of fundamental rights.[154] Such shaping of the provision serves to realise the protective purpose of the Atomic Law from the provision of §1 No. 2 of the Atomic Law.[155] To statutorily parametrise a certain safety standard by creating a rigid regulation would rather restrict technical progress and adequately protect fundamental rights.[156] In the Court's view, such an approach would be a retrograde step and, in addition, would come at the expense of reduced safety.[157] The Court reasoned that if one wanted to oblige the legislator to do that, it would be an example of a misunderstanding of the law's prescription of determinacy.[158] The specified level of legal uncertainty is reduced by regulations issued by the executive, as well as by administrative practice and jurisprudence developing over time.[159] According to the opinion of the Court, this level of legal uncertainty has to be accepted in those areas where the legislator would otherwise have to pursue the scenario that it would either adopt impractical regulations or avoid regulating a certain area, a certain field or certain activities at all.[160] According to the FCC, none of these scenarios contributes to the improvement of fundamental rights,[161] as each will weaken their level.[162]

According to the Federal Constitutional Court, the findings must also be applied to the so-called Restrisiko, i.e. risks that cannot be eliminated.[163] According to the FCC, *Restrisiko* must be considered in analysing the provision §7(2)(3) of the Atomic Law.[164] The provision of §7(2)(3) of the Atomic Law disregards the so-called *Restschaden*, i.e. damage that cannot be excluded.[165] This is because this provision allows the issuance of a licence in a situation where it is not possible to completely eliminate the occurrence of damage in the future.[166] The Court emphasised that the Act itself does not specify what the level of *Restrisiko* (i.e. non-eliminable risk) must be for a permit to be granted.[167] Indeed, for specific areas of risk, the Atomic Law formulates provisions authorising the issuance of regulations (e.g. §§10–12 of the Atomic Law).[168] The Act left it to the legislature's competence to determine the level of risk that cannot be eliminated – both at the level of regulations and in taking every decision.[169] The Court also emphasised that the Act does not contain any more detailed regulations regarding the procedure for examining such risks.[170]

According to the Federal Constitutional Court, it was the intention of the statutory lawmaker that, in principle, all types of damage, hazards and risks specific to individual installations and their operation should be taken into account.[171] According to the FCC, when granting a permit, it should be taken into account that the lawmaker's intention was also that there should be a low probability of damage.[172] Furthermore, this probability should be lower the more serious the damage (and its subsequent consequences) is likely to be.[173] The introduction of a reference to the current state of science and technology implies a normative binding of the executive to the principle of the

best possible protection against hazards and risks.[174] Determining the risks of a nuclear installation depends on numerous factors and their interplay. These include calculation methods, resistance and compressive strength, vulnerability of materials and equipment to damage, susceptibility to process accidents, and determination of robustness and estimation of human behaviour.[175] Continuously adapting the assessment of risks and current circumstances to the latest findings of knowledge and science can meet the requirement for the best possible protection against hazards and risks.[176] Making this assessment should, in the Court's view, be entrusted to the executive power of the state.[177] The executive can adapt its forms of conduct for as widely as possible.[178] Hence, in the Court's view, the transfer of risk assessment from the lawmaker to the executive level is intended to make the protection of legal assets more dynamic.[179] The Federal Constitutional Court takes it for granted that the legislature must familiarise itself with all important scientific and technical findings.[180] According to the FCC, a certain degree of imprecision that inevitably arises in connection with such a risk assessment is due to the nature of human cognition.[181] If, in such a state of affairs, the law leaves the executive with a certain degree of discretion in making its assessment, this does not constitute a violation of the constitutional injunction of the determinateness of the law's provisions.[182]

In the Court's view, the provision of §7 of the Atomic Law, concerning the licensing of nuclear installations has been shaped in such a way that not only the provisions can sometimes result in a violation of an individual's fundamental rights, but also the decision of the public administration.[183] However, in the opinion of the FCC, the prerequisites in these provisions are defined in such a way that it is impossible for fundamental rights to be violated following the issuance of the licence and in connection with its consequences.[184] In the FCC's view, the wording used in the provision of §7(2)(3) of the Atomic Law is relevant here. According to this provision, the necessary safeguards against damage in connection with the construction and operation of a nuclear installation must be applied in accordance with the current state of knowledge and science.[185] Because of this, the hazards and *Restrisiko* (risks that cannot be eliminated) must be interpreted in such a way as to subsequently preclude the granting of a licence for the construction or operation of the nuclear installation in question. This could lead to harm that constitutes a violation of fundamental rights.[186] This means that the scope of *Restschaden* (i.e. non-excludable damage) or *Mindestschaden* (i.e. minimum damage that is certain to occur) that the Atomic Law provides for in connection with the granting of a licence cannot constitute a violation of fundamental rights under Article 2(2), first sentence, of the Basic Law.[187] Furthermore, the scope of the *Restschaden* and the *Mindestschaden* may not violate any other fundamental right included in the *Grundgesetz*.[188]

The provision of §7(2)(3) of the Atomic Law also allows for the issuance of a licence if it cannot be completely ruled out that damage can occur in the future due to the construction and use of the nuclear installation in

question.[189] In this aspect, this provision passes over the existence of *Restrisiko.*[190] According to the FCC, this type of regulation cannot be accused of being unconstitutional.[191] Moreover, the risk of future damage does not constitute an actual admission of damage when issuing a licence.[192] Hence, according to the FCC, there is no violation of fundamental rights with the issuance of such a permit.[193] According to the FCC's consistent jurisprudence, legal guarantees do not merely contain individual subjective rights against interference by state power. However, they are, at the same time, objective determination of the catalogue of values of the *Grundgesetz* itself. This catalogue translates into all areas of the legal order and provides guidelines for the lawmaker, the administration and judicial decisions.[194]

According to the Federal Constitutional Court, the lawmaker was also aware of the possible serious consequences of the peaceful use of nuclear energy, as demonstrated by the goal of protection as the basis of the Atomic Law.[195] The Court also pointed out that with regard to such ailments and the consequences of such damage, the probability of the remote occurrence of such damage must be taken into account. The idea is to make the legislature aware of its related protective duties. The Federal Constitutional Court, referring this to the fast breeder reactor, pointed out that even if it were to be assumed that today, the probability of such damage cannot be excluded, based on this assumption, it could not be established that currently provision of §7(2)(3) of the Atomic Law violates such constitutional protective duties that rest on the legislator by the provision of §7(2)(3) of the Atomic Law.[196]

If one were to require the legislator, given the protective obligations incumbent upon it, to adopt regulations that would undoubtedly exclude the infringement of fundamental rights that may result from the authorisation of such technical installations and their use, this would amount to a mis-judgement of the limits of human cognition.[197] Such an approach would subsequently also preclude the state from allowing the use of technology.[198]

In the opinion of the FCC, with regard to damage to life, health or material property, the statutory lawmaker – through the principles of protection against dangers and safeguards against risks laid down in the provisions of §1 No. 2 and §7(2) of the Atomic Law – creates such measures that the granting of a licence is only possible if, according to the state of knowledge and science, the possibility of such damage would be practically excluded.[199] The Court concludes that uncertainties of this kind of practical reason originate within the limits of human cognition.[200] According to the Federal Constitutional Court, uncertainties of this kind are unavoidable and represent, in this respect, the burden that citizens have to accept as related to functioning in society.[201] The Court found that the form of the Atomic Law at the time did not provide any basis for concluding that the legislature was in breach of its duty to protect citizens from the dangers associated with the use of nuclear energy.[202]

At the same time, the Court drew attention to the construction of the provision of §7(2) of the Atomic Law. It provides that "a licence shall be granted if … ."[203] This wording of the provision of §7(2) of the Atomic Law

implies introducing a preventive statutory prohibition of such activities with an order to obtain a licence each time.[204] From the applicant's perspective, the provision of §7(2) of the Atomic Law does not confer a legal claim to granting a licence, but only a claim to the error-free exercise by the competent public administration body of the discretion granted to it.[205] By making this provision so worded during the lawmaking process, the lawmaker consciously sought to grant public authorities the possibility to refuse to grant a licence.[206] This would be in relation to the occurrence of such circumstances, which were not foreseeable in shaping the provision stipulating the conditions for granting the permit.[207] The establishment of such a scope of this provision was due to the special subject matter of nuclear law and the entry of the lawmaker into a completely new, unknown regulatory area (i.e. peaceful use of nuclear energy for power generation).[208] This entailed granting the executive a greater degree of discretion to refuse to grant a licence if this became necessary due to special and unforeseen circumstances.[209] The Federal Constitutional Court pointed out that the legislature sufficiently clearly delimited the scope of this discretion through the provisions of §1 of the Atomic Law and, in particular, through the normalisation of the protective purpose of the Atomic Law.[210]

4.5 Assessment of the *Restrisiko* concept

The German legal system has regulated and strives to eliminate the most minor risks. In contrast, with regard to great risks to human life, it legalises them precisely in the form of *Restrisiko.*[211] Furthermore, it is part of the essence of the *Restrisiko* concept that it orders everyone to put up with precisely these risks.[212]

The *Restrisiko* concept, after its application by the FCC in the Kalkar judgment and then by the Federal Supreme Administrative Court in 1980, was to be used to limit citizens' complaints against new or existing nuclear installations.[213] After all, if citizens considered something to be a threat, while specialists (from the *Reaktosicherheitskommission*) did not confirm these concerns, then citizens' complaints raising such concerns landed outside the scope of practical examination (*praktischer Vernunft*).[214]

The concept of *Restrisiko* was formulated primarily in connection with the newly introduced nuclear technologies in the 1970s and 1980s. This follows the fact that one form of public protest against nuclear power was also litigation. Meanwhile, light-water reactors were also a new technology in the early 1960s when they were introduced into industrial use. The lack of public resistance at the time meant that a similar standard arising from the *Restrisiko* concept was not applied to the first generation of nuclear reactors, which, from the perspective of the *Restrisiko* concept, could also then be classified as high-risk installations. The *Restrisiko* concept, insofar as it enables the development of nuclear power, is not without at least basic safeguards from the perspective of the constitutional status of the individual.

Meanwhile, until its formulation and application, individuals were deprived of this protection.

However, it may be questionable to extend the *Restrisiko* concept to all nuclear technologies (*nota bene* this was the case with radioactive waste).

German society was even named as a risk-based society (*Risikogesellschaft*). This is because a non-excludable risk would be socially dangerous if it materialised.[215] In this case, non-excludable risk was the risk of such damage taking on apocalyptic proportions.[216] The paradox of German society as a *Risikogesellschaft* is that, despite the extensive use of technical preventive measures, the risk of uncontrollable and irreversible consequences (such as those affecting human life and health) could not eliminated (*Restrisiko*).[217]

The public perception of the *Restrisiko* doctrine after the Chernobyl disaster is interesting. Studies conducted immediately after the event shows that under normal operating conditions, society actively and strenuously ignores risks that cannot be eliminated.[218] On the other hand, when this risk already materialises (as was the case with the Chernobyl catastrophe), then, because the scenario of everyone being harmed materialises, individual people rely on the hope that individually this catastrophe will not affect them after all.[219]

4.6 Unavoidable risks assessment update after the Fukushima disaster

Given the fact that the return to an accelerated phase-out of the use of nuclear energy for power generation by Germany (*Atomausstieg II*) was the outcome of events in 2011 near Fukushima (Japan), it is worthwhile to describe in more detail the factual situation in Japan that had significant and systemic consequences for Germany.

On 11 March 2011, a magnitude 9 (Richter scale) earthquake broke out near the Japanese island of Honshu. It was the effect of the movement of the Pacific tectonic plate. Meanwhile, the Fukushima Daiichi power plant was prepared for an 8.2 magnitude earthquake on the Richter scale.[220] The result of the earthquake was a tsunami. The plant site was protected from the tsunami by a 6.51-metre wall, but the waves caused by the earthquake were over 7 metres high.[221] Reactors 1, 2 and 3 were operating at the time and were automatically shut down.[222] However, significant amounts of heat were still generated despite the interruption of the chain reaction.[223] As long as these amounts of heat were taken away, the situation was under control. The earthquake broke the power plant's connection with the power grid.[224] Due to the lack of power supply at the nuclear plant, the reactor cooling system was kept active by diesel generators, which were switched on at that time.[225] After about an hour, the generators also stopped working as the tsunami flooded them.[226] At the same time, the installed batteries' capacity did not allow prolonged operation to cool the reactors.[227] On 12 March, reactor unit 1 exploded; on 14 March 2016, unit 3 exploded; and on 15 March

2016, unit 2 exploded.[228] The cause of the explosions was due to the technical conditions of the nuclear power plant's physical processes. Failure to take away the generated heat caused the water used for moderation to chemically split and produce hydrogen, which self-ignited, leading to explosions.[229]

The construction of the first reactor began on 31 July 1967; it began supplying power to the grid in March 1971.[230] Following the Fukushima Daiichi disaster, Japan's nuclear reactors were shut down, and the country was to move rapidly away from nuclear power.[231]

After the Fukushima disaster, the Ethics Commission for Safe Energy Supply (*Ethik-Kommission Sichere Energieversorung*) was set up in Germany. The Commission stated that Fukushima did not change the risk associated with the use of nuclear power in Germany but that the perception of that risk had changed.[232] The perception that such an event could not happen in Germany had collapsed since the disaster occurred in Japan, a highly industrialised country like Germany.[233] Until then, the public conviction was based on the certainty that highly industrialised countries have superior control procedures to prevent such disasters. Furthermore, the disaster in Japan occurred in a reactor cooled by ordinary water (so-called light water) – this is a solution very similar to the way used in the commercial nuclear reactors that still operate in Germany (or worked at the time of the Fukushima disaster). Admittedly, in the case of the German reactors, the moderation of the fuel rods and the cooling of the reactor takes place in closed circuits (in the Japanese generator, the circulation took place in a single circuit, i.e. BWR technology), but the disaster scenario related to the inability to cool the reactor is similar to the one that could apply to Germany. These circumstances significantly affect the German public and the German public's perception of the Chernobyl disaster. The Chernobyl nuclear reactors had two closed circuits and light water cooling, but the nuclear fuel was moderated with liquid graphite. It is doubtful that a reactor made with the (Soviet) technology used at Chernobyl could be put into operation in Germany. On the other hand, the Japanese reactor could be located in Germany. From the perspective of German public debate, this represents a fundamental difference between the Chernobyl and Fukushima disasters. Furthermore, the change in risk perception also relates to the so-called recency effect. This is based on the fact that the public overestimates the risk after a specific extraordinary event. On the other hand, if an event (risk) does not occur, it is underestimated by the public.

The catastrophe in Japan was caused by a series of events that were not considered in the various adverse event scenarios, assuming that specific reactors at Fukushima should survive.[234] The individual scenarios were considered separately, and the correlation between the different risks and the possibility of their accumulation were not considered. Consequently, the reactors at Fukushima were not adapted to the scenario that materialised at the time. It is emphasised that this circumstance clearly shows the limits and unreliability of both human perception and technical risk assessment.[235]

Meanwhile, the concept of *Restrisiko* is based on the possibility of technical risk assessment. Moreover, there is no certainty that even the best risk management in the sense of economic sciences would have prevented the consequences resulting from the occurrence of a given risk – as it was in the case of Fukushima.

The developments in Germany that resulted from the new assessment of the risks of nuclear power after the Fukushima disaster could have followed different scenarios. The most far-reaching scenario would have included an order to shut down all nuclear reactors immediately. This scenario did not happen. In the wake of *Atomausstieg II*, it was decided to return to the concept from *Atomausstieg I*, i.e. to the gradual phase-out of nuclear power. The solution adopted meant that until all nuclear reactors were shut down, nuclear power would be treated as a "transitional technology,"[236] which was supposed to ensure the security of the power supply. It is interesting that, despite the change in the perception of the risks associated with nuclear power, it was decided in Germany in connection with *Atomausstieg II* to introduce a transitional solution, assuming that nuclear power and its associated risks would still have to be accepted.

At the same time, the legal act introducing *Atomausstieg II* was subject to the FCC reviews in December 2016 and September 2020. The Court first imposed an obligation on the legislature to assess nuclear power risks (in the form of law) in the *Kalkar* judgment. Then it assessed the legislature's exercise of its right to amend the assessment of these risks in its judgment of that year. Before that, however, the legislature's risk assessment had not been fundamentally altered from that of 1958. The Chernobyl disaster led to several changes by the legislature, including the creation of a federal reactor safety watchdog. The changes in Germany brought about by the Chernobyl disaster were not as immediate as those brought about by the Fukushima disaster.

Shortly after the Fukushima disaster, the Federal Government established the Ethics Commission, its full name being the Ethics Commission for Safe Energy Supply (*Ethik-Kommission Sichere Energieversorung*). In its final report,[237] the Commission recommended moving away from the commercial use of nuclear energy for power generation in ten years.[238] It also made several recommendations that were directly related to the *Restrisiko* issue. In the Commission's view, nuclear reactors should be used until their available capacity can be replaced by sources of energy supply whose use generates significantly less risk.[239] The Commission further pointed out that those nuclear reactors whose capacity (8,500 MW) was surplus to the actual needs of the whole sector to meet the country's energy needs should be permanently disconnected from the grid.[240] The Commission came to this conclusion because the Federal Government's decision to immediately shut down the seven oldest nuclear reactors and the Krümmel power plant was, in the Commission's view, intended to demonstrate that the total installed capacity

of these units of 8,500 MW could be effectively replaced by energy sources that generate significantly lower risks.[241]

In contrast, in the Commission's view, peak demand for energy in winter and summer is to be met by the remaining available nuclear power plant capacity.[242] The Commission has further pointed out that the risks to the operation of German nuclear reactors have not changed with the Fukushima disaster but that the German public's perceptions about the risks associated with nuclear power have completely changed.[243] According to the Ethics Commission, a larger part of the public has realised that the risks of a nuclear catastrophe exist not just as a possible scenario but as a major accident scenario that can materialise.[244] This means that, according to the Commission's findings presented by the FCC, the perception of nuclear power by some of the public has adjusted to the reality of the real risks associated with nuclear power.[245] At the same time, this part of the public, which began to treat the risks of nuclear power differently, was large enough to speak of a social breakthrough in the way of thinking – a change in public awareness in Germany.

Besides, the explanatory memorandum to the statute that introduced *Atomausstieg II* referred to the *Kalkar* judgment on two points.[246] Firstly, the FCC recalled that it is exclusively the role of the legislature to make a strategic decision either for or against nuclear power.[247] The key point was the Court's indication that, according to the FCC's established jurisprudence, the provision of Article 14 of the *Grundgesetz* does not serve to protect the future profits of nuclear power reactor operators.[248] Nor does the scope of protection of Article 14 of the Basic Law extend to the possibility of future profits for these operators.[249] In the explanatory memorandum to the draft that was to introduce *Atomausstieg II* (13th Amendment to the Atomic Law), it has been made clear that the drafter extends the application of the theses of the *Kalkar* judgment to the draft legal act introducing *Atomausstieg II*.[250]

The Federal Constitutional Court addressed the extent to which the property rights of nuclear power plant operators are constitutionally protected. In the opinion of the FCC, in the analysis of the property rights of energy corporations (i.e. concerning nuclear reactors that were erected under the regime of the provisions of the Atomic Law), the special dimension of the social impact of this law must be borne in mind.[251] According to the Court, by adopting the Atomic Law in 1959, the legislature consciously opted for the peaceful use of nuclear energy to generate power.[252] As an aside, the FCC's argumentation should be extended – the legislature's decision was unambiguously supported by the constitutional lawmaker, as an amendment to the Basic Law was specifically made to deal with the peaceful application of nuclear energy. In the Court's view, the state's involvement in nuclear power is confirmed by the operation of several state instruments that have supported investments by private entities in nuclear power generation.[253]

On the other hand, the FCC highlighted the increase in public awareness of the risks of the peaceful use of nuclear energy as a high-risk technology over

the last few decades.[254] Among other things, there is the risk of gigantic damage.[255] Another problem already highlighted by the FCC in the *Kalkar* judgment (and later in the *Müllheim-Karlich* judgment) was the lack of solutions to the problem of permanent storage of radioactive waste.[256] This provides the legislator with a particularly broad regulatory latitude in shaping the provisions of the Atomic Law, also with regard to property rights already in legal circulation. However, this does not have the effect of depriving protection of these property rights.[257]

According to the FCC, Germany is still exposed to nuclear *Restrisiko* due to the operation of nuclear reactors in neighbouring countries that are located close to the borders of the Federal Republic of Germany.[258] The Court has made it very clear that the risk posed by the operation of foreign nuclear reactors (affecting German territory) does not alter the assessment of the effectiveness of reducing the lifetime of domestic nuclear reactors to minimise the associated risks.[259] In order to be able to assess the desirability of the statutory solutions (i.e. the contested provisions of the 13th Amendment of the Atomic Law), the Court recommended focusing on the extent to which the statutory solutions support the achievement of the statutory objective concerning possible measures within the jurisdiction of the sovereign action of the German public authorities.[260] Here, too, the Court's judgment of December 2016 does not take up the controversy so far. Above all, the paradox of *Atomausstieg I* and *Atomausstieg II* was that the targeted shutdown of the country's nuclear reactors would not bring about a qualitative change concerning nuclear power risks. A significant part of German territory will still be influenced by French, Belgian, English, Czech, and Hungarian nuclear reactors. The FCC's invocation of the argument that the solution to the risks associated with the operation of these reactors is outside the scope of the sovereign action of the German public authorities is an oversimplification of the issue. First of all, there are instruments within the existing international agreements that are within the remit of the German public authorities.

The Court, referring to the treatment of the challenged solutions of the 13th Amendment of the Atomic Law, recalled the principles developed in its jurisprudence, which are applicable in strategic decisions taken by public authorities with regard to nuclear power.[261] These include the verdict in favour of nuclear power, an exclusive statutory matter reserved to the Parliament,[262] and the Atomic Law, which has a special position justifying a departure from many constitutional principles recognised in other areas of the legal system.[263] These principles imply a considerable degree of regulatory discretion for the legislature in deciding for/against the peaceful use of nuclear energy.[264] The Court emphasised that it does not follow from the above that compensatory or indemnity measures can be dispensed with altogether [my emphasis – RR].[265] Indeed, the acceleration of the move away from the commercial use of nuclear energy in the power generation sector serves the fulfilment of constitutional values, which, as the FCC points out,

are high in the hierarchy of constitutional goods.[266] The constitutional values protected are the protection of the health and life of citizens, guaranteed by Article 2 of the Basic Law, and the protection of the environment in which people live, guaranteed by Article 20a of the Basic Law.[267] The Court pointed out that the reversal of the effects of the *Laufzeitverlängerung* and, thus, the earlier shutdown of all nuclear reactors by an average of about 12 years contributed significantly to the reduction of the risks associated with the use of nuclear power.[268] Thus, the Court independently assessed the risks of the law introducing *Atomausstieg II,* while simultaneously evaluating it as such in an extremely positive light.

The Federal Constitutional Court upheld its findings to date. It did so even though no new findings concerning nuclear reactors in Germany as to a significant increase in the level of risk for German nuclear reactors following the Fukushima disaster have been produced since 2011.[269] Furthermore, the Court considered that it was most likely impossible to prove any link between the Fukushima disaster and a possible increase in risk for German nuclear reactors.[270] Despite being aware of the absence of an increase in risks, the FCC maintained its acceptance of the objective of the law introducing *Atomausstieg II,* which was to significantly reduce the risks created by nuclear power. According to the Court, the explanatory memorandum to the bill introducing Atomausstieg *II* is based on the assumption that no such change in the level of risk has occurred.[271] The explanatory memorandum to the law indicated that the acceleration of the move away from nuclear power was due to the events in Japan and a different understanding of the risks associated with using nuclear power.[272] The Court summarised the purpose of the law introducing *Atomausstieg II* in that the intensive presence of *Restrisiko* would be less severe for 12 years than planned.[273]

Furthermore, the consequence of *Atomausstieg II* will be a reduction in the problems associated with the disposal and management of radioactive waste.[274] The Court has assessed the consequences of the law introducing *Atomausstieg II* in real terms. The FCC has correctly diagnosed both consequences of this law. However, it should be pointed out that shortening the commercial use of nuclear energy by an average of 12 years will significantly reduce the amount of radioactive waste. Meanwhile, the findings in the three preceding chapters show that the main problem in Germany today is not at all the amount of radioactive waste, which means that these 12 years will not make a qualitative difference to the problems of dealing with radioactive waste in Germany. Instead, the problem is the lack of capacity to dispose high-level radioactive waste in general.

At the same time, the FCC has pointed out that the choice of whether – and under what conditions – the legislator was going to allow a high-risk technology such as the peaceful use of nuclear energy, taking into account current knowledge of the existing risks, is mainly political.[275] In making this choice, the legislator should make it largely contingent on the public's acceptance of the high-risk technology in question.[276] The original decision to

use nuclear power technologies may now change to the opposite.[277] In the Court's view, a change in the strategic decision on the use of a particular technology can also be made if there are no significant new findings on the risks associated with its use and the possibilities of controlling them.[278] It should be pointed out that the terminology and approach used by the FCC in this part of the reasoning of the December 2016 judgment is again close to that found in economic sciences concerning risks and how to manage them.

In order to fully understand this argumentation of the FCC, it is still necessary to include in these considerations the concept of "risk appetite" used in economic sciences concerning risk management. The Federal Constitutional Court analogously uses the concept of "risk tolerance level" (Risikotoleranz).[279] The Court confirmed the admissibility of reducing the existing "risk appetite" by public authorities concerning nuclear power. The "risk appetite" reduction was first visible among the general public. It manifested as a wave of protests in the 1970s and 1980s in the context of events such as the Three Mile Island accident in the US, then the Chernobyl disaster, and finally, the Fukushima disaster. Public authorities, primarily executive and legislative (and judicial jurisprudence), followed this manifestation of public opposition. A truly German civil society played a central role in managing the risks of nuclear technology by taking specific actions, including differentiated forms of organised protest. It is important to recognise that there were elements of a bottom-up risk management, i.e. through grassroots citizen initiatives. However, modern risk management systems are characterised by individual decisions in this respect being taken at the highest levels of a given structure (e.g. a corporate group). The situation in this case is quite the opposite. Risk reduction is a social need and not a consequence of a decision originally taken at the government level.

The Federal Constitutional Court explicitly endorsed this line of decision-making regarding risks generated by nuclear power, which was taken by the public authorities in a later judgment. The Court stated that the legislature can react to events such as, for example, the nuclear reactor disaster in Japan.[280] The legislature can also learn from the growing public concerns and the changing level of risk tolerance ("risk appetite").[281] The Court emphasised that constitutional bodies, such as the Federal Government and the legislature, are held accountable in democratic forms and, therefore, represent an essentially political point of view when making a decision.[282] According to the Court, the action taken by the state organs in the form of a judgment that adjusts to the level of risk tolerance of the public concerning nuclear power is within the discretion of these organs and does not give rise to doubt.[283]

The FCC's reasoning, which takes the form of a legal argument, confirms that it is primarily an argument from the realm of economic sciences. Indeed, the Court uses the terminology of economic science and accepts that society determines the level of "risk appetite" ("risk tolerance"). Different people and societies have different tolerance for the same risk, while the risk itself does not change. Despite the same living conditions of different societies, their risk appetite can be quite different.

The Court pointed out that a special situation occurs when there are compelling reasons to act for the common good and the State undertakes such projects.[284] This situation compels, first of all, a political assessment of a high-risk technology. On the one hand, it involves the risk of enormous damage; on the other hand, the risk of materialisation of such a scenario is low.[285] According to the Court, the assessment to be made, which will mainly be political in nature, is also dependent in a specific way on public support.[286] For these reasons, each new development may have a particular impact on this overall assessment.[287] According to the Court, even if the public does not recognise the new (real) risks, they can change their awareness of the existing risks of the high-risk technology in question by themselves.[288] The FCC, referring to the law in question introducing *Atomausstieg II*, stated that in the context discussed above, there was no possibility to challenge this law, as it was not based on recognising new risks,[289] i.e. new risks.

The FCC's discussion points, which concerned the assessment of the scope of the constitutional protection of property of energy companies concerning nuclear reactors, are also closely related to the issue of the risks created by nuclear power plants. The Court pointed out that the constitutional protection of property in terms of ownership as an individual right in the case of nuclear reactors is significantly limited.[290] This is due to the nature and function of the objects covered by property protection: they serve the individual's personal freedom only to a small extent.[291] In the case of nuclear reactors, it is important to assess the level of constitutional protection of property that it is a company's property, and a particular social dimension which characterises this property.[292] On the one hand, the peaceful use of nuclear energy has served and continues to ensure society's energy security.[293]

On the other hand, the peaceful use of nuclear energy is an example of using high-risk technology.[294] At its core is the possibility of damage (nuclear damage) on a catastrophic scale.[295] In addition, the problem of solving the permanent storage of radioactive waste has not been dealt with to date.[296] Both of these dimensions of nuclear power (ensuring the security of energy supply and becoming a high-risk technology) make the ownership of nuclear reactors subject to strong public pressure.[297] According to the FCC, for these reasons, the legislator has a large degree of regulatory discretion in shaping the provisions of the Atomic Law.[298] The cited reasoning of the Court appears to concern the risks caused by nuclear power generation, particularly the issue of *Restrisiko*, as well as other risks related to nuclear power generation.

Notes

1 The FCC's judgment of 8 August 1979, ref. 2 BvL 8/77, publ. BVerfGE 49, 89.
2 BVerfGE 49, 89, p. 143.
3 cf. inter alia J. Kersten, *Der Abschied vom Restrisiko? Zur juristischen Neubewertung atomarer Risiken nach Fukushima* [in:] J. Ostheimer, M. Vogt (eds.), *Die Moral der Energiewende. Risikowahrnehmung im Wandel m Beispiel der Atomenergie*, Stuttgart 2014, pp. 164–181; U. Wollenteit, *Vom Ende des Restrisikos*, "Zeitschrift für

Umweltrecht" 2013, pp. 323–329; P. Becker, *Fukushima und die Falsifizierung der "Restrisiko"-Theorie* [in:] ibid, *Aufstieg und Krise der deutschen Stromkonzerne,* Bochum 2011, pp. 244–254; H. Wagner, *Kein Ausstieg aus der Kernenergie durch Gesetzesauslegung*, "Neue Juristische Wochenschrift" 1987, pp. 416–417; K. Lange, *Rechtliche Aspekte eines "Ausstiegs aus der Kernenergie"*, "Neue Juristische Wochenschrift" 1987, p. 2459.

4 See the FCC's judgment of 12 November 2008, ref. 1 BvR 2456/06, §19; the FCC's judgment of 6 December 2016, ref. 1 BvR 2821/11, 1 BvR 1456/12, 1 BvR 321/12, publ. BVerfGE 143, 246. In contrast, in the FCC's judgment of 29 September 2020, ref. 1 BvR 1550/19 (publ. BVerfGE 155, 378) there is no reference to the *Restrisiko* concept and the *Kalkar* judgment, so given the fact that it is a continuation of the judgment of 6 December 2016, this lack of reference must be regarded as the FCC upholding the *Restrisiko* concept. *Mutatis mutandis* also FCC's judgment of 7 December 2021, ref.1 BvL 2/15 (publ. BVerfGE 160, 1).

5 The already mentioned FCC's judgment of 7 December 2021 (BVerfGE 160, 1) is such an example of a minor issue, related to nuclear energy, which was not any kind of a turning point, but it rather continued the concepts developed in the FCC's jurisprudence up to now.

6 This is what they do: K. Jajuga, *Koncepcja ryzyka i proces zarządzania ryzykiem – wstęp* [in:] K. Jajuga (ed.), *Zarządzanie ryzykiem*, Warsaw 2015, p. 13; M. Iwanicz-Drozdowska, *Istota ryzyka w działalności banku i zarządzania nim* [in:] M. Iwanicz-Drozdowska (ed.), *Zarządzanie ryzykiem bankowym*, Warsaw 2012, pp. 12–13.

7 *PWN Polish Language Dictionary*. Available online at <sjp.pwn.pl/search/ryzyko.html>.

8 Ibid.

9 Ibid.

10 Ibid.

11 Cf. M. Iwanicz-Drozdowska, *Istota ryzyka w działalności banku* …, p. 13.

12 Similarly, M. Iwanicz-Drozdowska, *Istota ryzyka w działalności banku* …, p. 13.

13 K. Jajuga, *Koncepcja ryzyka i proces zarządzania ryzykiem* …, p. 13.

14 M. Iwanicz-Drozdowska, *Istota ryzyka w działalności banku* …, p. 13; K. Jajuga, *Koncepcja ryzyka i proces zarządzania ryzykiem* …, p. 13.

15 M. Iwanicz-Drozdowska, *Istota ryzyka w działalności banku* …, p. 13.

16 K. Jajuga, *Koncepcja ryzyka i proces zarządzania ryzykiem* …, p. 13.

17 Ibid.

18 M. Iwanicz-Drozdowska, *Istota ryzyka w działalności banku* …, p. 13

19 Ibid.

20 K. Jajuga, *Koncepcja ryzyka i proces zarządzania ryzykiem* …, p. 13.

21 M. Iwanicz-Drozdowska, *Istota ryzyka w działalności banku* …, p. 13.

22 K. Jajuga, *Koncepcja ryzyka i proces zarządzania ryzykiem* …, p. 13.

23 Cf. ibid, p. 14.

24 Ibid.

25 Cf. M. Iwanicz-Drozdowska, *Istota ryzyka w działalności banku* …, p. 14.

26 K. Jajuga, *Koncepcja ryzyka i proces zarządzania ryzykiem* …, p. 14.

27 Ibid.

28 Explicitly in: K. Jajuga *Koncepcja ryzyka i proces zarządzania ryzykiem* …, p. 14.

29 Ibid.

30 Ibid.

31 This refers to the Act of 29 March 2000 on the Primacy of Renewable Energy, orig. *Gesetz für den Vorrang Erneuerbarer Energien (Erneuerbare-Energien-Gesetz – EEG) sowie zur Änderung des Energiewirtschaftsgesetzes und des Mineralölsteuergesetzes.*

32 See BVerfGE 79, 311, p. 338.

33 BVerfGE 49, 89, p. 116.
34 This is pointed out by M. Iwanicz-Drozdowska, *Istota ryzyka w działalności banku* …, p. 15.
35 So M. Iwanicz-Drozdowska, *Istota ryzyka w działalności banku* …, p. 15.
36 See e.g. J. Handrlica, *Aktuelle Entwicklungen des Atomhaftungsrechts in der Tschechischen Republik und in der Slowakischen Republik* [in:] N. Pelzer (ed.), *Europäisches Atomhaftungsrecht im Umbruch*, Baden-Baden 2010, pp. 123–138; G. Kecskes, *The Nuclear Liability Issue After Fukushima – The Role of International Law in Liability Theory* [in:] Burges Salmon *INLA 2012*, pp. 1–8. Publication available online: <https://www.burges-salmon.com/INLA_2012/10148.pdf>.
37 K. Jajuga, *Koncepcja ryzyka i proces zarządzania ryzykiem* …, p. 26.
38 Ibid.
39 M. Iwanicz-Drozdowska, *Istota ryzyka w działalności banku* …, p. 15.
40 E. Vaughan, T. Vaughan, *Fundamentals of Risk and Insurance,* Chichester 2003, p. 15, quoted in M. Iwanicz-Drozdowska, *Istota ryzyka w działalności banku …,* p. 16.
41 M. Iwanicz-Drozdowska, *Istota ryzyka w działalności banku* …, p. 16.
42 K. Jajuga, *Koncepcja ryzyka i proces zarządzania ryzykiem* …, p. 30.
43 K. Jajuga, *Koncepcja ryzyka i proces zarządzania ryzykiem* …, p. 31.
44 Ibid.
45 Ibid.
46 P. Becker, *Die Atomverstrommung: Triumph der Verdrängung* [in:] ibid, *Aufstieg und Krise der deutschen Stromkonzerne*, Bochum 2011, pp. 205 et seq.
47 E. Bohne, M. Speyer, *Staat und Konfliktbewältigung bei Zukunftstechnologien*, 'Neue Zeitschrift für Verwaltungsrecht' 1999, p. 1.
48 Ibid, p. 2.
49 Cf. E. Bohne, M. Speyer, *Staat und Konfliktbewältigung bei Zukunftstechnologien* …, p. 2. It should be noted that some studies point to the hidden emissions of nuclear power (at the stage of its erection, during its use as part of the use of the back-up generators, and later in its dismantling and decontamination work.
50 E. Bohne, M. Speyer, *Staat und Konfliktbewältigung bei Zukunftstechnologien* …, p. 2.
51 Ibid.
52 So E. Bohne, M. Speyer, *Staat und Konfliktbewältigung bei Zukunftstechnologien* …, p. 2. The authors put forward the thesis that all nuclear power should be qualified as a new technology, with which one cannot entirely agree.
53 See in more detail R. Rybski, *German Radioactive Waste. Changes in Policy and Law,* Oxford 2022, p. 80 et seq.
54 The other nuclear power technology with a broad (but smaller) scale of implementation are pressurised heavy-water reactors.
55 For: E. Bohne, M. Speyer, *Staat und Konfliktbewältigung bei Zukunftstechnologien* …, p. 10.
56 Publ. BVerwGE 72, 300.
57 Publ. BVerfGE 47, 146.
58 Publ. BVerfGE 49, 89.
59 Publ. BVerfGE 81, 310.
60 Publ. BVerfGE 53, 30.
61 Publ. BVerfGE 72, 299.
62 Publ. BVerfGE 104, 238.
63 Publ. „Neue Zeitschrift für Verwaltungsrecht" 2017, p. 317.
64 Publ. „Neue Zeitschrift für Verwaltungsrecht" 2016, p. 1079.
65 Explicitly in E. Bohne, M. Speyer, *Staat und Konfliktbewältigung bei Zukunftstechnologien* …, p. 4.
66 Ibid.
67 Ibid.

68 Ibid.
69 Ibid, pp. 4–5.
70 E. Bohne, M. Speyer, *Staat und Konfliktbewältigung bei Zukunftstechnologien* …, p. 5.
71 Ibid.
72 Ibid.
73 Explicitly in E. Bohne, M. Speyer, *Staat und Konfliktbewältigung bei Zukunftstechnologien* …, p. 5.
74 Ibid.
75 Ibid.
76 Ibid.
77 Ibid.
78 Ibid.
79 See further R. Rybski, *German Radioactive Waste* …, p. 86 et seq.
80 Ibid, pp. 6 and 10.
81 Ibid.
82 Ibid.
83 Ibid, p. 6.
84 P. Becker, *Aufstieg und Krise der deutschen Stromkonzerne*, Bochum 2011, pp. 202–243; E. Bohne, M. Speyer, *Staat und Konfliktbewältigung bei Zukunftstechnologien* …, pp. 5–8.
85 E. Bohne, M. Speyer, *Staat und Konfliktbewältigung bei Zukunftstechnologien* …, p. 8.
86 Ibid. See other examples of identification with nuclear power indicated there.
87 Publ. BVerfGE 49, 89.
88 BVerfGE 49, 89, p. 91.
89 BVerfGE 49, 89, p. 91.
90 BVerfGE 49, 89, pp. 91–92.
91 BVerfGE 49, 89, p. 95.
92 BVerfGE 49, 89, pp. 95–96.
93 BVerfGE 49, 89, p. 96.
94 BVerfGE 49, 89, p. 92.
95 BVerfGE 49, 89, p. 92.
96 BVerfGE 49, 89, p. 92.
97 BVerfGE 49, 89, p. 92.
98 BVerfGE 49, 89, p. 92.
99 BVerfGE 49, 89, p. 92.
100 BVerfGE 49, 89, p. 124.
101 BVerfGE 49, 89, pp. 92–94. This provision provides:

"Permit for installation

1 Whoever constructs, uses or owns a stationary installation for the production or processing or enrichment or for the fission of nuclear fuel or for the reprocessing of spent nuclear fuel, or when the installation or the way in which it is used is substantially altered, must obtain a licence.
2 Authorisation may only be granted if:

1 no circumstances are known from which doubts arise as to the warranty of the applicant and the persons responsible for the construction, management and supervision of the use of the installation and as to the training of the persons responsible for the construction, management and supervision of the use of the installation;
2 it is ensured that other persons employed to operate the installation have sufficient knowledge of the safe operation of the installation, the possible risks and the protective measures that can be taken;

3 the necessary precautions are in place, corresponding to the state of knowledge and technology, against damage which may arise in connection with the construction and use of the installation;
4 the necessary precautions have been taken to fulfil the statutory liability for damages;
5 protection is guaranteed against disruptive or other third-party influence;
6 the choice of location of the installation does not infringe on important public interests, in particular concerning the purity of water, air and land."

102 BVerfGE 49, 89, p. 94.
103 BVerfGE 49, 89, p. 94.
104 BVerfGE 49, 89, p. 124.
105 BVerfGE 49, 89, pp. 125–126.
106 BVerfGE 49, 89, pp. 125–126.
107 BVerfGE 49, 89, p. 126.
108 BVerfGE 49, 89, p. 126.
109 Cf. the FCC's judgment of 28 October 1975, 2 BvR 883/73, 379, 497, 526/74, publ. BVerfGE 40, 237, p. 248.
110 BVerfGE 49, 89, p. 126.
111 BVerfGE 49, 89, p. 127.
112 BVerfGE 49, 89, p. 127.
113 BVerfGE 49, 89, p. 127.
114 BVerfGE 49, 89, p. 127.
115 BVerfGE 49, 89, p. 129.
116 BVerfGE 49, 89, p. 129.
117 BVerfGE 49, 89, p. 128.
118 BVerfGE 49, 89, p. 128.
119 Yes BVerfGE 49, 89, p. 91.
120 BVerfGE 49, 89, p. 128.
121 BVerfGE 49, 89, p. 128.
122 BVerfGE 49, 89, p. 130.
123 BVerfGE 49, 89, p. 130.
124 BVerfGE 49, 89, p. 130.
125 BVerfGE 49, 89, p. 131.
126 BVerfGE 49, 89, p. 131.
127 BVerfGE 49, 89, p. 131.
128 BVerfGE 49, 89, p. 131.
129 BVerfGE 49, 89, p. 132.
130 BVerfGE 49, 89, p. 132.
131 The provision of Article 1(1) of the Basic Law provides: "Human dignity is inviolable. Its respect and protection is the duty of all state authorities."
132 BVerfGE 49, 89, p. 132.
133 BVerfGE 49, 89, p. 135.
134 BVerfGE 49, 89, p. 135.
135 BVerfGE 49, 89, p. 135.
136 BVerfGE 49, 89, p. 135.
137 Cf. BVerfGE 49, 89, p. 135.
138 See BVerfGE 49, 89, p. 135.
139 BVerfGE 49, 89, p. 135.
140 BVerfGE 49, 89, p. 135.
141 Explicitly in BVerfGE 49, 89, p. 135.
142 BVerfGE 49, 89, p. 135.
143 BVerfGE 49, 89, p. 136.

144 BVerfGE 49, 89, p. 136. See also further R. Nolte, *Rechtliche Anforderungen an die technische Sicherheit von Kernanlagen. Zur Konkretisierung des* §7 Abs. 2 Nr. 3 AtomG, Berlin 1984.
145 BVerfGE 49, 89, p. 136.
146 BVerfGE 49, 89, p. 136.
147 Explicitly in FCC: BVerfGE 49, 89, p. 136.
148 BVerfGE 49, 89, p. 136.
149 BVerfGE 49, 89, p. 136.
150 BVerfGE 49, 89, p. 136.
151 BVerfGE 49, 89, pp. 136–137.
152 BVerfGE 49, 89, p. 137.
153 BVerfGE 49, 89, p. 137.
154 BVerfGE 49, 89, p. 137.
155 BVerfGE 49, 89, p. 137.
156 BVerfGE 49, 89, p. 137.
157 BVerfGE 49, 89, p. 137.
158 BVerfGE 49, 89, p. 137.
159 BVerfGE 49, 89, p. 137.
160 BVerfGE 49, 89, p. 137.
161 BVerfGE 49, 89, p. 137.
162 BVerfGE 49, 89, p. 137.
163 BVerfGE 49, 89, p. 137.
164 BVerfGE 49, 89, p. 137.
165 BVerfGE 49, 89, p. 137.
166 BVerfGE 49, 89, p. 137.
167 BVerfGE 49, 89, p. 138.
168 BVerfGE 49, 89, p. 138.
169 BVerfGE 49, 89, p. 138.
170 BVerfGE 49, 89, p. 138.
171 BVerfGE 49, 89, p. 138.
172 BVerfGE 49, 89, p. 138.
173 BVerfGE 49, 89, p. 138.
174 BVerfGE 49, 89, pp. 138–139.
175 BVerfGE 49, 89, p. 139.
176 BVerfGE 49, 89, p. 139.
177 BVerfGE 49, 89, pp. 139–140.
178 BVerfGE 49, 89, pp. 139–140.
179 BVerfGE 49, 89, pp. 139–140.
180 BVerfGE 49, 89, p. 140.
181 BVerfGE 49, 89, p. 140.
182 BVerfGE 49, 89, p. 140.
183 BVerfGE 49, 89, p. 140.
184 BVerfGE 49, 89, p. 140.
185 BVerfGE 49, 89, p. 140.
186 BVerfGE 49, 89, pp. 140–141.
187 BVerfGE 49, 89, p. 141. The provision of Article 2 para. 2 sentence 1 of the Basic Law provides: "Everyone has the right to life and personal inviolability."
188 BVerfGE 49, 89, p. 141.
189 BVerfGE 49, 89, p. 141.
190 BVerfGE 49, 89, p. 141.
191 BVerfGE 49, 89, p. 141.
192 BVerfGE 49, 89, p. 141.
193 BVerfGE 49, 89, p. 141.

194 BVerfGE 49, 89, pp. 141–142; see also BVerfGE 7, 198, p. 205; the FCC's judgment of 29 May 1973, ref. 1 BvR 424/71 and 325/72, publ. BVerfGE 35, 79, p. 114; the FCC's judgment of 25 February 1975, ref. 1 BvF 1, 2, 3, 4, 5, 6/74, publ. BVerfGE 39, 1, p. 41 et seq.
195 BVerfGE 49, 89, p. 142.
196 BVerfGE 49, 89, p. 142.
197 BVerfGE 49, 89, p. 143.
198 BVerfGE 49, 89, p. 143.
199 BVerfGE 49, 89, p. 143.
200 BVerfGE 49, 89, p. 143.
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202 BVerfGE 49, 89, p. 143.
203 BVerfGE 49, 89, p. 144.
204 BVerfGE 49, 89, p. 145.
205 BVerfGE 49, 89, p. 144.
206 BVerfGE 49, 89, p. 144.
207 BVerfGE 49, 89, p. 144.
208 BVerfGE 49, 89, p. 144.
209 BVerfGE 49, 89, p. 147.
210 BVerfGE 49, 89, p. 147.
211 J. Kersten, *Der Abschied vom Restrisiko? Zur juristischen Neubewertung atomarer Risiken nach Fukushima* [in:] J. Ostheimer, M. Vogt (eds.), *Die Moral der Energiewende. Risikowahrnehmung im Wandel m Beispiel der Atomenergie*, Stuttgart 2014, p. 170.
212 See BVerfGE 49, 89, p. 143 and J. Kersten, *Der Abschied vom Restrisiko?* …, p. 170.
213 P. Becker, *Aufstieg und Krise der deutschen Stromkonzerne* …, p. 249.
214 Ibid, p. 249.
215 J. Kersten, *Der Abschied vom Restrisiko?* …, p. 166.
216 Ibid, p. 167.
217 Ibid.
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219 Ibid.
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221 Ibid.
222 Ibid, p. 250.
223 Ibid.
224 Ibid.
225 Ibid.
226 Deutsche Presse-Agentur, *Was geschah in Fukushima?* "Zeit Online", 13 March 2011, available online: <http://www.zeit.de/wissen/umwelt/2011-03/fukushima-AKW-reaktoren>.
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237 Available at: <https://www.bundestag.de/blob/434430/bb37b21b8e1e7e049ace5db6b2f949b2/drs_268-data.pdf >.
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239 Ibid.
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241 Ibid.
242 Ibid.
243 BVerfGE 143, 246, pp. 265–266.
244 Ibid.
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246 BVerfGE 143, 246, p. 267.
247 Ibid.
248 Ibid.
249 Ibid.
250 Ibid.
251 BVerfGE 143, 246, p. 325.
252 Ibid.
253 Ibid.
254 Ibid.
255 Ibid.
256 See BVerfGE 49, 89, p. 142 et seq.; BVerfGE 53, 30, p. 55 et seq.; BVerfGE 143, 246, p. 325.
257 Cf. BVerfGE 49, 89, p. 145 et seq. and BVerfGE 143, 246, p. 325.
258 See BVerfGE 143, 246, p. 348.
259 Ibid.
260 Ibid.
261 Cf. BVerfGE 143, 246, p. 351.
262 As formulated by the FCC in the Kalkar judgment: BVerfGE 49, 89, p. 127.
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266 BVerfGE 143, 246, pp. 353–354.
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269 BVerfGE 143, 246, p. 354.
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285 Ibid.
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287 Ibid.
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Concluding remarks

The German experience with nuclear energy is universal. Those nearly 70 years of experience should greatly interest an audience outside Germany. Firstly, universality means the reception of the German experience in other democracies with the established rule of law and the nuclear power sector present (or planned) will be easy. Because of the central role of the German Federal Constitutional Court, developments within the German constitutional system (and public debate on those issues, including numerous judgments and even more peer-reviewed literature) are of interest not only for the legal systems with the continental legal system but also in common law countries. Secondly, similar legal issues arise in all countries that developed their nuclear sectors (or intend to develop). Those issues concern the full life cycle of nuclear installations (or nuclear material) at the investment and disinvestment phases, policy or governance level. Thirdly, those jurisdictions that do not have (or do not plan to develop) a nuclear power sector share similar issues in the area of radiological protection (including consequences of military application of nuclear energy).

In light of the Basic Law, energy security is to be identified as a constitutional value recognised by the FCC as particularly important. The content of energy security is equally co-shaped by constitutional legal norms. It also has the opposite effect: energy security similarly affects other constitutional legal norms (e.g. fundamental rights).

A very clear normative content of energy security emerges from the FCC case law. It belongs to the field of securing the basic living needs of the population. The highest rank characterises energy supply, and the FCC has equated its importance with food supply. The essence of energy security is to ensure the continuous availability of an adequate (i.e. sufficient) amount of energy. In doing so, the Court emphasised that energy security is an issue independent of current politics. This also follows from the FCC's attribution to it of an "absolute" common good. Therefore, as the energy supply serves the general interest, it can be financed with the (partial) use of public tributes. At the same time, the (possible) need to import energy resources significantly undermines a country's energy security. For this reason, the FCC has adopted as a desirable solution an energy system in which the full demand for energy

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(electricity, heat as well as energy used in transport) is met by domestic raw material resources (self-sufficiency model of the country in question, which also includes its own generating units).

The democratic state governed by the rule of law has many instruments for ensuring energy security (security of energy supply). Firstly, this will be the possibility of entrusting energy supply to specialised private entities, with appropriate state supervision of this activity. Another instrument is the possibility of granting state aid. Finally, expropriations are also an appropriate means of implementing measures to realise the constitutional security of the energy supply.

In its 2016 judgment, the FCC addressed the arguments of the opponents of *Atomausstieg II* about the negative consequences of an accelerated exit from nuclear power for Germany's energy security. The FCC pointed out that the purpose of the 11th Amendment to the Federal Atomic Law (*Laufzeitverlängerung*) was, among other things, to increase energy security. The 13th Amendment (*Atomausstieg II*) was aimed at minimising the risks associated with the commercial use of nuclear energy. Therefore, the Court considered the negative impact on energy security irrelevant to achieving the basic statutory objectives of the 13th Amendment to the Federal Atomic Law. The Court's reasoning quoted here in the context of legal interpretation is correct. However, it ignores the problem of the impact of the accelerated departure from nuclear power (i.e. *Atomausstieg II*) on national energy security. Due to Germany's very strong interconnection with other EU countries through cross-border power connections, the accelerated departure from the use of nuclear power for the generation of power affects the energy security of several EU member states. The first impression may be that it is difficult to require a constitutional court to pronounce in detail on matters concerning threats to national energy security. However, given the possibility of reconstructing a constitutional value based on the German Basic Law precisely in the form of energy security, the FCC should have addressed this matter in its judgment of 6 December 2016.

The German Basic Law contains two provisions that explicitly refer to nuclear energy: Article 73(1)(14) and Article 87c. The mere fact that the constitutional lawmaker introduced these provisions into the text of the Basic Law significantly impacted the FCC's judgment on the constitutional permissibility of the use of nuclear power for the commercial generation of power from it. The FCC deduced from the fact that the legislature had introduced nuclear energy directly into the text of the constitutional provisions that the Basic Law, in principle, permitted the production and use of nuclear energy for peaceful purposes. The Court has consistently upheld this position in its subsequent judgments.

The constitutional approval of nuclear power does not naturally exclude a constitutional review of the constitutionality of legal regulations on the use of nuclear energy for power generation. The competence basis from the Basic Law (Article 73(1)(14)) does not constitute a *carte blanche* for the statutory

legislator. However, all statutory (and sub-statutory) acts are subject to constitutional follow-up evaluation. However, it is limited by the impossibility of reviewing the admissibility of the use of nuclear energy for nuclear power generation. Indeed, the control of constitutionality is limited only to determining whether nuclear energy regulations are constitutionally permissible and whether they are applied in a manner consistent with the Constitution. On the other hand, the decision taken by the legislature (on the admissibility of the use of nuclear energy for the generation of electricity) does not have the character of an unchangeable decision. The Court explicitly pointed out that if the legislature made a determination (in federal law), it was based on specific factual circumstances at a specific time. If, on the other hand, new circumstances arise that were not known at the time the determination was made (by the legislature), the legislature may then be under a constitutional obligation to review whether the original determination expressed in the law is justified (and tenable) also in the new, changed circumstances.

The decision on the peaceful use of nuclear energy should be taken by the legislature (and not by the FCC). In a situation characterised by uncertainty, the political responsibility for making the right decision lies with the federal legislature and the federal government within their respective competences. Such a (directional) decision on the permissibility of the peaceful use of nuclear energy for the generation of electricity on account of the far-reaching impact on citizens and, in particular, on the scope of their freedoms, on equality, on general life relations and on account of the necessity of the related type and intensity of regulation constitutes a fundamental decision in the sense of a matter reserved by law. This implies formulating a requirement that a strategic decision on nuclear power must be taken in the form of a statutory regulation.

The characteristic feature of the very extensive provision of Article 73(1)(14) of *Grundgesetz* is the use of terms derived directly from nuclear physics. The scope of the Federation's competence expressed in Article 73(1)(14) of the Basic Law extends to the entire essence of nuclear energy. The competence provision of Article 73(1)(14) of the Basic Law functions as a *lex specialis* for all general regulations which do not necessarily concern the essence of nuclear energy but should be shaped in connection with nuclear energy, such as regulations on the protection of working conditions or liability for nuclear damage. The provision of Article 73(1)(14) of the Grundgesetz creates the basis for a new, independent area of legal regulation concerning nuclear energy and ionising radiation.

The provision of Article 73(1)(14) of the Grundgesetz was shaped in the form of a general clause so that the Federation could regulate all issues relating to nuclear energy. As a result, the Grundgesetz provision in question applies to all phases of nuclear power use. In the first instance, it includes a fundamental ruling on the commencement of the use of nuclear energy by the Federal Republic of Germany in the power industry. The subsequent phase to which this legislative competence applies also includes the decision on the

further use of nuclear power. This concerns, in particular, the legislature's decision on the possible extension of the operation of nuclear reactors and the adaptation of the existing legal order to the new circumstances. The provision of Article 73(1)(14) of the Basic Law also includes covers a decision on the phase-out of nuclear energy for power generation.

The second provision of the Basic Law, which relates to nuclear energy (Article 87c), allocates tasks relating to performing administrative duties in nuclear energy between the Federation and the Länder. The intention to introduce a new type of administrative tasks that would be outsourced to the *Länder* by the Federation required an amendment to the Basic Law, as the catalogue of tasks that the Federation could outsource to the *Länder* was closed at the level of the Basic Law. It was planned to involve a number of administrative bodies due to the complexity of the nuclear licensing procedure, and it was desired to keep the entire procedure under the responsibility of a single administrative body. Hence, the drafters of the 1959 amendments to the Basic Law on nuclear energy were convinced that the competent authority for granting the licence should be the public administration at the level of the individual *Länder*. The choice of an optional administration outsourced to the *Länder* by the Federation (and subsequently supervised by the Federation) had several reasons. In the first instance, by retaining oversight within the administration outsourced to the *Länder*, the Federation sought to preserve a uniform interpretation and application practice of the relevant international agreements (above all, the Euratom Treaty). As a member of Euratom, Germany had to implement and apply Euratom legislation correctly, and it was up to the Federal Government to do so. The choice of an optional administration delegated to the Länder by the Federation was a way of working out a compromise within the already existing practice of distributing competences between the Federation and the *Länder* – the Federation was allowed to maintain the uniform application of law within the jurisdiction of the German state and to ensure the maintenance of economic unity. At the same time, the *Länder* retained their traditional competences regarding zoning administration and the economy. Another reason was to avoid the need to create new administrative bodies.

Also, in the case of the provision of Article 87c of the Basic Law, it might seem that no significant normative content is derived from the competence provisions. However, this is not the case in Germany. In the first place, the content of the provision of Article 87c of the Basic Law is understood as a confirmation of the constitutional permissibility of the peaceful use of nuclear energy. Moreover, an additional function of Article 87c of the Grundgesetz is important – legitimising the peaceful application of nuclear energy (also to generate power). This does not mean, however, that it would be possible to formulate any obligations or authorisations relating to the use of nuclear energy or concerning the constitutional permissibility of the abandonment of nuclear energy based on the content of Article 87c of the Basic Law. Likewise, the content of Article 87c of the Basic Law, despite its additional

legitimising function, does not make it possible to formulate a constitutional injunction on the use of nuclear energy. The provision of Article 87c of the Grundgesetz leaves the assessment of the advantages and disadvantages of nuclear power to a political decision to be made by the relevant body, i.e. the Parliament.

In the light of the provisions of Articles 85 and 87c of the Basic Law, the activities of the *Länder* administrations are subject to the supervision of the Federation with regard to their legality and purposefulness. The *Länder* administrations are obliged to provide the Federation, at its request, with information on how federal laws have been implemented to the extent required. Conversely, the Federation is competent to make (directional) decisions on a particular matter. Even if the Federation exercises its power to intervene, implementing this decision and the external representation of the federal state on the ongoing licensing procedure will still be the responsibility of the competent body of the federal state administration.

The Federation's most important legal means of action in supervising the administration delegated to the Länder remains the possibility for the Federation to issue instructions to the Länder on matters on which administration has been delegated to the *Länder*. The instructions are like intra-administrative orders and contain binding content ordering the authority concerned to take (or not to take) certain actions. The supervision of administration vested in the Federation concerns both legality and purposefulness.

At the same time, the supervision of the Federation itself is understood to be the continuous supervision of the *Länder* administrations and their performance of the tasks entrusted to them by law. Supervision can also consist of intervening and correcting certain decisions of the *Länder* authorities through supervisory measures vested in the competent federal authorities. Therefore, the administrative bodies of the Länder must be aware from the outset of the tasks entrusted to them that the Federation may also begin to supervise them concerning their substance. The Federation's use of the authority to issue instructions should be effective and substantively justified. It is emphasised, however, that the use of instructions may ultimately also lead to the negation of certain administrative measures of the respective federal state. Furthermore, the content of the instruction cannot be arbitrary – it must address the issue of the conformity of administration with the laws and the purposefulness of implementing federal laws.

Summing up, it is also worth referring to the circumstance of why the Federal Constitutional Court, despite its initially positive stance towards nuclear power, has on no occasion challenged the constitutionality of reforms that went in the opposite direction (in the case of *Atomausstieg I* in its judgment on the moratorium on work on the location of the final radioactive waste repository in Gorleben and on *Atomausstieg II* in its December 2016 and September 2020 judgments). On each occasion, the Court has consistently applied the thesis reconstructed earlier in its jurisprudence that it is for the federal legislature to decide on the commencement of the use of

nuclear energy to generate power and on the continued use of nuclear power and the (possible) abandonment of nuclear power (strategically key decisions). The Court's judgments on strategically key decisions have been remarkably consistent. Since the constitutional legislature expanded the scope of the Federation's competence in 1959, it is a political decision for the legislature (Parliament) to make those strategic (key) decisions. However, not all of those key legislative decisions concerning nuclear power were verified by the FCC, or at least not in their entirety. In the case of *Atomausstieg II*, in the December 2016 and September 2020 judgments, the FCC ruled only on one aspect of nuclear power, i.e. the admissibility of expropriating energy companies from nuclear reactors. In the case of *Atomausstieg I*, on the other hand, the Court referred only indirectly to the moratorium on any works on the final radioactive waste repository at the Gorleben site. This matter formed one element of the consensus in *Atomausstieg I*, but it was not a question of substance.

Similarly, the Court did not examine the strategic (key) decision on the commencement of the use of nuclear power taken by Parliament with adopting the Federal Atomic Law in 1959 – even though a manifest unconstitutionality was apparent at that time because the Federal Atomic Law had been passed before the amendment to the Basic Law granting the Federation legislative competence in the area of nuclear power came into force. The first ruling on the nuclear phase-out (*Atomausstieg I*) was also not subject to a constitutional review by the FCC regarding its substance. Similarly, the statutory ruling on the extension of the operation of nuclear reactors (*Laufzeitverlängerung*) was also not subject to a constitutional review of its constitutionality by the FCC. On the other hand, the Court has issued several rulings on nuclear energy that dealt with issues that concerned particular nuclear installations. At the same time, paradoxically, it was only in the judgments handed down in the cases of particular nuclear installations that the FCC stated that Parliament should take key decisions regarding nuclear power.

In the nearly 70 years since the Basic Law was amended to include direct references to the peaceful application of nuclear energy, it is possible to grasp how consistently the FCC has implemented and not exceeded the test it established that the strategic (key) decisions concerning nuclear power can only be taken by Parliament (in statutory form). When ruling in cases concerning particular nuclear installations, the possible unconstitutionality of some sub-issue could have led to the fact that the use of nuclear energy could have been questioned, e.g. because it could have distorted the economic viability of such an activity, or such a ruling could also have prohibited the activity (or the technology in question) altogether. Thus, in ruling on cases involving particular nuclear installations, there was still a risk that the FCC itself would challenge the test it had established regarding the competence of Parliament to make such key decisions. Thus, the FCC's establishment of such a judicial test almost at the outset of using nuclear energy to generate power could have undermined the viability of the subsequent review of the

constitutionality in particular issues. The Court explicitly pointed out the impossibility of a constitutional court to directly make such a key decision. Taking into account the peculiarities of the functioning of the constitutional judiciary, where it would have been much quicker for the constitutional court to indirectly make such a key decision based on any of the cases concerning particular nuclear installations, then the possible activism of the German constitutional court in later years was effectively eliminated by the FCC itself practically at the very beginning of the formation of the nuclear jurisprudence (due to this jurisprudence test).

At the same time, if the FCC had contented itself with such an assessment, the legal position would have been clear for all participants. However, the FCC formulated another concept – on the need for society to bear unavoidable risks (the so-called *Restrisiko*) in nuclear power in its *Kalkar I* judgment. One of the core elements of this concept was the possibility of assessing whether the extent of the risks generated is excessive. While cognitively, this was an interesting concept, it is not very practical. This was because the possibility of using it did not exist, as the range of control criteria it comprised was so excessive that it was impossible to fulfil them. The introduction of this concept as an additional element in the control of nuclear issues on a case-by-case basis (in addition to the concept that the Parliament should take the direction) constituted the establishment of such preliminary criteria which effectively ruled out the feasibility of performing a control of the constitutionality of individual solutions. A much more pertinent preliminary criterion would have been to refer to the need for energy supply and enjoyment on a par with access to food (as the FCC stated in one of its first judgments, and which it did not return to later). At the same time, the logic of reasoning based on energy security, i.e. that energy must be produced and its supply ensured at all costs, was applied despite the different initial criteria for such an assessment. The conclusions drawn from the analysis of the consequences of the lack of electricity supply for the functioning of the modern state and society confirm the truth of this assumption. Therefore, the FCC was indeed able to invoke it directly and consistently.

The FCC's consistent application of the idea that key decisions in nuclear energy are vested in Parliament has not escaped the attention of Parliament and the Federal Government. All four key decisions concerning nuclear power over the last 20 years (*Atomausstieg I*, *Laufzeitverlängerung I, Atomausstieg II* and *Laufzeitverlängerung II*) have been taken by Parliament. Thus, the FCC's judicial concept has been consistently applied (also by the Court itself). This represented a de facto limitation of the scope of constitutional review in key decisions on nuclear power. Paradoxically, the success of using the parliamentary path had the effect that particular key decisions on nuclear power were not as intensively challenged before the FCC (which does not mean that each subsequent strategically key decisions did not generate many constitutional controversies).

The FCC has granted the (federal) Atomic Law a special position, as this law expressed the strategic decision of the legislature on the use of nuclear energy by the Federal Republic of Germany for power generation. This special position

provides an adequate justification to deviate (in this law) from constitutional principles, which are recognised in other areas of law. This includes, for example, the lack of individual ownership of nuclear fuel (which is the property of Euratom) and the introduction of a ban on activities relating to generating power from nuclear energy. This prohibition could only be lifted once the relevant licence for such activities was issued. In the 2016 judgment, the Court went even further, confirming the very wide regulatory discretion of the legislature in creating a strategic decision not only on whether to use nuclear energy for power generation, but also on how nuclear energy may be used. The Court, in ruling that the legislature has a great deal of regulatory discretion in formulating the rules for the use of nuclear power, made it clear to the legislature that the political responsibility for making decisions in the area of nuclear power lies with the legislature. This appears to prevent the rather frequent attempts by participants in the nuclear power dispute to get the FCC to act as a legislature in this area.

It is also worth noting the catalogue of sources of law in the area of nuclear installation safety. It was based on the catalogue of sources of universally applicable law established by the Basic Law. However, this was only a starting point, as this catalogue comprises internal regulations formulated by many legislative bodies. Characteristic of this is the extent of stakeholder participation in the committees set up at the Federal Ministry for the Environment, Nature Conservation and Reactor Safety (*Bundesumweltministerium*) and, above all, within the KTA. In addition, a significant number of entities responsible for developing sources of internal law have been linked to the *Bundesumweltministerium*. This manoeuvre allows for adequate substantive resources in connection with creating legal norms. Of the various legal sources in nuclear installation safety, special attention should be paid to legislation created by the KTA. It is based on the involvement of industry representatives in the (soft) law-making process. At the same time, regulations are adopted by the KTA only in those areas where there is consensus on the arrangements to be standardised. In addition, all KTA Rules issued to date are subject to regular review. The final criterion for verification is compliance with the state of the art and science. It is this institutional arrangement for KTAs that can be considered as a model arrangement for other jurisdictions.

The initial impact of Euratom on German constitutional law was enormous. Indeed, the extension of the content of the Basic Law in 1959 in order to include the issue of nuclear energy was the result of Germany's accession to Euratom. Although the provisions introduced in the Basic Law that referred to nuclear energy only concerned institutional issues (the introduction of legislative competence for the Federation in the field of nuclear energy and the possibility of introducing administration delegated to the *Länder*), they acquired a much broader normative content over time with the development of constitutional court case law and the literature on the subject. Of course, Euratom cannot be solely credited with the development of the FCC's

jurisprudence and the doctrine of constitutional law in the field of nuclear energy, as this was linked, among other things and to the intensification of investments in nuclear installations in Germany or to the increased awareness of participants in the public debate. However, Euratom was precisely the factor that led to the constitutional changes. In particular, it should be emphasised that thanks to this (i.e. Euratom), the constitutional changes took place very early – even before this economic sector's development and the first nuclear installations were built. The creation of a constitutional regulation dedicated to the new branch of the economy, even before its development, also reflected a large mobilisation on the part of the state so that state bodies were regulatorily prepared for it. At the same time, the legislative changes introduced were dedicated to this new sector of the economy. From the perspective of the time that has elapsed since 1959, it can be seen that this is not a systemic practice that would be followed later. Thus, this one-off systemic practice also confirmed the Federal Republic of Germany's accession to Euratom and the adaptation of the entire national legal system to Euratom regulations. The same reason for adapting national legislation to Euratom membership influenced the enactment of the Federal Atomic Law.

The subsequent (until 2006) impact of Euratom on German public law was not spectacular. The legislation created under Euratom did not impact German constitutional issues. This was related to the development of Euratom itself and the shape that this European community had taken. In contrast to the tasks that had originally been set for Euratom, the powers subsequently delegated by the Member States to be exercised by Euratom alone and those shared with the Member States did not make it possible to fulfil these tasks. Indeed, in the framework of ensuring the supply of ore and nuclear fuel, building a common market for nuclear services and developing an EU-wide nuclear industry was difficult. The lack of reforms to increase the efficiency of Euratom over its lifetime was increasingly evident in the emphasis on the sovereignty of the Member States to create their energy mixes in terms of energy generation sources, which was also due to the (extremely) different approaches of national energy policies to nuclear power generation. Therefore, Euratom persisted within its originally developed remit (later extended to include energy security) and without institutional reforms. Moreover, it can be clearly pointed out that the German *Atomausstieg I* also influenced the *status quo*, which is why the reform of Euratom was not conducted at all. Thus, the impact of the changes in German public law (*Atomausstieg I*) on Euratom by blocking any fundamental changes and maintaining the *status quo* was most pronounced during this period.

Another period within which it is possible to identify a significant impact of Euratom on constitutional regulation in Germany are the amendments to the Basic Law related to the 2006 Federation Reform (*Föderalismusreform*). The legislative competence of the Federation in the field of nuclear energy was moved to the category of so-called exclusive competence of the Federation. This represented an extension of the legislative competence of the Federation at the expense of the federal states (*Länder*). At the same time,

the rationale for the change also stemmed from the dynamics of Euratom legislation. Indeed, there has been a significant increase in Euratom regulations. Consequently, the space for different nuclear regulations at the level of the *Länder* decreased significantly, and the need arose to unify nuclear regulations at the federal level. While the dynamics of the EU legislation justified the need for constitutional changes, this was also due to the subject matter of the EU regulations, as they focused on the issue of safety standards (which resulted from the shape and development of Euratom itself). Although the nuclear legislation of federal states had lost relevance and was cited as a reason for the changes to the Basic Law, it also resulted from what Euratom regulated. Establishing uniform safety standards for nuclear installations in the EU would only make sense if those standards were simultaneously implemented uniformly throughout the European Union and in the individual Member States respectively (and not, for example, with deviations within particular *Länder* within the Federal Republic of Germany). Thus, the shift of legislative competences in Germany at the level of the Basic Law from the federal states (*Länder*) exclusively to the Federation had to do with this specific character of Euratom.

After the 2006 *Föderalismusreform* reform, it is possible to identify a fourth period, covering the extension of the operation of nuclear reactors, the Fukushima disaster and *Atomausstieg II*. The confirmation of the energy policy direction of a complete abandonment of the commercial use of nuclear power by Germany, as in the case of the second period, will impact Euratom. Indeed, the changes made to public law in Germany will most likely inhibit any reform of Euratom. At the same time, Germany's withdrawal from Euratom (and thus Euratom legislation) is unlikely to happen, as *Atomausstieg II* represents a move away from the commercial use of nuclear energy for power generation. Nuclear installations (research reactors, interim storage facilities and, in the future, a deep geological repository for spent nuclear fuel) will remain in Germany – and those nuclear installations should be subject to common safety standards, shaped and implemented precisely within the framework of Euratom.

An assessment of the overall constitutional regulation of nuclear energy should begin by noting that the provisions added in 1959 to the German Basic Law regulated a branch of the economy that did not yet exist in Germany. If one juxtaposes this with the high level of detail of this regulation, which made extensive use of the conceptual framework of nuclear physics, and the fact that it covered all areas of potential regulatory intervention by the state and remains relevant, the constitutional framework of the Basic Law relating to nuclear energy should be assessed positively. In doing so, attention should be drawn to the very fact that the Basic Law included the issue of radioactive waste and its disposal. In terms of the content of the provision of Article 73(1) (14) added to the Basic Law, the constitutional legislature in 1959 could have merely referred to the production of nuclear energy using nuclear fission and nuclear fusion. Meanwhile, the legislative technique adopted at the time was to list (and thus include) the most diverse areas of nuclear energy. Although

the quantities of radioactive waste must have been insignificant in 1959, a relevant regulation was nevertheless introduced into the Basic Law. This circumstance demonstrates the high quality of the 1959 amendment to the Basic Law, as it (from today's perspective) comprehensively regulated nuclear energy.

Some authors point to the need to expand the content of the Basic Law with additional provisions relating to nuclear energy. Namely, *Atomausstieg I* and *Atomausstieg II*, i.e. Germany's phase-out of using nuclear energy to generate power, should be included in the Basic Law. This would guarantee the immutability of the decision made in this regard. Such a provision would extend the existing provisions of the Basic Law, which were provisions regulating competence of the Federation, with a fully-fledged substantive provision. Interestingly, suppose the constitutional legislature decided to extend the content of the Basic Law with such a provision. In that case, this would simultaneously constitute a confirmation by the legislature of the current understanding of the nuclear competence provisions of the Basic Law as developed in the case law of the Federal Constitutional Court and German constitutional law scholarship.

The Federal Constitutional Court case law played an equally important role as the wording of the Basic Law's competence provisions themselves. This is because it was the FCC that confirmed the considerably richer normative content of the Basic Law's provisions on nuclear energy (rather than as provisions solely relating to the competences of federal bodies in the field of nuclear energy). Above all, the FCC needed to demonstrate that the legislature, by extending the provisions of the Basic Law to include provisions on nuclear energy, had thereby taken a strategic decision on the admissibility of the peaceful use of nuclear energy (primarily for power generation). Such an unequivocal interpretation of the provisions of the Basic Law already at the very beginning of a decades-long series of judgments of the Court on various aspects of nuclear power deprived in general the FCC of the possibility to question the peaceful use of nuclear energy to generate power in Germany. At the same time, an analysis of the FCC's jurisprudence from the almost 70 years of the Basic Law's nuclear provisions clearly shows the FCC's consistent application of this approach throughout this period.

Similarly, the FCC has consistently required in its case law that the legislature should take strategic (key) decisions on nuclear energy in statutory form. At the same time, the Court refused to assume the role of "positive legislator" in areas where those strategic (key) decisions had to be taken. The FCC has also made it clear in its jurisprudence that key political decisions must be made by those authorities who bear political responsibility for their decisions. In this area, too, one can point to the FCC's exceptional consistency in its more than 50 years of jurisprudence.

Also of great importance in the area of FCC jurisprudence is the (controversial) concept of unavoidable risks (the so-called *Restrisiko*), which the Court developed in its *Kalkar I* judgment and began to apply in its rulings on the use of nuclear energy to generate power. The obligation imposed by

the *Restrisiko* concept on the general public to bear the risks arising from the use of such an "innovative" technology as nuclear energy for the generation of power, including those risks that cannot be avoided, was a bold way of making the public aware that the operation of a highly industrialised country involves numerous (negative) risks that can be felt precisely by the general public. In this way, the FCC encapsulated in a legal concept the paradox of German society's inability to benefit from a high level of gross national income (generated thanks to a significant share of GDP generated by the industry, including the nuclear power sector) without the German public being prepared to (possibly) bear the consequences. The *Restrisiko* concept also imposed several obligations on public authorities. The most important element of the state licences granted to nuclear installations was an obligation to continuously adapt them to the state of the art so that the technologies used in nuclear installations kept up with the current state of knowledge and technology. At the same time, the jurisprudential concept of the so-called *Restrisiko* setting (in a dynamic way) a minimum level of safety for nuclear installations through an obligation to continuously adapt them, the FCC also set a higher level in this respect. Namely, in one of its judgments FCC indicated that the applicant was not entitled to claim a higher standard of protection that would exceed that level of risk that the applicant had to endure due to the concept of the so-called *Restrisiko*, which is also applicable to the applicant. At the same time, in the same judgment, the Court stated that even if the provision of a sufficient supply of energy is a common good ranking high in the hierarchy of constitutional values, there is no justification in the value order of the Basic Law for permitting such technical systems to operate that would jeopardise the Constitution's fundamental decision to place human life as the highest legally protected good. Therefore, the admissibility of the peaceful use of nuclear power and the duty of society to endure risks that cannot be eliminated must be accepted. These are underpinned by an obligation on the part of the German public authorities to protect the human life of those within their jurisdiction. Thus, the *Restrisiko* concept does not constitute a mere blanket authorisation of the peaceful use of nuclear power but also required (and requires) public authorities to take into account the constitutional fundamental rights under the Basic Law and to examine each time the impact of the peaceful use of nuclear energy on the level of protection of fundamental rights. Under the *Restrisiko* concept, on the other hand, it is the competence of the legislature to determine the level of risk that cannot be eliminated (the so-called risk appetite). This is a decision to be taken by the public authorities who bear political responsibility. It is these authorities that, in setting the level of non-eliminable risk and taking appropriate actions and measures in connection therewith, effectively set the level of protection to which individuals within the jurisdiction of German public authorities are entitled under their fundamental rights.

The FCC has been extremely consistent in applying the concept of the so-called *Restrisiko*. It combined it with the refusal to declare possibly unconstitutional

successive solutions adopted by the legislature in various areas of nuclear energy. The obligations imposed by the *Restrisiko* concept on the public authorities can be seen in the sense that they were a standard of protection set by the FCC, while the public authorities should already make strategic decisions. By contrast, it is impossible to consider that the *Restrisiko* concept represents all that the FCC could have proposed concerning nuclear energy. Certainly, the Court could have sought to formulate additional requirements that would translate into an increased level of the standard of protection of fundamental rights within the framework of punctual statements of jurisprudence in specific aspects of nuclear energy (instead of leaving it to other public authorities to take care and weigh the level of ensuring the protection of fundamental rights with such constitutional goods as, for example, security of energy supply). The above findings indicate that the FCC did not want to step into the role of a positive legislator in the area of the peaceful use of nuclear energy. Moreover, the FCC exercised its so-called "negative legislator" powers extremely restrainedly. The controversial nature of *Restrisiko's conception* was precisely due to its conservativeness, as the Court left a significant amount of regulatory discretion to the legislature and discretion to other public authorities who bear political responsibility. While the FCC's jurisprudence has traditionally provided the impetus for social change in many spheres, the Court's approach must be considered extremely restrained in nuclear energy. The concept of *Restrisiko* (in terms of imposing an obligation on the general public to endure unavoidable risks) was a form of counteracting the change in German society itself (which consisted of changing the attitude of a significant part of the population towards the use of nuclear energy for power generation to a negative one). Only when this change in German society took the form of a statutory decision to phase out nuclear power was the legislature in line with this restrained FCC approach. Just as it was possible to observe a high degree of consistency in the FCC's jurisprudence, the federal legislature later (fairly) consistently followed the standards set by the FCC's jurisprudence. This was particularly evident within the framework of *Atomausstieg I*, *Laufzeitverlaengerung I*, *Atomausstieg II*, *Laufzeitverlaengerung II* when subsequent strategic decisions of a political nature were taken in statutory form. Similarly, within the framework of the procedure for selecting the location of a final repository for spent nuclear fuel, the *Standortauswahlgesetz* implemented standards derived precisely from FCC case law.

With the benefit of hindsight, it can be assessed that *Atomausstieg I* (2002) represented one of a kind of constitutional compromise. Indeed, while the constitutionality of the statutory solutions was highly controversial, the very process of working out this constitutional compromise through the involvement of the nuclear power plant operators in direct negotiations (with the representative of the Federal Government), culminating in an agreement with the Federal government, was also controversial. However, none of the entities directly affected by *Atomausstieg I* (i.e. the owners or co-owners of the nuclear power plants) challenged the provisions of the agreement reached – they did not then seek the protection of the constitutional court. This course

of the political process provided a great deal of legal certainty. It allowed the focus to be on implementing the so-called *Energiewende*, i.e. the policy of moving away from non-renewable energy sources (including uranium) to renewable energy sources. When one juxtaposes this with the *Atomausstieg II* (2011), which was introduced quickly, without a mechanism for agreement with stakeholders, it is very apparent that an element of this legal certainty was missing with the *Atomausstieg II* until the FCC rulings of 2016 and 2020.

It is a phenomenon of the German legal system that constitutional law doctrine and constitutional court jurisprudence have taken a broad interest in nuclear energy. This is due to the considerable politicisation of nuclear power issues. It was also the result of the FCC's role as guardian of the Constitution in German public life since the beginning of the Basic Law. It should also be noted that jurisprudence and legal doctrine have shown a particular interest in the constitutional aspects of nuclear power from its inception in the 1950s. According to the most monumental commentary on the German *Grundgesetz*, these constitutional aspects of nuclear power include as follows: liability for nuclear damage, the level of admissible radiation, the juridification of technical norms, norms and standards, requirements related to the definiteness of undefined legal concepts, the right of refusal, the guarantee of the protection of fundamental rights through the proper design of procedures, the conduct of administrative proceedings with even mass participation of stakeholders, the participation of the public, the participation of foreigners in German administrative proceedings, the obligation to strengthen safety systems, the dynamic protection of legally protected assets, waste disposal, long-term risk management and issues related to the handling of plutonium. All measures related to the aforementioned aspects of nuclear energy – implemented through legal measures on the basis of and in accordance with the *Grundgesetz* – are intended to ensure that the various risks associated with nuclear technology and radiation are contained. Given the breadth of this body of jurisprudence and doctrine, it is possible to underline that nuclear regulation in Germany embodies the concept of F. Werner that administrative law is a concretisation of constitutional law.

The provisions of *Grundgesetz* and FCC's case law presented, which deal with the peaceful use of nuclear energy, provide valuable insight. It is possible to recommend the application of convergent constitutional provisions and standards resulting from the FCC case law in other democratic countries that function on the basis of the rule of law. The appropriateness of the application of the acquis resulting from the German legal system and the case law of the German Constitutional Court applies equally to countries that are about to start using nuclear energy for power generation (such as Poland), are already using it (such as France) or are considering a nuclear phase-out. The adequacy of solutions and standards stemming from the German legal system stems from the fact that the political system of the Federal Republic of Germany was adjusted to the nuclear power industry even before the establishment of commercial nuclear plants. Subsequently, key decisions were made in the legislative procedure (e.g. on nuclear phase-out or disposal

of radioactive waste). In addition, there is a wealth of case law on the subject and numerous documents on various aspects of nuclear power available in the literature. The appropriateness of using Germany's wealth of experience with nuclear power within other constitutional systems is evidenced by the fact, among other things, that the subsequent statutory changes were not theoretical but had a real impact on one of the world's largest economies. At its peak, nuclear power provided nearly 30% of Germany's electricity needs. The combined actions of the legislature, the executive branch and the judiciary have had (and continue to have) a real impact on gigantic assets that have significantly contributed to the energy security of one of the world's most industrialised countries.

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