REPORT

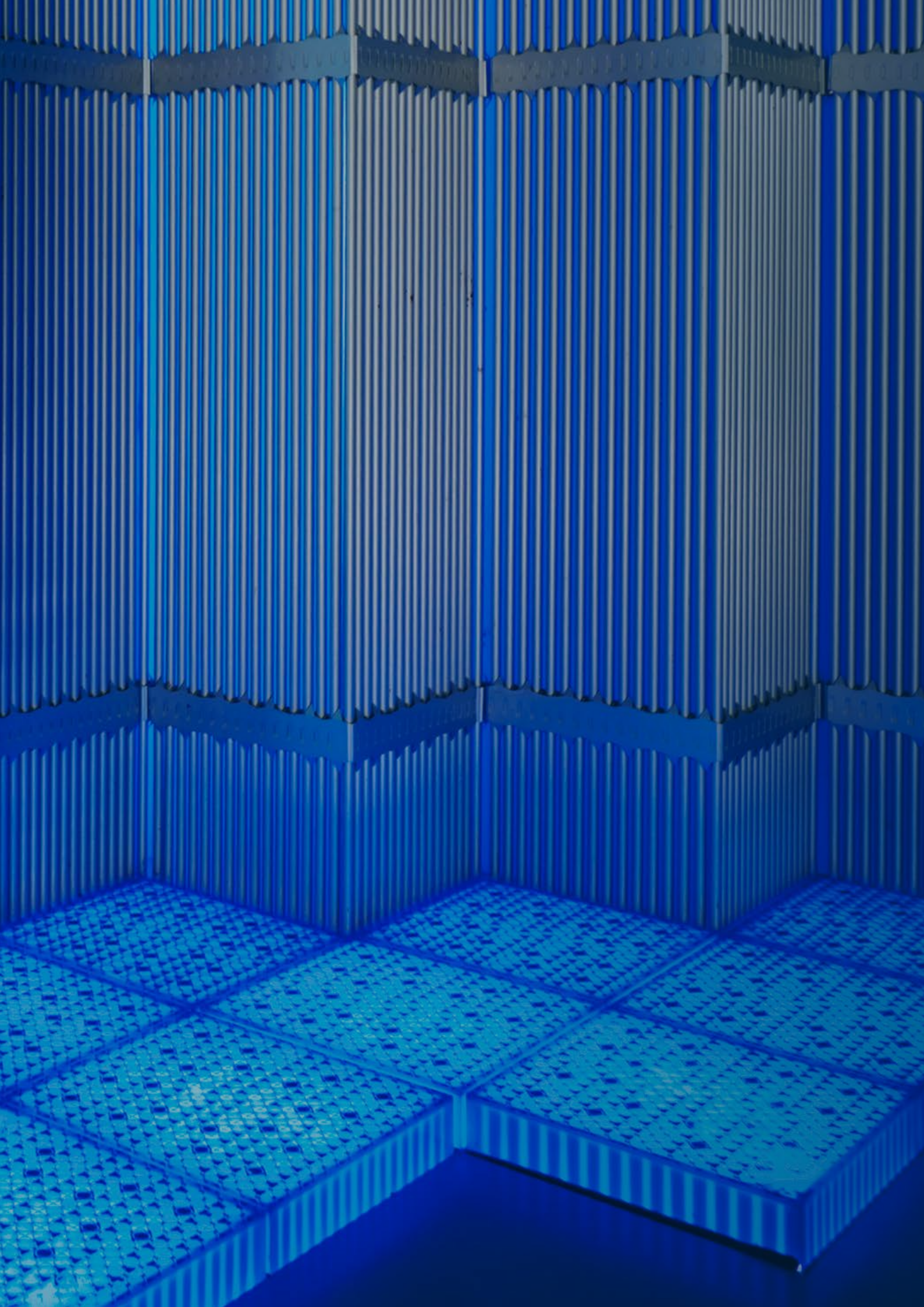
Nuclear Energy in Poland

Assessment of Readiness for the Construction of the First Nuclear Power Plant

2025

Baker McKenzie.

POLITYKA INSIGHT



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Introduction

In April 2023, the report "Nuclear Poland. How to bring reactors to Poland. Scenarios for the development of nuclear power"[1] was published, prepared jointly by Polityka Insight, the law firm Baker McKenzie, and external experts. The report analysed three scenarios for the introduction and expansion of nuclear power in Poland in five dimensions: technological, economic, legal, environmental and social.

Much, however, has changed since its publication – significant progress has been made in certain nuclear projects, while the implementation of others remains uncertain. There was also a change of government in Poland at the end of 2023, which has impacted on the dynamics and course of events for nuclear power development in Poland.

The purpose of this publication is to analyse Poland's readiness to construct its first nuclear power plant. We examine this readiness using an index that expresses it in percentage terms, which we have called the Nuclear Readiness Index. Whether a power plant will be built depends not only on the internal conditions of the investment (including its stage of development), but also on external factors of a regulatory, social, political and technological nature. To provide a more detailed view of the subject, in the first chapter we discuss the status of the Polish nuclear energy sector, focusing specifically on the changes that have taken place since April 2023. In chapter two we present the assumptions behind the Nuclear Readiness Index and its score, and in chapter three we set out the actions that will bring Poland closer to the goal of being fully ready to start investing in nuclear energy generation.

The report is based on an analysis of resources and source documents, academic and industry publications, investor data, the authors' own research and opinions of independent experts. Conclusions are based on publicly available information, including details of planned investments and statements made by public authorities and institutions.

We wish you an interesting read.

Dominik Brodacki
Polityka Insight

Agnieszka Skorupińska
Baker McKenzie

Key Conclusions

General assessment:
Poland is about 58% ready to start construction of the Choczewo nuclear power plant.

1. Regulatory readiness

Poland has a high level of regulatory readiness to begin building a nuclear power plant. However, it still has limited experience in applying these regulations and limited ability to swiftly adapt them to market changes or investors' legitimate needs.

2. Social readiness

Nuclear projects in Poland enjoy strong public support. However, measures are needed to monitor any decline and to skilfully manage public emotions and the "NIMBY" phenomenon (Not In My Back Yard).

3. Political readiness

Nuclear investments have been supported by both past and present governments, which is reflected in their decisions and policy approach. They are embedded in Poland's energy strategy, including development documents and plans, and are an integral part of Poland's economic policy. Moreover, the construction of nuclear power plants in Poland is supported by the political class at large, local authorities and international actors.

4. Systemic readiness

The shortage of qualified personnel is an obstacle to the construction and future operation of nuclear power plants in Poland. Activities aimed at overcoming this shortage are being carried out, although the process of training and attracting specialists is a long-term, multi-stage process and is therefore progressing slowly. Nevertheless, electricity generated by a nuclear power plant is included in the plans to expand the National Electricity System (KSE), although the government's main strategic documents do not adequately define its intended role in the Polish energy sector.

5. Investment readiness

Investment progress in the Choczewo nuclear power plant is still relatively low. The signing of the first reactor construction contract (EPC) may be delayed until 2028–2029, before which the following will have to be done: finalisation of discussions on the conclusion of the EDA (Engineering Development Agreement), obtaining the European Commission's (EC) approval for state aid for the construction and operation of the plant, and finalisation of the financial model for the investment.

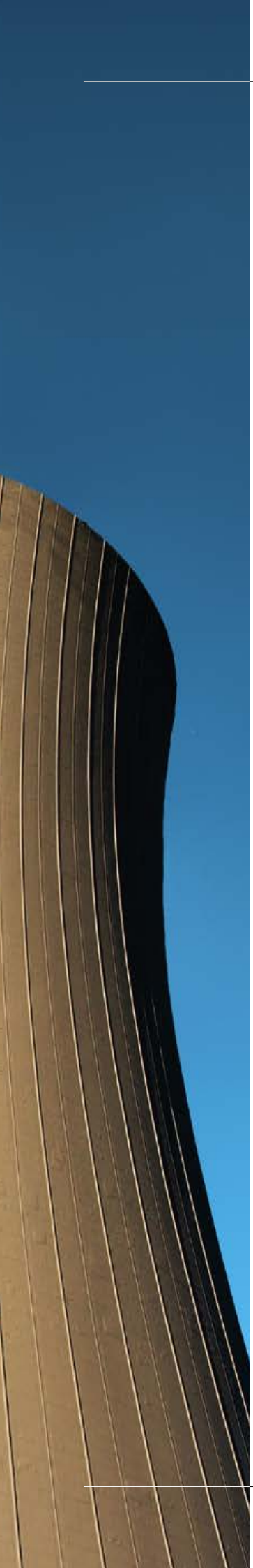
6. Technological readiness

In the case of the Choczewo plant, the investor has yet to make key decisions on the supply chains for essential goods and services. Other nuclear projects in Poland are at an early stage of development.

CHAPTER I

Timeline of nuclear power in Poland

Between April 2023, when we first published the report entitled "Nuclear Poland. How to bring reactors to Poland. Scenarios for the development of nuclear power", and the beginning of 2025, fundamental changes have occurred in the development of nuclear power in Poland. The new government continues the direction of its predecessors but has also tried to make the plans more realistic.



As a reminder, we highlight the plans presented to the public regarding the development of nuclear power in Poland. The plans include both strictly governmental initiatives and privately supported concepts.

Development of nuclear power in Poland

The most advanced is the "government" project to construct the first nuclear power plant at the Lubiatowo-Kopalino site near Choczewo, in the Pomorskie Province (NPP1), with a capacity of 3.75 GWe (three reactors using AP1000 technology, each with a gross capacity of 1,250 MWe). It is being implemented by the state-owned company Polskie Elektrownie Jądrowe sp. z o.o. (PEJ).

Planning is underway for the possible start of preparations for the construction of a second "government" nuclear power plant at a yet unspecified location and with unspecified technology and capacity (NPP2).

PGE – one of the largest capital groups of the State Treasury – and ZE PAK – one of the largest private energy companies – stand by their plans to build a nuclear power plant near Konin / Pątnów (Pątnów NPP) using at least two APR1400 reactors (manufactured by KHNP) with a total capacity of 2.8 GW.

Initiatives are being taken to build small modular reactors (SMRs). The most advanced projects are being implemented by several entities in parallel:

- Orlen Synthos Green Energy (OSGE) – a joint venture between Orlen and Synthos, respectively the largest state-owned group in the fuel and energy sector and one of the leaders in the Polish private chemical sector; the technology partner is GE Hitachi Nuclear Energy.
- KGHM – one of the largest state-owned groups in the mining and processing sector, cooperating with NuScale Power (VOYGR reactor), but also considering as an alternative, use of the reactor technology of Rolls-Royce SMR (UK SMR), NUWARD, SMR-160 and BWRX-300.
- Świętokrzyska Grupa Przemysłowa Industria (ŚGPI) – which plans to implement technology supplied by Rolls-Royce SMR.
- Respect Energy – a private energy company working with the French state-owned EDF to develop the NUWARD reactor design.

Politically, nuclear power is identified in key government documents as an important part of the energy mix. Poland's Energy Policy until 2040 (PEP2040) of February 2021[2], which requires an update, is still in force. It envisages the construction in Poland of two nuclear power plants with a capacity of 6-9 GW.

The 2020 Polish Nuclear Power Programme is dedicated to the development of nuclear power (PPEJ)[3]. This document also needs to be amended, mainly because the schedule of investments in nuclear power plants it contains is already outdated. Work is therefore underway to update the PPEJ.

The last year-and-a-half have seen many developments in the above projects and in the nuclear environment. Below is a calendar of events for each of the above projects.

> "The shift in the perception of nuclear power is increasingly evident also in the context of transactions. Until a few years ago, institutional investors did not see the sector as an attractive investment, not least because of its high dependence on the regulatory authority, long investment horizon, limited exit opportunities and the risk of nuclear power being reclassified as a sustainable energy source. However, this approach is evolving. We are seeing growing interest in transactions in the sector – if not directly in power plants, then in companies that are part of the broad nuclear-related value chain."

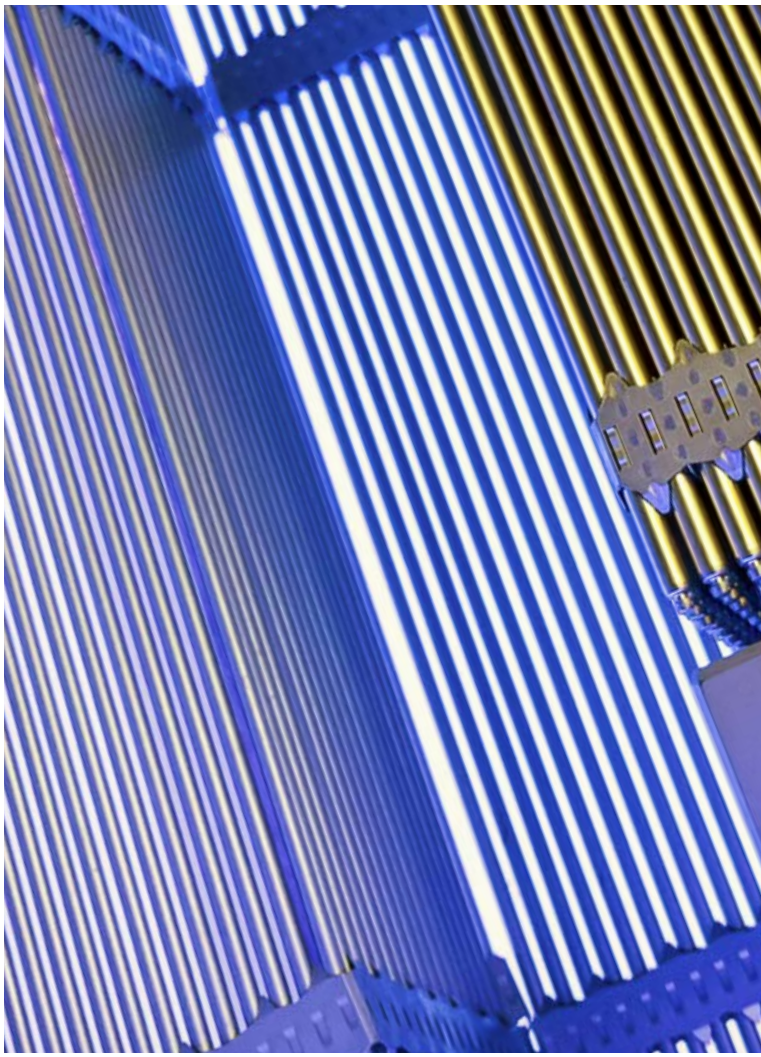
Weronika Achramowicz
Baker McKenzie

Choczewo Power Plant

There has been significant progress in preparations for the construction of NPP1. Just before the parliamentary elections in 2023, **at least four milestones in the implementation of the project were reached within a few weeks.** On 11 July 2023, PEJ obtained what is known as a "principal decision" expressing political support for the investment. This was followed by the "general opinion of the Head of the National Atomic Energy Agency" (PAA), which confirmed the correctness of the scope of verification of the safety analyses. On 19 September 2023, the General Director for Environmental Protection (GDOS) issued an environmental decision for the construction and operation of NPP1, which is immediately enforceable. In turn, on 27 September 2023, PEJ and Westinghouse and Bechtel signed the "ESC (Engineering Service Contract) for the design of NPP1", and on 26 October 2023, the Governor of the Pomerania Province issued a decision on the location of the investment, indicating the commune of Choczewo as the location for NPP1.

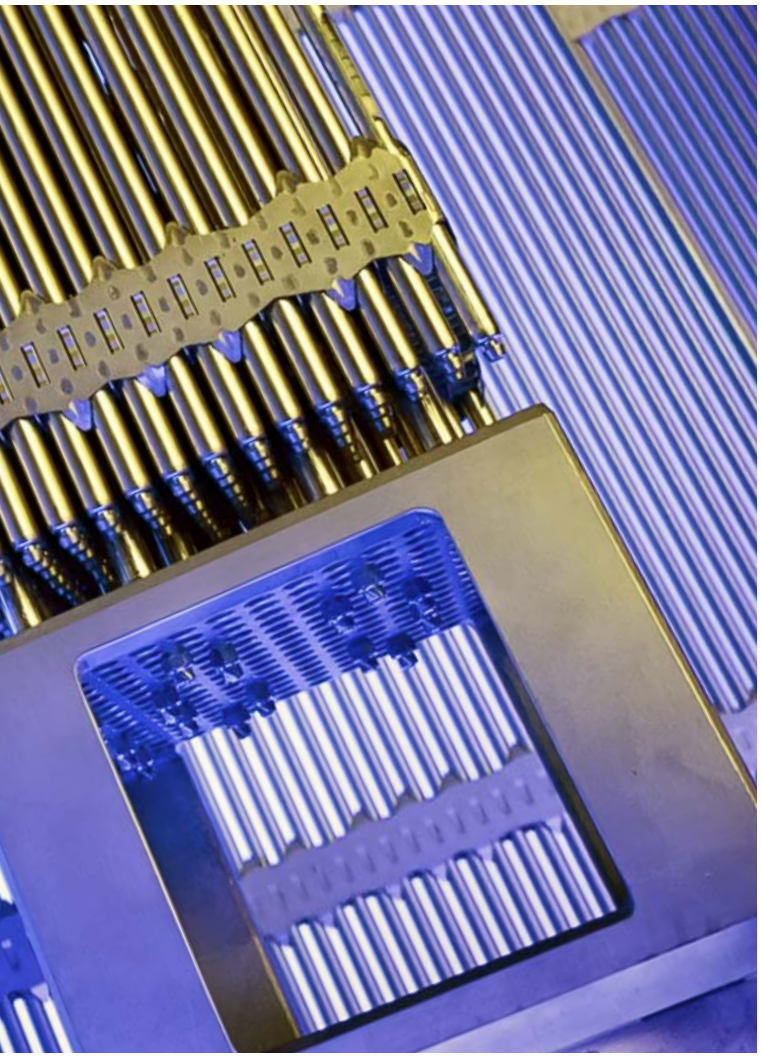
Preliminary discussions are underway to conclude an EDA (Engineering Development Agreement) contract.

The current government has decided to build NPP1 in accordance with the assumptions of the previous parliamentary majority. **In 2024, the government announced that the first reactor of NPP1 would be commissioned for commercial operation in 2036, with subsequent reactors to follow in 2037 and 2038. The construction is expected to be completed a year earlier in each case (the 2020 PPEJ assumes that construction will continue until 2033, 2035 and 2037 in each case).** To this end, the pouring of the 'first nuclear concrete' for the first reactor has been announced for 2028.[4]



In September 2024, the government notified the EC of the state aid it intended to provide for the construction of NPP1, and on 18 December 2024, the EC opened an official procedure to approve the aid. According to the application, the total cost of the investment would be around EUR 45 billion (around PLN 192 billion). Public support would consist of three elements:

- a capital injection by the State Treasury into PEJ of about PLN 60.2 billion (about 30% of the cost of the project);
- State Treasury guarantees covering 100% of PEJ's debt to cover the remaining 70% of the investment cost;
- operating aid in the form of a 60-year Contract for Difference, which would provide PEJ with stable revenues from the sale of electricity generated by a nuclear power plant on organised markets and under PPAs. The government hopes to close the talks with Brussels in 2026.



Further progress has been made on financing the Choczewo investment. In February 2025, the Polish parliament passed an amendment to the Special Nuclear Act, creating the legal path for the above capital injection of PLN 60.2 billion into PEJ by 2030. In turn, in December 2024, PEJ selected an advisor for the external financing process (a consortium of BNP Paribas France and KPMG Advisory). At the same time, letters of intent were signed with potential lenders. By January 2025, PEJ had received commitments of about PLN 95 billion from the following institutions: Export-Import Bank of the United States (EXIM), International Development Finance Corporation (DFC), Bpifrance Assurance Export and Sfil (France) and Export Development Canada (EDC).[5]

NPP2 and Pątnów NPP

Over the past 1.5 years, there has been little progress in preparations for the construction of the second nuclear power plant envisaged in the PPEJ. The process of selecting several potential sites is still underway, and the contractor for this investment will eventually be selected through a competitive process. In October 2024, Prime Minister Donald Tusk announced a discussion on the matter, adding that the government wanted NPP2 to be constructed, but with the financial participation of partners willing to do it. Interest has been expressed by Westinghouse of the US, EDF of France and KHNP of Korea. Official statements from the Ministry of Industry also indicate that one of the investment financing options under consideration is to allow end-users to participate in the ownership of NPP2.

Plans for other nuclear projects – apart from those directly supported by the government – have been revised. As regards the Pątnów NPP, a special purpose vehicle (PGE PAK Energia Jądrowa S.A.) was established by the stakeholders in April 2023. In November 2023, the Ministry of Climate and Environment issued a principal decision for this investment. The construction of the plant was also envisaged in the draft update of the KPEiK of October 2024, while on 23 January 2025, PGE signed a term sheet with ZE PAK on the possible acquisition of, inter alia, 50% of the shares in PGE PAK Energia Jądrowa from ZE PAK, expressing its willingness to continue the investment, but possibly in a different form and location.

Small Modular Reactors (SMRs)

Projects to implement SMR technology are at various stages of implementation.

OSGE and GE Hitachi Nuclear Energy projects:

- In May 2023, the Head of the PAA issued a general opinion confirming the correctness of the design assumptions adopted for the BWRX-300 reactor. regarding nuclear safety requirements.[6]
- Between June and September 2023, the GDOS initiated procedures to issue decisions on environmental conditions for the construction of SMRs at the following sites: Stawy Monowskie, Włocławek and Ostrołęka.[7]
- In December 2023, OSGE secured six principal decisions for the construction of a total of 24 reactors using BWRX-300 technology at the following locations: Ostrołęka, Włocławek, Stawy Monowskie, Dąbrowa Górnicza, Kraków (Nowa Huta) and Tarnobrzeg – Stalowa Wola.[8]
- In February 2024, the GDOS laid out what the environmental report for the SMR planned for Stawy Monowskie should cover (the first time such decision has been issued in the EU).[9]
- In October 2024, OSGE and 17 other stakeholders from 11 countries received EC approval for the proposal to set up a Project Working Group within the European Industrial Alliance for SMR. Such decision confirms that the BWRX-300 technology has the potential to be implemented in the EU in the early 2030s.[10]
- In November 2024, OSGE signed an agreement with the Canadian company Laurentis Energy Partners to collaborate on the preparation of the EU's first Preliminary Safety Analysis Report (PSAR) for SMR technology.[11]

Project carried out by KGHM and NuScale Power:

- In July 2023, the Ministry of Climate and Environment issued a principal decision for a VOYGR plant with a total capacity of 462 MW consisting of six NuScale NPM-20 reactors with a capacity of 77 MW each; these would be built in the Wielkopolska Province (Lubasz and Wieleń) locations.[12]
- In November 2023, the media reported the end of cooperation between KGHM and NuScale Power, but the Polish company strongly denied this and indicated that this supplier's technology was the preferred one, although it is not the only one under consideration.[13]
- KGHM also obtained two PAA general opinions (issued in December 2023 and April 2024) on selected technical assumptions and safety analysis methodologies for the NuScale NPM-20 reactor technology.[14]
- In June 2024, information appeared in the media suggesting that KGHM might abandon further work on SMR implementation, citing the high costs involved.[15]

Project carried out by ŚGPI and Rolls-Royce:

- In May 2024, ŚGP Industria obtained a principal decision for the construction of an SMR using two Rolls-Royce SMRTM technology reactors with a total net electrical output of 940 MWe and a net thermal output of 2716 MWt. It concerns two alternative locations in the district of Kielce (Świętokrzyskie Province): Commune of Chmielnik or commune of Daleszyce.[16]

> "There is now a global recognition that nuclear energy plays a key role in achieving net zero. Traditionally the nuclear sector has faced more challenges than other comparable energy sectors, including much higher capital costs, complex licensing and regulation approvals processes (which can vary significantly across jurisdictions), much longer lead times and construction periods, and a resulting challenge in attracting private capital. With the world's biggest banks now pledging their support for nuclear as part of the goal to triple nuclear energy capacity by 2050, some of these barriers are being removed. However, many of the challenges remain. Governments need to continue to focus on developing and enabling routes to market for nuclear projects in order to realise the true potential of nuclear power. We had the great pleasure to act as a legal advisor for KEPCO as sponsor and contractor on the Barakah Nuclear Power Plant Project. That demonstrated how some of the challenges can be overcome successfully. The Abu Dhabi Government, along with all stakeholders and advisors collectively and proactively addressed and appropriately allocated risk around the regulatory and licensing issue, nuclear liability and other issues that impacted project economics, timelines and overall investment viability, which ultimately led to the success of the project."

Tania Arora
Baker McKenzie

Regulatory changes

In December 2024, a draft amendment to the "Special Nuclear Act" was submitted for consultation. The act envisages the introduction of significant simplifications in the construction of nuclear power plants, in particular:

- it will be possible to issue a building permit for the construction of a nuclear power facility only for the part of the construction project that cannot function independently;
- it will be possible to issue a building permit only for preliminary construction works.

The main purpose of this is to minimise the risk of delays in the implementation of NPP1.

"The draft amendment to the "Special Nuclear Act" provides for streamlining and increasing the efficiency of the process of construction of nuclear facilities by introducing the possibility of staging this type of investment. According to the proposed solution, it will be possible to apply for a building permit for preliminary construction works before obtaining a building permit for the construction of a nuclear power facility. In this respect, the draft amendment distinguishes between preliminary construction works which, due to their scope and nature, do not require a permit from the Head of the PAA (basic preliminary construction works, e.g., earthworks, drainage works, construction of fire protection reservoirs) and qualified preliminary construction works which, however, will require a permit from the Head of the PAA (e.g., reinforcement of the ground foundation for the construction of facilities forming part of a nuclear energy facility and the stabilization of this foundation). This is a very important change that should definitely speed up the process of nuclear power plant construction.

In addition, since the catalogues of basic and qualified preliminary construction works are not closed, the draft provides for the Head of the PAA to give an opinion on the qualification of other construction works in each of these categories. This will allow for the necessary flexibility in what is, however, a new procedure.

According to the proposed amendment, a building permit for preliminary construction works will be issued by the provincial governor, in principle within 30 days of the submission of the application. In turn, the above opinion of the Head of the PAA is to be issued within three months (six months in particularly complicated cases)."

Agnieszka Skorupińska
Baker McKenzie

In the last 18 months, no draft legislative solutions have been put forward to address the calls for the drafting of a separate special act of law for SMRs.

"The current rules are technology-neutral and do not differentiate the regulatory requirements for nuclear power plants according to their capacity. However, in the future – as we indicated in the 2023 Report – it may be appropriate to adopt dedicated legislative solutions for SMRs. As their technology has not yet been validated under market conditions, it is natural for regulators and legislators to be much more cautious about taking a casual approach to the criteria and conditions for the construction and operation of small modular reactors. Therefore, no changes in this respect are expected in the near future. On the other hand, the experience gained over time from the implementation of ongoing nuclear projects should allow for a rational review of the individual requirements for SMRs and for determination of whether there is a need for appropriate legislative changes – either by adopting a separate dedicated act or by regulating these issues within the framework of existing legislation in a way that takes into account the specificities of this technology."

Arkadiusz Ratajczak
Baker McKenzie

CHAPTER II

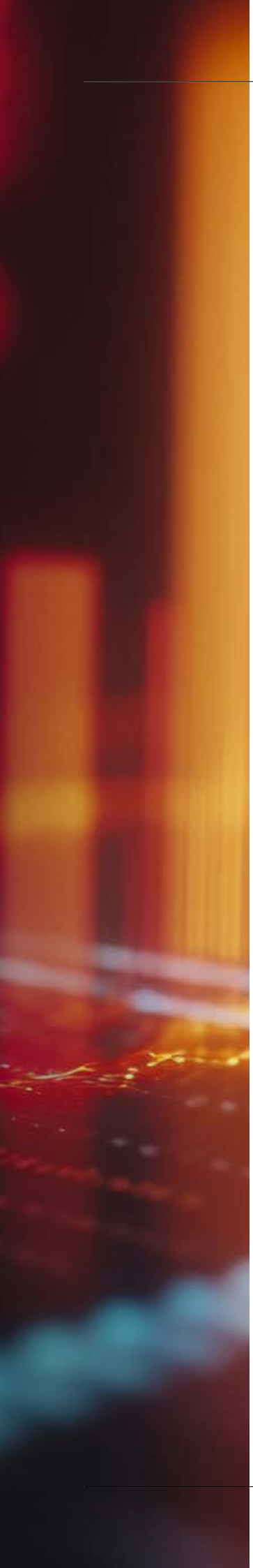
Nuclear Readiness Index

The Nuclear Readiness Index shows the level of readiness to start construction of Poland's first NPP1 at the Lubiatowo-Kopalino site in the Choczewo commune.

Reference to this project is due to its level of advancement and the greatest likelihood of its completion compared to other ongoing nuclear projects – the investment in NPP1 is the one that best meets the objective of the Index. In addition, other projects at the current stage benefit greatly from the conditions created by and the experience gained from the development of NPP1, including the political and legal solutions adopted in response to the needs of PEJ.

The Nuclear Readiness Index takes into account not only the progress of the NPP1 investment but also its political, regulatory and social environment, as well as the way it is advancing.

Methodology



The Nuclear Readiness Index combines scores on the following aspects:

Regulatory readiness
(weight: 15%)

Shows the extent to which rules and regulatory policies are adequate to meet the conditions and requirements of nuclear investment. We consider the adequacy of regulations to the challenges of the investment process, but also the potential ability to adapt them relatively quickly to the needs of investors. We assess the experience and competence of the various stakeholders in applying the regulations.

Social readiness
(weight: 15%)

Shows the extent to which the social context is conducive to the implementation of ongoing and long-term plans to build a nuclear power plant. We look at whether they have the support of both the general public and the inhabitants of the regions where reactors are to be built.

Political readiness
(weight: 15%)

Shows the support of both past and present governments for the construction of a nuclear power plant in Poland, as well as the inclusion of such investments in political decisions and strategic documents. We also assess whether there is support from local authorities and the international community.

System readiness
(weight: 20%)

Reflects the ability to ensure the development and operation of nuclear power in Poland, e.g., in terms of staffing, as well as the administrative readiness to construct reactors and related infrastructure and to consider the role of nuclear power in the electricity system.

Investment readiness
(weight: 20%)

Reflects the formal stage of development of the nuclear project, including knowledge of the terms and conditions of the investment, its costs and rules for its coverage, or progress in contracting its subsequent stages.

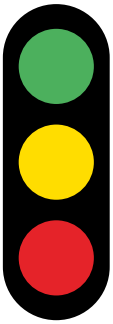
Technology readiness
(weight: 15%)

Indicates the extent to which the selected nuclear technology can be implemented and operated in Poland, i.e., reflects the technical aspect of preparations for the construction of NPP1. This refers in particular to the applicability of the preselected nuclear technology. It also includes ensuring the supply of goods and services for NPP1, which is partly the responsibility of the technology supplier.

Each of the six aspects of the assessment was given a subjective score (from 0 to 10) and a weight. The latter represents the degree of difficulty in making progress in each area. For example, we conventionally assume that it is more complicated and time-consuming to secure financing and contracts for the construction of a nuclear power plant than it is to build public and political support for it.

The final Index score is a weighted average of these scores, expressed on a scale from 0 to 10 points, where the first value indicates that Poland is completely unprepared to start constructing a nuclear power plant, and the last value indicates full readiness. The criteria used to assess the components of the Nuclear Readiness Index are explained below. They are intended to reflect key milestones in the preparation for the implementation of nuclear investments. Importantly, the achievement of successive milestones by the NPP1 investment can follow any order.

When considering their achievement, a sub-rating (on a scale of 0 to 2 points) is therefore necessary – hence:



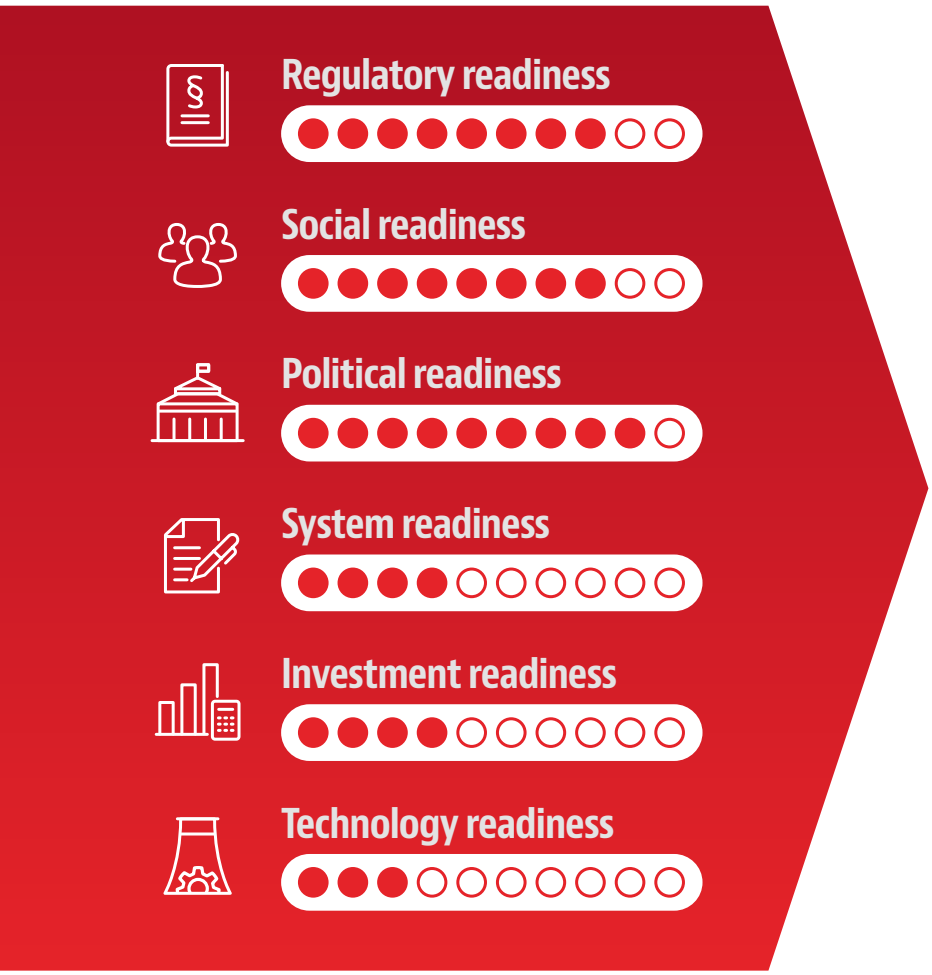
green means that a milestone has been fully achieved,

yellow means that it has been partially achieved,

red means that it has not yet been achieved at all.

The report is based on an analysis of resources and source documents, academic and industry publications, investor data, the authors' own research and opinions of independent experts. Conclusions are based on publicly available information, including details of planned investments and statements made by public authorities and institutions.

Nuclear Readiness Index results:



Poland is approx.

58%

ready to start the construction of NPP1

NUCLEAR READINESS INDEX

Regulatory readiness score: 8/10

Poland has a high level of regulatory readiness to start constructing a nuclear power plant, although a potential weakness is the still limited experience in applying the regulations and the ability of the administration to adapt them quickly to changes in the market environment or the legitimate needs of investors.

EVALUATION CRITERIA

- Regulations have been introduced that define the procedure for the construction and operation of nuclear power plants, including those that consider the specificities of the investment process (i.e., facilitate its progress in relation to generally applicable principles). A set of implementing regulations is also in force. The regulations are in line with international standards (including IAEA and EU guidelines), specifically those regarding nuclear safety and radiation protection.
- The regulations are technology-neutral, i.e., they allow the implementation of a nuclear investment regardless of the planned reactor's capacity and technology.
- The regulations are not challenged by market participants, including investors and politicians. There may be reasonable demands for minor changes to the regulations, but not for systemic changes.
- Polish, EU and international regulations mitigate the main risks associated with the implementation of a nuclear investment and do not themselves constitute such risks, including in relation to the financing of its construction and operation.
- The effectiveness of the regulations is gradually being tested in practice, especially by public administration bodies.

Key aspects of nuclear investments in Poland are regulated by:

1. Nuclear Act of 29 November 2000;
2. Act of 29 June 2011 on the preparation and implementation of investments in nuclear power facilities and associated investments (the "Special Nuclear Act").

Both are fully compliant with international requirements and standards, including those under IAEA guidelines and EU law. However, an amendment to the Nuclear Act is planned that will implement the recommendations made by the IAEA under the 2023 Integrated Regulatory Review Service ("IRRS mission"). The Act regulates activities related to the peaceful use of nuclear energy, including nuclear materials and waste, devices that produce ionising radiation and the handling of spent nuclear fuel. It also defines the competences of the nuclear safety and radiological protection authorities, the principles of civil liability for nuclear damage, or Poland's fulfilment of its international obligations. On the other hand, the Special Nuclear Act regulates the course of the investment process, establishing a much more favourable framework for its implementation than for many other infrastructure projects.

Poland's nuclear law is technology neutral. It does not differentiate between the rights and obligations of investors and does not make requirements dependent on the design or capacity of the reactor.

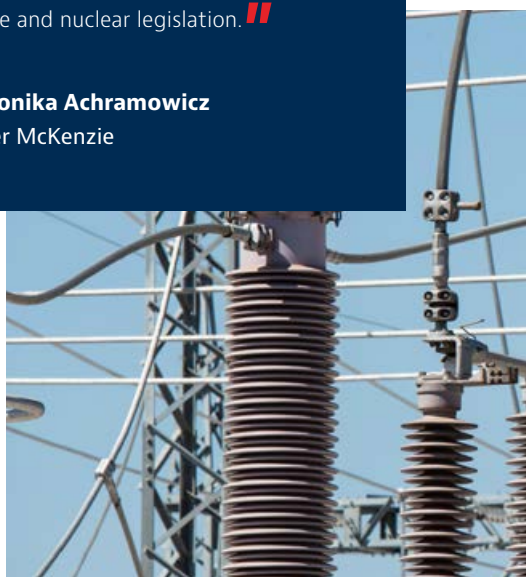
It does, however, require the use of solutions and technologies that have been proven in practice in nuclear facilities or through trials, tests and analyses. This means that the investor must prove that the nuclear technology he intends to use meets all the requirements of nuclear safety and radiation protection.

The Polish regulations mitigate foreseeable risks arising from the relatively early stage of investment implementation, particular those regarding costs and liability for the work performed.

The fact that Poland is not yet fully ready for nuclear investment from a regulatory point of view is due to the lack of experience in this area – investors and the administration that 'serves' them are just learning how to apply certain regulations in practice. Due to the length of the legislative process, it is and will remain a challenge to adapt regulations to changes in the market environment or to the legitimate needs of the investor. This is inevitable given the long-term nature of the investment process. Meanwhile, these needs are not always foreseeable due to the early stage of nuclear projects. Future practice may require modification of some legislative solutions, as exemplified by the draft amendment to the Special Nuclear Act submitted for consultation in December 2024. While this is not a factor preventing the start and continuation of the nuclear investment, it may lead to further challenges in its preparation and execution, which are currently difficult to anticipate.

"The complex nature of the construction and operation of a nuclear power plant – combined with the very wide range of potential liabilities for potential damage caused by nuclear incidents – requires the engagement of insurers willing to assume the associated financial risks. Currently in Poland, no single entity or even a consortium of entities can bear the cost of insuring the operation of a nuclear power plant. It will be necessary to set up – following the example of solutions adopted in other countries – so-called insurance pools, operating on the basis of co-insurance and reinsurance principles, with the participation of foreign entities (insurers). Such solutions will require appropriate changes in insurance and nuclear legislation."

Weronika Achramowicz
Baker McKenzie



The Polish nuclear law is not widely contested by individual stakeholders, although there are (and certainly will be) calls for minor changes to the law. This is a natural and even desirable situation resulting from a practical evaluation of the regulations and the evolution of the technical solutions applied.

A good example of adapting the regulations to current conditions is the announced amendment to the 2012 regulation on the scope of the site analyses and the site report for a nuclear facility, as well as the regulation on the requirements to be met by the design of a nuclear facility. In addition, the regulation on the scope of safety analyses and the safety requirements themselves are to be updated to the latest standards. Moreover, any plans for a major and sudden overhaul could be perceived negatively by the market (including financial institutions), e.g., as a risk of reducing the stability of the regulations and the predictability of government action in this area.

In addition, no final decisions have yet been taken on how the responsibilities for providing insurance for the investment and operational stages of the nuclear project development will be fulfilled.

Consideration should also be given to the preparation of regulatory solutions aimed at ensuring local content, i.e., the participation of local companies in the entire supply and value chain associated with the construction of a nuclear power plant.

The national legislation allows for supporting the investment with public funds, both through direct transfers and by providing State Treasury guarantees to cover the debt incurred for the nuclear project. **However, the final form, amount and conditions of this support depend on the decision of the EC.**

"Local content in the value chain of nuclear projects will be very important for the development of the Polish economy. While one can agree that it should be at the highest possible level for these projects, being part of the value chain, especially the supply chain, will be a major challenge for Polish companies. Such companies will have to develop their know-how, invest in staff training, change quality systems or obtain demanding certifications. Last year, representatives of the Polish government declared their intention to maintain local content at a minimum of 50 percent by 2040. However, such an assumption would only be included in the PEP. Therefore, it is questionable whether this will be sufficient, especially given the low level of local content achieved in offshore investments. However, in the case of offshore wind farms, there is at least a legal requirement to prepare a supply chain plan for materials and services. In the case of nuclear power, a similar legislative solution remains to be considered, and perhaps even more far-reaching regulations (e.g., strengthening local content requirements at the procurement stage or specifying how they should be calculated)."

Agnieszka Skorupińska
Baker McKenzie

Thus, national regulations on the coverage of PEJ liabilities by State Treasury guarantees do not constitute a significant barrier, provided that not too many investors want to use the guarantees at the same time. In Poland, guarantees can cover up to 100% of the value of a project of particular importance for the national economy, but there is a limit on their provision for all investments in a given calendar year. In 2025, as in previous years, the limit is PLN 200 billion.

A bigger challenge may be the EU state aid rules that apply in Poland. The EC is the only authority authorised to approve such aid. This also applies to support for the construction and operation of a nuclear power plant.

The 2024 Electricity Market Design (EMD) reform envisages that the preferred instrument for operational support for nuclear power plants is a two-way Contract for Difference (CfD). The effectiveness of this scheme depends heavily on ensuring that as much of the electricity produced by the reactors as possible can be sold (known as offtake). Importantly, however, the legislation does not exclude the use of other models to support the construction of nuclear power stations but only refers to the mechanism for shaping the electricity sold from them on the market.

EXAMPLE: In its 2024 decision approving state aid for the construction of the Czech nuclear power plant Dukovany II, the EC agreed that the contract for difference should be valid for 40 years and that the fixed buy-back price for electricity from the new unit specified in that contract should be between EUR 50 and EUR 60/MWh. However, the EC required that at least 70 % of this electricity be sold on the wholesale market, whereas the Czech application was for the entire volume to be sold under a PPA. In practice, this means that Dukovany II will have to align its operations with other sources that have priority access to the grid, in particular RES. This creates a potential risk that it will generate electricity for too few hours to be profitable. **If the 'Czech' arrangements with the EC were to be applied to Polish nuclear projects, there would be a risk that the economic viability of these projects would be lost due to the priority of renewable energy sources for access to the grid and the possibility of the latter squeezing nuclear power out of the market.**

"Any financial models for the operation of nuclear power plants must take into account their ability to compete with other generation sources, primarily RES. Due to the structure of the energy market in the EU, including the "merit order mechanism", nuclear power can often be 'squeezed out' of the market by theoretically cheaper renewable sources in direct cost competition. As a result, a nuclear power plant may not operate at a load that is sufficiently high – both in terms of capacity and the number of operating hours per year – to ensure a return on the funds invested to construct it and to cover its operating costs. This raises the question of whether another aspect of nuclear power, which is also extremely important from the point of view of the entire electricity system, should not be adequately priced and taken into account, namely the stability and flexibility of the supply of electricity generated in this way."

Arkadiusz Ratajczak
Baker McKenzie

"In Spain the first nuclear power plants were built in the late 1960s, and presently there are seven operating reactors. However, nowadays, the situation of nuclear power plants in Spain is marked by a governmental decommissioning plan to be carried out between 2027 and 2035. Therefore, it is expected that no electricity from nuclear energy will be generated in Spain from 2035 onwards. However, the closure of nuclear power plants could jeopardize Spain's compliance with the objectives of the Paris Agreement, since nuclear energy is a source of zero emission electricity. In particular, the elimination of nuclear power plants could increase dependence on fossil fuels and consequently increase CO2 emissions. Subsequently, this would make it difficult to achieve the goals of reducing greenhouse gas emissions and decarbonizing the Spanish economy, as established in the "National Integrated Energy and Climate Plan" (Spanish acronym: "PNIEC"). In the current situation, nuclear energy would be crucial in maintaining the stability of the electricity supply and reducing the risks arising from dependence on more variable and less predictable energy sources. Although Spanish regulations do not establish a clear limit for the useful life of nuclear reactors, it is possible to extend their operation by renewing operating permits."

Manuel Somacarrera
Baker McKenzie

NUCLEAR READINESS INDEX

Social readiness score: 8/10

Nuclear projects in Poland enjoy strong public support. Nevertheless, measures are needed to monitor its allocation and to skilfully manage public emotions and the "NIMBY" phenomenon.

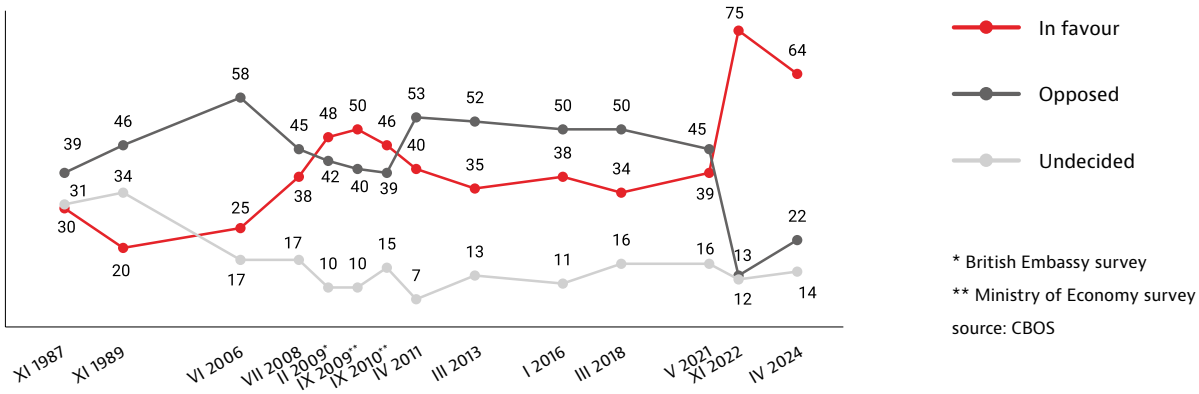
EVALUATION CRITERIA

- Nuclear investments have general public support, both in terms of their technological aspects and environmental impact.
- Approval levels at both the national and local levels remain stable or are trending upward.
- At the proposed development site, the NIMBY phenomenon is relatively minor and does not hinder implementation of the project or affect its chances of success.
- The construction of the nuclear power plant is supported by the local community.
- Public support for nuclear investments remains resilient to external factors, such as political attitudes, geopolitical shifts and economic conditions.

In 2024, 64% of Poles surveyed supported the construction of a nuclear power plant in Poland, according to the Public Opinion Research Centre (CBOS). This is a high level of support, although 11% lower than in 2022. At that time, however, support was boosted by the energy crisis and the war in Ukraine, as well as the changing importance of security issues in public debate and state policy (in 2021, 45% of respondents were in favour of nuclear power). By contrast, the percentage of those opposed to such investment increased by 9% to 22%, compared to the 2022 survey, while the number of those with no opinion on the matter remained relatively stable – between 2022 and 2024, their share of the respondent group increased by only 2% to 14%. According to CBOS, in 2024, the construction of a nuclear power plant in Poland was supported by 64% of Poles surveyed[17].

On the other hand, a survey conducted by Danae on behalf of the Ministry of Industry in November 2024 shows that as many as 93% of Poles are in favour of building a nuclear power plant, compared to 90% in 2023 and 46% in 2019. Accordingly, 6% of respondents were against, compared to 13% in 2019.[18]

Support for the construction of a nuclear power plant in Poland 1987–2024 (%)



Leaving aside the significant discrepancy in the results of the above surveys, it should be noted that **support for the construction of a nuclear power plant in Poland is higher than in the previous decade**, when it hovered around 50%. Moreover, it shows an unprecedented upward trend. It can be assumed that even if the results were to be adjusted for the effects of extraordinary temporary circumstances (war, energy crisis, etc.), support for nuclear power would remain stable, with an upward trend.

The social factor is not an obstacle to the start of construction of a nuclear power plant in Poland.

There is also no clear opposition among the inhabitants of the regions selected for investment. There are voices of opposition, but they are not organised and usually concern specific aspects of the construction process, e.g., the way access roads are mapped out. The question of the construction of the nuclear power plant itself, the planned use of one or another reactor technology and its safety, are not part of the mainstream debate.

However, there is a NIMBY phenomenon in Poland, with the above 2024 CBOS survey showing that nationally **only 45% of respondents support the construction of a power plant in their area (79.6% according to Danae), while as many as 43% are against it.** This does not prevent the development of key projects, but it does require investors to skilfully manage the emotions of local communities to avoid a rise in anti-nuclear sentiment.

One element that somewhat undermines the Index's overall score in the social readiness category is the potential lack of resilience of support for nuclear power to external factors. Such a factor could be a significant change in the geopolitical (e.g., security) and economic situation in Poland. Changes in these respects can both strengthen and weaken public support for nuclear power in Poland. For example, the increasingly visible revision of the perception of the European Green Deal, expressed for example in the 2024 farmers' protests or statements by EU governments questioning certain legal solutions, may reduce public support for "competitive" investments, for example in RES or gas-fired power plants, which will benefit nuclear power. On the other hand, the general economic situation – including the level of inflation – could have a negative impact on the potential cost of building reactors, which would be a strong argument for their opponents.

NUCLEAR READINESS INDEX

Political readiness score: 9/10

The construction of a nuclear power plant in Poland is supported not only by both past and present governments, but also by the vast majority of the political class, including the leading parliamentary forces. Plans to build it form an important part of the country's development strategies and are also supported by local authorities and internationally.

EVALUATION CRITERIA

- Nuclear investments have the support of the government, expressed for example through successive administrative decisions and policy approach. These investments are central to the government's energy strategy, including development documents and plans, and form an integral part of Poland's economic policy.
- Nuclear investments are not widely contested by the political class at large (including opposition parties) and by both past and present governments. The change in the parliamentary majority has not negatively impacted on the implementation of the nuclear project.
- Nuclear investments have the support of local authorities. They form part of the region's development and transformation plans.
- Nuclear investments are not being questioned internationally.
- The level of political support for nuclear investment at central and local level is largely immune to external factors, such as the geopolitical and economic situation.

Irrespective of the current parliamentary majority, there are opponents of nuclear power within the various political factions and parties, but they do not have sufficient strength to translate their opposition into political action.

As a result, **the future and role of nuclear power is not a bone of contention between the government and the opposition**, except perhaps in relation to the pace of project implementation.

This is reflected in the inclusion of nuclear power in successive government strategy documents. The October 2024 draft update of the KPEiK assumes in the ambitious transformation scenario (With Additional Measures, WAM) that Poland will have large-scale nuclear reactors with a total capacity of 1170 MW and SMRs with a capacity of 600 MW in 2035, and 6.2 and 1.2 GW respectively in 2040. This brings the estimated total electricity production capacity from nuclear power plants to 9.5 TWh in 2035, and 58.1 TWh in 2040.[19]

The situation is similar for the planned construction of NPP1. Thanks to years of continuous dialogue with local stakeholders in Choczewo and the surrounding area, there is no opposition to the project that could affect its fate. In addition, **successive statements by local authorities have expressed their support for the project and their conviction that the construction of a nuclear power plant will bring significant economic benefits to the entire region.**

The political readiness also traditionally includes support for nuclear power in Poland in the international arena. **Most foreign politicians and societies have no objections.** This is evidenced by the successful conclusion in the summer of 2023 of a consultation on the cross-border environmental impact of the construction of NPP1, as well as the apparent general renaissance of nuclear power in Europe. It follows the energy crisis of 2021–2023 and the war in Ukraine, after which some countries delayed their phase-out of nuclear power while others announced the construction of new reactors. However, the opposition of some countries (Germany, Austria, Luxembourg), which traditionally oppose new nuclear projects in the EU, should be taken into account, including at the stage of the EC decision approving state aid[20]. In the context of support for the development of nuclear power in Poland, it is also worth mentioning the agreement signed at the end of January 2025 between the governments of Poland and Canada on cooperation in the peaceful use of nuclear energy, particularly in the field of technological assistance. This agreement is not only important for the implementation of the Choczewo investment but can also provide important support for the construction of SMRs in Poland.

In terms of political readiness – as in the case of social readiness – the assessment is underlined by the lack of resilience of support for nuclear power development in Poland to external factors. Such factors could include, for example, pressure from other influential EU countries against nuclear investment or an increase in the cost of such investment. The latter factor could, for example, necessitate allocating additional funds from the state budget to nuclear projects, which, in turn, could be seen as politically undesirable due to potential competing priorities. It is also very likely that the above decline in public support would quickly weaken politicians' determination to invest in nuclear power.

NUCLEAR READINESS INDEX

System readiness score: 4/10

The shortage of qualified personnel is a major obstacle to the construction and future operation of nuclear power plants in Poland. Efforts are being made to provide qualified staff, although the process of training and attracting specialists is slow – it is long-term and multi-stage.

EVALUATION CRITERIA

- The investor and the government have secured adequately qualified human resources for the construction of the nuclear power plant.
- An inflow of human resources for the operation of the nuclear power plant has been secured and/or an effective system for their training has been established.
- The public authorities, including the nuclear regulatory authorities, have adequate competence and resources (human and financial) to manage administratively the process of constructing and operating the nuclear power plant.
- Necessary investments for the construction and operation of the nuclear power plant have been made, including for access roads, railway lines or electricity infrastructure for power transmission from the plant.
- There is a defined role and place for nuclear power in the National Electricity System (KSE) and other sectors, e.g. district heating. The nuclear technology chosen and the level of investment are consistent with the needs and capabilities of the KSE, including in terms of power transmission from the plant.

The training of personnel is made more difficult by the scarcity of such personnel on the market and the very high turnover of personnel in the SPVs, including at senior management level. It should be noted, however, that PEJ has concluded several agreements in this regard with, among others, the Maria Curie-Skłodowska University in Lublin, the Gdańsk Medical University, the Gdańsk University of Technology, the Warsaw University of Technology, the Łódź University of Technology, the Warsaw University and the AGH University in Kraków.

It is expected that **in a few years' time the above will result in many nuclear specialists entering the labour market**, including for the operation of the nuclear power plant. It will also be possible to recruit experts from abroad or from other fields, e.g., thermal engineering, electrical engineering, automation or mechanical and materials engineering. There is also a potential influx of specialists from conventional power generation who (in connection with the phasing out of further coal-fired power plants) will gradually be able to provide personnel for the operation of the nuclear power plant.

As the NPP1 project evolves and Westinghouse and Bechtel work more closely together, PEJ and the state authorities (particularly the nuclear regulator) are also gradually building up their expertise in the implementation of the AP1000 technology and its future operation. This is an ongoing process and is expected to culminate in the completion of licensing and commissioning of this reactor in Poland.

In December 2023, the Ministry of Climate and Environment published a document entitled "Plan for the Development of Human Resources for Nuclear Power".[21] It contains general assumptions for building human resource potential for the development of the sector, a diagnosis of the human resource situation at that time and targeted actions for its development. Among other things, the document assumes that between September 2023 and 2035 the number of employees at PEJ will increase from 357 to 1,871, of which 901 will be needed at the end of the design phase of NPP1, 1,848 at the end of its construction and 1,975 during the commissioning of NPP1, after which the company's human resources needs will decrease somewhat.

According to the plan, by 2033 the PAA will need 88 new employees specialised in technical fields and safety analysis. However, up to 75% of these will need to be employed before the first reactor licence application is submitted. It must be said that the PAA's limited financial capacity means that it is not progressing fast enough in recruiting staff. In this situation, the PAA may not be able to prepare itself to fully manage the nuclear power plant construction process. In this respect, it will undoubtedly be necessary to increase the budget of this public institution, which is key to the whole process.

Any investment in new generating capacity, including a nuclear power plant, must be included in the KSE development plans and in reliable forecasts of the growth of electricity demand.

These parameters are set out in the document Transmission Network Development Plan, which is updated every two years by the Polish TSO (Polskie Sieci Elektroenergetyczne – PSE), the latest version of which (approved by the President of the Energy Regulatory Office in December 2024) has a horizon up to 2034 and takes into account the construction of a connection and power output line from the future nuclear power plant.[22]

A further horizon is provided by the draft update of the KPEiK of October 2024. **According to this document, reactors in the WAM scenario will be able to produce 9.5 TWh of electricity in 2035 and 58.1 TWh in 2040.** It should be noted, however, that the KPEiK is primarily political in nature and therefore reflects the government's objectives and interests and, to a lesser extent, the real conditions and prospects for the development of the Polish energy sector. Meanwhile, key nuclear projects in Poland are being implemented more slowly than their official schedules suggest. As a result, there is a risk that the planned amount of electricity from NPP1 will be fed into the grid later than the government has assumed.

This uncertainty is compounded by the failure to update the PEP2040 and to develop a strategy for the development of district heating. This makes it much more difficult to plan the role of nuclear power in meeting national electricity demand.

It is also important to assess the progress that has been made on the related investments that are a necessary part of the construction process of NPP1 and its subsequent operation. The most important of these are expected to be completed in 2028 and 2029, which means that the timing of these projects is very tight, especially when viewed through the prism of the official completion date of NPP1.

The government's programme, already adopted in June 2023, envisages spending in the order of PLN 4.7 billion on investments related to the construction of the nuclear power plant at the Lubiatowo-Kopalino site. The programme is expected to be implemented between 2023 and 2029 and includes investments in road, rail and water infrastructure.

In particular, the following projects are being implemented:

1. **The construction of a national road connecting the S6 expressway to the nuclear power plant (the investment is being carried out by the General Directorate for National Roads and Motorways – GDDKiA):** in June 2024, the final route variant of this road was selected and applications for the issuance of a decision on environmental conditions were submitted. The investment is expected to be completed in Q2 2029.

2. **The construction of a rail link (the investment is being carried out by the Polish Railways – PKP):** this includes both the construction of new railway lines and the modernisation of existing ones. The first tenders for the construction works are expected to be announced in 2025, and the construction works are expected to be completed in 2029.

3. **The construction of the Marine Off-Loading Facility (MOLF), to be carried out by the Maritime Office in Gdynia:** this will enable the offloading of oversized items, large materials, and equipment. A design contract was signed in August 2024. In 2025, the project is expected to receive an environmental decision, a location decision and a building permit. The agreement with the contractor is planned for 2026, with completion of the works expected in 2028.

4. **The construction of a substation necessary for the offtake of electricity from the power plant (the investment is being carried out by the PSE):** the application for a building permit is planned to be submitted in 2028, and the completion date of the construction works is 2034.

5. **The construction of a power connection to supply electricity first to the NPP1 construction site and then for the power plant's own needs (the investment will be carried out by Energa Operator):** the conclusion of the agreement with the contractor is planned for Q4 2025, and the commissioning of the connection is planned for Q1 2027.

"The challenge will be to coordinate the construction of the accompanying infrastructure in an optimal way with the progress made in the preparations for the construction of NPP1 itself – even more so as each of these investments is a complex, time-consuming and costly undertaking, and many stakeholders at central and local level are involved in their implementation. The government programme adopted by the Council of Ministers, together with the dedicated budget for the implementation of the investments in the accompanying infrastructure, allows us to believe that they will be completed on time. The state of advancement of the administrative and contractor selection proceedings, as well as the adopted implementation schedules, give no indication that the course of the accompanying infrastructure investments could disrupt the construction of the nuclear power plant. Of course, it is necessary to monitor each of these projects on an ongoing basis and to take appropriate remedial steps in advance to prevent potential delays and thus additional risks to the timely completion of the Choczewo investment."

Klaudia Cholewa
Baker McKenzie

NUCLEAR READINESS INDEX

Investment readiness score: 4/10

Investment progress in NPP1 is still relatively low. The signing of the first reactor EPC contract may be delayed until 2028–2029.

EVALUATION CRITERIA

- A site for NPP1 has been selected, and the feasibility of its construction and operation, including its ability to manage associated impacts, has been positively assessed.
- The nuclear technology supplier and contractor have been preselected. The nuclear power plant design process has been completed.
- The investor has secured the financing of the investment, including with its own equity (e.g., through support from the State Treasury) and external capital. As part of the financial model adopted, the investor has also received guarantees from the State Treasury to ensure repayment of the debt financing.
- A financial model for the investment has been defined and approved by the EC, including how to cover the costs of constructing the nuclear power plant and ensuring its revenues, as well as the cost of the electricity produced in it and the model for its sale.
- An EPC (Engineering, Procurement and Construction) contract has been signed between the investor and the general contractor.

PEJ is the only investor with a formally and definitively approved site for a nuclear investment. In the case of NPP1, this is Lubiatowo-Kopalino in the Choczewo commune, as confirmed by the decision of the Governor of the Pomerania Province dated 26 October 2023. However, the company is still carrying out geological surveys there.

Nevertheless, the process of designing the NPP1 (more precisely, its first stage, the conceptual design) is still ongoing. At the same time, preparatory work is being carried out at the construction site. The basis for this is the ESC (Engineering Services Contract) signed by PEJ and Westinghouse and Bechtel on 27 September 2023. The contract stipulates that the power plant design will be completed within 18 months, i.e., by the end of March 2025. Recent statements by PEJ indicate a risk that this deadline will not be met. The publicly declared delay in the design of NPP1 shows the need for the extension of the ESC contract term for a yet unspecified period and the conclusion of an Engineering Development Agreement (EDA), negotiations for which started in autumn 2024.[23]

However, **it is only after this phase has been completed that an EPC contract can be signed for the overall execution of the investment and that the preliminary and full design stages can begin**, during which the design of the plant will be progressively detailed and adapted to specific technological solutions.

"An EPC contract, also known as a turnkey contract, provides for the contractor to deliver to the investor a turnkey facility within an agreed price, time and specification. In the case of highly complex investment projects, which undoubtedly include the construction of a nuclear power plant, investors very often use the EPC formula. Under this arrangement, the contractor is responsible for coordinating all design and construction work, as well as the supply of all materials and equipment necessary to complete the investment. Of course, the contractor is fully responsible for completing the contract in accordance with the agreed terms. An EPC contract combines the obligations and powers relating to the design, resource management and execution (construction) of the plant itself to maximise the delivery of the project. By properly addressing the interests of both parties in the EPC contract, risks to the timely delivery of the project are minimised and the use of all resources is optimised. The key provisions of an EPC contract for a nuclear project should be those relating to the scope of investment, costs, schedule, change orders, contractual penalties, guarantees and liability."

Agnieszka Skorupińska
Baker McKenzie

Another condition precedent to the conclusion of an EPC contract is the approval by the EC of the rules for the support of NPP1 and the completion of the work on the financial model of the investment. In the case of nuclear projects, negotiations on the latter usually take well over a year, and sometimes two years or more. Therefore, the previously stated intention to conclude the EPC contract in 2025 already seems unrealistic.

In September 2024, the Council of Ministers notified the EC of plans to grant state aid in connection with the construction and operation of NPP1.
On 18 December 2024, the Commission opened an investigation. According to EU law, this should take about 18 months, but sometimes this period is extended, which is normal in the case of support for nuclear power plants. As past experience shows, the investigation will involve intensive negotiations and discussions on both the amount of state aid and the conditions under which it is to be granted. It should be borne in mind that it may be necessary to introduce changes, including limiting the amount of planned support compared to the proposal presented in the notification application. Such regularity can be deduced from the already completed EC proceedings on state aid related to the construction and operation of nuclear power plants. A final decision by Brussels on NPP1 is not expected until 2026 at the earliest.

"Past practice shows that the EC generally looks favourably on programmes to support the development of nuclear energy, approving public funding for the construction (investment aid) or operation (operating aid) of new nuclear power plants. In each of the most recent EU cases (state aid to Hinkley Point C in the UK, Paks II in Hungary or Dukovany II in the Czechia), the EC carried out an investigation. The duration of the investigations after notification ranged from two years and one month (Dukovany II) to three years and four months (Paks II). At the same time, when approving operating aid, the EC has clearly been leaning towards a two-way contract for difference (Hinkley Point C, Dukovany II), expecting electricity generated by publicly supported nuclear power plants to be sold under market conditions, e.g., on the power exchange or through auctions (Dukovany II, Paks II), thus competing with electricity generated by RES facilities."

Arkadiusz Ratajczak
Baker McKenzie

The above also makes it difficult to precisely determine the final cost of building NPP1 (despite the indicative amount of PLN 192 billion given by the Council of Ministers in its notification to the EC). This is because it depends, among other things, on the outcome of the power plant design process (which will determine the specific solutions to be applied), discussions with the EC and the detailed provisions of the EPC contract. As a result, it is not possible at this stage to make a final decision on the detailed method of financing the investment.

None of the nuclear projects under construction in Poland has fully secured financing.

The investment in NPP1 is the most advanced in this respect – as mentioned above, its implementation is to be supported by public funds, including in the form of a direct capital injection into the NPP of around PLN 60.2 billion.

In February 2025, the Parliament adopted an amendment to the Special Nuclear Act, according to which state aid will be transferred to PEJ in the form of a capital increase by the State Treasury in exchange for shares in the company. Of this amount, PEJ is to receive for the preparation and implementation of the construction of NPP1 and accompanying investments, as well as its current operations: **PLN 4.6 billion in 2025, PLN 11 billion in 2026, PLN 14 billion in 2027, PLN 13 billion in 2028, PLN 11 billion in 2029 and PLN 6.6 billion in 2030.**

It is known that their disbursement will be possible only after the EC approval following the notification of the support programme for the construction and operation of NPP1.

Approximately 70% of the construction costs of NPP1 will be covered by external financing, of which two-thirds will be provided by export credit agencies and the rest by commercial financial institutions. PEJ has secured declarations (in the form of letters of intent) of financial commitment for **approximately PLN 95 billion from, among others: the Export-Import Bank of the United States (EXIM), U.S. International Development Finance Corporation, Bpifrance Assurance Export, Sfil and Export Development Canada.** Taking into account the aforementioned capital injection of around PLN 60.2 billion, there are still tens of billions missing to cover the estimated project budget (around PLN 192 billion).

However, given the pace at which PEJ has so far obtained declarations of external financing, further preliminary agreements with financial institutions can be expected in the future. These are likely to be translated into loan agreements only after the final investment financing model is established, which in turn will only be possible after a positive EC decision on state aid for NPP1.

NUCLEAR READINESS INDEX

Technology readiness score: 3/10

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In the case of NPP1, a relatively time-consuming process will be the adaptation of the AP1000 reactor and its documentation to the conditions of collaboration with the Polish electricity system. PEJ also has to make important decisions on the supply chains for key goods and services.

EVALUATION CRITERIA

- The pre-selected nuclear reactor technology has been commercialised and has undergone a full licensing procedure in the EU, confirming its safety and feasibility in Poland.
- The design and technical documentation of the selected nuclear technology meets Polish technical requirements, including quality requirements, e.g., in terms of harmonisation of units and measurements or translation.
- There is a defined way of dealing with nuclear waste, and the nature and extent of the environmental impact of the nuclear technology.
- The supply chain of goods and services for the whole investment is assured.
- The supply of nuclear fuel is assured.

The large nuclear reactors being considered by Poland are based on technologies developed by Westinghouse (AP1000), EDF (EPR) and KHNP (APR1400). Each of these has already been commercialised, is available on the market and the first power plants using these units have been built. **In Europe, however, only an EPR reactor has been built (it is in operation in France and Finland, and another is under construction in the UK), and it is the only one to have gone through the full licensing process in the EU.** This confirms not only the safety of its design (which is the case for all the technologies mentioned above), but also its full compliance with EU requirements. The latter differ in some respects from those in force in the USA, South Korea or elsewhere.

Completion of the EU licensing process for the AP1000 reactor (selected for NPP1) is a matter of time, although some design modifications and safety demonstrations will be required. This includes, for example, the technical parameters of certain components or the adaptation of the operation of the reactors to work with the European electricity system, which operates at a different frequency from the US system. This is a costly and relatively time-consuming process. It also requires translation of the reactors' technical documentation and the inclusion of other units, such as measurements.

Although some of this work is still ongoing for the AP1000 reactor selected by PEJ, given the factors described above (including the status of the licensing processes), we have decided to consider that milestones 1, 2 and 3 of our Technology Readiness Index have been partially achieved.

The extent of the environmental impact of the Choczewo NPP and the management of nuclear waste have been sufficiently clarified at this stage. These issues are resolved by the decision on environmental conditions for NPP1 issued by the GDOS on 19 September 2023, which is immediately enforceable. The decision became final in January 2025. However, the nuclear waste management infrastructure itself is obviously not ready at this stage.

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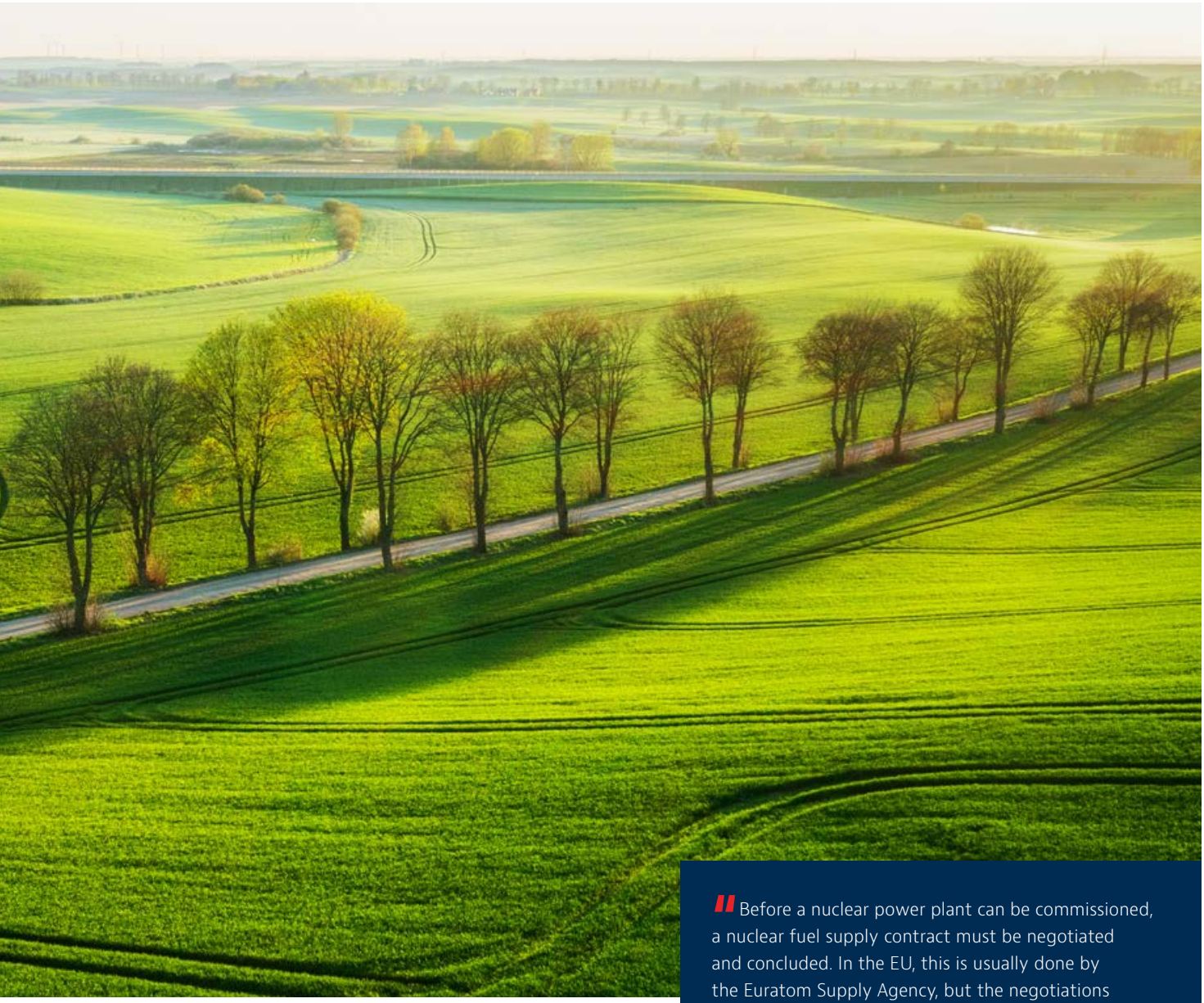
"The management of radioactive waste is particularly strictly regulated to ensure safety at all stages, from generation to disposal. A power plant that generates radioactive waste or spent fuel is responsible for ensuring that radioactive waste and spent fuel can be managed, including ensuring the financing of such management, from the time of generation to the time of disposal, including the financing of disposal. Low and intermediate level waste will come first, but eventually high-level waste in the form of spent fuel will also need to be managed. Appropriate infrastructure will need to be developed."

Klaudia Cholewa
Baker McKenzie



Little is known about plans for the procurement of long lead items, i.e., components for nuclear power plants that take a long time to arrive. These include the steam generator, the generator or the pressure vessel – these items are difficult to build and the number of companies producing them is small, so they need to be ordered early. Similarly, the nuclear fuel supply chain is not yet secure.

"Before a nuclear power plant can be commissioned, a nuclear fuel supply contract must be negotiated and concluded. In the EU, this is usually done by the Euratom Supply Agency, but the negotiations themselves are carried out by the Member States. According to the information in the October 2024 draft update of the KPEiK, Poland aims to secure a long-term stockpile of nuclear fuel. However, it is common practice for the reactor technology supplier to secure fuel supply (in the form of "fuel cassettes") for the first few years of the plant's operation. Thereafter, the fuel fabrication data should be transferred so that the fuel can be supplied by third parties. According to the KPEiK update, Poland aims to conclude a fuel supply agreement by 2030."

Agnieszka Skorupińska
Baker McKenzie

Conclusion – what scenario is nuclear power development following?

In this section, we attempt to determine which of the scenarios proposed in our April 2023 report best describes the way nuclear power development in Poland is unfolding.

These boiled down to the scale and scope of investment associated with each technology (large-scale power plant and SMR). Accordingly, we proposed three options at that time:

1. Minimal

Only the large-scale projects envisaged in the PPEJ and the current PEP2040 will be developed in Poland, i.e., NPP1 and the second "government power plant", the location of which is not yet known. In time, the idea of building a NPP in Pątnów and the use of SMRs will also be abandoned.

2. Balanced

Three large nuclear projects will be developed in Poland (those mentioned in the minimum scenario and the Pątnów NPP) and a small part of the many SMR projects planned at that time.

3. Nuclearisation of Poland

All planned large projects will be developed in Poland, as well as dozens of SMRs built by large capital groups and smaller Polish and foreign investors.

So far, the assumptions we made in April 2023 about the limits of investment in nuclear energy in Poland have materialised, i.e.:

- **the Polish energy policy has been continued** at least partially over recent years (the new parliamentary majority in practice continues the actions of its predecessors);
- **the EU maintains a relatively favourable policy towards nuclear power** (the EU does not block nuclear investments, but does not make them more profitable);
- **the risk of a supply gap in the Polish power sector in the 2030s is increasing** (an increase in electricity demand with a decrease in supply from domestic sources is one of the projected scenarios for the KSE).

At present, the development of nuclear power in Poland is taking place under the second scenario, although noticeable trends and business and political sentiment may indicate a change in the dynamics of this process towards the first scenario.

The implementation of NPP1 project and the site selection process for the second power plant planned under the PPEJ (minimum scenario) are progressing gradually. At the same time, preparatory work for the Pątnów NPP investment and some announced SMR projects (balanced scenario) is still ongoing. However, for both the Pątnów NPP and SMRs, we believe it is equally likely that these projects will either continue to full completion or be terminated during the pre-implementation phase. Therefore, we conclude that the current state of these processes falls at the intersection of the minimal and balanced scenarios.

According to the experts

The results of the index are largely subjective and stem from interpretations of progress as it relates to the implementation of nuclear projects in Poland. To this end **we asked independent experts for their own assessments of the components of the Nuclear Readiness Index**, the results of which were included in the overall assessment presented in the report. Below we present a summary of each of the experts' assessment and comments on the key – in their opinions – challenges currently facing Poland's nuclear power projects.

ŁUKASZ SAWICKI
Polish Nucleonic Society
summary assessment: 52%

One of the key areas for improvement in Poland's nuclear projects is the transparency of investment processes. So far, there has been no structured discussion on how nuclear projects – regardless of ownership – should be implemented to generate real economic benefits rather than simply incurring costs. As a result, we are seeing an increasing number of critical publications, as well as the quiet and gradual cancellation of certain projects.
In the short- and medium-term, the most significant challenge for the continued implementation of nuclear projects will be their projected impact on electricity prices for consumers. Currently, high energy prices are one of the main factors driving the gradual decline of industry and hindering business development in Poland. Yet, affordable energy has so far been one of the (implicit) justifications for adopting nuclear power. This raises the question of whether investing in nuclear energy makes sense given the unfavourable regulatory environment imposed by the EU, with any potential changes remaining a distant prospect. Avoiding this discussion is no longer an option. This issue poses a potential risk of eroding public (and consequently political) support, ultimately becoming a showstopper for the development of nuclear energy in Poland. The sooner solutions to this problem are developed, the lower the risk of declining support for nuclear power and a forced halt to investment processes due to a lack of political acceptance. Another challenge is the issue of local content, particularly concerns from Polish companies that are being excluded from nuclear power plant construction contracts. A low level of local content could lead to a decline in socio-political support for these investments, as one of the motivations for adopting nuclear energy was precisely the opportunity to secure valuable contracts for Polish firms. Experience from other infrastructure projects – which were dominated by foreign companies and workers with minimal participation from domestic entities – has already created a negative backdrop and presents a potential second showstopper for the continuation of nuclear projects in Poland.

KATARZYNA ZASADNI
Lead engineer at the Pallas reactor, the Netherlands
summary assessment: 52%

Poland's readiness for nuclear power is increasing, but contradictions in the process will cause both short- and long-term delays. There is widespread acceptance of nuclear power, yet at the same time, major gaps exist in systemic, regulatory, and investment readiness for its implementation. Technological readiness must rely on a highly-skilled foreign workforce, which must also receive incentives to remain in Poland. Without such measures, recruited specialists will not develop deeper ties with the local workforce, which still needs training, nor will they feel a strong commitment to the projects they are involved in. There is also a common belief in Poland that Polish specialists working in foreign nuclear organizations, under Western workplace standards, do not differ from the domestic workforce, which is accustomed to Polish work culture. As a result, they do not receive sufficient support for adaptation upon returning to Poland, and – like foreign experts – are not provided with additional incentives to stay.

WOJCIECH GAŁOSZ
FOTA4Climate
summary assessment: 51%

The process of implementing nuclear power in Poland is ongoing. Along with changes in the economic environment in Poland, the cost estimation is changing, and procedures seemingly drag on. A natural and rational desire to speed up actions arises – e.g., by preparing another amendment to regulations. Great caution will be required here because such shortcuts could undermine public trust. If the existing regulations are further loosened, deadlines shortened, and some procedures removed, it is unlikely to have a significant impact on the level of public acceptance for the construction of the power plant at the Lubiatowo-Kopalino site. However, it could become a significant point of resistance for those opposed to such facilities in other locations. Although public acceptance of nuclear energy remains high and the NIMBY effect is surprisingly low, this capital of social trust should not be squandered, as we may simply not have the time to rebuild it.

CHAPTER III

Next steps

The viability of building nuclear power plants in Poland is not and should not be called into question. On the contrary, it must be a central element not only of the country's energy policy but also of its economic policy. It also requires the full involvement of all key stakeholders.

However, the start of construction of a nuclear power plant is only one stage in the implementation of nuclear power in Poland – the construction stage is characterised by very different challenges than the preparation stage.

The following activities can be expected in the context of increasing Poland's readiness to start the construction of a nuclear power plant.

In the case of the Choczewo NPP1 project, the following sequence of activities is likely to be adopted to reach subsequent milestones:

1. Evaluation

Evaluation and potential revision of the existing project assumptions and the way it has been implemented, based on a thorough and substantive assessment;

2. Negotiation

PEJ negotiating an EDA (Engineering Development Agreement) contract with Westinghouse and Bechtel.

3. EC approval

Obtaining EC approval for the disbursement of state aid to PEJ for the construction and operation of the reactors.

4. Financial model

Finalizing the work on the financial model for the investment (including obtaining loans, State Treasury guarantees, and concluding discussions on the form of the Contract for Difference).

5. EPC contract

Signing of the EPC contract by PEJ and the Westinghouse-Bechtel consortium (achievable in 2027, more realistically in 2028–2029).

Once the EC approves state aid for NPP1, it will be necessary to implement the provisions of the amendment to the Special Nuclear Act, according to which the State Treasury will inject about PLN 60.2 billion of additional capital into PEJ by 2030.

The implementation of related investments must also continue smoothly. Specifically this means two sections of a railway line, a national road, a marine structure (the "MOLF") and a 400 kV station.

It should be added that in the process of obtaining EC approval for state aid to PEJ, **Poland should seek a more flexible approach from Brussels to:**

- the rules for the operation of nuclear power plants in the electricity system – the aim is to avoid their competition with RES and thus ensure the viability of the NPP;
- the principles for the disbursement of state aid – it would be desirable to reach a compromise on an exemption from the requirement to use only the Contract for Difference as a support mechanism for nuclear power generation; it is worth pushing for the possibility of complementary use of other mechanisms to make the financial model of the Choczewo project and other Polish nuclear projects more flexible.

In the long term, work should continue on creating human resources specialised in nuclear energy.

It is also necessary to strengthen the administration, including the nuclear regulator (PAA), and other bodies involved in the investment process, such as GDOS or UDT (State Technical Inspection Authority), both financially and in terms of personnel. At present, these issues are among the main risk factors for nuclear investments in Poland, which can significantly slow down and hinder their implementation, and in an extreme scenario, even make them impossible.

The role of nuclear power in the KSE should be consistently sought and defined in relation to other sectors, such as industry and district heating. This is crucial for aligning nuclear energy ambitions with projected power and electricity demand and the future operating characteristics of the KSE in the context of the dominant share of uncontrollable renewable sources. Combined with the provisions of government strategies, the arrangements worked out should be a roadmap for investors, their stakeholders and the addressees of plans to decarbonise the economy.

The state's nuclear policy should be stable, predictable and clearly communicated. This is essential, at the very least, to maintain support for investments in this area, limit the "NIMBY" phenomenon, and reduce the vulnerability of this support to negative changes in external conditions, such as the geopolitical situation. The investment process and its benefits should be communicated as transparently and honestly as possible to the public.

The government should ensure the ability to carry out a relatively smooth revision of nuclear law should the need arise. This is important for investors – their projects have FOAK (First of a Kind) status nationally, so they are the first to test the utility of certain legal solutions in practice. It is highly likely that, over time, there will be a need for (at least) periodic revision of these solutions.

The above-mentioned activities also relate to building Poland's readiness for the development of other nuclear projects (with their inherent specificity), including those implemented by PGE PAK Energia Jądrowa, OSGE, ŚGPI, and possibly KGHM. In this regard, it should be emphasized that the burden of building Poland's nuclear investment readiness is shared by all stakeholders, and its achievement will benefit society as a whole and all electricity consumers.

Individual nuclear projects are not in competition with each other – they should complement each other. They are largely based on similar conditions and face the same challenges. As far as possible, individual stakeholders should share knowledge and combine their strengths and potential in formulating and pushing forward important demands at the national or EU level. Poland needs nuclear power and its development based on realistic, stable business and economic foundations.

List of abbreviations

TECHNICAL ABBREVATIONS:

EPR – European Pressurized Reactor
NPP1 – first "government" nuclear power plant (located in Lubiatowo-Kopalino near Choczewo)
NPP2 – second "government" nuclear power plant (planned)
SMR – Small Modular Reactor

NAMES OF ENTITIES ABBREVATIONS:

DFC – U.S. International Development Finance Corporation
EDC – Export Development Canada
EDF – Electricite de France, nuclear power plant operator
EXIM – Export-Import Bank of the United States
GDDKiA – General Directorate for National Roads and Motorways
GDOS – General Directorate for Environmental Protection
IAEA – International Atomic Energy Agency
OSGE – Orlen Synthos Green Energy
PAA – National Atomic Energy Agency
PEJ – Polskie Elektrownie Jądrowe, State Treasury company, investor and future operator of NPP1 and NPP2
PGE – Polska Grupa Energetyczna, a capital group of the State Treasury
PGE PAK – PGE PAK Energia Jądrowa company, joint company between PGE Polska Grupa Energetyczna and ZE PAK
PSE – Polskie Sieci Elektroenergetyczne S.A., Transmission System Operator (TSO) responsible for Polish Power System
ŚGPI – Świętokrzyska Grupa Przemysłowa Industria (Świętokrzyskie Industrial Group Industria)
UDT – Office of Technical Inspection
ZE PAK – Zespół Elektrowni Pątnów Adamów Konin, privately owned energy company

OTHER ABBREVIATIONS:

EDA – Engineering Development Agreement
EPC – Engineering, Procurement, Construction
ESC – Engineering Service Contract
EMD – Electricity Market Design
IRRS – Integrated Regulatory Review Service
KPEiK – National Energy and Climate Plan (pol. Krajowy Plan w dziedzinie Energii i Klimatu)
KSE – Polish Power System
PEP – Energy Policy of Poland until 2040
PPA – Power Purchase Agreement
PPEJ – The Polish Nuclear Power Programme
WAM – With Additional Measures

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