



En nationell samordnare för utbyggnad av kärnkraft

KN 2024:01

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Interim report: The nuclear new-build coordinator's recommendations regarding the expansion of new nuclear power in Sweden – June 2024

1. Introduction

Since 1 February 2024, the inquiry "A national coordinator for the expansion of nuclear power" (KN 2024:01, hereinafter referred to as the "nuclear new-build coordinator" or "the inquiry") has evaluated the measures taken linked to the expansion of nuclear power in Sweden and whether these are sufficient in relation to the roadmap for new nuclear power presented by the cooperating parties within the Tidö Agreement and adopted by the Swedish Parliament as part of the new energy policy framework¹. The Government has initiated, and in some cases implemented, several measures and investigations to create clearer and more efficient conditions for new nuclear power in Sweden. The Government has also assigned a number of missions to authorities for the same reason. These efforts are summarised in Chapter 4. In Chapter 5, the nuclear new-build coordinator provides an assessment of the ongoing investigations in relation to the objectives of the roadmap,

¹ Regeringens proposition 2023/24:105, Energipolitikens långsiktiga inriktning, 14 mars 2024.

and in Chapter 6 proposes further measures to strengthen the conditions for new nuclear power in Sweden.

The report summarizes the main recommendations of the nuclear new-build coordinator based on the work carried out during the period from 1 Feb to 31 May 2024. The report is not a complete account of the work carried out, nor should the analysis be seen as comprehensive in terms of obstacles and needs linked to new nuclear power in Sweden.

2. Methodology

During the first four months of the inquiry, on which this report is based, the nuclear new-build coordinator has conducted a large number of meetings with several stakeholders. The stakeholders involved consist of authorities, utilities, project developers, vendors, developers, subcontractors, service companies, embassies, export promotion organisations, industry organisations, municipalities and regional development offices. The nuclear new-build coordinator has also met nuclear power coordination offices in other countries and participated in international nuclear power conferences in Sweden's vicinity. Altogether, these meetings have provided the inquiry with insights that have contributed to an assessment of Sweden's ability to sustain an extensive expansion of new nuclear power reactors. This report is thus the result of an analysis based on the input given to the inquiry in conjunction with the investigator's competence in the subject.

3. Basic conditions for new nuclear power in Sweden

The latest reactor to be completed in Sweden was Forsmark unit 3 in 1985. The construction was preceded by a referendum in 1980 on the future of nuclear power. According to a Parliamentary decision after the referendum, all nuclear power in Sweden was to be phased out by 2010. These circumstances created uncertainties about the completion of the reactors that were under construction in Sweden in the early 1980s, but also for nuclear power in general in Sweden. A total of twelve large-scale light-water reactors were completed in Sweden. In line with the Parliamentary decision and with the support of the phase-out act², the two reactors in Barsebäck were shut down in 1999 and 2005. A paragraph was also established in the Environmental Code that prohibited preparatory measures linked to new nuclear power in Sweden. The phase-out policy was interrupted after a

² Lag (1997:1320) om kärnkraftens avveckling

political agreement in 2009, which enabled a controlled generational change of the remaining reactors. Therefore, a legal possibility was established to allow for a maximum of ten reactors in operation in Sweden, at existing nuclear sites. However, the prospects for nuclear power appeared unclear, not least after 2016 when a parliamentary agreement stated that the goal would be an electricity system based entirely on renewable power sources by 2040 at the latest, even if new nuclear power was not banned per se. A development line without new nuclear power became the guiding principle for the authorities' work, which gave the power source low justification in a general sense. During the period 2015 to 2020 additional four reactors were decommissioned in Sweden.

Since the autumn of 2022, a U-turn has been made regarding the view of nuclear power in Sweden. Measures have been taken to facilitate new nuclear power in Sweden. As a first step, the cap of ten reactors, and the restriction that new reactors may only be built at existing nuclear sites, have been removed³. The Parliament has also established a new energy policy goal of a completely fossil-free electricity system by 2040⁴, which also includes nuclear power. In addition to these initial decisions, the current government has taken a number of measures to remove barriers and create better conditions for new nuclear power. These measures are described in the following chapters. The background to this reversal can be explained by increasing climate awareness, a cumbersome geopolitical situation, increased technical challenges related to the electricity system and a more strained national economy where its link to the electricity price has become increasingly clear.

For more than 40 years, the *raison d'être* of nuclear power has been a political issue. This has laid the foundation for a difficult investment climate not only for new nuclear power, but also its entire value chain in terms of subcontractors, service companies and training activities. In principle, all supporting structures, including the academic infrastructure, have been shrunk to an absolute minimum, governed by the needs of the safe operation of existing reactors. During this time, the vast majority of research activities in the nuclear field have been financed by industry itself. A large part of the training activities has also been ensured by the industries own resources.

³ Regeringens proposition 2023/24:19, Ny kärnkraft i Sverige – ett första steg, 28 sep 2023.

⁴ Regeringens proposition 2022/23:99, Vårändringsbudget för 2023, 13 april 2023.

Only recently have investment frameworks at EU level⁵ been opened to nuclear power, but there is still a negative discrimination regarding nuclear power's access to investment funds⁶. These obstacles testify to a widespread exclusion of nuclear investments in the financial markets. The strong negative signal values around nuclear power that have been established at the international level have made it difficult for investors to justify investments at the national level.

At the same time as the conditions for nuclear power to develop have been minimized, promoting policy instruments for renewable power sources have been strong and ambitious. Examples include monetary subsidies, a dedicated authority tasked to develop the sector's conditions and regional energy offices to ensure efficient expansion. The development of renewable power sources has also been supported by a promotional policy at EU level.

Thus, there is a need to level the playing field by strengthening the conditions for nuclear power, so that all fossil-free power sources have comparable conditions to develop in the Swedish energy market. For example, when a foreign industry association for that country's nuclear value chain recently sought cooperation with a Swedish counterpart, there was no corresponding organization to establish contact with. The example indicates that it is not only the state that needs to act to restore the balance, it also requires increased awareness and preparation within the industry and its networks. A whole new ecosystem needs to be resurrected after several decades of hibernation. To achieve equal investment conditions, targeted efforts will be required to support nuclear power specifically.

4. Ongoing efforts of importance to nuclear power expansion

On 29 May 2024, the Parliament decided upon on a new long-term direction for energy policy. The new focus describes how energy policy should be pursued for the energy system to develop in line with society's needs. On the basis that all fossil-free power sources will be developed, there is also room for nuclear power. The new energy policy framework describes two objectives: a planning target for electricity consumption that corresponds to approximately a doubling of today's electricity consumption, and a target for

⁵ Regulation (Eu) 2020/852 of the European Parliament and of the Council of 18 June 2020 on the establishment of a framework to facilitate sustainable investment, and amending Regulation (EU) 2019/2088.

⁶ Regulation (Eu) 2021/1056 of the European Parliament and of the Council of 24 June 2021 establishing the Just Transition Fund Regulation, and (Eu) 2021/523 of the European Parliament and of the Council of 24 March 2021 establishing the InvestEU Programme and amending Regulation (EU) 2015/1017.

security of supply of the electricity system. Nuclear power has the potential to contribute significantly to both goals as it can contribute large volumes of electricity while also contributing to the robustness and fault resistance of the electricity system as such.

In addition to the two goals, the Parliament has decided upon a strategy for energy planning that will be based on three levels of society: national, regional and municipal. The fact that society in this way may take the role of system architect is positive for the development of all fossil-free power types, not least nuclear power, which is not only a power source but also constitutes an important part of the efficient functionality of the entire electricity system.

Another important part of the energy policy framework is sector coupling. In this area, nuclear power of the future has good opportunities to contribute through both electricity and heat. Efficient hydrogen production, which uses both fossil-free electricity and heat from, for example, nuclear power, can contribute to a large-scale production of electrofuels. Future reactors may thus play a completely different role in the energy system than today's nuclear power.

Through the energy policy framework, the Parliament has also decided upon the roadmap for new nuclear power presented by the Government and its cooperation party on 16 Nov 2023. The energy policy framework states that the Government currently sees that new nuclear power with a total output corresponding to at least two large-scale reactors should be in place by 2035, and that by 2045 there is a need for a powerful expansion that could, for example, correspond to at least ten new large-scale reactors. Furthermore, it is stated that the exact amount of nuclear power, the number of large-scale and small modular reactors, that will be required will be determined by the rate of expansion in the electricity system, where new consumption and production are located, as well as the technological development of both new nuclear power but also the possibility of extending the operating time of existing nuclear power reactors. In concrete terms, this means that the conditions need to be prepared to enable 2500 MW of new nuclear power capacity by 2035. By 2045, this could mean a total of about 10,000 MW of new nuclear power capacity.

Within the energy policy framework described above, a number of measures have been taken to improve the conditions for new nuclear power. These measures are summarised in Table 1. The energy policy framework describes several promotional measures that do not only concern nuclear power, such as a developed electricity market. Such measures, as well as the nuclear-specific measures, are largely covered by Table 1. As already mentioned, the Government has also introduced an energy policy goal of 100 percent fossil-free electricity production by 2040 and removed the number and location limit for new reactors.

Several of the measures that have been undertaken are likely to promote fossil-free power sources other than nuclear power. This is of course positive and is a desirable approach.

In addition to the measures listed in Table 1, the grants of the Swedish Energy Agency dedicated to nuclear research has been increased. In May 2024, 14 projects were granted a total of approximately SEK 208 million for nuclear power-related research (including fusion). During the period 2023-2027, the Swedish Energy Agency and the Swedish Radiation Safety Authority (SSM) are jointly announcing SEK 20 million per year for radiation safety-related research related to new nuclear power. SSM has also been allocated extra funding to strengthen the national competence in the field of radiation safety. The budget for 2024 amounts to SEK 20 million and for the following year, this budget item is estimated to amount to SEK 40 million per year.

In August 2023, SSM submitted its final report on a government assignment, initiated by the previous government, concerning the development of the regulatory framework to enable new nuclear power technology⁷. This work constitutes an important basis for the ongoing investigations.

In this context, Sweden's increased activity regarding nuclear power in international contexts should also be mentioned. Through Sweden's participation in the newly formed Nuclear Alliance within the EU, the Commission has been able to facilitate nuclear power measures in a more active way. One example is the recently launched Industrial Alliance on Small Modular Reactors. Sweden has also been involved in a statement by

⁷ Strålsäkerhetsmyndigheten: Utveckling av regelverk och andra åtgärder för befintlig och framtida kärnkraft (slutredovisning), 2023-08-08.

some twenty countries on the need to triple nuclear power globally by 2050 to meet the climate goal. The statement was made at COP28 when the world's 197 countries agreed for the first time to express, in the climate agreement, the need to accelerate the development of nuclear power.

	Measure	Type of action	Timing of reporting
Promotional measures	Assignment to review the tasks and responsibilities of government agencies in the energy sector	Investigation within the Ministry of Climate and Enterprise	2024-03-29
	Development of risk-sharing model for new nuclear power ⁸	Investigation within the Ministry of Finance	2024-08-12
	Electricity market study to develop investment conditions in the electricity market ⁹	Committee under the Ministry of Climate and Enterprise	2025-04-25
	A national coordinator for the expansion of nuclear power ¹⁰	Committee under the Ministry of Climate and Enterprise	2026-12-31
	Assignment to take preparatory measures to enable state credit guarantees for investments in new nuclear power	Assignment to the Swedish National Debt Office	-
	Assignment to map areas suitable for fossil-free electricity production	Assignment to the Swedish Energy Agency	2024-10-25 2025-10-25
	Planning for increased electricity use, indicate connection points	Assignment to Svenska kraftnät (Swedish TSO)	2025-02-22
Regulatory measures	Environmental permit investigation ¹¹	Committee under the Ministry of Climate and Enterprise	2024-12-15
	The Nuclear Power Assessment Inquiry ¹² (licensing process etc)	Committee under the Ministry of Climate and Enterprise	2024-12-20 2025-08-29 2026-02-27
	New Act on Nuclear Activities	Investigation within the Ministry of Climate and Enterprise	2025-09-30
	Assignment for early evaluation of reactors designs	Assignment to SSM	2024-06-11
	Strengthened competence within the field of radiation safety	Assignment to SSM	2025-12-20
	Financing of waste management for new nuclear power	Assignment to the Swedish National Debt Office	2025-08-31
	Organisation of technical support for nuclear safety and radiation protection	Government assignment to the Swedish Agency for Public Management	2025-01-15

Table 1. Summary of measures of importance for the conditions for establishing new nuclear power in Sweden. Some of the measures also concern other areas than nuclear power.

⁸ Finansdepartementet: Finansiering och riskdelning vid investeringar i nya kärnkraftsreaktorer. 2023-12-20.

⁹ Kommittédirektiv 2024:12. Ett elsystem med tydligt systemansvar, hög leveranssäkerhet och långsiktiga planeringsförutsättningar

¹⁰ Kommittédirektiv 2024:1: En nationell samordnare för utbyggnad av kärnkraft

¹¹ Kommittédirektiv 2023:78: Förenklade och förkortade tillståndprocesser enligt miljöbalken

¹² Kommittédirektiv 2023:155: Ny kärnkraft i Sverige – ett andra steg

5. Assessment of current situation

The activities presented in previous chapter address the obvious main obstacles and challenges regarding the possibility of constructing new nuclear power in Sweden. As can be seen from the summary in the previous chapter, there are seven investigations and seven assignments that are now being carried out, or have recently been completed, with the aim of clarifying and simplifying the conditions for new nuclear power. The nuclear new-build coordinator's assessment is that these measures are well-targeted and correctly designed with regard to the state's ability to create good conditions for new nuclear power in Sweden.

The main risks associated with investments in new nuclear power are regulatory risks, financial risks and political risks. The most extensive and obvious regulatory and financial risks are managed within the framework of the interventions summarised in the previous section. Regarding the political risks, the nuclear new-build coordinator notes that its mandate does not include the political aspect of a nuclear power expansion. On the other hand, the conditions for long-term political stability increase potentially as the regulatory and financial conditions are clarified.

It is important that the activities that have been initiated are completed within the allocated time. This allows the conditions for new nuclear power to gradually become clearer during 2025. For new small-scale nuclear power, certain aspects will be clarified in early 2026. With clear conditions, the opportunity for actors to apply for necessary permits increases.

The nuclear new-build coordinator believes that several of the conclusions presented by the inquiry on the tasks and responsibilities of the energy-related authorities should be introduced as soon as possible. Regarding Svenska kraftnät (the Swedish transmission system operator), this applies in particular to long-term planning responsibility, a clarified and appropriate definition of requirements for the electricity system's actors and a more goal-oriented system operation. For the Swedish Energy Agency, the proposal to change the agency's overall mandate to be more in line with the energy transition and security of supply is particularly relevant. For both authorities, it is also particularly important that the scenario analyses for the electricity system are congruent and reflect outcomes that are possible based on current legal requirements.

Given that the above is taken into account, that ongoing activities are carried out as planned and that more than one actor materialises their plans, there are good conditions for achieving the roadmap's capacity targets for new nuclear power. However, the nuclear new-build coordinator has identified additional measures that need to be taken to ensure the possibility of reaching the goal of 2500 MW of new nuclear power by 2035, or to reach an effective large-scale expansion by 2045. These measures are described in the following chapters as "Measures required for the achievement of the roadmap's objectives".

In addition, there are a number of identified measures that should be undertaken to further reduce the risks of investments in nuclear power and to achieve a more efficient process in the future. Such measures are described below as "Risk minimisation measures". Of course, it can be difficult to distinguish the two categories of recommendations from each other, so this should only be seen as a rough classification. In addition, the work on the risk minimisation measures may result in the identification of aspects that challenge the objectives of the roadmap.

6. Recommendations

6.1 Actions required for the achievement of the roadmap's objectives

6.1.1 Need for a program organisation

In a near future, there is a need to establish a program organisation for the national nuclear power expansion. A program organisation can manage activities that are common to several nuclear power projects and coordinate resources that affect several projects. The need will primarily arise after the state's financial responsibility has been clarified. The activities of the program organisation should be based on the extent of the financial responsibility, which is unknown at the time of writing. However, the state should prepare for different levels of engagement through a program organisation based on different outcomes in terms of financial responsibility.

As a minimum level, the state should define a project sponsor that ensures the progress and achievement of the nuclear power projects. The State's interests in the projects in question, such as financial conditions, geopolitical aspects, aspects of civil defence and other technical or competence related issues that might be of national interest, should be followed up and

monitored. Risk mitigation should not only be limited to the design stage, but should also cover other activities early in the process, such as ground preparation measures. With state risk-sharing, which can be administered through a program organisation, the stakeholders' processes can be set in parallel to a greater extent than if the companies act on their own without risk-sharing. In this way, more efficient processes and a more tolerant schedule can be established.

In addition to the need for a project sponsor, a program organisation can be expanded modularly depending on the extent of the state's financial responsibility and in line with needs that may arise. Examples of areas that potentially could be managed by a program organisation include:

- Preparation of nuclear sites
- Comprehensive planning of the expansion in relation to the availability of the supply chain and the completion of nuclear sites
- Management of applications for standardised designs and procurement of reactors
- Common system for the management of nuclear waste from new reactors

In other words, these are activities that are currently expected to be carried out by the respective entity that applies for new-build permits, but there may be national interests or efficiency gains to run the activity at the program level. In some cases, the project organisation might not have all the information, or the overall picture, required to make socio-economically optimal decisions. Such things can therefore be handled at the program level. The nuclear power coordinator assesses that it is possible to achieve a more cost-effective total expansion (of up to about 10 GW) if the processes *are not* optimized based on getting a first reactor into operation as early as possible. Instead, the processes and activities should be optimized based on the greatest national benefit, which requires coordination through a program organization. Such coordination requires operational elements that go beyond the mission of the current nuclear new-build coordinator.

The program organisation can thus carry out activities that are placed between what is currently the state and industry. Possible forms of

organisation are, for example, a government agency or a state-owned company. An international outlook indicates that a state-owned company would probably provide the flexibility and ability to act that would be suitable for Swedish conditions. The appropriate time for the establishment of a program organisation should be determined after in-depth discussion with relevant stakeholders.

6.1.2 Need for a system study

Additional dispatchable electricity production in southern Sweden in the form of, for example, nuclear power would contribute with system-wide benefits in addition to the energy and power supplied¹³. These benefits allow the system operator Svenska kraftnät to allocate higher transmission capacity to the market between the bidding areas within Sweden and, to a certain extent, to and from neighbouring countries. The Agency for the Cooperation of Energy Regulators, ACER, has reported that Sweden stands out with relatively low market-allocated transmission capacity for DC connections¹⁴. For AC connections, Sweden stands out in a Nordic perspective in the same aspect. Svenska kraftnät has undertaken several measures¹⁵ to increase market-allocated transmission capacity in light of previous capacity drops due to reduced amount of dispatchable electricity production in southern Sweden¹⁶. Additional dispatchable electricity production would further contribute to strengthened market-allocated transmission capacity, but the market significance of this has not yet been quantified according to the nuclear new-build coordinator's assessment. The strong contribution of nuclear power to the possibility of connecting additional consumption provides a high level of efficiency in the electrification of the society. This is also an aspect that has not yet been quantified in relevant electricity system analyses.

A risk-sharing model to enable investments in new nuclear power is being developed at the time of writing. Such a targeted effort can be expected to have a market-influencing effects in a negative sense because it steers investments in a certain direction and investments in other electricity production can be dampened. As described above, the investments that the

¹³ Svenska kraftnät, Stärka försörjningstryggheten – deluppdrag 3, Kartlägga hur elproduktion utifrån kraftslag bidrar och samverkar för att skapa en trygg elförsörjning, 2022/3774, 2023-12-29.

¹⁴ Acer, Cross-zonal capacities and the 70% margin available for cross-zonal electricity trade (MACZT), 2023 Market Monitoring Report, 2023-07-21.

¹⁵ Svenska kraftnät, Så arbetar vi för att öka överföringskapaciteten, Kortsiktiga åtgärder, Kvartal 4 – 2022.

¹⁶ Svenska kraftnät, Systemutvecklingsplan 2022–2031 – Vägen mot en dubblerad elanvändning, 2021.

risk model intends to drive also entail market advantages. Failure to invest in nuclear power also has market-influencing effects in the form of the risk of a less efficient market due to lower availability of ancillary services and increased challenges in maintaining high market-allocated transmission capacities. Prior to an assessment of how a risk-sharing model can be applied in Sweden, it would be good for the concerned stakeholders to have access to a quantified assessment of the systemic benefits of nuclear power. That would allow for a balanced market assessment to be carried out by stakeholders.

Therefore, the nuclear new-build coordinator proposes that the Ministry of Climate and Enterprise instructs Svenska kraftnät to carry out a system study with the aim of quantifying the market benefits that new nuclear power may bring to the system. Specifically, such a system study should describe the electricity market benefits that can be expected regarding:

- how market-allocated transmission capacity is affected by the supply of dispatchable electricity production in southern Sweden,
- the expected reduction in electricity price differences between national bidding zones to which the new nuclear power is expected to contribute and the extent to which new nuclear power may affect the payment of capacity charges, and
- The extent to which the expanded nuclear power enables increased power consumption nationally, increases the possibility of connecting more variable electricity production and the extent to which it reduces the need to develop the electricity grid.

The analysis should be carried out from a 2035 perspective and based on realistic assumptions about how today's electricity system may develop until then and given that 2500 MW of new nuclear power is added to the bidding areas SE3 and SE4. For the results to be useful, aspects of operational security need to be included in the analysis. A further analysis should be carried out to provide an indicative assessment of the extent to which an expansion of 10 GW of new nuclear power by 2045 may affect the bidding zone structure. The analyses should be carried out in dialogue with the Swedish Energy Agency and the Swedish Energy Markets Inspectorate.

6.1.3 Delimitation of building regulations and related permitting process

A large number of regulatory requirements govern the design of a nuclear power plant. The requirements can be broadly divided into radiation safety requirements and other conventional requirements. Regarding radiation safety requirements, their applicability to new reactors has been discussed to varying degrees for the least ten years. The nuclear new-build coordinator also notes that the responsible authority, the Swedish Radiation Safety Authority (SSM), has received increased budget to be able to prepare for a possible expansion of nuclear power. Matters related to radiation safety requirements for nuclear power plants are high on the agenda and are actively managed. However, the same does not necessarily apply to other authorities that will also be affected by the expansion of nuclear power. A central authority is the National Board of Housing, Building and Planning, which is responsible for requirements related to the construction of buildings. Any national requirements related to the design of the reactor that deviate from the requirements on which the reactor is designed can lead to very high additional costs and extended construction time. It is therefore of great importance to detect any challenging requirements at an early stage and, if necessary, to find alternative solutions to avoid costly design changes.

After dialogue with the National Board of Housing, Building and Planning, the nuclear new-build coordinator notes that the requirements overlap with SSM's requirements in the same area. The National Board of Housing, Building and Planning's regulations are not excluding nuclear facilities, as other non-nuclear regulations might do. Anyone who builds a nuclear reactor thus has two regulations to comply with at the same time. The nuclear new-build coordinator also notes that all the requirements of the National Board of Housing, Building and Planning will be directly applicable to those who are going to build a nuclear power plant. It seems there is no possibility of exceptions without a change in law.

Another potentially challenging aspect is that it is not the National Board of Housing, Building and Planning that decides whether the requirements are met. That responsibility lies with the municipality concerned. The nuclear new-build coordinator assumes that it is a too complex task for a municipality to assess the construction of nuclear power plants and that this task should probably be assigned an authority.

Therefore, the nuclear new-build coordinator recommends the Ministry of Rural Affairs and Infrastructure to appoint an internal investigator to:

- clarify how the delimitation of the requirements can be made between SSM and the National Board of Housing, Building and Planning,
- describe how the possibility of exemption can be introduced into the legislation and, if so, how an alternative requirement is established, and
- investigate how a permit process can be brought to the appropriate authority and propose which authority is best suited to grant approval for the conventional part of a nuclear power plant.

The assignment should be carried out in dialogue with SSM.

6.1.4 Establishing a national value chain

Constructing a large nuclear reactor or several small reactors is an extensive project that requires the involvement of a large number of suppliers and subcontractors. The potential reactor suppliers are mainly foreign companies, but they will in turn need access to national and regional resources. To create a broader understanding of the industrial capabilities that exist nationally and regionally, a mapping of the nuclear value chain needs to be carried out. Such a mapping should indicate what Sweden's strengths and weaknesses are and how these relate to strengths and weaknesses in nearby countries. It also needs to be made clear that such a value chain for Swedish nuclear power expansion can also contribute to the expansion of nuclear power in other countries. In this way, the Swedish and regional value chain can thrive to be able to serve the national expansion even better. It would of course be valuable if manufacturers of components for standardized nuclear power plants chose to establish themselves in Sweden.

Therefore, the nuclear new-build coordinator recommends the Ministry of Climate and Enterprise to commission Business Sweden to describe and develop the Swedish value chain for new nuclear power and describe its relationship to the regional value chain. The work should be carried out

according to the established procedures for the development of new industry sectors.

6.2 Risk minimisation measures

6.2.1 Investigation of labour security requirements

For the same reasons as in the previous section on building requirements, a better understanding of how national labour health and safety requirements may govern the design of a nuclear power plant's construction is required. Such requirements, if they challenge the design of the reactors, can cause cost increases and increased time for construction – especially if they are discovered late in the process. The Swedish Work Environment Authority's requirements appear to be largely limited to non-nuclear facilities, but for the conventional plant parts of a nuclear power plant, there may nevertheless be aspects that can drive costs for the power plant as a whole. To better understand the extent of this problem, an investigation needs to be carried out.

Therefore, the nuclear new-build coordinator proposes that the Ministry of Employment instructs the Swedish Work Environment Authority to map out the ways in which Swedish labour safety requirements deviates from requirements from primarily the USA, France, UK and Finland. These countries are chosen on the basis that reactors have been designed based on the requirements of these countries, or that reactors have recently been built or are now being built in these countries. Experience should be gained from companies within the Swedish nuclear power industry, which in turn might have gained experience in this area.

Within the framework of the assignment, the Swedish Work Environment Authority should also describe how nuclear power plants, to the extent that it can be considered appropriate, can be granted exemptions from Swedish labour safety requirements.

6.2.2 Strengthened local planning

The nuclear new-build coordinator notes that the municipalities' planning processes may require long time. It is therefore important that such processes can get started early, perhaps even before concrete applications for new nuclear power have been received. Enabling new nuclear power is not just about making room for a nuclear power plant. It is also about preparing

for other infrastructure that may be needed, such as housing, service activities and roads.

To strengthen cooperation and knowledge transfer between municipalities and regions that wish to develop the possibility of housing new nuclear power in their respective areas, the nuclear new-build coordinator intends to establish a forum for knowledge building and knowledge transfer. The target groups are mainly municipalities, regional offices and county administrative boards. The effort will begin after the summer of 2024.

In the long term, the initiative should be incorporated into the developed planning of the electricity system at local and regional level, which is described in the energy policy framework adopted by the Parliament. Therefore, the Swedish Energy Agency will also be a key player.

6.2.3 Assessment of skills

The electrification of society will require a great need for skills in a large number of disciplines across the entire energy system. For the expansion of nuclear power, there are some specific areas of expertise that need to be strengthened. In France and UK, the respective nuclear power industries have estimated a total need for skills required by the expansion of nuclear power in the coming decades to be about 100,000 people in each country. This includes retirements and skills other than nuclear power that are also required for the transition at large. It would be valuable for us in Sweden to have access to a corresponding analysis to understand what skills may be needed in Sweden, when in time they will be needed and to what extent. Such a basis would provide a good steering signal for Swedish universities to review their range of programmes so that future skills needs can be better met.

The nuclear new-build coordinator has noted that the Swedish Energy Agency has already begun such an in-depth analysis for nuclear power. Nevertheless, the nuclear new-build coordinator wishes to emphasize the importance of this measure in this report.

It is also of great importance for the future supply of expertise in the field of nuclear technology that related research is covered in the forthcoming research bill. However, the need is of course broader than just the supply of nuclear expertise.

6.2.4 External review of Sweden's preparations for new nuclear power

The International Atomic Energy Agency (IAEA) provides support to countries that intend to enable new nuclear power. The IAEA's program¹⁷ is primarily designed for so-called newcomer countries that have no previous experience of nuclear power, but can also be used by countries that have not built new nuclear power for a long time. The aim is to assess how well prepared the country is for the extensive undertaking involved in managing nuclear power plants within the country's borders.

As a first step, a self-review is carried out by the country in question. In the next step, an IAEA review team is conducting a review of the country's capacity to handle new nuclear power. Such a review would be good for Sweden for two reasons. First, the approach allows for a systematic review of the country's preparations. The IAEA guidance in this area thus provides a good basis for the work of the nuclear new-build coordinator. Second, an external review would be an important risk-reducing acknowledgment for stakeholders interested in making investments in the nuclear power area in Sweden. It is therefore the intention of the nuclear new-build coordinator to proceed with such a review during 2024-2025.

7. Further activities of the inquiry

From autumn 2024, the nuclear new-build coordinator intends to deepen the efforts linked to the reported recommendations, in particular regarding the design of a program organisation, strengthened local planning and preparations for an external review. It is also a high priority to initiate dialogue with additional authorities to fully understand their part in the process related to new nuclear power. Within the Government Offices, it will be time to prepare for an interdepartmental working group to expand the opportunities for effective coordination between the relevant ministries. It will also be important to achieve a more detailed roadmap description that clarifies the role of all stakeholders in the expansion of nuclear power.

Carl Berglöf, National Nuclear Power Coordinator

¹⁷ INIR mission (Integrated Nuclear Infrastructure Review)