Draft Memorandum on Scope and Level of Detail

SEA-r location study for two new nuclear power plants

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Ministry of Climate Policy and Green Growth
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Contents

1. Introduction

1.1 Nuclear power plants in the Netherlands' energy mix

The Netherlands aims to be climate neutral by 2050. Nuclear energy can make an important contribution to that goal. For this reason, the Dutch government sees a valuable role for nuclear energy in our future energy mix. The government has therefore decided to go ahead with preparations for two new nuclear power plants. The Ministry of Climate Policy and Green Growth is initiating a planning procedure for the construction of two new nuclear power plants. The first phase of this procedure involves a scoping exercise to find a suitable location for the construction of two nuclear power plants.

1.2 An environmental impact report on the choice of locations for the nuclear power plants

Completing a plan environmental impact assessment procedure (SEA or EIA procedure) is mandatory for this scoping exercise. This draft Memorandum on Scope and Level of Detail marks the starting point of that procedure. The procedure is explained further in Section 2.3, *The EIA procedure briefly explained*. As such, this document provides the research parameters for the scoping exercise into suitable locations for two nuclear power plants. This document describes which issues and aspects are important and which locations will be investigated (the scope) and how they will be investigated (the level of detail). The document is organised as follows.

Terminology: EIA-r or EIA?
The abbreviations EIA and EIA-r are both used in environmental impact assessments. The abbreviation EIA denotes the complete procedure, the environmental impact assessment. EIA-r stands for the environmental impact report.

1.3 Guide to reading this document

The structure of this draft Memorandum on Scope and Level of Detail and the points covered are as follows:

- Chapter 1 describes what a nuclear power plant is, the reasons for building new nuclear power plants and the objectives and principles governing this project. This enables a better understanding of the rest of the content of the document.
- Chapter 2 describes the EIA procedure in more detail, explaining why the procedure is necessary, what the objectives of the procedure are and what happens during the procedure. It emphasises the importance of participation in drawing up this document and specifies the competent authority and the initiator of the project.
- Chapter 3 contains an evaluation of the safeguarding policy that has been in place since 1986. This policy establishes the framework for suitable locations for nuclear power plants. The policy is explained in this chapter, as are the results of the investigation into the continued suitability of the locations identified previously.
- Chapter 4 details the process of moving from relevant areas to possible locations for nuclear power plants.
- Chapter 5 describes the reference situation against which potential establishment locations will be evaluated. Autonomous developments are discussed, along with tangential projects that may have a bearing on the construction of the two nuclear power plants.
- Finally, Chapter 6 contains an explanation of the methodology and the criteria used in the EIA-r for investigating the locations.

Various sources have been used when drawing up this draft Memorandum on Scope and Level of Detail. Sources are indicated in the text in *italics* and included in the list of sources in Appendix 6.

1.4 What is a nuclear power plant?

Power plant

A nuclear power plant is a power station that generates electricity using the energy released from nuclear fission. During nuclear fission, an atomic nucleus splits into two or more lighter fragments, generating significant quantities of energy. In the case of a nuclear power plant, the nucleus in question is a uranium nucleus.

A nuclear power plant is safely shielded by steel and concrete. Inside are hundreds of so-called fuel rods made of uranium oxide, held within a reactor vessel filled with water. The nuclear fission takes place in the fuel rods as water flows past. The energy from the nuclear fission is released in the form of heat, which is absorbed by the water, which then heats up in turn. The hot water circulates through the reactor vessel under high pressure until it reaches the steam generator. There, the heat is passed to a secondary water circuit in which steam is generated. This type of reactor is called a pressurised water reactor (PWR).

As in any other power station, a steam turbine is used to generate the electricity. The turbine is situated on an axle that drives a generator. The electricity produced by the generator is supplied to the power grid. The figure below depicts this process at the Dutch nuclear power plant in Borssele.

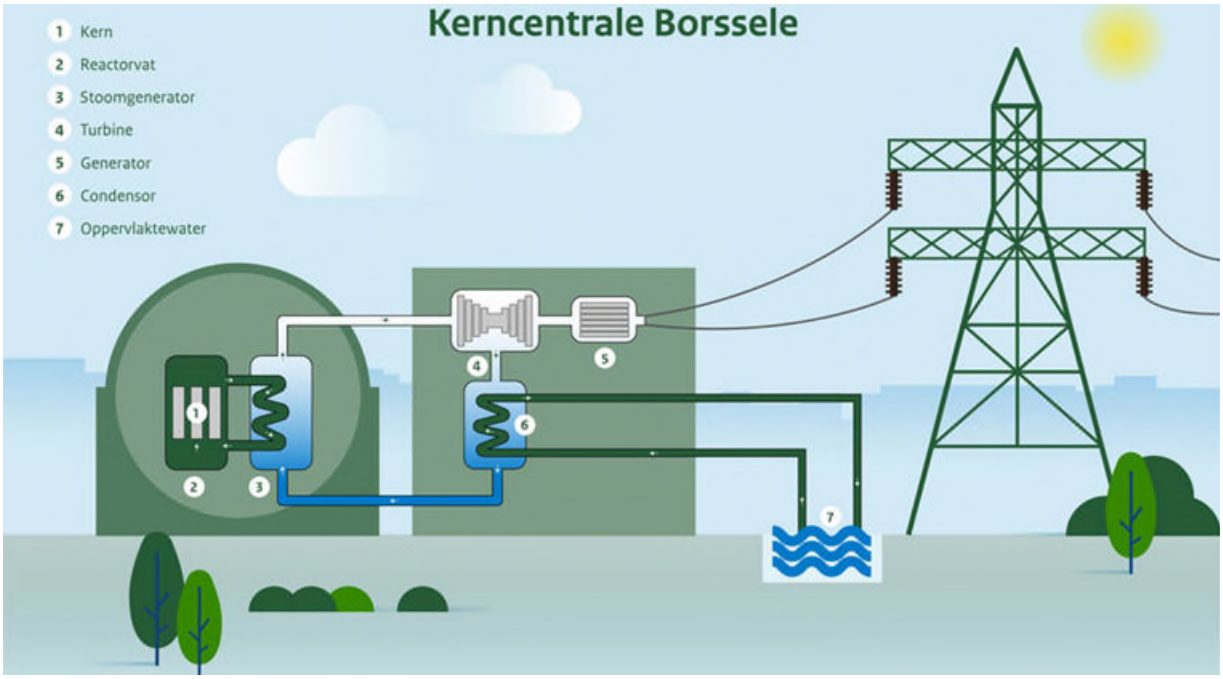

Figure 1-1 How a nuclear power plant works (example of Borssele), Authority for Nuclear Safety and Radiation Protection.

Cooling

After use, the steam is cooled into water in a condenser (a collection of tubes containing steam; see no. 6 in Figure 1-1). In the Borssele nuclear power plant, the cooling takes place by passing cold surface water from the Western Scheldt through the condenser (see no. 7 in Figure 1-1). This nuclear power plant has three segregated water/steam circuits, which means water from the reactor does not enter the turbine or cooling system. An alternative to surface water cooling is the use of cooling towers, as in the case in the Belgian nuclear power plant at Doel. The large nuclear power plants for which technical feasibility studies are now being conducted are pressurised water reactors with three segregated water/steam circuits.

Carbon neutral

Nuclear energy can supply zero-carbon energy on a large-scale (*IPCC, 2023*). However, CO_2 is released during the construction of a nuclear power plant (depending on the construction methods), during the extraction of uranium – which serves as fuel – and during monthly test operation of backup diesel generators.

1.5 Why do we need new nuclear power stations?

The Netherlands aims to be climate neutral by 2050. This has implications for our future energy system. The generation, transport, storage and use of energy will have to change. One of the most important steps in making the Netherlands' energy consumption more sustainable is electrification, also known as the energy transition from fossil fuels to electricity. This transition is one of the main reasons why demand for carbon-neutral electricity will increase considerably in future, as is evident from the results of the *Climate and Energy Outlook*. In addition, there is a European agreement to end net CO_2 emissions from the production of electricity by 2040. That means our challenge going forward is to generate more electricity while at the same time making it carbon-neutral.

The *National Energy System Plan (NPE)* provides a clearly defined roadmap for the development of the energy system up to 2050. The NPE sets out important choices that will lay the foundations for the Netherlands' future energy system. For example, the use of as many different sources of energy as possible, along with the construction of the required infrastructure. Two important priorities linked to this goal are generating sufficient energy (domestic and imported), and ensuring adequate energy infrastructure is available well ahead of time. This will facilitate the shift to sustainability for sectors which are major consumers of energy (the built environment, mobility, industry and agriculture). The government is taking this opportunity to obtain a good overview of the entire energy system. Nuclear energy is part of that shift: from the 0.5 GW (gigawatts) currently generated (by the existing nuclear power plant at Borssele) to approximately 3.5 GW of nuclear energy as soon as possible after 2035 (anticipated with the proposed construction of two new nuclear power plants) (*Letter to Parliament of 9 December 2022, Parliamentary Paper 32645, no. 116).*

The NPE assumes growth in the volume of nuclear energy generation as soon as possible after 2035 from 3.5 GW to 7 GW of nuclear energy by 2050. Ultimately, in 2050 nuclear energy will supplement wind and solar as a source of electricity.

Considerations related to nuclear energy

There are a number of reasons for choosing to generate more nuclear energy. Investing in nuclear energy will help make the Netherlands' electricity supply more stable by diversifying the sources of energy used. This will make the Netherlands less dependent on imported energy from other countries. No CO_2 is emitted when generating energy with nuclear power. This is important if we want to reduce greenhouse gases and combat climate change. Another factor is that nuclear power stations take up relatively little space compared to other forms of carbon-neutral power generation (such as wind and solar farms) (*United Nations*).

Moreover, nuclear power plants use technology with a proven ability to supply electricity 24 hours a day. Nuclear power is a reliable source of energy that can deliver constant, stable electricity, regardless of the weather conditions. At times when the sun is not shining and the wind is not blowing, nuclear energy can be counted on to deliver its share of the country's energy needs. This helps ensure that the Netherlands has a reliable energy supply, even at times when large numbers of consumers, businesses and organisations need energy at the same time and renewable sources are insufficient to meet the demand.

Nuclear energy, in the shape of the Borssele nuclear power plant, has been part of our energy mix since 1973. With a capacity of 485 MW (megawatts), this power plant produced just over 3% of the total energy generated in the Netherlands in 2021. That is enough electricity to power a large city, including trams, trains and a major airport. Two new nuclear power plants with a joint capacity of 2,300 to 3,300 MW would be able to generate 4 to 7 times more energy. They would be able to meet 9 to 13% of our expected energy demand by 2035 (*Letter to Parliament of 9 December 2022, Parliamentary Paper 32645, no. 116*).

Alongside the advantages mentioned above, there are also issues that need to be considered with regard to nuclear energy, particularly concerns about the safety of nuclear installations. Safety is an absolute precondition for the operation of a nuclear power plant. For this reason, Dutch nuclear reactors are required to comply with strict national and international safety standards. As a result, the risk of accidents is very small. Should an incident nonetheless occur, there are a significant number of technical measures in place to limit the impact.

Assuring safety
Nuclear facilities are under strict national and international oversight. The chances of an accident involving a nuclear reactor are very small. Nuclear facilities must comply with very strict standards. The Authority for Nuclear Safety and Radiation Protection (ANVS) oversees compliance with those standards. A nuclear power plant requires a licence under the *Nuclear Energy Act*. The licence sets out requirements to protect people and the environment. This assures that a new nuclear power plant is safe. Moreover, the EIA-r considers any potential differences for different locations – for example, a higher risk of an emergency due to activities in the surrounding area, climate change or the suitability of the soil. The EIA-r also highlights any differences between the consequences of an emergency at different locations, for example because an area is densely or sparsely populated.

Nuclear power generation produces radioactive waste. In the Netherlands, this waste is stored above ground for at least 100 years and managed by the Central Organisation for Radioactive Waste (COVRA) in the municipality of Borsele in Zeeland province. Ultimately, the radioactive waste must be stored underground, in a so-called geological disposal facility. This ensures that it remains isolated from the human living environment for thousands of years. A roadmap is currently being developed to achieve a geological disposal solution as part of the *National Radioactive Waste Programme (NPRA)*. This will bring forward the date of the decision, which was previously set for 2100. Bringing forward the decision date makes it possible to also bring forward the delivery of the final disposal solution. Safe storage of radioactive waste is a responsibility that future generations will also have to bear.

The construction of nuclear power plants is subject to a planning procedure and a licensing process involving many different challenges and risks. Any estimates about construction costs and the duration of the construction project are therefore as yet uncertain. Incidents and geopolitical developments elsewhere in the world could also have a considerable impact on this project – the construction of two new nuclear power plants at a single location. On the one hand, they could lead to additional requirements being introduced for the design of the reactor, possibly with significant financial implications, as after the Fukushima disaster. On the other hand, they could have a tremendous impact on the public image of nuclear reactors and the ability to generate broad public support for nuclear energy.

Weighing up all of these considerations, the Dutch government sees a valuable role for nuclear energy in our future energy mix. For this reason, the Schoof government is now committed to the – eventual – construction of four nuclear power plants in the Netherlands. The procedure for the construction of the first two new nuclear power plants, which will be built at a single location, has begun.

Environmental considerations related to nuclear energy in the energy mix
In its other nuclear energy projects (the operating life extension of Borssele nuclear power plant and the *NPRA*), besides investigating the concrete environmental consequences of the plan or project, when inviting responses from the affected public and the Netherlands Commission for Environmental Assessment (NCEA), the government has asked them to consider the (environmental) arguments based on which nuclear energy in general may be regarded as useful or essential for the Netherlands' energy supply.

This has led the Ministry of Climate Policy and Green Growth to conduct a supplementary study identifying the positive and negative environmental impacts of nuclear energy in the energy mix. The results of the study will be considered in the process of deciding whether to build nuclear power plants, along with, inter alia, the environmental impact report. This will consist of an initial decision on the so-called 'preferred solution', followed by the final project decision. The affected public can participate in both decisions. The results of the study will also be directly included in the legislative procedure for the operating life extension of the Borssele nuclear power plant.

The progress of the studies may be tracked on the website *www.overkernenergie.nl*. This website also provides information on the opportunities for participation.

1.6 Objective

1.6.1 Objective of the project

As part of a reliable, climate-neutral energy supply in the future, the government of the Netherlands envisages the construction of four new nuclear power stations. This project is concerned with identifying a suitable location for the first two nuclear power plants. The project objective is:

"The spatial integration of two new nuclear reactors at a single location in the Netherlands with a proven design (Generation III+), each with the capacity to deliver more than 1,000 megawatts (MW)."

The project centres on the construction of two new nuclear power plants at a single location[1]. Other types of solutions, such as alternative forms of power generation, are not part of this project. The vision of the energy mix is set out in the *NPE*. The operating life extension of the existing nuclear power plant in Borssele and the manner in which radioactive waste is stored are also not part of the project. Separate EIA procedures are in progress for both these decisions – the *NPRA* and the Operating Life Extension of the Borssele Nuclear Power Plant.

Planning approach to nuclear power plants 3 and 4
The task of investigating options for two new nuclear power plants in this project procedure was issued by the previous government (Rutte IV).

The *Governing Programme* of the Schoof government articulates the aim of building not two but four nuclear power plants. It specifies that the nuclear power plant in Borssele will remain open and that the construction of two new nuclear power plants will be taken forward. In addition, there will be two extra nuclear power plants, with the option of building multiple small plants also being considered. In accordance with the *Governing Programme*, the project procedure will be continued under the Schoof government.

There are substantial demands for space for the energy transition, but also for other aims, such as defence and housing. This in itself makes the siting of two nuclear power plants in the Netherlands a complex matter. Based on the existing assumptions, that may be even more the case for a third and fourth nuclear power plant. In order to cope with this complexity, the government has adopted a twin-track planning approach for nuclear energy. For the construction of the first two new nuclear power plants, the government will adhere to the existing assumptions and policy considerations concerning locations for nuclear power plants, within the project procedure of which this Memorandum on Scope and Level of Detail is part. For nuclear power plants 3 and 4, the government will follow a second track within the framework of the National Energy Network Programme (PEH). Nuclear power plants 3 and 4 are therefore not part of this project procedure.

Under the PEH, the desirability of adopting different policy assumptions for the subsequent aims will be considered, based on the overall challenge for the future energy system and in connection with other planning aims. Naturally, the results of the studies in the ongoing project procedure will be utilised in the PEH, for example for potential new siting policy for nuclear energy. The PEH will also provide direction for the siting of nuclear power plants 3 and 4. Following the adoption of the PEH (planned for 2028), the project procedure for nuclear power plants 3 and 4 can also be initiated.

1.6.2 Objective of the SEA-r

This phase of the project centres on the choice of location. In the SEA-r, reasonable alternatives (locations) will be compared on all the relevant aspects of the physical living environment in order to arrive at a Preferred Alternative. These aspects are listed in Chapter 6. The SEA-r will thus fulfil the European and national requirement to draw up an EIA-r.

[1] In terms of affordability, the assumption is that the construction of the two nuclear plants will be most cost-effective if they can be built at a single location and in sequence. If this is case, the construction of the second nuclear reactor will start somewhat later than the first.

1.7 Areas to be explored for locations

Provided all the safety requirements are met and the land use/zoning plan allows, it is possible to build nuclear power stations anywhere in the Netherlands. Those requirements include sufficient cooling water, distance from homes, high quality electrical network, etc. In the past, various studies have been conducted into suitable locations for the siting of nuclear power plants. Based on those studies, locations were selected at which it was decided to deny permission for certain developments, such as housebuilding, to leave open the option of constructing nuclear power plants there. This is known as the safeguarding policy. The studies into these safeguarded locations provide the starting point for this study.

1.7.1 Safeguarded locations

In order to facilitate the siting of new large-scale power plants (with a power output of over 500 MW), and nuclear power plants in particular, in the 1970s the government started designating specific areas for this purpose. Those locations were defined in a Key Planning Decision in 1986, an SEA-r and a new Key Planning Decision in 2008. This approach is legally enshrined in the *Living Environment (Quality) Decree* and is part of the so-called 'safeguarding policy'. The locations are:

- The 'Borssele' location, also known as Sloegebied or 'Borssele/Vlissingen'[2];
- The 'Maasvlakte I' location (in the Rotterdam port area);
- The 'Eemshaven' location in Groningen.

The legal foundation for the policy is contained in the instructions in Articles 5.156 (2) and 5.158 of the *Living Environment (Quality) Decree*. Those articles oblige government agencies and other parties involved to take specific measures in order to comply with the environmental values and assure the general duty of care.

The *PEH* of 2024 provides guidance with regard to the space requirements for the different elements of the Dutch energy system in 2050. In it, the safeguarding policy for Borsele and Maasvlakte I is reconfirmed. The document contains a commitment to build two new nuclear power plants (generation III+ reactors) with a combined capacity of approximately 3 GW. It also notes that Eemshaven has been dropped as a safeguarded location. The latter decision dates back to a legislative consultation meeting on 4 March 2021. At that meeting, the *Beckerman motion* was adopted, which urges that Eemshaven be dropped as a safeguarded location. With the *Mulder & Sienot motion*, the House of Representatives has also expressed the intention not to build a nuclear power plant in the province of Groningen. The reason stated in the motion is that the consequences of gas extraction are still considerable in Groningen and earthquakes have continued to occur. Eemshaven has not yet been formally removed from the *Living Environment (Quality) Decree*, although this action has been initiated. The proposed change to the *Living Environment (Quality) Decree* was put out to online consultation for 4 weeks from late March 2025. It is expected to come into effect on 1 July 2026. Omitting Eemshaven from the safeguarding policy does not mean that no nuclear power plants can or may be constructed there, only that this location will no longer be kept free of activities that might be impediments to nuclear power plants.

The safeguarding policy stipulates that the construction of nuclear power plants should be possible at the specified locations. It is also imposes certain conditions on the developments permitted at those locations to ensure ('safeguard') that the construction of the nuclear power plants remains possible.

1.7.2 Additional locations: Terneuzen and Maasvlakte II

As part of the project, an 'update report' has been drawn up; see Appendix 1. In this update report, the studies and conclusions underlying the safeguarding policy are analysed in order to determine whether other promising alternatives should also be considered for the construction of two nuclear power plants. The update report recommends that two additional areas (Terneuzen and Maasvlakte II) be considered in this EIA procedure. Chapter 3 of this draft Memorandum on Scope and Level of Detail contains a detailed summary of the origination of the safeguarding policy and further explanation of the recommendations from the update report.

[2] In previous documentation, the name 'Borssele' was used. This memorandum also considers areas in Vlissingen municipality, as well as a location in Borsele municipality. For this reason, the name 'Sloegebied' is used in this memorandum except where reference is being made to historical documents (such as in Chapter 2), in which case the name used at that time is retained here.

1.8 Safety: SSR-1 and SSG-35 provide the basis for the choice of location and the environmental impact report

A number of aspects contribute to making a location more or less suitable for the construction of a nuclear power plant. Safety is a key area of concern. The safety criteria relevant to locations for nuclear power plants are outlined in the international documents of the International Atomic Energy Agency (IAEA); see also Appendix 4. The *Specific Safety Requirements 1 (SSR-1)* and the *Specific Safety Guideline 35 (SSG-35)* will be used in this scoping exercise to weigh up decisions on locations. This guideline describes safety considerations relating to:

- Volcanism, earthquake risk and soil conditions;
- Flood risk;
- External safety risks caused by human actions, such as the presence of potentially high-risk industry, aircraft crashes or acts of war;
- Extreme meteorological events, such as drought, hurricanes, tornadoes, etc.

In cases where locations score lower on these criteria, adjustments to the design of nuclear installations will be necessary in order to meet the high safety requirements, or certain measures will have to be taken to improve the suitability of the location. Such adjustments and measures may affect the cost and duration of the project.

In addition to the aspects mentioned above, the following factors also carry significant weight when searching for suitable locations for nuclear facilities:

- Distance from highly populated urban centres and the ability to meet the requirements in relation to the safety of local residents;
- Accessibility, for example for the emergency services and for the delivery and collection of materials;
- The presence of sufficient and suitable water for cooling;
- The suitability of the electrical infrastructure and future opportunities for the investment in modifications to the electricity infrastructure;
- The presence of potential users/purchasers for the energy generated (and possibly the residual products);
- The potential for spatial integration, including the related measures, such as earth moving or changes to infrastructure.

These requirements have implications for the choice of locations to be investigated in the SEA-r and/or the assessment framework.

1.9 Generation III+ nuclear power plants

Four generations of reactor technology

The development of reactor technology can broadly be divided into four generations. The first two generations can be ruled out based on their design concepts. The first generation (Gen I) were prototypes and proof-of-principle reactors. Modern, standardised second-generation (Gen II) designs, while economically attractive, do not meet the additional safety requirements which apply today.

Third-generation reactors (Gen III and III+) represent a technical evolution from generation II reactors, with improved operating life, fuel technology, thermal efficiency and standardised designs. The additional safety requirements described above have already been incorporated into the design of generation III+ reactors. These modern plants are also capable of more flexible generation and can therefore be combined more effectively and efficiently with solar and wind power.

Finally, there are the fourth-generation reactors (Gen IV). These are the reactors of the future and feature a wide range of design concepts that are not currently operational. For example, the designs of these reactors may be based on alternative cooling technologies (such as molten salt) or a different energy source (such as thorium). Benefits are expected from this generation of reactors in terms of safety, and potentially also reduced production of radioactive waste.

Small Modular Reactors (SMRs)
Since the beginning of this century, alongside large nuclear power plants, so-called Small Modular Reactors (SMRs) have also been under development. There are many different designs of SMRs which are in different stages of development. Compared to conventional reactors, SMRs tend to have lower power outputs. In some design concepts, the modular aspect takes the form of several small reactors which are combined to form a large power plant. In other concepts, parts of the plant are constructed as small modules which are then assembled on site.

The government is contributing to research and innovations for SMRs and molten salt reactors. This does not currently fall under the scope of the PEH of 2024 and this environmental impact report.

In elaborating the tasks defined for nuclear energy, the *Letter to Parliament of 9 December 2022* stated the intention of choosing generation III+ reactors for the construction of the two new power plants. It is assumed that the two plants, with a combined capacity of between 2.2 and 3.3 GW and a capacity factor of 90%, will contribute some 24 TWh (Terawatt hours) per year between them. Based on this assumption, the plants will account for between 9 and 13% of electricity supply in 2035 (*Letter to Parliament of 9 December 2022, Parliamentary Paper 32645, no. 116*).

One of the reasons to opt for generation III+ reactors is that these reactors are proven to be safe. It is a more advanced reactor type, with improved safety characteristics compared to previous generations. These reactors are also already in operation, allowing realistic and feasible planning and cost estimates to be made and delivered. By significantly expanding the contribution of nuclear power, this makes these reactors the fastest available route to a stable, carbon-neutral and diverse energy system. They combine passive and active safety design features, which means they can cool down without human intervention or electronic feedback. Based on experience gained in other countries, this choice will also result in an improved ability to estimate the construction costs and timetable.

Technical feasibility study
Talks are currently underway with a range of suppliers about manufacturability and the likelihood of permits being granted for different designs. They will also be asked to conduct a technical feasibility study. The site adjacent to the existing Borssele nuclear power plant will be used for this purpose. This is separate from the preferred location, which is part of the Preferred Solution under the project procedure. Using the information from this study, the government will draft a tender document aimed at selecting a supplier and design, plus any additional conditions. It has yet to be decided who will operate the plant. The final decisions on these matters will be taken at a later stage. Information from the feasibility studies may become available in the interim, including information about the size of the nuclear reactors and the construction sites. Such information may yield guiding principles that will be observed as far as possible in the studies in this procedure.

Table 1-1 provides an overview of the suppliers, types and capacities of the nuclear power plants. All types are advanced pressurised water reactors.

Table 1-1 Overview of potential suppliers and types of nuclear power plants.

Supplier	Type	Capacity (approximate)
Westinghouse	AP 1000	1,100 MW
EDF	EPR 1650	1,650 MW

1.10 Space required during the construction and usage phase

The basic assumption when judging the availability of a location is that there must be a prospect of acquiring a location for two new nuclear power plants. The plot in question will preferably be undeveloped. In the absence of such a plot, the search will be widened to include plots that can be cleared for the construction of the plants.

Space is needed to accommodate the two new nuclear power plants. In addition, over a relatively long period (10-15 years), additional space will also be needed for the construction of the plants, for example construction sites. Six types of land use are differentiated for this purpose. The space requirement is known up to a point, but the exact requirement needs to be determined and will be subject to optimisation once a location is chosen:

Final site for which the bandwidth of the land footprint is known (50 – 60 hectares):

1. Main site
   This comprises the site of the reactors, the pump buildings, the turbine building, the control room, essential parking, security fence, etc.

Land used in the construction phase for which the bandwidth of the land footprint is known (60 – 70 hectares additional):

2. Access roads and parking (adjacent to the main site)
   Direct access roads (possibly two, in order to comply with safety regulations) leading to main roads and parking spaces adjacent to the site.

3. Storage, construction equipment and manufacturing (adjacent to the main site)
   Storage of construction materials, the installation of a concrete plant, storage and workshops for civil engineering installations. Ideally, but not necessarily, these functions will be situated on the main site. A site directly adjacent to the location would make construction easier.

Land used in the construction phase for which the bandwidth of the land footprint is not known:

4. Parking spaces during construction (outside the construction sites)
   The size of the parking area required during construction depends on the location and the number of workers needed based on the construction plan. This in turn leads to future choices about, for example, a central P+R, separate parking facility, stacked parking in a two or three-storey temporary building. The space required for this purpose is not yet known.

5. Accommodation (outside the construction sites)
   The amount of accommodation required will depend on the choices to be made, such as the construction timeline, the supply of housing in surrounding municipalities, options for an on-site campus (by way of comparison: at Hinkley Point, the on-site campus consisted of up to 700 apartments close to the construction site), the possibility of constructing temporary structures, etc. The space required for this purpose is not yet known.

6. Soil storage (outside the construction sites)
   Depending on the location, a plateau may be needed in order to meet water safety requirements. In addition, excavations will be required for the installation of the reactors. These groundworks may result in large-scale soil displacement. Temporary storage for the soil must be available in the vicinity of the construction location. The space required for this purpose is not yet known.

For each alternative, the SEA-r specifies whether and to what extent the required sites for types 2 to 6 are expected to fit within the port areas and/or whether footprints and impacts are anticipated outside the port areas.

2. Environmental impact assessment

The EIA procedure is explained in more detail in the next chapter. We first explain why we have opted for an SEA-r (section 2.1), what the purpose of the SEA-r is (Section 2.2) and how the EIA procedure will proceed (Section 2.3). Section 2.4 then details the public consultation and participation process – both participation which has already taken place and future opportunities for participation in the EIA procedure. The chapter concludes with a brief description of the initiator and lead party within the EIA procedure and the eventual preferred solution.

2.1 Why an environmental impact assessment?

In the Netherlands, the regulations governing environmental impact assessments are set out in Section 16.4 of the Environment and Planning Act and Chapter 11 and the accompanying Appendix V of the Environment and Planning Decree. The Environment and Planning Decree establishes the requirement to complete an EIA and draw up an EIA-r for developments involving potentially significant adverse (environmental) impacts. Appendix V, column 1, row C3 (see Table 2-1), stipulates that an EIA must be carried out for the construction of a nuclear power plant.

Table 2-1 Appendix V of the Environment and Planning Decree, column 1, row C3.

Projects	Cases in which the EIA requirement applies (Article 16.43(1), opening lines and (a) of the Act).	Cases in which the EIA evaluation requirement applies (Article 16.43(1), opening lines and (b) of the Act).	Decisions as referred to in Article 11.6(3)(c) of this decree
C3: Nuclear power plants and other nuclear reactors, including the dismantling or decommissioning of those plants or reactors, with the exception of research facilities for the production and processing of fissile or fertile nuclear material, with a constant capacity of up to 1 kW (thermal).	Establishment	Modification or expansion	The licence under section 15 of the Nuclear Energy Act.

In the Netherlands there also exists a so-called SEA requirement for plans and programmes which establish the framework for other activities which are subject to a mandatory environmental assessment. This also applies to plans and programmes for which an appropriate assessment must be made (if significant impacts on Natura 2000 sites cannot be ruled out). In this case, the Preferred Solution is the plan which sets the framework for the establishment of two new nuclear power plants and for which an appropriate assessment is drawn up.

The purpose of the EIA procedure is to ensure that full account is taken of the environmental interest in the planning and decision-making at an early stage and to investigate the feasibility of a plan or project. An EIA is always linked to a decision, in this case the Preferred Solution which stipulates the location for the nuclear power plant.

The difference between a plan and project EIA-r relates, inter alia, to the level of detail and the objective. An SEA-r is concerned with making assessments at a higher level of abstraction (and therefore also involves research at a higher level of abstraction). An SEA-r considers the environmental impact of policy plans and programmes and, in this case, the Preferred Solution, at a strategic level. In this project, the SEA-r involves comparing reasonable alternatives – the different locations – and investigating impacts on the local environment, in order to inform choices of areas and locations. The specifics are then considered in follow-up procedures and the accompanying project EIA. A project EIA-r assesses the environmental impacts for the purposes of the project decision and the licensing process, and is more detailed. A visual representation is shown in Section 2.3, *The EIA procedure briefly explained*.

2.2 Purpose of this environmental impact assessment

Completing an EIA procedure has various goals. The most important goal is to fully weigh the environmental interest in the choice of location for the two nuclear power plants. This is achieved by conducting impact studies for the realistic alternatives. Figure 2-1 shows objectives that help in determining the realistic alternatives and fully weighing the environmental interest.

Figure 2-1 Objectives of this SEA procedure.

Understanding the current state of the physical living environment and the reference situation

The basis for investigating different reasonable alternatives is understanding the current situation at those locations. That means, for example, understanding the existing ecological, archaeological and cultural-historical values, current traffic flows, elevation, nature reserves, etc. It is also important to understand trends such as climate change, population growth and nature development.

Finally, the reference situation of each area is identified. This is the future situation that will be created if the two nuclear power plants are not built but other agreed policy and developments – the autonomous developments – do go ahead. The reference year is 2040. This is a commonly used reference year for the SEA-r. The relevant considerations for this choice of reference year are:

- the commissioning of the nuclear power plants is expected to take place after 2035;
- data for the SEA-r, for example for traffic and air quality, will be easily obtainable before that date.

Understanding the impacts of two generation III+ nuclear power plants on the physical living environment

A nuclear power plant has various impacts on the physical living environment. For instance, there are impacts due to the footprints of the plants. This can have consequences for existing values, such as flora and fauna or buildings of cultural-historical value. There are also indirect impacts, such as from the use of cooling water. Finally, there are impacts resulting from construction, such as noise, extra traffic and transport and additional nitrogen deposition on Natura 2000 sites. This is set against positive impacts, such as energy supply and the economic contribution to the region. Both this draft Memorandum on Scope and Level of Detail and the SEA-r will focus on all the relevant aspects of the physical living environment. This is explored in more detail in Chapter 5.

Investigating alternatives: identifying different reasonable alternatives

The heart of an EIA procedure is the investigation of alternatives. Based on the safeguarding policy, this draft Memorandum on Scope and Level of Detail involves an initial narrowing down of areas with potential for the construction of two new nuclear power plants to promising plots. This is described in Chapter 4. In the SEA-r, the remaining reasonable alternatives are further investigated on all relevant aspects of the physical living environment (including the *SSR-1* and *SSG-35* criteria).

Identifying risks and opportunities for the follow-up procedures

The SEA-r will conclude with an assessment table containing pluses and minuses for each aspect for the reasonable alternatives. The SEA-r also describes the possible risks, issues to be considered and opportunities for each alternative. These can provide the basis for the studies in the follow-up procedure and the project EIA-r.

Importance of transparency

Finally, the EIA procedure and the SEA-r will help support the choices and decision-making on the preferred location for the construction of two new nuclear power plants. In this connection, it is important that the EIA procedure and the drafting of the SEA-r has taken place in a manner which is transparent and comprehensible to all. For this reason, this draft Memorandum on Scope and Level of Detail has been drawn up as a research design for the SEA-r.

2.3 The EIA procedure briefly explained

In order to identify a single location for two new nuclear power plants, the national government will complete a project procedure. The scoping exercise will result in the selection of a preferred location in a Preferred Solution. The Preferred Solution is a plan or programme which in this case is subject to a mandatory SEA requirement, on the one hand because the Preferred Solution provides the framework for the project decision for a project designated in Appendix V of the Environment and Planning Decree, on the other because consequences of this project for Natura 2000 sites cannot be ruled out in advance and an appropriate assessment needs to be made. Because a Preferred Solution establishes the framework (determines the location) for the subsequent licensing procedure, there is an SEA procedure.

This draft Memorandum on Scope and Level of Detail provides the starting point for the SEA procedure. The SEA procedure ends with the SEA-r, in which possible alternative locations are described and the impacts assessed for all relevant aspects of the environment, the physical living environment and safety. In addition, an Integrated Impact Analysis (IIA) is drawn up, in which cost, technical aspects and the opinions of local stakeholders are also considered. These research reports provide the decision-making information based on which the Minister of Climate Policy and Green Growth and the Minister of Housing, Spatial Planning and the Environment can choose a preferred location for two new nuclear power plants. This is the ‘Preferred Solution’.

Figure 2-2 depicts the overall project procedure, including the process that will be completed in the EIA procedure. This is explained further below the figure.

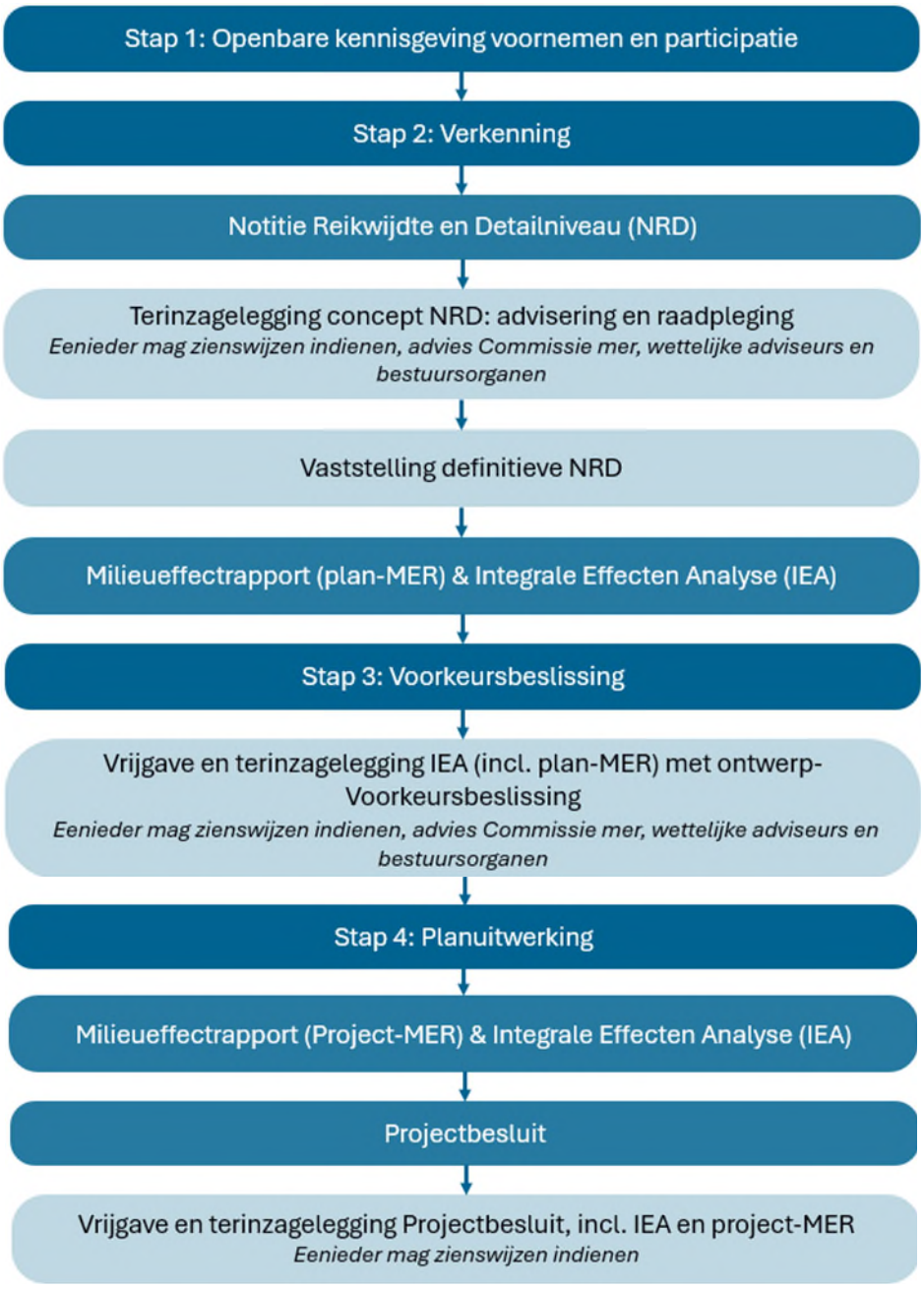

Figure 2-2 Steps in the project procedure including the SEA procedure

Step 1: Notification of intention and proposal for public participation

The first formal step of the project procedure is the notification of intention and proposal for public participation. On 22 February 2024, a public notification of the intention to build two new nuclear power plants was issued by means of the *Intention and Proposal for Public Participation* (kennisgeving nieuwbouw kerncentrales).

Step 2: Scoping exercise

Publication of the intention is followed by the start of the scoping exercise. That step begins with this draft Memorandum on Scope and Level of Detail. The draft Memorandum on Scope and Level of Detail provides more detail on the intention and the process. It also describes which locations will be investigated in the SEA-r and how the relevant studies will be conducted. The draft Memorandum on Scope and Level of Detail will then be available for public inspection for six weeks. During that six-week period, anyone (citizens, civil society organisations, companies and institutions) can submit a response to the content of this draft Memorandum on Scope and Level of Detail and the forthcoming SEA-r. The affected public and the competent authorities from neighbouring countries can also submit responses (in accordance with Article 11.24 of the Environment and Planning Decree). Additionally, the government's statutory advisors will be consulted on the scope and level of detail of the impact

studies. They are the ministers of Infrastructure and Water Management, Education, Culture and Science, and Agriculture, Fisheries, Food Security and Nature, plus designated advisors (such as the Cultural Heritage Agency of the Netherlands). The NCEA will also be asked to advise on how to approach the scope and level of detail when drawing up the SEA-r. Its recommendation will be published on the NCEA website.

The recommendations and responses received during the consultation on the scope and level of detail will be evaluated to determine whether they should be included in the final Memorandum on Scope and Level of Detail and in the implementation of the SEA-r. The final Memorandum on Scope and Level of Detail will be approved by the Minister of Climate Policy and Green Growth and the Minister of Housing and Spatial Planning.

Based on the approved Memorandum on Scope and Level of Detail, the SEA-r will be drawn up, which will identify the impacts of the selected potential locations of nuclear power plants on the (living) environment. In parallel with the drafting of the SEA-r, the Integrated Impact Analysis (IIA) will be drawn up.

The IIA involves conducting studies into the different impacts of the different locations on the various environmental aspects – a summary of the SEA-r, local area, technical concept, cost and future-proofness. It clearly identifies the key impacts (major and/or distinctive impacts) for each location. This information is used by the minister to choose a preferred location for two nuclear power plants.

Step 3: Preferred Solution

As part of the IIA, the SEA-r will be presented for inspection simultaneously with the IIA and the provisional Preferred Solution. Anyone can a submit statement of views in response to these documents in accordance with the relevant procedure. The neighbouring countries will be informed about the SEA-r and the provisional Preferred Solution. Citizens of those neighbouring countries can also submit statements of views. The NCEA will also be asked to evaluate the SEA-r. This recommendation, too, will be published on the NCEA website.

The Minister of Climate Policy and Green Growth and the Minister of Housing and Spatial Planning will jointly approve the Preferred Solution (including the SEA-r). When doing so, they will explain how the SEA-r and the statements of views and recommendations have been reflected in their decision. The Preferred Solution describes the government's preference with regard to the siting of the two nuclear power plants. The Preferred Solution marks the end of the scoping exercise and the start of the plan development phase.

Step 4: Plan development phase

Another EIA procedure is completed in the next step, the plan development phase, involving further detailed studies to identify the preferred location and ultimately resulting in a single project decision. This is the project EIA procedure.

2.4 Your opinion on this draft Memorandum on Scope and Level of Detail

The construction of new nuclear power stations will impact the local area, both during the construction phase and when the reactors are operational. The goal of participation in relation to the draft Memorandum on Scope and Level of Detail is to gather information, local knowledge, areas of concern, ideas and opportunities from local stakeholders.

How will the interests of local stakeholders be reflected in the decision-making process?
The studies for the SEA-r and the IIA will be performed in an objective and consistent manner for all locations. The goal of these studies is to provide a factual representation which can be used to support a decision on the final location. This also means that locations or other issues that arouse resistance must be investigated in this phase.

Due to the objective nature of the investigation, it is not always clear how the views of residents, stakeholders and other public authorities have been weighed in reaching the conclusions. The approach and outcomes of the SEA-r and the IIA are discussed with the provincial and municipal authorities concerned. We do this in order to establish a shared view on the information to be presented to the competent authority (the ministers of Climate Policy and Green Growth and Housing and Spatial Planning) in order to take a decision on the location. Besides discussions with other public authorities, in accordance with the participation plan, other channels will also be used to gather information on what citizens, other public authorities and other stakeholders consider important in terms of the choice of location. The outcome of this participation exercise will be published in the Local Stakeholders chapter of the IIA and represents part of information on which the decision-making will be based.

The SEA-r therefore spells out, for the benefit of the competent authority, what all the impacts are and what local stakeholders think of them. Following the delivery of the studies, the competent authority decides how it will weigh all the information, including the regional views. The outcome of this assessment is then published, supported by reasoning, in the provisional Preferred Solution.

What went before?

On 23 February 2024, the former Ministry of Economic Affairs and Climate Policy published the *Notification of Intention and Proposal for Participation* for two new nuclear power plants. This represents the initial step in the project procedure to arrive at a final project decision, the final step in the project procedure. The former Ministry of Economic Affairs and Climate Policy asked interested parties to contribute their views on the studies for and participation in the construction of the two new nuclear power plants between 23 February 2024 and 4 April 2024. Whilst this publication was available for public inspection, four information meetings were held:

- On Tuesday 5 March 2024 in Heinkenszand, Borsele municipality;
- On Wednesday 6 March 2024 in Terneuzen, Terneuzen municipality;
- On Wednesday 13 March 2024 in Vlaardingen, Vlaardingen municipality;
- On Thursday 14 March 2024 in Oostvoorne, Voorne aan Zee municipality.

During this period, approximately 1,370 responses to the *Intention and Proposal for Public Participation* were submitted. The answers to the main points from the responses may be found in the *response memorandum* drawn up by the Ministry of Climate Policy and Green Growth. The *response memorandum* indicates whether and how the responses to the *Intention and Proposal for Public Participation* have been incorporated into the draft Memorandum on Scope and Level of Detail. Both the collated responses and the response memorandum have been published on the *Nieuwbouw kerncentrales* website of the Netherlands Enterprise Agency.

The responses to the *Intention and Proposal for Public Participation* have resulted in several additions. Interested parties were asked to contribute ideas on possible locations for the nuclear power plants and to raise any other concerns. Based on those responses, we have evaluated all the locations put forward in the process in more detail (see also the approach to alternatives that may reasonably be considered in Section 4.2). Where possible, more detail on other issues identified (such as the handling of radioactive waste, the cost of building two new nuclear power plants, (nuclear) safety around nuclear power plants) has been provided with the assessment criteria in this draft Memorandum on Scope and Level of Detail (see Sections 6.2 and 6.3).

How can you respond to this draft Memorandum on Scope and Level of Detail?

Following the publication of this draft Memorandum on Scope and Level of Detail, citizens, civil society organisations, companies and institutions will be able to submit statements of views on the content of this draft Memorandum on Scope and Level of Detail and the forthcoming EIA-r. For more information, go to *www.overkernenergie.nl*.

What are the next steps?

Following the submission of a statement of views or response, an answer will be provided in the form of a response memorandum, as was the case for the *Intention and Proposal for Public Participation*, indicating how the responses to the draft Memorandum on Scope and Level of Detail have been incorporated. Following the incorporation of feedback, the final Memorandum on Scope and Level of Detail will be approved, after which the drafting of the SEA-r and IIA will begin. After delivery, both documents will be presented for inspection with the provisional Preferred Solution, in response to which statements of views can be submitted. Ultimately, the minister will approve the Preferred Solution, identifying the preferred location for the nuclear power plants, so concluding the scoping phase (phase 1) and marking the start of the project procedure.

What is the timetable?

The government considers the expeditious construction of the two new nuclear power plants to be important. Commissioning is envisaged as soon as possible after 2035.

2.5 Competent authority and initiator

New nuclear power stations fall into the category of national energy infrastructure and are therefore of national importance. The Ministry of Climate Policy and Green Growth is the initiator for the choice of location for the construction of two new nuclear power plants; after that point, the role of initiator will pass to a commercial enterprise. The Minister of Climate Policy and Green Growth and the Minister of Housing and Spatial Planning together represent the competent authority for the scoping phase and the choice of Preferred Solution. The roles of initiator and competent authority are carefully separated from one another. In this project, the Nuclear Power Programme Directorate will act as the initiator of the intention. As the competent authority, the Energy Transition Directorate will take the decision on the Preferred Solution.

This decision is reserved for the national government because projects of national importance, such as nuclear power plants, have a significant impact on the national infrastructure and the living environment. Article 2.3 of the Environment and Planning Act specifies that the allocation of tasks and competences between administrative organs must contribute to effective and efficient care for the physical living environment. For this reason, the national government is responsible for decision-making on the preferred location and the further licensing of these nuclear power plants.

3. Current policy on nuclear power plants

The next chapter provides a brief introduction to relevant policy (both national and international), decrees and other binding documents. Section 3.1 begins with a short description of the safeguarding policy, after which Section 3.2 considers policy-making and how it impacts on the selection of potential safeguarding locations in more detail, divided up into the different phases. All of this is considered with a view to the validity of the safeguarding policy in the current situation in Section 3.3.

3.1 Safeguarding policy

It is possible to build a nuclear power plant in the Netherlands if an initiator is able to meet all the conditions for the required licences. In principle, this could be anywhere in the Netherlands, provided the legislation, regulations and safety requirements have demonstrably been met. In the past, studies have been conducted into suitable locations for the siting of nuclear power plants. Based on those studies, locations were selected at which it was decided that certain developments, such as housebuilding, would not be permitted. We refer to this as the safeguarding policy. The safeguarding policy prohibits developments that would render impossible or seriously impair the potential construction of nuclear power plants at the establishment locations Borssele/Vlissingen, Eemshaven and Maasvlakte I. This policy is laid down in the Dutch Living Environment (Quality) Decree, Article 5.158, Safeguarded locations for nuclear energy plants.

This policy has an extensive history, starting with the key planning decision of 1986. An update report may be found in Appendix 1. The latter report analyses whether the assumptions on which the safeguarding policy were originally based are still valid. This involves considering whether, with current insights, the information on which the policy was based would still result in the same choice of safeguarded locations.

The conclusion of the update report is that the establishment and refining of the safeguarding policy has been diligently and comprehensively carried out and that the existing safeguarding locations represent a considered and transparent choice. The existing safeguarded locations are still valid and provide an adequate basis for exploring the construction of two new nuclear power plants. The changes to the local area and the developments in policy and environmental information over the years are not such as to require a reconsideration of the remaining safeguarding locations. However, based on current insights and developments, two additions are recommended for inclusion in the forthcoming EIA procedure for two new nuclear power plants:

- In view of the planned extension of the 380 kV grid to Zeeuws-Vlaanderen, the report recommends further investigation as to whether the Terneuzen location may be a reasonable location alternative[3];
- Maasvlakte II is not included in the policy as a safeguarded location. The report recommends further investigation as to whether this may be a reasonable location alternative.

The findings of the update report are discussed briefly below.

3.2 Policy-making around establishment locations for nuclear power plants

Since the end of the 1970s, in a series of steps, a total of thirty locations have been whittled down to the current locations identified in the safeguarding policy. The process began in 1975 with the first *National Structure Plan for Electricity Supply (SEV)*.

This history is reproduced in brief in Figure 3-1. For a more extensive analysis and overview, the reader is referred to the update report in Appendix 1.

[3] An important fact is that this project is still in the scoping phase, and that therefore there is still no significant dependency between this 380 kV project going ahead and the construction of two new nuclear power plants.

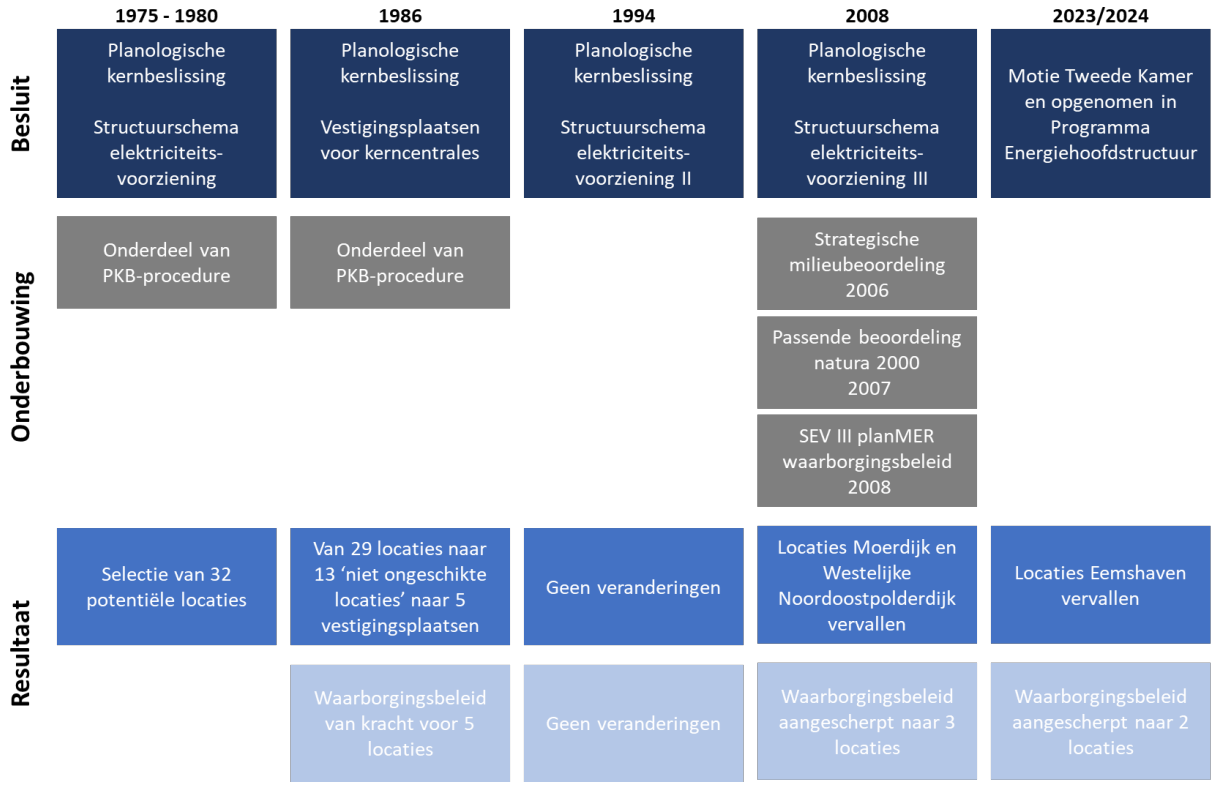

Figure 3-1 Process flowchart of decision-making and selection of safeguarding locations.

Designation of potentially promising locations in the National Structure Plan for Electricity Supply (SEV).

The policy around establishment locations for nuclear power plants dates back to the SEV. This National Structure Plan was published in 1975 by the ministers of Economic Affairs and Public Housing and Spatial Planning. It contained an overview of possible establishment locations for power stations. Those locations were potentially suitable for a total production capacity in excess of 1,000 MW. The selection was based on a study into cooling possibilities (a location close to large water bodies), environmental aspects (such as safety, noise and soil), recreation and landscape aspects.

Eventually, in the *1980 Policy Document on Energy Policy*, 32 locations were selected as potentially promising. Those locations are shown in Figure 3-2.

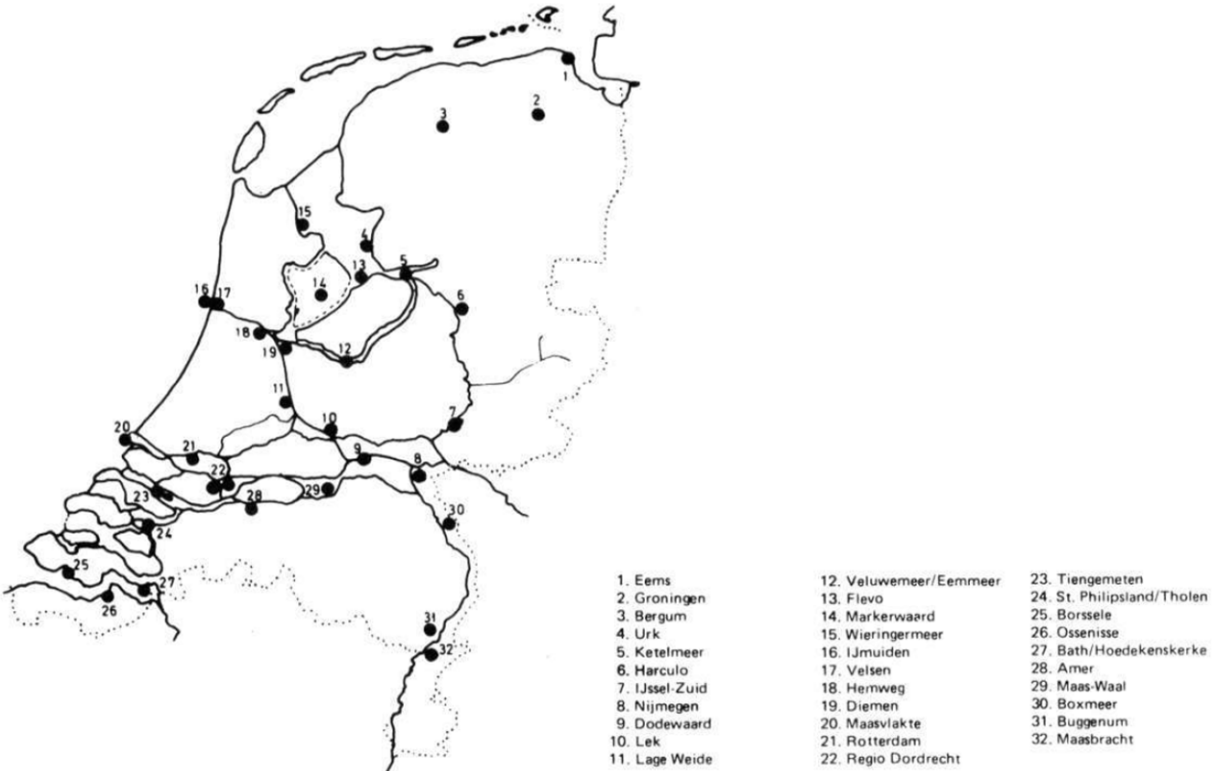

Figure 3-2 Overview of 32 establishment locations for nuclear power plants (Policy Document on Energy Policy, part 3: Power plants, fuel use, Parliamentary Paper, 15802, 1979-1980).

In part D of the SEV, the Government Decision, the number of potentially suitable locations was further reduced to 29. The following three locations were dropped due to practical barriers following further analyses, based on the abovementioned criteria and objections from other public authorities:

- IJssel-Zuid (no. 7);
- Veluwemeer/Eemmeer (no. 12);
- Tiengemeten (no. 23).

The St. Philipsland/Tholen location (no. 24) was replaced by the Moerdijk location.

The newly proposed establishment locations were not closely defined in the SEV. In certain cases, only areas in which the establishment of nuclear power plants might be considered were identified. For a number of those areas, it was noted that it might be possible to install more than a single power generator unit. The SEV also briefly considered the problems of the possible siting of nuclear power plants. The government announced that these issues would be considered in more detail in the future. Further details were provided in the '*Establishment locations for nuclear power plants' Key Planning Decision*.

Initial selection phase: from 29 potential establishment locations to 13 promising locations

In selecting the 29 potentially suitable locations, no distinction was yet made as to the type of fuel to be used – fossil fuel or renewable energy sources. Because nuclear power plants are subject to specific considerations, particularly in respect of safety, only thirteen promising locations were left after the initial phase of the selection process.

The primary reason for dropping potential establishment locations in this phase was that they were located in the immediate vicinity of urban areas. The ten locations that were dropped immediately as potential locations for a nuclear power plant based on this criterion were: Groningen/Hunze (no. 2), Harculo/Zwolle (no. 6), Nijmegen (no. 8), Utrecht/Lage Weide (no. 11), Hemweg/Amsterdam (no. 18), IJmuiden (no. 16), Velsen (no. 17), Diemen (no. 19), Rotterdam/Waalhaven (no. 21) and Dordrecht region (no. 22).

Ossenisse (no. 26) was dropped due to specific circumstances, including the absence of major high-voltage connections (380 kV connection) and the lack of port facilities.

The remaining eighteen locations were subsequently assessed according to the threshold value of 4,500 residents for the most densely populated 45° sector. This means that the population may not exceed 4,500 residents within an angle of 45° where the population density is highest. Based on that analysis, a further five locations were dropped: Dodewaard (no. 9), Lek (no. 10), Amer (no. 28), Buggenum/Roermond (no. 31) and Maasbracht (no. 32). It was also noted in respect of these locations that problems would probably arise in terms of the availability of sufficient (back-up) cooling water, so that in addition to the population criterion, they would have also been dropped on the basis of that criterion (see *Energy Policy*, part D: fuel document, page 281, Parliamentary Paper 1980).

In accordance with the methodology of the Key Planning Decision, scientific bodies such as the Health Council and the Advisory Council for Spatial Planning were consulted in defining the criteria and assessment method to be used.

Second selection phase: from thirteen to five suitable locations

In the second phase of the selection process to identify promising establishment locations for nuclear power plants, the thirteen remaining locations were investigated in more detail. These thirteen locations are listed in Table 3-1.

Table 3-1 Thirteen remaining potential establishment locations for nuclear power plants.

Potential locations for large-scale energy generation			
1. Eems	9. Dodewaard	17. Velsen	25. Borssele
2. Groningen	10. Lek	18. Hemweg	26. Ossenisse
3. Bergum	11. Lage Weide	19. Diemen	27. Bath/Hoedekenskerke
4. Urk/Westelijke Noordoostpolderdijk	12. Veluwemeer/Eemmeer	20. Maasvlakte	28. Amer
5. Ketelmeer	13. Flevo (North)	21. Rotterdam	29. Maas-Waal
6. Harculo/Zwolle	14. Markerwaard	22. Dordrecht region	30. Boxmeer
7. IJssel-Zuid	15. Wieringermeer	23. Tiengemeten/ Zuidelijke Hoeksche Waard	31. Buggenum/Roermond
8. Nijmegen	16. IJmuiden	24. Moerdijk	32. Maasbracht

The thirteen locations were investigated according to a range of criteria: population size, drinking water, ecology, landscape, spatial quality and soil types and use. Technical considerations also played a role, such as the presence of infrastructure, opportunities for connection to the power grid and the availability of surface water for cooling. This evaluation, combined with a consultation process, led to five locations being identified as promising: Eems (no. 1), Westelijke Noordoostpolderdijk (no. 4), Maasvlakte (no. 20), Moerdijk (no. 24), and Borssele (no. 25).

Inclusion of cooling towers in previous deliberations
Cooling towers were not ruled out in the analyses and in reducing the number of promising locations for nuclear power plants. The *Key Planning Decision*, part A, states in this regard: "Assuming two units per establishment location, a cooling capacity of 2,700-3,900 MWe must be achievable. However, given the financial drawbacks of using cooling towers, it seems obvious that establishment locations offering significant cooling capacity by means of surface water will score more positively than locations where only limited cooling capacity is available, or where the use of cooling towers is essential." The use of cooling towers also calls for more space – 10 to 20 hectares, depending on cooling requirements – and at certain locations will result in negative impacts on landscape quality. At riverside locations in particular, cooling towers may be needed.

Defining promising locations in the Key Planning Decision: three locations, plus two requiring further investigation

The 'Moerdijk' and 'Westelijke Noordoostpolderdijk' locations were included with the caveat that they required further investigation. For Moerdijk, issues raised included the local population size and the potential impact on drinking water. For the 'Westelijke Noordoostpolderdijk' location, a series of studies highlighted issues related to drinking water supplies and general water management aspects. The publication on 27 January 1986 of the *Key Planning Decision* marked the end of the policy and planning process.

Establishment and content of the safeguarding policy

With the finalisation of the *Key Planning Decision*, the safeguarding policy came into effect. It covered the five locations, including a five-kilometre zone subject to planning restrictions. This was explained as follows (see Table 3-2).

Table 3-2 Content of safeguarding policy in 1986.

Distance	Policy
0 – 1 kilometre	The policy is aimed at maintaining the existing favourable low population density and preventing the establishment of facilities that could result in the presence of large numbers of people that would be difficult to relocate.
1 – 5 kilometres	As 0 – 1 km, with possible exceptions if other interests are also at stake.
5 – 20 kilometres	In principle, the policy is aimed at ensuring that existing and planned spatial developments can go ahead as far as possible. No explicit measures apply in this area.

The *Second National Structure Plan for Electricity Supply* of 1994 extended the safeguarding policy from 1986, *establishment locations for nuclear power plants*. No specific amendments were made.

Studies for the SEA-r result in the exclusion of the Moerdijk and Westelijke Noordoostpolderdijk locations

In 2008, the five safeguarding locations were further investigated in an SEA-r for the *Third National Structure Plan for Electricity Supply*. A comprehensive assessment framework was used for this SEA-r, based on the previous *Key Planning Decisions* and the IAEA Site Evaluation of Nuclear Installations.

In this SEA-r, Moerdijk in particular scored poorly on the close proximity of densely populated areas and safety measures. Issues were also raised in connection with cooling water. The 'Westelijke Noordoostpolderdijk' location was also assessed as unsatisfactory on two points: impact on the food chain and impact on drinking water supplies. It also received a negative score for transport facilities by road, rail and water. For these reasons, those two locations were dropped, leaving only Borsele, Maasvlakte and Eemshaven as safeguarding locations.

Maasvlakte II a potential option but not included in the safeguarding policy

The *Key Planning Decision Project Mainport Development Rotterdam* (2006) stipulates that the reclaimed land at Maasvlakte II is primarily intended for deep-sea related activities, for example specific large-scale container storage and transhipment and directly related distribution activities. Additionally, the Maasvlakte II land reclamation area could also be used for large-scale deep-sea related chemical activities. The *Key Planning Decision* explicitly allows for the possibility of other activities at the Maasvlakte II location under exceptional circumstances and based on careful consideration. Due to the restrictions on cooling water discharge from Maasvlakte I caused by the construction of Maasvlakte II, 'exceptional circumstances' clearly exist in relation to the establishment of electricity power plants at Maasvlakte II as referred to in the *Key Planning Decision Project Mainport Development Rotterdam*. The Key Planning Decision allows for the possibility of constructing power plants, for example, subject to careful consideration.

Updating the safeguarding policy in the National Energy Network Programme and the Environmental Quality Decree

The National Energy Network Programme (PEH) of 2024 reaffirmed the safeguarding policy for Borsele and Maasvlakte I. It committed to the construction of two new nuclear power plants (generation III+ reactors) with a combined capacity of approximately 3 GW as soon as possible after 2035, whilst also dropping Eemshaven as a safeguarded location.

The latter decision dates back to a legislative consultation meeting on 4 March 2021, which adopted the *Beckerman motion* which argued that Eemshaven should be dropped as a safeguarded location. Parliament also asked the government not to build a nuclear power plant in the province of Groningen. The reason stated in the motion is that the consequences of gas extraction are still considerable in Groningen and earthquakes have continued to occur. Eemshaven has not yet been formally removed from the *Living Environment (Quality) Decree*.

Current safeguarding policy adopted in the Environmental Quality Decree

The current safeguarding policy is laid down in Article 5.158 (safeguarding of nuclear power plant locations). As of spring 2024, this article lists the safeguarding locations and their geographical delineation. The following rules apply:

Insofar as the location for a nuclear power plant and the area within a radius of one kilometre around that location are subject to an environment plan, the environment plan does not permit:

a. The construction of buildings with a residential function if, as a consequence, the number of residents in the area will exceed 5,000; and
b. The construction or realisation of other vulnerable or highly vulnerable buildings or vulnerable locations with the exception of a nuclear power plant at the location and vulnerable or highly vulnerable buildings and vulnerable locations which, in the judgement of the competent authority, are necessary for the area, or for an activity permitted within the area.

3.3 Consideration of transparency and validity of the origination of the current safeguarding policy

The update report (see Appendix 1) includes an analysis of the extent to which the safeguarding policy is still valid, whether locations which have been dropped might still be considered due to changed circumstances and whether other areas not previously considered might be considered as possible establishment locations for new nuclear power plants.

The following conclusions may be drawn from the analysis of whether the assumptions and insights used are still valid and/or new developments have an impact on the safeguarding policy:

- The safeguarding locations are still valid;
- Even when different distance criteria are applied for population size, locations dropped on the basis of this criterion are still not reasonable;
- The distance used in the EIA-r 2008 (5 kilometres) is still a practicable criterion for understanding population densities in the vicinity of a nuclear power plant. The condition introduced at that time (and in the 1980s) with regard to potential evacuation zones around a nuclear power plant still applies. The update report recommends considering the population densities in different distance zones, for example 1.5 and 10 kilometres, in more detail in the EIA procedure for two new nuclear power plants compared to previous studies;
- In view of the planned extension of the 380 kV grid to Zeeuws-Vlaanderen, it recommends considering whether the Terneuzen location represents a reasonable alternative in the Memorandum on Scope and Level of Detail;
- Maasvlakte II is not included in the policy as a safeguarded location, but in view of the possibilities cited in the Key Planning Decisions at the time, it is an alternative that may reasonably be considered and is explored further in this draft Memorandum on Scope and Level of Detail.

4. Analysis of reasonable alternatives

This chapter discusses the reduction of the areas identified (based on the safeguarding policy and the responses to the Intention and Proposal for Public Participation) to more specific locations within those areas. This has involved weighing up the considerations described in this chapter. Section 4.1 explains the method used for this purpose. Section 4.2 discusses the areas put forward under the safeguarding policy and the participation process, the so-called extended longlist. In Section 4.3, this list is further reduced to a longlist of locations within those areas, and considerations and evaluations are detailed for each location. Finally, Section 4.4 contains a shortlist of locations to be investigated further in the SEA-r.

4.1 Method of reduction

Reduction: from extended longlist to EIA-r alternatives

In order to identify areas and locations, a reduction procedure was followed. This process of reduction, from extended longlist to shortlist, is explained step-by-step in Figure 4-1.

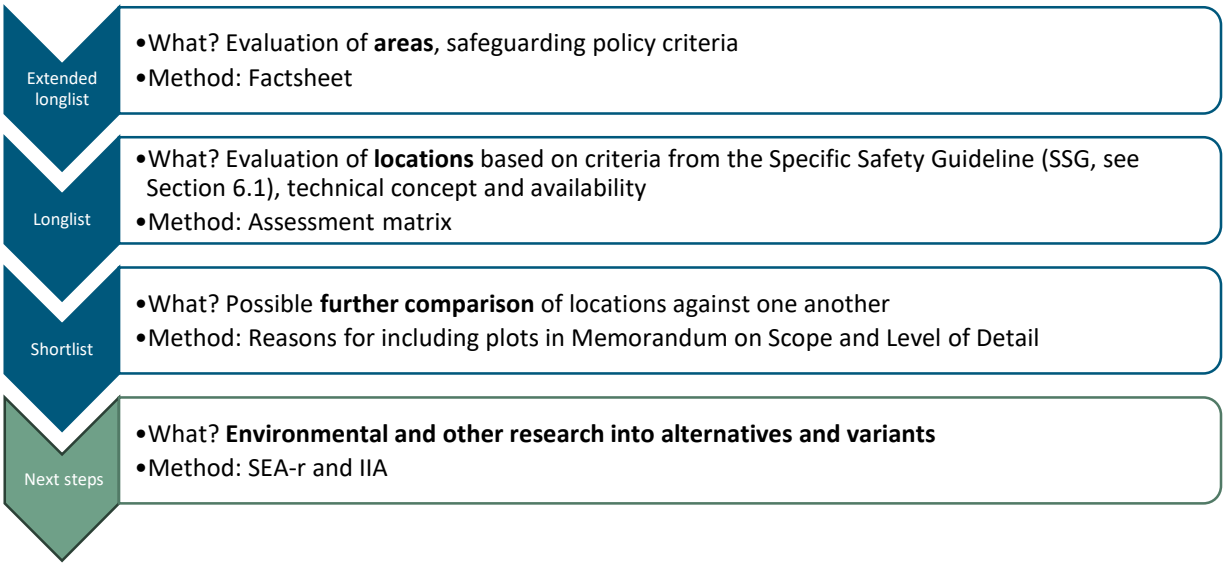

Figure 4-1 Method of reduction: from areas to alternatives.

The result of this reduction exercise is a list of reasonable locations for the construction of two new nuclear power plants (the shortlist). This shortlist is included in Section 4.4. The alternatives in the SEA-r are thus not whole areas but specific locations within those areas. Compared to an area approach, this location approach allows more detailed studies to be carried out in the SEA-r. This provides greater clarity for local stakeholders and enables the Preferred Solution to be elaborated in the following phase of the project procedure for the purposes of the licensing process.

Criteria for the assessments

When reducing the areas and locations, various criteria play a role. These are largely the same criteria as those used for the safeguarding policy (see Chapter 3).

For filter 0 (from extended longlist to longlist) and filter 1 (from longlist to shortlist), the following criteria were applied:

- Limiting criteria:
  - Location (not within one kilometre of densely populated areas);
  - Safety (preventive and emergency response measures must be possible).
- Criteria for safe operation of the nuclear power plants:
  - Weather conditions (risks of storm, flooding and fire);
  - Ground stability;
  - Cooling water (availability);
  - Explosion risk (from land and water);
  - Crash risk (aircraft);
  - Nautical safety (shipping routes and oil disasters).
- Criteria for impact on the local environment:
  - Radiation (dose load and transport);
  - Food chain;
  - General nuisance (residential area);
  - Natural values;
  - Water organisms;
  - Contamination of soil and groundwater;
  - Spread of contaminants;
  - Discharge of cooling water into freshwater supply;
  - Opportunities for avoiding the use of cooling towers (large reserves of water available);
  - Archaeology and cultural history;
  - Landscape.
- Other consideration:
  - 380 kV substation present within a six-kilometre radius.

Areas were dropped if there were potential showstoppers on or more of the above criteria.

The areas emerging from filter 0, which therefore have no potential showstoppers, were then assessed more closely in filter 1 on criteria from SSG-35, availability and (planning) feasibility and other (technical) issues. This is in line with the above criteria. Additionally, the following criteria were applied for filter 1:

- Modifications required to the proposed site;
- Modifications with regard to access to and from the proposed site;
- Size of the location;
- Shape of the location;
- Space for and proximity of construction site;
- Current designated land use;
- Ownership situation;
- Current use and need for relocation;
- If necessary: space for cooling towers.

The presence of significant obstacles that might give cause to drop the location were identified in filter 1.

Level of detail of the assessment

The level of detail of the assessments in filters 0 and 1 differ from one another. In filter 0, the level of detail is more abstract and suitable for assessment at area level. In filter 1, the criteria are assessed at location level.

4.2 Assessment of areas put forward based on the responses to the Intention and Proposal for Public Participation

Based on the safeguarding policy and the update report (Appendix 1), areas that may be suitable for the construction of two new nuclear power plants come into view. As explained in Chapter 2, all alternatives that may reasonably be considered must be examined. For this reason, following on from the conclusions of Section 3.2, a

Groslist
Longlist

broad inventory was made of the different areas identified once the *Intention and Proposal for Public Participation* had been made available for public inspection between 23 February and 4 April 2024 All parties were then asked to contribute ideas on potential locations for the construction of two new nuclear power plants.

From these responses, 39 areas emerged, ranging from non-viable areas, areas to be considered and areas that had already been identified based on the safeguarding policy and the update report. Appendix 2 contains the factsheet used to assess whether those areas should be placed on the longlist.

The following table shows all the areas put forward for consideration, including areas listed in the update report. The table provides a concise explanation of why particular areas were not placed on the longlist. The green shaded areas are areas which present no compelling a priori obstacles. These were then added to the longlist and put forward for the next assessment round (shown in Appendix 2). The GIS analysis carried out for the extended longlist (see Appendix 2) confirms this outcome.

Based on the safeguarding policy (see Chapter 3), the additions from the update report (see Appendix 1) and the assessment of the extended longlist (see Appendix 2), five areas were placed on the longlist:

1. Sloegebied;
2. Maasvlakte I;
3. Maasvlakte II;
4. Terneuzen;
5. Eemshaven.

In the following section, these five areas are considered in more detail in order to determine which locations within them should be investigated as reasonable alternatives in the SEA-r.

Table 4-1 Extended longlist with areas and the assessment.

No.	Area from responses to Intention and Proposal for Public Participation	Area in update report	Compelling obstacles
1.	Amsterdam	Hemweg	Excessive population
2.	Austerlitz		No cooling water availability, no 380 kV substation
3.	Blaricum		Excessive population, major impact on freshwater supplies, no 380 kV substation
4.	Born		Excessive population
5.	Borssele (existing nuclear power plant)	Sloegebied	Conflicts with existing Borssele Nuclear Power Plant
6.	Chemelot		Excessive population
7.	De Zandmotor		Major impact on water safety, no 380 kV substation
8.	The Hague (Binnenhof)		Excessive population, no cooling water, no 380 kV substation
9.	Den Helder		Excessive population, no 380 kV substation
10.	Delft		Excessive population, no cooling water
11.	Delfzijl		No 380 kV substation
12.	Eemshaven	Eemshaven	
13.	Emmen		Excessive population, no cooling water, no 380 kV substation
14.	Geertruidenberg	Amer	Excessive population
15.	Ghent/Terneuzen	Terneuzen	
16.	IJmuiden (offshore)		No 380 kV substation
17.	IJmuiden (Tata Steel)	Velsen	Excessive population
18.	IJsselmeer (Afsluitdijk)		No 380 kV substation
19.	Maasbracht	Maasbracht	Excessive population
20.	Maasvlakte I	Maasvlakte I	
21.	Maasvlakte II	Maasvlakte II	
22.	Maasvlakte III		Natura 2000 footprint
23.	Markermeer		Major impact on freshwater provision, no 380 kV substation
24.	Zuid-Kennemerland		Excessive population, impact on Natura 2000
25.	Petten		No 380 kV substation
26.	Ritthem (Scheldepoort)	Sloegebied	
27.	Roermond		Excessive population, impact on Natura 2000, no 380 kV substation
28.	Sittard		Excessive population, no cooling water
29.	Sloegebied	Sloegebied	
30.	Spijk		No 380 kV substation
31.	Terneuzen	Terneuzen	
32.	Twello		Excessive population, no 380 kV substation
33.	Vlissingen East	Sloegebied	
34.	Wassenaar		Excessive population, impact on Natura 2000, no 380 kV substation
35.	Wassenaarseslag		Impact on Natura 2000, no 380 kV substation
36.	Wijk aan Zee		Impact on Natura 2000
37.	Zoetermeer		Excessive population, no cooling water
38.	Dodewaard		Excessive population, impact on Natura 2000
39.	Nijmegen		Excessive population, impact on Natura 2000

4.3 Consideration per area: which locations may reasonably be considered

In terms of the size of the two nuclear power plants, at this stage a rectangular site covering at least 30 hectares is anticipated for the primary facilities alone, such as the reactors and the turbines. For locations which are promising and where this space is reasonably available, a further assessment is made as to whether space is also available directly adjacent to the site for secondary facilities such as offices and parking, as well as space to construct those facilities. Some 50-60 hectares need to be allowed for primary and secondary facilities (depending on the chosen design, shape of the plot and facilities to be included/modified). A construction site covering a further 60-70 hectares, half of which needs to be directly adjacent to the main site, is also needed for construction materials and storage. Should cooling towers be necessary, an additional 10 to 20 hectares of space is required per cooling tower, depending on the cooling requirements. Because nuclear power plants can be constructed on raised ground in areas not protected by dykes, including port areas, a location of this kind is not considered to be an impediment. Any other use at the location, such as other industry or existing infrastructure, is also not automatically regarded as an obstacle.

In each area, efforts have been made to identify the most realistic locations, the thinking being that “if nuclear power plants are to be built in an area, the most feasible locations should be sought for them”. The possibility remains that the most feasible location in an area may nevertheless have significant obstacles, as revealed in the subsequent assessment based on the assessment framework for the longlist. This may result in locations on the longlist not, after all, being investigated further in the subsequent EIA-r.

Table 4-2 Longlist of areas to be investigated.

No.	Area from responses to Intention and Proposal for Public Participation	Area in update report	Longlist areas
1.	Vlissingen-Oost	Sloegebied	Sloegebied
2.	Sloegebied		
3.	Ritthem (Scheldepoort)		
4.	Maasvlakte I	Maasvlakte I	Maasvlakte I
5.	Maasvlakte II	Maasvlakte II	Maasvlakte II
6.	Ghent/Terneuzen	Terneuzen	Terneuzen
7.	Terneuzen		
8.	Eemshaven	Eemshaven	Eemshaven

In consultation with the port authorities
The selection process for the locations to be investigated included talks with Port of Rotterdam (Maasvlakte I and II), North Sea Port (Sloegebied and Terneuzen) and Groningen Seaports (Eemshaven).

4.3.1 Sloegebied

Description of location and developments
The Sloegebied area, located in the municipalities of Borsele and Vlissingen, is designated in the safeguarding policy as an area to be kept free from certain developments to allow the potential siting of nuclear power plants. These are developments that could impede the establishment of nuclear power plants, such as new population concentrations or the construction of schools, hospitals, care homes and other facilities for vulnerable individuals around the area. This is not to say that space has actually been reserved for nuclear power plants.

Space is required in the Sloegebied area for the energy transition. Once allowance has been made for the development of a hydrogen cluster (VoltH2, Orsted), the construction of high-voltage infrastructure (high-voltage substations and converter stations for TenneT), the production of biofuel and ammonia (Evolution Terminals, Vesta Terminals) and the redevelopment of quay-based seaport activities, there are is no free location which is big enough for two new nuclear power plants without adapting the existing use of space.

Location assessment

For the purposes of the technical feasibility study, a location directly north of the existing EPZ plant (plot A) (see Figure 4-2) is currently being considered. Due to the limited size of this area, on which a solar field and wind turbines have also been constructed, choosing this location would necessitate moving flood defences, a road (Europaweg-zuid) including cycle paths, a single track railway and various primary transport cables and pipelines. This would require additional space. Partly for this reason, the potential alternative locations included in the 2011 Memorandum on Scope and Level of Detail were considered first. Some of these are located further from the coast and have since been utilised for other functions. One of the locations lies partly in a Natura 2000 site. None of these locations are promising. For this reason, the entire area was reassessed for this memorandum.

In connection with the supply of cooling water, a location on the south-west side of the port area – the coastal strip – is the obvious choice. This avoids the need for complex and expensive works to supply the required cooling water – i.e. building channels extending over more than 1.5 kilometres. In this connection, an area located in the northern part of the port (C) is located too far from available cooling water. But even aside from this consideration, there is no space for nuclear power plants in the central and north-eastern part of the port. Situated along the coastal strip are the location referred to above, adjacent to EPZ (approximately 30 hectares), and the former Thermphos site (plot B: approximately 40 hectares) (Figure 4-2). The latter location is still largely undeveloped, but a hydrogen and ammonia cluster is planned here – the first licences have already been awarded. On this site, the strip immediately beside the port with quay facilities has for the time being been kept free from developments related to the energy transition and for seaport activities.

Due to the impediments to nuclear power plants at the former Thermphos site and the site adjacent to EPZ, efforts have also been made to identify an area (with existing activities) that could potentially be eligible as a location and does not conflict with the port-based function or the energy cluster under development. Such a location might be the existing recycling centre and soil depot on the eastern side of the port (plot C) (Figure 4-2). Besides the existing use, the distance from cooling water (1.5-2.5 kilometres) represents an obstacle.

Options for new land reclamation have not been considered, partly in view of the existence of a Natura 2000 site and the required procedure (time) in relation to the task of building nuclear power plants on time.

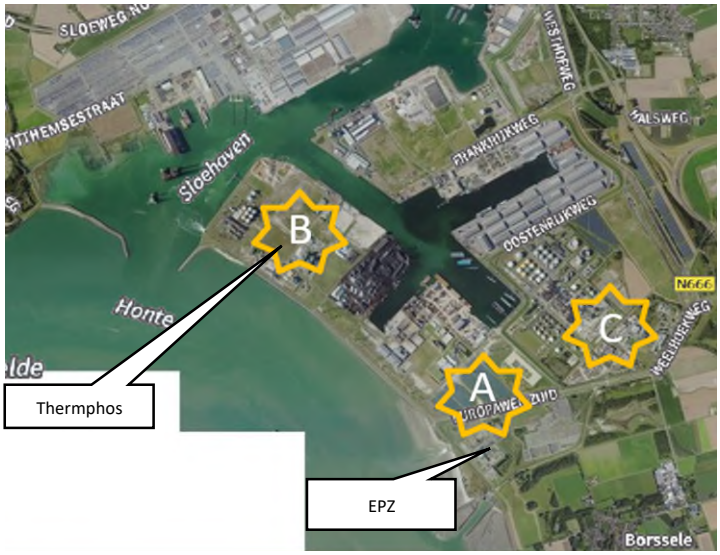

Figure 4-2 Sloegebied locations.

Conclusion

Within the Sloegebied area, despite various and diverse obstacles, the locations EPZ north (A), the former Thermphos site (B) and the area around the recycling centre and soil bank (C) have been included on the longlist for further investigation into alternatives that may reasonably be considered.

Sections 4.3.7 and 4.4 describe the results of the follow-up investigation and the alternatives for the EIA-r.

4.3.2 *Maasvlakte I*

Description of location and developments

Maasvlakte I is designated in the safeguarding policy as an area to be kept free from certain developments to allow the potential siting of nuclear power plants. This is not to say that space has actually been reserved for nuclear power plants. Despite the fact that industrial developments are moving apace at Maasvlakte I, for example in the context of the energy transition, there is no location available of the required size of approximately 60 hectares.

The area to the west of the Onyx power plant is in transition to uses including ammonia (storage/cracking) and hydrogen. The Porthos project – for CO_2 storage under the North Sea – is being realised on the final remaining location, comprising approximately 30 hectares of free space on Maasvlakteweg (near Maasvlakte II). This means that the construction of two new nuclear power plants would necessarily be at the cost of existing use and mean halting commercial activities. Moreover, following the completion of Maasvlakte II, extensive measures would be needed to provide cooling water at Maasvlakte I. It is likely that water from the port would be insufficient and that a connection would have to be dug to the North Sea. For locations in the centre of the port, the distance involved could easily amount to five kilometres.

Location assessment

If a strategic decision is taken to prioritise the nuclear power plants at the cost of the existing fossil fuel facilities within the Maasvlakte I safeguarding area, promising sites (also in terms of size and position) could include the locations of the existing Uniper power plant (plot A: approximately 100 hectares) (see Figure 4-3) which must be coal-free by 2030 or (part of) the Maasvlakte oil terminal (plot B, Maasvlakte Olie Terminal, 100 hectares). In spite of the fact that both are located adjacent to the water, further investigation is required to establish whether this would provide sufficient cooling water, or whether an additional supply would be needed from the sea. Maasvlakte Olie Terminal lies within five kilometres of a population concentration in Hoek van Holland. Other areas located further from the sea and with access only to Maasvlakte I water (such as south of Missouriweg, near Onyx) offer insufficient options for cooling water. Nuclear power plants on the site of existing port-based companies, such as container transshipment, do not appear feasible.

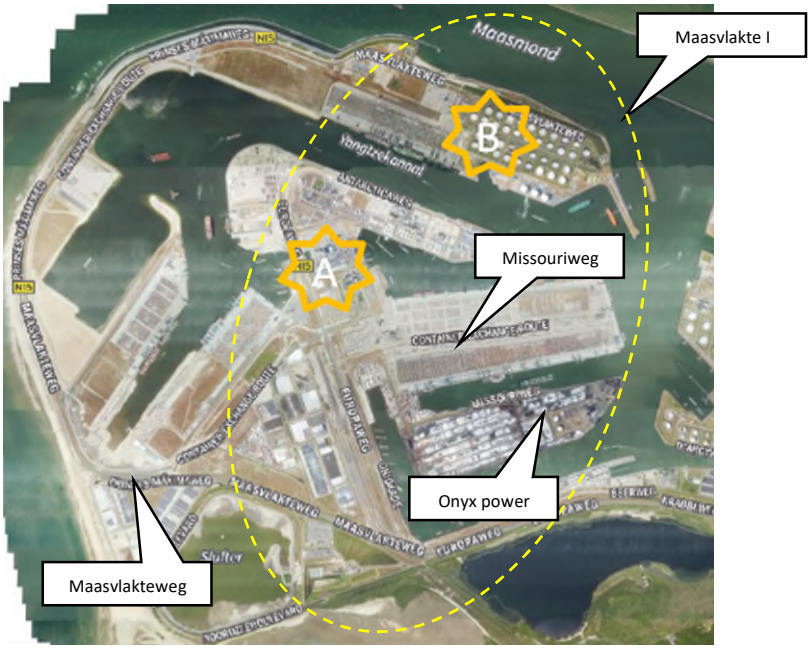

Figure 4-3Maasvlakte I locations.

Conclusion

Within the Maasvlakte I area, despite various and diverse obstacles, the locations Uniper (A) and Maasvlakte Olie Terminal (B) have been included on the longlist for further investigation into alternatives that may reasonably be considered.

Sections 4.3.7 and 4.4 describe the results of the follow-up investigation and the alternatives for the EIA-r.

4.3.3 *Maasvlakte II*

Description of location and developments

Maasvlakte II is not included in the safeguarding policy. That is to say that the area has not been actively kept free from population concentrations in order to facilitate nuclear power plants. Due to the location of the area and the port activities, the distance from population concentrations is favourable.

The area is primarily designated for deep sea-related seaport activities; transshipment and chemicals. The energy and resources transition lays a claim to space in the area. For this reason, the locations which do not have port infrastructure (and which would therefore be the first to be considered for nuclear power plants) have initially been issued to projects linked to the energy transition. In 2024, the new Portlantis visitor centre will open at Maasvlakte II. All the 'free' land on Maasvlakte II will then be port-related. As such, the potential construction of nuclear power plants must be weighed against the other interests at Maasvlakte II, with its focus on seaport-related activities.

Location assessment

At Maasvlakte II, there are various locations which are free from development. These will be considered first, despite the fact that they are primarily intended and designated for deep sea-related activities. On the north side of the land which is still unused (approximately 70 hectares) is a plot on which Cang holds a long-term option for the expansion of its port terminal. On the south side, automated terminals (RWS and APM) are expanding southwards. To the south-east of this, a rail terminal is being built on a plot approximately 30 hectares in size.

Space not already in use or earmarked for future use is also to be found on the east and west side of Prinses Alexiahaven. On the east side, the land designated for commercial use (approximately 70 hectares) has yet to be reclaimed from the sea. Part of a 140-hectare strip on the west side has already been reclaimed and part is still water (plot A) (see Figure 4-5). There is currently a temporary construction site approximately 40 hectares in size in the centre of this strip for a development on Maasvlakte I (Neste). This land will once again become free after completion. In essence, this means that land is available on both the east and west sides, for either port activities or nuclear energy, which is free from obstacles in the form of existing or licensed activities. Because there are no preferences (or comparable disadvantages) associated with port activities and because there is a clear preference for constructing nuclear power plants on the west side due to cooling water availability from the sea, it seems obvious to focus the study for Maasvlakte II on the west side of Alexiahaven.

Options for new land reclamation have not been considered, partly in view of the existence of a Natura 2000 site and the required procedure (time) in relation to the task of building nuclear power plants on time.

Figure 4-4 Maasvlakte II locations.

Conclusion
Within the Maasvlakte II area, despite various obstacles, the Alexiahaven west side location (A) has been included on the longlist for further investigation into alternatives that may reasonably be considered.

Sections 4.3.7 and 4.4 describe the results of the follow-up investigation and the alternatives for the EIA-r.

4.3.4 Terneuzen

Description of location and developments
Terneuzen is not included in the safeguarding policy. That is to say that the area has not been actively kept free from population concentrations in order to facilitate nuclear power plants. Because a new 380 kV substation is planned in the area (*380 kV Zeeuws-Vlaanderen*), it has also emerged as an option for new nuclear power plants. Within the area, two subsidiary areas with industrial clusters may be differentiated: De Mosselbanken/Paulinapolder and the Ghent-Terneuzen Canal Zone. Both are (partly) located at a distance from population concentrations and within six kilometres of the search area for a new 380 kV high voltage substation for TenneT.

At De Mosselbanken, to the west of DOW, various developments are taking place which are connected to the energy transition, circular industry (Valuepark) and CO_2 reduction (Carbon Capture). There are also solar panels at De Mosselbanken. There are developments connected to the energy transition in the adjacent area of agricultural land in Paulinapolder (*VAWOZ programme*). This area lies directly on the Western Scheldt for cooling water.

In the Ghent-Terneuzen Canal Zone, industrial sites alternate with greenhouse horticulture, areas of agriculture and villages. On and around Axelse Vlakte, approximately three kilometres from Axel and Westdorpe, there is an industrial cluster. Various developments are planned in between the businesses and greenhouse horticulture, including hydrogen production (VoltH2), but the area is not yet entirely in use by industry. The canal is not sufficient for cooling water, which means that new nuclear power plants planned here would have to be provided with cooling towers, increasing the footprint (in the order of 30 additional hectares). When combined with cooling towers, there is sufficient available cooling capacity at this location, and it has been included in the assessment of which alternatives may reasonably be considered.

Location assessment
There are various activities taking place in connection with the energy transition at De Mosselbanken, west of EVOS (approximately 70 hectares). Moreover, the safety risk contours of the EVOS site extend over the eastern part of De Mosselbanken, which would argue for a location as far westwards as possible for nuclear power plants. This effectively means that one location remains for further investigation; the western part of De Mosselbanken and Paulinapolder (plot A) (see Figure 4-4). Areas south of De Mosselbanken have not been considered due to their distance from cooling water.

In the northern part of the Canal Zone is the population concentration of Terneuzen, and there is no location of sufficient size among the industrial clusters. Further south, the village of Sluiskil lies less than one kilometre away and there is no available space. On and around Axelse Vlakte (plot B) (Fig. 4-4, next page) there are undeveloped fields set among industry and glasshouse horticulture and at a distance from population concentrations which, including the space taken up by several businesses that would be moved for the purpose, could be approximately 50 hectares in size. This makes this the most realistic solution within the Canal Zone. However, there is likely to be impact on existing businesses in the area and expansions of industry and glasshouse horticulture are also planned. Further south, there are no industrial clusters and Westdorpe and Sas van Gent are nearby.

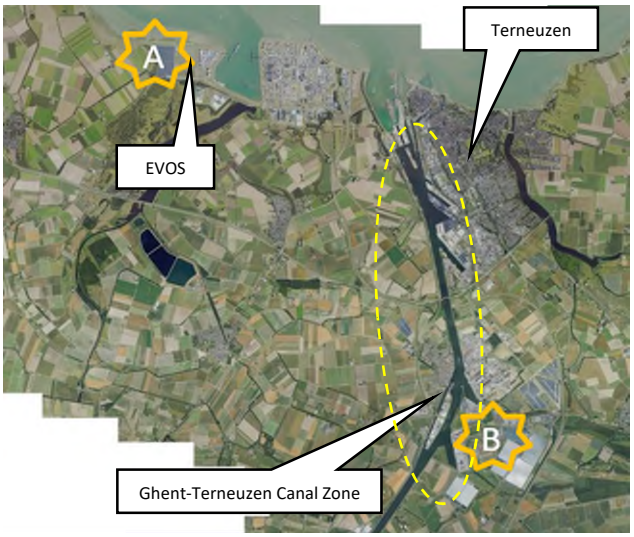

Figure 4-5 Terneuzen locations.

Conclusion

Within the Terneuzen area, despite various and diverse obstacles, the Western Mosselbanken/Paulinapolder (A) and Axelse Vlakte locations (B) have been included on the longlist for further investigation into alternatives that may reasonably be considered.

Sections 4.3.7 and 4.4 describe the results of the follow-up investigation and the alternatives for the EIA-r.

4.3.5 Eemshaven

Description of location and developments

Eemshaven is included in the safeguarding policy as an area that has been kept free from new population concentrations for the potential development of nuclear power plants. This is not to say that space has actually been reserved. Relevant to assessing whether the construction nuclear power plants should be further investigated in Eemshaven are the adoption of the *Beckerman motion (35 603, no. 51)* and the *Mulder & Sienot motion (35 603, no. 59)* in 2021, which rule out nuclear power plants in Groningen and have prompted Eemshaven to be dropped from the safeguarding policy. The forthcoming new National Energy Network Programme will drop Eemshaven as a safeguarded location for nuclear energy.

However, the area has not been dropped from the extended longlist – which includes locations in the responses to the publication of the intention and proposal for public participation. It meets the preconditions, such as potential availability of 380 kV and cooling water, is not associated with any significant environmental obstacles and population concentrations are at a distance away. From the point of view of the EIA, this makes it suitable area to explore for reasonable locations. The *Landsadvocaat* (State Advocate) also concludes that, whilst the aforementioned motions definitely represent an argument, they are insufficient to drop an alternative that may be reasonably considered at this stage.

An important issue relating to this location is a disputed maritime boundary between the Netherlands and Germany (the so-called Eems-Dollard question).

Location assessment

A range of activities related to the energy transition are taking place in Eemshaven – expansion of the 380 kV high voltage network and other high-voltage substations and connections between them, the landing of offshore wind and the generation, import, production and use of hydrogen, offshore wind activities and exports of CO_2. All of this calls for space above and below ground in the port, as well as nautical capacity. With more facilities, the tension between seaport-related activities and activities related to the energy transition grows. With this in mind, the initial search focused on *locations that would not compromise quay facilities*. Subsequently, locations including quay facilities were also considered, as was the option of replacing gas and coal-fired power stations. The risk of earthquakes at Eemshaven is included in consideration in the SEA-r.

In the west of Eemshaven, at Westereemsweg/Westlob, there appears to be an area which is partly undeveloped and partly covered with solar fields (plot A: approximately 50 hectares). Despite its location adjacent to flood defences, deep (cooling) water is present approximately 1.5 km away. At this location, a large hydrogen factory (H2M project of Equinor) is planned but has not yet been licensed. Depending on this development, parts of the surrounding plots (including Vopak) and the agricultural area located to the west, Emmapolder, would be needed for the nuclear power plants. This site is located beside a railway line. In order not to impede the planned hydrogen development in the west of Eemshaven, the development of nuclear power plants could also take place exclusively in Emmapolder. Emmapolder has already been earmarked for the construction of the Eemshaven-West wind farm, which was licensed last year.

Without decommissioning existing facilities, the non-port-related available land in the east of Eemshaven falls significantly short of the size required for nuclear power plants. For this reason, a further assessment was made as to whether there are *free port-related plots* and whether it would be expedient to decommission existing facilities for the benefit of a nuclear power plant. West of the Magnum power plant on Synergieweg there is an undeveloped plot (plot B: approximately 50 hectares). Its enclosed situation (without space for a construction site nearby) makes this location less suitable. A development by Van Merksteijn to produce green steel has been licensed, but work has not yet comm

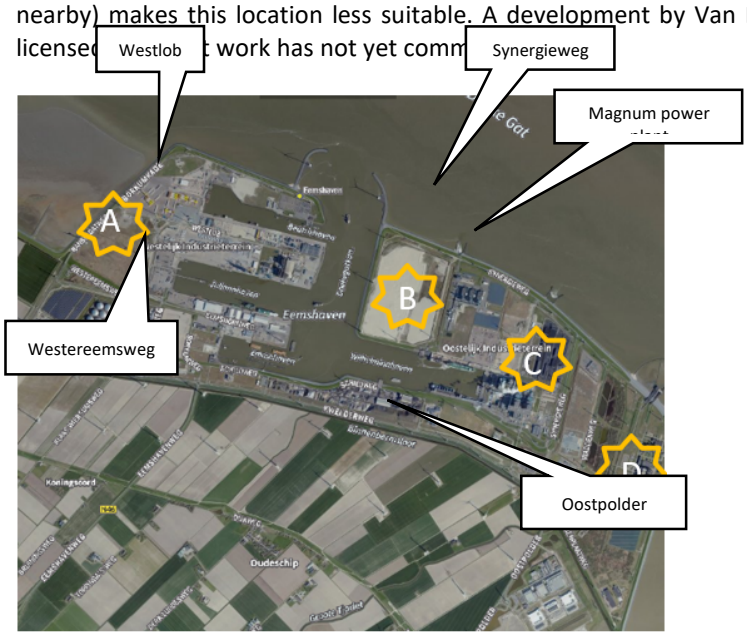

Figure 4-6 Eemshaven locations.

If a strategic decision is made to prioritise the nuclear power plants within Eemshaven at the cost of the existing fossil fuel facilities, promising sites (also in terms of size and position) could include the location of the existing RWE Eemshaven power plant, which must be coal-free by 2030 (plot C: approximately 50 hectares), or the existing gas-fired Eems power plant operated by ENGIE (plot D: approximately 75 hectares), which is approaching the theoretical end of the operating life of gas-fired power plants of 25 to 30 years (construction 1996/renovation of original plant built in 1978 in 2000). The coal-fired power plant has quay facilities, making it unsuitable for initiatives which do not require direct access to the water; the gas-fired power plant has no quay facilities. The current plans for the Eemshaven power plant involve BECCUS (Bio Energy Carbon Capture Utilisation Storage) and biomass. There are also initiatives for green hydrogen production and battery storage on the site.

In Oostpolder, south of existing Eemshaven, expansion of the industrial and energy sector is planned. The distance from cooling water makes this site less suitable for nuclear power plants from a financial perspective. The as-yet undeveloped site to the east, on the Eems, is owned by Google for further expansion of its data centre.

Conclusion

The following locations within the Eemshaven area are recommended for inclusion on the longlist for further investigation into alternatives to be reasonably considered: (A) Westereemweg, (B) Synergieweg, (C) the Eemshaven power plant and (D) the Eems power plant. Development of a hydrogen factory (A), green steel factory (B) and the replacement of existing power plants (B and C) are points to consider when making the choice.

Sections 4.3.7 and 4.4 describe the results of the follow-up investigation and the alternatives for the EIA-r.

4.3.6 Evaluation of longlist locations

The locations described in Sections 4.3.1 – 4.3.5 on the longlist have been evaluated on the following aspects. These aspects are among the (safety) requirements of the SSG-35 (*Site Survey and Site Selection for nuclear installations*). The evaluation, which is contained in Appendix 3, considers the obstacles at each location, categorised in accordance with the aspects of safe operation, technical concept, availability and local environment. What is considered for each aspect is explained below.

Safe operation
The 'safe operation' aspect comprises four sub-aspects. They are:
- external safety – the influence of risk sources in the local environment;
- meteorological events – the probability of extreme weather resulting in damage and flooding;
- geology – the probability of earthquakes, landslides, soil liquefaction, soil settlement and erosion;
- accessibility – (escape) routes during regular operation and evacuation.

Technical concept (complexity)
The 'technical concept' aspect comprises four sub-aspects. They are:
- cooling water provision – the proximity of cooling water (a large body of open water), with increased distance from cooling water being associated with increased complexity and cost;
- 380 kV connection – the proximity of existing or future 380 kV high-voltage substations, with increased distance from a 380 kV high-voltage substation being associated with increased complexity and cost;
- required modifications to a site – with the level of complexity increasing if existing facilities need to be decommissioned/moved;
- accessibility – a site that can be reached over land and/or water, with the level of complexity increasing if facilities need to be constructed/modified.

Availability
The 'availability' aspect comprises seven sub-aspects. They are:
- size of the location – the minimum size must be sufficient for the primary facilities;
- shape of the location (rectangular) – based on a standard configuration with a primary facility of 500 x 600 m;
- space for and proximity of construction sites – the size must be sufficient for movable and non-flexible construction sites or alternatives must be available;
- designated land use (commercial or industrial) – to what extent does the designated land use already permit industry, energy generation, nuclear power plants;
- ownership (availability) – number of owners, public/private;
- necessity of existing use/feasibility of relocation – is the location in use and can this use be discontinued/moved;
- space for cooling towers (if necessary) – is there space at the location for cooling towers if needed (20 to 30 hectares extra space).

Local environment
The 'local environment' aspect comprises eleven sub-aspects. They are:
- proximity of population concentrations;
- nuisance – significant nuisance for local residents and businesses during the construction phase;
- restrictions on surrounding businesses – impact on environmental zoning;
- Natura 2000 site – location in or directly adjacent to a Natura 2000 site;
- Netherlands Nature Network – location in or directly adjacent to Netherlands Nature Network;
- heating of surface water caused by cooling water;
- location in an area with geographical values and soil risks;
- water quality and flood risk;
- congestion and unsafe situations due to traffic in the usage phase;
- location in an area with archaeological or cultural-historical value;

- location in an area with protected landscape value;

The evaluation of longlist locations is an outline evaluation focused on distinctive aspects which differentiate the locations. The aim is to identify the least obstructed location within that area. Significant cost and planning risks are also identified. Table 4-3 provides an overview of the biggest obstacle for each location and the aspects identified. The full evaluation may be found in Appendix 3.

The evaluation has resulted in a selection of locations which may be reasonably considered for further investigation and comparison as alternatives in the SEA-r.

Table 4-3 Summary of evaluation of longlist locations.

Area	*Location*	*Safe operation*	*Technical concept*	*Availability*	*Local environment*	*Competing interest*
Sloegebied	*A*	-	*Modifications to flood defences, N-road (trunk road), railway line, pipelines, high-voltage*	*Current use, available area*	*Natura 2000 (nitrogen)*	*Seaport-related activities*
	B	-	-	*Future use, available area*	*Natura 2000 (nitrogen)*	*Seaport-related activities*
	C	-	*Cooling water availability*	*Current use, available area*	*Natura 2000 (nitrogen)*	-
Maasvlakte I	*A*	-	*Cooling water availability*	*Current use, available area*	*Natura 2000 (nitrogen)*	*Seaport-related activities*
	B	-	*Cooling water availability*	*Current use, available area*	*Natura 2000 (nitrogen)*	*Seaport-related activities*
Terneuzen	*A*	-	-	*Current use*	*Natura 2000 (nitrogen)*	*Agriculture*
	B	-	*Cooling water availability*	*Current use*	*Natura 2000 (nitrogen)/landscape (cooling towers)*	*Seaport-related activities*
Maasvlakte II	*A*	-	-	-	*Natura 2000 (nitrogen)*	*Seaport-related activities*
Eemshaven	*A*	-	-	*Available area, future use*	*Natura 2000 (nitrogen)*	*Seaport-related activities, agriculture*
	B	-	-	*Available area, licensed development*	*Natura 2000 (nitrogen)*	*Seaport-related activities*
	C	-	*Decommissioning existing power plant*	*Available area*	*Natura 2000 (nitrogen)*	*Seaport-related activities*
	D	-	*Decommissioning existing power plant*	-	*Natura 2000 (nitrogen)*	-

The 'competing interest' column has been included in order to include location-based aspects, for example the fact that a particular site is adjacent to a seaport, when assessing that location. Seaport-related locations are limited in the Netherlands and some businesses require access to a quay for transshipment – the loading and unloading of goods from one transport mode to another, for example from truck to ship. This makes it necessary to weigh up what is better for that location.

4.3.7 *Assessment of locations*

Locations A and B in the Sloegebied area have fewer impediments than location C. Location C lies some kilometres further away from access to cooling water, is technically more challenging and will cost more money. The nature and scale of impediments differ between A and B according to the different aspects. There are no significant advantages of location C that would prompt giving further consideration to this area in the SEA-r. Within the Sloegebied area, locations A and B will be investigated further in the SEA-r.

New nuclear power plants could only be integrated at Maasvlakte I at the cost of existing facilities, without any concomitant (environmental) benefits with respect to e.g. Maasvlakte II. A location at Maasvlakte II presents fewer impediments than Maasvlakte I on a range of aspects and also offers significant benefits compared to locations in the other areas. As for Maasvlakte I, the function of the area as a deep-sea port is an issue to consider. The Maasvlakte II A location will be further investigated in the SEA-r. None of the locations at Maasvlakte I justify elaboration in the SEA-r.

At Terneuzen, location A has fewer impediments on all aspects than location B. Location A seems comparable to the other areas in terms of feasibility and impacts. For this reason, Terneuzen location A will be investigated further in the SEA-r and location B will be dropped. It is likely that in the further elaboration of the intention at this location, agricultural land (Paulinapolder) will form part of the intention.

At Eemshaven, a licence has already been issued to develop a green steel factory at port location B and no more space is available. At non-port location A, there are hydrogen initiatives which have not yet been licensed. Here, the assumption is that agricultural land west of Eemshaven (Emmapolder) will form part of the intention. At location D, there is no need to weigh the siting of nuclear power plants against seaport-related activities and there is space for the establishment of two nuclear power plants in place of the existing gas-fired power plant. The location of the existing coal-fired power plants will also be included as an alternative in the SEA-r, despite various sustainability initiatives. Eemshaven locations A, C and D will be investigated further in the SEA-r. Location B will not be investigated further.

4.4 Alternatives for the SEA-r

Based on the above analysis, the following alternatives (locations) for the two nuclear power plants will be investigated in the SEA-r:

Sloegebied:

1. *EPZ north*
2. *Thermphos site*

Terneuzen:

1. *Western Mosselbanken/Paulinapolder*

Maasvlakte II:

1. *Amaliahaven west side*

Eemshaven:

1. *Westereemweg/Emmapolder*
2. *Eemshaven power plant*
3. *Eems power plant*

These locations are shown (Figures 4-7 to 4-10) and numbered on the following page, with arrows used to indicate the areas potentially used for the construction of two nuclear power plants.

Figure 4-7 Sloegebied alternatives.

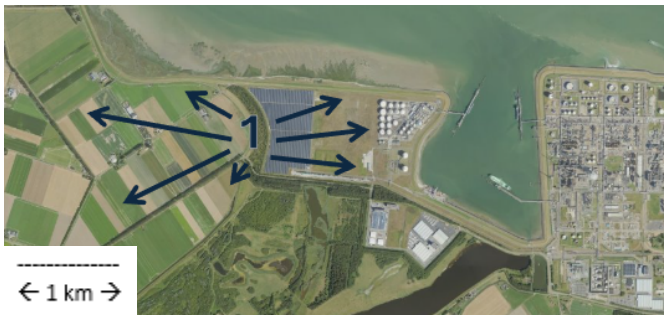

Figure 4-8 Terneuzen alternatives.

Figure 4-9 Maasvlakte II alternatives.

Figure 4-10 Eemshaven alternatives.

5. Reference situation and autonomous developments

This chapter describes a reference situation for each location. The impacts of two new nuclear power plants are evaluated in the SEA-r with respect to the reference situation in 2040. The reference situation consists of the current situation and the autonomous developments. The starting point for the reference situation is the current state of the physical living environment, for example the current spatial characteristics, combined with autonomous developments.

Autonomous developments are spatial developments originating independently of the proposed activities in and around locations. They are either approved (spatial) developments or developments that will be approved in the near future.

The area description also includes tangential projects. Tangential projects are projects which have not (yet) been officially approved as spatial plans. In the case of a tangential project, it is uncertain whether the development will go ahead. Tangential projects are not part of the reference situation. However, they are included in the Integrated Impact Analysis because they can influence the impacts of or the Preferred Solution for the proposed activity. New tangential projects can arise in the course of the procedure. New tangential projects can arise in the course of the procedure.

5.1 Sloegebied

Sloegebied is a zoned industrial estate. Roughly half of it lies within Borsele municipality (the southern part) and the other half in Vlissingen municipality (the northern part). The Sloegebied area is characterised by large-scale industry and spacious dimensions. Characteristic elements are the harbour basins, large plots, large-scale industrial complexes and smaller-scale commercial buildings, infrastructure above and below ground and landscape integration around the seaport site plus the adjacent N254 trunk road. Further away from the business park are farms with connected accommodation, scattered individual housing and residential areas, of which Nieuwdorp is the nearest to the seaport site. The nearest homes within this residential area lie less than 400 metres from the edge of the business park, but the residential area of Borssele is also located a relatively short distance from the seaport and industrial estate. The distance to the nearest plots is approximately 700 metres. The industrial estate is owned by North Sea Port.

Figure 5-1 provides an overview of autonomous developments in the Terneuzen and Sloegebied areas.

Figure 5-1 Autonomous developments

Operating life extension of Borssele nuclear power plant (autonomous development)

The government intends to keep the existing nuclear power plant in Borssele operational beyond the date stipulated in the Nuclear Energy Act (31 December 2033). This operating life extension is needed in order to achieve the country's climate goals and maintain a stable electricity supply. Preparations for the decision-making started in 2022. The EIA procedure has since been concluded and the legislative change will be presented to the House of Representatives in the second half of 2025.

High-voltage connection Borssele – Rilland (autonomous development)

TenneT is working with various contractors to build the new 380 kV connection between Borssele and Rilland (South-West 380 kV West). According to the current timetable, the high-voltage connection will be operational in 2025. The old connection, the 380 kV high-voltage connection in Zak van Zuid-Beveland, will then be removed. On 7 July 2021, the Council of State ruled on the appeals lodged against the final decisions. The appeals were declared inadmissible and/or unfounded (*uitspraak Zuid West 380 kV West*). This means the project can go ahead.

Energy hub on former Thermphos site (autonomous developments and tangential projects)

An energy hub is planned for the former Thermphos site. A green hydrogen factory has been licensed. Construction work has not yet begun. Adjacent to this, on the former Thermphos site, a battery energy storage system is planned. This has not yet been licensed.

Offshore wind cable landing points: Nederwiek 1/IJmuiden Ver Alpha offshore wind farms (autonomous developments)

Two cable landing points for offshore wind are planned in the Sloegebied area, for the Nederwiek 1 and IJmuiden Ver Alpha offshore wind farms. Nederwiek 1 is an underground high-voltage connection from the Nederwiek wind energy area to land. Much of the route for this new connection runs parallel to the IJmuiden Ver Alpha offshore wind project, with a connection at Borssele. The Nederwiek 1 offshore wind farm will make it possible to transport 2 GW of sustainable energy to land by 2030, and as such it will contribute to achieving the (more stringent) climate objectives.

IJmuiden Ver Alpha is an underground high-voltage connection from the IJmuiden Ver wind energy area in the North Sea. Wind farms with a total capacity of 6 GW are being built there. Underground high-voltage connections are needed to transport this energy to land. The high-voltage connection from the IJmuiden Ver Alpha wind farm will join the high-voltage network on land in the Sloegebied area in order to transport the energy to users. On 28 February, the final decision on the environment and planning permit was published (*omgevingsvergunning - Net op zee IJmuiden Ver Alpha*).

Two converter stations are needed for these cable landing points, plus one 380 kV high-voltage substation, along with the accompanying connections above and below ground. These will be built within the Sloegebied area. A planning procedure has already been completed for these developments and construction has begun. The initiator is TenneT TSO B.V. (TenneT). The construction of the high-voltage substation will enable future connections to facilitate measures to make industry more sustainable. The final Preferred Alternative (*VKA - Hoogspanningsstation omgeving Sloegebied*) was published on 2 October 2024

Landfall Sites for Offshore Wind (VAWOZ) (autonomous development)

The energy generated in the North Sea needs to be brought ashore by means of electrical cables and hydrogen pipelines and connected to the high-voltage network and the hydrogen network. The Programme for the Investigation of Landfall Sites for Offshore Wind (VAWOZ) 2031-2040, an initiative by the Ministry of Climate Policy and Green Growth, is exploring options for these cable landing points to support the construction of 29 GW of offshore wind energy capacity by 2040. This objective is supplementary to the existing roadmap, which assumes 21 GW of offshore wind energy. As set out in the decision on the National Energy Network Programme, the VAWOZ programme is also focused on the siting of large-scale electrolysis in connection with the generation of offshore wind energy.

An IIA/SEA-r study is being conducted to identify landfall sites for this electricity or hydrogen in Zeeland. The purpose of the study is to establish whether they should be located in the Sloegebied area or in Zeeuws-Vlaanderen. An IIA and an SEA-r are part of the scoping exercise. It is anticipated that a preferred location will have been identified for the landfall site for offshore wind around mid-2026.

Lion Storage battery energy storage system (autonomous development)

On 17 February 2025, Lion Storage announced that it had secured financing for the Mufasa project, one of the biggest battery-energy storage systems (BESS) in Europe. The project, supported by Macquarie Capital and other investors, will become operational in Vlissingen in the first half of 2027. It will be an important new hub for renewable energy, with a storage capacity of 1,400 MWh (megawatt hours) and an output capacity of 350 MW.

Sloerandzone Green Project (tangential project)

Launched around 2003, the Sloerandzone Green Project serves as a green buffer zone between the Sloegebied industrial estate and the village of Borssele. Some 130 of the 200 hectares have since been delivered. The compensation plan focuses on the transition area between the industrial estate and the rural environment.

5.2 Maasvlakte II

Maasvlakte is a large industrial estate which has been created at the mouth of the river Maas. It lies directly on the North Sea and is part of the port of Rotterdam. The area is characterised by large-scale industrial activities, wide waterways with harbour basins and bundled infrastructure all around, with green zones providing buffers between the port and the surrounding area. Maasvlakte is connected to the hinterland by Europaweg and the A15. Maasvlakteweg provides the main road access to Maasvlakte II and connects to Europaweg with a grade-separated junction. On the north side there is a hard sea wall (a block dam backed by a pebble beach and a green dyke) and on the west side a soft sea wall (a beach backed by a dune). On the south-west side, the new Portlantis visitor centre opened in 2024. The entire area is owned by the national government which (with the exception of the maritime section) has granted it to Rotterdam municipality in perpetual lease. In turn, the municipality has granted the area to the port authority in perpetual sublease, with the exception of the pipelines.

Figure 5-2 provides an overview of the autonomous developments in the Maasvlakte II area.

Figure 5-2 Autonomous developments in the Maasvlakte II area.

Creation of green energy farm (hydrogen conversion facility) (autonomous development)

The Port of Rotterdam Authority is working with partners to establish a hydrogen system, to enable industry and transport to switch from fossil fuels to green energy in the form of green hydrogen. A hydrogen conversion facility is being built at Maasvlakte with various partners. The goal is for the facility to be generating 2.5 GW of power in hydrogen factories in the port by 2030. Four hydrogen factories will be built over an area of 24 hectares and will convert green electricity from offshore wind farms into green hydrogen via electrolysis. All the plots in the facility have been reserved for companies including Shell and Air Liquide. The facility will be fully operational by 2030. On 25 October 2024, it was announced that the amendment to the zoning plan for this project became irrevocable on 1 September 2024 (*bekendmaking - Conversiepark*).

Porthos (autonomous development)

The Porthos project involves CO_2 from industry in the port of Rotterdam being captured, transported and stored in empty gas fields under the North Sea. In October 2023, the final decision (*besluit - Porthos*) was taken, and the

construction of Porthos began in 2024. There will be approximately 30 km of underground pipelines on land, and up to a further 20 km of pipelines extending from the coast under the North Sea. The connection between the land and sea pipelines will be made at Maasvlakte. The Porthos system is expected to become operational in 2026.

Offshore grid: Amaliahaven high-voltage substation (autonomous development)

The high-voltage projects at Maasvlakte are the IJmuiden Ver Beta, IJmuiden Ver Gamma and Nederwiek 2 offshore grids. These underground high-voltage connections will be used to transport the renewable energy generated in offshore wind farms to Maasvlakte. There, the cables will connect to the high-voltage grid on land via a new 380 kV high-voltage substation to be built at Amaliahaven. The converter stations for the planned IJmuiden Ver Beta and IJmuiden Ver Gamma offshore grid projects will be located directly to the south of the Amaliahaven substation. The draft zoning plan was available for public inspection in December 2022/January 2023. The draft decision was published on 22 February (*ontwerp besluit Amaliahaven*).

Maasvlakte South rail terminal (autonomous development)

The Port of Rotterdam Authority is constructing a marshalling yard at Maasvlakte South in partnership with ProRail. It will be operational in mid-2027. The work involves constructing a new marshalling yard with a maximum of four sets of six sidings, suitable for trains 740 metres in length.

Aramis (autonomous development)

The companies Total Energies, Shell, EBN and Gasunie together make up the Aramis consortium. Aramis, the initiator, aims to construct new infrastructure for the transport of CO_2 from land to platforms at sea, where the CO_2 can be stored in empty gas fields deep underground. The intention is to expand this infrastructure further in the future for new CO_2 suppliers and other storage fields. The draft project decision was published on 13 September 2023 (*Ontwerp Projectbesluit Aramis*)

5.3 Terneuzen

De Mosselbanken (Valuepark), a new area of land west of Terneuzen, DOW Chemicals and the Ghent-Terneuzen Canal, was reclaimed for industry in 1977. The area is part of the industrial cluster and the docks at Terneuzen and is being developed into a sustainable and circular industrial estate. An oil terminal is located in the eastern part of the polder. In the western part there are wind turbines and a solar field. Paulinapolder to the west of De Mosselbanken is agricultural land. The two polders are separated by Scheldedijk. The polders are bounded by the Western Scheldt to the north. To the south lies De Braakman, an area of nature, and beyond that are recreation facilities. The industrial estate is owned by North Sea Port. Biervliet lies approximately three kilometres south-west of these polders. Hoek lies approximately four kilometres to the south-east. The existing access road to De Mosselbanken runs alongside the DOW site. Slightly further away is the N62, the road through the Western Scheldt tunnel. Paulinapolder is linked to the N61 to the south via Biervliet.

Figure 5-3 Autonomous developments around Terneuzen and Sloegebied.

380 kV Zeeuws-Vlaanderen (tangential project)

Paulinapolder and De Mosselbanken are part of the search area for a new 380 kV high-voltage substation. A high-voltage substation and a connection to the national high-voltage grid are conditions for the construction of the two nuclear power plants. The locations for the substation and the power plants do need to be chosen in a coordinated manner, while also taking other interests in the local area into account.

Carbon capture and utilisation (tangential project)

Alta Carbon Technologies is establishing a pilot project at Valuepark Terneuzen to convert CO_2 and gases from chemical industry into a liquid that can be used in batteries. The development will take up an area of approximately four hectares at De Mosselbanken.

Carbon Connect Delta (tangential project)

Under the name *Carbon Connect Delta,* a cross-border consortium consisting of Gasunie, Smart Delta Resources, North Sea Ports and Fluxys has made plans that could result in a 30% reduction in CO_2 emissions by industries in Terneuzen, Vlissingen and Ghent (6.5 Mton/year).

The CO_2 can be stored in empty gas fields under the North Sea, possibly as part of one of the carbon capture projects which Gasunie is already involved in: Porthos and Aramis in Rotterdam.

5.4 Eemshaven

Eemshaven was constructed in 1973 as an industrial and transhipment port. The port lies in the municipality of Het Hogeland in Groningen and is the largest seaport in the northern Netherlands. The port lies on the western bank of the Eems estuary, a sea arm where the river Eems flows into the North Sea. North of Eemshaven is the Wadden Sea, a UNESCO World Heritage and Natura 2000 site. To the east lies Germany. In the 1990s, the focus shifted towards energy and logistics and, starting in the 2000s, the area was given a new impulse as an energy and data centre hub. Since 2008, energy-related activities in Eemshaven have been increasing. Following the construction of coal-fired and gas-fired power stations, the energy transition is now becoming visible. New energy connections with land and sea, wind turbines, solar fields and a battery and hydrogen industry are being established. There are also data centres in the south-east of Eemshaven. Eemshaven is in the beneficial ownership of Groningen Seaports. Access to Eemshaven is provided by the N33 and N46. The port lies in an agricultural area. A number of farms are scattered around Eemshaven. Oudeschip, the nearest village, with approximately 150 residents, lies a little over one kilometre away.

Figure 5-4 provides an overview of the autonomous energy projects in Eemshaven.

Figure 5-4 Autonomous developments in Eemshaven (national energy projects map).

Synergieweg green steel factory (autonomous development)

On Synergieweg, Van Merksteijn has been licensed to develop green steel. This decision was finalised on 15 March 2023 (*Definitief besluit Van Merksteijn*). It is not known when construction will take place.

Oostpolder area development (autonomous development)

The provincial authority and Het Hogeland municipal authority have plans to expand Eemshaven (*ontwerpbesluit veiligheidscontour*) by developing a business park in Oostpolder. This will be located in the area directly south of Eemshaven and will be bordered by the railway line, the dyke and linear development in Oudeschip and the N33 trunk road. Hydrogen companies, battery factories, data centres and new forms of high-tech companies are planned.

H2M project by Equinor (tangential project)

The H2M Eemshaven project is a partnership between Equinor and Linde to convert natural gas from Norway into low-carbon hydrogen with carbon capture and storage (CCS). The captured CO_2 will be stored under the sea floor off the coast of Norway. With a planned production capacity of 1 GW, the project is intended to serve large industrial customers in the Netherlands and Germany and is expected to be operational from 2029.

Sustainability upgrade to 'Eemshavencentrale' coal-fired power plant (partly tangential project and partly autonomous development)

RWE has the long-term aim of converting the Eemshaven power plant into a biomass plant in the long term. There are plans to capture CO_2 (Biobased Energy, Carbon Capture, Utilisation & Storage: BECCUS). Battery storage and hydrogen factories are also envisaged on and around the site.

Offshore wind connection programme (PAWOZ) – Eemshaven (autonomous development)

As a generator of renewable energy, offshore wind is crucial to achieving the climate objectives. PAWOZ-Eemshaven will contribute to those efforts. As part of this project, options are being explored for landfall sites for 4 GW of electricity from the Doordewind (DDW) wind energy area and 500 MW of hydrogen from the Ten Noorden van de Waddeneilanden wind energy area around 2031. PAWOZ-Eemshaven is also exploring options for future landfall sites after 2031. The programme is expected to be approved in June 2025.

The Climate Agreement contains a commitment to making the Netherlands' energy supply sustainable. This will reduce CO_2 emissions and help counteract climate change. The generation of wind energy offers opportunities to achieve this, but it requires a lot of space. That space is available offshore. For this reason, offshore wind farms are being constructed. In order to bring the generated green energy ashore, a good connection is essential. Eemshaven is one of the possible locations for the landfall site.

5.5 Rural

Ruimte voor Defensie (tangential project)

The national 'Ruimte voor Defensie' programme is an initiative by the Ministry of Defence to identify space required for military activities within the Netherlands. That includes physical space for barracks, practice areas, infrastructure and munitions storage, as well as (environmental) space to operate vessels, aircraft and vehicles within appropriate norms. The project was initiated because the security situation in the world is changing. The Dutch armed forces are shifting their focus towards protecting the country's own territory and that of NATO allies. For this task, they need not only more military personnel and equipment, but also more space in the Netherlands. The Ministry of Defence is investigating various locations, some of which overlap with search areas for two new nuclear power plants.

6. SEA-r impact assessment - scope and level of detail

This chapter considers the assessment framework for the SEA-r. First the assessment method is discussed (Section 6.1), then the aspects that will be covered (Sections 6.2 and 6.3). Sections 6.4 and 6.5 consider the impacts during decommissioning and radioactive waste. Finally, the considerations related to the IIA are explained in brief (section 6.6).

6.1 SEA-r assessment framework

Situations assessed in the SEA-r

The assessment framework in the SEA-r differentiates two phases:

1. the establishment of the nuclear power plants (construction phase);
2. the operation of the nuclear power plants (usage phase).

In the SEA-r, the locations are explicitly evaluated against the (safety) requirements of the SSG-35 (*Site Survey and Site Selection for nuclear installations*). In this evaluation, a distinction is drawn between hard and soft criteria. Failure to meet hard criteria rule a location out. In the case of soft criteria, further analysis is required to see whether the location may nonetheless be considered.

Assessment method

All impacts are compared to the reference situation (see Chapter 5) in 2040. In doing so, distinctive impacts – impacts that clearly differentiate a location from other locations – are identified for the different alternatives. The level of detail of the SEA-r is such that it contributes to the choice of a preferred location. In the phase after the SEA-r, further and more detailed research is conducted for the preferred location.

In the SEA-r, the environmental impacts of the alternatives are identified. The impacts are determined by comparing the future situation created by the construction of two nuclear power plants with the situation that would arise without the construction of two nuclear power plants. This is called the comparison with the reference situation. A qualitative value is assigned to the difference between the two situations, the impact, in the SEA-r. The assessment uses a seven-point scale of plusses and minuses as shown in Table 6-1. In this way, the impacts for all relevant aspects (safety, non-safety and environment) are identified and evaluated. The assessment also considers potential mitigating measures for the impacts identified.

The aspects are explained in more detail in sections 6.2 and 6.3.

Table 6-1 Impact assessment scale (compared to the reference situation).

Assessment	Explanation
++	Highly positive impact; significant positive impacts on the environment.
+	Positive impact; positive impacts on the environment.
0/+	Slightly positive impact; possibility of positive impacts on the environment.
0	No or negligible impact.
0/-	Slightly negative impact; some but not significant negative consequences.
-	Negative impact, with compensation or mitigation measures.
- -	Highly negative impact; significant negative consequences that may not allow for mitigation or compensation.

In the SEA-r, the location of the nuclear power plant is specified in more detail. This also makes it possible to describe the impacts specifically for those locations. In this phase, uncertainties remain about the construction phase, because the construction method can only be worked out after the choice of the Preferred Alternative and, moreover, it is dependent on the party that will be developing the nuclear power plants. Impacts in the construction phase are therefore estimated on the basis of available sites within port areas, how likely it is that space will also need to be found elsewhere, and the values present and potential nuisance there.

If the impact assessment reveals that mitigating measures are needed, the SEA-r provides a starting point for those measures for the subsequent phase of the plan.

6.2 Safety aspects of SSG-35

Safe operation is the basic principle for any nuclear power plant. Emergencies can occur that may endanger such safe operation. The SEA-r considers the *SSG-35 safety criteria*, which relate to the safety aspects (see Table 6-2). In essence, this concerns impacts in the local environment that can produce a risk to safe operation of the nuclear power plants.

Table 6-2 Assessment framework for emergencies (safety aspects), in accordance with the SSG-35 framework.

SSG-35 assessment framework: Safety Issues			
Safety aspects	**Sub-criteria**	**Excluding (hard) criterion**	**(Soft) criterion, to be assessed in more detail**
Earthquake risks	Location with respect to Mercalli zones	✓	
Geological risks	Subsurface type	✓	
Risks due to volcanism	Location with respect to (active) volcanoes	✓	
Flood risks	Maximum water depth in the event of flooding and dyke breach		✓
Extreme weather conditions	Location with respect to areas susceptible to wildfires		✓
	Storm risks		
Risks due to human action	Location with respect to military objects		✓
	Impact of potential acts of war, terror and sabotage		
	Location with respect to airports, flight paths and shipping routes and low-flying areas (aviation accidents)		
	Location with respect to evacuation routes and potential shelter		

Where possible, when assessing safety risks, the probability of occurrence is shown if the risk of the event occurring is once in 10,000 years (site-specific risk contour 10^{-4}) or 1,000,000 years (site-specific risk contour 10^{-6}).

The SSG also includes non-safety aspects, such as accessibility and impact on existing land use. These are included in the 'environmental impacts' assessment framework in Table 6-3. Other aspects, such as availability of cooling water, are a requirement for every alternative and part of the intention to be assessed for impacts.

Earthquake risk

The SEA-r identifies the geographical position of the locations of the two new nuclear power plants with respect to earthquake-sensitive areas. One method used to clarify impacts in the SEA-r is the risk map showing earthquake zones (Mercalli zones).

Geological risks

The SEA-r identifies the geological condition of the locations for two new nuclear power plants. An unstable or highly mobile subsurface can result in a location being ruled out for nuclear power plants. For this purpose, geological studies are conducted and the results presented in the SEA-r.

Risks due to volcanism

The SEA-r identifies the geographical position of the different locations with respect to volcanic activities, including the Mulciber (an extinct volcano in the Netherlands part of the North Sea) and the Zuidwal volcano (an extinct volcano under the Wadden Sea). The SEA-r describes the related impacts.

Flood risks

Climate change is leading to rising sea levels and more extreme weather, with the chances of flooding increasing. The SEA-r uses public cartographic material to identify the maximum water depth in the event of flooding and a potential dyke breach and the risks to the nuclear power plants (based on 2023 climate scenarios by KNMI).

Risk of extreme weather

Extreme weather can occur in various forms and result in wildfires and storms. The SEA-r uses public cartographic material to identify the geographical position of the different locations in relation to areas susceptible to wildfires (sensitivity map) and the risks to the nuclear power plants from storms (based on 2023 climate scenarios by KNMI, the Royal Netherlands Meteorological Institute). The SEA-r describes the related impacts.

Risks due to human activity

Human activities can produce risks for two new nuclear power plants. The SEA-r identifies the geographical position of the different locations in relation to military objects (such as barracks) and which activities take place there. The SEA-r also considers whether there are differences between the locations in terms of risks of acts of war, terror and sabotage.

Accidents can also take place involving (heavy) vehicles. The SEA-r identifies the geographical position of the locations with respect to low-flying areas for aircraft, shipping routes and (the zones around) airports. In the event of an emergency in the area around the nuclear power plants, escape routes and shelter (for humans) are needed. The SEA-r identifies the geographical location of this infrastructure within five kilometres of the locations and how usable this infrastructure would be in the event of an emergency.

6.3 Environmental aspects

A nuclear power plant can cause impacts on the physical living environment. The SEA-r identifies the environmental impacts of two nuclear power plants on the surrounding environment at the different locations. Some of the aspects assessed are taken from the *SSG-35 non-safety criteria* – requirements relating to other non-safety requirements in the SSG (Table 6-2) – supplemented by environmental aspects which are common in the Netherlands (table 6-3).

Table 6-3 Assessment framework for impacts on the physical living environment (including *non-safety criteria SSG-35*).

Criteria	Sub-criteria		
Physical living environment (Environmental aspects)		**1 Construction phase**	**2 Operating phase**
Traffic	Accessibility by road, rail and water	✓	
	Traffic flow	✓	✓
	Traffic safety (incl. nautical safety)	✓	✓
Noise	Industrial noise	✓	✓
	Traffic noise	✓	✓
Vibration	Vibration nuisance	✓	
Light	Light emissions	✓	
Air quality	Nitrogen dioxide	✓	✓
	Particulate matter (PM_{10} and $PM_{2.5}$)	✓	✓
Environmental safety (including ionising radiation)	Site-specific risk		✓
	Group risk & ionising radiation (emergencies)		✓
Health	Environmental health quality	✓	✓
Soil	Soil conditions	✓	
	Soil quality	✓	
Water	Water quality	✓	✓
	Water quantity	✓	✓
	Water safety and flood risk	✓	✓
Ecology	Natura 2000 sites (including nitrogen)	✓	✓
	Other protected areas	✓	✓
	Protected species (land and water)	✓	✓
Landscape, cultural history and archaeology	Landscape values	✓	✓
	Cultural-historical values	✓	✓
	(Anticipated) archaeological values	✓	
Land use	Current function(s) of location & topography	✓	
	Land use in the local area (including recreation)	✓	✓
	Situation with respect to food production and drinking water extraction	✓	✓
Renewable energy	Linking options for residual heat		✓
	CO_2 emissions	✓	

Traffic

During the construction phase, construction materials and people will be moved to and from the construction sites. The SEA-r describes whether impacts during the construction phase can be limited by means of transport by road, water and rail. The traffic impacts of traffic to and from the nuclear power plants in the usage phase are assessed. The SEA-r indicates how many vehicles are expected during the construction and usage phases. A traffic model is used to help calculate which routes this traffic will take and what impacts that will have on traffic flows and road safety. Finally, the SEA-r identifies which impacts can arise during the construction and usage phases on nautical safety (due to currents caused by cooling water).

Noise

Noise impacts can occur as a result of the construction and use of the nuclear power plants. In the construction phase, these impacts involve noise emissions from vehicles to, from and on the construction sites and the project area and noise emissions from equipment (tools, pile-driving machines, etc.). During the operation of the nuclear power plants (the usage phase), the noise impacts involve noise emissions from vehicles to and from the nuclear

power plants and noise emissions caused by installations within the nuclear power plants. The SEA-r reveals which activities produce noise emissions and which noise impacts are associated with those activities and whether impacts are to be anticipated in designated quiet areas.

Vibration
Vibration can occur during the construction phase, for example caused by pile-driving activities or heavy traffic. The SEA-r reveals whether and where vibration is to be anticipated. The SEA-r details the related impacts, based on guideline distances.

Light
Light can be emitted by installations used during construction and installations of the nuclear power plant itself. The SEA-r reveals whether and where light emissions are to be anticipated. The SEA-r details the related impacts, based on guideline distances.

Air quality
Impacts on air quality can occur as a result of emissions from plant and equipment during the construction phase. The changes in air quality (particulate matter; PM_{10} and $PM_{2.5}$, and nitrogen dioxide; NO_2) are estimated in the SEA-r, based on the emissions of the expected work activities. The SEA-r reveals potential local exceedances of target values.

Safety of the local environment
The SEA-r shows the population density around the nuclear power plants in the form of contours. The impacts of an emergency are compared based on the number of people within the so-called 'preparation zones'. In concrete terms, this means establishing the number of residents within 5, 10, 20 and 100 kilometres of the nuclear power plants. The SEA-r states whether there are 10^{-6} risk contours for surrounding businesses and infrastructure which are relevant for the operation of the nuclear power plants. The SEA-r identifies the risk of transporting radioactive waste to the storage facility based on route length and population density along the route.

Health
The SEA-r considers to what extent the impacts on air quality, noise levels and safety of the local environment will result in impacts on the health of people in the surrounding area. The SEA-r considers whether there will be cumulative nuisance from the intention with other sources of nuisance in the surrounding area.

Soil
Impacts on the soil can occur as a result of groundworks and soil displacement during the construction of the new nuclear power plants, in the form of impacts on soil quality and subsidence of the soil. Possible impacts include disruption of soil structure and deterioration or improvement of soil quality. Existing contaminants in the soil may need to be cleaned up in the construction phase.

Water
The construction of two new nuclear power plants may cause changes to the level and quality of the groundwater. This may be the result of groundwater extraction (potentially) required for underground construction work and the discharge of groundwater following groundwater extraction. Alongside the impact of groundwater extraction on water quantity and water quality, the SEA-r also considers the risk of salinisation. Changes can also occur in the infiltration of rainwater as a result of changes in the size of paved surfaces on the construction sites and in the project area. The potential impacts on water quality and quantity are identified. The cooling water may influence water quality. These impacts, too, are identified.

Finally, there can be impacts in terms of water safety in the areas around nuclear power plants due to flood risk, for example in the event of changes to or near flood defences. The water safety impacts on the surrounding area are described in the SEA-r.

Ecology
Impacts can occur on protected species and protected areas during the construction phase and the usage phase. Within the 'ecology' category, these impacts are investigated on Natura 2000 sites, other protected areas and

protected species. For example, impacts such as nitrogen deposition, disruption/deterioration of plant and animal habitats (both on land and in water) caused by light, noise, vibration, cooling water and land use.

Landscape, cultural history and archaeology

Nuclear power plants can influence the landscape and cultural-historical values both above and below ground. The SEA-r identifies the impacts on protected cultural-historical, landscape and geographical values. The SEA-r also considers spatial-visual changes to the landscape.

Excavation work in the construction phase can influence archaeological remains in the soil. The SEA-r identifies the existing protected archaeological values and anticipated archaeological values.

Land use

The SEA-r describes the locations of the construction site and the nuclear power plants in relation to existing and autonomous land use, such as recreation, agriculture, urban areas, port activities and drinking water extraction and whether these will be influenced by the development. If insufficient land is available for the construction phase directly adjacent to the nuclear power plant, the possible consequences of land use elsewhere during the construction phase are also considered.

Sustainable energy

Nuclear power plants are part of the energy transition, which is aimed at achieving sustainable energy generation. Activities during the construction of nuclear power plants generate CO_2 emissions, resulting in a temporary increase in CO_2. This increase is detailed in the SEA-r. During the operation of nuclear power plants, residual heat is released via the cooling water. The SEA-r describes which opportunities exist to use that residual heat elsewhere.

6.4 Shutdown and decommissioning

A nuclear power plant is built in order to generate energy for a long period of time. Currently, the expectation is that energy will be generated for approximately 60 to 80 years. This means that the land on which the nuclear power plants are built will not be available for other uses for a long time. When constructing a nuclear power plant, it is mandatory – despite the fact that the activity will continue far into the future – to consider its reversibility or otherwise. A nuclear power plant must be decommissioned once it is finally shut down. The manner in which this will be done is detailed by the operator of a nuclear power plant in a decommissioning plan. Licences are also required for the decommissioning – the ANVS also acts as the competent authority for this licensing process.

In this phase, the scoping exercise, the environmental impacts of decommissioning are not considered. Decommissioning will be required eventually, regardless of the location. The spatial configuration of the two nuclear power plants is the same for the different locations. The size of the impacts of decommissioning are therefore not a point of differentiation. What is relevant in deciding on a suitable location for the nuclear power plants is that there may not be any impediments to decommissioning. Future decommissioning is taken into account during the licensing process for the establishment of the nuclear power plant (the phase after the Preferred Alternative and the SEA-r).

6.5 Radioactive waste

Radioactive waste is produced from nuclear power generation. The storage and management of radioactive waste is subject to strict rules. In the Netherlands, this takes place at COVRA in the municipality of Borsele. The radioactive waste is stored above ground for a period of at least 100 years. The waste is kept fully isolated in order to minimise the risk of radioactivity being released. The existing nuclear power plant in Borssele produces approximately 4.5 m^3 of radioactive waste per year (*Netherlands government: on nuclear energy*). Part of this is reused, but a proportion of the residue is not reusable with the technology currently available. The Ministry of Infrastructure and Water Management is responsible for nuclear waste policy. A new National Programme on Radioactive Waste Management is currently being drawn up, in accordance with *Directive 2011/70/Euratom* (see Appendix 4: policy framework). For the purposes of the programme, an EIA-r has been drawn up independently of the choice of location for new nuclear power plants.

The quantity of radioactive waste produced by two nuclear power plants will be the same regardless of location. For this reason, in the SEA-r, the storage of radioactive waste is not considered in relation to the choice of location. Regardless of the location chosen, radioactive waste will be processed abroad before being stored at COVRA in Vlissingen. This means that proximity to COVRA is also not a relevant aspect for the choice of location.

6.6 The Integrated Impact Analysis: a broader perspective than the SEA-r

The SEA-r is part of the IIA, drawn up by the Ministry of Climate Policy and Green Growth as a standard element of the Project Procedures. Alongside the SSG-35 criteria and the environmental aspects (from the SEA-r), the IIA also considers matters related to local stakeholders, cost, technical concept and future-proofness. Whereas the SEA-r describes the impacts of the construction and use of the two new nuclear power plants in a reference situation, the IIA also sheds light on the relationships between this intention and other developments in the surrounding area. With regard to technical concept, issues which play a role include the opportunities offered by the locations for possible future connections to – and expansion of – the high-voltage grid and the related considerations. Based partly on the SEA-r, the IIA provides the information required to take a decision on the provisional Preferred Solution. The IIA is presented for inspection simultaneously with the SEA-r and the provisional Preferred Solution.

Table 6-4 Assessment criteria in the Integrated Impact Analysis.

Criteria	Explanation
Environment	The IIA contains a description of the results of the SEA-r for each alternative, i.e. the environmental impacts of the two new nuclear power plants in the construction and usage phases. The results of the EIA procedure provide the basis for the 'environment' criterion.
Local stakeholders	The IIA contains a description of the outcomes of the participation process conducted for each alternative up to that point (issues for local stakeholders, socio-economic aspects, etc.) and reveals which concerns local stakeholders have and to what extent the local area will experience positive or negative impacts from the two new nuclear power plants.
Technical concept	The IIA considers the feasibility of the two new nuclear power plants for each alternative, focusing not on their (environmental) impacts but on their technical complexity. This includes any structures that need to be removed in order to free up the location for the nuclear power plants, the technical challenges during the construction phase and the complexity of the cooling water solution, as well as the efforts required to ensure the accessibility of the location in the construction phase and the supply and removal of fuel and radioactive waste. The complexity of the connection to the (380 kV) power grid also plays a role, as does the extent to which the existing 380 kV high-voltage network needs to be modified for nuclear power plants. Relevant sources for this information are the cooling water studies and system studies on integration into the electricity network.
Future-proofness	For each alternative, the IIA describes the extent to which two new nuclear power plants are consistent with trends (for example the energy transition and climate change) and spatial developments in and around the locations. The IIA describes the influence of a choice of location for nuclear power plants on other future developments, based on an interface analysis.
Cost	The IIA describes distinctive elements of the locations that will significantly influence the investment required for two new nuclear power plants – for example, differences with regard to acquiring land and moving infrastructure or existing industry. The IIA clarifies the ownership situation of the land under investigation.

Appendix 1: Safeguarding policy update report

{Separate appendix}

Appendix 2: Evaluation of extended longlist (areas in the Netherlands)

{Separate appendix}

Appendix 3: Evaluation of longlist (locations within areas)

{Separate appendix}

Appendix 4: Policy frameworks

This appendix lists the international and national legal and policy frameworks which apply to the project for the construction of two new nuclear power plants. The SEA-r provides a more detailed overview per research theme.

International frameworks

Euratom Treaty (1957)

The Netherlands is obliged to subject its nuclear activities to international oversight. Every nuclear facility in Europe automatically falls under the oversight of the EU (Euratom) and the IAEA in Vienna, and the licensee is obliged to supply necessary information.

Euratom directive on the management of spent fuel and radioactive waste (2011)

Under this directive (Directive 2011/70/Euratom), Member States must draw up national programmes specifying as concretely as possible how they will construct and manage final storage facilities. These programmes must be based on principles such as minimising waste production, complete responsibility for cost on the part of waste producers and prioritising safety. Member States may cooperate in order to comply with these principles. In the Netherlands, the Ministry of Infrastructure and Water Management is responsible for policy and laws and regulations around nuclear waste and spent fuel.

Water Framework Directive (WFD) (2000)

The objective of the WFD is to assure the quality of surface and ground water in Europe. All water in the European Union must have a 'good chemical status' and a 'good ecological status' by 2027. The WFD also seeks to promote the sustainable use of water and reduce discharges and emissions of hazardous substances, especially in view of the increased pressure on water sources. The WFD must therefore be taken into account when establishing a nuclear power plant.

European Flood Risk Directive (2007)

The goal of the directive on assessing and managing flood risks is to limit the negative consequences of flooding. Member states are required to conduct risk assessments and draw up maps. They must then make management plans setting out measures to reduce risks, taking account of local circumstances. Coordination among member states and cooperation with third countries are essential for effective prevention and mitigation.

European system of trading in emissions allowances (2005)

The emissions allowance specifies how much of a particular gas a country or company is permitted to emit. Emissions ceilings have been established for this purpose. The Dutch Emissions Authority (NEa) records and monitors emissions trading in, for example, NO_x and CO_2 rights by companies in the Netherlands. The system was established in response to the Kyoto protocol. The available allowances are limited and are reduced every year. In April 2023, the European Council and the European Parliament approved a revised directive for the European Union Emission Trading System (EU ETS). This revision is part of the Fit for 55 package, the European climate act under which the EU commits itself to reducing net emissions of greenhouse gases by at least 55% by 2030.

Kyoto Protocol (2005) & Paris Climate Agreement (2020)

The Kyoto protocol committed industrialised countries to reducing greenhouse gas emissions, in accordance with agreed individual targets. This treaty, ratified by 192 countries and 2005, was replaced in 2020 by the Paris Climate Agreement, which has been ratified by 194 countries. The Paris Agreement contains several important differences and nuances compared to the Kyoto protocol with regard to the reduction of greenhouse gas emissions. The Paris Agreement:

- was drawn up with all the countries in the world in mind and is not limited to developed countries;
- states that all countries share responsibility, not just the developed countries;
- seeks to limit global warming to 1.5°C compared to pre-industrial levels, rather than 2°C;
- aims to reduce the use of fossil fuels;
- sets the expectation that rich countries will financially support developing countries in reducing greenhouse gases.

Basel Protocol on Liability and Compensation (1999)

The Basel Protocol on Liability and Compensation of 1999 establishes who has financial responsibility in the event of an incident involving hazardous waste (including radioactive waste), from the point at which the waste is loaded onto the means of transport to its export destination, international transit, import and final disposal. It strives for adequate and timely compensation of losses resulting from transboundary movements of waste. It promotes transparency and accountability in handling hazardous waste.

Espoo Convention (2017)

The Espoo Convention (Convention on Environmental Impact Assessment in a Transboundary Context), signed in 1991 and in force since 2017, imposes a duty on parties to establish an environmental impact assessment procedure that provides for public participation for proposed activities with potentially significant adverse transboundary impacts – either new activities or existing activities that have been substantively modified. Under Section 2(3) of the Espoo Convention, where such activities are present and are associated with potentially significant adverse transboundary environmental impacts, an EIA-r must be drawn up to identify those impacts. This ensures that both the authorities and the public in neighbouring countries are involved in the EIA procedure that provides for international consultation.

Aarhus Convention (2005)

The *Aarhus Convention* is an environmental treaty of the United Nations Economic Commission for Europe dating from 1998 (ratified in 2001, and in the Netherlands in 2005) which guarantees the right to early and effective access to environmental information for the public (private individuals, legal persons and the associations which represent them) of the states which are party to the treaty, including the EU. The convention also enshrines the right to effective participation whilst all options are still open, prior to the initial (planning) decision. To this end, the authorities must inform the affected public about, inter alia, the significant impacts of the proposed activity on the environment, the intended measures to prevent and/or ameliorate the impacts, including emissions, and the most important reports and recommendations issued to the government in this regard (Article 6, paragraph 6, *Aarhus Convention).* The convention also guarantees access to the courts if government bodies failed to comply with these rights and environmental legislation.

Convention on Nuclear Safety (1996)

The Convention on Nuclear Safety, adopted in 1994 and in force since 1996, seeks to commit signatories operating land-based civil nuclear power plants to maintaining high levels of safety. This is achieved by establishing fundamental safety principles. The convention is based on the parties' common interest in achieving higher safety levels that will be developed and promoted through regular meetings. It obliges parties to submit reports on the implementation of their obligations for 'peer review'. This mechanism is the most important innovative and dynamic element of the convention.

Non-Proliferation Treaty, NPT (1970)

The goal of the international Non-Proliferation Treaty, which came into force in 1970, is to limit the spread of nuclear weapons and ultimately achieve a world without nuclear weapons. The treaty limits the possession of nuclear weapons to five countries: the United States, the United Kingdom, France, Russia and China. In addition, the NPT encourages international cooperation in the peaceful use of nuclear energy and promotes compliance with treaty obligations by means of international coalitions such as the Non-Proliferation and Disarmament Initiative. The Netherlands is a signatory to the treaty and encourages other countries to accede also, with the aim of creating a safer and more stable international climate.

IAEA Safety Documents

The IAEA has developed a series of safety documents that serve as a global reference to ensure nuclear safety and guarantee the protection of people and the environment. These documents are divided into three main categories: Safety Fundamentals, Safety Requirements and Safety Guides. The Safety Fundamentals lay down the fundamental safety objectives and principles that provide the basis for all the other safety standards. The Safety Requirements describe the specific requirements that need to be met in order to ensure a high level of protection. The Safety Guides provide detailed recommendations, including the Site Survey and Site Selection for Nuclear Installations (No. SSG-35), and guidelines on how to comply with the requirements. These standards are used worldwide by regulatory authorities, national authorities and organisations involved in the design, construction and operation of nuclear facilities, and by organisations that use radiation-related technologies. The goal of these harmonised safety standards is to ensure a consistently high level of safety worldwide, which is crucial for protecting the population and the environment against the potential risks of nuclear activities.

The IAEA's international step-by-step plan for choosing locations for nuclear power plants is illustrated in the following figure. This step-by-step plan is enshrined in international guideline *SSG-35*.

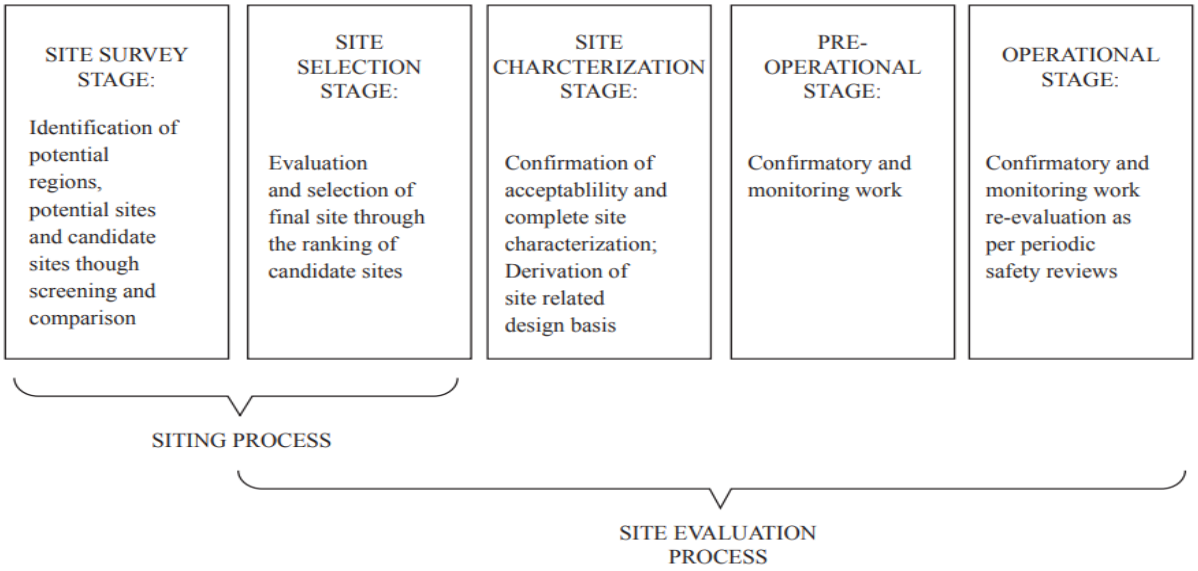

Figure 0-1 The five phases of the two processes to assure the safety of a location for a nuclear power plant (source: SSG-35).

Siting process

In the first phase of the siting process which is part of the international step-by-step plan of the IAEA, large areas are studied in order to identify smaller areas and, ultimately, within those smaller areas, potential locations for the construction of new nuclear power plants.

In phase 2, unsuitable locations are rejected. The remaining locations are evaluated on the basis of safety and other considerations in order to arrive at a preferred location.

Site evaluation process

In phase 3, all the relevant information about the selected preferred location is collected. Based on this information, the design criteria for the construction and operation of the facility are established, taking the specific risks and characteristics of the location into account.

In the pre-operational phase (phase 4), the studies and investigations initiated in previous phases continue, following the commencement of construction and before the start of operation of the nuclear installation, in order to complete and refine the evaluation of the location characteristics. The location details obtained enable a final evaluation of the simulation models that will be used in the final design.

In the operational phase (phase 5), suitable safety-related location evaluation activities are performed throughout the entire lifespan of the nuclear installation(s). These activities primarily take the form of monitoring and periodic safety assessments.

National frameworks

National Strategy on Spatial Planning and the Environment (Extra) (NOVEX)

The National Strategy on Spatial Planning and the Environment (Extra) (NOVEX) is aimed at strengthening and accelerating the implementation of the National Strategy On Spatial Planning And The Environment (NOVI). It provides additional guidelines and measures to improve and coordinate spatial planning in the Netherlands and is focused on specific national challenges such as housing, climate adaptation and infrastructure. NOVEX provides an overarching framework for spatial planning, bringing together national and regional interests in order to promote sustainable and coordinated spatial developments. Within that framework, an area-based approach has been established for 16 specific areas in the Netherlands, with a development perspective for each area drawn up jointly by national and regional government. Two of those areas are the North Sea Port District and the port of Rotterdam. Eemshaven and the port of Delfzijl are part of the wider NOVEX area Groningen and are in the concluding phase of the development perspective.

As a Dutch-Flemish port, North Sea Port provides an opportunity to promote transboundary collaboration, enhancing the effectiveness of action while contributing to the national economy and broadly-based welfare.

The port of Rotterdam offers opportunities to promote area-based coordination of initiatives and developments, speeding up decision-making and contributing to the energy transition of the port and industrial area. It also offers potential sources of additional finance, which is crucial for sustainable development. However, there is limited space available at Maasvlakte, an issue which needs to be urgently addressed.

Preliminary draft of the Spatial Policy Document (2024)

The new Spatial Policy Document sets out a long-term vision of the Netherlands and addresses the issue of dealing with a scarcity of available space while delivering on the aims. The Spatial Policy Document looks ahead to the years 2030, 2050 and 2100.

In 2024, the preliminary draft of the Spatial Policy Document was published, a second interim product ahead of the Draft Spatial Policy Document, which builds on the Spatial Policy Document contours memorandum published in October 2023. The preliminary draft provides an overview of the new directions, planning aims and choices for today, tomorrow and beyond – choices which have already been made and implemented in various national programmes, additional choices that will be necessary and have yet to be made in the (draft) Spatial Policy Document and future choices that will be put on the agenda in the Spatial Policy Document. The new directions, planning aims and maps provide the basis for the further elaboration of coordination approaches, available tools and participation ahead of the Draft Spatial Policy Document.

Electricity Act (1998)

In 1996, the European Parliament and the Council European Union adopted Directive 96/92/EC on the generation, transport, supply and export of electricity. Based on this directive, the Electricity Act (1998), which regulates the generation, transport and supply of electricity, came into force in 1998. Among other things, it covers:

- The role of the Minister of Economic Affairs, Agriculture and Innovation;
- The extent and manner of regulation;
- The expansion, construction, repair and modernisation of power grids;
- The reliability of energy supply;
- The duties and obligations of the network operator;
- Connection to the grid and transport of electricity;
- The import and export of electricity;
- Promoting and guaranteeing sustainable electricity;
- Licences for supply.

Under Article 9b of the Electricity Act (1998), decisions on nuclear power plants with a capacity of over 500 MW are subject to a project procedure (Section 5.2 of the Environment and Planning Act).

Energy Act (2024)

The new energy act replaces the existing Electricity Act (1998). The new act came into force on 1 January 2025. The energy act represents the legal foundation for the energy transition and provides a future-proof legislative framework for the changing electricity and gas markets and energy systems. The principal points of this act are:

- The protection of energy consumers by means of improved contractual protection in order to combat fraudulent energy suppliers;
- It enhances the ability of network operators to tackle the power grid as a whole;
- It enables households and businesses to actively participate in the energy market;
- It introduces a new system for the safe and controlled exchange of energy data.

National Energy System Plan (2023)

The *National Energy System Plan (NPE)* sets out a roadmap for the development of the energy system up to 2050. The government is guided by the NPE when taking decisions that set the direction for the development of the energy system. The NPE aims for a sustainable and fair energy system, to be achieved by building, saving, distributing and connecting:

1. Maximum supply: development of maximum supply and infrastructure for electricity, hydrogen, sustainable carbon carriers and heat;
2. Energy conservation: indispensable, given scarce energy and infrastructure;
3. Distribution in the event of scarcity: distribution and deployment of energy and energy infrastructure based on a system perspective;
4. International cooperation: the Netherlands as an important energy hub for the European Union;
5. Joint coordination: with members of the public and companies, with ample scope for participation and initiative.

Environment and Planning Act (2024)

This act provides an integrated framework for spatial planning, environmental management and the protection of nature and water. It sets out an integrated approach to nature and water management to protect valuable areas of nature, including Natura 2000 sites. Activities that can have significant impacts on such areas are subject to strict rules. There are various Natura 2000 sites in and around the various search areas. The establishment of two new nuclear power plants must be consistent with the applicable (quality) standards.

Nuclear Energy Act (1963)

The Nuclear Energy Act is a framework act and establishes a licensing obligation for nuclear facilities, including nuclear power plants. This means that a number of matters are not elaborated in detail in the act but rather in various administrative orders (decrees and decisions). The benefit of this is that the act can more easily be modified to bring it into line with current scientific knowledge. The Nuclear Energy Act regulates the following matters:

- Definitions of terms including fissionable materials, ores and radioactive materials;
- The transport, holding and disposal of fissionable materials or ores (Article 15);
- The establishment, putting into operation or maintenance in operation of facilities in which nuclear energy can be released and fissionable materials can be processed or stored (Article 15b);
- The preparation, transport, holding or use of radioactive materials (Article 29);
- Rules relating to devices that emit ionising radiation (Article 34);
- Licensing procedures (accompanying decrees).

Decrees which fall under the Nuclear Energy Act include:

- The Radiation Protection Decree;
- The Nuclear Facilities, Fissionable Materials and Ores Decree;
- The Fissionable Materials, Ores and Radioactive Substances (Transport) Decree;
- The Radioactive Waste and Spent Fuel (Import, Export and Transit) Decree
-

Alongside the Nuclear Energy Act and its decrees, there are European directives and international recommendations of the IAEA. The ANVS is the competent authority under the Nuclear Energy Act.

Nuclear Accidents (Liability) Act

The Nuclear Accidents (Liability) Act defines the liability of owners of nuclear reactors for nuclear accidents. The owner is responsible for losses resulting from such accidents. The owner must insure this liability up to a maximum of €1.2 billion. Losses beyond this amount are covered by a government-backed guarantee of up to €2.3 billion. In return, the owner pays an annual fee to the Dutch government.

National Programme on Radioactive Waste Management (NPRA)

The Dutch *National Programme on Radioactive Waste Management (NPRA)* lays down requirements for the management of radioactive waste and spent fuel. All EU member states are required to draw up a programme of this kind every ten years. The NPRA was first published in 2016 and a new programme must be available by 2025 at the latest. The programme is aimed at minimising production of radioactive waste and its safe management. It also seeks to limit unreasonable burdens on future generations, while ensuring that those who cause radioactive waste bear the cost of managing it.

Regional frameworks

Zeeland Spatial Vision

The Zeeland Spatial Vision (2025) is built around four aims for the province. They are:

1. An excellent living and working environment in Zealand. In 2050:
   - everyone has a suitable home in a safe, healthy and climate-neutral living environment, with good mobility, digital accessibility and high quality education. The cultural infrastructure is robust and provides an innovative cultural offering.
2. Balance within the major bodies of water and the rural areas. In 2050:
   - soil, groundwater and biodiversity are of high quality. The agricultural system operates sustainably and fisheries respect natural values. Environmental quality has improved and the nature network is complete.
3. A sustainable and innovative economy. In 2050:
   - Zeeland has a circular economy with green raw materials and modern infrastructure. Education is aligned with the labour market and companies operate in clusters. Innovation and test facilities contribute to the economy.
4. Climate-proof and carbon-neutral Zeeland. In 2050:
   - Zeeland is climate-resilient and water-robust. The province emits virtually no CO_2 and industry, mobility, heating and electricity production are fossil-free and/or carbon-free.

Nuclear energy is also an option for generating carbon-free energy. Zeeland regards Borssele as the obvious location for a new nuclear power plant, in view of the nuclear expertise already available at the EPZ plant, the proximity of COVRA, the ample availability of cooling water and the fact that Borssele is designated in the safeguarding policy.

'Connect 2025' strategic plan: ambitions for further development as a European port

In its 'Connect 2025' strategic plan, North Sea Port formulates specific ambitions to further develop the transboundary port area in the coming years. Central to the further development of North Sea Port is a commitment to economic development and employment, sustainability and climate, and solid financial foundations, with a particular focus on relationships with companies, public authorities and local stakeholders, with the port authority North Sea Port acting as a connector.

Implementation is focused on three core challenges:

1. Providing infrastructure and space;
2. Nautical services;
3. Providing direction and connection within the port area.

There are eight programmes to deliver the strategic plan:

1. Investing in the circular economy;
2. Investing in energy projects;
3. Investing in climate;
4. Strong logistics chains;
5. Future-proof infrastructure;
6. Digitalisation and data community;
7. Cooperation with local stakeholders;
8. Connecting collaborating parties.

Zuid-Holland Spatial Vision

The Zuid-Holland Spatial Vision is built around seven aims for the province:

1. Working together for Zuid-Holland:
   - Public administration tasks have become more complex. The province is striving for more effective cooperation between the different administrative levels and rapid delivery of complex challenges by involving residents and organisations at an early stage. It values participation and trust in public administration. The aim is a versatile, inclusive and innovative administration.
2. Accessible Zuid-Holland:
   - Good accessibility is important for quality of life, welfare, economic development and good access to residential and working areas. To this end, the province is investing in cycle paths, footpaths,

roads, waterways, bridges, locks and good public transport. The mobility transition is aimed at reducing CO_2 emissions and contributing to a future-proof infrastructure.

3. Clean energy for everyone:
   - The province wants to create a smart and clean economy, generate new jobs and contribute to national climate goals. In order to achieve that, it is committed to the transition to sustainable energy sources, with a focus on residual heat, renewable energy and limiting CO_2 emissions. No zero-carbon technologies will be ruled out in advance.
4. A competitive Zuid-Holland:
   - Zuid-Holland wants to be the most innovative region in the Netherlands, with cross-pollination between different sectors. It is committed to products and services that add sustainable and digital value, resulting from the three areas that will drive economic change: energy transition, circular and digitalisation.
5. Enhancing nature in Zuid-Holland:
   - The province wants to enhance biodiversity by ensuring sufficient drinking water, clean surface water, healthy soils and a sustainable freshwater situation. It aims for healthy, balanced nature that people can enjoy and provides the basis for social and economic activities. This calls for an integrated approach, with artificial interventions being required in order to preserve balance within a largely artificial landscape.
6. Strong towns and villages in Zuid-Holland:
   - The province wants to be an attractive, sustainable and competitive province that leads the way, in which people enjoy living, working and spending their leisure time in an attractive and healthy living environment. The province is focused on accelerating the construction of affordable and energy-neutral homes, connecting towns and villages and protecting valuable landscapes. By providing space for greenery and water, and by taking climate-adaptive measures, Zuid-Holland wants to be an attractive and competitive province where everyone feels at home.
7. Safe and healthy Zuid-Holland:
   - Zuid-Holland aims for a safe, healthy and beautiful living environment. The province takes responsibility for clean air, safe neighbourhoods and good access to nature and water. It takes measures to deal with climate change and urbanisation more effectively. Through cooperation and innovative solutions, it seeks to improve the living environment and encourage healthy lifestyles.

In the Zuid-Holland Spatial Vision (2023), Maasvlakte II is designated as a seaport landscape. The seaport landscape is characterised by a large industrial complex to the south of Nieuwe Waterweg and north of Hartelkanaal/A15, from Waalhaven to Maasvlakte II. The Spatial Vision describes the targets in terms of the spatial quality of the seaport landscape:

- Developments in and around the mainport are consistent with the large-scale industrial and logistical character of the port area;
- The Rotterdam port area is changing from a classic port economy to a knowledge-intensive complex based on (information) technology, renewable raw materials and innovative services. This transition must serve to enhance spatial quality;
- The energy transition will change the use and look of the Rotterdam port area. This transition must serve to enhance spatial quality.

Rotterdam Port Vision

Global developments such as the energy transition, the raw materials transition and digitalisation call for substantial modification of Rotterdam's port and industrial complex. The Port Vision (2019) describes the aims and prospects of Rotterdam's port and industrial complex. The central objective is to maintain and increase the societal and economic value of this complex and reduce undesirable external impacts such as CO_2 emissions.

The Rotterdam Port Vision describes "economic transition: future-proof" as one of the three challenges facing the port. Economic transition is understood to include recent developments such as digitalisation and the energy and raw materials transition, but also changing trade flows. A far-reaching transition is taking place in energy, in terms of both production and consumption. The options for storing renewable energy instead of consuming it directly, and converting it into molecules instead of electrons, are important elements in this transition.

Groningen Spatial Vision

The Groningen Spatial Vision (2023) sets out the province's aim of switching to forms of renewable energy as quickly as possible. Over the coming years, further steps will be taken in order to implement the commitments made under the Regional Energy Strategy 1.0. In the meantime, the provincial authority is anticipating the objectives and tasks that will help deliver the goal for 2050. This is a precondition for all future spatial policy. What exactly the task will involve is being worked out in a long-term energy vision, based on what is currently technically achievable. This energy vision not only provides direction for policy, it also offers stakeholders a clear benchmark to measure their future developments against.

In the vision, the profile of the supra-regional Eemshaven/Oostpolder business cluster is defined as seaport, automotive, batteries, hyper-scale data centres and green energy. The aim of assigning a profile is to facilitate appropriate economic activity at these locations. This will also enable companies to utilise each other's residual heat, residual materials and/or innovation. Other types of businesses may also be permitted to locate in these business clusters if they can make a solid case for doing so. Eemshaven will play a crucial role in the transition to the production, storage and processing of green energy.

The establishment of a nuclear power plant in Groningen is not in line with provincial energy generation plans. The region is committed to other sustainable alternatives, such as green hydrogen.

Municipal frameworks

Borsele Spatial Vision

Borsele municipality attaches great value to a safe, healthy and clean Borsele. Within the Sloegebied area, Borsele municipality sees opportunities for large-scale renewable energy generation in order to help meet objectives for climate, sustainability and the energy transition. The municipality believes there is sufficient space for businesses within the area's existing boundaries. It is against further expansion within those boundaries. The municipality regards the (environmental) impact of the Sloegebied area in the current situation as acceptable. The municipality considers the existing odour nuisance caused by industry, specifically in the Sloegebied area, to be an issue requiring attention.

Rotterdam Spatial Vision

Through its Spatial Vision, Rotterdam municipality aims to achieve a climate neutral port and economy. To this end, the municipality is committed to:

- Transitioning the existing cluster from fossil to renewable energy;
- Electrification of energy demand: expansion of wind farms;
- Timely modification and updating of infrastructure for energy systems.

An important element in the energy transition is the direct electrification of energy demand, subject to the condition that this demand can be met with zero-carbon electricity. The production of green hydrogen, for example, requires a lot of renewable electricity for electrolysis. Most of that will have to be supplied by offshore wind farms.

In order to facilitate electrification, Rotterdam municipality aims to modify and update the infrastructure for the energy systems in good time. That involves upgrading the power grid, particularly at Botlek and Maasvlakte, connecting Moerdijk to the high voltage networks and landing at least 2 GW of additional renewable electricity from wind farms in the North Sea by 2030.

The municipality also wants a mains distribution pipe for heat between Rotterdam and The Hague (and additional connections in the industrial estate for transferring renewable heat).

This economic transition translates to the following development challenge for Maasvlakte II: strengthening the intercontinental hub for container logistics, preserving the global hub for deep sea bulk flows, space to develop new markets in offshore, energy and chemical product manufacturing.

Vlissingen Spatial Vision 2040

The municipality of Vlissingen wants a balanced and sustainable future for Vlissingen. The Spatial Vision 2040 is focused on creating an attractive, green and accessible city for residents and visitors alike. Important goals include a natural and green living environment, climate-resilient cultural and physical connections and a good economic climate. The municipality is also striving for a balanced and circular and energy-neutral living environment. It aims to have a more-or-less sustainable energy system by 2040, with Vlissingen being Zeeland's energy hub. It is focused on reducing pollution in soil, water and the atmosphere.

Specifically for the port area, Vlissingen wants to strengthen its position as an internationally-oriented maritime city. This involves developing the port as part of North Sea Port, one of Europe's leading ports. The municipality is committed to innovative employment in the maritime sector and wants to become a clean, sustainable and climate-proof delta.

Terneuzen Structural Vision 2025

Terneuzen operates a progressive climate and energy policy, with a strong focus on sustainability. The municipality is anticipating the consequences of climate change by taking long-term measures, such as adapting spatial developments and encouraging water storage. The city seeks to promote a sustainable economy by providing space to develop large-scale business parks within new and existing locations for development, restructuring and transformation. Although no final policy decision has yet been taken to develop the west bank of the Ghent-Terneuzen Canal, a reservation has been set aside for this purpose. The areas within the existing industrial-logistical complex designated for agriculture and nature enjoy strong statutory protections.

The municipality is committed to a sustainable transition of process industry and further development of the Canal Zone as a logistics hub, with a strong focus on strengthening the position of bioenergy. Terneuzen regards itself as an energy-conscious municipality, both in the generation of renewable energy and in limiting energy consumption. The municipality also utilises industrial residual heat and is committed to bio-based concepts in order to reduce dependence on fossil fuels. Terneuzen promotes the generation of renewable energy, such as wind and geothermal, and actively seeks new opportunities to achieve its energy goals. The national government has designated the Canal Zone as an establishment location for a power plant of 500 MW or more (not being nuclear energy).

Het Hogeland Spatial Vision (2022)

The municipality of Het Hogeland wants to make a solid contribution to a carbon-neutral Netherlands by 2050. As regards large-scale generation of renewable energy, the focus is on Eemshaven, where the generation of energy (wind and solar) is part of the energy hub. Eemshaven is the core economic zone with growth potential and is being developed into an energy hub and centre for hydrogen production and processing. The area plays a crucial role in the Netherlands energy chain for the generation, landing and balancing of renewable energy. The focus is on a circular economy, with companies exchanging heat, water and raw materials. The aim is to make existing businesses more sustainable and offer space for new industry which is dependent on renewable energy. The development of Oostpolder, south of Eemshaven, marks the first step in this direction.

The future development of the energy and hydrogen economy and the associated space requirements are still uncertain. For this reason, an area programme is being drawn up for Eemshaven, based on the existing structural vision for the Eems Dollard area. This programme is being developed in conjunction with area partners and will explore how the economic growth of the port can be linked to renewable energy, future-proof agriculture, nature and a pleasant residential climate.

Appendix 5: Glossary of terms

Term	Definition
10-6 contours	Site-specific risk contour of activities associated with a risk of once every million years (10-6); this is used to establish the safe distance between activities involving hazardous substances and other activities.
Update report	Report which analyses whether the assumptions on which the safeguarding policy was originally based are still valid. This involves considering whether, with current insights, the information on which the policy was based would still result in the same choice of safeguarding locations.
Authority for Nuclear Safety and Radiation Protection (ANVS)	The ANVS ensures that the highest standards of nuclear safety and radiation protection are met in the Netherlands. To this end, the ANVS lays down rules, issues licences, makes sure that licence-holders abide by the conditions and takes enforcement action where necessary.
Autonomous developments	Spatial developments originating independently of the proposed activities in and around the locations. They are either approved (spatial) developments or developments that will be approved in the near future.
Assessment framework	Establishes the criteria used to describe the impact of a plan or project and specifies the measures against which the results of the impact description will be evaluated.
Living Environment (Quality) Decree	The Dutch Living Environment (Quality) Decree lays down rules for environmental values, instructions and assessments, and rules for monitoring.
Competent authority	The administrative body which decides on a licence application and is competent to conduct supervision and enforcement of water-based and other activities.
Netherlands Commission for Environmental Assessment (NCEA)	The NCEA is an independent organisation that advises on the content of environmental impact reports.
Central Organisation for Radioactive Waste (COVRA)	The storage and management of radioactive waste must comply with strict rules, and in the Netherlands it takes place at COVRA in the municipality of Borsele.
Energy mix	The mix of energy sources used to meet the demand for energy.
Gen III+ reactors	Third-generation reactors (Gen III and III+) represent a technical evolution from generation II reactors, with improved operating life, fuel technology, thermal efficiency and standardised designs. The additional safety requirements described above have already been incorporated into the design of generation III+ reactors.
Gigawatt (GW)	A thousand megawatts.
Group risk	Cumulative probabilities per year that at least 10, 100 or 1000 persons will die as a direct result of their presence in the area of influence of a facility and an exceptional incident within the facility involving a hazardous substance.
Port-based	Connected with the port, associated with or characteristic of a port or port area.
Integrated Impact Analysis (IIA)	Alongside the SSG-35 criteria and the environmental aspects (from the SEA-r), the IIA also considers matters related to local stakeholders, cost, technical concept and future-proofness. Based partly on the SEA-r, the IIA provides the information required to take a decision on the provisional preferred solution.
International Atomic Energy Agency (IAEA)	The IAEA is the global body for cooperation in the nuclear domain and promotes the safe, secure and peaceful use of nuclear technology. In the event of an incident, the IAEA plays a leading role by providing the international community with reliable information at an early stage.
Nuclear power plant	A power station that generates electricity using the energy released from nuclear fission.
Nuclear energy	Energy released from the fuel uranium. During nuclear fission, an atomic nucleus splits into two or more lighter fragments, generating significant quantities of energy. In the case of a nuclear power plant, the nucleus in question is a uranium nucleus.
Cooling tower	A tower that serves to dissipate heat from a thermal or nuclear power plant or chemical processing plant.
Cooling water	Water, in this case extracted from large bodies of water, used for cooling purposes.
Linking option	The combining of ideas, plans and developments which can be logically and practically linked to the plan within a planning area.
Megawatt (MW)	One million Watts.
National Energy System Plan (NPE)	Describes how the Netherlands will develop an energy system appropriate to a climate-neutral society.
Memorandum on Scope and Level of Detail (NRD)	Document that describes which issues and aspects are important and which alternatives will be investigated (the scope) and how they will be investigated (the level of detail) in the SEA.

Environment and Planning Decree	The Environment and Planning Decree contains rules about the competent authority for environmental permits, about procedures, enforcement and implementation, and about the Digital System for the Environment and Planning Act. The Environment and Planning Decree applies to all actors in the physical living environment – citizens, companies and government.
Environmental plan	The rules for the physical living environment laid down and enforced by a municipality.
Environmental safety	The risks associated with the use, production, storage and transport of hazardous substances and nuclear radiation. Environmental safety relates to how the limited space in the Netherlands can be safely utilised and how those risks can be kept to a minimum.
Environment and Planning Act	The law that regulates all aspects of the space in which we live, work and spend our leisure time.
Participation plan	A participation plan is a plan that clearly and transparently describes what you want to achieve by means of participation and how, which parties will be consulted on an issue, policy area, programme or project and when.
Site-specific risk	Site-specific risk is a term that expresses the degree of external safety of a location.
SEA	Complete environmental impact assessment, the entire EIA procedure.
SEA-r	The environmental impact report, the product resulting from the environmental impact assessment.
Key planning decision	A procedure used to draw up important plans in the realm of national spatial policy.
National Energy Network Programme (PEH)	Programme concerned with the space required for the national elements of the land-based energy system for a climate-neutral energy system by 2050.
Tangential projects	Projects which have not (yet) officially been approved as spatial plans. In the case of a tangential project, it is uncertain whether the development will go ahead. Tangential projects are not part of the reference situation. However, they are included in the Integrated Impact Analysis because they can influence the impacts of or the Preferred Solution for the proposed activity.
Reference situation	The reference situation consists of the current situation plus autonomous developments. In this SEA, the reference situation is the year 2040.
Site Survey and Site Selection for nuclear installations (SSG-35)	Guideline essentially concerned with the impacts in the local environment that can represent a risk to the safe operation of the nuclear power plants. The SSG also includes a number of non-safety aspects, such as accessibility and impact on existing land use.
Small Modular Reactors (SMR)	Advanced nuclear reactors with a generating capacity of up to 300 MW(e) per unit, which is approximately one third of the generating capacity of traditional nuclear reactors.
Specific Safety Requirements 1 (SSR-1)	Guideline for safety criteria relevant to nuclear facility locations as described by the IAEA.
Nitrogen deposition	The quantity of nitrogen oxides and ammonia that settles on the ground. In the Netherlands, the National Institute for Public Health and the Environment (RIVM) uses measurements and models to determine how much nitrogen settles on the ground.
National Structure Plan for Electricity Supply (SEV)	Policy in which potential locations are selected for large-scale energy generation. This process began in 1975 with SEV, followed in 1986, 2008 and 2023/2024 by new versions of the structure plan. SEV III is currently in effect.
Terawatt hours (TWh)	Billions of kilowatt hours. Quantity often used to express national electricity consumption.
Reduction	Arriving at a choice by gradually discarding options in order to eventually arrive at one or a small selection of options. Can take place in the form of different rounds.
Preferred Alternative	The alternative chosen from among different alternatives, based on an assessment of the aspects of Environment, Local Stakeholders, Technical Concept, Cost and Future-proofness.
Preferred Solution	Marks the end of the scoping exercise and the start of the plan development phase in complex projects.
Intention and Proposal for Public Participation	Document in which everyone is informed about the intention.
Safeguarding policy	Since the end of the 1970s, the Dutch government has been drawing up policy on locations where new nuclear power plants could potentially be built. These are so-called safeguarding locations.
Safeguarding locations	Locations where space is reserved for a nuclear power plant, even if it is never built.

Appendix 6: Sources

Authority for Nuclear Safety and Radiation Protection (no date). *New developments in nuclear reactors.* Consulted at Nieuwe ontwikkelingen in kernreactoren | ANVS.

Beckerman, C. (2021). *Amendment to the Temporary Groningen Act in connection with the reinforcing of buildings in Groningen province)* [motion letter]. Consulted at Tweede Kamer der Staten-Generaal.

Third Electricity Supply Structure Plan (SEVIII) (2009). Parliamentary Paper 31410, no. 15. Consulted at folio tweede kamer (officielebekendmakingen.nl).

First National Structure Plan for Electricity Supply (SEV) (1975). Parliamentary Paper 13488, Nos 1-2.

Health Council (1975). Parliamentary Paper 13122, no. 11.

International Atomic Energy Agency (2019). *Site evaluation for nuclear installations*. Consulted at P1837_web.pdf.

International Atomic Energy Agency (2015). *Site survey and site selection for nuclear installations*. Consulted at Site survey and site selection for nuclear installations (iaea.org).

IPCC (2023), *Sixth Assessment Report (AR6)*. Consulted at https://www.ipcc.ch/report/ar6/wg3/.

Jetten, R. (2022, 9 December). *Details of the coalition agreement relating to nuclear power* [Letter to Parliament], Parliamentary Paper 32645, no. 116. Consulted at - (overheid.nl).

State Advocate Pels Rijcken (2025, 6 February). *Advisory report by the State Advocate on the planning procedure for the construction of new nuclear power stations.* Consulted at https://open.overheid.nl/documenten.

Ministry of General Affairs (2024). *Governing Programme: elaboration of the outline agreement by the government.* Consulted at https://open.overheid.nl/documenten.

Ministry of Economic Affairs and Climate Policy (2024, 5 March). *Living Environment (Quality) Decree, Safeguarding locations for nuclear power plants.* Consulted at officiële bekendmakingen.

Ministry of Economic Affairs and Climate Policy (2023). *Climate Memorandum 2023.* Consulted at Klimaatnota 2023 (overheid.nl).

Ministry of Economic Affairs and Climate Policy (2023). *National Energy System Plan (NPE).* Consulted at open.overheid.nl (overheid.nl).

Ministry of Economic Affairs (1986). *Establishment locations for nuclear power plants.* Parliamentary Paper 18830, no. 46-47. Consulted at 18076239.pdf (iaea.org).

Ministry of Economic Affairs and Climate Policy (2024). *Intention and Proposal for Public Participation: Construction of new nuclear power stations.* Consulted at Voornemen en voorstel voor participatie (12 februari 2024) - Nieuwbouw kerncentrales (rvo.nl).

Ministry of Economic Affairs and Climate Policy & Ministry of the Interior and Kingdom Relations (2024). *National Energy Network Programme. Space for a climate-neutral energy system in the national interest.* Consulted at https://open.overheid.nl/documenten.

Ministry of Economic Affairs, Agriculture and Innovation & Ministry of Infrastructure and the Environment (2011). *Draft Memorandum on Scope and Level of Detail SEA-r for second Borssele nuclear power plant.* Consulted at commissiemer.

Ministry of Infrastructure and Water Management (2016). *Report: The national programme for the management of radioactive waste and spent fissionable materials.* Netherlands government. Consulted at Rapport Het nationale programma voor het beheer van radioactief afval en verbruikte splijtstoffen | Rapport | Rijksoverheid.nl

Naeff Consult (2006). *Key Planning Decision Project Mainport Development Rotterdam: Part 4. Final text following parliamentary approval.* Consulted at PMR_*PKB* Deel 4_10045190.indd (naeff.com).

Policy Document on Energy Policy (1980). Parliamentary Paper 15802, Nos 11-12. Consulted at SGD_19791980_0005007.pdf (overheid.nl).

PBL, TNO, CBS & RIVM (2023). *Climate and Energy Outlook 2023. Estimates of GHG emissions, energy conservation and renewable energy*. The Hague: Netherlands Environmental Assessment Agency. Consulted at Klimaat- en Energieverkenning 2023 (pbl.nl).

Netherlands Enterprise Agency (2024). *380 kV Zeeuws-Vlaanderen*. Consulted at 380 kV Zeeuws-Vlaanderen (rvo.nl).

Netherlands Enterprise Agency (2024). *Programme for the Investigation of Landfall Sites for Offshore Wind.* Consulted at Programma Verbindingen Aanlanding Wind Op Zee (VAWOZ) 2031-2040 (rvo.nl).

Netherlands government, Nuclear Energy in the Netherlands, Radioactive waste. Consulted at Radioactief afval | Kernenergie in Nederland (overkernenergie.nl).

Sienot, A., & Mulder, A. (2019). *Motion by members Sienot and Agnes Mulder about a roadmap for floating solar energy.* House of Representatives. Consulted at https://www.tweedekamer.nl/kamerstukken/moties.

United Nations (2021). *Carbon Neutrality in the UNECE Region: Integrated Life-cycle Assessment of Electricity Sources*. Consulted at LCA_3_FINAL March 2022.pdf.

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