Summary of draft Memorandum on Scope and Level of Detail

SEA-r for the choice of location for the construction of new nuclear power plants

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Introduction

The Netherlands is working to create the energy system of the future. To that end, the current government wants to build four new nuclear power plants. The government is currently seeking a suitable location for the first two plants.

In order to facilitate the construction of two new nuclear power plants, the government has initiated a Project Procedure. This planning procedure is being followed in order to decide where the first two new nuclear power plants should be built. Part of this procedure is an environmental impact report (hereinafter: EIA-r). This EIA-r is focused on the question: If two new nuclear power plants are built, what will be the impacts on the different locations?

A research design has been made for the EIA-r. This plan is the draft Memorandum on Scope and Level of Detail. The draft Memorandum on Scope and Level of Detail lists the locations that will be investigated for the construction of two new nuclear power plants. It also describes which environmental aspects will be studied. The eventual results will be published in the EIA-r. Alongside the EIA-r, an Integrated Impact Analysis (IIA) will also be drawn up.

Based on the information in the EIA-r and the IIA, the minister of Climate Policy and Green Growth and the minister of Housing, Spatial Planning and the Environment can take a decision on the location for the two new nuclear power plants. This is called the Preferred Solution. The public will be extensively involved in the deliberations that ultimately result in this Preferred Solution.

Guide to reading this document
The summary of the draft Memorandum on Scope and Level of Detail describes the main points contained in that document, based on a number of important questions. The summary is structured as follows:

- Chapter 1: Why nuclear energy?
- Chapter 2: What is a nuclear power plant?
- Chapter 3: How does the EIA procedure work?
- Chapter 4: Which locations will be investigated?
- Chapter 5: Which impacts will be investigated?

1. Why nuclear energy?

Nuclear energy contributes to a reliable energy system, in which Dutch energy comes from a range of different energy sources. This means the Netherlands will not be dependent on a particular single energy source. The country's dependence on foreign countries will also be reduced. Nuclear energy is a supplement to other sustainable energy sources, such as solar and wind energy. Whereas those energy sources are dependent on the weather, nuclear energy is not. Nuclear energy can generate a particular quantity of electricity at almost any moment. This guarantees that everyone in the Netherlands has and will continue to have access to energy.

Currently, there is one nuclear power plant in Borssele that produces 485 Megawatts (MW). The intention is to build two new nuclear power plants which can together produce between 2,300 and 3,300 MW. That is 4 to 7 times more energy than is generated by the existing nuclear power plant. The new plants will be able to meet 9 to 13% of expected energy demand in 2035.

As part of a reliable, climate-neutral energy supply in the future, the government of the Netherlands envisages the construction of two new nuclear power plants. Building two new nuclear power plants at a single location will serve to limit cost and impacts. 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)”.

Like any other energy source, nuclear energy also has its drawbacks. Nuclear energy produces radioactive waste. The construction of nuclear power plants takes a long time and impacts the physical living environment. The government will do all it can to minimise the drawbacks of nuclear energy – for example, by observing due care in the storage of radioactive waste and complying with all the strict requirements related to the environment and safety. For more information about the pros and cons of nuclear energy and an explanation of how a nuclear power plant works, see www.overkernenergie.nl.

2. What is a nuclear power plant?

A nuclear power plant generates energy (heat), which is released when splitting uranium atoms. This heat is used to generate electricity.

The process is as follows. Inside the plant, there are rods made of uranium contained within a vessel filled with water (1 and 2). When the uranium atoms in these rods split, heat is released, heating up the water. This hot water flows to a steam generator (3), where it transfers its heat to a second water circuit, which produces steam. The steam drives a turbine (4), which drives a generator (5) to produce electricity. After the steam has done its job, it is cooled back into water in a condenser (6) by means of a cooling water system containing cold water (7).

In nuclear power plants there are three segregated circuits, so that water from the reactor does not enter the turbine or cooling system. In this way, the nuclear power plant delivers a stable and efficient supply of electricity. The operation of the plant is illustrated below (see Figure 2-1).

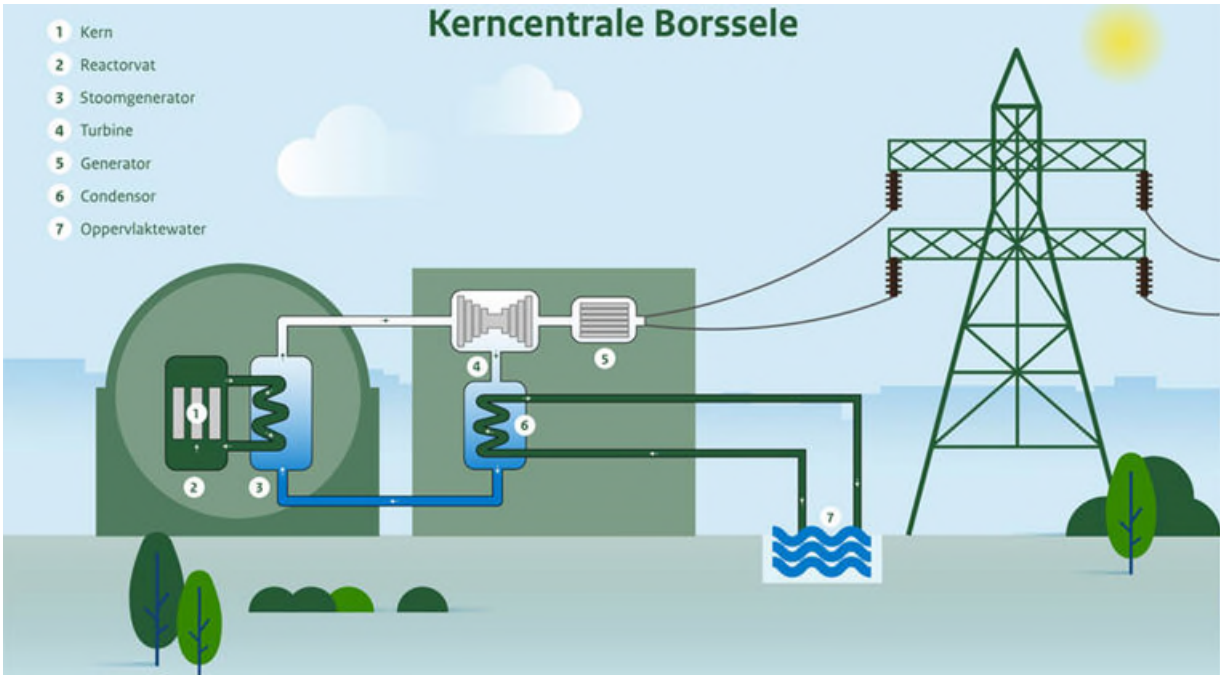

Figure 2-1 How a nuclear power plant works (example of Borssele), source: Authority for Nuclear Safety and Radiation Protection.

3. How does the procedure work?

3.1 What is an EIA-r?

An EIA-r is a report, the environmental impact report, which describes the consequences of a project for the environment. An EIA-r must be drawn up if a project has the potential to significantly impact the environment. Under European and Dutch legislation, an EIA-r is mandatory for nuclear power plants. The government completes a procedure for this purpose.

The goal of the EIA-r is to give full weight to the environmental interest when choosing a location for the two new nuclear power plants. This will help in reaching a properly considered decision that takes account of the impact on the environment. This EIA-r is focused on the question: If two new nuclear power plants are built, what will be the impacts on the different locations?

3.2 Which steps are involved?

In order to be able to build two new nuclear power plants, the government completes a project procedure. This procedure consists of four steps:

1. Public announcement and participation: the public is informed about the project;
2. Scoping exercise: results in the selection of a preferred location, the Preferred Solution;
3. Preferred Solution: confirms the chosen location;
4. Plan development phase: the project is worked out for the chosen location.

Two EIRs are drawn up at separate points in the project procedure. The first is during the exploration of various alternatives (step 2). This is the SEA-r (henceforth referred to as the EIA-r), which describes the environmental impacts based on which a preferred location is chosen. That location is confirmed by the decision on the Preferred Solution (step 3). In the plan development phase (step 4), a second EIA-r is drawn up, the project EIA-r. This looks at the environmental impacts of the chosen location in more detail. The spatial plan is approved and, if all the conditions for safe nuclear power plants are met, the Authority for Nuclear Safety and Radiation Protection (ANVS) issues a licence for the new nuclear power plants under the Nuclear Energy Act.

3.2.1 What has already been done?

Step 1 The public announcement of the intention and proposal for public participation has been made.
On 12 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. Between 23 February and 4 April 2024, interested parties had the opportunity to contribute their ideas about the intention and the participation process. Four information sessions were held, in Heinkenszand, Terneuzen, Vlaardingen and Oostvoorne. A total of 1,374 responses were received. Those responses led to several additions to the draft Memorandum on Scope and Level of Detail.

3.2.2 What point are we at now?

Step 2 The scoping exercise is about to begin.
The scoping exercise begins with the research design, the draft Memorandum on Scope and Level of Detail. The draft Memorandum on Scope and Level of Detail provides information about the intention and the process, and describes which locations will be investigated in the EIA-r. The draft Memorandum on Scope and Level of Detail will be available for public inspection for six weeks. During that period, residents, companies, public authorities and other organisations can submit responses to the research design. Those responses will be incorporated into the final Memorandum on Scope and Level of Detail. The recommendations of legal advisers and the Environmental Impact Assessment Committee will also be incorporated into the Memorandum on Scope and Level of Detail.

3.2.3 What is still to come?

Step 3 The scoping exercise concludes with the Preferred Solution.
Based on that Memorandum on Scope and Level of Detail, the EIA-r is drawn up. The EIA-r provides the environmental information for the IIA. Alongside a chapter on the environment, the IIA will also include chapters on technical concept, cost, local environment and future-proofness. The EIA-r and the provisional Preferred Solution will be made available for public inspection. Anyone who wants to can submit a statement of views. Neighbouring countries will also be informed and can submit statements of views. The EIA-r is evaluated by the Environmental Impact Assessment Committee. The minister of Climate Policy and Green Growth and the minister of Housing and Spatial Planning approve the Preferred Solution, including the preferred location for the nuclear power plants. In doing so, they take account of the EIA-r and the statements of views.

Step 4 The plan development phase follows the Preferred Solution.
In this phase, detailed studies are carried out for the preferred location. The project EIA-r is drawn up and licences are requested from the Authority for Nuclear Safety and Radiation Protection. Eventually, a single project decision is reached.

3.3 What does the participation process look like?

Participation is currently underway on the research design (draft Memorandum on Scope and Level of Detail). With the publication of the draft Memorandum on Scope and Level of Detail, residents, businesses, public authorities and other organisations can submit a response to the content of this draft Memorandum on Scope and Level of Detail and the forthcoming EIA-r.

We invite you to put forward your views on the location assessment study, for example with regard to the locations to be investigated or research questions. You can find more information about how and when documents will be available for public inspection and the options for responding at www.overkernenergie.nl.

The research design is partly based on responses previously received to the publication of the intention and proposal for public participation (the participation plan). The participation plan describes how residents and government and other agencies are involved in the participation programme. The participation is made up of mandatory and additional participation.

The participation later on in the project procedure is about the studies carried out (EIA-r and IIA). The outcome of the participation is described in the 'Local stakeholders' chapter of the IIA and helps inform the Preferred Solution.

The construction of nuclear power plants will affect the local environment, both during the construction phase and when the reactors are operational. The studies for the EIA-r and the IIA describe these impacts objectively and equally for all potential locations. The goal is to provide a clear picture of the facts, so that a good decision can be taken about where the nuclear power plants should be built.

In this way, the ministers get the clearest possible picture of all the impacts and how local stakeholders feel about them. Once the studies are complete, they decide how much weight should be given to all the information, taking account of responses from the regions. The outcome of this assessment is then published, with supporting evidence, in the provisional Preferred Solution.

3.4 What is not investigated in this EIA-r?

You cannot give your views on other projects related to nuclear energy in this project procedure – for example, whether the operating life of the existing nuclear power plant in Borssele should be extended, how radioactive waste is stored and the approach to small modular reactor (SMRs). Different procedures apply in those cases, as part of the National Programme on Radioactive Waste Management (NPRA), Borssele Nuclear Power Plant Operating Life Extension and other studies.

4. Which locations will be investigated?

4.1 Space for nuclear power plants

The construction of two nuclear power plants calls for a permanent site covering 50 to 60 hectares. During the construction phase, which will last 10 to 15 years, an additional 60 to 70 hectares will be needed for construction sites. The total size of the location being sought is therefore 130 hectares, equivalent to around 260 football pitches. Additional space may also be required for housing, for example.

4.2 Searching for suitable locations

In order to identify locations to be investigated, a step-by-step approach was followed. Firstly, a number of search areas were selected. This selection was made with input from the responses to the Intention and Proposal for Public Participation and the areas identified in the safeguarding policy (existing policy aimed at securing potential locations for nuclear power plants).

The selection was then reduced on the basis of various criteria, including the proximity of the areas in question to the required cooling water and electricity supplies. Their position in relation to population concentrations was also considered. In total, 39 areas were investigated, of which five remain.

After that, a more specific search was conducted for suitable locations within the five remaining areas. This involved looking at issues such as which modifications would be required to the site, the size and shape of the area, the space for construction sites and the current use of land. The aspects of safe operation, technical concept, accessibility and local environment were taken into account. This led to a selection of seven locations for further investigation in the EIA-r.

4.3 Which locations are being investigated in the EIA-r?

The locations to be investigated in the EIA-r are shown in Table 4-1. They are the locations for which the impacts of the construction and use of two new nuclear power plants are being identified. These locations are referred to in the EIA-r as *the alternatives*. The locations are depicted below. They are elaborated further in the EIA-r.

Table 4-1 Overview of locations that will be investigated in the EIA-r.

Sloegebied	Terneuzen	Maasvlakte	Eemshaven
1. *EPZ north* 2. *Thermphos site*	1. *Westelijke Mosselbanken & Paulinapolder*	1. *Amaliahaven west side*	1. *Westereemweg & Emmapolder* 2. *Eemshaven power plant* 3. *Eems power plant*

Figure 4-1 Sloegebied alternatives.

Figure 4-2 Terneuzen alternatives.

Figure 4-3 Maasvlakte II alternatives.

Figure 4-4 Eemshaven alternatives.

5. Which impacts will be investigated?

The aspects to be investigated in the Integrated Impact Analysis (IIA) are environment, local stakeholders, technical concept, future-proofness and cost. Table 5-1 breaks down what each one involves. The EIA-r provides information for the overall assessment of the 'environment' aspect in the IIA. The results of the IIA facilitate a properly considered decision on the location of nuclear power plants.

Table 5-1 Assessment criteria in the IIA.

Criteria	Explanation
Environment	The IIA summarises the results of the environmental impact report (EIA-r). The EIA-r considers the environmental impact during the construction and use of the two new nuclear power plants.
Local stakeholders	The IIA lists the concerns and questions of local stakeholders and explains what impacts local stakeholders will experience from the construction of two new nuclear power plants.
Technical concept	The IIA sets out the technical challenges in building two new nuclear power plants. These include: • The cooling water solution; • The complexity of the construction phase; • The issues around connection to the 380kV grid.
Future-proofness	The IIA describes links with other developments in the local area – for example, how the project relates to other projects in the energy transition. It discusses the relationship between a decision on the two new nuclear power plants and other local projects.
Cost	The IIA describes which factors influence the investment costs of building two new nuclear power plants for each location. These include: • The cost of acquiring the required land and preparing it for construction; • Moving existing infrastructure or businesses; • Mitigating environmental measures; • Complex cooling water solutions;

5.1 The assessment frameworks for the EIA-r

Two assessment frameworks are used in the EIA-r to identify the impacts for the 'environment' aspect. The first framework is focused on identifying a safe location for the nuclear power plants. The second framework is about the impacts on the local area. The research focuses on impacts which are different for different locations. It is precisely those differences which are relevant for deciding on a Preferred Solution.

The safety aspects covered in the EIA-r are:

Table 5-2 Assessment framework for safety aspects.

Safety aspects	Description
Earthquake risks	The EIA-r describes whether earthquakes can pose a risk to nuclear power plants.
Geological risks	The EIA-r describes whether the ground is stable enough for nuclear power plants.
Risks due to volcanism	The EIA-r shows the proximity of the locations to volcanoes.
Flood risks	The EIA-r identifies the flood risk to nuclear power plants.
Extreme weather conditions	The EIA-r reveals whether locations are susceptible to wildfires.
	The EIA-r investigates the risks to the nuclear power plants caused by storms.
Risks due to human action	The EIA-r considers how close the locations are to military objects such as barracks.
	The EIA-r investigates risks of acts of war, terror and sabotage.
	The EIA-r describes risks due to low-flying areas, shipping routes and airports.
	The EIA-r describes the evacuation routes and shelter opportunities.

The (environmental) themes covered in the EIA-r are shown in Table 5.3. In determining the impacts, both impacts in the construction of the nuclear power plants (the construction phase) and impacts in the usage phase are investigated.

Table 5-3 Assessment framework for environmental aspects.

Aspect	Description	Construction	Usage
Traffic	The EIA-r investigates how construction equipment, materials and people can be transported to the construction sites by road, rail and water and what the related traffic impacts will be.	✓	
	The EIA-r reveals how many vehicles will be on the roads during the construction and use of the nuclear power plants, what the most important routes are and what the related traffic impacts will be.	✓	✓
	The EIA-r investigates road safety.	✓	✓
Noise	The EIA-r investigates how many people will experience noise nuisance.	✓	✓
	The EIA-r identifies the noise from vehicles for the most important routes to and from the sites.	✓	✓
Vibration	The EIA-r investigates whether work activities may cause vibration.	✓	
Light	The EIA-r investigates whether and where light nuisance may occur.	✓	
Air quality	The EIA-r identifies changes in the concentrations of nitrogen dioxide and particulate matter and the impacts they will have on air quality.	✓	✓
Safety of the local environment	The EIA-r investigates the safety of other companies and infrastructure following the construction of nuclear power plants.		✓
	The EIA-r identifies the risks of transporting radioactive waste.		✓
Health	The EIA-r investigates whether the changes in air quality, noise and safety around the nuclear power plants will have a combined impact on health.	✓	✓
Soil	The EIA-r investigates the impacts on soil structure.	✓	
	The EIA-r investigates the impacts on soil quality.	✓	
Water	The EIA-r identifies how water quality will be affected.	✓	✓
	The EIA-r identifies how the water system will change.	✓	✓
	The EIA-r investigates whether nuclear power plants will affect water safety (flood risk) in the local environment.	✓	✓
Ecology	The EIA-r investigates the impacts on Natura 2000 sites.	✓	✓
	The EIA-r investigates the impacts on other protected areas of nature.	✓	✓
	The EIA-r investigates the impacts on protected animals and plants, on land and in the water.	✓	✓
Landscape, cultural history and archaeology	The EIA-r investigates the impacts on the landscape.	✓	✓
	The EIA-r investigates the impacts on cultural-historical values.	✓	✓
	The EIA-r investigates the impacts on potential archaeological values.	✓	
Land use	The EIA-r reveals what is currently at the locations.	✓	
	The EIA-r reveals how the space in the local area is used (including recreation).	✓	✓
	The EIA-r considers the proximity of the nuclear power plants to food production and drinking water extraction.	✓	✓
Sustainable energy	The EIA-r investigates whether there are opportunities for increasing sustainability.		✓
	The EIA-r calculates how much CO_2 is released during construction.	✓	

Would you like to find out more?
You can find the draft Memorandum on Scope and Level of Detail and more information about nuclear power stations and the procedure at *www.overkernenergie.nl*.

About Antea Group

Antea Group is home to 1800 proud engineers and consultants. Every day, we help build a safe, healthy and future-proof living environment. Our organisation employs the very best technical specialists in the Netherlands, who together provide innovative solutions in the fields of data, sensoring and IT. In this way, we contribute to the development of infrastructure, residential districts and hydraulic-engineering works, as well as issues around climate adaptation, energy transition and the replacement challenge. From research through to design and from realisation to management: for every task, we supply the appropriate knowledge base. We contribute critical ideas, always with the mindset of working together to achieve the best result. In this way, we anticipate the questions of today and the solutions of tomorrow, as we have for the past 70 years.

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