

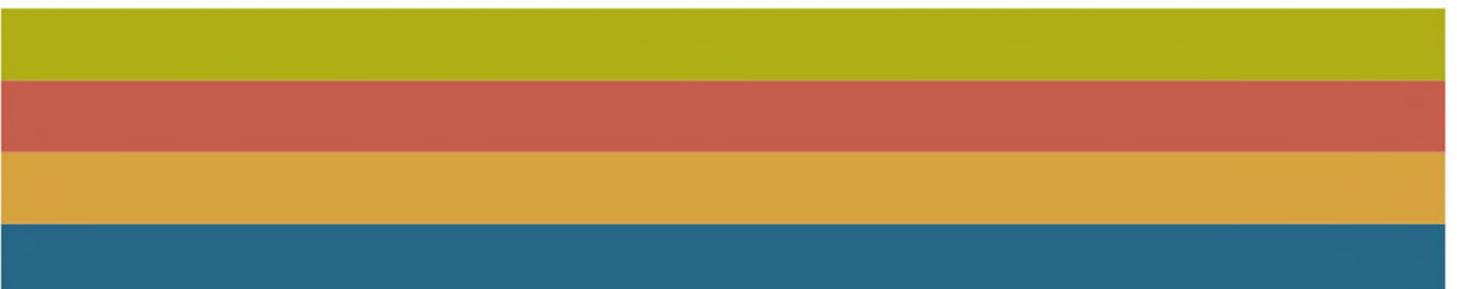


Commissie voor de
milieueffectrapportage

Lifetime extension of the Borssele nuclear power plant

Advisory report on scoping guidelines for the contents of the EA-report
(published in Dutch on October 12th, 2023)

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1 Advisory report on the contents of the EA-report

The government of the Netherlands is seeking to prolong the operational life of the Borssele nuclear power plant (hereinafter referred to as KCB) for the purposes of electricity production. The plant is owned by Elektriciteit-Produktiemaatschappij Zuid-Nederland (hereinafter referred to as EPZ).^{1,2} This will require amendments to the Nuclear Energy Act. Before the Senate and House of Representatives and the government can decide on a legislative amendment, the environmental consequences must be investigated.

The environmental assessment report to be drawn up for this purpose must consist of two parts. The first phase of the report (Part 1) maps out the environmental consequences of a legislative amendment to the Nuclear Energy Act. If a favourable decision is reached, EPZ may proceed to apply for a permit. This is because the current Act prohibits the processing of a permit application.³ At a later point in time, the second phase of the report (Part 2) will map out the environmental consequences of a permit application.

The Secretary of State for Infrastructure and Water Management (I&W) has requested the Netherlands Commission for Environmental Assessment (NCEA) to provide guidelines for the contents of 'Part 1 of the forthcoming environmental assessment report' (hereinafter referred to as the EA-report in this advisory report, unless specified otherwise).



Figure 1, Borssele Nuclear Power Plant (source NRD).

First a delineation: what falls within the scope of the legislative amendment and what does not?

Based on the current draft Terms of Reference memorandum (hereinafter referred to as NRD), it is unclear to the NCEA what exactly the legislative amendment is intended to achieve and how this aligns with the overarching decision-making process regarding nuclear energy use in the Netherlands. This complicates the task of providing guidance on what should or should not fall within the scope of this environmental study (delineation) and on which environmental studies are being conducted in connection with other decisions. In addition, it is unclear to the NCEA which additional decisions are required for a potential lifetime extension and what their connection is to the current legislative amendment and

¹ This is because the Nuclear Energy Act currently stipulates that KCB must close in 2033.

² The plant's technical design life expired in 2013. This has been conditionally extended to 2033, by mechanisms such as the [Borssele Covenant](#). The [Coalition Agreement](#) stipulates a second lifetime extension for KCB, which will extend past the year 2033 (both links in Dutch).

³ Article 15a of the Nuclear Energy Act states that a 'a permit application to release nuclear energy at the plant after 2033 shall not be considered'.

environmental assessment procedure. In other words: *‘What is to be decided, in what sequence and in which decisions regarding electricity production from nuclear energy in the Netherlands, and what is the role of the current Borssele nuclear power plant in this context?’* The NCEA held discussions on the delineation with⁴ representatives of the Secretary of State for Infrastructure and Water Management, the Minister for Climate and Energy Policy (KE) and EPZ (the owner). Hence, the NCEA felt that the most logical approach would be to await the findings of the technical feasibility studies and only then investigating the environmental consequences associated with the lifetime extension. Taking all of this into account, decisions could then be reached regarding a potential legislative amendment and a modified permit. In the course of these discussions, the NCEA learned that the Minister is currently focusing exclusively on enabling EPZ to submit a permit application and that, to this end, EPZ is ready to commence the requisite technical (long-term) studies. So consent for a potential further lifetime extension is not under consideration at this point in time. It remains to be seen whether, following the legislative amendment, EPZ will submit a permit application. However, the Minister has decided to start drawing up a (phased) EA-report to investigate the associated environmental consequences.

The NCEA notes that the NRD could imply that the legislative amendment can mean more. An example of this is the Memorandum of Understanding between central government and EPZ.⁵ In Section 2 of this advisory report, the NCEA addresses the delineation involved **and recommends that the Minister for Climate and Energy Policy provide a clear (or clearer) statement regarding the delineation of the legislative amendment.** In this context, address the connection with the overarching decision-making process regarding nuclear energy, such as its role in the energy mix.⁶

Based on above *and* given the protracted nature of technical studies, this NCEA advisory report assumes that the EA-report will focus solely on the feasibility of considering a permit application for a further lifetime extension. It has provided a more detailed explanation in Section 2 of this advisory report. For the sake of completeness, the NCEA reiterates that this advisory report does not pertain to the required contents of Part 2 of the EA-report.

Essential information for Part 1 of the EA-report

The NCEA deems the following points to be essential information for the EA-report. In other words, if environmental interests are to be factored into a decision on amendments to the Nuclear Energy Act, the EA-report must at least contain the following information:

- a **delineation decision** that includes a clear summary and timeline for the essential decisions (both strategic and operational) and details of the stakeholders. In this summary, clearly indicate what is to be decided, in which decision, and in what sequence;
- a **survey of the environmental consequences** of the legislative amendment, including a comprehensive and comprehensible summary of KCB’s existing environmental consequences. In particular, address nuclear safety, nature, and effects on neighbouring countries;
- an **agenda listing environmental focal points** for follow-up.

Decision-makers and participants primarily read the summary of the EA-report. That is why this section merits special attention. The summary should be comprehensible as a standalone

⁴ Visit to the Borssele site on 7 September 2023, involving representatives from I&W, the Ministry of Economic Affairs and Climate Policy (EZK), and the energy company EPZ.

⁵ For details of this Memorandum of Understanding see: [Parliamentary letter expanding on the provisions outlined in the Coalition Agreement concerning nuclear energy, 9 December 2022 \(in Dutch\).](#)

⁶ The energy mix indicates how much electricity is generated by a given energy source.

document, faithfully representing the content of the entire EA-report. In the forthcoming sections, the NCEA will elaborate on the specific details that must be included in the EA-report. Its advisory report builds upon the groundwork established by the NRD. It revisits points raised in the NRD only when this is required for a proper understanding of the advisory report, or when suggesting modifications to elements of the approach.

Background to the EA-report and procedure

An amendment to the Nuclear Energy Act is a primary and indispensable prerequisite if EPZ is to apply for a permit for a lifetime extension of KCB. Thus, the Secretary of State for Infrastructure and Water Management (I&W) and the Minister for Climate and Energy Policy (KE) have indicated that the NRD⁷ for the legislative amendment marks the initial stage of the environmental assessment procedure. They gave the following reasons for this:

1) in compliance with the case law of the European Court of Justice, they estimate that the environmental consequences must be investigated in an EIA before any amendments are made to the Nuclear Energy Act;⁸

2) in compliance with the Court's case law, the environmental consequences must also be thoroughly mapped out in the initial decision as far as possible.

As indicated in Section 2 of this advisory report, the precise delineation of the legislative amendment, partly in relation to the overarching decision-making process concerning nuclear energy use in the Netherlands, is currently unclear to the NCEA.

Due to the nature of the project and its location, transboundary effects cannot be ruled out. The Espoo Convention⁹ mandates that both the public and the authorities in neighbouring countries must be involved in the environmental assessment procedure in the same way and at the same time as those in the Netherlands.

According to the NRD, the environmental assessment procedure for the KCB lifetime extension will be carried out in phases. First, Part 1 of an EA-report for the amendment to the Nuclear Energy Act will be drawn up. If a favourable decision concerning the legislative amendment is reached, the Authority for Nuclear Safety and Radiation Protection (ANVS) will no longer need to withhold consideration of a permit for lifetime extension. Therefore, EPZ will be able to apply for such a permit.¹⁰ EPZ will then investigate the environmental consequences of this permit in Part 2 of the EA-report. The Authority for Nuclear Safety and Radiation Protection will decide on the permit application. Parts 1 and 2 jointly constitute the formal Environmental Impact Assessment (EIA) for the KCB lifetime extension, including all (other) associated permits. These could include an amended water permit and (possible) nature permits.

The NRD indicates that the Secretary of State for Infrastructure and Water Management anticipates that the legislative amendment will not constitute a plan or programme as defined in the SMB Directive.¹¹ However, as a precautionary measure, Part 1 of the EA-report will also comply with the substantive and procedural requirements applicable to Strategic Environmental Assessment (SEA). Nevertheless, within the framework of the Habitats Directive, a plan or programme might be involved¹². In such instances, an SEA may also be needed due to adverse impacts on Natura 2000 sites, which must be detailed in an

⁷ Draft Terms of Reference Memorandum for the Service Lifetime Extension of the Borssele Nuclear Power Plant, Ministry of Economic Affairs & Climate, 16 May 2023.

⁸ [European ruling on the Doel Nuclear Power Plant](#).

⁹ [Espoo Convention \(environmental assessment in a transboundary context\)](#).

¹⁰ [Authority for Nuclear Safety and Radiation Protection \(ANVS\)](#).

¹¹ [SMB Directive](#).

¹² The [Habitats Directive](#), this EU directive employs a more comprehensive definition for determining what qualifies as a plan or programme.

Appropriate Assessment. For this reason, a combined SEA/EIA (referred to as EA-report) will be drawn up.

Roles of the NCEA and stakeholders

The NCEA is independent body, established by law, that is tasked with advising on the content and quality of EA-reports. It appoints a working group of independent experts for each project. It does not prepare environmental assessment reports. That responsibility rests with the initiator (for Part 1 of the EA-report, that would be the Minister for Climate and Energy Policy, and later, for Part 2, it is EPZ). The competent authorities – which in this instance comprise the Senate, House of Representatives, and government for Part 1 of the EA-report, and subsequently, in any case, the Authority for Nuclear Safety and Radiation Protection for Part 2 – is responsible for making decisions regarding the legislative amendment and the permit.

Annex 1 of this advisory report contains details of the NCEA working group's composition and procedures, as well as additional project details. The project documents used in the advisory report have been made available at the website. These can be accessed by entering the number [3723](#) into the search field at www.commissieemr.nl (in Dutch).

2 Background and decision making

2.1 Background and goal

The Borssele nuclear power plant, which dates from 1973, is one of the oldest nuclear power plants in Europe. EPZ, the operator of the Borssele nuclear power plant, has been granted an operating permit for an indefinite period under the Nuclear Energy Act. The Borssele Covenant¹³ was signed in 2006. It includes the provision that KCB will continue to operate beyond its technical design life (2013). The Nuclear Energy Act was amended in 2010, specifying that Borssele is prohibited from generating nuclear energy beyond 2033. This also established an expiry date for KCB's permit.

In keeping with the Coalition Agreement, the (outgoing) cabinet has expressed its intention to keep the power plant in operation beyond 2033.¹⁴

The NCEA recommends that an accurate description of the goal be included in the EA-report, *and* a brief summary of the context and background of the power plant at Borssele. Also address the following:

- the safety of the plant vis-à-vis other reactors in Europe;
- the extent to which a lifetime extension beyond 2033 might also entail further modernisation?

¹³ [Borssele Nuclear Power Plant Covenant](#) (in Dutch).

¹⁴ [Memorandum of Understanding, regarding research into the feasibility of, and preparations for, the service lifetime extension of the Borssele Nuclear Power Plant](#) (2022) (in Dutch).

2.2 Delineation: what falls within the scope of the legislative amendment and what does not?

Multiple (partial) decisions are required for a potential lifetime extension. This also requires an amendment to the Nuclear Energy Act.

Based on the NRD, it is unclear to the NCEA about exactly what is included in the legislative amendment and what is not. This complicates drawing up an advisory report on the requisite delineation in the environmental study for the EA-report. The NCEA explains the uncertainties below.

2.2.1 Consent for a potential permit application or more?

On one hand, the amendment to the Nuclear Energy Act can be regarded as simply eliminating the legal obstacle for the Authority for Nuclear Safety and Radiation Protection (ANVS) to consider a potential permit application from EPZ. As a result, EPZ intends to commence the requisite technical studies. Incidentally, should the legislative amendment be limited solely to this point, then the NCEA feels that it will not be possible to include substantiated statements concerning a new period for an extension in the new legal text, given that the necessary studies have not been carried out.

On the other hand, the possible unconditional deletion or extension of KCB's expiry date in the Nuclear Energy Act^{3,15} can also be viewed in another way. Deleting or amending an expiry date in the legal framework could be seen as essentially equivalent to an approval in principle by the legislator for the extended operation of Borssele. Further partial decisions will be made at a later stage and will be substantiated in Part 2 of the EA-report.¹⁶

To some extent, it can be inferred from the text of the NRD (as well as from the cited Coalition Agreement⁵) that the intention behind the legislative amendment is to further extend KCB's lifetime at this stage. A complicating factor in this context is that the results of technical studies that might substantiate this notion may not be available in the short term. EPZ has stated that it will take several years to conduct these studies, *and* that they have not yet commenced. As a result, for the time being, it is not feasible, even in a general sense, to convincingly demonstrate in the EA-report that KCB's design life can safely accommodate a second extension of the approved lifetime, or in other words, that this is feasible and realistic. Thus, in this scenario too, it is not possible to articulate a substantiated statement about a revised period in the new legal text. The necessary studies have not been carried out.

2.2.2 Regional strategic choices to be made by central government

In the municipality of Borssele, seven National Coordination Procedures for major energy projects are currently under way. This number is expected to increase in the upcoming

¹⁵ Article 15a of the Nuclear Energy Act stipulates that the permit to operate the Borssele nuclear power plant will expire on 31 December 2033. This concerns the use of nuclear energy to generate electricity. If the year 2033 were to be deleted as an expiry date, this would immediately mean (once again) that KCB has a permit with no expiry date.

¹⁶ An EA-report does not supplant decisions but, instead, facilitates the decision-making process. If a phased EA-report is drawn up for the phased granting of a permit (as in this case), it is quite possible that a 'conditional' decision may be reached to enact a legislative amendment partially based on the information generated in Part 1 of the EA-report. Nonetheless, it is essential to consider the possibility that, based on information from subsequent parts of the EA-report, a decision may or must still be made that the lifetime extension is not feasible or is undesirable. Ultimately, as a result, the legislative amendment could and should be reversed.

decades. It remains uncertain when and where a comprehensive and cohesive examination of regional strategic decisions concerning National Energy Projects and their environmental consequences will take place. Consider, for instance, the effects of the Borssele Energy Hub¹⁷ and the potential impact on nature in Natura 2000 areas. KCB may have environmental effects on these upcoming energy plans and projects. Conversely, these plans and projects, particularly the plans for two new nuclear power plants, can also impact KCB. The municipality of Borssele's public submission underscores the need to draw attention to this aspect.¹⁸

From a logical standpoint, the decisions and considerations related to this matter are not entirely in keeping with 'Part 2 of an EA-report for a permit under the Nuclear Energy Act'. Responsibility for this does not rest with EPZ, a private entity entrusted with drawing up the EA-report part 2. In the NCEA's view, decisions and considerations of this kind are more appropriately handled by the government (central government) itself, using a non-binding approach that is yet to be specified. In summary, a solution is still needed to avert any alignment issues and environmental risks.

2.2.3 Other decisions on nuclear energy (overarching decision-making process)

Clarify which additional decisions are required for a potential lifetime extension and their connection to the current legislative amendment and environmental assessment procedure.

Consider, for instance, *the role of nuclear energy in the energy mix*. The NRD briefly mentions that decision-making on such an 'overarching decision-making process' will take place elsewhere, at a later stage.¹⁹ The question arises as to the precise 'scope' of the EA-report for this decision, in relation to other forthcoming decisions. In other words: *'What is to be decided, in what sequence and in which decisions regarding electricity production from nuclear energy in the Netherlands, and how does the current Borssele nuclear power plant fit into this context?'*

2.3 Advice to the Minister: clear delineation of legislative amendment needed

2.3.1 NCEA discussion with I&W, EZK and EPZ

The NCEA spoke⁴ on the delineation with representatives of the Secretary of State for Infrastructure and Water Management, the Minister for Climate and Energy Policy (KE) and EPZ. Hence, the NCEA felt that the most logical approach would be to await the findings of the technical feasibility studies and only then investigate the environmental consequences associated with the lifetime extension. Taking all of this into account, decisions could then be

¹⁷ As also described in the draft Main Energy Structure Programme (PEH).

¹⁸ In its public submission concerning the NRD, the municipality of Borssele urges central government to formulate an approach, within the framework of this environmental assessment procedure, that takes into consideration the collective impact of all developments in and around the municipality. For improved overall decision-making about all (future) Government Coordination (RCR) Procedures for energy projects in the municipality.

¹⁹ According to the NRD, this includes the [Main Energy Structure Programme \(rvo.nl\)](#) and the [National Energy System Plan \(NPE\)](#) (both links in Dutch).

reached regarding a potential legislative amendment and a modified permit.

In the course of these discussions, the NCEA learned that the Minister is currently focusing exclusively on enabling EPZ to submit a permit application and, to this end, is ready to commence the requisite technical (long-term) studies, but certainly no more than that. So, at this stage, there would be no consent whatsoever for a potential further lifetime extension. It remains to be seen whether, following the legislative amendment, EPZ will actually submit a permit application.

As an initial step, the NCEA advises the Minister for Climate and Energy Policy to make a statement regarding the delineation of the legislative amendment, and to use clearer formulation and accountability in this regard.

The alignment between the environmental assessment report (loosely translated: '*everything is still open*') and the participation process (loosely translated: '*the decision regarding the KCB lifetime extension has been made*') also requires clearer formulation and accountability.^{20,21}

The delineation has significant implications for the required content and depth of the environmental study to be conducted, and is not optional. If environmental questions remain unanswered elsewhere, they will have to be addressed later (for example, in Part 2 of the EA-report, in an SEA-report for the spatial development of the Energy Hub, and/or elsewhere).

2.3.2 The delineation adopted by the NCEA for the purposes of this advisory report

The NCEA's approach in this advisory report is based on a legislative amendment that solely enables permit applications for further lifetime extensions.²² The scope is then relatively limited, as the EA-report currently confines itself to this part of the decision-making chain. Indeed, in all cases, the NCEA operates under the assumption that KCB will need a revised permit if it is to continue producing electricity from nuclear energy beyond 2033.¹⁵ Hence, the legislative amendment and the accompanying EA-report should primarily offer an understanding of the overall environmental consequences of the legislative amendment. Accordingly, the range of environmental consequences to be investigated is more limited in this scenario. As mentioned, any other partial decisions for KCB (such as a revised permit and an expiry date) will be made at a later stage and will be substantiated in Part 2 of the EA-report.

A precondition for this advisory report is that the overarching decision-making chain is addressed elsewhere (see also Section 2.4 of this advisory report). The NCEA operates on the premise that the Minister will promptly clarify this matter (prior to any legislative amendment), thus enabling its inclusion in the EA-report. This is because the NCEA requires a clear understanding of the structure of the overall decision-making chain to effectively evaluate the accuracy and completeness of the EA-report for the legislative amendment at a

²⁰ Participation and Communication Plan for Nuclear Energy Part I Strategic Approach (31 May 2023, EZK), page 11: '*... Thus, before elucidating what participation entails, it is essential to clarify which contents have been fixed and, as a result, will involve no further participation. With regard to Borssele's service lifetime extension and the preparation of the new nuclear power plants, these are choices that politicians, as representatives of the Netherlands' representative democracy, have already taken...*'

²¹ Many public submissions underscore the need to draw attention to this aspect.

²² This requires that Article 15a of the Nuclear Energy Act be amended.

later stage.²³

2.4 Decision (or decisions) to be taken

Include a clear summary in the EA-report, together with a timeline featuring the essential decisions (both strategic and operational) of the overarching decision-making chain and details of the relevant stakeholders. This provides clarity for participants and others regarding the decision to be taken, the sequence involved, and the identity of the decision maker. The starting point for this process is the recommendation above, concerning the 'delineation of the legislative amendment'. In any case, be sure to specifically address:

- any decisions yet to be taken on PEH, NPE¹⁹ and the Borssele Energy Hub;
- impact on decision-making by possible international processes, involving bodies such as the IAEA^{24,25};
- the 'Borssele Nuclear Power Plant Covenant on environmental information'¹³. In the NRD, the possible revision of this covenant is described as a secondary objective.

2.4.1 Summary: what is decided in which decision?

Next, specify which decisions address the following environmental questions:

- on what (environmental) grounds is electricity production from nuclear energy, and especially a further lifetime extension for the existing power plant at Borssele, deemed to be useful or essential? In addition, address the role of nuclear energy in the energy mix and dependencies on foreign countries (for the supply of uranium, for example);
- is it feasible to incorporate the KCB's lifetime extension into the planning area, together with the other planned industrial developments, including the Energy Hub; in other words, what is the combined impact of the various businesses operating in this area?
- can the capacity of KCB and one or two new nuclear power plants at Borssele be stably integrated into the (projected) electricity transmission capacity in this part of the Netherlands?
- what safety preconditions does KCB impose on nearby sites for new nuclear power plants?
- what provisions are being made to mitigate the growing risk of flooding in this area? Should climate adaptation measures, such as dike reinforcement funded by central government, be considered and/or required for KCB and the two new nuclear power plants?
- could the lifetime extension have an adverse impact on Natura 2000 areas?

According to the NRD, decisions regarding the decommissioning of the power plant and the storage and final disposal of radioactive waste are beyond the scope of environmental studies in this EA-report. However, many of the public submissions reflect concerns about the storage and final disposal of radioactive waste. Thus, with that in mind, the NCEA recommends in the EA-report that attention (or special attention) should be given to this

²³ The NCEA will review the quality of the EA-report (in terms of its accuracy and completeness) in a subsequent advisory report.

²⁴ IAEA stands for [International Atomic Energy Agency | Atoms for Peace and Development \(iaea.org\)](https://www.iaea.org/).

²⁵ The IAEA regulates the peaceful use of fissile materials *and* the safety of nuclear energy. Governments can periodically request 'SALTO missions' (a form of peer review) from the IAEA.

aspect. In addition, in Section 4.3 of this advisory report, the NCEA calls for a broad outline to be provided of any changes in radioactive waste production.

2.4.2 Decision processes and timelines

Furthermore, with reference to the timeline, specify the following in the EA-report:

- the nature and interdependence of the various decision-making processes. Which decisions should take precedence due to the future preconditions they impose? The NCEA recommends actively engaging the municipality of Borssele in this regard¹⁸;
- construction period and any individual phases;
- timelines per process;
- a list of all the parties involved, and of their responsibilities and liabilities.

3 Proposed activity and alternatives

3.1 General

In this advisory report, the 'proposed activity' is a legislative amendment to the Nuclear Energy Act that restricts any permit applications to further lifetime extensions for KCB.

According to the NRD, the aim is to make the most of existing information about the power plant and environmental studies that are already available (historical). In this context, the NCEA notes that no environmental assessment report has been drawn up for the power plant for the period from 2013 to 2033.²⁶ This implies that there is no comprehensible and comprehensive summary of the existing power plant's environmental consequences for the period until 2033. As a result, an extra assessment for the determination of certain environmental impacts may be needed in the EA-report. Incidentally, a large amount of fundamental information regarding (nuclear) safety and radiation is already available.²⁷

To give readers of the EA-report an accurate impression, the NCEA recommends starting with a concise summary of the operation of the present KCB.

3.2 Alternatives and reference: different approach needed

Alternatives are important in environmental assessments because they help to clarify the range of approaches an initiator can use to accomplish a specific goal. In particular, potentially highlighting the existence of alternatives with fewer environmental consequences. These alternatives are compared with a reference in an environmental assessment report. The reference illustrates the future state of the environment in the event that a plan or project is not implemented.

²⁶ Various public submissions call upon the government of the Netherlands to draw up an environmental assessment report for the period from 2013 to 2033. This is in accordance with a decision by the [Aarhus Convention Compliance Committee](#) and the [European ruling on the Doel Nuclear Power Plant](#) (point 175). In this advisory report, the NCEA refrains from commenting on the potential legal requirement for this.

²⁷ See, for example, [Borssele Nuclear Power Plant | Authority for Nuclear Safety and Radiation Protection](#), various historical studies (safety studies) are available here.

Against this background, the NRD specifies alternatives²⁸ to the legislative amendment, such as a 10-year, 20-year, or indefinite lifetime extension. As previously stated, it is not yet possible to substantiate 'an alternative with a specific date' by means of technical environmental studies. Hence, the NCEA does not consider the alternatives (with different lifetime extensions) to be meaningful or realistic alternatives to this EA-report. A similar principle applies to the reference. The question is whether a comparison between the aforementioned alternatives and an uncertain (and hypothetical) development of the Borssele area and its surroundings in the distant future (in the period from 2033 to 2053) can offer decision-making information for the legislative amendment that is both distinctive *and* meaningful. In addition, describing the reference situation accurately would seem to be a complex undertaking.²⁹

Hence, the NCEA recommends taking a different approach to Part 1 of the EA-report. In essence, this involves drawing up **a survey** that:

- clearly and coherently provides details of the current environmental situation around KCB (the emissions by KCB and their consequences for people and nature). This is also important for nature conservation legislation (see also Section 4.4) and, subsequently, for Part 2 of an EA-report;
- provides a succinct extrapolation of this for the post-2033 period.

The NCEA believes that a survey of this kind would enable the EA-report to provide a more coherent and pertinent **understanding of the environmental consequences** *and* (following a favourable decision regarding a legislative amendment) an **agenda listing environmental focal points** for Part 2 of the EA-report. Both are designed to inform political decision-making by the government and in the House of Representatives and Senate.

In the next section, the NCEA explains what it expects from a survey of this kind.

4 Survey of environmental consequences

4.1 Introduction

The NCEA recommends that the survey should start by establishing a clear and comprehensive picture of the existing environmental situation around KCB. Next, use this to answer the following survey questions in the EA-report:

- Does extrapolation of the current environmental situation lead to an increase (or decrease) in environmental stress and is that acceptable?
- Does extrapolation result in standards being exceeded or thresholds being identified at which cumulative effects are no longer acceptable? And on what timescale might that happen?
- Are there any other internal factors at KCB that might alter the environmental stress, such as modifications in the composition of waste (decommissioning waste)?

²⁸ See page 18 of the NRD.

²⁹ Given all the ongoing (including seven National Coordination Procedures) and upcoming (including plans for new nuclear power plants) energy projects in this part of the Netherlands, accurately predicting the environmental consequences of autonomous development is no simple matter. This pertains to the period up to 2033 *and* the subsequent decades, specifically 2053 and beyond. This further complicates the task of making accurate predictions.

- Are there any other external factors that might influence the current functioning of KCB, such as climate change³⁰, the development of the Borssele Energy Hub and other local changes (see also Section 2.4.1 of this advisory report).

Below, the NCEA provides a more detailed analysis of how these questions should be addressed within the themes of 'safety', 'emissions', and 'nature'. Where relevant, it also addresses the environmental distinctions between a typical KCB operational scenario and emergency situations and disasters.

4.2 (Nuclear) Safety

If the survey is to provide an accurate picture of KCB's current safety situation, the NCEA recommends a focus on 'ageing management' and 'disasters and emergencies'. This is because these are decisive in this regard.

Ageing management

Ensuring the proper operation of KCB's technical and safety systems is fundamental to safety (nuclear safety) in the current situation. To illustrate this, it is essential to provide a concise summary of KCB's ageing management. In this context, address the following:

- the ageing of systems, structures and components since 1973;
- a summary of previously identified ageing issues, such as those revealed in 10-yearly safety evaluations (10EVA)³¹ and feedback from international experiences³² and inspections (including previous IAEA SALTO missions²⁵) can be included here;
- a summary of the modernisations carried out to date.

Based on these points, briefly substantiate the availability and reliability of the current systems, both during routine operation and in the event of incidents or accidents.

Provide a concise consideration that extrapolates the availability and reliability of existing systems into the post-2033 period. A preliminary assessment of potential bottlenecks and knowledge gaps³³ will offer insights into creating an agenda with focal points for Part 2 of an EA-report. More detailed studies will then take place in phase 2 (but not before). The NCEA recommends creating a concise diagrammatic roadmap for purposes of illustration. This roadmap should address essential tests, inspections, maintenance activities, and similar tasks that are already scheduled and that will be required in the upcoming years in preparation for a potential lifetime extension for KCB beyond 2033.

Emergencies and disaster scenarios.

Concisely summarise the emergencies and disaster scenarios formulated for KCB. In doing so, differentiate between 'design basis accidents'³⁴ and 'beyond design basis accidents'³⁵. Using this information, also provide a qualitative assessment of effects at home *and* abroad. This is also pertinent within the framework of the Espoo Convention.³⁶

³⁰ Such as changes in water temperature in the Western Scheldt.

³¹ <https://www.autoriteitnvs.nl/onderwerpen/tienjaarlijkse-evaluaties-nucleaire-installaties> (in Dutch).

³² For example, international [Stress Tests | Authority for Nuclear Safety and Radiation Protection](#).

³³ [Regulatory Oversight of Ageing Management and Long Term Operation Programme of Nuclear Power Plants | IAEA](#).

³⁴ This aspect has already been factored into the design or into previous modernisation projects.

³⁵ This technical term refers to accidents and disasters that were/are not (fully) taken into account in the power plant's technical design.

³⁶ Nearly all public submissions by foreign governments address this topic.

Next, explain the possible implications of a potential post-2033 lifetime extension on emergencies and disaster scenarios, as well as on effects at home and abroad. In doing so, focus on external factors, such as climate change (rising sea levels and the availability of cooling water in the Western Scheldt for KCB) and the development of the Borssele Energy Hub (including any domino effects, specifically those involving new nuclear power plants). This analysis may also provide initial insights for an agenda listing focal points for Part 2 of an EA-report.

4.3 Emissions

For the purposes of the survey, the NCEA recommends using the following three-part categorisation. This will facilitate a clear understanding of the environmental consequences of KCB emissions for both the present and the future: 1) radiation, 2) airborne emissions and 3) waterborne emissions.

4.3.1 Radiation on and around KCB

Specify radiation levels in the immediate vicinity of the current KCB in a typical operational scenario. Briefly explain the significance of these levels for people and nature. This could involve drawing comparisons with other types of exposure to radiation (natural radiation). In addition, address the 'MONET'³⁷ radiation measurement network at the power plant's site boundary, with a specific focus on the equipment used to detect abnormal radiation levels.

Describe potential post-2033 changes in radiation levels. Consider the potential cumulative radiation effects associated with new nuclear power plants, and address the question whether cumulative radiation levels could reach undesirable levels for neighbouring businesses and/or nature.

Conclude by briefly considering the radiation effects associated with current shipments of radioactive material, including incoming and outgoing fissile materials, along with any anticipated changes in this regard after 2033.

Storage and final disposal of radioactive waste and decommissioning

According to the NRD, final disposal and decommissioning are beyond the scope of the legislative amendment. Nevertheless, a lifetime extension can have an effect on this.³⁸ Hence, the NCEA recommends providing a concise summary of the following aspects of the current situation:

- order of magnitude, type, and quantities of radioactive waste and spent fuel;
- quantities and type of radioactive waste at the time of decommissioning;
- a description or reference to the storage of radioactive waste at COVRA³⁹ (sufficient space available?).

³⁷ [Radiation level measurements at the site boundary of the EPZ Borssele nuclear power plant in 2021 | National Institute for Public Health and the Environment \(RIVM\)](#).

³⁸ The NCEA notes that an extended operational period may result in increased activation of specific reactor components, potentially impacting the characteristics and quantities of radioactive waste to be handled during decommissioning.

³⁹ [Home - COVRA N.V.](#)

Next, explain how a lifetime extension could influence this situation. Any such influence could generate key focal points for Part 2 of an EA-report or for other decisions (such as the KCB's decommissioning plan and the 'national radioactive waste inventory and planning for COVRA').

4.3.2 Air

Give a concise summary of KCB's annual airborne emissions in the current situation.⁴⁰ Describe the emission measurement system, with a specific focus on the methods used for monitoring and for triggering alarms in the event of abnormal gaseous radioactive discharges. Provide a substantiated explanation of the effects and significance of radiological emissions. When doing so, draw a distinction between the various exposure pathways to humans and the environment. In this context, take actual discharges in the current situation into account, as well as discharge limits.

Next, explain the implications of a lifetime extension for airborne emissions (see also Section 4.4 for nitrogen deposition and nature).

CO₂ emissions across the chain

Briefly describe the extent to which nuclear-energy-based electricity production qualifies as 'low-carbon', focusing specifically on KCB. Base this estimate on factors such as key figures for emissions across the entire chain (from uranium mining and transport *and* the construction and decommissioning of nuclear power plants).⁴¹ This information helps to contextualise nuclear energy within an environmental framework. Moreover, it substantiates the climate benefits (percentage reduction in greenhouse gases, expressed in terms of CO₂ or its equivalents) associated with KCB's post-2033 electricity production.

4.3.3 Water

Give a concise summary of KCB's annual waterborne emissions in the current situation. Provide a short, substantiated explanation of the impacts and significance of these emissions. When doing so, draw a distinction between the various exposure pathways. In this context, take actual discharges in the current situation into account, as well as discharge limits.

The NCEA lacks a complete overview of existing environmental studies into the consequences linked to discharges of heat (cooling water plume), radioactive water, *and* other materials, including those associated with keeping the cooling water system clean.⁴² Hence, in the current situation, extra effort may be needed to pinpoint environmental impacts.

In the EA-report, outline the consequences for water quality (thermal and chemical) and for the seafloor in the Western Scheldt, with a specific focus on the accumulation of radioactive

⁴⁰ Here, the NCEA is considering a variety of factors, including gaseous radioactive emissions (such as noble gases, iodine isotopes, beta-gamma aerosols, alpha aerosols, tritium, and C-14), as well as the CO₂ and nitrogen emissions produced by KCB due to the intermittent use of (emergency) diesel generators.

⁴¹ For instance, use key figures from sources such as the [IPPC](#) or [JRC](#), which provide summaries of 'Life Cycle Analyses' that also take account of the CO₂ emissions involved in the mining and transport of uranium, *and* in the construction and decommissioning of nuclear power plants.

⁴² The use of seawater chlorination to prevent biofouling in the cooling water system. An additional effect of this is the formation of Bromoform in the receiving seawater. Bromoform may impact the food chain (e.g. uptake by fish).

emissions in sediment (see also Section 4.4 nature). With regard to emissions from radiological materials, briefly explain the significance of these levels for people and nature.

Address the question of whether, in the upcoming years, thresholds will be identified at which cumulative effects are no longer acceptable (such as European Water Framework Directive⁴³ targets)? Provide a concise summary of the environmental studies and arguments used to determine the acceptability of emissions.

Next, explain how a lifetime extension might affect the scale of these emissions after 2033. In particular, address the consequences of climate change (which could lead to intermittent reductions in the cooling water supply for KCB), while also addressing the effects (in the long-term) on other potential cooling water consumers, such as new nuclear power plants (distribution issue). This may be relevant when deliberating on the legislative amendment.

4.4 Impacts on nature

Surveying the environmental consequences for nature is a more complex task that demands an in-depth approach. This is because KCB is situated close to environmentally sensitive nature reserves, including the Western Scheldt & Saeftinghe Natura 2000 area. It is not possible to rule out in advance the likelihood that airborne emissions and/or waterborne emissions will have an (irreversible) adverse impact on protected nature reserves or on the habitats of certain species. After all, these impacts have not yet been extensively described, for instance, in the context of a permit under the Nature Conservation Act. Hence, in the current situation, extra effort may be needed to pinpoint environmental impacts.

Begin by describing the (potential) impact of KCB on the adjoining (protected) nature, in the current situation. In any case, be sure to address:

- the uptake of cooling water (fish intake) from the Western Scheldt, as well as thermal emissions into that body of water;
- the impact of radiological, thermal and/or chemical emissions⁴² on the conservation goals for the Western Scheldt & Saeftinghe⁴⁴ Natura 2000 area, while also taking indirect impacts via the food chain into account;
- nitrogen deposition on nature that is sensitive to this process, in the surrounding Natura 2000 area's.

Provide a concise summary of the studies and arguments (perhaps not yet fully described) used to determine the acceptability of impacts on nature. In particular, address the consequences for Natura 2000 areas.

Next, provide a substantiated explanation of the implications for nature of a lifetime extension beyond 2033. In particular, address any anticipated natural trends in the planning area and any cumulative effects due to extended periods of emission or to effects from elsewhere (Borssele Energy Hub).

No permit under the Nature Conservation Act, clarity about reference essential

As KCB holds no permit under the Nature Conservation Act, this permit cannot serve as a reference for describing the impact on Natura 2000 areas. In this case, the reference can be

⁴³ The European Water Framework Directive is designed to safeguard and, if necessary, improve water quality. It incorporates both chemical and ecological targets for water.

⁴⁴ [Western Scheldt & Saeftinghe: Objective | Natura 2000](#) (in Dutch).

drawn from the environmental clearance that was in effect when Article 6 of the Habitats Directive⁴⁵ became applicable to the relevant Natura 2000 areas, unless a subsequent environmental clearance has been issued for an activity with fewer environmental consequences. This is because that consent would then serve as a reference. Within this context, the EA-report should address the implications of Article 15a of the Nuclear Energy Act, which currently stipulates that the permit for KCB's continued operation, for nuclear energy generation, expires on 31 December 2033.⁴⁶ In other words, what rights will remain in effect after 2033 with regard to Article 15a of the Nuclear Energy Act. This is relevant to the environmental focal points for part 2 of the EA-report.

Post-2033 impact on Natura 2000 areas

Since adverse impacts on the conservation objectives of Natura 2000 areas cannot be ruled out in advance, these must be clearly specified in the EA-report. In any case, consider the following for the post-2033 period (if not already available):

- predicting the quantitative natural impact of current cooling water discharges (resulting from heat, chemical cooling water treatment,⁴² and radiation⁴⁷);
- to visualise the deposition of nitrogen compounds in a coherent and quantitative manner;⁴⁸
- a sensitivity analysis should be drawn up for the nature space that the Borssele Energy Hub will need in the coming years, especially for cooling water for new nuclear power plants at Borssele.

Expand on the above in a 'risk analysis / preliminary assessment' or directly in an Appropriate Assessment (which can also include mitigating measures). At this stage, it is important to conduct such relatively detailed studies to find out how much space (if any) protected nature can offer, in terms of a potential lifetime extension for KCB *and/or* for other plans and projects at Borssele. This may be relevant when deliberating on the legislative amendment.

Consequences for Nature Network Zeeland (NNZ) and protected species after 2033

Check whether airborne emissions and waterborne emissions might impact the core attributes and values of the Zeeland Nature Network (management approaches and associated target species), while also taking external effects into account⁴⁹. If that is indeed the case, list the available options for preventing or limiting these impacts.

Check whether airborne emissions or waterborne emissions might impact the conservation status⁵⁰ of protected species. Where applicable, describe the measures taken to prevent any deterioration in the conservation status.

⁴⁵ [ART. 6 INTERPRETATION GUIDE \(europa.eu\)](#).

⁴⁶ See, among other things, consideration 17.2 of ABRvS 20 January 2021, ECLI:NL:RVS:2021:71.

⁴⁷ Impacts on protected nature due to the accumulation (build-up) of radioactive materials in sediment.

⁴⁸ This includes the intermittent use of diesel generators that may precipitate these compounds in more than negligible quantities (> 0.005 mol/ha/year) in surrounding nitrogen-sensitive Natura 2000 areas.

⁴⁹ The phrase 'external effects' refers to situations in which nature reserves are impacted by activities that take place outside their boundaries.

⁵⁰ Conservation Status (in Dutch: *De Staat van Instandhouding*) is a measure of the sustainability of a population. The assessment methodology addresses four key aspects: distribution, population, habitat, and future prospects.

ANNEX 1: Project data

This advisory report is previously published in Dutch on 12 October 2023

The NCEA's advisory report on the scoping guidelines for the EA-report to be drawn up

The NCEA consists of a working group of experts. This working group specifies the topics it believes should be addressed in the EA-report, and the level of detail required. The working group visited the area that is susceptible to potential environmental consequences, to gain a better understanding of the situation. Further details about the [NCEA](#) and its [procedures](#) can be found at our website (in Dutch).

Composition of the working group

This project's working group consists of:

Dr. Roelf Blaauboer

Prof. Johan Camps

Mr Sjoerd Harkema (technical secretary)

Dr. Danny Lathouwers

Prof. Hans Mommaas (chair)

Dr. Marcel Soppe

Mr Rob Vogel

Mr Gerrit de Zoeten

Decision (or decisions) for which Part 1 of an environmental assessment (EA-report) is drawn up

Legislative amendment to the Nuclear Energy Act.

Why is an EA-report drawn up for this purpose?

In the Netherlands, EA-report's may be required for activities that could have major environmental consequences. The central government has indicated that this is the case here.

A phased procedure is used when drawing up the EA-report for KCB's lifetime extension.

First, Part 1 of the Environmental Impact Assessment (EIA) for the legislative amendment is drawn up. As a precautionary measure, Part 1 will also comply with the substantive and procedural requirements applicable to Strategic Environmental Assessment (SEA).

Within the framework of the Habitats Directive, a plan or programme might also be involved.

In such instances, an SEA may also be needed due to adverse impacts on Natura 2000 sites, which must be detailed in an Appropriate Assessment.

For this reason, a combined EA-report (SEA and EIA) will be drawn up.

In the event of a favourable decision regarding the legislative amendment, the next step could be the completion of Part 2 of an EA-report. In fact, the Authority for Nuclear Safety and Radiation Protection (ANVS) will now no longer need to withhold consideration of a Nuclear Energy Act permit for the lifetime extension. Therefore, EPZ will be able to apply for such a permit.

Whether or not EPZ will do so is still unclear. EPZ will draw up Part 2 of an EA-report.

Parts 1 and 2 jointly constitute the formal EIA-report for the Borssele Nuclear Power Plant's lifetime extension, including all (other) associated permits. Consider, for instance, an amended water permit and (possible) nature permits.

Competent authorities for decision on Nuclear Energy Act

The Senate and the House of Representatives and the government.

Initiator for decision on Nuclear Energy Act

The Minister for Climate and Energy Policy.

Competent authorities for environmental assessment procedure

The Secretary of State for Infrastructure and Water Management.

Has the NCEA included public submissions and advisory reports in its own advisory report?

The NCEA has reviewed all public submissions and advisory reports sent by the competent authorities up to and including 1 August 2023. Where pertinent to the EA-report, these have been integrated into the NCEA's own advisory report.

Where can I find the documents used by the NCEA?

The project documents used in the advisory report can be accessed by entering project number [3723](#) in the search field at www.commissiemer.nl (in Dutch).

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