

Guidelines for the Environmental Impact Assessment for the Natural-Gas- Fired Power Station (Advanced Power) in the Eemshaven Area

**Prepared by the Provincial Executive of Groningen and the
Ministry of Transport, Public Works and Water
Management**

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1. INTRODUCTION

Advanced Power, an international power company, wants to construct a natural-gas-fired CCGT power station in the Eemshaven area with a capacity of 1200 megawatts. Permits will be needed for this proposal under the Environmental Management Act, the Surface Waters Pollution Act and the Water Management Act. A permit under the Nature Protection Act will possibly also be required. The authorities responsible for granting these permits are the Ministry of Transport, Public Works and Water Management and the Provincial Executive of Groningen. The Province of Groningen is acting here as the coordinating authority.

The Ministry of Agriculture, Nature Management and Fisheries and the province of Friesland are the authorities responsible for the permit procedure pursuant to the Nature Protection Act (the disputed area and the rest of the Waddenzee respectively). To facilitate the decision about whether to grant these permits, the Environmental Impact Assessment (EIA) procedure is being followed.

By letter of 15 July 2008 we the Committee for the environmental impact assessment (EIA) were offered the opportunity to issue an opinion on the guidelines for the environmental impact assessment. The EIA procedure began with the announcement of the filing for inspection of the notification of intent in the Eemsbode, the Ommelander Courant, the Nederlandse Staatscourant and in the Dagblad van het Noorden on 23, 24, 25 and 26 July 2008 respectively.

By letter of 3 October 2008 the Committee for the EIA sent its opinion on guidelines for the environmental impact assessment (report number 2140-55).

In its opinion, the Committee takes the notification of intent as its basis. In other words, this opinion does not look at points which the Committee feels are discussed sufficiently in the notification of intent.

2. MAIN POINTS OF THE GUIDELINES

We regard the following points as essential information for the EIA. This means that the EIA will provide insufficient substantiation for the proposal if information about the following focal points is lacking.

1. The EIA must clarify how the proposal fits into the context of the present climate and energy policy, possible future developments in that policy and other relevant developments.
2. The EIA must contain a clear comparison of the alternatives presented.
3. The EIA must contain a description of the (cumulative) consequences of the proposal for the preservation objectives in the Wadden area, including the German Waddenzee, particularly as a result of the possible effects of fish being sucked into the plant, discharges of hot cooling water, underwater noise and nitrogen deposits. The possible impact on the openness of the landscape should also be included¹.
4. The EIA must contain a description of:
 - the electrical output of the plant under different operational loading levels and of the different alternatives;
 - the effects of the emissions from the proposed plant, including N₂O and NO_x emissions (if any) and the CO₂ emissions, expressed in Nm³/GJ_{el} and in kg (tonnes) / year or in gr./kWh. In addition, the report

¹ The (landscape) values to be preserved in the former national monument and protected natural monument of the Waddenzee (including openness) come into force in the new directive decision.

should describe the deposits of NH_x and NO_x ². Assume different loading conditions and give details of both the annual averages and - where relevant - the peak concentrations. Describe the emissions under normal and special operating conditions.

- the possibility for making the plant CO_2 -capture-ready and for storing / using the captured CO_2 .

We also ask that we be sent and presented with the information needed for an exemption on the grounds of Article 75 of the Flora and Fauna Act (Ffw) at the same time as the EIA. This is not mandatory, but we feel it is important for the smooth running of this process and it gives the applicant the opportunity to also have this information checked by the Committee for methodological correctness, completeness and plausibility.

The following chapters explain in more detail what information must be included in the EIA.

3. BACKGROUND AND DECISION-MAKING

Background, problem definition and objective

Give an idea of the considerations involved in choosing a completely gas-fired power station. The environmental arguments that have played a role in this choice are particularly important for the EIA. Also focus on the question of how uncertainties in the area of fuel prices and developments in sustainable energy sources have been dealt with in these considerations.

Explain how this initiative fits within the future demand for new production capacity. Explain how the increase in production capacity from other initiatives and/or from electricity imports is taken into account. Production capacity will also be taken out of operation in the future for as long as no measures can be taken by the owners to extend the life of the power stations. In so far as this information is available, indicate how much capacity (increase and decrease), which energy distributors³ and which energy suppliers are involved here.

Policy framework

The legal and policy framework has already largely been described in the notification of intent. Supplement this by explaining the consequences that the legal and policy framework described has for the proposal. In addition, focus on national policy in respect of sustainable energy and energy saving and on developments in the area of NO_x emissions from new Large Combustion Plants (LCPs). Consideration must also be given to how the objectives in the Water Framework Directive will impact on the proposal.

Also state whether the proposal fits within the prevailing zoning plan.

² The concentration of fine dust should also be described. It is expected this will be very low in this project.

³ For example, take TenneT's capacity into account here.

4. PROPOSED ACTIVITY AND ALTERNATIVES

In the notification of intent the applicant states that the proposed plant will only be fuelled by gas and that it will operate at full capacity. Explain how the decision to use this type of plant and this type of operation was arrived at. Plants of this kind have an economic lifespan of 25 years. Describe in detail the possibilities for taking advantage of / complying with new policy developments and regulations, and also new market developments⁴. It is possible that these developments will require modifications to operating procedures, which in turn may result in other environmental effects. Where relevant, work with scenarios here.

The EIA should therefore contain:

- Different scenarios for the plant's operation, such as full loading or partial loading. Quantify the emissions per GJ_{el} produced (NO_x, NH₃, N₂O, CO₂, SO₂ and fine dust) for the various scenarios.
- A description of the options offered by different turbine variants for using other energy sources because of sustainability or fuel diversification considerations (syngas, biogas). If these options are available, also provide a general picture of the environmental effects that are associated with them in terms of capacity, NO_x, NH₃, N₂O, fine dust, SO₂, total and fossil CO₂ emissions.

Alternatives

The EIA should include a clear comparison of the alternatives presented, according to the same methodology and at the same level of detail. It must be possible to implement all alternatives⁵. As building blocks for the alternatives, focus - in addition to the factors already described in the notification of intent - on the following:

- Maximization of the electrical and total energy output;
- Use of SNCR and/or SCR instead of, or in combination with, low NO_x burners. Quantify the NO_x, NH₃ and N₂O emissions here;
- Possibilities for making the plant 'CO₂-capture-ready' (reserving space for the infrastructure). Also focus on the possibilities for transportation and storage of CO₂ by describing the possible location of a pipeline to the store, the storage site and the possible alternatives for efficient use. Explain what concrete results in terms of CO₂ capture are feasible within the scope of the proposal in the medium term, in relation to the CO₂ agreements at European level. Also focus on the maximum number of initiatives for transporting⁶ and using the captured CO₂ that is possible within the scope of the proposal in the medium term;
- Cooling water discharge variants, including the location and design of the discharge point⁷ and minimization of its effects (by means of choices in and optimization of the cooling water system). Give a comparison of this at system level, unless it appears a realistic alternative, in which case it should be dealt with in greater detail;
- Minimizing the effects on the aquatic environment. Focus here on the consequences of the chosen method of condenser cooling for fish stocks (including non-protected fish) and shipping. Think for instance of measures to limit the numbers of fish sucked into the plant (stroboscopic lights, filters, etc.) and of less disruptive pile-driving techniques (such as screw-driving). If through-flow cooling is chosen, a comparison between the consequences of the different

⁴ Think for example of rising gas prices or the possible use of CO₂ in gas extraction, etc.

⁵ Focus here on response to comments No. 11 from the Ministry of Housing, Spatial Planning and the Environment concerning the outlet structure. Indicate what consequences this has for the through-flow cooling variant.

⁶ The Ministry of Housing, Spatial Planning and the Environment also had the answer to this in response to comments No. 11.

⁷ For example, by a construction which results in a fast distribution of the cooling water to be discharged on the surface of the water, whereby the effects on natural values can be minimized.

methods for combating accretion in the condenser pipework will also be needed, such as pulse chlorination or the use of coatings in combination with thermoshock;

- Minimizing the emissions of air pollutants (mainly NO_x and fine dust), acidifying / fertilizer substances and greenhouse gas emissions. If relevant, also indicate the associated concentrations and deposition rates.

For all alternatives, include a description of the mass flows and energy balance.

Most environmentally friendly alternative

The most environmentally friendly alternative (MEFA) must:

- be based on the best existing possibilities for protecting and/or improving the environment;
- fall within the applicant's competence.

Use the points listed under 3.1 when drawing up the MEFA. Pay attention in any case to minimizing the consequences for the natural values in the study area (sucking of fish into the plant, discharges of hot cooling water, underwater noise, nitrogen deposition).

Include a description of the maximum possible uses of residual heat in the MEFA. Make a distinction here between the different production alternatives and scenarios. Also describe the possibilities for delivering residual heat from the production process to third parties, such as the LNG plant and/or the glasshouse horticulture business that may be constructed on the edge of the Eemshaven area in the future.

Reference

Describe the existing state of the environment in the study area and the environmental condition that can be expected as a result of autonomous development, to serve as a reference for the environmental effects to be expected. The term 'autonomous development' is understood here to mean the future development of the environment if the proposed activity is not implemented. Base this description on developments of the existing activities in the study area and of new activities about which a decision has already been made or about which it is fairly certain that a decision will be made. For instance, this includes the widening and deepening of the waterway and the expansion of TenneT's cable capacity. Use scenarios to describe uncertain autonomous developments.

5. ENVIRONMENTAL CONSEQUENCES

Cumulation

On the basis of the available information, the EIA must go into detail about all existing activities / projects and activities / projects in development⁸ that (can possibly) have significant environmental consequences for the study area when accumulated with the effects of the proposal⁹. This description must connect at the level of the available information. This may mean that worst case scenarios need to be described for some developments, if it is still insufficiently clear to what extent those developments

⁸ Including all plans and projects that are currently in procedure and that can be expected to actually go ahead.

⁹ This is particularly important in the evaluation of suitability. For instance, possible cumulative effects can occur in the area of fish becoming sucked into the plant, heating due to discharges of cooling water, the use of activated chlorine, noise, etc.

contribute to the burden on the environment. State clearly in the EIA which developments are known and have been included and which have not been considered yet due to the lack of information. Also look in detail at any effects on German territory¹⁰ and possible mitigating measures.

Nature

The area of the plan borders the Waddenzee, which is classified as a natural area of great international significance. This means that the (cumulative) consequences must be surveyed as thoroughly as possible. The notification of intent gives a good and extensive description of the way in which nature information, including the evaluation of suitability, will be included in the EIA. In addition to and in connection with this, we recommend:

- Paying explicit attention to the (possible) consequences of the activities carried out during the *construction phase*. Indicate what the possibilities for mitigation are and what mitigating measures will actually be taken;
- Choose the boundaries of the study area in such a way as to ensure that a reasonable picture is given of all the proposal's possible consequences for the ecological functioning of the Wadden area, where relevant in relation to the preservation objectives¹¹;
- Describe the consequences of the proposal for the compensatory nature¹². Map the terrestrial and marine compensatory nature accurately and describe the possible consequences for natural values to be preserved and/or to be developed. Also focus on the consequences for the compensatory nature in the plan area itself, which was introduced because of damage to species protected under the Flora and Fauna Act;
- Go through the steps from the Habitat Test carefully. The first step is to develop a cumulative picture of whether significant effects on the Waddenzee Natura 2000 area (and Natura 2000 areas on the islands and in the neighbouring German area) can be ruled out^{13, 14}. If that is not the case, the steps of the ADC phase must be gone through in the right sequence. Firstly the question of whether alternatives are available must be clarified. It should be borne in mind that alternatives need to be interpreted more broadly within the scope of the Nature Protection Act than alternatives that fit within the applicant's objective. Only if the conclusion is that there are no alternatives and there are compelling reasons of great public concern can the step to compensation be made. This evaluation framework can also determine the feasibility of the different alternative techniques;
- Also pay attention to the acidifying and fertilizing effects of SCR/SNCR via NO_x and NH₃. Focus here on the emissions and effects of the possible DeNO_x plant, low NO_x burners and the combination of both of these.

¹⁰ In comment no. 2, the Gemeinde Bunde der Bürgermeister asks for attention to be paid to trans-border cumulative effects, mainly in the area of water and air. The rural district of Aurich also requests attention to cumulative effects in response to comments No. 4. There are also further Natura 2000 areas just across the border.

¹¹ Some examples of this are the cumulative effects of light disturbance on the whole of the Waddenzee Natura 2000 area and the effects of atmospheric deposition for the Wadden islands in the German Wadden region. Relevant German areas in this respect include the Niedersächsisches Wattenmeer national park and the Krummhörn EU Bird Protection Area.

¹² In response to comments No. 5 the Ministry of Agriculture, Nature Management and Fisheries also looks at the unclear relationship to the compensation plans and indicates that a good foundation is necessary if loss of land is to be compensated for in advance.

¹³ The effects on the aquatic environment (sucking of fish into the plant, discharges of hot cooling water, underwater noise) are particularly important here, but also nitrogen deposits on the dune vegetation of the islands.

¹⁴ In response to comments No. 5 the Ministry of Agriculture, Nature Management and Fisheries also asks for greater clarity as regards the cumulative effects on nature.

Noise

In the notification of intent the applicant states that the effects of noise on wildlife will be calculated on the basis of the average noise levels. However, wildlife is also sensitive to peak noise levels. The effects of these on the different species must be covered in the EIA, as must the effects of underwater noise¹⁵.

Chloroform and bromoform

When comparing the alternative techniques, the effects on nature of using activated chlorine for cleaning pipelines must also be taken into account. Indicate in which periods these effects occur. In particular, pay attention to the formation of chloroform and bromoform in the seawater into which the pipelines discharge and the consequences of this for the fish stocks and the rest of the food chain.

Climate

Indicate what effects the proposal will have on climate change and whether the project could hinder mitigating measures that may be necessary in the future. Also indicate how the proposal will affect the ability to achieve policy objectives. Focus on the following factors:

- The contribution of the different alternatives to greenhouse gas emissions, including N₂O and CO₂;
- The question of how far the increase in greenhouse gases caused by the proposal will threaten the ability to achieve the national and/or sectoral policy objectives or target values for greenhouse gas emissions (including the objectives for energy efficiency);
- The (possible reduction in the) emissions of non-CO₂ greenhouse gases;
- The environmental risks of the different alternative options for CO₂ storage (as described under 3.1) and the options for reducing the risks.

6. RESIDENTIAL AND HUMAN ENVIRONMENT

Describe the effects of the proposal on the residential and human environment, in the construction¹⁶ phase as well as in use. Discuss – in addition to what has already been described in the notification of intent – the following points.

Air quality

Describe the effects of the proposal on the air quality. Base this description on the air quality requirements of the Environmental Management Act (Wm) and use model calculations that comply with the Regulations for Air Quality Evaluation (2007). Indicate whether and how the proposal complies with the air quality requirements.

The EIA should give a picture of the concentration levels for fine dust (PM₁₀ and PM_{2.5}^{17, 18}) and NO₂ and of any instances where limit values are exceeded, both for the autonomous developments and for the different alternatives. Describe:

¹⁵ Noise is propagated approximately five times faster under water and is audible at a much greater distance than above water (authors including Van Opzeeland *et al.*, 2007, *Herrie onder water, vissen en geluidsoverlast*, De Levende Natuur, 39-43).

¹⁶ Response to comments No. 6 asks about the effects of the proposal during the construction phase on the residential environment, and as a result of traffic.

¹⁷ On 11 December 2007 the European Parliament established target and limit values for PM_{2.5}. A limit value applies for PM_{2.5} (annual norm 25 µg/m³ by 2015), together with target values (20 µg/m³ by 2020) and an objective of reducing the 'mean exposure index' (MEI) to 20% for the period 2010-2020. The MEI is the average exposure of the population of a member state that is determined for the reference year (2010) with the goal of reducing the harmful consequences for human health. Where possible, this must be achieved within a specified period. The new EU directive is expected to be implemented in Dutch

- The location and size of any exceedance areas;
- The highest concentrations within the exceedance areas;
- The quantity of homes and other sensitive designated uses located within the various exceedance areas;
- The extent to which limit values are exceeded
- The possibility of monitoring effects, for example on the basis of emission measuring.²³

It is not expected that the limit values¹⁹ and guideline values²⁰ for the other substances from the Environmental Management Act will be exceeded. However, bearing in mind the legal precedents, we recommend that the concentrations of these substances and comparisons of them against the limit values should nevertheless be included in the EIA.

Calculate the NO_x emission. Use the REF's system for Economics and Cross-Media Effects to compare the alternatives on these effects. State the NO_x emission in grams²¹ per GigaJoule produced and mg/Nm³ for the different possible loading percentages²².

Water quality

Describe the effects of waste water on the water quality, as a result of possible discharge of chemicals and drainage. Describe the different flows of waste water to be discharged as regards type, location of discharge points, composition and quantity expected. Indicate here the raw and auxiliary materials which may be encountered in the surface water via the residual discharge after treatment. Also indicate the (cumulative) effects of heating of surface water.

External safety

Use contours to give a picture of any safety risks by means of the individual and group-related risk. Indicate what the effect these can have outside the site, including the surface water, in the event of a disaster. Pay attention to the feeling of safety and to possible cascade-effects in the event of a disaster.

Health

Explain which substances will be released during the production process, in what quantities, and deposited on crops in the vicinity of the proposed plant²³. Indicate to what extent these are harmful to public health.

legislation at the end of 2008. In principle the provisions of a directive cannot take immediate effect before the implementation period has expired. However, member states are required to refrain from taking measures during this period that could threaten their ability to achieve the directive's goal.

¹⁸ At the moment no background concentration and emission factor figures are yet available to enable the PM_{2.5} concentrations to be calculated. The Committee therefore recommends that you use the most recent data (as currently described in the publication: Concentration maps for large-scale air pollution in the Netherlands, 2008 report from the Environment Nature Planning Office, see <http://www.rivm.nl/bibliotheek/rapporten/500088002.pdf>). Based on this data, you can give as reliable indication as possible. The Committee does however expect that the emission factors and background concentrations will be known by the start of 2009.

¹⁹ Limit values for SO₂, CO, Pb, and benzene.

²⁰ Guideline values for nickel, arsenic, cadmium, ozone and benzo(a)pyrene.

²¹ Use the new target values for NO_x emissions here (15-20 mg/Nm³= 13-17 g/GJ).

²² The following loading percentages can be considered here: full loading, 80%, 70%, 60% partial loading and associated emissions in mg of NO_x per N/M³, or daily and annual average emissions respectively.

²³ This point was raised during the information evening for this proposal.

Landscape

Describe the effects of the proposal on the landscape. Determine the effects on the landscape:

- Quantitative, by presenting 'maximum' visual distances and the visibility of the alternatives within them;
- Qualitative, with the aid of illustrations for relevant observation points in the environment (in any case from the Wadden Islands and the German Wadden coast). Make the relationship with other landscape elements visible here and indicate what the cumulative impact of this is on the qualities mentioned below.

Focus here on the effects on the landscape qualities of the Waddenzee, as formulated in the Third Memorandum on the Waddenzee. The qualities concerned are tranquillity, grandeur and an open horizon²⁴.

7. OTHER ASPECTS

We have no recommendations in addition to the legal requirements for the sections 'Comparison of Alternatives', 'Gaps in Environmental Information' and 'Summary of the EIA'.

8. EVALUATION PROGRAM

It must be specified how and within what timescale an evaluation study will be carried out in order to compare the predicted effects with the effects actually occurring and to take additional mitigating measures if necessary. It is recommended that the applicant lays the basis for an evaluation program in the EIA and establishes a link to the gaps in information and uncertainties that have been discovered.

We recommend that attention should be paid to the following subjects in any case:

- Energy output and greenhouse gas emissions;
- Air quality;
- Consequences for particular species (including summer birds, protected fish, marine mammals, natterjack toads) during the construction phase;
- Suction of fish into the plant (if through-flow cooling is chosen) and the effectiveness of palliative measures;
- The (cumulative) effects of hot water discharges on the aquatic environment in the area of influence.

9. SUMMARY OF THE EIA

The summary is the part of the EIA that is mainly read by decision-makers and parties that have an input to decisions. This part therefore merits particular attention. The summary must be capable of being read as an independent document and must provide a good reflection of the content of the EIA.

²⁴ The 3rd Memorandum of the Key National Planning Decision on the Waddenzee says about this: New development in the vicinity of the Waddenzee may only take place within the limiting conditions of the national spatial planning policy, and must be in keeping with the existing buildings in terms of height and, in the case of development in the outer region, it must fit in with the nature of the landscape. An exception to the height provision is made for the port-related and urban development in Den Helder, Harlingen, Delfzijl and the Eemshaven area. However, even in the case of these exceptions new buildings must be integrated into the existing skyline as far as possible.

APPENDIX 1:

Letter of 15 July 2008 in which the Committee is asked to issue an opinion.

APPENDIX 2:

Announcement of the filing for inspection of the notification of intent for the EIA procedure

APPENDIX 3: List of responses to comments and opinions

1. Federal Waterways and Shipping Office, Aurich
2. Municipality of Bunde, Bunde
3. Emden State Factory Inspectorate, Emden
4. Rural district of Aurich
5. Ministry of Agriculture, Nature Management and Fisheries, Department of Regional Affairs – North
6. Ms. H.A. Rietema-Schrage
7. Wadden Association
8. Town of Emden
9. Rural district of Leer
10. Lower Saxony Water Management, Coastal Defence and Nature Conservation Agency
11. Ministry of Housing, Spatial Planning and the Environment inspectorate, Region North