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COMMENTS – CORRECTED VERSION 2.0

on the

Environmental Scoping Report

for

The First Polish Nuclear Power Plant

(PGE_SCN_DES_0001_EN_2.0)

made by PGE EJ 1 sp. z o.o.

by

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Greenpeace in Central and Eastern Europe

25 January 2016



(picture on the front side: © Greenpeace / Jan Haverkamp; Lubiatowo Dunes – location Choczewo –to be destroyed if this location is chosen for Poland's first nuclear power plant)

List of introduced abbreviations (on top of the PIS)

BDA Beyond Design Accidents

DBA Design Based Accidents

PIS Environmental Scoping Report for the
First Polish Nuclear Power Plant

(English translation of KIP according to the PIS)

PRA Probabilistic Risk Analysis

PSA Probabilistic Safety Analysis (synonym with PRA)

ERRATUM: Due to a typing mistake in a calculation sheet, the remark number 62 was erroneous. This has been replaced by a new paragraph. For that reason, version 1p0 of this submission is retracted and should be replaced by version 2p0.

My name is Jan Haverkamp. I have a candidate (equivalent with Bachelors) degree and an academic engineering degree (Ir. - equivalent with a Masters degree) in Environmental Hygiene from the Agricultural University in Wageningen as well as a candidate (equivalent with Bachelors) degree in Biochemistry from the State University in Leiden, both in the Netherlands. I studied also nuclear physics and energy policy at the State University in Leiden.

I work as an independent expert in energy issues with specialisation in nuclear energy for among others the global environmental organisation Greenpeace and work since 1987 in Central Europe. Previously to this Environmental Impact Assessment (further: EIA), I have participated in the EIA procedures for the first two blocks of the Temelín nuclear power plant (NPP) in the Czech Republic, the Belene NPP in Bulgaria, the Cernavoda 3,4 NPP in Romania, the Visaginas NPP in Lithuania, the Mochovce 3, 4 NPP in Slovakia, the blocks 3, 4 of the Temelín NPP in the Czech Republic, the Paks II NPP in Hungary as well as in the Strategic Environmental Assessment of the Polish Nuclear Energy Programme. I have advised different stakeholders in the EIA procedures for Borssele 2 in the Netherlands, Hinkley Point C in the United Kingdom, Hanhikivi in Finland and EIA procedures relating to nuclear plant lifetime extension in Hungary, Ukraine, Belgium, Sweden, Spain, the Czech Republic and the Netherlands. I have participated as expert for the complainant or adviser in court procedures concerning public participation in Bulgaria, Slovakia, Lithuania, Poland, and Belgium and in procedures for the Aarhus Convention Compliance Committee in complaints against Slovakia, the Czech Republic, the United Kingdom, Germany and the Netherlands. I am a board member of the organisation Nuclear Transparency Watch, based in Brussels.

I have been asked by the independent legal entities Greenpeace Czech Republic, Greenpeace Central and Eastern Europe, Greenpeace Nordic and Fundacja Greenpeace Polska to prepare a submission for the scoping phase in the EIA procedure of the first Polish nuclear power project. I wrote these comments on personal title and my opinion – though partly based on my experience within Greenpeace and benefiting from input from other Greenpeace colleagues and experts – does not necessarily coincide with the opinion of Greenpeace as organisation.

Greenpeace Czech Republic and Greenpeace Central and Eastern Europe as organisations do, however, endorse my recommendations that the scoping report needs fundamental adaptations and after such adaptations should be resubmitted to public participation before the full EIA stage is started.

The confusion around whether or not public participation was to take place in the scoping phase of this EIA procedure impacted the way in which I could analyse the over 220 pages of documentation. My comments are therefore not comprehensive, and I reserve the right to add to them in a later stage or to make more in-depth assessments during the main phase of the EIA procedure.

I have used the English version of the documentation with the document name Environmental Scoping Report PGE_SCN_DES_0001_EN.pdf, entitled “The First Polish Nuclear Power Plant Environmental Scoping Report (PGE_SCN_DES_0001_EN_2.0) PGE EJ 1 sp. z o.o.” and the pages refer to the .pdf page counting of each document in the format

PIS13, whereby PIS refers to the scoping report (as in the scoping report itself) and the number to the pdf page.

Praha / Gdańsk, 25 January 2016

INTRODUCTION and summary of most important findings

1. This submission was made on request of Greenpeace Czech Republic, Greenpeace Central and Eastern Europe (respectively its offices in Slovakia, Austria and Poland) and Greenpeace Nordic (its office in Sweden) for the use during public participation in the scoping phase of the EIA procedure for the first nuclear power plant in Poland. Hereunder a summary of the most important findings, followed by a more detailed assessment including demands and recommendations.

2. This submission concludes that, in spite of the position of the Polish General Directorate for the Environment (GDOŚ) in this case to date, a round of **public participation is necessary during the scoping phase** in Poland and all countries that have been notified in the transboundary procedure under the Espoo Convention.

3. This submission concludes furthermore that the **justification** in the PIS is extremely poor, lacks substantial information and contains distorted data, and for that reason should be reassessed.

4. This submission concludes that the basic approach in the PIS to the need to include the **assessment of alternatives** is wrong. This holds true for alternatives to the entire programme (the need for description of what could be considered scenarios that would support the zero-option), alternative technologies (including the use by PGE of the so-called “envelope” procedure), alternative sites (insufficient justification for the limitation of considered sites), alternatives in waste and spent fuel management and for important sub-technology areas like cooling. If this PIS were to be accepted, important options would be closed, potentially without public participation, in breach with Aarhus Convention art. 6(4).

5. This submission comes to the conclusion that the proposed **accident scenarios to be considered** exclude important relevant accident scenarios that have to be considered to assess especially “significant effects” (as defined under the Aarhus Convention art. 6(6)(b)) with local, regional, national and transboundary impacts. This issue is of fundamental importance not only for the final decision on the project, but also because it increases the scope of citizens that should be allowed standing in the planning procedures to the transboundary level.

6. This submission concludes that **radioactive waste and spent nuclear fuel management** as well as **associated projects** (including among many others transmission lines, transformer stations) are not sufficiently included in the EIA. These issues are irreversibly linked to the project and when the project goes ahead without inclusion of these issues in this EIA, there are no zero-options for these issues any longer, so that public participation in that case cannot take place any longer when all options are open (Aarhus Convention art. 6(4)). The notion that such salami-tactics may be used is in breach with legal precedent and absurd. Any EIA for a proposed pig stable will have to include its waste management in the EIA – in the case where

the fundamental problems of waste management with radioactive waste from nuclear power stations are very much larger than with pig stables, the consideration of the waste problems is of fundamental importance for the final decision at the moment that all options are still open.

7. This submission concludes furthermore that the **perception of which nature areas need to be considered as protected** is too limited. The PIS only refers to Natura2000 areas, the impact on which indeed needs to be fully assessed. But the proposed sites are partially located on, and in all cases influence also other nature areas that contain biotopes or species mentioned on the Annexes of the EU Habitat and Bird Directives that justify protected status. This includes among others, but not only, areas on the so-called shadow-list of Natura2000 areas. It cannot be that a project would be accepted that destroys, as example, the Lubiatowo Dunes, an area that is feeding ground for osprey and lesser-spotted eagle, contains several spots of highly protected biotope and forms one of the top-5 most beautiful remaining dune areas in Poland. Protection of natural areas and key biotopes needs to be mirrored to the Habitat and Bird Directives.

8. Concluding over-all, **we recommend that GDOŚ returns the PIS to PGE EJ1 sp. z o.o. as insufficient and demands a higher quality, taking into account among others the remarks made in this submission. Such a reworked scoping report should be resubmitted to public participation before being accepted as basis for the full EIA report.**

The Need for Public Participation during the Scoping Phase

9. GDOŚ informed the public in Poland of the start of the scoping phase of the Environmental Impact Assessment (EIA) for the First Polish Nuclear Power Plant in November 2015. I had a telephone conversation with vice-director Katarzyna Twardowska of GDOŚ on 27 November 2015 in which we discussed the necessity for public participation during the scoping phase of the EIA procedure. I delivered for that the under following argumentation by email with the request to be informed about the result of the discussion. On 15 December, Ms. Twardowska over telephone informed me that GDOŚ had not yet decided on the issue. On 14 January 2016,

I received information from the Czech Republic, that the Ministry of Environment there had started a public consultation period on the EIA scoping report within the transboundary procedure under the Espoo Convention. The deadline for that consultation is 27 January 2006. I furthermore received information from Slovakia and Sweden that also there consultation periods had started and that Sweden had negotiated with GDOŚ a later deadline. After fruitlessly having tried to gain telephone contact with GDOŚ, I sent another email on 18 January 2016 in order to

discuss this situation and ask when the public in the different countries would be allowed to send submissions. The main arguments from that email are also added hereunder. I have to date not received any response to my communication to GDOŚ.

I call upon GDOŚ to enable citizens in Poland and in all in the transboundary procedure participating countries express their views on the Scoping Report, because this report is in dire need of improvement.

10. Concerning the international practice of public participation in the scoping phase of EIA procedures: this took in recent years place at least during the EIA procedures on Cernavoda 3,4 (Romania), Visaginas (Lithuania), Temelin 3,4 (Czech Republic), Jaslovské Bohunice V3 (Slovakia) and Paks II (Hungary).

The IAEA guidelines for EIA procedures for nuclear power stations (referred to by PGE EJ1

in the scoping report (PIS) on PIS13, stating that the procedure in Poland has to be in line with those guidelines) states on page 19, 4.3.3 Stakeholder involvement in the environmental scoping report: *"In that sense, public participation in the process is recommended after the governmental organizations have provided their initial input".* ¹ The Aarhus Convention Implementation Guide ² states on page 142: *"In many countries, the EIA procedure allows the public to participate in the "scoping" phase, i.e., at the stage of designing the terms of reference for the EIA documentation. In such countries, the public thus have the possibility to participate at least twice during a given decision-making procedure: both at the stage of scoping and, later on, when the EIA documentation is ready." The countries where this has been implemented in law include: "For example, Czech Republic, Denmark, Estonia, Finland, Latvia, Netherlands, Spain and Sweden."*

Also the UNEP EIA Training Manual ³ from 2009 indicates that it is usual to have public participation during the scoping phase.

11. On the basis of the Aarhus Convention ⁴, the public has a right on public participation in the scoping procedure, because the scoping decision is a decision that involves certain choices that limit the scope of the EIA report and thus closes options. The Aarhus Convention demands in art. 6(4) that effective public participation should take place when all options are open. ⁵

This is made more precise by the EU EIA Directive 2011/92/EU as amended by Directive 2014/52/EU in art. 6(4): "The public concerned shall be given early and effective opportunities to participate in the environmental decision-making procedures referred to in Article 2(2) and shall, for that purpose, be entitled to express comments and opinions when all options are open to the competent authority or authorities before the decision on the request for development consent is taken."

Although the Uoó 6 does not prescribe public participation in the scoping phase, it also does not explicitly exclude it, and it has to be clear from the above that it is not only highly recommendable, but also that the Aarhus Convention and the EU EIA Directive demand public participation when all options are still open, i.e. before options are closed as result from the scoping process.

12. Art. 2(6) of the Espoo Convention ⁷ prescribes *"The Party of origin shall provide, in accordance with the provisions of the Convention, an opportunity to the public in the areas likely to be affected to participate in relevant environmental impact assessment procedures regarding proposed activities and shall ensure that the opportunity provided to the public of the affected Party is equivalent to that provided to the public of the Party of origin".*

[Emphasis added, JH.]

Although this initially is oriented on providing the public in the Affected Party with at least the same access to public participation as in the Party of Origin, it should also be clear that if the public in Affected Parties receives the possibility of public participation during a certain phase of the procedures, this opportunity is not equivalent with that for the public in the Party of Origin, when the public in the Party of Origin did not get a chance to express its viewpoints.

13. Next to that, art. 3(9) of the Aarhus Convention prescribes that: *"[...] the public shall [...] have the possibility to participate in decision-making [...] without discrimination as to citizenship, nationality or domicile [...]"* (emphasis added, JH). This implies that it cannot be defended that when citizens in other countries can participate in decision-making in the scoping phase, this possibility is not accessible for the public in Poland.

Public participation in general

14. The issue of public participation is discussed on several instances in the start of the PIS. We already mentioned that PGE writes on PIS13 that *“the IAEA guidelines on the environmental impact assessment process for the nuclear power plants must be considered (the “Guidelines”)*”. The PIS plays an important role from the perspective of the social strategy dialogue implemented by the Investor (PIS14).

15. **PIS26 – 5.1 Legal classification of the project.** It is failed to mention that the project should also fulfil the requirements of the Aarhus and Espoo Conventions. Nuclear power stations fall in both Conventions under projects for which public participation, resp. an EIA is mandatory.

16. **PIS33:** PGE refers to the Espoo Convention but fails to mention the Aarhus Convention which stipulates that public participation (not *“public opinion”* (!) as is wrongly translated here) needs to happen when all options are open (art. 6(4)).

17. **PIS32, par 5.7:** *“the Investor is required to receive Environmental Permit before the decision on determination of the site for the investment in a construction of a nuclear power plant is issued.”* Does this mean that there will be no site decision until the EIA has been finalised?

18. **PIS79 and further 10.4 Potential impact areas of the Project:** PIS80 states *“In relation to radiation impacts in emergency conditions, which undoubtedly may also have a direct influence on the substantive legal situation of the potential parties, the adopted objectives are of key importance for determining the potential range of the impacts”*. This is a false conclusion. It is not the 'adopted objectives' that determine the potential range of impacts, but the to be expected real situation on the ground after the project has been implemented. It is the task of the EIA to find out what this situation will be for the proposed project. The technology guidelines in section 10.3 only give technological criteria for the design based on PRAs 8 – however, these are not predictions for potential environmental impacts. Art. 6(6) (b) of the Aarhus Convention talks about 'significant effects', and these include impacts of severe accidents whereby a substantial amount of radioactive substances is emitted into the environment, irrespective of the causes of this accident. The public concerned (art. 6(2) of the Aarhus Convention) encompasses everyone who is concerned also with these potential impacts. These members of the public also have under art. 9(2) of the Aarhus Convention access to legal recourse in case this faulty conclusion from PGE is not rectified in the scoping phase. For that reason, it needs to be concluded that the **substantive legal situation of the potential parties is defined by the extent of the largest possible impacts, i.e. includes legal subjects in a transboundary context.**

19. **PIS80** defines regional impacts only for *“CO 29 emissions, socio-economic changes in the form of higher employment,”* and others that would not have a direct influence on the substantive legal situation of the community. However, greenhouse gas emissions do have a substantial global impact and it has been determined in several recent legal cases (e.g. participation of the State of Micronesia in the EIA for the Pruhonice NPP in the Czech Republic, the legal excuse for the Kingsnorth 6 activists in the UK and others) that emissions of greenhouse gasses are influencing the substantive legal situation of a much larger community than defined here. For that reason, the EIA should investigate also to what extent nuclear power indeed realistically

can play a role in abating climate change or whether it in fact hinders effective abatement, as we would claim. For that, the project needs to be compared with reasonable alternatives that could lead to a zero-option (non-implementation of the project), including those based on the increased use of energy efficiency and renewable energy sources. Furthermore, it is not proven that the project will net lead to higher employment, because it may well prevent the creation of more jobs in the energy efficiency and renewable energy sector in the case the zero-option is chosen. Also for that reason, the EIA should compare the project with reasonable alternatives, including those based on the increased use of energy efficiency and renewable energy sources. Because of the potential far-reaching impacts of a nuclear power station, all who feel affected by the project should be recognised as a party to the proceedings, no matter their geographical location. This is supported among others by Aarhus Convention art. 3(9). 10

For those reasons, the “international impacts [that] may have effects beyond Polish borders” (PIS80) define the parties to the proceedings.

20. **PIS183 16 Public consultation program, 16.1 Preliminary issues:** *“Documents that define the requirements regarding information and social education in the field of nuclear power engineering are Nuclear Power Program for Poland, the Atomic Law and IAEA’s guidelines (NG-T-3.11 Managing EIA for construction and operation in new NP programmes, 2.3).”* [Emphasis added, JH] This formulation may be due to poor English translation, but the highlighted formulations seem to hint at an attitude of social engineering in the approach of the Ministry of Economy, PAA and PGE towards the issue of public consultation. These involved stakeholders with a direct interest in the project already have been active with strongly one-sided and biased propaganda campaigns in the region of North Pomerania (PIS189 and further). This includes the programmes ‘Świadomie o atomie’ and ‘Atom dla nauki’, the Atomowy Autobus, the websites www.poznajatom.pl and www.swiadomieoatomie.pl, the operation of local information centres, excursions to nuclear sites in Poland and abroad, as well many publications including those spread door-to-door and in local newsletters. None of the mentioned stakeholders has ever facilitated access to critical information about the project and there have been instances of intimidation of critical voices. It is the responsibility of the responsible authority (GDOŚ) to guarantee that during the entire EIA procedure, public participation can take place free from propaganda, coercion and intimidation on the basis of objective information from a wide range of points of view.

21. It is for those reasons of great importance **that the public consultations will be facilitated by independent facilitators** and not by facilitators related to PGE, the Ministry of Economy or other directly interested parties. This is valid for the assessment of input from the public in written form as well as for the organisation of hearings and other interactive platforms.

Scope of the EIA

22. PGE and GDOŚ propose an EIA procedure on the basis of the use of a so-called “conditions envelope”. There are fundamental problems in this approach. First of all, the use of envelope conditions excludes the comparison of different technologies with the goal to assess which of these technologies would be from environmental point of view the most optimal (see also: alternative technologies, point 36 hereunder). Secondly, the envelope conditions are defined on the basis of legal limits and criteria. However, the sense of an EIA is to assess whether such limits and criteria are met or to what extent they remain under them (allowing other activities

in the impact area still safe space until they are met). If an EIA is carried out on the basis of envelope criteria, the real technology on the ground could well lead to completely other outcomes. The use of the envelope methodology should therefore be used with great care and GDOŚ should insist that margins of error for all important data are included in the EIA documentation, and that conclusions are drawn on the basis of the precautionary principle, i.e. on the basis of the most hazardous potential values and not on the legally prescribed limits. It has to be brought to mind that the catastrophes in Seveso, Bhopal and Fukushima were not so catastrophic because the designs indicated that legal limits would be broken. They broke safe limits in reality. And it is the risk that these limits are broken in reality that defines whether a certain technology is acceptable, or not and should be replaced by one of the zero-alternatives.

23. **PIS23**, Chapter 3 fails to mention the environmental impacts on the front-end of the nuclear fuel chain: mining, uranium extraction, UF 6 production, enrichment, fuel production. In order to enable meaningful comparison with reasonable alternatives, these need to be included.

24. **PIS23**, Chapter 4 fails to mention the decommissioning of the project as well as the management of its wastes, including radioactive wastes. Both decommissioning and radioactive waste management are irreversibly connected to the operation of the nuclear power station.

25. **PIS28, par. 5.4:** It is *not* sufficient just to dump the decommissioning (and waste) phase of the project with a reference that it is 70 years away. Decommissioning and waste are irreversibly connected to the project. In order to fulfil the justification of the project, it also needs to be clear what kind of impacts can be expected – in the best possible estimates – from decommissioning and waste. Also potential impacts of decommissioning work on protected areas (incl. Natura2000 and other areas protected under the Habitat and Bird Directives) needs to be assessed. If decommissioning and waste management will not be included in the EIA, Greenpeace will for certain consider its options for access to justice for remediation of such a lack.

26. **PIS28, par. 5.5:** Each associated work that is irreversibly connected to the project should be included in the EIA. The reason is that when the project is accepted, there is no zero option any longer for these irreversibly connected activities (incl. decommissioning, waste, but also associated infrastructure, including vital transmission lines and transformer stations and indications of necessary back-up power). Public participation for those activities could in that case not take place any longer when all options are open. (Aarhus Convention art. 6(4))

27. No matter how many uncertainties there exist in the project, sufficient data need to be produced and assessments need to be made on the basis of best assumptions and best available information, indicating the levels of uncertainty and the range of uncertainty within the 95%ile. This in order to enable the in the decision procedure participating institutions and public an as exact as possible picture of the project to enable optimal feedback. But also to enable the permitting authorities to come to a best possible over-all assessment in the permitting procedure.

28. **PIS29, par. 5.5.2 Other associated investments:** As soon as an associated investment is irreversibly connected with the decision to build the nuclear power plant, it has to be included in the EIA, because only in that case all options, including the zero variants, are open. This is

valid for all the issues mentioned in 5.5.2. Salami-tactics for EIAs are not acceptable in EIA procedures.

29. **PIS71, paragraph 10.1, Table 13:** The stages “fuel production” and “waste management” should be included as stages rather than areas.

30. **PIS72, paragraph 10.1, Table 13:** Air quality and emissions also can take place during handling of fuel (could be counted under operation) and waste (which has handling steps beyond plant operation). These impacts can be outside of the locality of the power station, depending on where the handling takes place.

31. **PIS72, paragraph 10.1, Table 13:** Climate change: any analysis of “*reduction of CO₂ emissions*” only makes sense when the project is compared with other reasonable alternatives, including alternatives based on energy efficiency and renewable energy development, and when including the greenhouse gas emissions of the entire fuel chain (from mining to final disposal of radioactive waste). The potential impacts are not only local, regional or national, they are global
– climate change caused by greenhouse gas emissions has global effects.

32. **PIS72, paragraph 10.1, Table 13:** Communities: The extent of impact is not only local or regional but also national (comparison with other energy policies delivering the same services as this project).

33. **PIS72, paragraph 10.1, Table 13:** Human health and wellness: This should also include exposure to radiation, especially in the case of severe accidents with substantial emission of radioactive substances. The extent of impact is in the latter case also national and international/transboundary.

34. **PIS72, paragraph 10.1, Table 13:** Transportation and traffic of hazardous waste – given the fact that temporary and final disposal of radioactive waste may be on other locations in Poland, the effect will be local, regional and national.

Alternatives for the project

35. **PIS12:** The EIA should not only investigate “*d) possible project variants*” (as concluded from art. 3(1)(5) Uoos), it should also assess zero options (on the basis of the Aarhus and Espoo Conventions and EU Directives!) and the comparative environmental impacts of alternative policies that can lead to such zero-options.

At the moment when all options are open, the EIA should deliver a comparison with:

- different alternative technologies (for instance policies targeting higher efficiency and the increased introduction of renewable energy sources)
- alternative locations
- alternative nuclear technologies

This is later confirmed on PIS13 – “*a) types of alternative variants that require investigation*”, followed by PIS14 – “*5) alternative variants under consideration that will be subject of the impact assessment, including the so-called zero variant*”. It should be clear from this that 10 “project variants” is a too limited description, unless it is meant to mean “alternatives to the project” (see also point 37).

36. **PIS40, par. 6.4:** The EIA should investigate the environmental impacts of each technology in sufficient depth and detail to enable a comparison between different technologies. This in order to enable the relevant authorities and the investor to let the results of the EIA influence the choice of technology towards the environmentally most optimal one. The use of the “envelope” methodology does not offer that comparison between technologies, but basically defines a lowest common denominator of (environmental) quality and hence could lead to a run to the bottom among the technology providers if no competitive influence is introduced with the EIA procedure. When a comparison is made between technologies, this would spur the technology providers to optimise their designs also in environmental terms. The choice of technology is basically an environmental decision.

37. **PIS46 7. Project variants under consideration:** It is not sufficient to describe the zero alternative version as a baseline of no activity. In order to assess the justification for the environmental impacts of the project, it is necessary that the project variants also describe potential alternatives in energy policy that could lead to fulfilling the services offered by the project without it being implemented. This includes energy policies based on the introduction of clean energy technologies and energy efficiency. A reference to the Polish Nuclear Energy Programme is insufficient. As stated on PIS18, the choice for nuclear power was based on a circular argumentation: “*Consequently, nuclear power is present in all scenarios analysed in the draft Energy Policy until 2050.*” Nuclear power is supposed to be necessary because only scenarios with nuclear power were assessed. The same has to be concluded for the different Polish energy policies that led to the decision to introduce nuclear power. This insufficiency on the policy level will have to be corrected now at the project level by introducing an in-depth comparison with reasonable variants on all levels:

- the policy level (comparison of different energy scenarios, including scenarios with the zero option – justification of the choice for the introduction of nuclear energy in comparison with other options);
- the siting level (comparison of different potential sites on the level of environmental impacts – environmental justification of the site choice)
- the technology level (comparison of different proposed technologies for generation (power stations), cooling, decommissioning, waste management on their environmental impacts – environmental justification of technology choices)

The description of chapter 7 is falling hopelessly short of what is needed in the EIA report and should be rewritten.

Justification of the project – PIS16 and further

38. PGE claims on **PIS16** that “*The [Polish Nuclear Energy] Program is supported by analyses [...] that conclude that the use of nuclear energy sources is the most advantageous and profitable solution for achieving a fuel mix that provides for the theoretically highest possible reduction of CO2 emission while generating electrical power*”. These analyses do not conclude that, for the simple reason that they were not sufficient to be able to come to that conclusion. The PNEP did not investigate reasonable alternatives, did not give a realistic analysis of involved costs, nor important risks, nor gave a sufficient picture of the problems attached to radioactive waste management. For the alternatives, it relied on studies for two sets of energy strategies for 2030, which themselves did not carry out the analysis of scenarios without nuclear that focused on efficiency and renewable energy sources. The economic comparisons made in the PNEP were 11 of low quality and used highly outdated data, including severe underestimations of nuclear costs and severe overestimations of costs of renewables,

excluding any assessment of efficiency

potential. Reference to the PNEP or to the government energy strategy is irrelevant for the comparison with reasonable alternatives – even the latest strategy with a time horizon of 2050, but which only analysed scenarios including nuclear power (“*Consequently, nuclear power is present in all scenarios analysed in the draft Energy Policy until 2050.*” - See point 43).

This lack of sufficient analysis will have to be corrected in the EIA for the first Polish Nuclear Power Plant.

39. The projected increase in energy demand in the PNEP is not realistic. The EIA needs to investigate also more realistic demand scenarios and incorporate the potential of demand savings by energy efficiency.

40. Nuclear energy is in the PIS implied to be renewable (“*The elements identified above form a set of valid reasons for the modification of the Polish fuel mix, which is based in 90% on fossil fuels, and for the development of the renewable energy sources. Construction of the nuclear power plants is understood as crucial part of this process as the nuclear power plants might become an integral element of the baseload capacity to assure security of energy supply.*” **PIS17**), which is fundamentally untrue: nuclear power uses non-renewable fuels, and it causes waste for which

there is no final solution. The above formulation furthermore implies that large-scale baseload capacity is needed to assure security of supply. This is also not true. Many studies have shown that 100% renewable energy systems are possible, most recently from the Stanford University, including for Poland. 11

41. “*The assumptions for the National Plan for the Development of Low Emission Economy entail that an optimum fuel mix must be defined for Poland until 2050.*” (**PIS17**) The National Plan did not define an optimal fuel mix, but was calculated towards a certain result. For that reason the upcoming EIA report will have to remedy that shortcoming by containing a real calculation of an optimal mix, which necessitates the development of several energy scenarios.

42. The PIS quotes the “Energy Security and the Environment – 2020 perspective”: “Decision to start nuclear power plants in Poland will significantly limit greenhouse gas emissions. Nuclear power is able to provide an adequate amount of electric energy while allowing to meet the requirements for climate protection.” Apart from the fact that this statement was clear hogwash for the perspective of 2020 (it was even then impossible to construct an NPP before that time), also from a more general view, this statement is simply false. The first nuclear power station in

Poland with 3000 MW will generate 16,6 TWh of electricity, which equals 1,43 mtoe or around 1,5% of the Polish energy demand of 2012. That is a marginal amount, which will only marginally limit greenhouse emissions. In order to meet the EU targets of 85% to 100% reduction of fossil fuels in electricity production in 2050, Poland will have had to reduce its dependency on fossil fuels for electricity generation with at least 60% in 2030. From that, the first Polish nuclear power plant will cover less than 20%. It therefore has to be doubted that nuclear power is indeed so important in establishing the optimal mix, as 80% of the new generation capacity replacing fossil capacity would have to come in 2030 from renewable sources or efficiency gains anyway. There is a relevant question whether the marginal role that nuclear can play cannot be more effectively fulfilled by alternative sources like efficiency and renewables.

43. **PIS18:** *“Consequently, nuclear power is present in all scenarios analysed in the draft Energy Policy until 2050.”* Because PGE and the government have only assessed scenarios including nuclear power they conclude that scenarios without nuclear power, which were not assessed, are not capable of fulfilling Poland's energy need more effectively and optimally. **This is a circle argumentation**, which is not supported by any evidence. For that reason, the EIA will need to redo the justification of the project, including the justification of the environmental impacts caused by the project.

44. The quoted “Plan for spatial development of the Pomeranian Voivodeship” shows clearly that in the North there is ample potential for renewable energy generation in the North of Poland as alternative to nuclear power, also to fulfil the wish to bring more balance in the electricity grid in Poland.

45. **CONCLUSION: the PIS does not deliver sufficient reason to conclude that the introduction of nuclear power in Poland is justified. This justification should be redone in the EIA on a considerably higher level of quality and excluding circle-argumentations.**

Radioactive waste and spent nuclear fuel management

46. **PIS31, par. 5.5.3:** *“The construction of these repositories is not covered by the scope of the first Polish NPP build project. They are treated as separate projects.”* This is unacceptable. The production of radioactive waste is an inherent irreversibly connected issue to the start-up, operation and decommissioning of a nuclear power plant. When the nuclear power plant is built, the zero-option for radioactive waste and spent fuel management, storage and disposal is no longer open. Not including radioactive waste and spent fuel management, storage and disposal in this EIA means that the public will not be able to participate when all options are open and create a situation in breach with Aarhus Convention art. 6(4).

47. **PIS14:** It is stated here that *“3) lack of knowledge and gaps in knowledge on the environment and possible impact it might exert on the project that need to be filled so as to perform a correct and comprehensive environmental impact assessment”*. This also implies that the description of radioactive waste and spent nuclear fuel management given in the Polish Nuclear Energy Programme and in this PIS is highly insufficient. There are currently large gaps in knowledge concerning this issue, especially the management of high-level wastes and spent fuel. The programme proposed in the Polish Nuclear Energy Programme is highly speculative, the description only reflects the most optimistic scenario. It is important that the EIA assesses the full problem of radioactive waste and spent nuclear fuel management, including a fair description of uncertainties, lacks of knowledge and gaps in knowledge on proposed technologies and potential impacts, an assessment of alternative technologies, and a full estimate – including 95 percentile uncertainty margins – of the total costs of this management.

Assessment of the site, nature protection

48. **PIS21** fails to mention: destruction of existing natural habitats falling under the protection of the Habitat Directive and the Bird Directive (including Nature 2000 areas and shadow-Nature2000 areas), creation of compensation nature areas. The EIA should carefully assess the status of the sites foreseen, especially under the mentioned Habitat and Bird Directives

and assess and propose measures (incl. the zero variant) to minimise destruction of valuable natural habitats that fall under the protection of these Directives as well as adequate compensation measures for the resulting damage.

49. The EIA should not only investigate impacts on Natura2000 areas (**PIS26**), but on all areas that fall under the protection of the Habitat and Bird Directives. This includes also so-called shadow-Natura2000 areas and other areas that fulfil the criteria in the Habitat and Bird Directive Annexes.

50. **PIS50 Natura2000 sites:** the indicated sites for the proposed project do not only affect the mentioned Natura2000 sites, they also influence the coastal Natura2000 site encompassing the beaches and first hundreds of meters of sea, as well as areas that fall under the protection of the Habitat and Bird directives without having been appointed Natura2000 site because they fulfil the criteria of the Habitat and Bird Directives. These include among others the so-called shadow-Natura2000 sites, e.g. the Lubiatowskie Bory Bażynowe. 12

51. The Zarnowiec site should be investigated for its importance for breeding birds in the ruins of the old nuclear power station as well as feeding area for protected bird species.

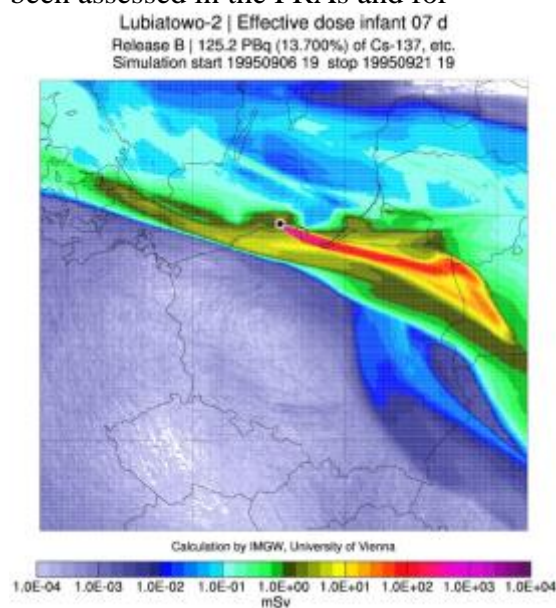
52. **PIS93, 12.1.2 Choczewo Location Variant:** The area of this location has different than stated in the PIS high ground water levels in dune valleys. It furthermore contains Habitat Directive Annex 1 biotopes. Greenpeace had an inventory made of the natural values of this area, which clearly comes to the conclusion that the entire area falls under the protection of the Habitat Directive. Greenpeace wants to see the data of this assessment being taken up in the over-all EIA. 13

Severe accidents

53. **There is a lack of clarity about which impacts from accidents are to be assessed.** Within recent nuclear EIAs, this has been a structural problem. On the basis of the Aarhus Convention, art. 6(6), the Party shall provide for public participation “(b) *A description of the significant effects of the proposed activity on the environment;*”. This includes all significant effects, independent on the way in which these effects are caused. As indicated in the PIS, there is during accident conditions a risk of uncontrolled release of radioactive substances to the environment. Such a release can be caused by a technological failure (which is often estimated in the Probabilistic Safety Analysis or PSA – we will speak rather of a Probabilistic Risk Analysis or PRA 14), or by human failure (only partially reflected in PRAs), extreme weather impacts (idem), or malevolent attack (sabotage, terrorist attack or act of war) (not included in the PRA). This means that even in the case that PRAs indicate low chances on certain outcomes, substantial releases of the radioactive inventory cannot be excluded, nor can the chance on such releases be adequately predicted. The PRA may be used as a tool, but can never be a decisive selection criterion for potential releases. In order to give a proper estimate of the risk that a nuclear power plant poses to the environment, it is important to use source terms that indeed describe such a substantial release, no matter how this release was caused (“think the unthinkable” – the most important lesson from the Fukushima catastrophe). Greenpeace has asked the Institute for Safety and Risk Research at the BOKU University in Vienna to calculate potential source terms of the most important radioactive substances during accident situations in extreme circumstances that should be taken into account in the environmental impact assessment of a nuclear power station at the Choczewo site. 15 It asked the department of Meteorology and Geophysics of the University of Vienna to calculate

spreading and deposition with the widely used FlexRISK model. 16
We want these calculations to be taken into account in the EIA report.

54. **PIS76:** It is stated that in case of a BDA (“**II In the case of design extension conditions**”) ”major radiation impact is limited to an area within 800m from the reactor, while an area within 3km from the reactor requires temporary intervention”. This is typical putting-your-head-in-the-sand argumentation. On the basis of the defence in depth principle of the IAEA, there is an obligation to be prepared for a breach of the fourth defence layer. That is, because this possibility exists, and this is illustrated by the calculations made by the BOKU University in Vienna and the University of Vienna. There are scenarios thinkable (“think the unthinkable” is still the most important lesson from Fukushima) under which there is an early release of several tens of percents of the inventory of radioactive caesium, iodine and strontium. Especially the early release of iodine will need early evacuation and prophylaxis measures on a large area. One illustrative situation is added hereby. Even though an accident of this type is highly unlikely, it can happen and therefore fulfils the criterion in the Aarhus Convention art. 6(6)(b) of a significant effect. The case is furthermore illustrative for a similar source term caused by malevolent attack (sabotage, terrorism, acts of war) or a combination of extreme weather, technical and/ human failure and/or malevolent attack that has not been assessed in the PRAs and for



which the chance of occurrence is unknown but could well be higher than the likelihood of $10E-7$ of the assessed technical failure sequence. The limitation by PGE of accident sequences to those that fall within the PRA and have there a likelihood of $10E-7$ or more is unacceptable because there are scenarios which are not included in the PRA, but can lead to larger emissions and for which the likelihood is simply unknown. To be clear: none of the scenarios that led to the accidents in Three Miles Island, Chernobyl, Windscale, Fukushima or even Tokaimura, Greifswald, Bohunice A1 was part of PRA sequence calculations because the scenarios had elements that do not appear in PRAs or because they had elements that were deemed too unlikely. It has to be pointed out here that the mentioned EUR documentation prescribes requirements for the quality of the technology based on PRA calculations and are meant to highlight weak spots in the technical design. This has nothing to do with the real chance on an accident with substantial emission of radioactive substances. Stating that (**PIS77**) “A nuclear plant will comply with Polish regulations...” is like stating

that tsunamis in Japan will fulfil the limits set in the PRA calculations for Fukushima. They did not. This argumentation from PGE is amateurish. Safety regulations and guidelines are implemented to reduce the risk of severe accidents on the basis of best available knowledge. Unfortunately this is often weakened by the use of the ALARA (As Low as Reasonably Achievable) principle, under which certain limitations to risk reduction are accepted because they are difficult to implement (on the basis of economic, practical or even political grounds). But none of this can **exclude** the risk of occurrence of a severe accident with substantial emissions of radioactive substances as long as these substances are concentrated on one place within a human constructed engineered facility. As was stated in the start of this paragraph in the report: *“During the operation of a nuclear power plant (as in the case of any other large industrial facility) it is not possible to eliminate the possibility of an accident or incident. The specific nature of nuclear power plant involves technological processes generating radioactive substances. During accident conditions there is a risk of uncontrolled release of such radioactive substances to the environment.”* **CONCLUSION: PGE should be required to include BDAs in its analysis that lead to a substantial release of radioactive substances in an early phase of the accident in the order of magnitude of several percent to 50% of the inventory of radioactive iodine, caesium and strontium and analyse the impacts for real weather simulations. It should furthermore indicate in detail how the fifth layer of defence in depth is to function under these circumstances, and include estimated impacts on health, economy and environment for such scenarios.**

Other issues in the content of the PIS report

55. **PIS42, 6.4.1.3. PHWR reactors:** a well known problem of PHWR reactors is their relatively high emission levels of tritium into the environment (see for instance Fairlie (2007) 17). The EIA should for that reason pay extra attention to tritium emissions in case the PHWR design is still contemplated.

56. **PIS42, 6.4.1.3. PHWR reactors:** The only deliverer of PHWR reactors is currently the Canadian firm SNC-Lavalin. SNC-Lavalin was debarred from Worldbank loans in 2013 for a period of ten years because of involvement in corruption. 18 It could therefore well be that SNC-Lavalin for that reason would not be eligible as supplier for the first nuclear power plant in Poland, so that the above mentioned issue would fall away. It is important that this issue is clarified.

57. **PIS43, 6.4.2. Cooling systems:** PGE indicates the potential need for cooling pipes from the Zarnowiec localisation to the sea, cutting through Natura2000 areas. The EIA should describe in detail also the potentially affected Natura2000 areas and other potentially impacted areas protected under the Habitat and Bird Directives (among others shadow-Natura2000 sites) and it should describe the potential impacts on these sites from the construction of these pipelines ring operation in which pipe-breaks lead to flooding or pipe-leaks lead to emissions of radioactive substances, especially tritium. The EIA should also describe the impact of emissions of warm cooling water in the coastal Natura2000 zone. Next to that, the EIA should describe the impact of the use of alternative cooling technologies, for example cooling towers, on the landscape of the Zarnowiec lake area when the piping option is not used.

58. **PIS45, 6.4.4:** Spent nuclear fuel storage: the EIA should include the assessment of the impacts of severe accidents in the spent nuclear fuel storage, included those caused by technological failure, extreme weather events, human failure, malevolent attack (including

sabotage, terrorist attack and acts of war) or combinations of those in which either the spent nuclear fuel cooling is interrupted in the case of wet storage, or the integrity of the containers is impaired in the case of dry storage.

59. PIS63, paragraph 9.2: Carbon dioxide emissions

- The assessment should encompass all greenhouse gas emissions (including also non-CO₂ greenhouse gas emissions like CFCs, HFCs, methane and others).
- For a sensible assessment of the impacts of the greenhouse gas emissions of the project, this should include all greenhouse gas emissions from the total fuel chain – from mining to final disposal of high-level waste. The in the report proposed assessment of greenhouse gas emissions does not give any usable outcome number for any further assessment or comparison and is therefore futile. Only full chain analyses can give a picture of the effect of the project on climate change and enable comparison with reasonable alternatives.

60. **PIS197 – Bibliography and PIS202 – Legal acts:** MISSING links to the mentioned bibliography and acts on the internet. These sources are often available. In order to simplify access to them for the public, PGE should include as far as available internet links for its sources.

61. **PIS202 – Legal acts:** MISSING: Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters done at Aarhus, Denmark, on 25 June 1998; <http://ec.europa.eu/environment/aarhus/>

Realism and preciseness

62. **PIS23:** The PIS indicates a potential output between 9 and 28 TWh per year. This means that the project might contain only one reactor of 1200 MW or indeed the maximum capacity of 3750 MW in the form of three reactors. This is a very big difference with direct consequence for the justification of the project as well as consequences for most other environmental impacts. It surely must be possible to give a more precise indication of proposed capacity. Otherwise these different potential capacities should fully be reflected throughout the EIA report analyses.

63. The EIA should NOT contain abbreviations in the form of NpfrWaSFM (**PIS31**). This is obfuscation. It is sufficient to shorten “National Plan for Radioactive Waste and Spent Fuel Management” to National Radwaste Plan or National Radioactive Waste Plan so that readers at least keep track about what is being talked about.

64. In general (Example: **PIS64 Table 7**): sourcing of data should not only be on the basis of data provided by technology providers, but where possible backed up by independent and verifiable data. Data from earlier EIA procedures in other countries should be traced back to the original data source.

65. Reference to “*practical experience from operation of nuclear power plants using PWR, BWR and PHWR reactors around the world*” (**PIS65**) should be taken with great reserve, because most of the proposed technologies (AP1000, EPR, CANDU6, EBWR) themselves have no operation, and the ABWR only very limitedly so. The technological jump from generation II reactors to generation III reactors is big enough not to enable simple copying experiences with generation II reactors to generation III reactors, nor to be able to extrapolate or conclude automatically that generation III reactors will perform better.

66. PIS75, paragraph 10.3 Radiation impact during accident conditions: Translation mistake in the ENGLISH version: the right terminology is DESIGN BASED ACCIDENT (DBA) and BEYOND DESIGN BASED ACCIDENTS (BDA)

1 <http://www-pub.iaea.org/books/IAEABooks/10391/Managing-Environmental-Impact-Assessment-for-Construction-and-Operation-in-New-Nuclear-Power-Programmes>

2 http://www.unece.org/env/pp/implementation_guide.html

3 http://www.unep.ch/etu/publications/EIA_2ed/EIA_E_top5_tit.PDF

4 Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters done at Aarhus, Denmark, on 25 June 1998; <http://www.unece.org/env/pp/introduction.html>

5 Aarhus Convention art. 6(4): “Each Party shall provide for early public participation, when all options are open and effective public participation can take place.”

6 Act of 3 October 2008 on Providing Information on the Environment and Environmental Protection, Public Participation in Environmental Protection and Environmental Impact Assessment (consolidated text, Polish J.o.L. of 2013, item 1235, as amended)

7 Convention on Environmental Impact Assessment in a Transboundary Context done at Espoo (Finland), on 25 February 1991; <http://www.unece.org/env/eia/eia.html>

8 PRA = Probabilistic Risk Analysis. PGE uses the term PSA (Probabilistic Safety Analysis), but because the analysis calculates risk and not safety, the use of the term PRA is more adequate.

9 PGE falsely only talks of CO₂-emissions. Important is the total of greenhouse gas emissions, which include among others also CH₄'s, FCH₄'s, methane and others. We therefore will further refer to greenhouse gas emissions instead.

10 Aarhus Convention art. 3(9): Within the scope of the relevant provisions of this Convention, the public shall have access to information, have the possibility to participate in decision-making and have access to justice in environmental matters **without discrimination as to citizenship, nationality or domicile** and, in the case of a legal person, without discrimination as to where it has its registered seat or an effective centre of its activities. [Emphasis added, JH]

11 Jacobson, Mark Z. e.a., 100% Clean and Renewable Wind, Water, and Sunlight (WWS) All-Sector Energy Roadmaps for 139 Countries of the World, Stanford (2015), Stanford University; <http://web.stanford.edu/group/efmh/jacobson/Articles/I/WWS-50-USState-plans.html> For Poland: <https://100.org/wp-addons/maps/#616>

12 <http://www.kp.org.pl/n2k/shadow%20list%202013%20-%20update%2020130108.pdf>

13 Kurkowski, Marek, Łukasz Czajka, Marcin Graczyk, Chronione typy siedlisk przyrodniczych oraz gatunki roślin i zwierząt w rejonie planowanej elektrowni jądrowej EJ Choczewo, Warszawa (2014) Greenpeace Polska – available from the author of this submission on request.

14 The nuclear industry uses the term PSA, although the tool does not calculate safety, but risk (chance on negative effect times impact). For that reason, we prefer to use the semantically better term PRA.

15 Sholly, Steven, Nikolaus Müllner, Nikolaus Arnold, Klaus Gufler, Source Terms for Potential NPPs at the Lubiatoowo Site, Poland, Vienna (2014) Institut für Sicherheits- und Risikowissenschaften;
https://www.greenpeace.de/sites/www.greenpeace.de/files/publications/20140304-irs_report_source_terms_poland.pdf

16 Seibert, Petra, Radek Hofman, Anne Philipp, Possible Consequences of Severe Accidents at the Proposed Nuclear Power Plant Site Lubiatoowo near Gdańsk, Poland, Vienna (2014) Department of Meteorology and Geophysics, University of Vienna; https://www.greenpeace.de/sites/www.greenpeace.de/files/publications/20140304-flexrisk_report_pl.pdf

17 Fairlie, Ian, Tritium Hazard Report: Pollution and Radiation Risk from Canadian Nuclear Facilities, Toronto (2007) Greenpeace Canada;
<http://www.greenpeace.org/canada/Global/canada/report/2007/6/tritium-hazard-report-pollu.pdf> Fairlie, Ian, Cernavoda 3 and 4: Environment Impact Analysis: Report for Greenpeace, Bucharest (2007) Greenpeace Romania;
http://www.banktrack.org/manage/ems_files/download/cernavod_3_i_4_evaluarea_impactului_asupra_mediului_raport_pentru_greenpeace/200709_cernavoda_report_for_gp_central_europe_ro.pdf

18 World Bank press release of 17 April 2013: World Bank debars SNC-Lavalin Inc. and its affiliates for 10 years;
<http://www.worldbank.org/en/news/press-release/2013/04/17/world-bank-debars-snc-lavalin-inc-and-its-affiliates-for-ten-years>
s.auch:<http://aarhus-konvention-initiative.de/polen/>