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LIFETIME EXTENSION OF NUCLEAR POWER PLANTS

Analysis of legal aspects

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Introduction

As numerous nuclear power plant are currently reaching the end of their originally defined operating period or design-lifetime, lifetime extension is a broadly discussed issue within the nuclear and environmental community. The Implementation Committee to the Convention on environmental impact assessment in a transboundary context (Espoo Convention) is currently involved in various cases which are all similar to this regard, but different in detail.

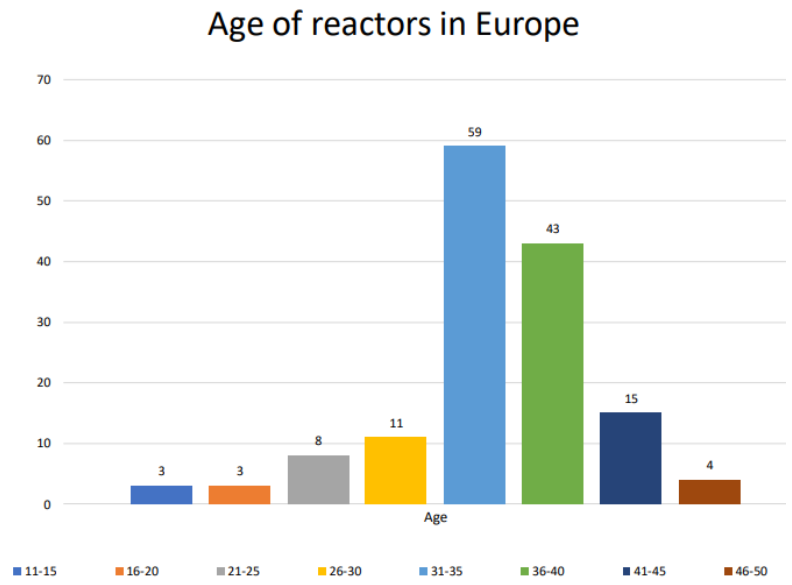
This legal analysis was prepared as a targeted input to the ongoing ad hoc group's work on the issue of NPP lifetime extension under the Espoo Convention in the light of the applicable legal frameworks and recent international and European case-law. The focus of the content is set on transboundary environmental impact assessment in the context of public participation.

The first section will provide a short introduction to the issue of lifetime extension as such and an explication of the current situation before the Espoo Implementation Committee. In the following section the different applicable legal frameworks will be elaborated in order to provide insight in the differing approaches and points of view. Although the scope of applicability differs for each regulation, the regulatory frameworks can be grouped in the environmental regulations, on the one hand, and nuclear/technical regulations, on the other. We will take a look at these different groups considering the aspects which came up in the discussions on the topic.

Before drawing any conclusions it must be noted that some aspects are of larger importance than others while additional questions not explicitly asked might add to a fruitful discussion. There is not much time left until the Meeting of the Parties to the Espoo Convention will decide on a future guidance on the application of the Convention to the lifetime extension of nuclear power points at its eighth session. This analysis is an attempt of giving the status quo and possible future agreements a clearer picture.

1. The general issue of LTE

Nuclear power plants are usually designed for 30 or 40 years.[1] Due to the age of the operating reactors in conjunction with the financial and administrative burdens related to constructing new reactors, many countries chose to continue the operation of old reactors as an existing electricity source.



Source: Presentation by Oda Becker at Conference "Climate Crisis" 2019[2]

The terminology for the extension of the operating period of a nuclear power plant (NPP) – the so-called "lifetime-extension" (LTE) – is as heterogenic as the situation in the different applicable national legal frameworks. Planned Lifetime Extension (PLEX) or Long-Term Operation (LTO) of nuclear power plants is, therefore, a sensitive issue within the European energy sector. For further elaborations of terminology and national approaches see below, Sections 3.3 and 3.4 on IAEA and OECD documents.

While some national legal frameworks provide for publicly accessible assessment procedures before the operational period of an NPP can be extended, others only require an approval of the responsible authority. In some cases, national law lays down **safety evaluations to be conducted on a regular basis in order to continue operations of a nuclear power plant**, whereas the expiry date of a power plant has never been explicitly set in the original operational permit. But long-term operation can also occur in other cases than reaching a licence or design limit; in some cases, time limits of nuclear reactors can be assumed according to their type and time of construction. The fact that some nuclear reactors have already been subject to environmental impact assessments while others have not only

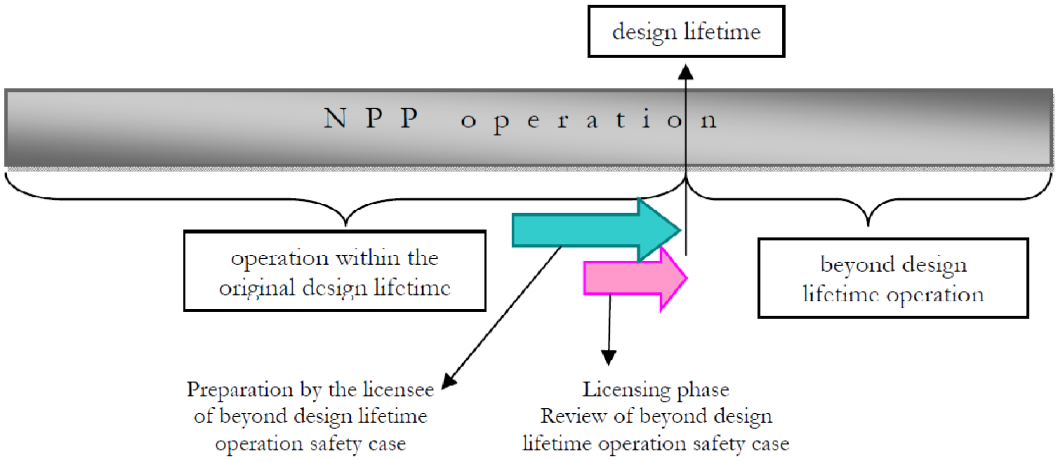
[1] Western European Nuclear Regulator's Association (WENRA), Pilot study on Long term operation (LTO) of nuclear power plants, March 2011 http://www.wenra.org/media/filer_public/2012/11/05/ltoofnpps_1.pdf (5 May 2020).

[2] Available at https://www.global2000.at/sites/global/files/OldNuclearPlants_DNTC_Conference.pdf (5 May 2020).

adds to the heterogenic scene. Further information on the differing systems and approaches in countries producing nuclear energy, will be elaborated below in Sections 3.3 and 3.

1.1. Conducting LTE/PLEX/LTO

In practice, lifetime extension and preparation start long before the originally designed lifetime is reached. This is also recommended by the Western European Nuclear Regulator's Association (WENRA).[3] The WENRA 2011 report on LTO contains the following graphic explanation:



Source: WENRA 2011, Pilot study on Long term operation (LTO) of nuclear power plants[4]

As mentioned above, in many countries, there is no reference to the lifetime of the plant in the license itself. In the safety analysis report, however, there might be some design assumptions related to the lifetime of some key components, of which the reactor pressure vessel is the most important one. When such values are mentioned, they are generally between 30 and 40 years. When a lifetime is specified in the license, the licensee has in general the possibility to ask for an extension, which needs to be supported by appropriate ageing management programmes and other relevant justifications. On the other hand, long-term operation may also require an impact evaluation if the design limit of a reactor can only be assumed.

This variety results in many different constellations to be addressed by a mutual solution, e.g.:[5]

1. A time-limited license can be due to expire and must be extended (or new license is to be issued)
2. The license does not include a time-limit, but the design lifetime is established by

[3] Western European Nuclear Regulator's Association (WENRA), Pilot study on Long term operation (LTO) of nuclear power plants, March 2011 http://www.wenra.org/media/filer_public/2012/11/05/ltoofnpps_1.pdf (25 May 2020).

[4] Ibid.

[5] See presentation at the International Workshop on the Applicability of the Espoo Convention to the Lifetime Extension of Nuclear Power Plants, 2 December 2020, online available at https://www.unece.org/fileadmin/DAM/env/eia/documents/WG2.8_Nov2019/Workshop/Slides_Stakeholder-Workshop_version_used_on_2_December.pdf (12 May 2020).

   a. a specific safety review and subsequent authorisation required to continue the operation or
   b. No specific safety review, but an authorisation is required to continue operation
3. The license does not include a time-limit and no design lifetime is established
4. The Time period on which an environmental impact assessment was based is due to expire

As presented in the study "Assessment on Lifetime Extensions of Nuclear Power Plants after ECJ Judgement C-411/17"[6], in the past decades every existing nuclear power plant underwent essential changes, usually called "safety upgrade programmes" during operation and/or a multitude of continuous smaller changes. As a result, today's power plants are different to the ones licensed 30 or 40 years ago. One reason is that changes and modifications undertaken do not only address the physical aging of components, but also technological and conceptual aging of the designs.

One important process all nuclear power plants in the EU underwent recently or should undergo in the very next future is the **implementation of stress test results**. In response to the massive nuclear disaster at the NPP Fukushima Daiichi site in Japan on 11 March 2011, a fundamentally renewed discussion on nuclear safety started in the EU and some neighbouring third countries. In France, for example, the stress tests carried out in 2011 resulted in the decision to improve French NPP's safety by introducing the so-called "hardened core", which will require comprising upgrades.

Another development in the operation of NPPs is **power uprates**. Power uprates can be achieved by adjusting the operational parameters (e.g. temperature or pressure) and control devices or by replacement of different components/equipment. The consequences of power uprates include a reduction of safety margins, the increased ageing of components and faster accident sequences, which can mean a serious reduction of safety.

Also, many **NPP safety upgrade programmes** have been carried out in the past years:

As an example, the widely deployed Soviet reactor type VVER 440/213 is used for the **Dukovany** units 1-4 in the Czech Republic. The start of commercial operation of the Dukovany NPP was dated 1986. According to the national CNS reports, two major upgrade programmes were conducted: The initial design of the "Back-fitting" was completed in 1990; its implementation started in 1991 and was completed in 1996. The second programme, MORAVA, most importantly included the exchange of the I&C (Instrumentation and Control system, the "central nervous system") stemming from the seventies with a digital control system. The result listed a total of 11 measures for the program "Back-fitting" and 37 for the MORAVA programme.[7] In 2010, the energy output was increased from 440 to 510 MW at all units. After the Fukushima accident, further changes had to be conducted at Dukovany, including the construction of additional cooling towers.

The scope of activities and upgrading programmes necessary to extend the operational period of an NPP can also be demonstrated by **Kozloduj**. According to the draft Bulgarian National Energy and

[6] ÖKOBÜRO – Alliance of the Austrian Environmental Movement, Environmental Impact Assessment on Lifetime Extensions of Nuclear Power Plants after ECJ Judgement C-411/17 (2019), available online at https://www.oekobuero.at/files/409/oekobuero_paper_on_eia_for_npp_lte.pdf.

[7] CNS Report 2001, Annex 1, 1.3; https://www.sujb.cz/fileadmin/sujb/docs/zpravy/mezinarorni_zpravy/Anex1.pdf (accessed 3 June 2020).

Climate Plan (NECP), different measures were taken in preparation of life-time extension of Kozloduj units 5 and 6.[8]

The lifetime extension of the Slovenian NPP **Krško** also requires major upgrade works, such as the construction of a new building with an independent power source to house two additional safety systems.[9]

The abovementioned examples should provide and idea on different types of changes to NPPs within the preparation of long-term operation. Additionally should be noted that, regardless of the changes to the physical infrastructure or changes in the approach to the operation of the plant, the **surrounding environment** in which the plant operates might have significantly changed since the original project was permitted.

1.2. Rivne and the UNECE Ad hoc working group on LTE of nuclear power plants

In 2011, the Implementation Committee to the Convention on environmental impact assessment in a transboundary context (Espoo IC) first began its consideration regarding the planned extension of the Ukrainian NPP Rivne, close to the border with Belarus and Poland. Information on this subject had been sent to the Committee by a Ukrainian NGO in April 2011, explaining that Ukraine had "initiated and partially completed a process for extending lifetime (designed period) of operation set for some nuclear reactors".[10] At that point, a final decision was already taken regarding two nuclear reactors of the NPP. The information argued that such an extension of nuclear reactors lifetime would qualify as a "major change" and, therefore, fall under the definition of proposed activity under the Espoo Convention and require a transboundary EIA.

The Espoo Implementation Committee held in its findings that,

> "*the extension of the lifetime of a nuclear power plant after expiration of the original licence, even in the absence of any works, [is] to be considered as a major change to an activity and consequently subject to the provisions of the Convention.*"[11]

In June 2014, the Meeting of the Parties to the Espoo Convention, while not adopting the wording proposed by the Committee, endorsed the findings of the EIC agreeing that,

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[8] Draft integrated Energy and Climate Plan of the Republic of Bulgaria, pp 14 et sq.; https://ec.europa.eu/energy/sites/ener/files/documents/ec_courtesy_translation_bg_necp.pdf (3 June 2020).

[9] See Nuclear Engineering International, *Upgrading Krsko*, 15 April 2020, https://www.neimagazine.com/features/featureupgrading-krsko-7874556/.

[10] See Supporting Information on Violations by Ukraine of its obligations under Espoo Convention in relation to extension of the lifetime of two 1st and 2nd nuclear reactor of Rivne NPP, attached to the Information on possible non-compliance submitted by Ecoclub in relation to Ukraine, p 1, online available at https://www.unece.org/fileadmin/DAM/env/documents/2019/ece/Restart/CI_Ukraine/2._Supporting_Information_3.0_FINAL.pdf (5 May 2020).

[11] Findings and recommendations further to a Committee initiative concerning Ukraine (EIA/IC/CI/4), ECE/MP.EIA/IC/2014/2, Annex, para 35, https://www.unece.org/fileadmin/DAM/env/documents/2014/EIA/IC/ece.mp.eia.ic.2014.2.e.pdf (5 May 2020).

> "*the extension of the lifetime of the nuclear power plant, subject of the proceedings, after the initial licence had expired, should be considered as a proposed activity under article 1, paragraph (v), of the Convention, and is consequently subject to the provisions of the Convention…*"[12]

The Meeting of the Parties concluded on noncompliance by Ukraine by not conducting a transboundary environmental impact assessment according to the Espoo Convention. However, it did not include a general finding on the extension of the lifetime of a nuclear power plant.

The NPP Rivne was an atypical case with a time-limited licence, whereas in many countries, operating or permitting licences do not state an explicit date of expiry. The issue of whether and in what circumstances lifetime extensions of nuclear power plants trigger the application of the Espoo Convention and thus require a transboundary environmental impact assessment still raises questions. There are currently several cases on this topic pending before the Espoo IC–e.g. on the Dutch NPP Borssele,[13] the Czech NPP Dukovany,[14] or the Bulgarian NPP Kozloduy[15]–and more are to be expected, as many reactors built in the Seventies or Eighties are currently reaching the end of their original lifetime.

This lead the Meeting of the Parties to the Convention at its seventh session in 2017 to the decision to establish an **ad hoc group** to draft terms of reference for possible guidance on addressing the applicability of the Espoo Convention in case of lifetime extension of nuclear power plants.[16]

At a meeting of the Working Group on EIA and SEA in 2018, a workshop on the draft terms of reference for possible guidance on the issue was held and the working group took note of the following main conclusions:

(a) *The Implementation Committee's work is heavily constrained. The guidance is therefore urgently needed;*
(b) *The interpretation of the Convention should be in line with its main purpose and objectives;*
(c) *The lifetime extension of nuclear power plants is not only about nuclear safety, but also about the environment; any changes in the surrounding environment, such as an increase in population or water scarcity, should be considered;*

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[12] Decision VI/2 adopted by the Meeting of the Parties to the Convention on Review of Compliance with the Convention, ECE/MP.EIA/20/Add.1, ECE/MP.EIA/SEA/4Add.1, para. 68, https://www.unece.org/fileadmin/DAM/env/documents/2014/EIA/MOP/ECE_MP.EIA_20_Add.1%E2%88%92ECE_MP.EIA_SEA_4_Add.1_e.pdf (12 May 2020).

[13] EIA/IC/INFO/15.

[14] EIA/IC/INFO/19.

[15] EIA/IC/INFO/28.

[16] For further information, see e.g. the Report of the Working Group on Environmental Impact Assessment and Strategic Environmental Assessment on its seventh meeting, 8 August 2018, ECE/MP.EIA/WG.2/2018/2, or the note by the Co-Chairs of the ad hoc working group on the progress in drafting guidance on the applicability of the Convention to the lifetime extension of nuclear power plants, 7 November 2019, ECE/MP.EIA/WG.2/2019/INF.6, https://www.unece.org/fileadmin/DAM/env/eia/documents/WG2.8_Nov2019/Informal_docs/ece.mp.eia.wg.2.2019.INF.6_LTE_of_NPP_Update.pdf (5 May 2020).

(d) *Environmental issues must be properly addressed in environmental impact assessment, possibly through a screening assessment;*
(e) *Safety reviews cannot replace transboundary environmental impact assessments: the two processes are complementary;*
(f) *The Convention is largely aligned with the European Union's Environmental Impact Assessment Directive,11 but it is a legally distinct instrument;*
(g) *The lifetime extension of nuclear power plants also entails ensuring public participation and transparency, including in a transboundary context;*
(h) *Consideration should be given to the impact of multiple short-term extensions;*
(i) *Not all safety upgrades lead to environmental benefits; they can also have adverse impacts on the environment.*[17]

The ad hoc working group, co-chaired by Germany and the United Kingdom, was thus mandated to discuss and consider adopting the terms of reference at its seventh meeting taking into account the outcome of this workshop.[18]

The Meeting of the Parties at its intermediary session in February 2019 confirmed the work carried out by the ad hoc working group. It decides that the draft guidance should be finalized for consideration by the Working Group in mid-2020, before its submission to the Meeting of the Parties to the Convention for adoption at its eighth session in December 2020.[19]

[17] ECE/MP.EIA/WG.2/2018/2, pp. 8 et seq.

[18] See "Terms of reference for guidance on the applicability of the Convention to the lifetime extension of nuclear power plants", ECE/MP.EIA/WG.2/2018/2, Annex VI.

[19] See Decision IS/2, 9 April 2019, ECE/MP.EIA/27/Add.1 - ECE/MP.EIA/SEA/11/Add.1.

2. Applicable environmental legal and regulatory frameworks

2.1 EIA Directive

One of the key documents on EU level, applicable for the permission of nuclear power plants is Directive 2011/92/EU[20] on the assessment of the effects of certain public and private projects on the environment – the EIA Directive. According to its article 1 (1), the Directive applies to the **assessment of the environmental effects of those public and private projects which are likely to have significant effects on the environment**. According to article 2 (2), an environmental impact assessment may be integrated into the existing procedures for development consent or into other procedures to comply with the aims of the Directive.

Terminology

Article 1 (2)(a) defines a "**project**" as "the execution of construction works or of other installations or schemes" or "other interventions in the natural surroundings and landscape including those involving the extraction of mineral resources". According to the ECJ, the term "project", especially in the context of the first indent of Article 1 (2)(a) of the EIA Directive[21] "refers to work or interventions involving alterations to the physical aspect of the site".[22] The mere renewal of an existing permit to operate, however, does not fall under the definition of a (new) project.[23]

According to the ECJ, the **measures and the upgrading work inextricably linked to a decision**, e.g. on the extension of an NPP's lifetime, together constitute a single project as defined in article 1 EIA Directive.[24] This is not changed by the fact that the implementation of those measures requires the adoption of subsequent acts or decisions.[25]

According to Annex I (24) of the EIA Directive, any **change to or extension of a project** listed in the Annex (such as nuclear reactors) must be subject to an EIA. An environmental impact assessment is required, regardless of whether an activity originally had been subject to such an EIA or not. It does not depend on whether the relevant provision had already been in place at the time the power plant was originally permitted.

[20] OJ L 2012/26, 1, last amended by Directive 2014/52/EU, OJ L 2017/124, 1.

[21] Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment, OJ 2012 L 26, 1.

[22] ECJ C-411/17, *Inter-Environnement Wallonie and Bond Beter Leefmilieu Vlaanderen*, ECLI:EU:C:2019:622, para 62 with further references.

[23] ECJ C-411/17, *Inter-Environnement Wallonie and Bond Beter Leefmilieu Vlaanderen*, ECLI:EU:C:2019:622, para 86, ECJ-201/02, *Wells*, EU:C:2004:12, para 52, ECJ C-2/07, *Abraham and Others*, EU:C:2008:133, para. 66.

[24] Ibid, para.s 63, 71, 90.

[25] Ibid, para. 72.

Decision-making and public participation

The EIA Directive 2011/92/EU grants participatory rights within EIA procedures to the public concerned, i.e. "the public affected or likely to be affected by, or having an interest in, the environmental decision-making procedures referred to in Article 2 (2)". **Non-governmental organisations** promoting environmental protection and meeting any requirements under national law are deemed to have an interest.

Article 6 (2) EIA Directive lists the relevant documents to be made available within a public participation procedure. The paragraph furthermore declares that the public must be informed "early in the environmental decision-making procedures […] and, at the latest, as soon as information can reasonably be provided". The EIA Directive refers the provisions of EU Directive 2003/4/EC on public access to environmental information. It provides that additional information relevant for an EIA decision which only becomes available after the time the public concerned was informed must also be made available.

Article 6 (4) EIA Directive, provides that public participation must take place at an early stage and the public concerned must 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. Procedures for public participation shall allow the public to **submit, in writing** or – as appropriate – at a **public hearing or inquiry** with the applicant, any comments, information, analyses or opinions that it considers relevant to the proposed activity (article 6 (5) EIA Directive).

According to the ECJ, the competent authority must **take effects on the environment into account at the earliest possible stage** in all the technical planning and decision-making processes. This makes it possible to prevent the creation of pollution or nuisances at source rather than counteracting their effects subsequently.[26] An EIA, according to the Directive, must therefore be carried out as soon as it is possible to identify and assess all potential effects of the project on the environment.

Article 8 EIA Directive provides that the results of consultations and the information gathered must be taken into consideration in the development consent procedure.

In some national legal frameworks, one stage is a **principal decision** and another an **implementing decision** which cannot extend beyond the parameters set by the principal decision. In this case, the possible environmental effects of the project must, according to the EIA Directive, be identified and assessed at the time of the procedure relating to the principal decision.[27]

Article 1 (4) EIA Directive provides that, under certain conditions, a project is to be excluded from the scope of the EIA Directive. This requires that the project must be adopted by a specific act of legislation that has the same characteristics as a development consent. In particular, the respective act must "grant the developer the right to proceed with the project"[28]. In addition, the project must

[26] Ibid, para 83 with additional reference.

[27] ECJ C-411/17, *Inter-Environnement Wallonie and Bond Beter Leefmilieu Vlaanderen*, ECLI:EU:C:2019:622, para. 86, ECJ-201/02, *Wells*, EU:C:2004:12, para 52, ECJ C-2/07, *Abraham and Others*, EU:C:2008:133, para 26.

[28] ECJ C-411/17, *Inter-Environnement Wallonie and Bond Beter Leefmilieu Vlaanderen*, ECLI:EU:C:2019:622, para. 105 with further references.

be adopted "in a sufficiently precise and definitive manner, so that the legislative act adopting the project must include, like a development consent, following their consideration by the legislature, all the elements of the project relevant to the environmental impact assessment".[29] The exception of Article 1 (4) EIA Directive, however, cannot be applied if the relevant act does not include the elements necessary to assess the environmental impact of the project or if the adoption of other measures is needed in order for the developer to be entitled to proceed with the project.[30]

EIA in case of lifetime extensions

Within a preliminary ruling regarding the lifetime extension of **NPP Doel**, the European Court of Justice (ECJ) for the first time had to deal with the question of the requirement to conduct an EIA for PLEX. According to the ECJ, the wording of Annex I (24) of the EIA Directive – which indicates that a change to or extension of projects subject to this annex requires an EIA (where such a change or extension in itself meets the thresholds, if any, set out in Annex I) – it applies to **any change or extension**, "which by virtue of, inter alia, its nature or scale, presents risks that are **similar, in terms of their effects on the environment, to those posed by the project itself**".[31]

Regarding the extent of the change to the activity of electricity production, the Court noted:

> "*The measures at issue in the main proceedings, which have the effect of **extending, by a significant period of 10 years**, the duration of consents to produce electricity for industrial purposes with respect to both power stations in question, which had up until then been limited to 40 years by the Law of 31 January 2003, **combined with major renovation works necessary due to the ageing of those power stations and the obligation to bring them into line with safety standards**, must be found to be of a scale that is **comparable**, in terms of the risk of environmental effects, **to that when those power stations were first put into service**.*"[32]

The renovation works addressed by the Court which were needed in order to extend the operational life of both power stations included replacement of facilities due to ageing and the upgrading of other facilities, along with changes to be introduced under a Periodical Safety Review and stress tests.[33] The relevant actions were described in an investment plan earmarking a EUR 700 million investment budget for the necessary works.[34]

The Court thus refers to the **extension of the operating period in conjunction with renovation works**, which might at first glance seem like a unique case. Practical examples as demonstrated in Section 1.1, however, show that major renovation works are by far not atypical in case of LTE/LTO.

[29] Ibid, para. 106.

[30] Ibid, para. 107.

[31] Ibid, para. 78.

[32] Ibid, para. 79.

[33] Ibid, para. 65.

[34] Ibid, para. 64.

Although they might be taken step by step and not necessarily as a major upgrade package before the final permit or decision to extend the lifetime is issued, works such as the renewal of the spent fuel pools, building a new pumping station and adaptation of the base to offer better protection to the power stations against flooding, as in the Doel case[35] are not at all exceptional.

The Court in the Doel case further noted that **extending the operation of an NPP** "by a significant period of 10 years" is, combined with the necessary upgrading works, **comparable to the original commissioning of a nuclear reactor**.[36]

Transboundary EIA

According to the ECJ, projects covered by Annex I EIA Directive, present an **inherent risk of significant effects on the environment** and therefore a (transboundary) EIA is indispensable in those cases.[37] Article 7 EIA Directive defines that a transboundary procedure is necessary where a Member State is aware that a project is likely to have significant effects on the environment in another Member State or where a Member State likely to be significantly affected requests it.

According to article 2 (4) EIA Directive, Member States may, in exceptional cases, exempt a specific project in whole or in part from the provisions laid down in this Directive. This exemption, however, may only be applied without prejudice to article 7 if a project is likely to have significant effects on the environment in another Member State.

2.2 Habitats Directive

Article 6 (3) of the Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (Habitats Directive) provides that plans or projects which are likely to have significant effects on an area protected under the Habitats Directive or Birds Directive[38] are subject to an impact assessment. The aim of this provision is to maintain or restore natural habitats and species of wild fauna and flora of a common interest at favourable conservation status.[39]

Terminology

The Habitats Directive itself does not include a definition of the term "project". Account must, therefore, be taken of the definition of the term "project" in Article 1 (2)(a) of the EIA Directive.[40]

[35] Ibid, ECLI:EU:C:2019:622, para 66.

[36] Ibid, para. 79.

[37] Ibid, para. 75.

[38] Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds, OJ L 2010/20, 7.

[39] See Article 2 (2) Habitats Directive.

[40] ECJ C-411/17, *Inter-Environnement Wallonie and Bond Beter Leefmilieu Vlaanderen*, ECLI:EU:C:2019:622, para. 122 with further references.

According to the ECJ, an activity must, a fortiori, be covered by the Habitats Directive if it is covered by the EIA Directive.[41] The term "project" according to the Habitats Directive is to be interpreted in a broader sense than defined in the EIA Directive.[42]

Decision-making and public participation

Other than according to the EIA Directive, the Habitats Directive does not contain the possibility for exemptions from the scope of applicability, if the national authority responsible to approve a project in question is the legislature.

As for the EIA Directive, if national law provides for a number of steps in the consent procedure, the assessment under article 6(3) of the Habitats Directive should be carried out as soon as the effects which the project in question is likely to have on a protected site are sufficiently identifiable.[43] As regards the work inextricably linked to the measures at issue in the main proceedings, if its nature and potential effects on the protected sites are sufficiently identifiable, an assessment must be conducted of that work at that stage of the consent procedure.[44]

Procedures according to article 6 (3) Habitats Directive are to be considered decisions on proposed activities according to article 6 (1)(b) Aarhus Convention "which may have a significant effect on the environment". [45,46]

Impact assessment in case of LTE

As an activity which falls under the definition of a "project" according to the EIA Directive must as well fall under the Habitats Directive, the conditions elaborated above in Section 2.1 are equally applicable: An assessment according to the Habitats Directive is required, if a project will not be carried out under operational conditions identical to those initially authorised, if only due to scientific developments and new safety standards, connected with major upgrading work.[47]

If a lifetime extension of an NPP is granted for a certain period of time, it is also likely to undermine the **conservation objectives for near-by protected sites** according to the EU Habitats Directive, especially in conjunction with the scale of the work involved.

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[41] Ibid, para. 123; ECJ C-293/17 and C-294/17, *Coöperatie Mobilisation for the Environment and Others*, EU:C:2018:882, para. 65.

[42] ECJ C-293/17 and C-294/17, *Coöperatie Mobilisation for the Environment and Others*, EU:C:2018:882, para. 66; recently Opinion of Advocate General Kokott C-254/19, *Friends of the Irish Environment Limited v An Bord Pleanála*, ECLI:EU:C:2020:320, para. 29.

[43] ECJ C-411/17, *Inter-Environnement Wallonie and Bond Beter Leefmilieu Vlaanderen*, ECLI:EU:C:2019:622, para. 143.

[44] Ibid., para. 144.

[45] ECJ C-243/15, *Lesoochranárske zoskupenie VLK*, ECLI:EU:C:2016:838, para.s 71, 72.

[46] For further information see below, Section 2.3.

[47] Ibid, para. 131.

In the Belgian case on the NPP Doel, the ECJ concluded, "given the scale of the work involved and the length of the extension granted for industrial production of electricity at the two power stations, that the project at issue in the main proceedings is likely to undermine the conservation objectives for nearby protected sites, if only because of how those power stations operate, in particular, by collecting large volumes of water from the nearby river for use in the cooling system, which are then discharged into that river, but also the risk of a serious accident."[48]

Even if the original project was already subject to an impact assessment according to the Habitats Directive, a new assessment might be necessary for the timely extension of a project. As Advocate General Kokott recently noted in an Irish case, an "earlier assessment of the same plan or project can rule out that risk only in so far as it contains complete, precise and definitive findings capable of removing all reasonable scientific doubt as to the effects of the works. Therefore, the screening test must also close any gaps in that earlier assessment and take account of whether the project has been changed in the meantime and whether other plans and projects have been added which, together with the plan or project under assessment, could have a significant effect on the site, and, moreover, whether there have been any changes in the protected habitats and species concerned and whether any new scientific knowledge is available."[49]

2.3 Aarhus Convention

The Aarhus Convention is the legal framework to regulate access to information, public participation in decision-making and access to justice in environmental matters within the UNECE.

Terminology and scope of applicability

According to article 6 1(a) Aarhus Convention, provisions on public participation must be applied to decisions on whether to permit "proposed activities" listed in Annex I. Annex I to the Convention lists, inter alia, the following activities:

> "*Nuclear power stations and other nuclear reactors including the dismantling or decommissioning of such power stations or reactors 1/ (except research installations for the production and conversion of fissionable and fertile materials whose maximum power does not exceed 1 kW continuous thermal load)*"

The public participation provisions in article 6 of the Aarhus Convention mostly refer to the "public concerned", i.e., a subset of the public at large. The members of the public concerned are defined in article 2 (5) of the Aarhus Convention on the basis of the criteria "**affected or likely to be affected** by" or "**having an interest in**" the environmental decision-making.

In a Czech case, the Aarhus Convention Compliance Committee (ACCC) noted that, although it is narrower than the definition of "the public", the definition of "the public concerned" under the

[48] Ibid, para. 127.

[49] C-254/19, *Friends of the Irish Environment Limited v An Bord Pleanála*, ECLI:EU:C:2020:320, para. 57.

Convention is still very broad.[50] Members of the public have an interest in the decision-making if their property and other related rights or interests relating to the environment may be impaired by the proposed activity. **Environmental NGOs** are not required to prove that they have a legal interest in order to be considered as a member of the public concerned.

The ACCC found that a legal system fails to provide for effective public participation during the whole decision-making process if a **restrictive interpretation of "the public concerned**" is applied during the phases of the decision-making to permit activities subject to article 6 that come after the EIA procedure. This, inter alia, leads to **non-compliance with article 6 (3) of the Aarhus Convention**. Members of the public concerned, including NGOs, must therefore be allowed to effectively participate and submit comments throughout the decision-making procedure subject to article 6.[51]

Decision-making and public participation

According to the Maastricht Recommendations[52], if a particular tier of the decision-making process has no public participation, then the next stage that does have public participation should provide the opportunity for the public to also participate regarding the options decided at that earlier tier.[53] Similarly, a **multi-stage decision-making procedure** that provides for public participation on certain options at an early stage, but leaves other options to be considered at a later stage without public participation, would not be compatible with the Convention. Thus, according to the ACCC, if the permitting procedure were to continue and the public concerned was not provided with the opportunity to participate effectively in that stage, the Party concerned would be in non-compliance with article 6 (4). Likewise, if the public authorities were provided with any further information relevant to the decision-making than that made available to the public concerned, this would amount to non-compliance with article 6 (6) Aarhus Convention.[54]

Procedures for public participation shall allow the public to **submit, in writing** or – as appropriate – at a **public hearing or inquiry** with the applicant, any comments, information, analyses or opinions that it considers relevant to the proposed activity (see article 6 (7) Aarhus Convention).

Public participation must take place at an early stage, **when all options are open**, and participation can still be effective. At the time when public participation is provided for, the authority must be neither formally nor informally prevented from fully turning down an application on substantive or procedural grounds.[55]

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[50] ACCC/C/2010/50 (*Czech Republic*), 2 October 2012, ECE/MP.PP/C.1/2012/11, para. 66.

[51] Ibid, para. 70.

[52] Maastricht Recommendations on Promoting Effective Public Participation in Decision-making in Environmental Matters prepared under the Aarhus Convention, November 2015, ECE/MP.PP/10, ECE/MP.EIA/SEA/5.

[53] Ibid, para. 18.

[54] ACCC/C/2012/71 (*Czech Republic*), ECE/MP.PP/C.1/2017/3, 26 December 2020, para.s 98, 93, 115, 116.

[55] ACCC/C/2014/104 (*Netherlands*), 21 January 2018, ECE/MP.PP/C.1/2019/3, para 76; ACCC/C/2007/22 (*France*), ECE/MP.PP/2009/4/Add.1, para. 38.

According to article 6 (8) Aarhus Convention, each Party shall ensure that in the **decision, due account is taken of the outcome of the public participation**. According to the ACCC, a format which summarizes groups and responds to the comments received from the public and is useful example of how to deal with comments received from the public.[56]

Assessment procedures in case of lifetime extensions

If the operating time according to an NPP license has expired and a new permit must be issued, it can be assumed that the separate new license is to be considered another activity to be subject to public participation according to Article 6 (1)(a) of the Aarhus Convention.

Paragraph 22 of Annex I to the Convention provides that,

> "*Any change to or extension of activities, where such a change or extension in itself meets the criteria/thresholds set out in this annex, shall be subject to article 6, paragraph 1 (a) of this Convention. Any other change or extension of activities shall be subject to article 6, paragraph 1 (b) of this Convention.*"

As Annex I does not set out any thresholds for nuclear reactors, one could conclude that any change or extension to such an activity meets the requirements of paragraph 22 and must be subject to public participation according to article 6 (1)(a) of the Convention.

It, however, needs to be mentioned that there is another provision which might be applicable in case of lifetime extensions, e.g. for cases in which the current license or permit is still valid, the lifetime extension of an NPP could require public participation: According to Article 6 (10) Aarhus Convention, the provisions regarding public participation must be applied *mutatis mutandis* and where appropriate if operating conditions of nuclear power plants are changed or updated.

In the opinion of the Aarhus Convention Compliance Committee, the **permitted duration of an NPP is clearly an operating condition**,[57] and therefore it falls under article 6 (10) of the Aarhus Convention if the operating period is not only extended for a minimal period of time. According to the ACCC, the application of article 6 is even more appropriate if the update in the operating conditions itself might have a significant effect on the environment. In a Dutch case concerning the NPP Borssele the ACCC thus considered that it is appropriate for extensions of duration to be subject to public participation according to article 6 Aarhus Convention, except for cases in which a change to the permitted duration concerns a minimal amount of time and would obviously have insignificant or no effects on the environment.[58]

But does this lead to the conclusion that the lifetime extension of the permitting period to a nuclear power plant is to be considered a change to an operating condition according to article 6 (10) rather than to the activity itself as set out in Annex I (22)?

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[56] ACCC/C/2014/104 (*Netherlands*), 21 January 2018, ECE/MP.PP/C.1/2019/3, para 68; ACCC/C/2013/107 (*Ireland*), 26 August 2019, ECE/MP.PP/C.1/2019/9, para 79.

[57] Ibid, para. 65.

[58] Ibid, para. 71.

In a Slovakian case on the extension of the operating period of NPP Mochovce, the ACCC considered the following:

> "*The Committee also considers that if the Mochovce NPP had been in operation since 1986 under the conditions set at the time, the changes of the activity required by the 2008 decisions would have met the criteria set out in annex I, paragraphs 1 and 22, of the Convention. In this context, the Committee wishes to stress that, while for many activities listed in annex 1 to the Convention there are certain criteria or thresholds envisaged below which the requirements of article 6 paragraph 1 (a) would not apply,* ***for some of the activities listed (including nuclear power stations) the Convention does not establish any criteria or thresholds****. This means that these activities, regardless of their size, are subject to article 6, paragraph 1 (a), and thus* ***provisions of article 6 must be applied*** *with respect to decisions of whether to permit such activities.* ***By virtue of the first sentence of paragraph 22 of annex 1 the same applies to a change or extension of such activities.*** *Thus, in principle, all changes or extensions to such activities are subject to article 6. However, bearing in mind that a* ***change or extension to already permitted activities requires reconsideration or updating of the existing permit****, the provisions of article 6 would apply "mutatis mutandis, and where appropriate", as stipulated in article 6, paragraph 10.*" (emphasis added by authors)

The applicability of article 6 (10) hence does not exclude the applicability of article 6 (1)(a) of the Convention in conjunction with annex I.[59] Whereas it is clear that the lifetime extension of an NPP requires to apply the provisions on public participation *mutatis mutandis* and "were appropriate" according to article 6 (10), if an already existing permit is extended, it might well also mean the extension to the activity itself requiring public participation as such according to article 6 (1)(a). On the other hand, if a different form of long-term operation appears, e.g. because of an assumed time-limit, and/or a new permit must be issued, it could rather be a question of a changed or extended activity than an update to the operating conditions. In this respect it should be considered that the extension to the operating period itself, as noted above in Section 1.1, usually comes with a lot of other – multiple minor or larger – operational or physical changes such as upgrading work.

The requirement of providing for public participation **early in the procedure** applies to decision-making processes according to article 6 (1)(a) as well as to procedures to reconsider or update old permits or to change or extend activities according to article 6 (10) Aarhus Convention. Although within the Aarhus framework, states have certain discretion to design the decision-making procedures covered by article 6 (10) Aarhus Convention, they are not entitled to entirely exclude public participation.[60]

The question of whether a member of the public is affected by a project depends on the **nature and size of the activity**, which especially concerns nuclear power plants. According to the ACCC, particular attention must be paid at the stage of identifying the public concerned in the case of

[59] See also the argumentation of the ACCC in ACCC/C/2014/104 (*Netherlands*), 21 January 2018, ECE/MP.PP/C.1/2019/3, para. 67.

[60] Ibid.

decision-making on **ultra-hazardous activities** like an NPP, given the fact that they are activities of wide public concern.[61]

Transboundary impact

According to the ACCC, states must ensure that when selecting means of notifying the public under article 6 (2), public authorities are required to select such means and to ensure effective notification of the public concerned, bearing in mind the nature of the proposed activity, and including, in the case of proposed activities with potential transboundary impacts, the **public concerned outside the territory of the Party** concerned.[62] Furthermore, when conducting transboundary procedures in cooperation with the authorities of affected countries, the competent public authorities must make the necessary efforts to notify the affected public in an effective manner.[63]

The obligation to ensure that the **requirements of article 6 Aarhus Convention** are met – whether in a domestic or a transboundary context – always rests with the **Party of origin**, i.e. the state where the project or activity is to be carried out.[64] In a case regarding the British NPP Hinkley, the ACCC thus found that Germany did not fail to comply with article 6 Aarhus Convention as there was no transboundary procedure under the Espoo Convention or EIA Directive within which the German authorities were required to carry out tasks under a joint responsibility.[65]

Parties to the Aarhus Convention are not necessarily required to always use all of the rights and competences that they have under international or national law with respect to a decision-making procedure in another country. However, the Aarhus Convention requires a level of effort appropriate to the actions open to it in the particular context. In the case of a formal notification from another country, when deciding whether to enter into a transboundary procedure under applicable international or EU regimes, a Party to the Aarhus Convention must take into account a **strong interest of its own public** in the outcome of the decision-making subject to the EIA procedure – even without a clear request from its public, when deciding whether to enter into the transboundary procedure.[66]

2.4 Espoo Convention

The term

Within the Espoo Convention community the generic term used is “lifetime extension of an NPP” (LTE). There is, however, no clear definition of LTE under current Espoo case law or working

[61] ACCC/C/2012/71 (*Czech Republic*), ECE/MP.PP/C.1/2017/3, 26 December 2020, para 74.

[62] Ibid, para. 113.

[63] Ibid, para. 72.

[64] Ibid, para. 67.

[65] ACCC/C/2013/91 (*United Kingdom*), 24 July 2017, ECE/MP.PP/C.1/2017/14, para. 71.

[66] ACCC/C/2013/92 (*Germany*), 8 September 2017, ECE/MP.PP/C.1/2017/15, para.s 91, 92.

documents. Even the mandate of the Ad Hoc group on LTE, as approved by WGP, acknowledges lack of technical definition of LTE:

> *According to the European Commission's Joint Research Centre in its presentation at the first meeting of the ad hoc working group, no specific definition for "lifetime extension" could be found.*[67]

It should also be noted, that the MOP VII report[68] refers to LTE *and* LTO when discussing the need to establish an ad hoc group:

> *"The Implementation Committee Chair explained that the Committee's proposal to develop guidance or criteria on the application of the Convention t**o the extension of the lifetime and the long-term operation of** nuclear power plants were needed to facilitate its consideration of a growing number of information-gathering cases on that topic being brought before it. After deliberations, the Meetings of the Parties decided on the preparation of draft terms of reference for such possible guidance by an ad hoc working group.." (para.12)*

The only available wording describing LTE itself can be found in the IC final findings in the Rivne case:

> "***the Committee agreed that the extension of the lifetime of an NPP originally designed to operate for 30 years for a further 20 years represented an activity that would require a comprehensive EIA of its effects according to the Convention, regardless of whether it was treated as a major change to an existing activity or a new activity, and regardless of whether originally it had been subject to such an EIA or not.***"[69][70]

One of the core legal issues relevant for this analysis is the definition of "**proposed activity**" under the Espoo Convention in Article 1(v):

> *"Proposed activity" means any activity or any major change to an activity subject to a decision of a competent authority in accordance with an applicable national procedure.*

Three corresponding questions under the Espoo Convention, as far as LTE is concerned, therefore are:

- Is LTE an "activity" or a "major change" under the Espoo Convention?
- If LTE is an "activity/major change", does it become a "proposed activity" regardless of whether LTE involves an authorization process, or not?

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[67] LTE group mandate http://www.unece.org/fileadmin/DAM/env/eia/documents/WG2.7_May2018/Report/1813047E.pdf, p. 43.

[68] http://www.unece.org/fileadmin/DAM/env/documents/2017/EIA/MOP7/22_12_ece_mp_eia_23_ece_mp_eia_sea_7_eng_pdf.pdf.

[69] ECE/MP.EIA/IC/2014/2, para. 24.

[70] Note, that the wording used in the MOP decision and committee's summary findings relates to LTE being a *proposed activity*, not to the concept of LTE itself:

> *"[..]the extension of the lifetime of reactors 1 and 2 of the Rivne NPP after the initial licence has expired, even in absence of any works, is to be considered as a proposed activity under article 1, paragraph (v), and is consequently subject to the provisions of the Convention."*

- If LTE is a "proposed activity" under the Espoo Convention, under which conditions it may trigger obligations under the Convention, in particular Articles 2(2), 2(3) and 3(1)?

From the outset two major elements of this definition can be distinguished: "any activity or any major change to an activity" and "subject to a decision of a competent authority in accordance with an applicable national procedure".

"Activity or any major change to an activity"

The first element involves two terms: "activity" and "major change". One of the key approaches in understanding the difference between "activity" and "major change to an activity" is to interpret "activity" as a "new activity": This was supported in the case-law of the Espoo Convention Implementation Committee.[71] "Activity" itself should be understood broadly by taking into account wording used in the Appendix I, i.e. construction, extraction, etc. The Implementation Committee also held that "for the purpose of the procedures under the Convention, in particular Article 2, paragraph 3, such an [proposed] activity includes not only construction but also operation and maintenance works"[72].

Definitions of "major change" have been subject to various interpretations by the Espoo Convention Implementation Committee, including: "resuming construction works after an extended time interruption in construction might be considered a major change"[73], "extension of the lifetime of a nuclear power plant, even in absence of any works, [is] to be considered as a major change to an activity"[74], "the modernization of motorways and express roads"[75]. Specifically related to Ukrainian LTE case, the original findings of the IC stated that "the Committee agreed that the extension of the lifetime of an NPP originally designed to operate for 30 years for a further 20 years represented an activity that would require a comprehensive EIA of its effects according to the Convention, regardless of whether it was treated as a major change to an existing activity or a new activity, and regardless of whether originally it had been subject to such an EIA or not"[76].

Based on current case-law of the Implementation Committee the answer to the first question seems rather clear: LTE should be considered as a major change to an activity in the meaning of the Espoo Convention – *if there is an LTE*.

One may find some inconsistency in the Committee's interpretation of LTE, and therefore disagree with the above answer, by referring to a later opinion of the committee in the same case, "[t]he extension of the lifetime of reactors 1 and 2 of the Rivne NPP after the initial licence has expired, even in absence of any works, is to be considered as a proposed activity under article 1, paragraph

[71] See para. 41 of the Decision IV/2, Annex I.

[72] Ibid.

[73] ECE/MP.EIA/IC/2011/2, para. 26 (a).

[74] ECE/MP.EIA/IC/2013/2, para. 21.

[75] ECE/MP.EIA/IC/2009/2, para. 30.

[76] ECE/MP.EIA/IC/2014/2, para. 24.

(v)" as supported by the Meeting of the Parties (MOP).[77] However, the real difference is that the Committee's earlier opinion in the case referred to "activity" (major change) element only, while the final opinion as supported by the MOP refers to the "proposed activity". Therefore, this brings us to the second element of the "proposed activity" definition.

"Subject to a decision of a competent authority"

The second element of the "proposed activity" definition is more ambiguous: "subject to a decision of a competent authority in accordance with an applicable national procedure". This can be understood in two major ways: an activity is "proposed" *if* it is subject to a decision of a competent authority or, alternatively, a "proposed activity" *must* be subject to a decision of a competent authority.

The "if" approach, while seems in line with the definition drafting logic, would be against the very goals of and basic obligations under of the Convention, as stipulated in the preamble and article 2 (1): this approach implies a party could exempt any activity listed in Appendix I from the application of the Convention by just not requiring any permit to commence such an activity. While the second, "must", approach to understanding is against the very logic of the definition itself, it is well in line with the Convention's principles and drafting logic: parties must ensure that an activity listed in Appendix I cannot start without a prior permit.

The final interpretation of LTE by the Implementation Committee (as supported by MOP) seems to rely on the second approach: it clearly refers to expiration of the license (permit) and it is the only element different from earlier interpretation. Yet, given the legal controversy of such approach described above, it is hard to argue that the Committee indeed relied on it. The other way to understand introduction of the new element ("after the initial licence has expired") into the wording of that opinion is to tie it to the understanding (definition) of the LTE itself: LTE is an LTE *after* expired license and constitutes a major change regardless of future permitting procedures applied. Such understanding creates a tricky loop since expiration of a license assumes a new licensing (permitting) process for an activity to continue (and therefore, the second element of the "proposed activity" is automatically covered) and, this again brings us to the beginning of this paragraph's discussion. Lastly, binding the words "after the initial licence has expired" to the LTE definition re-opens our answer to the first question. Therefore, the answer to the second question could be given together with answering the first question.

To summarize, current case law of the Espoo IC gives at least two possible alternative combined answers to the first two key questions ("Is LTE an "activity" or a "major change" under the Espoo Convention?" and "If LTE is an "activity/major change", does it become a "proposed activity" regardless of whether LTE involves an authorization process, or not"):

- (a) LTE should be considered a "proposed activity" by amounting to a "major change" due to and when LTE involves expiration of a license regardless whether in the future a permitting process is applied;

[77] ECE/MP.EIA/IC/2014/2, annex, para. 59.

- (b) LTE should be considered a "major change", but considering it a "proposed activity" requires prior expiration of a license and, therefore, depends whether it is subject to a permitting decision in the future.

Both options have weaknesses, as described above. Option (a) ties definition of a physical activity to existence of an administrative permitting procedure. Option (b) relies on an argument that an activity needs to be subject to a permitting procedure to be considered a "proposed activity". Both options allow for any activity to be exempted from the Convention's scope by simply exempting it from national permitting procedures – something clearly against the Convention's principles and spirit.

In conclusion, the answers to the first and second questions largely depend on understanding the LTE itself. The Espoo Convention lacks its own definition of LTE, and relying on nuclear legal framework brings huge uncertainty as to what sort of activities should be subject to the Espoo Convention requirements. Lack of predictability is unacceptable, therefore future LTE guidance would benefit from relying on specific LTE definition for Espoo purposes.

Likelihood to cause significant adverse transboundary impact

The **third** question requires analysis of the criteria applied in Articles 2(2), 2(3) and 3(1): the Convention's mechanism is triggered if a proposed activity is likely to cause significant adverse transboundary impact.

These criteria have been widely interpreted by the Espoo Convention bodies in the past, including in relation to nuclear activities:

> "*even a low likelihood of such an impact should trigger the obligation to notify affected Parties in accordance with article 3 […] This means that notification is necessary unless a significant adverse transboundary impact can be excluded*"[78];
>
> "*for certain activities, in particular for nuclear power plants where the magnitude of a significant adverse transboundary impact could be very high in case of a severe accident, integrating sufficient information in the environmental impact assessment documentation on the selection of alternatives and the likely impacts is of extreme importance, in keeping with the precautionary principle enshrined in the Convention and the Convention's objective of enhancing international cooperation in assessing environmental impact, in particular in a transboundary context*"[79];
>
> "*Moreover, in forming its view, the Committee evaluates both the impact caused by the activity during its usual operation as well as the impact caused by an accident. The Committee notes that for certain activities, in particular nuclear energy-related activities, while the probability of a major accident, accident beyond design basis or disaster occurring is very low, the likelihood of a significant adverse transboundary impact of such an accident can*

[78] MOP decision IV/2, annex I, para. 54.

[79] ECE/MP.EIA/IC/2018/4, para. 26.

be very high and the consequences severe. Therefore, the Committee believes that, on the basis of the principle of prevention, when considering the affected Parties for the purpose of notification, the Party of origin should be exceptionally prospective and inclusive, in order to ensure that all Parties potentially affected by an accident, however uncertain, are notified. The Party of origin should make such consideration using the most careful approach on the basis of available scientific evidence, which indicates the maximum extent of a significant adverse transboundary impact from a nuclear energy-related activity, taking into account the worst-case scenario"[80].

"*The Committee […] emphasizes that, in the absence of notification, particularly with regard to nuclear power plants, where a potentially affected Party considers that a significant adverse transboundary impact of a proposed activity cannot be excluded and expresses the wish to be notified, the Party of origin should apply the Convention. In such situations, failure to notify would infringe on the right of potentially affected Parties and their public to be informed and to participate in a timely manner in the environmental impact assessment procedure*"[81].

In the Ukrainian LTE case on the NPP Rivne, the Espoo IC clearly applied the approach "notification is necessary unless a significant transboundary impact can be excluded"[82]. However, as the Committee noted, the listed activity under item 2 of the Appendix did not specifically refer to the construction or the extension of lifetime or update of a nuclear reactor, but, rather, identified a nuclear reactor as such as an activity, among other activities in the list that, if it was likely to cause significant adverse transboundary impact would then require the application of the Convention. Thus, all relevant approaches cited above regarding construction of nuclear reactors should equally be applicable to LTE cases in the future when determining the existence of the three criteria.

Therefore, based on the Espoo Convention practice and bearing in mind the need for consistent approach, the answer to the third question is that as a "nuclear reactor" activity LTE meets impact related triggering criteria (a) unless significant transboundary impact can be excluded, and (b) when a wish for notification is expressed by a party.

[80] ECE/MP.EIA/IC/2016/2, para. 60, ECE/MP.EIA/2019/14, para. 94.

[81] ECE/MP.EIA/2019/14, para. 103.

[82] ECE/MP.EIA/IC/2014/2, para. 47.

3. Applicable nuclear legal and regulatory frameworks

3.1 EURATOM Directives

The Treaty establishing the European Atomic Energy Community (EURATOM) provides, inter alia for the establishment of uniform safety standards to protect the health of workers and of the general public. The relevant implementation provisions can be found in the Nuclear Safety Directive 2009/71/Euratom and Directive 2013/59/Euratom laying down basic safety standards for protection against the dangers arising from exposure to ionising radiation.

Directive 2013/59/Euratom contains rules from a perspective of the affected persons and environment, such as on a system of radiation protection, requirements for radiation protection education, training and information, regulations on occupational or medical exposures etc. The Nuclear Safety Directive, however, focuses on nuclear installations and shall thus be discussed a bit further.

Decision-making

The Nuclear Safety Directive 2009/71/Euratom is applicable to civilian nuclear installation subject to a licence. It requires Member States to "establish and maintain a national legislative, regulatory and organisational framework ('national framework') for the nuclear safety of nuclear installations". Article 4 further lists the following particular requirements:

> "*(a) the allocation of responsibilities and coordination between relevant state bodies;*
>
> *(b) national nuclear safety requirements,* ***covering all stages of the lifecycle of nuclear installations****;*
>
> *(c) a system of licensing and prohibition of operation of nuclear installations without a licence;*
>
> *(d) a* ***system of regulatory control*** *of nuclear safety performed by the competent regulatory authority;*
>
> *(e) effective and proportionate enforcement actions, including, where appropriate,* ***corrective action or suspension of operation and modification*** *or* ***revocation of a licence****.*" (emphasis added by authors)

According to article 5 (1), Member States are obliged to establish and maintain a "competent regulatory authority" in the field of nuclear safety of nuclear installations.

Article 8a of the Directive requires that Member States ensure within their national framework that "nuclear installations are designed, sited, constructed, commissioned, operated and decommissioned with the objective of preventing accidents". While this provision directly applies only to nuclear installations for which a construction licence is granted for the first time after 14 August 2014, it must also be used as a reference for the timely implementation of safety improvements to existing nuclear installations.

Article 8c Nuclear Safety Directive requires Member States to ensure that,

> "*(a) any grant of a licence to construct a nuclear installation or operate a nuclear installation, is based upon an appropriate* ***site and installation-specific assessment****, comprising a nuclear safety demonstration [...];*
>
> *(b) the licence holder under the regulatory control of the competent regulatory authority,* ***re-assesses systematically and regularly, at least every 10 years****, the safety of the nuclear installation as laid down in Article 6(c). That safety reassessment aims at ensuring compliance with the current design basis and identifies further safety improvements by taking into account ageing issues, operational experience, most recent research results and developments in international standards [...]*" (emphasis added by authors)

EIA and LTO

Article 8 of the Nuclear Safety Directive contains provisions on transparency. Its paragraph 4 provides that Member States must

> "*ensure that the general public is given the appropriate opportunities to participate effectively in the decision-making process relating to the licensing of nuclear installations, in accordance with relevant legislation and international instruments*".

This provision includes the objective to ensure consistency with international Conventions such as the Espoo or Aarhus Convention.

There is no reference to environmental assessments in the Nuclear Safety Directive, but article 8e requires Member States to conduct self-assessments at least every 10 years and invite an international peer review. According to its paragraph 2, they must furthermore ensure that

> "*(a) a national assessment is performed, based on a specific topic related to nuclear safety of the relevant nuclear installations on their territory;*
>
> *(b) all other Member States, and the Commission as observer, are invited to peer review the national assessment referred to in point (a);*
>
> *(c) appropriate follow-up measures are taken of relevant findings resulting from the peer review process;*
>
> *(d) relevant reports are published on the above mentioned process and its main outcome when results are available.*"

This system of peer review and periodic safety review shows that the approach differs from the concept of environmental assessments due to a new or changed activity or project as it has to be performed in any case to keep an installation operating. Although, as mentioned above in Section 1.2, the Espoo working group has already noted that safety reviews and transboundary EIA are complementary processes, it is thus important to understand both concepts – environmental as well as nuclear installations.

3.2 International Nuclear Conventions

When it comes to nuclear activities, there are two international Conventions of particular interest: The **Convention on Nuclear Safety (CNS)** and the **Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management** ("Joint Convention").

The objectives of these Conventions are to achieve and maintain within the regulated activities a high level of safety worldwide, to establish and maintain effective defences against potential hazards in order to **protect individuals, society and the environment from harmful effects of ionizing radiation** from nuclear installations and management activities, and to prevent accidents with radiological consequences and to mitigate such consequences should they occur.[83]

Parties to the Conventions must prepare on a regular basis National Reports on the measures they have taken to implement the obligations under the Convention to be discussed in the review meetings.[84]

In its Preamble the CNS recognizes that it

> "*entails a commitment to the application of fundamental safety principles for nuclear installations rather than of detailed safety standards and that* ***there are internationally formulated safety guidelines*** *which are updated from time to time and so can provide guidance on contemporary means of achieving a high level of safety*"

As a general safety requirement, the Joint Convention provides in its article 4, that

> "*Each Contracting Party shall take the appropriate steps to ensure that at all stages of spent fuel management,* ***individuals, society and the environment are adequately protected*** *against radiological hazards.*"

The same provision applies to radioactive waste management (article 11).

Terminology

The Conventions do not use the terminology of "activities" or "projects". Instead, the CNS focuses on the term "Nuclear installation", i.e.

> "*any land-based civil nuclear power plant under its jurisdiction including such storage, handling and treatment facilities for radioactive materials as are on the same site and are directly related to the operation of the nuclear power plant*".[85]

[83] See articles 1 of both Conventions.

[84] Articles 5, 20 CNS, and 30, 32 Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management; For further information see CNS Brochure "Introduction to the CNS and Its Associated Rules of Procedure and Guidelines", online available at https://www.iaea.org/sites/default/files/19/09/19-00679e_web_cns.pdf (13 May 2020), pp. 10 et sq. as well as rules and guideline to the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management, available online via https://www.iaea.org/topics/nuclear-safety-conventions/joint-convention-safety-spent-fuel-management-and-safety-radioactive-waste (13 May 2020).

[85] Article 2 (i) CNS.

The Joint Convention on the Safety of Spent Fuel Management on the other hand, is applicable to spent fuel arising from the operation of civilian nuclear reactors, radioactive waste arising from civilian applications, Uranium mining and milling wastes, discharges from regulated activities, and specific provisions on disused sealed sources.[86] It includes two other important legal definitions:

> "*(f) 'nuclear facility' means a civilian facility and its associated land, buildings and equipment in which radioactive materials are produced, processed, used, handled, stored or disposed of on such a scale that consideration of safety is required;*
>
> *(g) 'operating lifetime' means the* ***period during which*** *a spent fuel or a radioactive waste management* ***facility is used for its intended purpose****. In the case of a disposal facility, the period begins when spent fuel or radioactive waste is first emplaced in the facility and ends upon closure of the facility;*"

Both Conventions contain a definition of the term license:

> "'*licence' means any authorization granted by the regulatory body to the applicant to have the responsibility for the siting, design, construction, commissioning, operation or decommissioning of a nuclear installation.*"

While the Conventions contain a reference to the continuous operation, including necessary upgrade/improvement of nuclear power plant and facilities for spent fuel and radioactive waste management already existing at the date of their entry into force,[87] there is no regulation on future lifetime extension or LTO.

Decision-making

According to Article 7 (2) CNS, each party to the Convention must provide for:

> "*i) the establishment of applicable national safety requirements and regulations;*
>
> *ii) a* ***system of licensing*** *with regard to nuclear installations and the prohibition of the operation of a nuclear installation without a licence;*
>
> *iii) a* ***system of regulatory inspection and assessment*** *of nuclear installations to ascertain compliance with applicable regulations and the terms of licences;*
>
> *iv) the* ***enforcement*** *of applicable regulations and of the terms of* ***licences, including suspension, modification or revocation****.*" (emphasis added by authors)

Similarly, states with management facilities for spent fuel or radioactive waste must provide for:

> "*(i) the establishment of applicable national safety requirements and regulations for radiation safety;*

[86] Article 3; see also IAEA Brochure "The Joint Convention on Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management - AN overview", online available at https://www.iaea.org/sites/default/files/18/12/jc-brochure-2017.pdf (14 May 2020).

[87] Article 6 CNS, article 5 Joint Convention on Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management.

> *(ii) a **system of licensing** of spent fuel and radioactive waste management activities;*
>
> *(iii) a system of prohibition of the operation of a spent fuel or radioactive waste management facility without a licence;*
>
> *(iv) a system of appropriate institutional control, **regulatory inspection and documentation and reporting**;*
>
> *(v) the enforcement of applicable regulations and of the terms of the licences;*
>
> *(vi) a clear allocation of responsibilities of the bodies involved in the different steps of spent fuel and of radioactive waste management."*[88]

Other than the approach on which the environmental assessment and related decision-making procedures according to the regulatory frameworks elaborated in Section 3., there are three crucial implications:

1. Nuclear installations must be subject to a licensing system,
2. Inspection and assessment must take place on a regular basis, and
3. In case of nuclear installations, the licensing system must be open to suspension, modification, and revocation.

The Conventions also require that a "separate"[89] or "independent"[90] regulatory body is in charge of the abovementioned framework.

The Conventions furthermore require the establishment and implementation of quality assurance programmes (to provide, according to article 13 CNS, "confidence that specified requirements for all activities important to nuclear safety are satisfied throughout the life of a nuclear installation").

Other than setting clear rules regarding the decision-making process and licensing it becomes clear that the focus is set on a continuous monitoring and evaluation of installations and facilities through the regulatory body.

EIA and LTO

Article 17 of the Convention of Nuclear Safety provides for the **siting process** that,

> "*Each Contracting Party shall take the appropriate steps to ensure that appropriate procedures are established and implemented:*
>
> *i) for evaluating all relevant site-related factors likely to affect the safety of a nuclear installation for its projected lifetime;*
>
> *ii) for evaluating the **likely safety impact** of a proposed nuclear installation **on individuals, society and the environment**;*

[88] Article 19 (2) Joint Convention.

[89] Article 8 CNS.

[90] Article 20 (2) Joint Convention.

iii) for re-evaluating as necessary all relevant factors referred to in sub-paragraphs (i) and (ii) so as to ensure the continued safety acceptability of the nuclear installation;

iv) for ***consulting Contracting Parties in the vicinity*** *of a proposed nuclear installation,* ***insofar as they are likely to be affected*** *by that installation and, upon request providing the necessary information to such Contracting Parties, in order to enable them to evaluate and make their own assessment of the likely safety impact on their own territory of the nuclear installation.*" (emphasis added by authors)

Articles 6 and 13 of the Joint Convention contain similar provisions on the siting of proposed fuel management and radioactive waste management facilities.

Article 14 CNS further includes provisions on safety assessments:

"*Each Contracting Party shall take the appropriate steps to ensure that:*

i) ***comprehensive and systematic safety assessments*** *are carried out* ***before the construction and commissioning*** *of a nuclear installation and throughout its life. Such assessments shall be well documented, subsequently updated in the light of operating experience and significant new safety information, and reviewed under the authority of the regulatory body;*

ii) verification by analysis, surveillance, testing and inspection is carried out to ***ensure that the physical state and the operation*** *of a nuclear installation* ***continue to be in accordance with its design, applicable national safety requirements, and operational limits and conditions****.*" (emphasis added by authors)

Article 19 CNS further provides that parties to the Convention ensure that the "initial authorization of a nuclear installation is based upon an appropriate safety analysis and a commissioning programme demonstrating that the installation, as constructed, is consistent with design and safety requirements". States must further define "operational limits and conditions derived from the safety analysis, tests and operational experience" and revise them as necessary.

According to articles 8 and 15 of the Joint Convention, "a **systematic safety assessment and an environmental assessment** appropriate to the hazard presented by the facility and covering its operating lifetime" must be conducted before a facility's construction. Another updated detailed assessment is required before its actual operation.

The assessment of environmental aspects is therefore covered by the Nuclear Conventions. Yet, the regulated procedures concern but the siting and construction phase. There is neither a requirement for time-limited licenses nor a clear statement that a re-evaluation must occur at some point. This give reason to assume that with a focus set on **safety aspects regular inspections/evaluations** are supposed to **ensure the conformity of continuous operation**.

3.3 The IAEA technical standards

The term

Relevant IAEA standards and guidance uses the term "***long term operation***" of NPPs. In particular, the safety standards "Safety of Nuclear Power Plants: Commissioning and Operation. Specific Safety Requirements" (so called "SSR-2/2, 2011"[91]) include the following requirement:

> "*Requirement 16: Programme for **long term operation.***
> *Where applicable, the operating organization shall establish and implement a comprehensive programme for ensuring the **long term safe operation** of the plant beyond a time-frame established in the licence conditions, design limits, safety standards and/or regulations.*
> *4.53. The justification for **long term operation** shall be prepared on the basis of the results of a safety assessment, with due consideration of the ageing of structures, systems and components. The justification for long term operation shall utilize the results of periodic safety review and shall be submitted to the regulatory body, as required, for approval on the basis of an analysis of the ageing management programme, to ensure the safety of the plant throughout its extended operating lifetime*". (emphasis added by authors)

Specific Safety Guide No. SSG-48 "Ageing Management and Development of a Programme for Long Term Operation of Nuclear Power Plants"[92], SRS No.57 "Safe Long Term Operation of Nuclear Power Plants", SSG-25 "Periodic Safety Review for Nuclear Power Plants" and General Safety Requirements "Governmental, Legal and Regulatory Framework for Safety"[93] also use the term "long term operation" (LTO).[94]

The widely used definition of the LTO under IAEA framework is:

> "*Long term operation of a nuclear power plant is operation beyond an established time frame defined by the licence term, the original plant design, relevant standards or national regulations. Long term operation should be justified by safety assessment and, depending on the State, this justification may take place within a broader regulatory process, such as licence renewal or a periodic safety review"* (see SSG-48)

The IAEA definition of LTO, therefore, includes several elements:

- LTO is a continued "operation" – which implies a specific lifetime stage of a nuclear facility and distinguished from siting, construction, commissioning and decommissioning;

[91] Specific Safety Requirements INTERNATIONAL ATOMIC ENERGY AGENCY VIENNA ISBN 978–92 –0–109415–5 ISSN 1020–525X No. SSR-2/2 (Rev. 1).

[92] IAEA Safety Standards Series No. SSG-48.

[93] General Safety Requirements INTERNATIONAL ATOMIC ENERGY AGENCY VIENNA ISBN 978–92 –0–108815–4 ISSN 1020–525X No. GSR Part 1 (Rev. 1)

[94] SSG-25 also incidentally uses expressions "extension of the lifetime of a nuclear power plant" and "extending the operating lifetime of the nuclear power plant", paras.3.2, 3.4. There is also an IAEA document, which uses the term "PLEX" for power plant lifetime extension (Technical Report No. NP-T-3.18).

- LTO is an operation "beyond established time frame", which implies existence of operational time frames;
- The timeframe is established by a variety of means:
    - License term
    - Original plant design
    - Relevant standards
    - National regulations;
- LTO should be "justified" (cannot be automatic or assumed). The decision of the operator to pursue LTO should be based upon an evaluation that covers, in particular, "a technical assessment of the environmental impact of LTO"[95]
- Such justification for LTO should be subject to a regulatory oversight, which may be done in several ways depending on a state.[96]

Decision-making

IAEA does not have clear guidance on ***authorization process*** for an LTO. Generally, there is a diversity of approaches to LTO authorizations among "nuclear" states. From the licensing standpoint, there are three conceptual approaches that licensees use to obtain an authorization to operate their NPP unit beyond its design service life. One approach is based on the licence renewal application (LRA) concept, the second on the PSR concept and the third on a combined approach:[97]

> "*If a licensee follows the maintenance rule and other US operating and licensing practices, it is likely that elements of the US LRA process may be incorporated into the LTO authorization process.*
>
> *In countries where the safety performance of NPPs is monitored through PSRs, if the PSR results are satisfactory, the regulator releases an authorization to continue operation to the end of the PSR cycle (usually ten years). This regulatory system does not limit the number of PSR cycles, even beyond the original design life of a nuclear power generation unit. The fundamental requirement is for the licensee to demonstrate a good understanding of the plant's condition and of its capability to operate safely for the duration of the PSR cycle. If the new operating period reaches or crosses the end of the plant design life, the main focus of the LTO authorization process becomes that of determining whether the ageing of critical SSCs is being effectively managed so that all required safety functions can be maintained through the LTO period. In other words, the regulator focuses on the effectiveness and on the capability of*

[95] SRS No.57, 3.1(d).

[96] The need for regulatory approval is also stressed in several IAEA guidance documents, including SSG-48 and GSR Part 1. In this context, GSR Part 1 clearly state that "the regulatory body shall review and assess the particular facility or activity in accordance with the stage in the regulatory process (initial review, subsequent reviews, reviews of changes to safety related aspects of the facility or activity, reviews of operating experience, or reviews of long term operation, life extension, decommissioning or release from regulatory control)" (para. 4.40).

[97] See Technical Report No. NP-T-3.18.

the ageing management programme (AMP) to adequately cover the LTO period. Regulators may also use PSR as a tool to identify and resolve safety issues in NPPs".

EIA and LTO

LTO-related IAEA standards have limited scope over environmental impacts of LTOs, while referring to the need to consider environment-related aspects during technical assessments as part of the LTO justification (see above).

An interesting insight into relationships between LTO and environmental impact assessment gives Technical Report No. NP-T-3.18 "Plant Life Management Models for Long Term Operation of Nuclear Power Plants"[98], referred to above.

IAEA recognizes that in some countries, an environmental assessment report of the impact of LTO is required for regulatory and public review.[99] In LRA (a US system of authorization for LTO) environmental impact assessment for the additional service life is a prerequisite for an LRA in the **USA**.[100] In accordance with the **Canadian** Environmental Assessment Act, LTO projects may be required to undergo an environmental reassessment. In such cases, proof that the LTO will not have significant adverse environmental effects is required prior to any licensing action being initiated. As the appointed authority for the conduct of the environmental assessment process, the Canadian Nuclear Safety Commission (CNSC) determines whether an environmental assessment is required and ensures that the process is carried out appropriately.[101] In **France**, a periodic licensing validation process is practiced and is regulated by a PSR process, therefore the documentation required for an operating period beyond the plant's original design life is not very different than the documentation contained in a regular PSR report that is augmented by additional analysis, particularly a special SSC ageing analysis. Any additional calculation required will include, inter alia, licensing requirements, such as safety analysis FSAR updates, environmental impact reassessments and reviews.[102] In **India**, the key elements considered in a PSR include environmental impact[103]. In the Republic of **Korea**, the licensee who wants to operate an NPP beyond its original design life submits a PSR report evaluating the required 11 safety factors, and the following two additional reports, one of which is an assessment of the radiological and environmental impact on the territory, considering the plant age condition and all design changes since the start of operation. The radiological environmental impact assessment (REIA) is to be carried out in accordance with the technical standards in effect at the time the REIA was most recently conducted at the same site. Providing that the NPP has implemented the

[98] Plant life management models for long term operation of nuclear power plants. — Vienna : International Atomic Energy Agency, 2015. p. ; 30 cm. — (IAEA nuclear energy series, ISSN 1995–7807 ; no. NP-T-3.18).

[99] Cost Drivers for the Assessment of Nuclear Power Plant Life Extension, IAEA-TECDOC-1309, IAEA, Vienna (2002).

[100] NP-T-3.18, Sec. 1.

[101] Ibid, Sec. 2.1.4.6.

[102] Ibid, Sec. 2.3.6.

[103] Ibid, Sec. 2.5.1.

REIA and submitted it to NSSC in a previous operating cycle, the evaluation can be limited only to the parts not previously evaluated for earlier operating cycles. Evaluations should cover:

- The continued operation plan;
- The environmental status of the territory;
- A global condition assessment of the NPP;
- The environmental effects of continued operation on the territory;
- The effects of postulated accidents;
- The environmental monitoring programme[104].

In **Russia**, the NPP unit license for LTO can be obtained by the operating company through the submission, to Rostechnadzor, of an application package reporting on the nuclear safety, the environmental impact, the radiation protection and the industrial safety during the extended period of operation beyond the original design term.

The Technical Report No. NP-T-3.18 concludes, that the decision to pursue LTO is usually based on an evaluation that covers strategic elements, such as, inter alia, the results of an environmental impact and the consequent impact on the site (land and water usage) during the LTO.[105]

3.4 OECD guidance

Strictly speaking, there is no separate OECD legal framework for nuclear activities. In 2019, the OECD Nuclear Energy Agency (NEA) issued the report "Legal Frameworks for Long-Term Operation of Nuclear Power Reactors"[106]. The report does not impose any requirements or standards on OECD NEA member states, it serves rather as a legal overview "addressing the legal and regulatory aspects of decisions to authorise or approve the long-term operation of nuclear power reactors in countries around the world".[107] The aim of the report is "to provide insight into the various laws, regulations and policies that contribute to different countries' approaches to LTO, without any judgement as to the merits of one approach over another"[108]. We provide a brief overview of the relevant issues covered by the report.

The term

The survey, on which the above mentioned report is based, used so called "slash approach" when developing specific questions related to LTE. It meant the use of "long-term/extended/continued operation" as a term to define LTE, therefore acknowledging various use of different words to

[104] Ibid, Sec. 2.7.6.

[105] Ibid, Sec. 111.

[106] LEGAL FRAMEWORKS FOR LONG-TERM OPERATION OF NUCLEAR POWER REACTORS, NEA No. 7504 (OECD) (2019). Available at http://www.oecd-nea.org/law/pubs/2019/7504-long-term-operation-npp.pdf.

[107] Ibid, p. 3.

[108] Ibid, p. 17.

describe the same or similar concepts at national country levels. The same "slash approach" was used to refer to other important elements of the subject matter, such as authorisations, decisions, licensing, etc.

The report, however, uses "generic" terms, including "design life", "long-term operation", authorisation" etc., all of which except "licence" rely on relevant IAEA documents (also addressed in the previous sections).

According to the OCED guidance, only in rare cases, such as Hungary, Slovenia, or the Russian Federation, the term lifetime extension is officially applied to define the process of extending the licensed life of a nuclear power reactor.[109] The definition of the term "operating time" or "lifetime" according to the OECD guidance is "*the period during which an authorized facility is used for its intended purpose, until decommissioning or closure.*"[110]

The decision-making

The report provides a clear overview of the applicable authorization procedures for LTO. First, it stresses that "at the very outset of a nuclear power programme, one decision is made that shapes the approach a country takes to allowing LTO: the approach to authorising initial nuclear power reactor operation". It further explains that among responding countries, initial authorisations for nuclear power reactor operation are given either for a specific time-limited authorisation term or for an indefinite duration. Of the responding countries, 60 % provide a specific time-limited authorisation term, while 40 % provide an indefinite duration authorisation.[111] Second, it argues that whether a country employs a specific time-limited authorisation term or an indefinite duration authorisation often determines whether there is a specific regulatory decision at the time of long-term operation, leading to a specific authorisation for LTO. None of the eight responding countries that employ an indefinite duration authorisation require a specific authorisation for LTO.[112] To conclude, it explains that there are two basic regulatory approaches to approving or authorising LTO – PSR and licence renewal – and that some countries use aspects of one or both in their regulatory processes.[113]

LTO and EIA

The report has a separate section on EIA describing various applicable practices. It acknowledges that the requirement to perform an environmental review is generally clear and consistent in the initial licensing of major nuclear activities. However, differences exist among responding countries

[109] Ibid, pp. 79, 109, 119.

[110] LEGAL FRAMEWORKS FOR LONG-TERM OPERATION OF NUCLEAR POWER REACTORS, NEA No. 7504 (OECD) (2019). Available at http://www.oecd-nea.org/law/pubs/2019/7504-long-term-operation-npp.pdf., p. 20.

[111] Ibid, p. 25.

[112] Ibid, p. 28.

[113] Ibid, p. 30.

regarding whether there is a requirement to perform such an environmental review as part of the LTO-approval process. Of the responding countries, 65% reported performing some sort of an environmental review as part of the LTO-approval process, while 35% of responding countries reported no such requirement.[114] Even among the 13 countries that reported having some requirement for an environmental review, the situation nonetheless varies. Of those, nine countries reported a legal requirement to perform a full environmental review as part of the LTO-approval process. Such environmental review is often – but not always – referred to as an environmental impact assessment (EIA).[115]

Transboundary EIA

The report specially addresses the issue of transboundary consultations in the context of EIA. The report acknowledges work undergone in the Espoo Convention in relation to LTE. It states that most responding countries reported that the LTO of a nuclear power reactor does not systematically entail carrying out a notification of potentially affected neighbouring states.[116] Three responding countries reported systematically requiring a transboundary EIA, including notification and consultation with potentially affected parties, as part of the LTO-approval process, all of which assess the LTO of a nuclear power reactor within an LTO-specific process. Six responding countries, however, indicated that transboundary notification could be required if certain criteria are met, such as if the extension of the operating licence could have a significant impact on the environment of another EU member state.[117]

[114] Ibid, p. 32.

[115] Ibid, p. 33.

[116] Ibid, p. 34.

[117] Ibid.

4. Key questions

When elaborating the issue of lifetime extension from different aspects of the aforementioned frameworks it becomes clear that terminology plays a central role to understand the concept of the issue. The Espoo Convention with its UNECE background and approach from an environmental perspective shows a different concept than might not be common among the nuclear community and its applicable safety regulations. Yet, it is not uncommon that different legal frameworks use different approaches for defining similar concepts. For example, the terms "proposed activity" and "project" underlie the legal framework for EIA while other regulatory frameworks are not using these terms when it comes to specific activity (such as "installation" being one of the key terms for nuclear framework).

Therefore, in the first part of this Section we will put further focus on the definition of the term "Lifetime" extension from the different perspectives. After that, the following three different questions currently discussed among the Espoo Convention's ad Hoc Group on lifetime extension of nuclear power points will be illustrated from the different angles:[118]

- Is lifetime extension an activity or rather a major change to an activity?
- Lifetime extension of nuclear power plants subject to a decision of a competent authority in accordance with an applicable national procedure.
- The likelihood of lifetime extension to cause significant adverse transboundary impact.

4.1 The concept of LTE

Clear understanding and definition of LTE concept is critical to effective, consistent and non-discriminatory application of the Espoo Convention to such activities in the future. There is no doubt that *some* kind of LTE concept is commonly agreed to exist within EIA and nuclear regulatory frameworks, as well as public participation framework. As argued in previous sections, despite the differences in approaches, all applicable legal frameworks attempt to regulate it. However, in the context of future application of the Espoo Convention there needs to be an agreed approach to understanding this concept within the Espoo Convention's framework. So basically this subchapter attempts to answer a rather obvious question: "What is LTE?" We also argue that for a future guidance to be effective, it must include a definition of the LTE.

Currently under the Espoo Convention case law the definition of LTE can be put as: "the extension of the lifetime of an NPP originally designed to operate for 30 years for a further 20 years" (see section 2.5 for details). An obvious shortcoming of this definition stems from assumption of an originally designed operation period (30 years) and its further extension for 20 years (even in Ukraine, which "hosted" the relevant Espoo LTE case, some extensions are shorter). Transferring this definition to

[118] See Update on the progress in drafting guidance on the applicability of the Convention to the lifetime extension of nuclear power plants, 7 November 2019, ECE/MP.EIA/WG.2/2019/INF.6, para. 2; https://www.unece.org/fileadmin/DAM/env/eia/documents/WG2.8_Nov2019/Informal_docs/ece.mp.eia.wg.2.2019.INF.6_LTE_of_NPP_Update.pdf.

LTE guidelines would certainly exclude a number of similar activities (LTE) in other countries just on formal basis. This would lead to inconsistent and, probably, discriminatory application of the Espoo Convention among the parties.

A generic term the IAEA uses is "LTO**"**, with much broader meaning and including all forms of "operation beyond an established time frame defined by the licence term, the original plant design, relevant standards or national regulations". The lifetime ("established time frame") can thus be deducted from an expiry date set in the license, result from the technical design lifetime stated, standards or even national regulations. In case of license term fixed, the operating time past the initial designed life thus needs to be actively extended, e.g. by an update or renewal to the operating license. As other authorizations are very often for an indefinite duration, this makes this element of LTO concept much more complicated for the purpose of the Espoo Convention.

Current EU case law under EIA framework, uses the LTO concept following the national Belgian framework (see discussion on preliminary ruling regarding the lifetime extension of **NPP Doel** by the European Court of Justice in section 2.1.). As such, the court does not give a definition of LTO, but on substance it refers to a set of "measures", which have the *effect of extending*, by a significant period of 10 years, the duration of consents to produce electricity for industrial purposes with respect to both power stations in question, which had up until then been limited to 40 years *by the law*, combined with major renovation works related to aging of power stations. The "major renovation works" element seems to be necessary for these measures to qualify as "project" under EIA Directive, but not as LTE itself. LTE itself can be described, within that judgement, as "extending by a significant period of 10 years the consents...limited to 40 years by law". This approach perfectly fits the IAEA approach to LTO as operation beyond an established time frame defined by national regulations. From this perspective it does not propose a unique definition of the LTE as such.

The mid-conclusion is that LTO, the term used by IAEA, is the most general term describing the concept of operation beyond established timeframes and, as one of its elements, it includes the LTE (operation beyond designed time of operation) in the current understanding of the Espoo Convention in Ukrainian case.

It does not mean, however, that the IAEA definition of LTO can be easily incorporated into the Espoo Convention framework. There are at least two major problems.

First, as explained earlier, international nuclear legal framework uses the term LTO (long term operation), and LTE is only one possible "option" of LTO. LTO, as a generic term, relies on several possible requisites: it is an operation beyond an established time frame defined by (a) the licence term, (b) the original plant design, (c) relevant standards or (d) national regulations. License term, therefore, is inevitably one of the possible requisites (qualifying criteria). This creates a problem when put in the context of "proposed activity" concept of the Espoo Convention. Based on wider European legal traditions regarding EIA, including EU law, and the Espoo Convention principles, we argue that qualification of a "proposed activity" cannot depend on whether a country puts an activity subject to a permitting decision or not. Any activity listed in Appendix I to the Espoo Convention must be subject to an authorization (decision, permit) at national level. Therefore, one may conclude that

in principle any definition of an activity involving license expiration as a prerequisite is void for the purpose of the Convention.

The solution lies in the difference of approaches which may be taken to define the scope of application of the LTE guidance and its terminology. One approach is to define LTE as "proposed activity" within the LTE guidance. Such an approach would face the problem discussed above. Another possible approach is to define LTE as "activity" (or "nuclear reactor activity" as listed in Appendix I to the Convention). This approach could be justified and solve the problem above if it combines several prerequisites (or qualifying criteria) for an activity to qualify as LTE. The LTE definition for Espoo Convention purposes cannot rely on license expiration as a necessary prerequisite, but may include license term expiration as *one* of the possible requisites to reflect the complexity and differences of the LTO/LTE concept in national nuclear regulatory frameworks. In our view, this is a strong argument supporting the need to introduce LTE definition into the guidance.

Second, an obvious problem is lack of consistency among real terms (years) established by original plant designs, standards or national regulations (three other qualifying criteria of IAEA LTO definition). This may create a situation that such term in practice could be 10 years (PSR minimum period in the EU) or 30 years (as in Ukrainian case) or 40 years (as in Belgium case), therefore bringing huge uncertainties as to when and how often transboundary impacts need to be assessed (or reassessed). This ambiguity can be solved by adding additional qualifying criteria to the LTO definition of IAEA. Therefore, we came up with another argument that Espoo-specific definition of LTE is needed.

Given the discussion above we propose the following definition of the LTE to be used for the purpose of the Espoo Convention guidance on LTE:

> "For this purpose of this guidance, lifetime extension of nuclear installation means an operation beyond a time frame:
>
> (a) established (defined) by the licence term, the original plant design, relevant standards or national regulations; and
>
> (b) initially lasting from 30 to 40 years, depending on case specific circumstances".

This definition brings clarity and sufficient consistency to the scope of application of the Espoo Convention, reflects the complexity of the LTE/LTO concept, is based on widely accepted definition of LTO within IAEA legal framework and takes into account differences in national approaches and, most importantly, fits within environmental legal framework as established by the provisions of the Espoo Convention and relevant EU law. It uses physical duration as a necessary qualifying criterion, based on evidence available as to what the practice has been for establishing (defining) initial timeframes of operation.

4.2 "Major change"

Under current case law of the Espoo Convention, there is no need and no legal consequences for distinguishing LTE as "new activity" or as a "major change".

This conclusion is supported by LTE definition used in Rivne findings. Additionally, this is also supported by the Implementation Committee's opinion on this issue in the context of LTE as a proposed activity in the same findings:

> *"On the basis of the above, it was the view of the Committee that the decision to authorize a proposed activity subject to the Convention, according to the national procedure, only for a limited period of time meant that any subsequent decision to extend that limited period of time, whether in the form of a new licence or amendment or renewal of the existing one, would, under the Convention, be another decision of a competent authority to authorize or undertake a proposed activity. In that context* ***it becomes less relevant whether it is a new activity or a major change to an activity****"*[119] (emphasis added by authors)

From the perspective of nuclear framework, this issue is also not relevant. In practice, all nuclear installations constantly undergo various technical upgrades related to increasing the safety and aging parameters of the equipment. In other words, there are physical works associated with LTE (LTO), as well as the implication of significant environmental impacts. As a result, various additional issues, such as multiple minor changes to a nuclear reactor or possible changes in the surrounding environment since its original licensing would as well need to be addressed and taken into account. This understanding is confirmed by the ECJ ruling, where the court basically equalled, in that context, major renovation works and new project: "must be found to be of a scale that is comparable, in terms of the risk of environmental effects, to that when those power stations were first put into service". This seems to confirm our initial statement that for the purpose of the Espoo Convention there is no practical reason to distinguish LTE as major change or new activity.

4.3 What makes a "decision"? (no "final decision")

The current (Rivne related) interpretation under Espoo Convention is very general: any *new* decision to authorize or undertake a proposed activity, "whether in the form of new license or amendment or renewal of the existing one" if the activity would legally have to be terminated without such decision:

> *On the basis of the above, it was the view of the Committee that the decision to authorize a proposed activity subject to the Convention, according to the national procedure, only for a limited period of time meant that any subsequent decision to extend that limited period of time, whether in the form of a new licence or amendment or renewal of the existing one, would, under the Convention, be another decision of a competent authority to authorize or undertake a proposed activity*[120]
>
> *[…]*
>
> *Whether this licence was a new one or just, as Ukraine argued, a confirmation that the operation of the installations could continue within the parameters defined initially, had no*

[119] Ibid, para. 45.

[120] Report of the Implementation Committee on its thirtieth session, 14 August 2014, ECE/MP.EIA/IC/2014/2, para. 45, http://www.unece.org/fileadmin/DAM/env/documents/2014/EIA/IC/ece.mp.eia.ic.2014.2.e.pdf

effect on the Committee's determination, since without a new decision the activity would legally have to be terminated when the licensed time period expired. That was also the situation according to Ukrainian law (Order No. 181, para. 1.2). In that respect, Committee recalled that article 1, paragraph (v), of the Convention defined a "proposed activity" as "any activity or any major change to an activity subject to a decision of a competent authority in accordance with an applicable national procedure". [121]

As described in the OECD guidance, the decision to allow LTO lies in the respective country's approach to authorize initial nuclear power reactor operation.[122] Whether a country employs a specific time-limited authorisation term or an indefinite duration authorisation often determines whether there is a specific regulatory decision which leads to the authorisation for LTO.[123] This would mean that LTE in a narrower sense (see above, Section 4.1) always requires a clear decision to be taken.

According to the OECD guidance, countries employing an indefinite duration authorisation do not require a specific authorisation for LTO.[124] The only steps taken that can induce a "decision" in these cases are a (voluntary) license renewal or the performance of a periodic safety review.[125]

However, all countries covered by the OECD guidance require a review of nuclear *safety-related* aspects of LTO by their national regulatory bodies, although they might not be followed by a – formally speaking – authorizing decision as such.[126] At the same time, the *form* of decision is less relevant as any regulatory oversight over such review has a permitting (or prohibiting) *nature*. We could not identify any legal framework, which would rely on tacit consent approach to regulatory oversight over the LTO process.

The question of what makes a relevant decision relevant from an environmental procedure perspective is, therefore, mostly important in terms of the broad definition of LTO and rather unproblematic in case of LTE definition (as proposed above).

A similar position was also taken by the Aarhus Convention Compliance Committee which, in its observations on the draft terms of reference for possible guidance on the applicability of the Espoo Convention to the lifetime extension of nuclear power plants, stated that,[127]

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[121] Ibid, para 41.

[122] LEGAL FRAMEWORKS FOR LONG-TERM OPERATION OF NUCLEAR POWER REACTORS, NEA No. 7504 (OECD) (2019). Available at http://www.oecd-nea.org/law/pubs/2019/7504-long-term-operation-npp.pdf.

[123] Ibid, p. 25.

[124] Ibid, p. 28.

[125] Ibid, p. 30.

[126] Ibid, p. 13.

[127] Observations by the Aarhus Convention Compliance Committee on the draft terms of reference for possible guidance on the applicability of the Espoo Convention to the lifetime extension of nuclear power plants, May 2018, https://www.unece.org/fileadmin/DAM/env/documents/2018/EIA/WG_7/Workshop_on_LTE_of_NPPs/Observations_on_Espoo_s_draft_ToR_on_LTE_of_NPPs_07.05.2018_final__002_.docx (28 May 2020).

> *"any future guidance not take an overly formalistic approach to what constitutes a 'decision'. The key point should be whether or not the lifetime of the existing NPP will in fact be extended."*

As discussed, most important to understand, or clarify, is whether any decision is needed for an activity to qualify as "proposed activity" under the Espoo Convention. In our opinion, the parties need to accept an approach that for the purpose of the Espoo Convention activities listed in Appendix I must be subject to a decision. What is the final decision in the context of LTE should be left at the discretion of each party. Therefore, no common understanding of the form of decisions needs to be developed for the purpose of the LTE guidance.

4.4 Likelihood of adverse impact

LTE in any case falls under "nuclear reactors" activity listed in Appendix I to the **Espoo Convention**. Therefore, all relevant "nuclear reactor" case law applies to LTE.

In this context, the IC said that "even a low likelihood of a [significant adverse transboundary] impact should trigger the obligation to notify affected Parties", and that "notification is necessary unless a significant transboundary impact can be excluded" (decision IV/2, annex I, para. 54).[128] It also said "in absence of a transboundary EIA documentation arguing to the contrary, it [Ukraine] could not exclude the significant transboundary impact of the proposed activity".[129]

Also, the MOP implicitly recognized that nuclear activities require a precautionary approach:

> *"Reiterating that nuclear energy-related activities by their nature can lead to significant transboundary and long-range adverse environmental impacts and imply special challenges owing, inter alia, to national interests and, in some countries, greater public concern"*[130]

Therefore, under current Espoo approach LTE is considered "by default" to have likely significant adverse transboundary impact unless it can be excluded on the basis of EIA documentation. This reflects precautionary approach based on the fact that nuclear energy-related activities by their nature can lead to significant transboundary and long-range adverse environmental impacts and imply special challenges.

The OECD guidance takes note that not all countries provide for a mandatory environmental assessment in case of LTE/LTO. In many cases, lifetime extension or LTO does not include a requirement for a transboundary EIA.

Although at the time of LTO the site-aspect might as well need to be re-evaluated, especially due to possible environmental changes in the area of a site since its initial license, the Convention on Nuclear Safety does not provide any regulations on the LTO issue.

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[128] http://www.unece.org/fileadmin/DAM/env/documents/2014/EIA/IC/ece.mp.eia.ic.2014.2.e.pdf

[129] Ibid, para 47.

[130] MOP Decision VII/6, recital 3; http://www.unece.org/fileadmin/DAM/env/documents/2017/EIA/MOP7/22_12_ece_mp_eia_23_Add.2__ece_mp_eia_sea_7_Add.2_eng_pdf.pdf.

The fact that some countries indicate that transboundary notification could be required *if certain criteria are met*, shows that a significant environmental transboundary impact of lifetime extension is not (yet) a common presumption among the nuclear community.

What seems to be most important for this research, the nuclear regulatory framework recognizes and assumes that nuclear installations may have **transboundary** effects (see Espoo MOP Decision VII/6, cited above).

As discussed in Section 2.1., in the C-411/17 case the ECJ took a view that "such a project carries an inherent risk of significant effects on the environment, within the meaning of Article 2(1) of that directive, and must therefore be subject to an assessment of its environmental impact under Article 4(1) of that directive", therefore relying on the concept of "inherent" risks of significant effects for Annex I activities, including nuclear related.

Given the above, we may conclude that LTE bears inherent risk of significant transboundary effect on the environment and, unless it can be excluded based on EIA documentation. Such approach would be the most consistent with current EIA and nuclear regulatory frameworks.

5. "Instead of Conclusions"

To summarize the above sections, we can draw the following five suggestions for a future "Guidance on the applicability of the Espoo Convention to the Lifetime Extension of Nuclear Power Plants":

(1) The guidance should recognize adequately that lifetime extensions or long-term operation of nuclear power plants occurs in different variations. This includes a **clear definition** which does not rely on license expiration as a necessary prerequisite. We therefore suggest the definition of LTE as

> "*an operation beyond a time frame:*
>
> *(a) established (defined) by the licence term, the original plant design, relevant standards or national regulations; and*
>
> *(b) initially lasting from 30 to 40 years, depending on case specific circumstances*".

(2) The future guidance must reflect the **precautionary principle** embedded in the Convention and thus reflect the fact that nuclear energy-related activities by their nature can lead to **significant transboundary and long-range adverse environmental impacts** and imply specific challenges.

(3) A future guidance should consider that the **form of decision is less relevant** as any regulatory oversight over such review has a permitting (or prohibiting) nature. In line with the Convention's principles and drafting logic, parties are obliged ensure that **an activity listed in Appendix I *must* be subject to a decision**, whereas a common understanding of the form of decisions is less relevant for the purpose of the LTE guidance.

(4) The importance of a **consistent and non-discriminatory approach** regarding all pending and already decided should be reflected in the guidance.

(5) For the purpose of the Espoo Convention there is **no practical reason to distinguish between LTE as major change and LTE as new activity**, because the implication remains the same.

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