ENSREG assessment of the technical parameters corresponding to the best-available technology (BAT)

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Background

In the context of the EU taxonomy for activities contributing to climate change mitigation objectives, the Commission Delegated Regulation 2022/1214 of 9 March 2022[1] gives, among other topics, the conditions for nuclear projects to be taxonomy aligned.

Section 4.27 of annex I of the above-mentioned Commission Delegated Regulation 2022/1214 considers the need for the project to comply with Technical Screening Criteria including:

- **Point 2.** the use of *best-available technology* (BAT)[2] and, from 2025, accident-tolerant fuel(s) (ATF), provided the technology is approved by the national safety regulator;
- **Point 5.** the Commission review, from 2025, at least every 10 years, of the technical parameters of these BAT on the basis of the assessment of the ENSREG.

As a follow-up, ENSREG decided in its 2024-2026 work programme to task its working group on Nuclear Safety and International Cooperation (WG1) with the development of an ENSREG position with regard to best available technologies under the EU Taxonomy Complementary Climate Delegated Act.

Principles of nuclear safety assessment in the EU

The principle of an assessment of any technology used in nuclear projects is based on different national regulatory frameworks, European law, IAEA standards, Western European Nuclear Regulators Association (WENRA) safety objectives and safety reference levels (SRLs).

European nuclear safety standards and objectives (the amended directive on nuclear safety[3] (NSD), WENRA, IAEA) define requirements without imposing a particular technology which is the sole responsibility of licensees.

As an example, at the European level, the NSD introduces obligations to apply in particular defence-in-depth principles up to the limitation of consequences of a severe accident. In this sense, the NSD describes objectives and requirements for technologies to be acceptable in the EU. Whether this obligation is met is verified by independent nuclear safety regulators on a case-by-case basis.

In addition, safety cannot be guaranteed by the simple implementation of a particular technology but is assessed through a holistic approach by independent regulators.

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[1] Commission Delegated Regulation (EU) 2022/1214 of 9 March 2022 amending Delegated Regulation (EU) 2021/2139 as regards economic activities in certain energy sectors and Delegated Regulation (EU) 2021/2178 as regards specific public disclosures for those economic activities.

[2] "For the purposes of this Section, best-available technologies mean technologies that fully comply with the requirements of Directive 2009/71/Euratom and fully respect the most recent technical parameters of the IAEA standards and the WENRA Safety objectives and Reference Levels".

[3] COUNCIL DIRECTIVE 2009/71/EURATOM of 25 June 2009 establishing a Community framework for the nuclear safety of nuclear installations amended by Council Directive 2014/87/Euratom of 8 July 2014

In practice, every Euratom Member State with a nuclear programme is responsible for defining its own strategy for the use of nuclear energy with fuel cycle considerations also having implications on the technological choices. These different contexts, such as the use of reprocessed fuel or advanced technology, may lead to different technological and industrial choices[4], for both fuels and reactor designs.

The nuclear industry has been developing various designs of nuclear reactors which may provide higher levels of safety, designed on the most advanced technologies, the most recent experience, the state of the art of science and technology and the best available knowledge. It is therefore not feasible for a regulator to state that one technological choice is better than another as long as they both comply with the safety regulations[5].

ENSREG assessment on the definition of Best Available Technologies[6]

1. The NSD, WENRA SRLs and safety objectives, and IAEA safety standards describe objectives and requirements for a technology to be acceptable in the Euratom MS in terms of nuclear safety. **All of them must be taken into account** and it should not be indicated whether any requirements can be singled out.

2. Members of the WG1 **do not identify other international standards and requirements** that may be relevant to include in the definition of BAT.

3. Members of the WG1 **do not identify** other views that could further inform the Commission review of the technical parameters.

Above all any requirement of the EU taxonomy should not override the existing nuclear safety framework of the Euratom Member States which aims to achieve a high level of nuclear safety. Within this framework, WG1 proposes, on the basis of available developments, to periodically re-interview itself on evolutions likely to emerge in this area, and to inform the ENSREG of situations when necessary.

[4] As long as in full compliance with the requirements of Directive 2009/71/Euratom as amended and fully respect the most recent technical parameters of the IAEA standards and the WENRA Safety objectives and Reference Levels.

[5] Nuclear safety regulations in Euratom Member States should be in line with the highest international safety standards such as IAEA Safety Standards, WENRA Safety Reference Levels, while noting that all Euratom MS are parties to the Convention on Nuclear Safety and Joint Convention and subject to the obligations of the NSD.

[6] Disclaimer: WG1 members, as nuclear regulators, only independently assess the compliance of the power plant with nuclear safety standards and regulations, but do not assess it in terms of compliance with the taxonomy.