

RePlanet Nederland's review of the draft Delegated Regulation on nuclear energy and gaseous fossil fuels in the sustainable finance taxonomy

Introduction

At RePlanet Nederland, we are delighted that the European Commission has proposed, on December 31, 2021, to include nuclear energy in the sustainable finance taxonomy. Yet, we believe that in its current form the proposal would not achieve the goal of encouraging private investment in nuclear energy as a sustainable activity. This review highlights problematic elements of the proposal and provides recommendations to improve them.

RePlanet Nederland is a Netherlands-based environmental NGO, aiming to help solve the problems of global warming, biodiversity loss and poverty. We believe we must take a science-based approach and prioritize policies and technologies that enable us to liberate nature and elevate humanity.

In order to steer investment toward environmentally sustainable activities, the European Union launched the Taxonomy Regulation framework to define activities deemed sustainable. Investors and governments will be expected to refer to the Taxonomy in order to determine whether an activity they want to pursue can be considered sustainable, and under what conditions (screening criteria).

Originally, nuclear energy had not been included, due to the stated inability of the TEG¹ to determine whether nuclear energy qualifies as a sustainable activity. After a period of fact-finding involving Europe's top research institutions, the European Commission has now determined that there are no objective reasons to exclude nuclear energy from the taxonomy. It has therefore drafted a proposal² - a Delegated Regulation - which sets out screening criteria for investments in nuclear energy, effectively declaring nuclear energy part of the sustainable finance taxonomy.

Notably, in the same proposal, the Commission has also included screening criteria for gaseous fossil fuels. However, unlike nuclear energy, the use of fossil fuels was not subjected to a scientific audit as to its sustainability and has thus not been formally shown appropriate for inclusion in the taxonomy. Their inclusion appears to be the

¹ [Technical expert group on sustainable finance \(TEG\)](#)

² [COMMISSION DELEGATED REGULATION \(EU\) .../...of XXX 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 \(Text with EEA relevance\)](#) (leaked copy)

result of a political compromise with Member States rather than of scientific appraisal as in the case of nuclear energy.

The following elements of the Regulation proposal are dealt with in this review.

1. The Regulation sets a time limit on the inclusion of nuclear energy but not on fossil fuels and grants the Commission special powers to rule on nuclear taxonomy compliance.
2. The Regulation sets a deadline on the operation of final disposal facilities for radioactive waste.
3. The Regulation requires the use of “best” technologies and standards for existing and future nuclear energy applications as opposed to merely appropriate technologies and standards.

1. Sunset clauses and Commission ruling on nuclear compliance

The inclusion in the Taxonomy is limited to nuclear projects which have a construction license by 2045 (see §4.27 of the proposal) and for existing installation only until 2040 (see §4.28). While the Regulation provides for future review and amendment of these cut-off dates by the Commission (see the amendment to Article 2a on page 11), the fact that there is a cut-off date for nuclear energy raises concerns.

It creates an arbitrary “expiration date” in the year 2045 for new investments, whereas nuclear industry is inherently a long term concern. Having an expiration date creates political investment uncertainty and risk, which is precisely what the Taxonomy intended to remove. There are no good arguments to call nuclear a sustainable investment at one time and not sustainable a moment later. After all, the compliance of nuclear energy technology with the EU’s own sustainable investment criteria has been confirmed in exhaustive detail by the European Joint Research Centre³ and there is no basis on which to declare that compliance time-limited.

An expiration date creates a disincentive for both technology developers and utilities to invest in commercializing “4th generation” technologies intended to more efficiently recycle used fuel. Such technologies are expected to become mainstream and mass-produced only sometime in the late 2030s or early 2040s. While the Regulation provides for the possibility of future adjustment of the expiration date (Article 2a), it is not defined how such adjustments would come to pass. There are no objective criteria governing them and hence no security for governments and investors intending to exploit nuclear energy after 2045.

Extending the license of existing installations is particularly efficient in environmental and economic terms. The cut-off at 2040 for investments in license extensions for existing installations is therefore hard to reconcile. If anything, authorities should encourage such extensions which are known to be highly economic⁴ and effective⁵ at reducing CO2 emissions.

The use of gaseous fossil fuels has not been restricted by an expiration date. The Regulation’s proposed criteria for gaseous fossil fuels (which includes both conventional natural gas, and synthetic gas derived from coal gasification) allow investment in their consumption without restriction in function, scale or time period, as long as greenhouse gas emissions are no higher than 100 gCO₂eq/kWh (see §4.29-31 1(a)).

³ [Technical assessment of nuclear energy with respect to the ‘do no significant harm’ criteria of Regulation \(EU\) 2020/852 \(‘Taxonomy Regulation’\)](#)

⁴ [IEA Projected Costs of Generating Electricity 2020](#)

⁵ [IPCC Assessment Report 4 WG3 chapter 4.3.2](#)

This appears to constitute a significant relaxation of the existing criteria⁶ in the Taxonomy Regulation for Transitional Activities (Article 10(2)):

- Whereas the existing criteria require that transitional technologies have greenhouse gas emission levels that correspond to the best performance in the sector or industry, the current proposal for gaseous fossil fuels requires only that they are less than 100 gCO₂eq/kWh - an emission level that can be relatively easily achieved⁷ by applying carbon capture and storage (CCS) technologies that are either mature or being demonstrated.
- Whereas the existing criteria require that the transitional activity does not hamper the development and deployment of low-carbon alternatives (such as wind, solar or nuclear) the current proposal has no such restriction in function. For example, the replacement of nuclear power generation by fossil fuels would still be considered a sustainable activity.
- Whereas the existing criteria require that the transitional activity does not lead to a lock-in of carbon-intensive assets, the current proposal sets no end date for investment in gaseous fossil fuels, even while it does so for investment in nuclear energy. The current proposal would encourage long-term consumption of fossil fuels, since the required greenhouse gas emission performance level of 100 gCO₂eq/kWh is easy to achieve using relatively low cost CCS technology on either the post-combustion or pre-combustion (via methane reforming) phase of the life cycle.

It should be noted that fossil fuel resources including gaseous fuels are subject to depletion at rates relevant to the timescale of human civilization. Even if carbon capture and storage (CCS) technologies are applied exhaustively and unconventional resources are tapped, the practical availability of fossil fuels is expected to end within a few hundred years. In sharp contrast, nuclear fuels will never⁸ run out, owing to their extraordinary abundance and low extraction cost.

Moreover, the extraction of fossil fuels is relatively expensive in terms of cost per unit of fuel energy extracted, causing high grade fossil fuel resources to bestow significant strategic advantage on nations that control them. This advantage is a commonly known source of international tension, if not conflict, and declaring fossil fuels sustainable effectively declares such tension sustainable too, even while the depletion of low cost fossil fuel reserves is sure to aggravate tensions in time.

⁶ [REGULATION \(EU\) 2020/852 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on the establishment of a framework to facilitate sustainable investment. Article 10\(2\)](#)

⁷ [Energy Technology Perspectives 2020 - Special Report on Carbon Capture, Utilisation and Storage](#)

⁸ [IEEE EIC Climate Change Technology - Nuclear Fission Fuel is Inexhaustible](#)

In contrast, again, the sheer abundance, geographic spread and low cost of nuclear fuel extraction means that control of uranium (or thorium) resources bestows little or no strategic advantage, and hence does and will not strain international relations.

In addition to ruling on the amendment of the nuclear expiration dates noted above, the Commission grants itself extensive powers to monitor and assess the Taxonomy compliance of nuclear activities (item 11 on page 16). This is done without providing details on how those powers are to be appropriately limited in scope and time. This amounts to the addition of political risk on nuclear investments not faced by other technologies already in the taxonomy. Existing European environmental and safety regulations on nuclear industry are already among the strictest and most comprehensive in the world and are unlikely to be improved by additional screening criteria.

Summary: The expiry date on nuclear energy is baseless, arbitrary and serves no useful purpose. It will cause uncertainty and add unnecessary costs and deployment bottlenecks which could delay climate mitigation and the transition to a clean energy system of Member States. It appears to ignore the fact that nuclear fuels are practically inexhaustible, which is an important reason why nuclear energy is considered by relevant experts to be long-term sustainable.

Furthermore, the lack of restrictions on function, scale or time period for investments in gaseous fossil fuels are a *de facto* declaration of sustainability of fossil fuels, despite the fact that fossil fuel resources are expected to run out on time-scales relevant to human civilization.

Granting the Commission the power to assess and decide on the taxonomy compliance of nuclear projects would introduce political risks not faced by fossil or renewable energy activities.

Recommendations

- The 2040 and 2045 expiry dates for investments respectively in existing and new nuclear infrastructure should be removed.
- An end date for fossil fuel consumption should be included. In addition, the current implication that fossil fuels could be considered *de facto* sustainable should be removed.
- Nuclear energy should be treated the same as other energy sources already in the Taxonomy, i.e., as a sustainable activity that can be pursued indefinitely and at any scale according to the policy goals of individual Member States, under current rules and regulations.

2. Timeline of final repository and disposal planning

The condition for nuclear inclusion is that the host country has a *detailed plan* on how to get a final repository (disposal facility, in practice a geological disposal facility) in operation by 2050.

While it may be thought necessary to push Member States to accelerate the development and approval of final disposal options, the proposed timeline is problematic and potentially harmful. While it is important that funds to deal with waste (and decommissioning) are collected and stored during the operational life of the plant, this is already standard practice in many countries, regulated according to existing European and international legal codes.

As an illustrative example, the Finnish Posiva is now building a final repository for which it got a political permit (Decision-in-Principle) in 2001, and it is aimed to be operational in 2024. The time from political permit to a working facility was 23 years. Observing this timeline, countries should have the plan laid out, with the appropriate political permission given, no later than 2027, to have a disposal facility operational by 2050. Depending what is meant by “detailed”, it is unknown and therefore subject to political interpretation what needs to be included in the plan. This makes the condition impractical.

For existing nuclear nations, appropriate plans for waste management already exist because they are required by relevant EU law and international guidance.

Requiring the creation of “detailed” plans for operating a final repository before 2050 as a prerequisite for taxonomy compliance of new construction or the extension of current power plant operations will make it harder or impossible for projects to be taxonomy compliant, and it will not materially improve existing European radioactive waste management practices.

Newcomer countries and countries making little use of nuclear energy should wait with investing in final disposal until the volume of waste they have is large enough to allow optimal final disposal, which is a process characterized by large economies of scale. There is no evidence that current intermediate solutions cause significant harm, as has been confirmed by the Joint Research Centre. Demanding that such a plan exists right from the start and is executed decades before a disposal facility is actually appropriate, makes it more difficult for newcomer countries to begin exploiting nuclear energy.

Radioactive waste management is first and foremost a political issue, since the requisite technologies and processes have been known⁹ for decades, so technical

⁹ [Report to the American Physical Society by the study group on nuclear fuel cycles and waste management](#)

screening criteria should be directed at efforts to improve the political process.

Instead, the current Regulation proposal - through its setting of policy deadlines on which private investors have no influence - will only increase the political tension around nuclear waste management. Radioactive waste is a solved problem, technologically, and since carefully storing radioactive waste above ground is relatively easy and can be maintained for decades or even centuries, there is no need to pressure governments to accelerate the construction of final disposal.

Investing in public information and understanding of nuclear energy and radioactive waste should be at the forefront of sustainable radioactive waste management policy. In the course of the century, as the energy transition progresses and public understanding of energy issues including nuclear energy and radioactivity is expected to increase, political tension around radioactive waste management should subside, allowing commensurately easier and more effective policymaking.

Summary: Current European regulations and practices for radioactive waste and spent fuel management cause no significant harm to people or the environment, as confirmed by the JRC in its assessment of the Do No Significant Harm criterion as applied to nuclear energy. It should be enough to have in place basic legislated policy requiring the collection of funds and the development of long-term radioactive waste management procedures and facilities. Additionally, investment to improve public information and confidence should be pursued as part of good waste policy.

Recommendations

- New technological options for long-term management of waste/spent fuel needs to be allowed, not prescribed or limited to currently known options (geological repository).
- It should be enough that funds for disposal and decommissioning are collected during operations, as technological advances can give us significantly better and lower-cost and lower impact solutions on how to deal with spent fuel in the long term.
- There is no basis to have a firm date for a disposal facility to be in operation, given that different countries are in very different situations in both their fuel cycles and aspirations. A newcomer country will only need final disposal towards the end of the century, if ever, depending on its fuel cycle choices.
- Ideally, the Taxonomy should require that Member States invest in improving public understanding of radioactive waste management issues, with the goal of increasing confidence that the efficient and sustainable management of radioactive waste is a known science, is being pursued and will be assured.

3. Using the “best” technologies and standards

Throughout the proposal the Regulation uses superlatives like “best” and “highest” to define nuclear technology performance levels required by the Regulation. For example, the title of section 4.27 reads (our emphasis):

*“4.27. Construction and safe operation of new nuclear power plants, for the generation of electricity or heat, including for hydrogen production, using **best-available** technologies”*

Requiring “best-available technologies and standards” as opposed to simply existing, proven and appropriate ones increases regulatory complexity and investor risk. It means that rather than investing to improve the efficiency of existing technologies, vendors are pushed to continually “improve” their offerings, even when potential benefits in terms of safety, environmental performance or economics have long become hard to demonstrate. It also nurtures a sense that existing nuclear technologies are not good enough, or worse: that existing technologies should be considered suspect, if not unacceptable.

A second example of the ill-advised use of superlatives is in paragraph (7) of the preamble, which will be quoted in full, with our emphasis.

*(7) The scientific review conducted by experts¹⁵ concluded that the technical screening criteria concerning nuclear energy related economic activities should ensure that no significant harm is done to other environmental objectives due to potential risks arising from the long-term storage and final disposal of nuclear waste. Those technical screening criteria should reflect the **highest** standards of nuclear safety, radiation protection and radioactive waste management, **building upon** requirements laid down in the Euratom Treaty and in Union legislation adopted under that Treaty, and in particular in Council Directive 2009/71/Euratom. That Directive contains a high-level nuclear safety objective covering all stages of the lifecycle of each nuclear installation, including the siting, design, construction, commissioning, operation and decommissioning of such installations. In particular, the Directive calls for significant safety **enhancements** in the design of new reactors, **including** the so-called Generation III+ reactors, for which the state of the art knowledge and technology should be used taking into account the latest international safety requirements.*

With the first use of the word “highest” followed by the words “building upon”, the Commission tells Member States to apply new standards which need to be even higher than the - already - very high standards to which the European nuclear sector is currently held. The Commission suggests that current regulations are somehow not sustainable, and goes even further toward the end of the paragraph. In the final

sentence, the Regulation calls for “significant safety enhancements [...] including the so-called generation III+ reactors”. This implies that the Commission considers even generation III+ reactors to be less safe than they need to be in order to comply with the Taxonomy Regulation. Again, this is contrary to the Do No Significant Harm findings of the JRC.

The use of Accident Tolerant Fuels (ATF) is specified (p.8) as a criterion for new nuclear construction, potentially to protect against accidents. But the use of such fuels contributes little or nothing to accident prevention because fuel damage is not a cause of accidents which might affect the public. Fuel damage can be a result of cooling system failure combined with lack of timely external mitigation - which is what happened at the Fukushima Daiichi plant in Japan in 2011 - but the use of ATF would not have affected the outcome much since ATF does not - and is not expected to - survive indefinitely without liquid cooling. Generation III+ rated nuclear plants are already required to maintain fuel integrity after station blackout for 72 hours and the use of ATF is only expected to extend that time by 5 to 28 hours¹⁰.

ATF is more importantly a technology with potential economic benefits via allowing more efficient operations. However, since requiring the use of ATF (which - contrary to what is said in the Regulation proposal - is *not* yet available or licensed commercially) may delay the licensing of new construction it should be a decision left to investors and Member States.

Finally, the criteria requiring investments in life time extensions of existing plants to conform to the highest safety standards rather than those appropriate for the plant in question may make it unaffordable for some Member States to extend the life of their - currently certified sufficiently safe - nuclear plants. These criteria would then fail to attract private investment in the maintenance of nuclear infrastructure in those countries.

Recommendations

- Superlatives in the proposal need to be replaced by measured and appropriate language reflecting the stated purpose of the Taxonomy to encourage - rather than discourage - the uptake of sustainable activities such as nuclear energy investment.
- Requirements which exceed current European nuclear industry standards or require current standards to be replaced by new “higher” standards should be removed.
- The requirement to use ATF should be removed or relaxed in order to ensure that it does not become a barrier if ATF is not licensed and commercialized in time for the first nuclear projects seeking sustainable finance.

¹⁰ [Improving Accident Tolerance of Nuclear Fuel with Coated Mo-alloy Cladding](#)

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January 13, 2022