Société Française d'Energie Nucléaire

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Contribution from SFEN to the European consultation on taxonomy for sustainable finance

The French Nuclear Energy Society (SFEN) is a non-profit scientific association that brings together 4,000 professionals, engineers, technicians, chemists, doctors, professors, and students, industrial sites and French nuclear research organizations. SFEN is a place of exchange for those interested in nuclear energy and its applications. It is a founding member of the European Nuclear Society (ENS).

Purpose

On June 18, 2019, the European Commission published its European taxonomy project aimed at orienting financial market investments towards "sustainable" activities. This project is the result of the work of a technical expert group of the Commission, the Technical Expert Group (TEG).

The Opinion of the European Taxonomy Project on Nuclear Energy

The TEG considers the impact of the life cycle of an activity according to 6 criteria: an activity is considered "sustainable" if it contributes significantly to at least one criterion, and meets the "Do No Significant Harm" (DNSH) criterion on others. The TEG recognizes that nuclear energy, as a low-carbon energy, contributes to climate change mitigation goals. However, it considers that it has not been possible for it to conclude that the nuclear life cycle satisfies the DNSH criterion on all other environmental criteria and in the timeframes considered, in particular on the issue of nuclear waste management. high-activity long-lived (HA-VL). The TEG has recommended not to include nuclear energy in the taxonomy for the time being, and suggests that more in-depth technical work on the DNSH criterion be entrusted to a group of experts in the nuclear life cycle and its environmental impacts.

SFEN's Position

1. The inclusion of nuclear energy in taxonomy is a strategic necessity for the European Union (EU): according to the Commission's own scenarios, it will need a 20%[1] share of nuclear power in 2050 to achieve its objective of carbon neutrality. To achieve this, its industry must be able to benefit as soon as possible from access to green funds that the taxonomy framework must allow to better define.

2. SFEN is surprised that the TEG has not been able to conclude on the DNSH criterion of the life cycle of nuclear activities:

   a. The health and environmental impacts of the life cycle of nuclear activities have already been the subject of numerous studies and international reference reports (e.g Nuclear and Sustainable Development, IAEA, 2016). The existing scientific consensus makes it possible to conclude today that the European nuclear industry already meets the DNSH requirement on all the criteria studied.

   b. The nuclear activity is already subject to the DNSH requirement within the EU (Directive 2011/70 / Euratom[2]), under the control of the national safety authorities.

   c. The information on the consultation process followed by the TEG (name and qualification of experts, arguments, scientific references) has not been published, and does not guarantee that the same criteria have been applied to all energies.

3. SFEN requests that the TEG provide clarification on these points and also:

a. If new work is needed, they must be part of a timetable for the inclusion of nuclear power as soon as the taxonomy is first published.

b. That the work be conducted in such a way as to guarantee complete transparency, especially concerning the plurality and qualification of the expertise, according to the same criteria as the other energies included in the taxonomy.

Additional Information

1. On the need to include nuclear power from the first publication of the taxonomy:

The EUCO30 scenario, developed for the European Commission (EC) under the Clean Energy for All Europeans project in 2016, estimates the nuclear base needed for 20% of the European electricity mix, with a capacity of 110-120 GW of nuclear power. This would require not only an effort to renovate the existing fleet for the long-term use, but also an effort to renew the park with 100 GW of new facilities. For France, nuclear capacity in France is estimated at 40 GW in this scenario, which corresponds to the need to build between 15 and 20 EPR-type reactors between 2030 and 2050.

More recently, the EC's communication on its "long-term energy strategy[3]" at the end of 2018 confirms that nuclear power will play a major role alongside renewables in a low-carbon European energy system by 2050.

This analysis was supported by the International Energy Agency (IEA), which published a report[4] in May 2019 on the role of nuclear energy in a global energy system. low carbon: without new nuclear construction or extended operating life, it would be almost impossible to meet our climate objectives unless we accept significant risks for energy security and significant additional costs for the consumer.

2. The criterion "Sustainable use and protection of water resources and marine resources"

This criterion focuses on the impact of an activity on EU waters.

All relevant activities likely to cause significant damage to water and marine resources are regulated and require an impact study prior to the activity.

Water withdrawals and heating by nuclear power plants as part of their normal activities are subject to strict regulations in order to avoid significant damage to water or marine resources. These regulations are one of the main reasons why, during the hot summer weeks of 2019, some reactors were shut down and some were operating at lower capacity in Europe.

3. On the criterion "The transition to a circular economy, waste prevention and recycling"

The circular economy is already operating in the nuclear sector. Nuclear power is one of the most basic forms of electricity production in metals and minerals, especially since the operating life of its reactors is long. It is estimated that nuclear energy consumes about 7 times less steel per kWh than wind power[5]. Significant progress has been made in eco-design: the EPR model allows a gain of around 20% in natural uranium consumption per kWh compared to existing reactors.

Valuation strategies are a function of both regulatory constraints and technical, economic and industrial conditions. For example, in France:

• 95% of conventional waste produced by power plants is processed in recovery channels.

• The recycling of plutonium from spent fuel allows for a 10% reduction in natural uranium consumption.

• Very low-level radioactive waste (TFA), which accounts for 30% of the volume of radioactive waste produced in France, could be recycled, as is the case in many other countries, but is not currently done so for regulatory reasons. This circular economy approach, already implemented within the sector, is a strong point at a time when the World Bank is warning the public authorities about the large amount of mineral resources needed for the energy transition.

4. On the criterion "Prevention and control of pollution (terrestrial, aquatic and atmospheric)"

In Europe, air pollution is responsible for the untimely death of 480,000 people a year, according to the latest annual report of the European Environment Agency[7]. In this context, nuclear energy is an ally of air quality. It emits neither fine particles, nor CO, nor SO_X, nor NO_X. A survey published in June 2013 on this topic by two US researchers[8] estimated the number of deaths averted in the world from nuclear power between 1971 and 2009 at 1.84 million.

The operation of the facilities is subject to regulation; continuous measurements and controls are carried out: control of gaseous effluents at the outlet of chimneys, control of liquid effluents before and after discharge, continuous detection of ambient radioactivity and atmospheric dusts, monthly monitoring of groundwater and rainwater, sampling and analysis of samples of fauna, flora and agricultural products (milk, cereals). Each year in France, each nuclear facility carries out nearly 20,000 environmental monitoring measures. The results show that releases are well below regulatory thresholds.

In general, in environmental matters, France has implemented very conservative regulation. For example, health authorities have set a quality criterion for tritium of 100 Bq / L. This reference value in France is 100 times lower than that recommended by the World Health Organization (WHO) of 10,000 Bq / L.

5. The criterion "The protection of healthy ecosystems"

65 of the world's leading experts in conservation biology have taken a stand to argue that nuclear energy is the most respectful of biodiversity[9]. Indeed nuclear power plants can provide a significant amount of energy on a small area of land. According to the IAEA10, the most energy producing energies per m^2 over their entire life cycle are nuclear power plants, gas-fired power plants and hydro-electric power stations, thus preventing the concretization of territories and preserve natural spaces and landscapes.

This is a considerable advantage because according to an IPCC report (dated 8 August 2019[11]), preserving land and forests is necessary to combat climate change. Scientists call for the preservation and restoration of CO_2-absorbing ecosystems, such as "peatlands, wetlands, grasslands, mangroves and forests".

Finally, the waste that the industry produces is treated, stored and monitored and is not in contact with the biosphere (all living organisms and their living environments), and therefore have no health impact.

6. On the issue raised by the TEG on waste management, in particular the most radioactive waste:

The TEG specifically stated that it is unable to assess the long-term consequences of deep geological disposal of high-level long-lived nuclear waste (HA-LLW).

However, the EU itself, in its directive of 2011[12], requires Member States, for long-lived high and medium-level radioactive waste, to set up "storage in appropriate facilities that will serve as the final location" and specifies that "the storage of radioactive waste, including in the long term, is only an interim solution that can not constitute an alternative to storage".

In 2015, Finland obtained authorization for the creation of the Onkalo storage center. Sweden submitted an application for authorization in 2011. Canada, China, Belgium, Switzerland, Germany, the United Kingdom and Japan are also working on geological storage solutions.

For the IAEA, "the safety of geological disposal is widely accepted in the technical community and many countries have now decided to proceed with this option" [13]. This international consensus on geological disposal is also summarized by the OECD Nuclear Energy Agency (NEA), noting that "the opinion of specialists is that disposal by geological disposal is a satisfactory solution, and is ethically sound for the long-term management of long-lived radioactive waste. The feasibility [of geological disposal] of waste, including spent fuel, is now technically established" [14].

In France, Andra is studying the creation of a storage center (Cigéo project) located in Bure in eastern France. To study and design this center, Andra has since 1991 conducted research in various disciplines ranging from geology to digital simulation through studies on materials or the environment. The agency has mobilized a hundred scientists as well as French and international partners recognized in their fields. To ensure that storage will remain safe over long time scales, all phenomena that could degrade its performance and jeopardize safety have been taken into account (earthquake, erosion, intrusion, etc.)[15] and their consequences are evaluated and assessed and documented.

Thus, it has been shown that the selected clay rock has adequate confinement properties. It is an ancient sedimentary rock (160 million years old), homogeneous, of very low permeability located in a seismically and tectonically calm zone. The circulation of water is very limited- a molecule of water travels a few centimeters in 100,000 years. Due to this very low permeability, the radioactive elements preferentially move by diffusion in the rock and this diffusion is very slow. As a result, this process allows time for radioactivity to decline naturally without risk of spreading into the environment. The argillite is finally sufficiently resistant to allow the digging of galleries, descendant and access wells for the storage of waste packages[16].

References

[1] EUCO 30, 2016'

[2] Directive 2011/70/Euratom du Conseil du 19 juillet 2011 establishing a community framework for the responsible and safe management of spent fuel and radioactive waste

[3] https://ec.europa.eu/energy/en/topics/energy-strategy-and-energy-union/2050-long-term-strategy

[4] IEA*, Nuclear Power in a Clean Energy Sytem*, 2019, OCDE/IEA, Paris

[5] Energy mix and biodiversity: why nuclear power has a role to play? D. Beutier, Areva, 2016

[6] Arrobas, Daniele La Porta; Hund, Kirsten Lori; Mccormick, Michael Stephen; Ningthoujam, Jagabanta; Drexhage, John Richard. 2017. The Growing Role of Minerals and Metals for a Low Carbon Future. Washington, D.C.: World Bank Group.

[7] EEA, Air Quality in Europe - 2018 report

[8] Kharecha, P.A., and J.E. Hansen, 2013: Prevented mortality and greenhouse gas emissions from historical and projected nuclear power. Environ. Sci. Technol., 47, 4889-4895, doi:10.1021/es3051197.

[9] Brook, B. W. and Bradshaw, C. J. (2015), Key role for nuclear energy in global biodiversity conservation. Conservation Biology, 29: 702-712. doi:10.1111/cobi.12433

[10] AIEA, Nuclear Power & sustainable development (2016)

[11] IPCC Special Report on Climate Change, Desertification, Land Degradation, Sustainable Land Management, Food Security, and Greenhouse gas fluxes in Terrestrial Ecosystems (2019)

[12] Voir supra

[13] The long term storage of radioactive waste: safety and sustainability - A position Paper of International Experts, AIEA 2003

[14] AEN/OCDE, « Final storage of high-level waste» - 2008

[15] On and around the Oklo natural reactor in Gabon, it has been observed and demonstrated that there is no migration of fission products, despite rainwater runoff and lack of containment.

[16]Andra - Dossier 2005