

Feedback to EC call for evidence on Small Modular Reactors

A Eurelectric consultation response paper

Eurelectric represents the interests of the electricity industry in Europe. Our work covers all major issues affecting our sector. Our members represent the electricity industry in over 30 European countries.

We cover the entire industry from electricity generation and markets to distribution networks and customer issues. We also have affiliates active on several other continents and business associates from a wide variety of sectors with a direct interest in the electricity industry.

We stand for

The vision of the European power sector is to enable and sustain:

- A vibrant competitive European economy, reliably powered by clean, carbon-neutral energy
- A smart, energy efficient and truly sustainable society for all citizens of Europe

We are committed to lead a cost-effective energy transition by:

investing in clean power generation and transition-enabling solutions, to reduce emissions and actively pursue efforts to become carbon-neutral well before mid-century, taking into account different starting points and commercial availability of key transition technologies;

transforming the energy system to make it more responsive, resilient and efficient. This includes increased use of renewable energy, digitalisation, demand side response and reinforcement of grids so they can function as platforms and enablers for customers, cities and communities;

accelerating the energy transition in other economic sectors by offering competitive electricity as a transformation tool for transport, heating and industry;

embedding sustainability in all parts of our value chain and take measures to support the transformation of existing assets towards a zero carbon society;

innovating to discover the cutting-edge business models and develop the breakthrough technologies that are indispensable to allow our industry to lead this transition.

Dépôt légal: D/2025/12.105/68

Eurelectric is pleased to respond to this call-for-evidence on Small Nuclear Reactors, SMRs. 2026-2027 will be a decisive time to move forwards with the SMR Industry Alliance and pave the way for future development into deployment to realise potential SMR reactor benefits.

To begin with all carbon-free power generation technologies including SMRs must be treated in a technology-neutral way in all EU energy and industrial policy initiatives. Technology neutrality must go to the core of all governmental, public and EU support for clean electrification. This also means lead-times for regulatory and legal reviews of applications for newbuild, state aid reviews, etc, must be significantly reduced in the best interest of the European society.

First – Role of Small Modular Reactors in EU’s future power mix

SMRs can serve several purposes including enhanced grid reliability during, for instance, outage situations. Other options with SMR reactors can be to replace existing coal-fired power plants and decommissioned nuclear stations, reutilising existing sites and infrastructure as well as contributing to district heating solutions. This allows the EU to consider Member States’ different starting points in their net zero efforts and recognise the full discretion of their future decarbonised power generation mix. The greatest environmental benefits of using SMRs for heating purposes may be achieved in systems based on fossil fuels that do not meet the definition of an effective heating system.

Second – Recognize that this is a paradigm shift

It must be recognised that SMRs is a paradigm shift in how new nuclear will be manufactured and delivered. This means many practices must evolve and change accordingly. It will not suffice to build single units one at a time. A successful SMR implementation will require a fleet approach, a high degree of standardisation and breakthrough approaches to modularization from design to delivery with prefabricated systems and units. Knowledge-sharing between EU MS and projects will be essential, likely also resource sharing as appropriate during different build-out phases.

Regulatory requirements must also be harmonized between EU MS with these nuclear ambitions. ENSREG is doing important work in regulatory cooperation – and all such efforts must now accelerate. Licensing and permit procedures must be simplified and less time consuming – and regulators must be able to prepare for new applications with much needed resources and competencies.

Third – This will require a holistic EU view

SMR expansion in the EU may provide a competitive edge for Europe including technology exports beyond the region. Getting there means change – but so does entire scope of accelerated electrification that will be key to EU’s future climate change mitigation, industry competitiveness, security-of-supply and affordability of electricity for European households. As SMRs and renewables go well together with an integrated electricity system such a holistic view must be the norm. Here nuclear plays one part complementing other clean-energy technologies also providing ancillary services and resilience to disturbances. Such an integrated approach may also provide overall system cost benefits.

Four – Essential with a robust supply chain

By necessity a competitive and efficient supply chain will reach beyond the EU. But technologies of superior strategic importance must also be feasible to source from inside the region to enhance longer-term sovereignty. The supply chain is the backbone of SMR expansion with technologies, components and competences. There is already impressive

technical industries within the EU – these must be encouraged and enthused to invest in their future capabilities. The longevity of positive EU and national policy commitments will be of the essence. Both nuclear-specific and non-nuclear specific parts and components can be standardised.

Five – Time if of the essence. We must act accordingly

A 2027 thorough Commission stock-taking of the progress and status with the SMR Industry Alliance is imperative. All efforts must be guided towards where there is time-critical potential to reach the objective with SMR expansion during the first half of the 2030s. Research-driven projects will be essential for long-term European competitiveness. This said focus must not waver from what is feasible to implement within a decade from 2025 onwards. No measures should be spared to reach the goals of the SMR Industry Alliance's Strategic Action Plan 2025-2029.

Below – some more key topics:

A. Public awareness and engagement initiative

Public and transparent dialogue will be essential for societal acceptance. This includes a broader comprehension of the impact of energy policy regionally, nationally and locally. The importance of always-on electricity supply can hardly be overstated for peoples' well-being, economic development, growth and EU self-sufficiency. This is where the European Commission should spearhead even more public communications and dialogue leading into existing nuclear municipalities with concrete and decade-long experiences of nuclear operations. These networks must be applauded, reinforced and supported. Work within the EESC should be reinforced in parallel to new national fora sponsored by the EU and with significant Commission attention. Civil society representation should be enhanced. Science is important but so is local experiences, insights and preferences. Thematic panels, physical meetings as well as online, involving academia, education, regulators, unions, industry and off takers.

Multi-language science-based programs at EU-level and extensive exchanges between EU MS with nuclear ambitions should be encouraged and co-sponsored by the Commission. These are avenues of two-way communication that must be anchored regionally, nationally and with local communities. Local perspectives must be encouraged.

B. Robust and scalable supply chain

The modularity of supply will be a key success factor. This involves expectations on sub-suppliers. The SMR Industry Alliance's assessment of EU's supply capabilities must be comprehensive and EU-wide and should incorporate opportunities where suppliers could shift their focus from fossil to clean energy and NZIA tech. To encourage investments there need to be a stable outlook on future demand where initially the strategic intent of the EU, well communicated, will be important.

Successful technology supply is not limited to the field of nuclear. The EU must encourage and probably provide additional financing with programs regarding R&D, human capital as well as implementation that also involve certification. It must be determined how financial contributions may be made on the basis of the Innovation Fund, Euratom, Horizon, with NZIA, EIB, and through IPCEIs to build future capabilities.

Extensive modularisation comes with a leap in innovation in terms of design and technology and manufacturing, and delivery models. This will serve EU competitiveness, job creation and high-tech competency for decades to come. Interfaces and standards need to be open. The capacity in EU for standardization, testing and qualification must be assessed and most likely considerably expanded.

Advanced manufacturing methodology, such as with 3D printing/additive manufacturing with metal, etc, must be well-financed and interregional cooperation between technical universities and verification centres must be sufficiently resourced. Such technologies benefit many sectors beyond nuclear and already evolves for utilization in, among other industries, auto manufacturing and there will surely be cross-industry synergies to harvest in both R&D and in implementation.

In a global perspective this may – for the time being – present a possible gap in EU core competence competitiveness. This translates into opportunities to mould international experiences into an attractive cross-European ecosystem to build future resilience aligning research grants, education, awards, private capital and a public narrative of opportunity.

It will require foresight, financing and prioritization but should come to characterize the next MFF 2028-2034. This said nuclear is a well-established as a global industry. Essential industrial, governmental and agency cooperation must not only be retained but enhanced.

At the same time modularisation will require a higher degree of standardisation of codes and regulation compared with today. It will also be important to widen the supply base by expanding capabilities to verify and qualify supply of best-in-class industry components to be applied in nuclear as well.

The state of necessary basic and vocational skills call for attention, too, such as with welding, foundry, piping, turbine technology. Such skills are not exclusive to nuclear and are much in demand by multiple industries simultaneously.

C. Skills

EU and EU MS with nuclear ambitions should arrange for a joint and standardised European framework for education, training and certification with leading European technical high schools and universities. Indeed, there may be an ERAMUS++ program in select fields of nuclear with financed student exchange.

International exchange paves the way for a yet more integrated Europe including demographics and social dimensions. Such programs may already start at basic study levels. Leading researchers and research teams may be recruited from beyond the region and terms and conditions must be highly favourable for their temporary or permanent relocation. Initiatives must be adapted to industry skills requirements but also on the region's vision for the future.

An NZIA Academy that covers all clean technologies for accelerated electrification in the EU may be set up but must be financed in the very near-term. These are initiatives that may require 5-10 years to deliver the substantial effect needed. The Euratom research program should be amended so that it will embrace both safety and security related topics to knowledge critical for future large-scale nuclear build-out.

D. Member state collaboration

The frequency of PINC reports should increase with an interval of, at the most, three years. This will incur a constant dialogue on the prospects of nuclear and align better with NECPs and national priorities in a rapidly evolving environment.

Moreover EU MS collaboration must accelerate including pre-licensing, regulatory cooperation, joint acceptance and qualification criteria, additional joint early reviews, expert exchange. ENSREG's efforts to accomplish some of this must be applauded – and now accelerated.

E. Fuel and waste

More investments will be needed in the nuclear fuel supply chain in the medium-to-long-term with conversion and enrichment. Simultaneously EU MS should be encouraged to evolve programs for safe and permanent storage of spent nuclear fuel, high-level waste as well as low-level waste. Here more international cooperation must be encouraged. Already there has been significant cooperation between early movers such as Swedish Nuclear Fuel and Waste Management company, SKB, and Finnish Posiva.

Eurelectric pursues in all its activities the application of the following sustainable development values:

Economic Development

- Growth, added-value, efficiency

Environmental Leadership

- Commitment, innovation, pro-activeness

Social Responsibility

- Transparency, ethics, accountability



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