

EU emissions trading system (ETS) – revised rules (e.g. competitive bidding under the Innovation Fund)

SuperNode Ltd's contribution to the European Commission's consultation on Draft delegated regulation - Ares(2023)4773077 – 10/07/2023

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About SuperNode and Superconductors

SuperNode, headquartered in Dublin, Ireland, is a global technology development company that designs and delivers cutting-edge, superconducting cable systems for bulk electricity transmission.

Conventional transmission cables are limited in terms of current levels which in turn limit their power transfer capability. Electricity grids based upon superconducting cable systems can move larger quantities of power over longer distances with smaller and less obtrusive infrastructure, without electrical losses and at significantly lower voltages. SuperNode's technology will connect electricity producers and consumers in a way that facilitates the most efficient integration of large-scale renewables and the achievement of energy independence and a decarbonised pan-European energy system.

SuperNode was founded in 2018 by Dr. Eddie O'Connor and renewable energy developer Mainstream Renewable Power Ltd. SuperNode is jointly owned by Dr. O'Connor and Norwegian green investment group AKER Horizons.

1. Introduction – the case for electricity grid innovation

The global network of cables for electricity transmission will need to double in length between now and 2050, according to BloombergNEF, to reach 152mn kilometres or about the distance between the Earth and the Sun. This constitutes some \$21tn of investments by 2050, or app. 30% of all the investment required for the global energy transition.

SuperNode is a European company, headquartered in Dublin, Ireland. It is owned by Irish renewable energy entrepreneur Eddie O'Connor and Norwegian green investment group Aker Horizons. SuperNode is developing innovative electricity transmission technology based on superconductors for terrestrial and sub-sea application. Superconducting Cable Systems (SCS) transfer several times more electricity than conventional copper-based electricity transmission technology, with zero electrical losses, using less space and materials. To carry one kiloamp of current, conventional copper conductors require 180 times more raw material than superconducting cables.

Conventional copper-based electricity transmission technology can only carry 1 GW per cable. Transmission technology based on superconductors transfer several times more electricity. SuperNode has spent the past 5 years leading European efforts to develop terrestrial and subsea superconducting cables for power transmission, together with partners throughout Europe.

The dual challenge of overhead line planning on land and technology deficiency of underground cable technology means that, there is a strong and urgent need for new innovative grid technologies to facilitate efficient, long-range transmission of onshore and offshore renewable electricity that can match overhead lines' power capacity.

SuperNode seeks to deploy a demonstration project in 2026 to demonstrate a superconducting cable up to 10 kiloamps with up to 2 GW capacity to function as an export cable to demonstrate the technology. It will operate below its operational limits, with respect to electrical current and power, but will demonstrate the reliable installation, operation, and possible maintenance of a marine superconducting cable, which would be a world first. Such as demonstration project would have capital cost in the order of €100 million and would generate limited income during its operation as a demo.

2. The Innovation Fund must be made fit for enabling electricity grid technologies

The European Commission's intention to revise the regulation and the legal basis governing the Innovation Fund, including its complex eligibility criteria, is urgently needed. Many enabling technologies that are vital for delivering on Europe's carbon mitigation and energy independence efforts do not fit the current criteria for funding, because these are biased towards the carbon intensive industries listed in the ETS Directive.

There is strong need for applying far more flexibility in the evaluation criteria, which mandate detailed avoidance of greenhouse gas emissions (GHG). These are almost impossible to assess in the case of enabling technologies such as innovative grid technology based on superconductors. The result is a sometimes arbitrary project and technology selection process

that ignores the long term benefits and carbon reduction potential of many enabling technologies.

For three years, SuperNode has investigated the EU Innovation Fund for grant funding opportunities. The key challenge for an enabling technology such as ours, concerns the GHG methodology criteria of the existing Delegated Regulation 2019/856 on the Innovation Fund. With the introduction of the REPowerEU Window in 2022, e.g. Mid-Scale Projects and manufacturing were introduced. This reduced the weighting of the GHG criteria. Nevertheless, it is still a cause of major uncertainty, how the GHG criteria will be applied for a technology such as ours and other enabling technologies.

Two of the five innovation Fund evaluation criteria relates to GHG avoidance in the existing Delegated Act. Moreover, the existing Delegated Regulation 2019/856 establishes that “the major part of the Innovation Fund support should depend on verified avoidance of greenhouse gas emissions”.

SuperNode has sought clarification from CINEA on how a Superconductor Demo project or manufacturing plant would be evaluated. We have also held a number of very helpful meetings with Commission staff to seek clarity. These confirmed that our Superconducting cable technology is eligible for funding under the Innovation Fund. Nevertheless, applying the criteria of the existing Delegated Act to our enabling technology does not make us confident enough to prepare an application process that drags large resources for a small company of 60 staff.

Applying our understanding of the GHG emissions guidance, SuperNode does not achieve the required/competitive relative emissions reduction to warrant pursuing a grant application.

Applying the GHG emission reduction criteria of Delegated Regulation 2019/856 simply does not return the needed thresholds with high enough confidence, because electricity grids are enabling technologies rather than carbon emitting technologies with emission reduction potentials such as for CCS and hydrogen technologies. Indeed, of the €3.1 billion allocated since 2020, 74% of total funding has gone to Hydrogen (24%) and CCUS (50%) Projects, while Renewables and Storage has only received a combined 18 % of funding.

From SuperNode’s perspective, there is an urgent need to adjust the evaluation criteria for electricity transmission. SuperNode therefore warmly welcomes the Commission’s initiative to adjust the Delegated Act on the Innovation Fund, following the agreement on a revised ETS.

3. The need to increase the Innovation Fund’s technology scope and adjust its evaluation criteria.

Whereas, the draft Act contains important new elements, such as competitive bidding, an increased budget, and changes to the Project Development Assistance, SuperNode had hoped to see a somewhat clearer reflection of the important additions of electricity grids and the Union targets on interconnectivity in the ETS Article 10.

- **Article 10, para 3 (b):** Grids are now included as activities that can be funded by auctioning revenue from ETS allowances: revenue shall be used, inter alia, “to develop

renewable energies and grids for electricity transmission to meet the commitment of the Union to renewable energies and the Union targets on interconnectivity...”

From SuperNode’s perspective, this addition of grids for electricity transmission to the legal basis of the Innovation Fund, should be seen as an opportunity to provide innovative electricity grid infrastructure with a clearer pathway towards funding for demonstration projects that could give Europe an early lead in innovative transmission technology.

SuperNode has previously - together with currENT, the Brussels-based association of innovative grid technologies – called for a new draft Delegated Act to establish a set a new evaluation criteria for innovative electricity transmission technology in a revised Delegated Act in the Innovation Fund. According to currENT’s submission¹ “there seems to be significant uncertainty among technology developers because the two carbon mitigation criteria of the Innovation Fund do not fit well with enabling technologies such as innovative transmission technology”.

SuperNode and others have suggested introducing a set of evaluation criteria that better fit enabling technology such as innovative electricity transmission projects - now included in the revised ETS Directive framework.

The new draft Delegated Act does not remove the inappropriate GHG reduction criteria for grid technologies, but does go some way to address the concerns (see section 3). However, it still remains unclear how, for example, the new award paragraph 3 that has been added to Article 11 on award criteria, would impact evaluation of enabling technologies applications.

There is a need for increasing the Innovation Fund’s technology scope and adjust its evaluation criteria. While grid technologies do not directly avoid greenhouse gas emissions, they are no less in desperate need of innovation and are critical to the energy transition, as already recognised in the Commission’s Offshore Renewable Energy Strategy” (COM72020/741), which states that:

“it will be important to facilitate the testing of new technologies for future offshore grids,” and that “the increasing amount of energy generated offshore by these offshore technologies must also be supported by further development of innovative infrastructure and grid technologies.”

The EU ETS Innovation Fund has an important role to play in accelerating the transition to a low-carbon economy. By adjusting the evaluation criteria, extending its scope and providing more targeted support for specific technology areas, SuperNode strongly believes that the fund can help unlock the potential of small, innovative companies and breakthrough technology to drive real change.”

4. Comments to specific selected provisions of the Draft Delegate Act

SuperNode finds in general that the changes proposed to the Act are positive, including:

- The threshold for small-scale projects has been increase from €7.5 million to €20 million;

¹ See currENT’ [submission](#) of 8 February 2023: Improved funding facilities needed to take Europe to the Net-Zero Age

- The new definition of A 'medium-scale project' as a project with a total capital expenditure btw €20 million and €100 million
- **Article 12:** The amendments to the two-stage application procedure may provide for a less complex first stage application, making a decision to apply less resource heavy for applicants, especially for smaller, innovative companies. The less complex procedure for small scale project, is also welcomed;
- **Article 12:** Would now make it possible for applicants to apply for EIB Project Development Assistance in respect of any projects falling within the scope of the Innovation Fund, irrespective of whether a grant under the Innovation Fund has been previously applied

Article 3 (aa):

SuperNode finds the new objective of funding that has been added highly relevant. The new, proposed objective is:

“to support projects that are sufficiently mature, have a significant potential to reduce greenhouse gas emissions and are aimed at scaling up innovative technologies, processes or products to achieve their broad commercial roll-out across the EU”.

Article 11 , 1(d)

An important [addition](#) has been made to criteria (d) in Article 11 so it now reads (addition in blue):

“technical and market potential for widespread application or replication, or for future cost reductions; [and in terms of the proposed projects’ potential to address multiple environmental impacts and its contribution to the EU’s zero pollution and circularity objectives;](#)”

SuperNode strongly supports this addition, which must be seen as the Commission’s insistence on seeking to apply the Energy efficiency First Principle to its flagship innovation funding programme. Innovative grid enhancing technologies, advanced conductors and superconducting cables are all characterised by superior performance in terms of circularity, less space, efficiency benefits and raw material efficiency, compared to building new, conventional grid infrastructure. These are features that a revised Delegated Act should pursue to the greatest extend possible.

New Article 11, 3.

SuperNode vehemently supports the proposed addition to Article 11 of the new paragraph 3, concerning award criteria. It could significantly enhance the potential applicability of the Innovation Fund to enabling technologies, if the Commission would be empowered to make sector specific calls or establish sector specific topics within a sector, with altered criteria.

This new funding may enable specific call texts for enabling electricity grid technologies with vast potentials for GHG reductions when scaled, including innovative Grid Enhancing Technologies, such as Dynamic Line Rating, Modular Power Flow Control Systems, new sensor technologies, as well as Advanced Conductors and Superconducting Cable Systems

It is also highly welcomed that the new, additional award criteria or requirements seek to evaluate:

“the potential contribution of the proposed projects to the objectives and priorities of the European Green Deal. Such additional award criteria or requirements may include the potential contribution of the proposed projects to the EU’s access to a secure and sustainable supply of net-zero technologies needed to safeguard the resilience of the EU’s energy system and to contribute to the creation of quality jobs.”

The Commission’s proposed Net Zero Industry Act includes “Grid Technologies” as one of eight Strategic Net Zero Technologies. The proposed addition to the Article 11,3 would enable the European Commission to add a topic on innovative grid technology.

As pointed out already, this would necessitate alternative criteria because of the challenge of determining GHG reductions of enabling technologies.

Ideally, SuperNode would have liked to see the introduction of, a new, additional Article (Article 11a) for enabling technologies such as Innovative Electricity transmission technology, that excludes the two existing GHG avoidance criteria (Article 11 1, (a) and (e)). Such a new, additional Article 11a could add alternative criteria as proposed in the Draft Act, while maintaining criteria (b), (c), and (d) for such a new group of enabling technologies?

In the absence of a new, additional Article 11, specifically addressing Grid Technologies, SuperNode proposes that the formulation “...additional award criteria or requirements...” is replaced by the formulation “...adjusted award criteria or requirements...”.

This would *provide additional clarity and strong signals to grid technology innovation companies.*

The current criteria in Article 11 do not fit enabling technologies, including innovative grid technologies, which are viewed by the European Commission to be one of eight technologies, vital for delivering on Europe’s carbon mitigation and energy independence efforts.

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