



European
Commission

INNOVATION FUND

Driving clean innovative technologies towards the market

NorthFlex: Decarbonising temporary power & flexible storage

The Innovation Fund is 100% funded by the EU Emissions Trading System

Project summary

The NorthFlex project objective is to introduce to the market and scale-up the deployment of an innovative battery pack technology. The system, referred as the Voltpack Mobile System (VMS), comprises of two units: an individual high energy-density battery pack and a central power hub. Benefiting from innovations in design and manufacturing, the new system will lead to batteries with 50% higher energy density and 50% weight reduction compared to the state-of-the-art. After the planned ramp-up of production, the project expects to place an annual capacity of 457 MWh on the market, supporting the transition to renewable electricity supply and electric mobility in Europe and leading to 100% greenhouse gas (GHG) emissions avoidance compared to conventional electricity production.

COORDINATOR

Northvolt Battery Systems

LOCATION

Poland and Sweden

SECTOR

Intra-day electricity storage

AMOUNT OF INNOVATION FUND GRANT

EUR 4 427 807

RELEVANT COSTS

EUR 7 379 678

STARTING DATE

01 April 2021

PLANNED DATE OF ENTRY INTO OPERATION

Q2 2024



VMS.CAKE

An innovative mobile 'plug and play' energy storage system

The VMS is the first truly mobile 'plug and play' energy storage system, with modularity and flexibility functionalities. It will provide an alternative to: (1) carbon intensive diesel generators for existing market applications (construction sites, events); and, (2) other industrial/commercial scale temporary energy storage solutions which are bulky, inflexible and difficult to transport and operate. The project introduces innovation with the mobile and modular design, and in the manufacturing process of the product, with an expected impact on scaling up the production and lowering the costs of production.

The VMS consists of two separate units: the Voltpack Mobile (Voltpack) and the Volthub Grid (Hub). The Voltpack is the individual self-contained, industrial-grade, high energy-density Lithium-ion Battery Energy Storage System (BESS) with a capacity of 255 kWh per unit. The Volthub Grid is the central power hub, providing a 400V AC pluggable input and output allowing the energy storage to interface with standard distribution equipment. Up to five Voltpack Mobiles (1 275 kWh) can be connected to a single Volthub Grid, providing the innovative modular scalability of the product.

Significant potential reduction in GHG emissions and air pollutants

The introduction of the VMS product will support increased adoption of clean energy storage and direct replacement of diesel-based power generation. Once production is fully ramped up, the project expects to have an annual capacity of 457 MWh placed on the market. This represents a significant potential reduction in GHG emissions and air pollutants once the batteries are in use (more than

1 165 000 tCO_{2e} net absolute emissions avoided during the first ten years of production). At sector level, the VMS has the potential to contribute to further GHG-emission reductions by accelerating the transition to electrified transport and decarbonisation of the stationary electricity grid.

The VMS delivers a BESS which will close the gap between two separately developed markets: (i) temporary power generation, which is predominantly served by diesel generators and (ii) commercial / industrial scale energy storage relying on stationary, containerized BESS with a high cost of installation and low flexibility. The innovative features (mobility, 'plug and play', modularity, flexibility, sustainability, and digital connectivity) will make it competitive in both these markets and will reduce the overall cost of deployment of industrial scale BESS.

The solution also addresses the environmental concerns of current temporary power solutions (e.g. the World Bank estimates that back-up generators alone release 100 MtCO_{2e} emissions annually into the atmosphere) and allows for a fleet of modular storage systems that can be deployed and re-deployed easily for EV charging stations and distribution grid applications (e.g. grid forming units in remote areas or providing ancillary services).

A real potential to disrupt the diesel-based temporary energy generation market

Development of the product has been taking place in Northvolt's facilities in Sweden, while the industrialization and mass manufacturing of the VMS will take place in Poland. Northvolt Battery Systems is already investigating the feasibility of expanding the manufacturing capacity for the VMS beyond the scope covered by the NorthFlex project. There is also evident potential for transferring the project's technology to other sites.

The innovations behind the VMS set it on a path to disrupt the diesel-based temporary energy generation market mimicking the disruption electric vehicles have brought in the automotive market and bridging the gap between mobile temporary power solutions and stationary BESS. This will allow an entirely new market for energy storage - one that can service the fast-growing need for electrification through rapid deployment, while offering a wholesale sustainable replacement for diesel gensets.