

Hitachi Energy calls for urgent action to strengthen power systems and address grid bottlenecks

- With 3,000 gigawatts of renewable projects waiting in connection queues, power system upgrades are vital to support the clean energy transition
- Increased integration of wind and solar energy into power systems is causing intermittency and reducing system inertia and stability
- Hitachi Energy launches Grid-enSure™, a fully integrated solution portfolio to stabilize power systems by strengthening transmission, managing frequency variations and system voltage and addressing capacity constraints

Paris/Zurich, August 27, 2024 – Hitachi Energy is calling for immediate action to expand global power grids, reduce connection bottlenecks, and accelerate the energy transition by increasing the deployment of innovative power electronics technology.

3,000 gigawatts (GW) of renewable projects are currently waiting in grid connection queues, equivalent to five times the amount of solar photovoltaic (PV) and wind capacity added in 2022. It is estimated that 80 million km of grids must be added or replaced by 2040, requiring grid investment to double to more than \$600 billion a year by 2030 ([IEA](#)).

The increasing penetration of renewables, the decentralization of power generation, and the electrification and decarbonization of traditional fossil-based industries are creating challenging operating environments for power systems. Due to more variable power flows, lower inertia and predictability, the need for increasingly controlled interconnection capacity, green energy corridors, directly feeding cities, is required to support the remote sustainable generation. Inertia is crucial to ensure overall grid stability.

To address these issues and the needs of a fast-evolving power system, Hitachi Energy is today launching Grid-enSure™ at the CIGRE 2024 Paris Session – a portfolio of fully integrated solutions that helps to enhance grid flexibility, resilience, and stability to accelerate the sustainable energy transition.

Grid-enSure brings a new holistic approach to designing, planning and operating present and future power systems. The portfolio is based on Hitachi Energy's extensive advisory and consulting services for grid development and modernization, an in-house verticalized value-chain for power electronics and advanced control systems, as well as strong power system domain and control engineering expertise.

Hitachi Energy's consulting services also help customers understand future challenges and the relevant Grid-enSure solutions to address them. The solutions combine Hitachi Energy's existing and future power electronic solutions such as high-voltage direct current (HVDC), static compensators (STATCOM and Enhanced STATCOM), static frequency converters (SFC), medium-voltage direct current (MVDC), energy storage solutions and semiconductor technologies.

“We are at a defining moment in the energy transition. With unprecedented levels of renewable power being added globally, we must reconsider how we design, plan, and operate power systems to support the rapid pace of the energy transition,” said Niklas Persson, Managing Director of Hitachi Energy's Business Unit Grid Integration.

“Traditional power technology solutions alone cannot provide the necessary speed and

functionalities that our renewable-powered grids require, so a more holistic approach is needed.”

Grid-enSure’s power electronics solutions include advanced semiconductor technology – entirely manufactured in-house - to allow the fast and secure conversion and control of energy flows, thanks to higher power density and optimal switching frequency.

“The cutting-edge control systems provide microsecond response to address the needs of the grid, providing the required flexibility with the help of advanced control functionalities such as grid-forming, synthetic inertia, fast-frequency response, voltage control, interoperability, and much more. This puts the Grid-enSure portfolio at the center of power system transformation”, said Inés Romero, Head of Product Management and Strategy of Hitachi Energy’s Business Unit Grid Integration.

In the European synchronous area alone, an estimated 450 gigawatt-seconds (GWs) of additional energy is required to support inertia requirements by 2030¹. In the past, this requirement would have been addressed by large rotating synchronous generators and machines. Hitachi Energy’s Grid-enSure solutions, such as Enhanced-STATCOM, store energy in the form of supercapacitors controlled by high-power semiconductors, doubling the energy utilization rate and reducing the required installed capacity by 20 percent or more, compared to conventional solutions².

1 https://eepublicdownloads.blob.core.windows.net/public-cdn-container/clean-documents/sdc-documents/231108_Project_Inertia_Phase_II_First_Report_FOR_PUBLICATION_clean.pdf

2 According to Hitachi Energy calculations

In addition, solutions such as HVDC, STATCOM and energy storage solutions can help stabilize voltage and frequency, improving operational reliability and reducing the need to build new power plants.

Investment in next generation STATCOM technologies worldwide could result in up to 40 percent lower CO2 emissions over a 30-year lifetime compared to traditional alternatives, while investment in Hitachi Energy’s HVDC Light® brings over 65 percent carbon footprint reduction compared to traditional HVDC technology.

Grid-enSure in action

Grid-enSure is the breakthrough solution behind the successful energization of **Caithness Moray-Shetland in Scotland**, a world-leading multi-terminal HVDC voltage-source converter system, integrating wind energy generation from remote islands. It provides grid performance and resilience by stabilizing Caithness AC network, through grid forming control, and Viking Wind Farm on Shetland, through frequency and AC voltage control. Moreover, it enables the grid to rapidly respond to reliably deliver the equivalent power consumption for around 10 million UK homes.

In an initial installation at **TransnetBW** in Germany, which supplies power to 11 million people and numerous industries, Grid-enSure will improve power quality by contributing almost 2 GWs to the grid inertia level and helping to reduce CO2 emissions by up to 40 percent over a 30-year lifetime compared to traditional alternatives. Additionally, its advanced control features, like grid forming control, provide significant improvements over previous solutions.

The new **Waratah Super Battery near Sydney** is now under construction, supported by cutting-edge power converter technology³. When complete, the Battery Energy Storage System will help Australia meet its renewable energy target of adding 33,000 gigawatt-hours

(GWh) each year through 2030. The 850-megawatt/1680-megawatt hour BESS will include 288 Power Conversion Systems (PCS).

3 [Waratah Super Battery supercharges energy transition in NSW, Australia | Hitachi Energy](#)

Another example is Hitachi Energy's advisory and consulting work in designing a unique and record-breaking **250 km power-from-shore AC connection off the coast of Norway**. By integrating STATCOM technology and thyristor-controlled series capacitors for the first time, the solution supplies hydropower to offshore oil and gas assets, minimizing their carbon footprint.

Grid-enSure website

<https://www.hitachienergy.com/markets/utilities/energy-transmission/grid-ensure>

- End -

About Hitachi Energy

Hitachi Energy is a global technology leader that is advancing a sustainable energy future for all. We are advancing the world's energy system to be more sustainable, flexible and secure and we collaborate with customers and partners to enable a sustainable energy future – for today's generations and those to come. Hitachi Energy has a proven track record and unparalleled installed base in more than 140 countries, serving customers in utility, industry, transportation, data centers and infrastructure sectors. With innovative technologies and services including the integration of more than 150 gigawatts of HVDC links into the power system, we help make the energy value chain more efficient, making electricity more accessible to all. Together with stakeholders across sectors and geographies, we enable the digital transformation required to accelerate the energy transition towards a carbon-neutral future. Headquartered in Switzerland, we employ around 45,000 people in 90 countries and generate business volumes of around \$13 billion USD.

<https://www.hitachienergy.com>

<https://www.linkedin.com/company/hitachienergy>

<https://twitter.com/HitachiEnergy>

About Hitachi, Ltd.

Hitachi drives Social Innovation Business, creating a sustainable society through the use of data and technology. We solve customers' and society's challenges with Lumada solutions leveraging IT, OT (Operational Technology) and products. Hitachi operates under the 3 business sectors of "Digital Systems & Services" – supporting our customers' digital transformation; "Green Energy & Mobility" – contributing to a decarbonized society through energy and railway systems, and "Connective Industries" – connecting products through digital technology to provide solutions in various industries. Driven by Digital, Green, and Innovation, we aim for growth through co-creation with our customers. The company's revenues as 3 sectors for fiscal year 2023 (ended March 31, 2024) totaled 8,564.3 billion yen, with 573 consolidated subsidiaries and approximately 270,000 employees worldwide. For more information on Hitachi, please visit the company's website at <https://www.hitachi.com>.

Information contained in this news release is current as of the date of the press announcement, but may be subject to change without prior notice.
