

Hitachi Energy Investor Days 2023

**Power electronics and business models
as key enablers for the future energy system**



Niklas Persson

BU Managing Director Grid Integration
Hitachi Energy

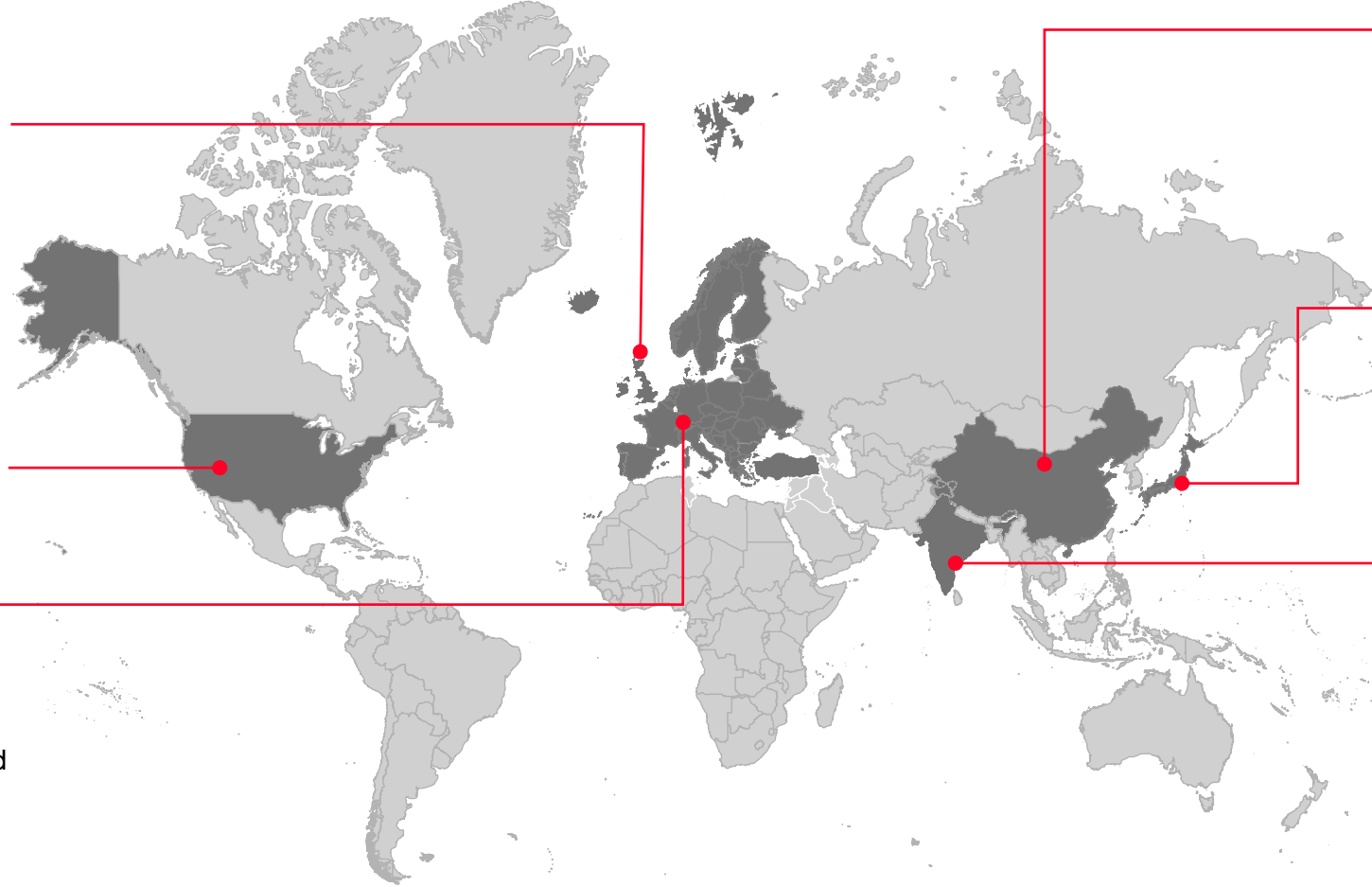





Hitachi Energy –
Advancing a sustainable
energy future for all



Significant growth opportunities as commitments gather pace

-  **UK**
Net zero by 2050
50GW offshore wind ambition
-  **US**
Net zero by 2050
30GW offshore wind ambition by 2030
-  **EU**
Net zero by 2050
109-112GW offshore wind ambition by 2030 and 281-354GW by 2050



-  **China**
Net zero by 2060
1.2TW solar and wind ambition by 2030
-  **Japan**
Net zero by 2050
Up to 45GW offshore wind by 2040
-  **India**
Net zero by 2070
500GW renewables by 2030 (~50% of energy mix)

Sources: [IEA WEO 2022 - Net Zero Emissions by 2050 \(NZE\) Scenario](#); [White House; The American Jobs Plan](#); [White House; EU Renewable Energy Targets](#); [European Commission; EU Action Plan](#); [UK Net Zero Strategy](#); [GOV.UK](#); [IRENA](#); [Gov China](#); [Press Information Bureau, India](#); [WEF](#); Status: May 2023

Sustainability



Innovation



Digital



Plan

Comprehensive services to support net zero transformation

Novel solutions to new challenges

Technical expertise to deliver data driven insights

....solving the increasing **grid planning** needs



ENOWA

Partnership for world's most advanced renewable energy hub and the first at-scale fully renewable energy system

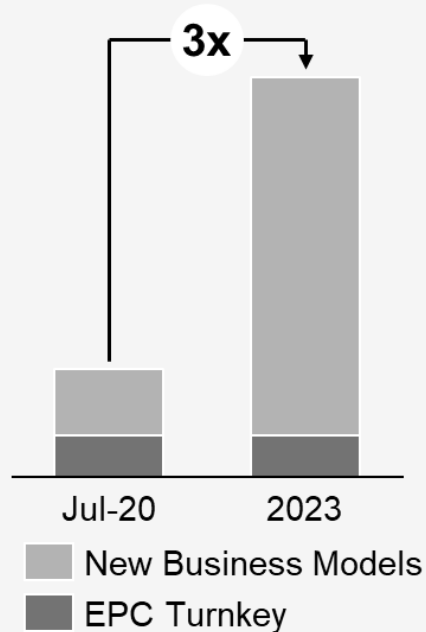


PowerGrid India

PreFEED of 2x 2.5GW Pang-Kaithal HVDC green energy corridor to connect 13GW (solar, wind) to load centers in south of India



Indicative backlog of projects



Framework agreements

- Execution synergies across projects
- Lessons learned process
- Technology innovation
- Predefined project agreements

Innovative business models

- Adjusted performance of framework agreements
- Inflation adjustment mechanisms
- Modularity and scalability
- Detached civil work

Scaling enablers (examples)



Innovate through pioneering technology, standardization, and modularization

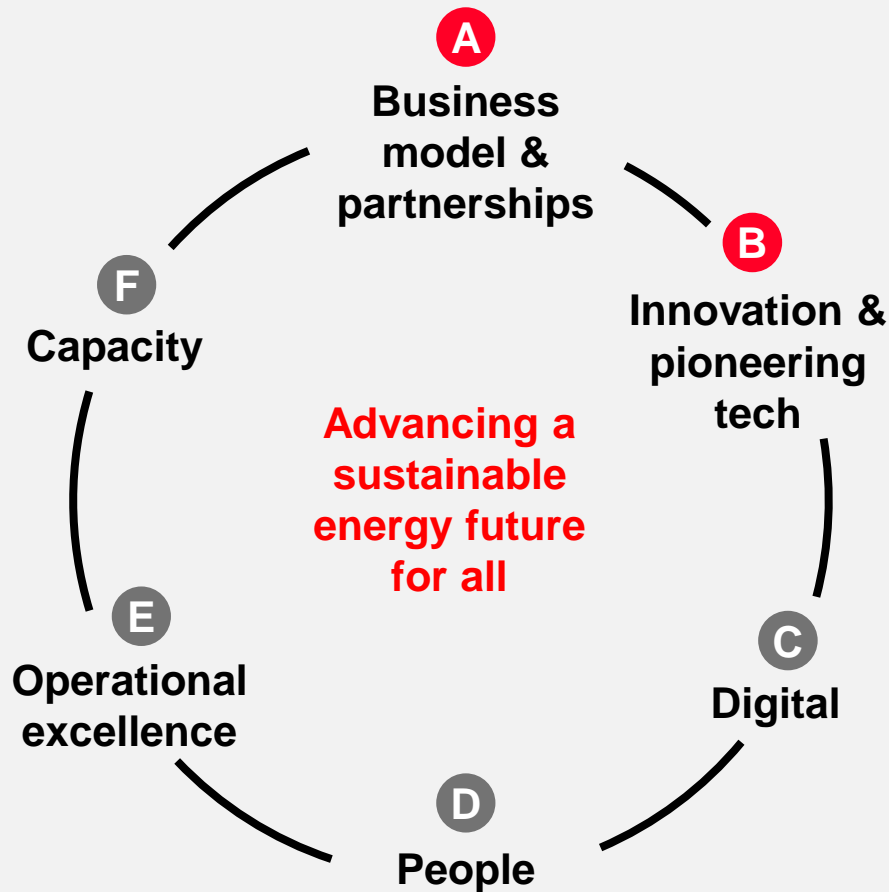


Scale supply chain through capacity expansion and holistic procurement strategy



Ramp up execution and ensure operational excellence and resources





A Business model & partnerships – global standards
 collaboration with our customers and partners to unlock growth, allow standardization and optimize capacity planning

MV/LV¹ technology partner

ABB

Schneider Electric

Offshore platforms partner

Petrofac

Aibel

T&D substations partner

Linxon

B Innovation & pioneering technology
 Next-level product portfolio to catalyze the energy transition
 Power electronics-based solutions

HVDC



STATCOM



eMobility



Grid Edge



Framework agreements improve contractual setups and ability to deliver on projects

A Business models and partnerships

Long-term framework agreements:

- enable faster and more efficient deployment of HVDC¹ solutions
- improve contractual setups and ability to deliver

... through ...

- **Standardization** to increase synergies
- **Speed and productivity**
- **Visibility** for potential investments



Dogger Bank A, B and C

3 projects **3.6** GW



TenneT 2GW Program

6 projects **12** GW



NEOM

3 projects **9** GW



SSEN Transmission

5 projects **10** GW

1. HVDC is a key technology for a carbon-neutral energy system

B Innovation and pioneering technology

HVDC

Bulk transmission over long distances, integration of renewables and interconnecting grids

>150GW of HVDC¹ links integrated into the power system



Higher power, lower losses, compactness



Full control for grid reliability and flexibility



Pioneering technology and execution leader



High growth segment

Project Lightning

First of its kind sub-sea power transmission network in Middle East and North Africa region

Power-from-shore solution 3,200 MW

Clean power transfer from mainland to ADNOC's offshore production operations

> 30% CO₂ reduction of ADNOC's² offshore operations



2. STATCOM allows increased efficiency and stability

B Innovation and pioneering technology

STATCOM

Facilitates renewable adoption

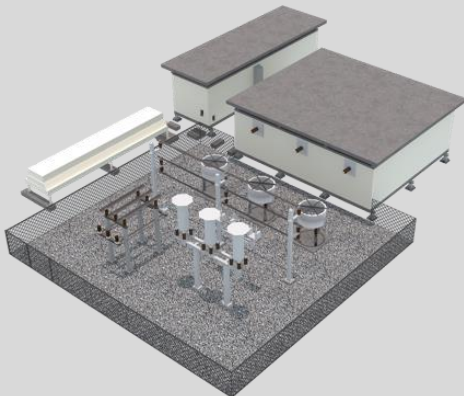
Improves industry efficiency
and secures grid stability



Compact design, lower losses, increased efficiency



40% less CO₂ emissions



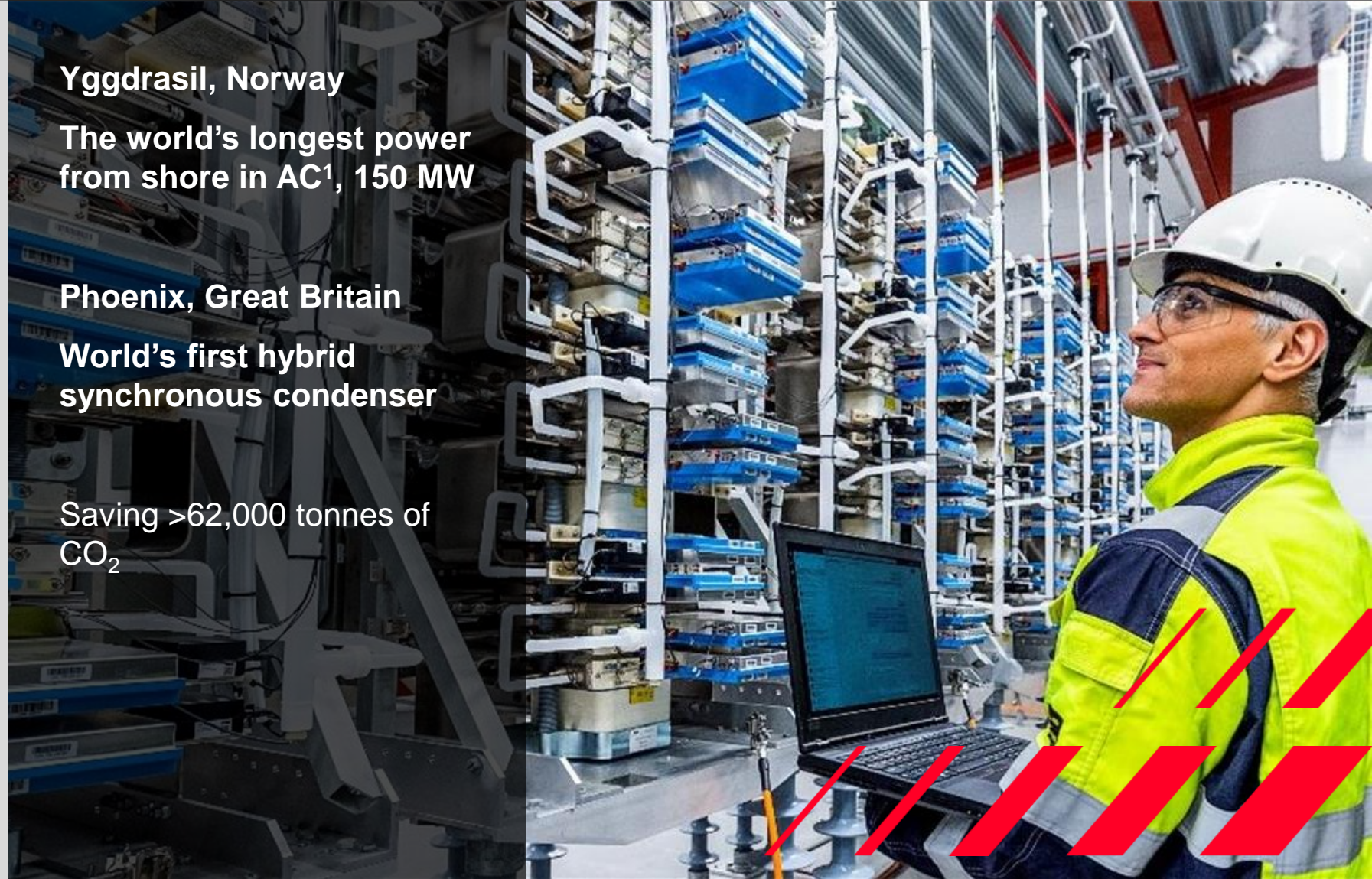
Yggdrasil, Norway

The world's longest power
from shore in AC¹, 150 MW

Phoenix, Great Britain

World's first hybrid
synchronous condenser

Saving >62,000 tonnes of
CO₂



3. eMobility solutions enable high-performance charging to scale up electric fleets

B Innovation and pioneering technology

Grid-eMotion®

Compact and configurable grid-to-plug and data-to-analytics charging system



High-performance charging



Scalable for sites >1 MW and multiple charging points



> 500 charging points with ~100 MW charging power¹



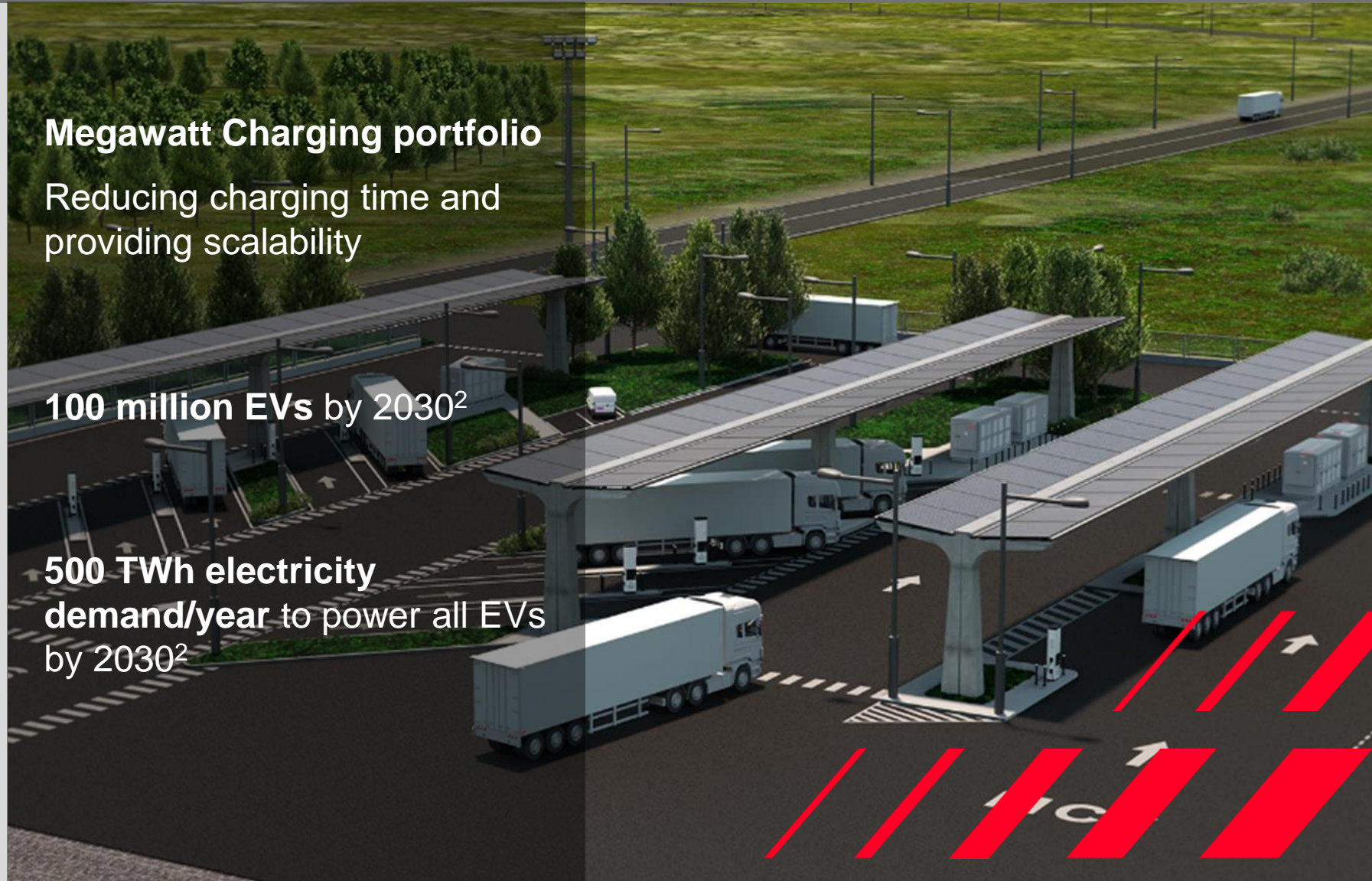
Lower noise, vibrations and emissions

Megawatt Charging portfolio

Reducing charging time and providing scalability

100 million EVs by 2030²

500 TWh electricity demand/year to power all EVs by 2030²



4. Grid Edge Solutions increase energy autonomy and unlock new economic opportunities

B Innovation and pioneering technology

Grid Edge Solutions

Energy management solutions

Achieve energy autonomy & manage renewables



Digital

Automation

Power

Acquisition of **eks Energy** - leading supplier of power electronics

Helping the Faroe Islands aim for 100% renewables

Challenge:

- Integrate the Porkeri wind farm to reduce diesel consumption and CO₂ emissions
- Improve power quality

Solution:

- Maximize the use of wind energy
- Meet sustainability targets

Impact:

- Harnessing renewables like wind, hydro & solar



**Scaling to
accelerate
the energy
transition will be
enabled by new
business models,
partnerships and
pioneering
technologies**

Key takeaways

- 01** The energy transition has catalyzed a surge in electricity demand and fundamental changes to power grids
- 02** New delivery models are essential to meet this growing electricity demand within a significantly more complex power grid system
- 03** Hitachi Energy is introducing new business models to unlock growth, allow standardization, optimize capacity planning and focus on our core competencies
- 04** Our pioneering technology solutions are crucial to unlock the energy transition from power generation to end use



HITACHI
Inspire the Next 