HITACHI
Inspire the Next

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

Hitachi Energy –
Advancing a sustainable
energy future for all

Significant growth opportunities as commitments gather pace

HITACHI
Inspire the Next

UK
Net zero by 2050

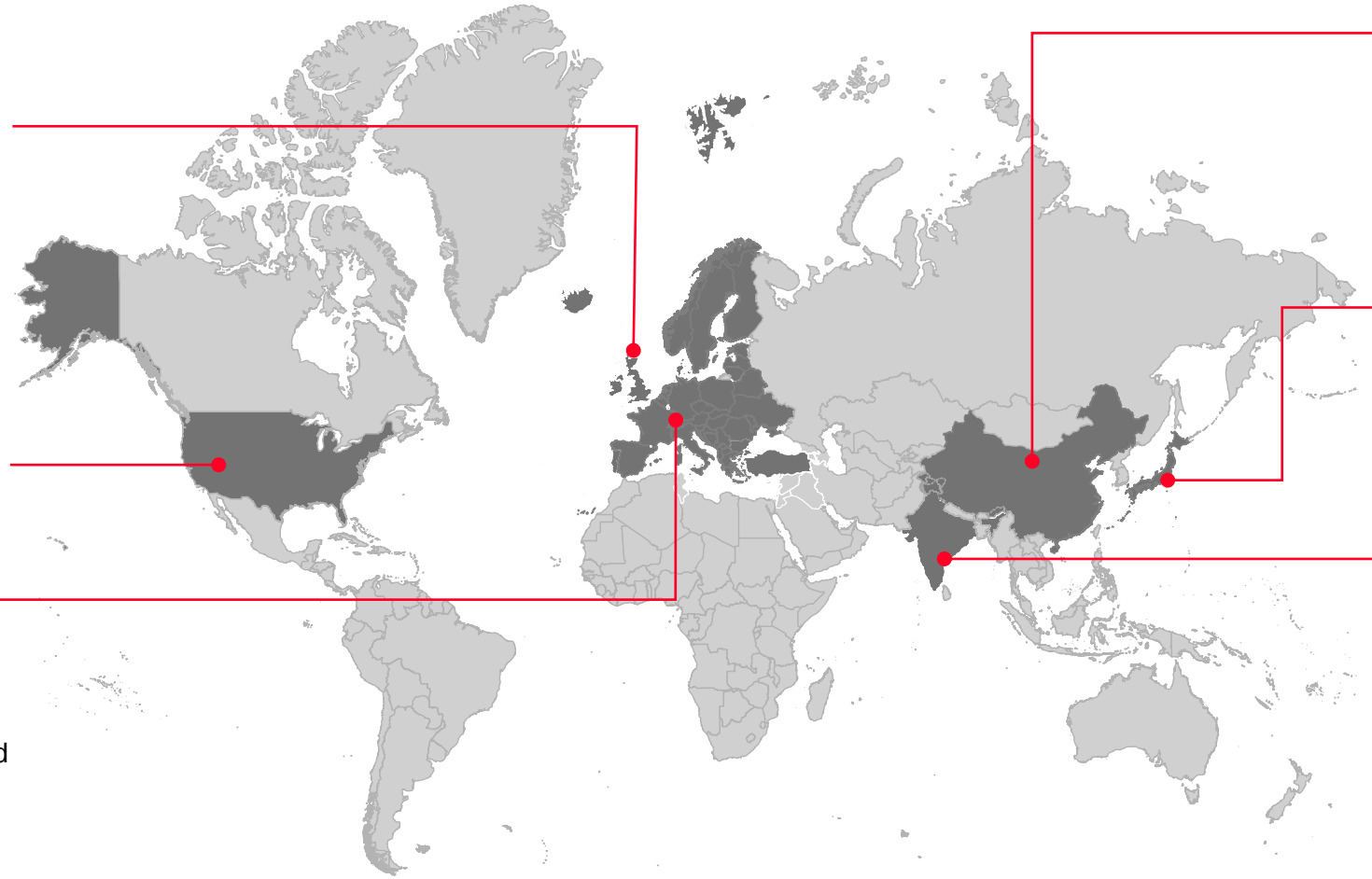
50GW offshore wind ambition

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

Hitachi Energy

Power consulting advisory services – Plan

HITACHI
Inspire the Next

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

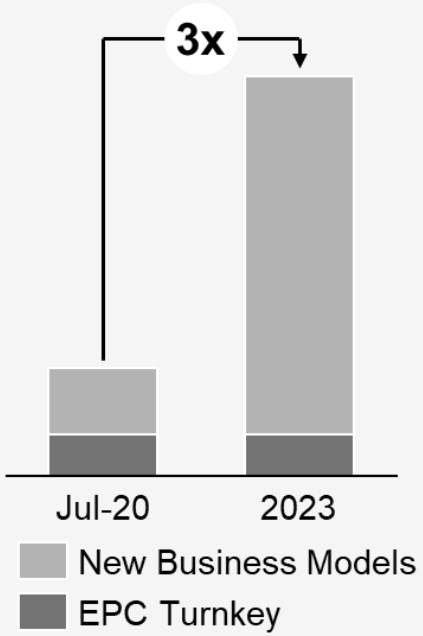
PreFEED of 2x 2.5GW Pang-Kaithal HVDC **green energy corridor** to connect 13GW (solar, wind) to load centers in south of India

Hitachi Energy

Scaling, new business models and framework agreements – Build

HITACHI
Inspire the Next

Indicative backlog of projects



New business models 3x

De-risked EPC turnkey

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**

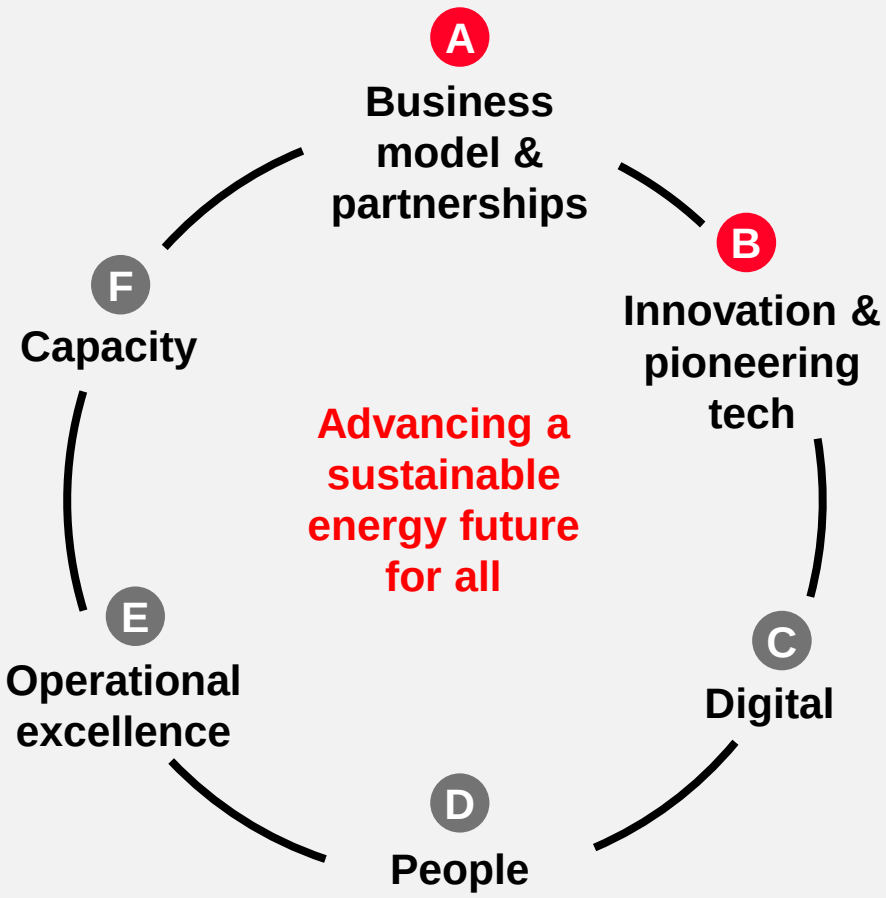
Scale supply chain through capacity expansion and holistic procurement strategy

Ramp up execution and ensure **operational excellence** and **resources**

EPC: Engineering, Procurement, Construction

Hitachi Energy

Our delivery model will enable rapid scaling – Build



A Business model & partnerships – global standards

collaboration with our customers and partners to unlock growth, allow standardization and optimize capacity planning

MV/LV[1] technology partner	Offshore platforms partner	T&D substations partner
ABB	Petrofac	Linxon
Schneider Electric	Aibel	

B Innovation & pioneering technology

Next-level product portfolio to catalyze the energy transition
Power electronics-based solutions

HVDC

STATCOM

eMobility

Grid Edge

1 Medium-Voltage and Low-Voltage

Framework agreements improve contractual setups and ability to deliver on projects

HITACHI
Inspire the Next

A Business models and partnerships

Long-term framework agreements:

- **enable faster** and more **efficient deployment** of **HVDC[1]** solutions
- **improve contractual** setups and **ability to deliver**

… through …

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


Image credit: courtesy of Aibel

Dogger Bank A, B and C

3 projects **3.6** GW


Image credit: courtesy of TenneT

TenneT 2GW Program

6 projects **12** GW

NEOM

3 projects **9** GW

SSEN Transmission

5 projects **10** GW

1 High-Voltage Direct Current

Hitachi Energy

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

HITACHI
Inspire the Next

B Innovation and pioneering technology

HVDC

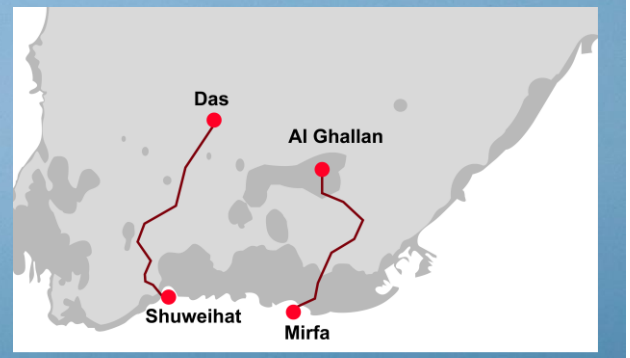
Bulk transmission over long distances, integration of renewables and interconnecting grids

>150GW of **HVDC[1] 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% CO_2 reduction of ADNOC's[2] offshore operations

1 High-Voltage Direct Current
2 Abu Dhabi National Oil Company

Hitachi Energy

2. STATCOM allows increased efficiency and stability

HITACHI
Inspire the Next

B Innovation and pioneering technology

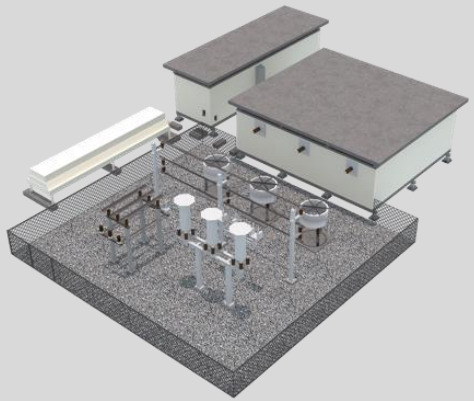
STATCOM

Facilitates renewable adoption

Improves industry efficiency and **secures grid stability**

Compact design, lower losses, increased efficiency

40% less CO_2 emissions



Yggdrasil, Norway

The world's longest power from shore in AC[1], 150 MW

Phoenix, Great Britain

World's first hybrid synchronous condenser

Saving >62,000 tonnes of CO_2

1 Alternating Current
Hitachi Energy

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

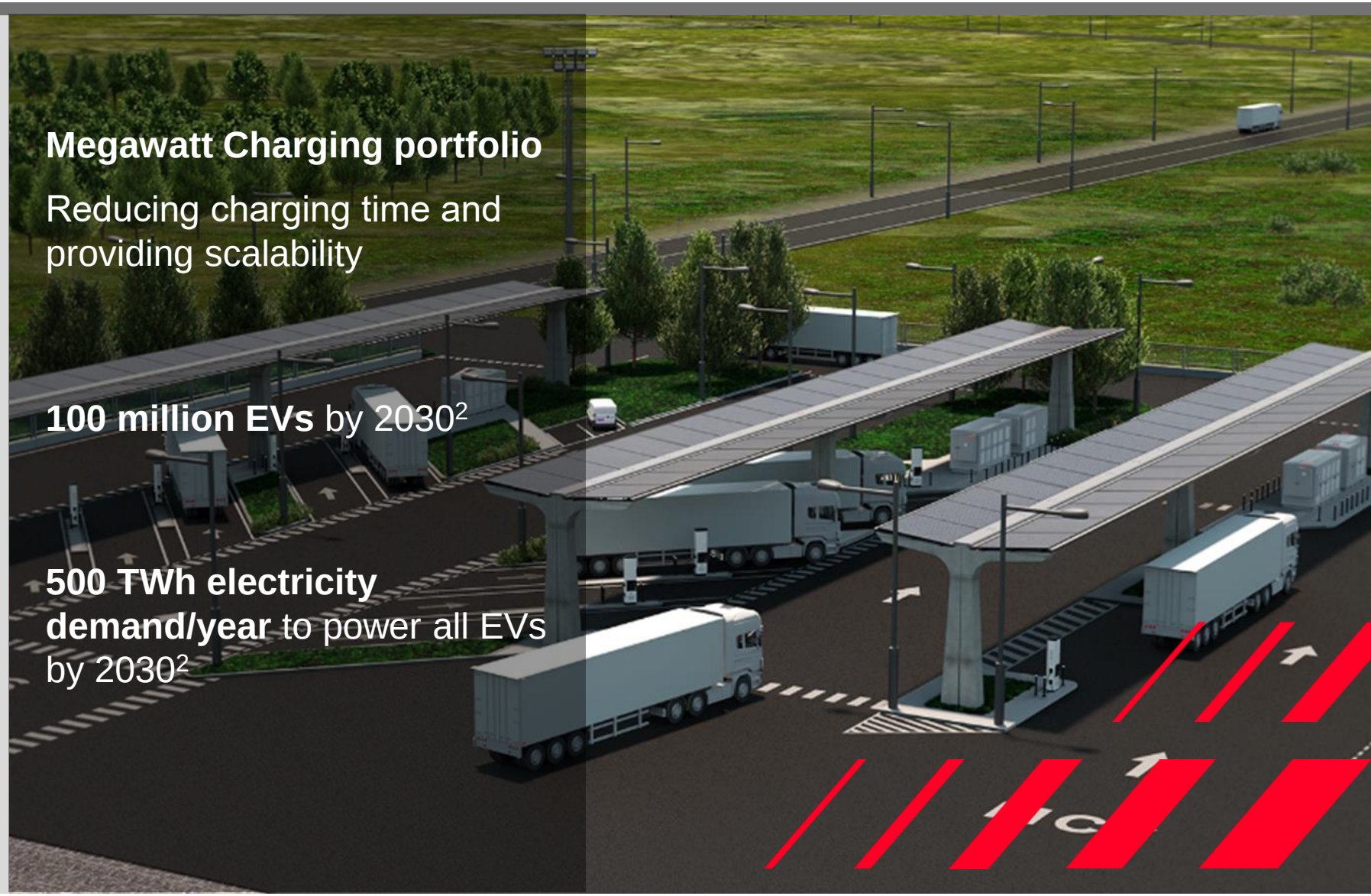
HITACHI
Inspire the Next

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 power[1]
- Lower noise, vibrations and emissions



1 Installed base and undergoing projects
2 EVO report. Bloomberg NEF report 2021

Hitachi Energy

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

HITACHI
Inspire the Next

B Innovation and pioneering technology

Grid Edge Solutions

Energy management solutions

Achieve energy autonomy & manage renewables

Customer Value

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 CO_2 emissions
- Improve power quality

Solution:

- Maximize the use of wind energy
- Meet sustainability targets

Impact:

- Harnessing renewables like wind, hydro & solar

Hitachi Energy

Power Electronics and Business Models as key enablers: Delivering leading technology to accelerate the energy transition

HITACHI
Inspire the Next

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 Energy

HITACHI

Inspire the Next