Hitachi Energy Investor Days 2023

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

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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
Power consulting advisory services – Plan

**Plan**

- **Sustainability**
  - 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
Scaling, new business models and framework agreements – Build

**Indicative backlog of projects**

- **3x**
- Jul-20
- 2023

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<th>New Business Models</th>
<th>EPC Turnkey</th>
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New business models 3x

**Framework agreements**

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

**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

**Innovative business models**

- Adjusted performance of framework agreements
- Inflation adjustment mechanisms
- Modularity and scalability
- Detached civil work
Our delivery model will enable rapid scaling – Build

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

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

Capacity
- Advancing a sustainable energy future for all

Operational excellence

People

Innovation & pioneering tech

Digital

A

Business model & partnerships

E

Operational excellence

D

People

F

Capacity

A

Business model & partnerships

B

Innovation & pioneering technology

MV/LV technology partner
- ABB
- Schneider Electric

Offshore platforms partner
- Petrofac
- Aibel

T&D substations partner
- Linxon

HVDC

STATCOM

eMobility

Grid Edge
Framework agreements improve contractual setups and ability to deliver on projects

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

### Projects and GW Capacity

- **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

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\(^1\) HVDC: High-Voltage Direct Current
1. HVDC is a key technology for a carbon-neutral energy system

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
2. STATCOM allows increased efficiency and stability

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 AC, 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

**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

**Megawatt Charging portfolio**

Reducing charging time and providing scalability

- **100 million EVs** by 2030\(^2\)
- **500 TWh electricity demand/year** to power all EVs by 2030\(^2\)

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\(^1\) Installed base and undergoing projects

\(^2\) EVO report. Bloomberg NEF report 2021
4. Grid Edge Solutions increase energy autonomy and unlock new economic opportunities

**Grid Edge Solutions**

Energy management solutions

Achieve energy autonomy & manage renewables

- Digital
- Automation
- Power

**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

Acquisition of eks Energy - leading supplier of power electronics
Power Electronics and Business Models as key enablers: Delivering leading technology to accelerate the energy transition

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