Opening Remarks

Energy & Digital World (EDW) 2024 – 09:10 – 09:30

Predrag Grupkovic, President Director

2024-05-25

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Energy system 2050

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“

Electricity will be the backbone of the entire energy system

HE is advancing the world’s energy system to be more sustainable, flexible and secure.

Mega trends

Public attention to environmental issue

Environmental regulatory framework

Quicker than ever technology development

Digitalization

01
Accelerated shift from fossil-based to renewable power generation

02
Growing electrification of Transportation, Industry and Buildings sectors. DtC as new mega consumers

03
Sustainable energy carriers, complementary to direct electrification

Shaping an evolving power system to accelerate the energy transition

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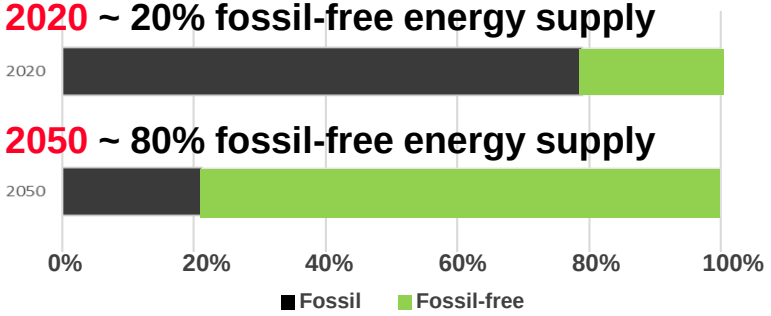
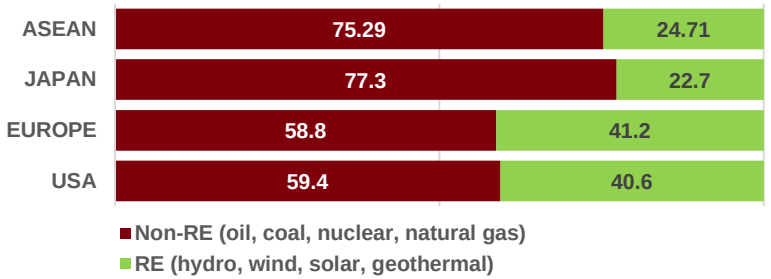
Share of fossil-free energy:

2020 ~ 20% fossil-free energy supply



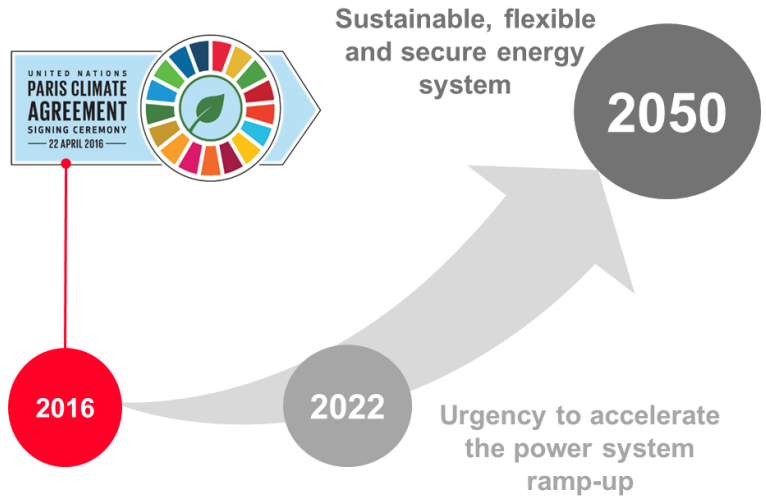
2050 ~ 80% fossil-free energy supply

2022 condition on the Energy Mix in %:



Fast facts

- ❑ Global electrification will be more than 50% of total energy demand in 2050 compering with 21% in 2023
- ❑ Electrification improves energy efficiency
- ❑ All market sectors converting towards electrification
- ❑ Energy sector-coupling beneficial



In the global power system of 2050, we need four times of today's generation capacity with major participation of renewables and we will need to transfer three times as much electrical energy, and on long distances from renewable sources (wind solar, hydro ,ocean tides etc) On demand side i.e consumers side also will be changes in how energy is consumed

Technologies – enabling the energy transition

Sustainable products & solutions

Power Electronics

Digital technology and services

Advancing a sustainable energy future for all

Building the foundation for a system of systems

Estimations based on Hitachi Energy analysis of recently published IEA Net Zero by 2050, 2022 – 2023 Energy Outlook studies such as IEA, BNEF, DNV, Asean Power Update and IRENA. References on Energy Mix: Asean Center for Energy Power Update 2024; EU Commission Report 2024; World Economic Forum report 2023 and Institute Sustainable Energy Policy 2023

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Future Power System of Systems

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Sustainable products/ solutions

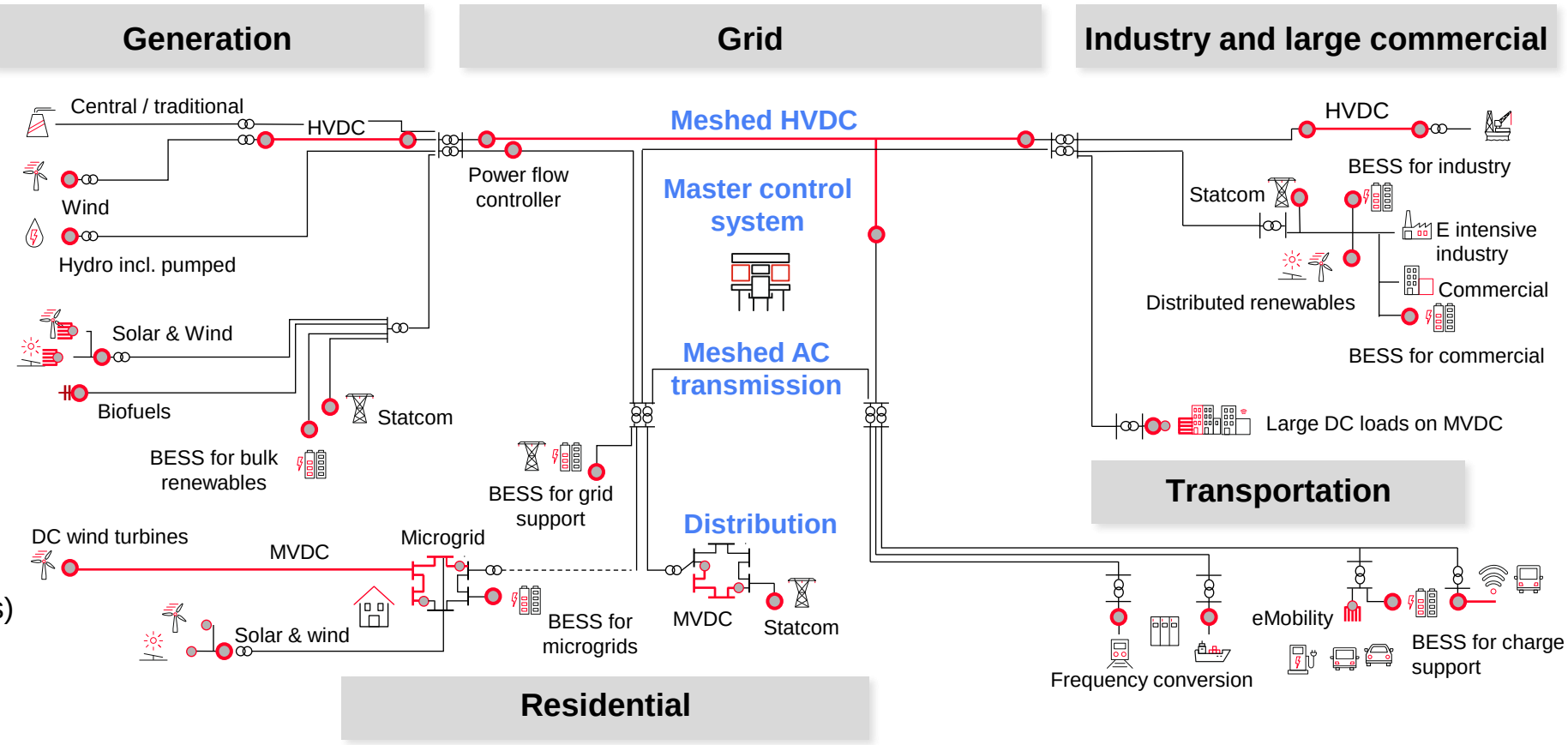
SF6-free switchgear
Sustainable Transformer solutions
Energy efficiency

Power Electronics

Semiconductors
Converters
Hybrid solutions (Storage, SST, etc.)

Digitalization

SCADA and Digital Substations
Asset erformance magement
Enterprise Digital Twins (Life-cycle, automation & system integration dimensions)
Network control (AC, DC, centralized – decentralized, virtualization)
Secure communication
ADMS (Advance Distribution Management System)



Sustainable, flexible and secure energy system with embedded AC & DC systems will require advanced power electronics and digital technologies(IT/OT)

Power conversion system built with power electronics and digital control

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Power quality challenges

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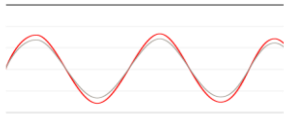
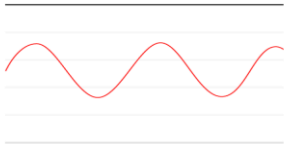
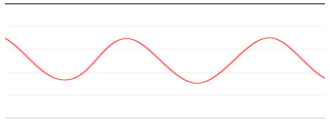
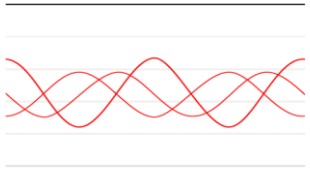
		Causes	Consequences
01	**Low power factor** 	– Loads with high reactive power demand • (Induction motors, furnaces, heaters, fluorescent bulbs etc.) – Machines (motors, transformers etc.) running at partial or no load	– Increased losses – Reduced capacity utilization of network – Overeating of equipment – Penalties from utility
02	**Harmonics** 	– ‘Non-linear’ loads • (drives, UPS, SMPS, fluorescent and LED lighting etc.) – Home and office appliances	– Excessive wear to equipment, leading to potential failure – Incorrect operation of protection devices – Malfunction of other equipment – Penalties from utility
03	**Voltage variation** 	– Fast switching loads • (Cranes, hoists, elevators, welding supply boards, rail locomotives, EV chargers etc.) – Connection / Disconnection of large loads or generating station	– Stress on equipment, leading to potential failure – Power outage, causing revenue losses
04	**Load imbalance** 	– Large single-phase loads • (Cranes, hoists, elevators, welding supply boards, rail locomotives, EV chargers etc.) – Failure of one phase in a 3-phase network	– Stress on network and equipment, leading to potential failure – Power outage, causing revenue loss

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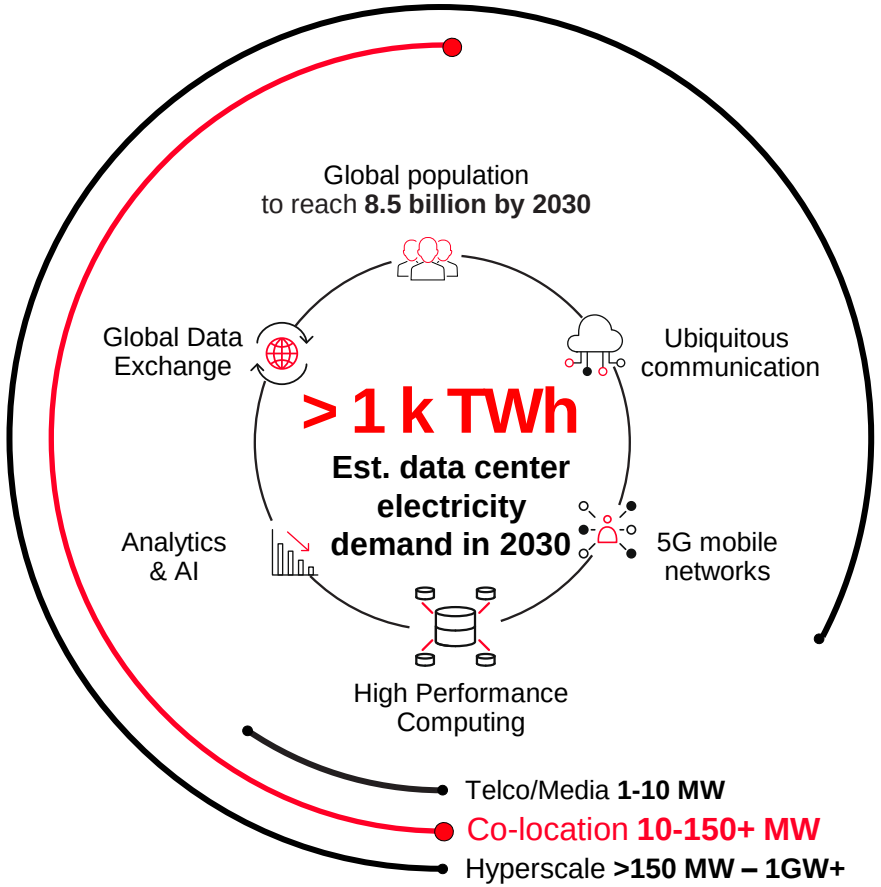
The future demand of Digital and AI data centers *

Global data center electricity demand could double 2022 demand by 2026 and continue strong growth until 2030

10%+ CAGR growth rate

5x+ energy consumption from 2022 to 2030

Artificial Intelligence and cryptocurrencies are additional sources of electricity demand growth on top of digitalization every where



Hyperscale and Colocation data centers demand secure, flexible and sustainable electrification

* Data from IEA Electricity report 2024

BESS Global Market Outlook

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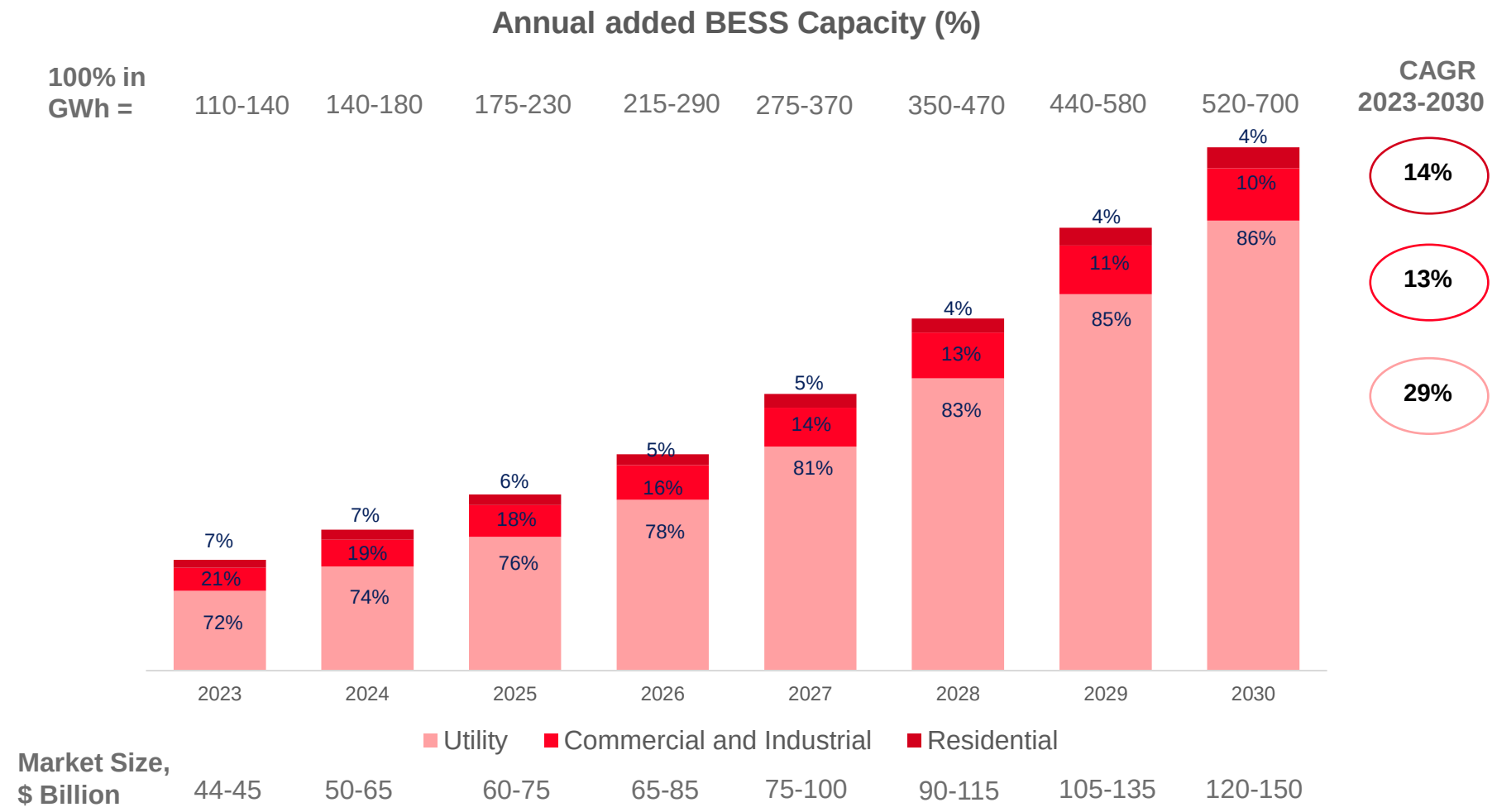
Battery Energy Storage System capacity is likely to quintuple between 2023 and 2030

CAGR of

21.4%

The global BESS market is expected to be worth ~USD 120 Billion by 2030.



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Availability of renewable sources in Indonesia

Solar

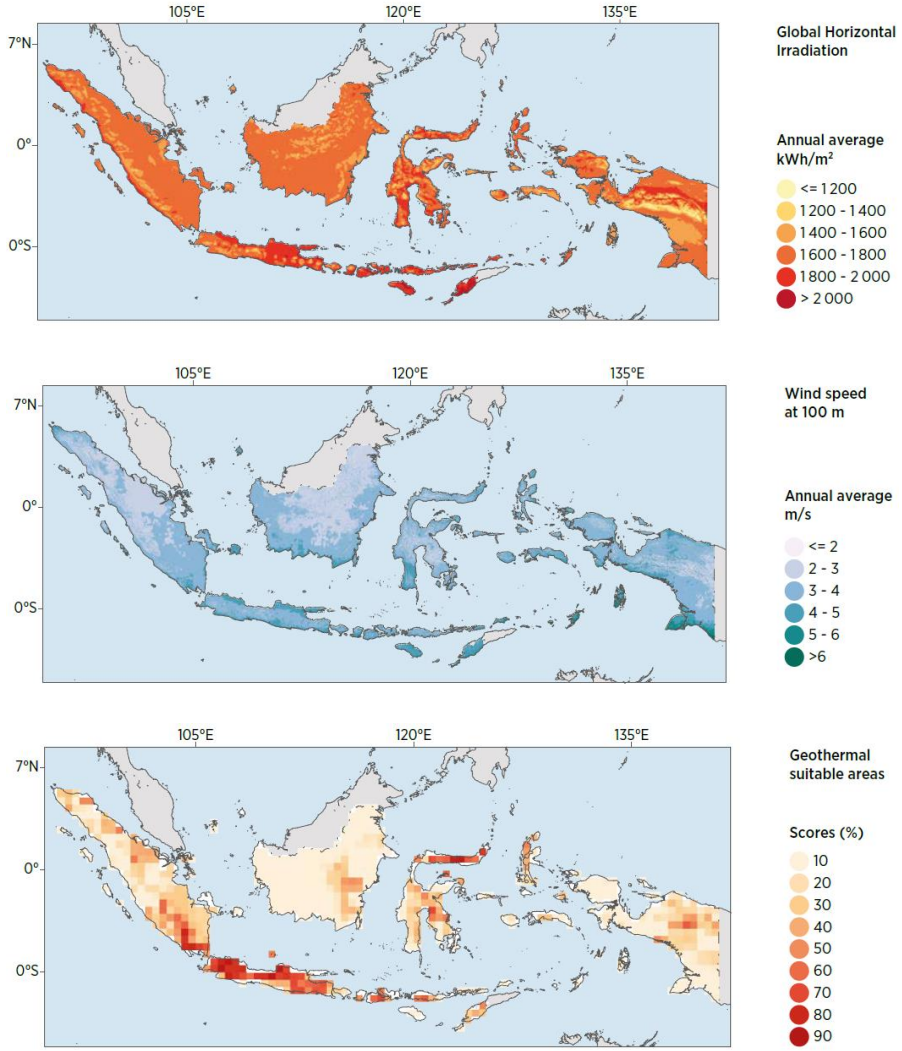
The Ministry of Energy estimates the technical potential of the country to 2000 GW.

Wind

IRENA estimates 589 GW of off-shore wind. The World Bank, together with Wind Atlas estimate 277 GW, split in 198 GW fixed and 79 GW floating.

Geothermal

The potential of geothermal power has an estimate of 29 GW, being mainly located in Java.



Source: IRENA, IESR

Indonesia – grid of the future

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AC Power System enforcement and upgrades on islands

- Statcom with energy storage for increase of asset utilization and reliability improvements
- Continuous introduction/enhancement of most-modern digitalization from field to control & operations center

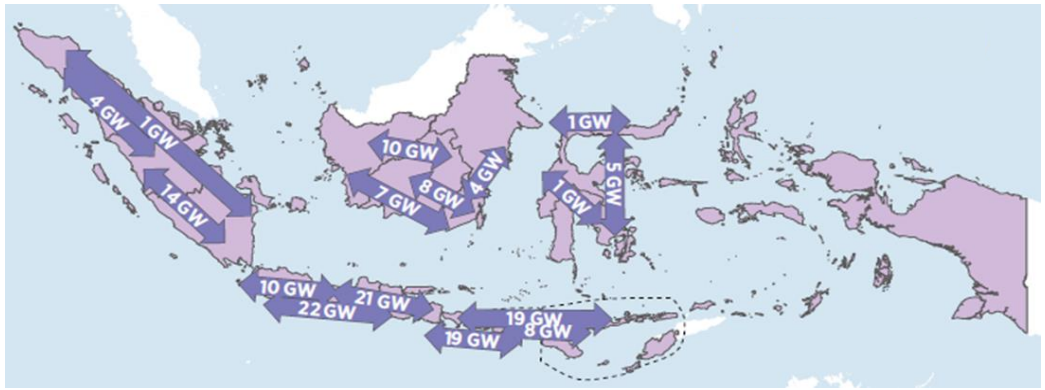
Stand-alone grids (Microgrids) on smaller and mid-size islands, and in remote parts of large islands

- Continuous upgrade and enhancement of stand-alone grid infrastructure (digital and power electronics technologies)

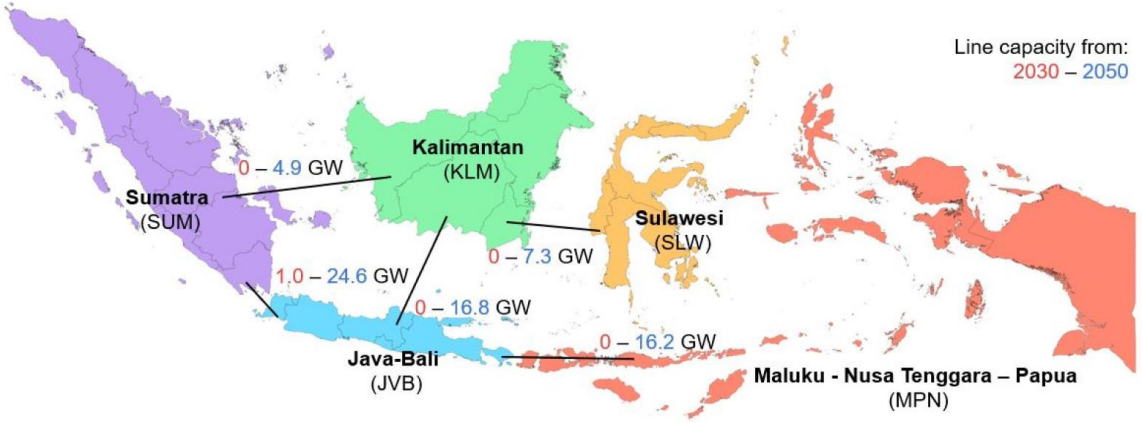
HVDC/VSC Interconnection of islands and across borders

1. Java – Sumatra
2. Java – Kalimantan
3. Further cross-island and country interconnection (e.g. to Malaysia, Singapore, etc.)

Systems' regional connections in IRENA – 1.5°C scenario by 2050



Systems' interconnections in IEA Announced Pledges Scenario (APS)



Source: IEA, IRENA

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A vision of Indonesia's Future Power System

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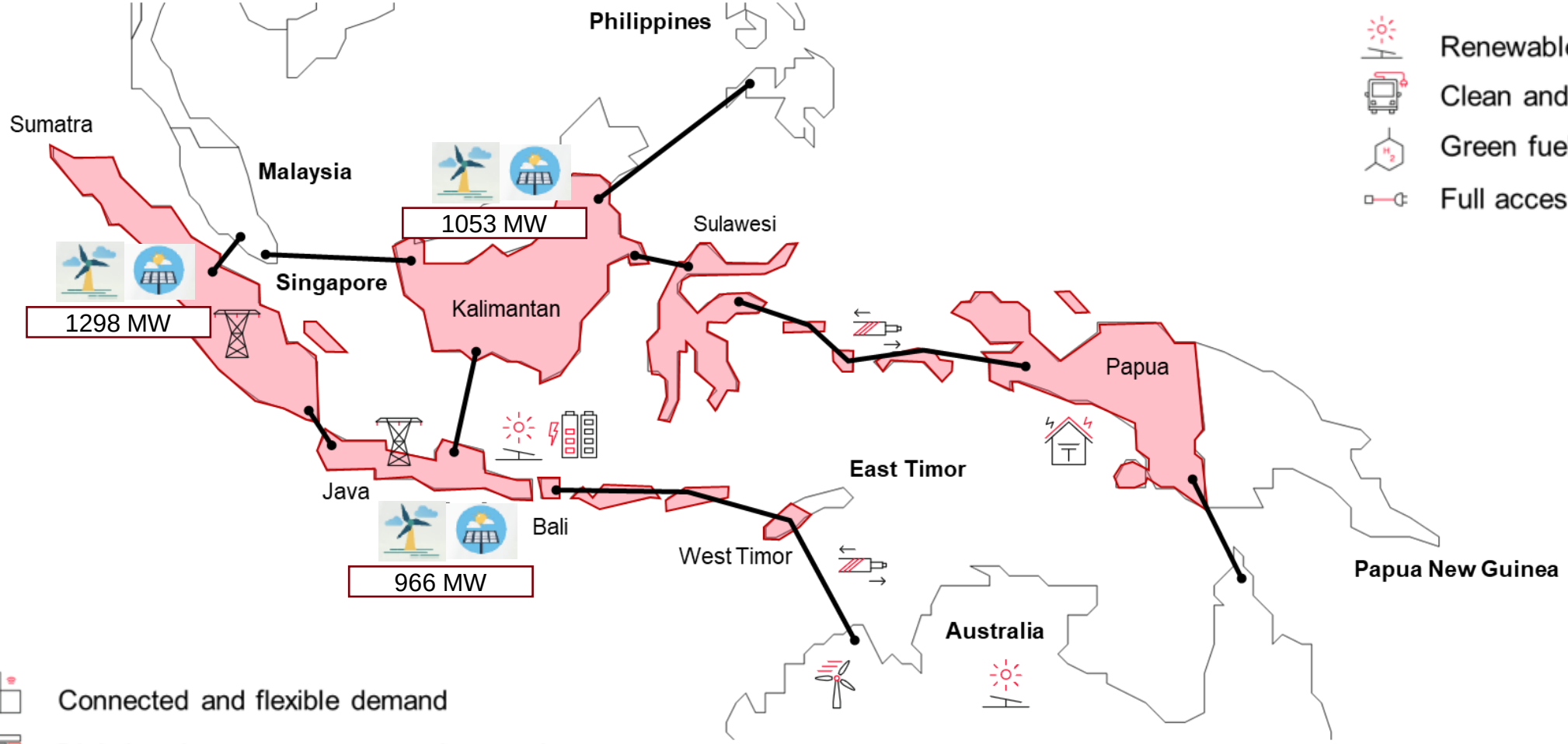

- Renewables deployment at scale
- Clean and sustainable transportation
- Green fuels and feedstock
- Full access to reliable power supply

- Connected and flexible demand
- Digital and autonomous network control
- Stronger and more interconnected grid
- Wide adoption of ICT for reliable, resilient and economic supply

Total Indonesia:

- Geothermal: 484 MW
- Hydro: 5159 MW
- Solar PV + Wind: 3317 MW

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Company Profile

Hitachi Energy Indonesia

13 June 2022

Hitachi Energy

About Hitachi Energy

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~ 45,000 employees

90
countries with 200+ offices

~250
years' heritage combined

5,500
sales employees & field engineers

2,000
engineers & scientists in R&D

~ $13 billion USD business volumes

Four Business Units

Grid Automation	**High Voltage Products**
Grid Integration	**Transformers**

Customers

- Transport & Infrastructure
- Industry&DtC
- Utilities

Offering

- Services
- Software & Automation
- Systems
- Products

Geographies

- Asia, Middle East & Africa
- Americas
- Europe

% split based on FY 2022 orders

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Historical Background

1988

ABB is the product of many acquisitions and mergers, but primarily in the 1988 coming together of ASEA and BBC, formerly known as Brown Boveri, two of proudest and best known names in European electrical engineering history

Incorporated PT Asea Sakti Utama became **PT ABB Sakti Industri**

2016

Inaugurated **Global Software Development Center** in Bali

2017

Inaugurated **AIS manufacturing facility** in Tangerang

2018

Inaugurated **GIS manufacturing facility** in Tangerang

The announcement of **Hitachi's acquistion of ABB Power Grids**, where Hitachi would acquire about 80.1 percent of the business while ABB to hold the rest

2020

PT ABB Power Grids Indonesia became fully operational on the 1st May, 2020 under the management control of Hitachi ABB Power Grids

2021

Starting in November 23rd, 2021, the company has legally changed its name to become **PT Hitachi Sakti Energy Indonesia**

Markets we serve

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Utilities

Industries

Data Centers

Renewables

Transportation

Smart Life

Comprehensive portfolio and solutions across all sectors

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Hitachi's Social Innovation Business

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Co-Creation for Society

Growth

Green
Digital
Innovation

LUMADA

Planetary Boundaries

Wellbeing





Customer (Power, Transport) | Customer (Financial, Public Services) | Customer (Industry, Urban)

Green Energy & Mobility

Support the energy shift for decarbonization and provide safe, comfortable, and clean mobility

Energy | Rail

Number of employees 60,000

Digital System & Services

With cutting-edge CPS, improve the efficiency of systems which underpin society

Front business | IT services

Services & platforms

Number of employees 10,100

Connective Industries

Create a resilient supply chain and innovate industries and cities

Urban | Industries

Advanced technologies

Number of employees 82,000*1

*1 As of March 31, 2023 *2 Result of FY2022

PT Hitachi Sakti Energy Indonesia

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- Since 1980s, Hitachi Energy in indonesia has a long-standing presence, expanding footprint and proven track record in Indonesia.
- The company has been supporting the country's clean energy transition through technologies and solutions that enable the energy system to become more sustainable, flexible and secure.
- Located in the World Trade Center 3, Jakarta, our head office is comprised of high-skilled engineers who successfully run projects in the sites across Indonesia with full capability for engineering, design of complex substations and electrical plants
- Around 40 sales to cover the market with the solid support from corporate functions, such as: Finance, Human Resources, Legal, Health & Safety, Marketing, Communications & Public Affairs
- With approximately 300 employees, we have played a part in Indonesia's growth story, commissioned landmark projects and shaped the future talent in the country.

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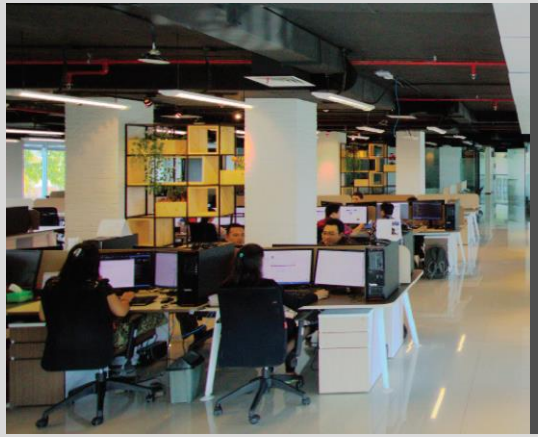
Facilities and Location

1. Jakarta (Country Headquarters)
2. Tangerang (GIS & AIS Manufacturing facilities)
3. Bali (Global Software Development Center)
4. Surabaya
5. Medan
6. Makassar
7. Balikpapan

~300 employees

7 locations

~40 years in the country



Global Software Development Center Facility

The 100-seats facility features state-of-the-art workstations for our dynamic and diverse group of local software engineers. The facility applies state-of-the-art development processes, including agile methodology, continuous integration, fully automated testing, and reliable field-proven frameworks and technologies to create the highest quality software available. The facility opened in January 2016 with 50 employees and continues to grow.

High Voltage Switchgear Manufacturing Facility

Employed around 70 people, the factory is spread over 3,400 square meters and has been designed on the principles of lean production to manufacture air-insulated switchgear (AIS) and gas-insulated switchgear (GIS) up to 170 kV.

Businesses in Indonesia

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- A global leader in power technologies that help balance the growing need for electricity while reducing environmental impact as a partner of choice for enabling a stronger, smarter and greener grid.
- The company is focused on addressing key areas such as the integration of renewable energies, growing network complexity, grid automation and microgrids.

Grid Automation
- Enterprise Software
- Grid Automation Products & Systems
- Microgrids and Distributed Generation
- Services

Grid Integration
- Grid and Power Quality Solutions
- HVDC
- Power Consulting
- Semiconductors
- Service Solutions

High Voltage Products
- Breakers and Modules
- Gas-insulated switchgear
- High Voltage Components
- Service & Generator circuit breakers

Transformers
- Distribution, traction and dry transformers
- Power transformers
- Transformer components and services

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Project Reference

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Powering the island of Nusa Penida and G20 Summit in Bali

Supporting electricity demand during the G20 Summit in Bali and empowering communities in Nusa Penida with the largest microgrid deployment

Optimizing control and reliable operation for Pertamina (Persero)

Utilizing MicroSCADA X for the first time in the APAC region for Pertamina in Dumai

Enabling an efficient and reliable power supply ~500k homes in South Sumatra

Connecting a geothermal plant to the main island's transmission system through the use of our substation

Driving digitalization in East Java

Ensuring power quality and supporting PLN's digital transformation with the first digital substation deployment in East Java

Powering Indonesia's tallest building

Delivering dry-type transformers K-13 to provide a sustainable and environment-friendly technology

Integration of renewable power generation

Deploying GIS for greater efficiency, reliability, and safety for Indonesia's major regions

Enabling greener mining with the largest micro grid facility in Indonesia and Southeast Asia

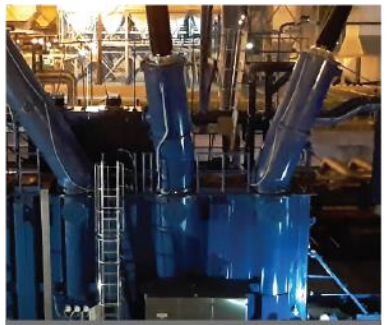
Supporting PT Indo Tambangraya MegahTbk, to reduce the current diesel consumption and carbon emissions

The first turnkey 500kV AIS project for Lengkong substation, West Java

Supporting PT PLN (Persero)UIP ISJ in Lengkong to strengthen the Java grid

Transformers technology for LRT Palembang operation in South Sumatra

Delivering power rectifier and rectifier transformers to grant, the reliability, durability, and efficiency required for city's light rail transit (LRT)



GSU Transformer for one of the Country's biggest IPP power generation

Deploying 1008 MVA 3ph 525/27kV Generator Step-up (GSU) Transformer to PT Paiton Energy in Situbondo, East Java

Powering more than 7,500 homes in Semau

Providing reliable and sustainable access to electricity to 7,500 homes in East Nusa Tenggara

Optimizing control and reliable operation for Freeport Indonesia

Utilizing Lumada APM to indentify and mitigate risks reliability based on collected measurements data

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Thank you!

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