LEADING THE ENERGY TRANSITION BEYOND THE HYPE

Singapore | November 13-14, 2018

13 NOVEMBER 2018



eps



Cleantech Forum Asia

AGENDA



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8

19

26

Challenges behind the Energy Transition

Our positioning and business model

Key Figures and 2020 Strategic Plan

Special Projects







Biomass*

Nuclear

11%

14%

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3

2%

Gas & peakers





Coal

5% 2%

22%

* Including Geothermal



GROSS CAPACITY ADDITIONS & RETIREMENTS (GW)



Source: bnef.com

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AN ENERGY REVOLUTION MORE THAN A SIMPLE TRANSITION



Not a coincidence: the European showcase as a cornerstone for the global energy transition

EU CHALLENGES

- Decarbonization
- Market Efficiency
- Security of Supply

SECTOR TRENDS

- Intermittent RES increase
- Thermal phase-out
- Technological development
- Energy efficiency

SYSTEM NEEDS

- Flexibility: RES integration
- Security: of the whole supply
- Adequacy: at system level,

At the lowest cost with the highest quality

NOT A COINCIDENCE: THE ITALIAN SHOWCASE, ENERGY TRANSITION FOR REAL

RES GROWTH (GW)



THERMAL PHASE OUT (GW)



26% of the European storage installed capacity has been developed by Terna in Italy



Source: Terna estimates for Italian Electricity Market, 27 September 2017

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OUR MISSION



The Group's mission is to **unlock the energy transition**, by mastering the intermittency of renewable energy sources. Being pioneer of **Hybrid Storage Solutions**, transforming **intermittent renewable** sources into a **stable power source**. And **enabling renewables to power society**: reliably, affordably and sustainably.



ADDRESSABLE MARKETS

Grid Support Independent Power Generation Utility-Scale and behind the meter and weak-grids stabilization Storage Microgrids Systems 45 GW global 2016-2024 600 GW 14 GW global to 2017 EMEA 29 GW Annually TOSHIBA TOSHIBA

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NET LOAD IN RES PENETRATED COUNTRIES: ANCILLARY SERVICES WILL BLOW-UP



* Net Load means the difference between the forecasted load and expected electricity production from RES. The Graph shows the net-load in a typical March day in California

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ADDRESSABLE MARKET WITH STRONG FOCUS IN EMERGING COUNTRIES BECAUSE OF THE INDISPUTABLE MARKET POTENTIAL



Source: bnef.com, GOGLA and BCG integrated with ENGIE EPS analysis

¹²

SOLID BUSINESS CASE IN BOTH EMERGING COUNTRIES AND DEVELOPED ECONOMIES



2017202020172020Evolution of Power Generation cost (\$/MWh) in
emerging countries to 2020Evolution of electricity tariffs (\$/MWh)
in developed economies to 2020Evolution of electricity tariffs (\$/MWh)
in developed economies to 2020



excluding any additional benefit from DG efficiency (approx. 30% of total consumption) and O&M savings

Solar/BESS ratio =4:1 at \$1mln/MW turnkey solar + 450k\$/MW BESS

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HyESS: ONE VERTICALLY-INTEGRATED TECHNOLOGY PLATFORM



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BATTERIES ARE NOT (AT ALL) THE CORE OF THE SYSTEM (€/MW)



Source: Real Frequency regulation project 2C normalized on a 1MW/0.5MWh basis. In the 2020 Strategic Plan batteries are represented for utilities-scale and microgrids applications, to 40% and 14% respectively.

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WATCH OUR STORY

POWERING 165,000 PEOPLE EVERYDAY AT A LOWER COST, IN A CLEAN WAY, AROUND-THE-CLOCK

BUSINESS MODEL

A System Provider that develops its own pipeline of projects acting for the customer as a partner also for all the site activities: one single point of responsibility, minimizing project risk and complexity for the customer





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OUR 4-YEAR PEOPLE STORY



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Source: EPS Annual Financial Report and update as at 07.09.2017



SINGLE SYSTEM SIZE STORY (BY COMMISSIONING YEAR)



* According to Bloomberg New Energy Finance (Energy Storage Project Database, 28 October 2017) as of today just 18 li-ion energy storage systems have higher than 20MW (all in the US, Korea and Japan).

INSTALLED BASE AND SYSTEMS UNDER COMMISSIONING



OUR KNOW-HOW





SAFETY HR ICT PROCUREMENT LEGAL COMPLIANCE ETHICS COMMUNICATION WHAREHOUSING AFC ENVIRONMENT KNOW-HOW MANAGEMENT

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PROJECT SEMAKAU (SINGAPORE)



Customer:



Semakau, 2MWh hydrogen-enabled microgrid

ENGIE EPS, in collaboration with ENGIE, is developing a microgrid-based hydrogen storage system, which will power the island of Semakau, Singapore.

This Smart Island is part of the Renewable Energy Integration Demonstrator Singapore project (REIDS), that aims to provide renewable and sustainable energy to the remotest regions in Southeast Asia with the largest hybrid microgrid platform in the tropics area.

STATUS | UNDER CONSTRUCTION





PROJECT AUSTRALIA



Customer: TOSHIBA

Australia, 12MW microgrid powering a mining site

Prior to the installation of the Hybrid Power Plant, this mining town in South Australia was entirely relying on diesel generation. The Hybrid Power Plant, provides the mining site and its below-ground residences, with approximately 70% renewable energy over the 20-year life of the project. The Hybrid Power Plant realized by ENGIE EPS for Toshiba, sired to the Coober Pedy Renewable Hybrid Power Project, realised by Energy Developments (EDL) is a concrete example of distributed competitive generation of fully off-grid microgrids.

STATUS | IN OPERATION |





PROJECT MALDIVES



Customer:

Luxury resort in the Maldives

The Maldives, 10MW microgrid powering resorts

The two microgrids installed by ENGIE EPS, with a total power of 10.4MW, provide energy daily to two resorts on two separate islands of the Maldives, which combined host about 2,300 people. A single microgrid, composed of solar panels distributed on shelters coupled with the ENGIE EPS storage system, manages to provide up to 63% of the resort's energy demand, decreasing the consumption of diesel fuel of 423,000 litres per year and reducing the emissions of greenhouse gases by about 460 tons of CO_2 per year.

STATUS | IN OPERATION |



PROJECT ARMONIA



Palau, 100MW, the largest microgrid in the world

ARMONIA is a fully dispatchable solar PV project: with 35MW of renewable energy and 45MWh of energy storage, it will be coupled with the current diesel generation to transform the Palau grid into a smart, integrated system with an overall installed power of over 100MW, representing the largest microgrid in the world and a global reference for the state-of-the-art technology. Renewable energy produced by solar will represent 45% of Palau's total demand.

STATUS | UNDER DEVELOPMENT |



