



Enel Group

Leading the Energy Transition

**International Energy Conference on Coal Phase-Out
October 2017**

**Gu-Yoon Chung
Head of Business Development Asia Pacific
Enel Green Power**





Presentation Overview

- ❑ Introduction of Enel Group
- ❑ Phase-out of Fossil Fuel Generation
- ❑ Renewable Energy
- ❑ A New Paradigm



Enel Group today

Global and Diversified Operator⁽¹⁾



~36 GW renewable capacity²
~85 TWh renewable energy generation



~44 GW thermal capacity
~140 TWh thermal generation



426 TWh Electricity Distributed
1.9 mn km Distribution Networks



~62 mn distribution end users
~17.5 mn free retail customers

263 TWh Electricity sold to end customers
10.6 bcm gas sold to end customers



63,500 Employees

1

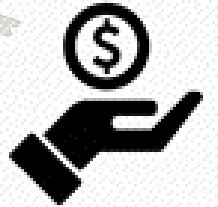
Diversified by tech
& geographically
(31 countries)

2

Leadership in the
segments of the
value chain

3

Focused on
sustainability &
growth



+39%

Dividend per
share since 2013

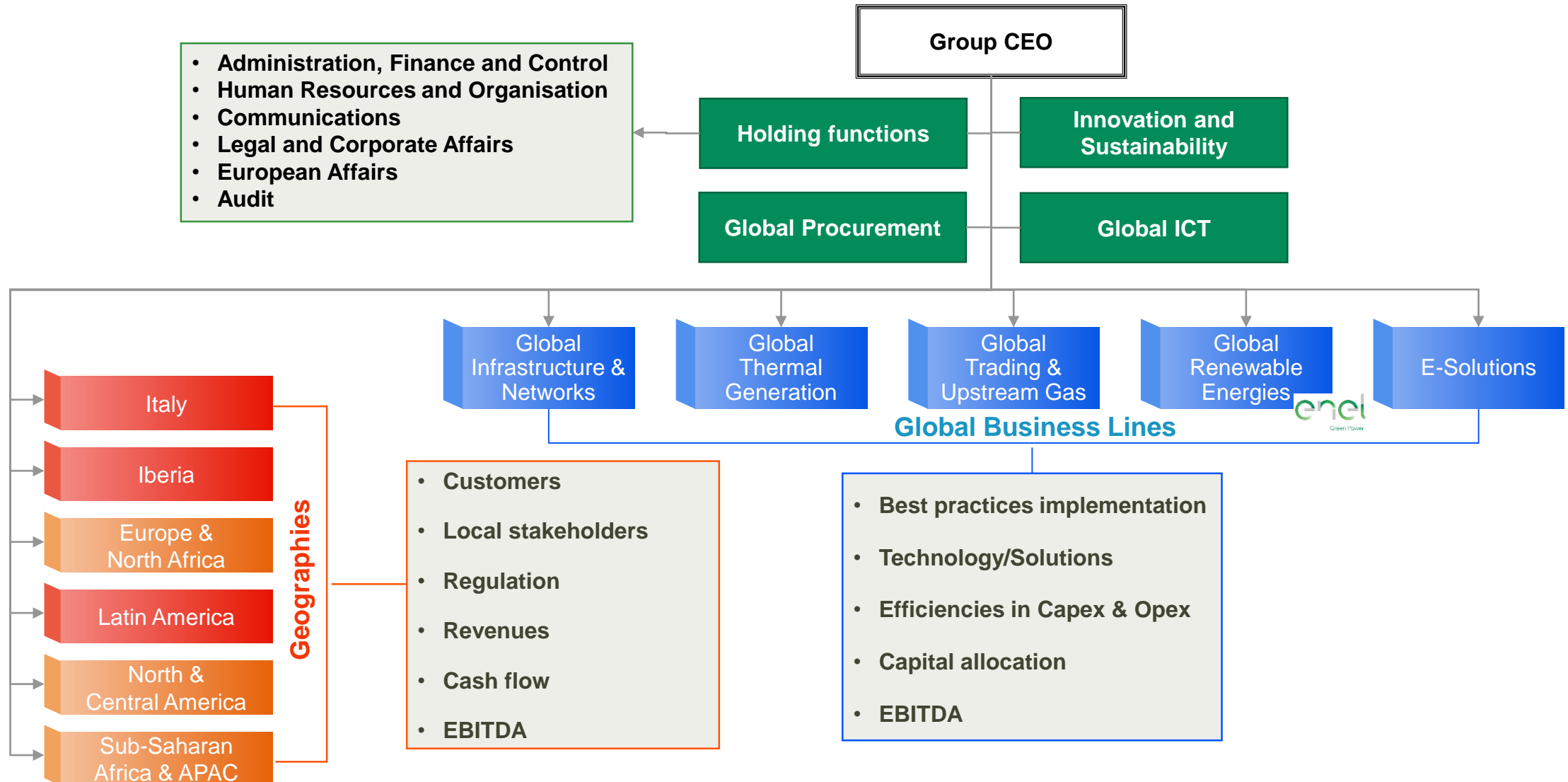
Market cap. €53 bn⁽³⁾

2016 EBITDA: €15.2 bn

World leader in the energy market

Enel's organisation

Simple and effective organization

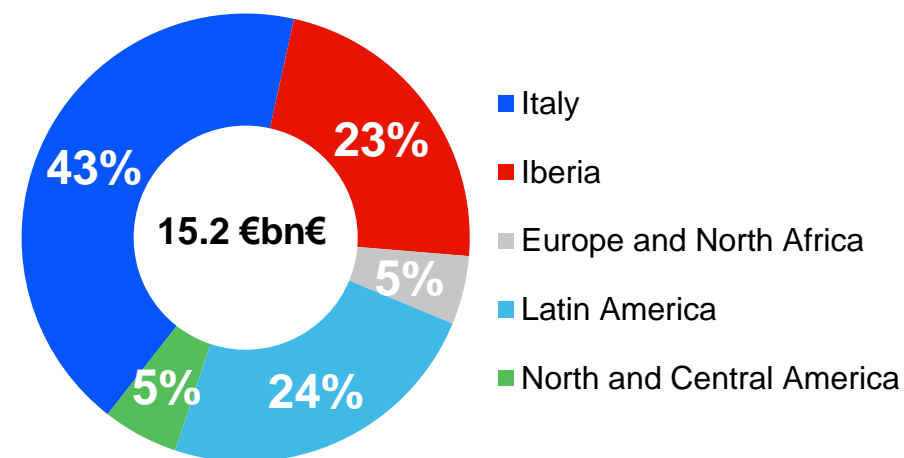


2016 financial results¹



	FY 2016
Revenues	70.6 €bn
Ordinary EBITDA ²	15.2 €bn
Net ordinary income	3.2 €bn
Net debt	37.6 €bn

2016 Ordinary EBITDA breakdown³



1. Data as of December 31st 2016

2. Excluding extraordinary items for 102 €mn in 2016

3. Breakdown excludes -0.1 €bn from holding and services

Operational data

Leadership along the various segments of the value chain



Key indicators¹



Infrastructure & Networks

62 mn end users
41.2 mn smart meters
1.9 mn km grids



Retail

56.4 mn power customers
5.5 mn gas customers



Renewables generation

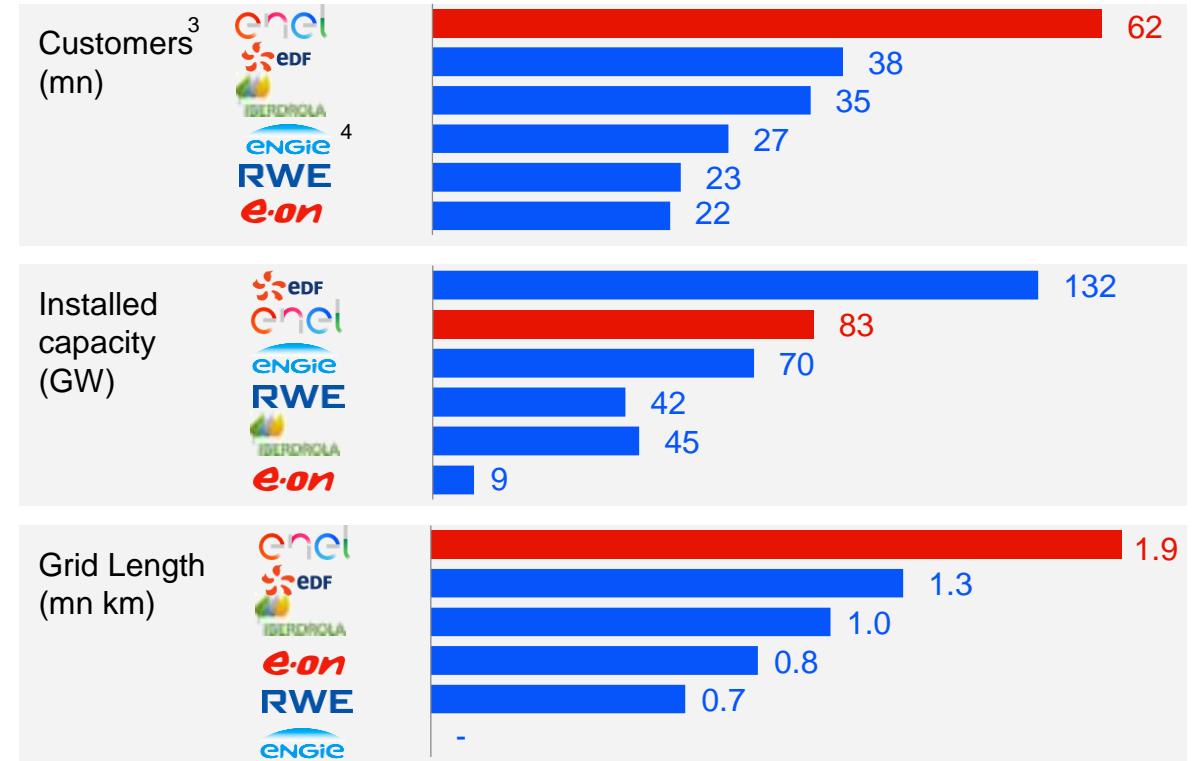
35.9 GW of installed capacity⁵



Thermal generation

46.8 GW of installed capacity

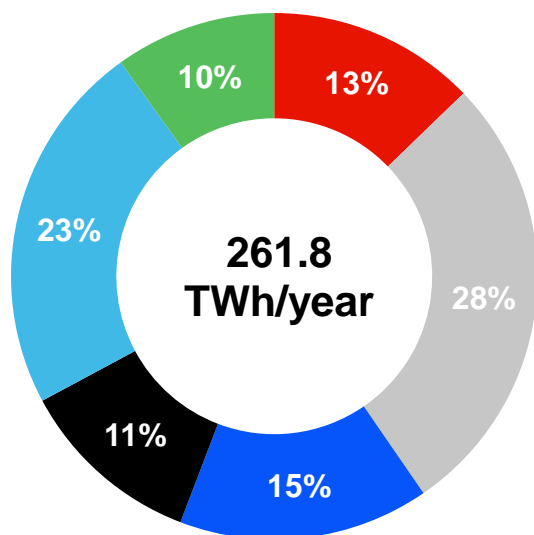
Enel and European peers²



Portfolio breakdown¹

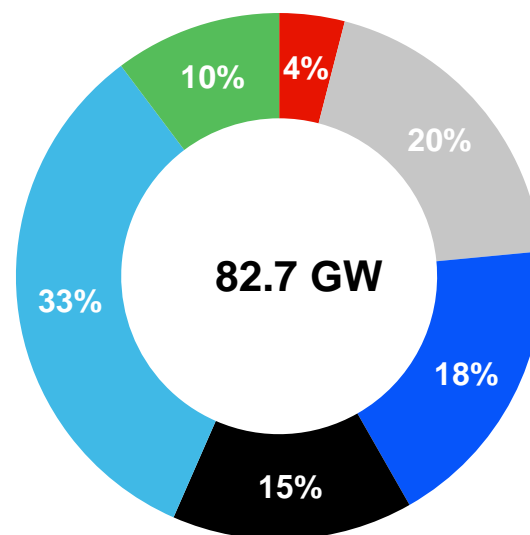


Production mix



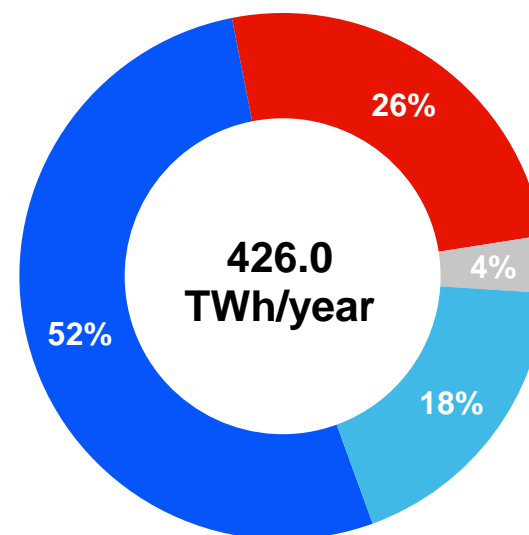
■ Nuclear
■ Coal
■ CCGT
■ Oil + Gas
■ Hydro
■ Other Renewables

Installed capacity



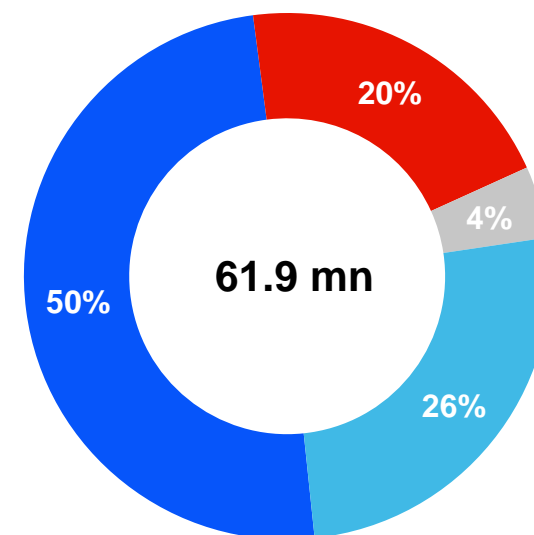
■ Nuclear
■ Coal
■ CCGT
■ Oil + Gas
■ Hydro
■ Other Renewables

Distributed energy



■ Italy
■ Iberia
■ Europe & North Africa
■ Latin America

Customers (power + gas)



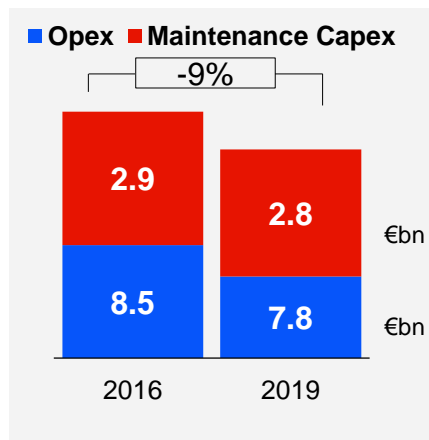
■ Italy
■ Iberia
■ Europe & North Africa
■ Latin America

2017-2019 Strategic plan – Key pillars



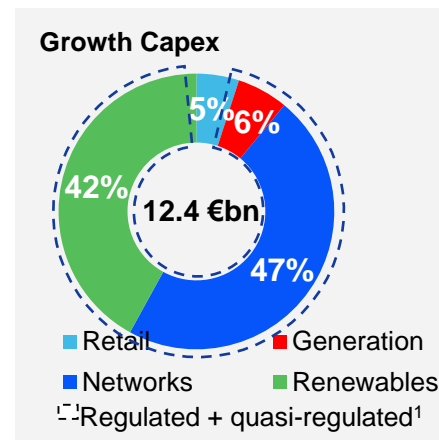
Operational efficiency

Digitalization enables acceleration on operational efficiency



Industrial growth

Rebalancing capex between networks and renewables



Group simplification

Ongoing simplification to improve alignment, focus and efficiency

Ongoing simplification



Active portfolio management

Structural rotation of assets

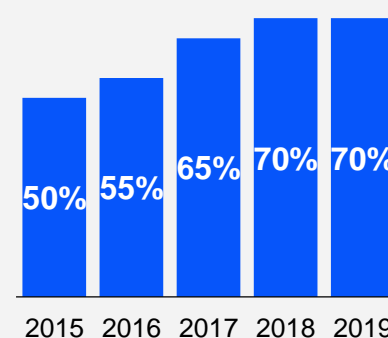
Capital recycling



Shareholder remuneration

Increasing dividends during plan period, providing certainty in the transition phase with a minimum DPS²

Dividends policy



1. Networks, generation with long-term PPA, renewables with PPA and generation in the Iberian islands

2. Minimum Dividend Per Share 2015: 0.16 €/sh; 2016: 0.18 €/sh; 2017 0.21 €/sh



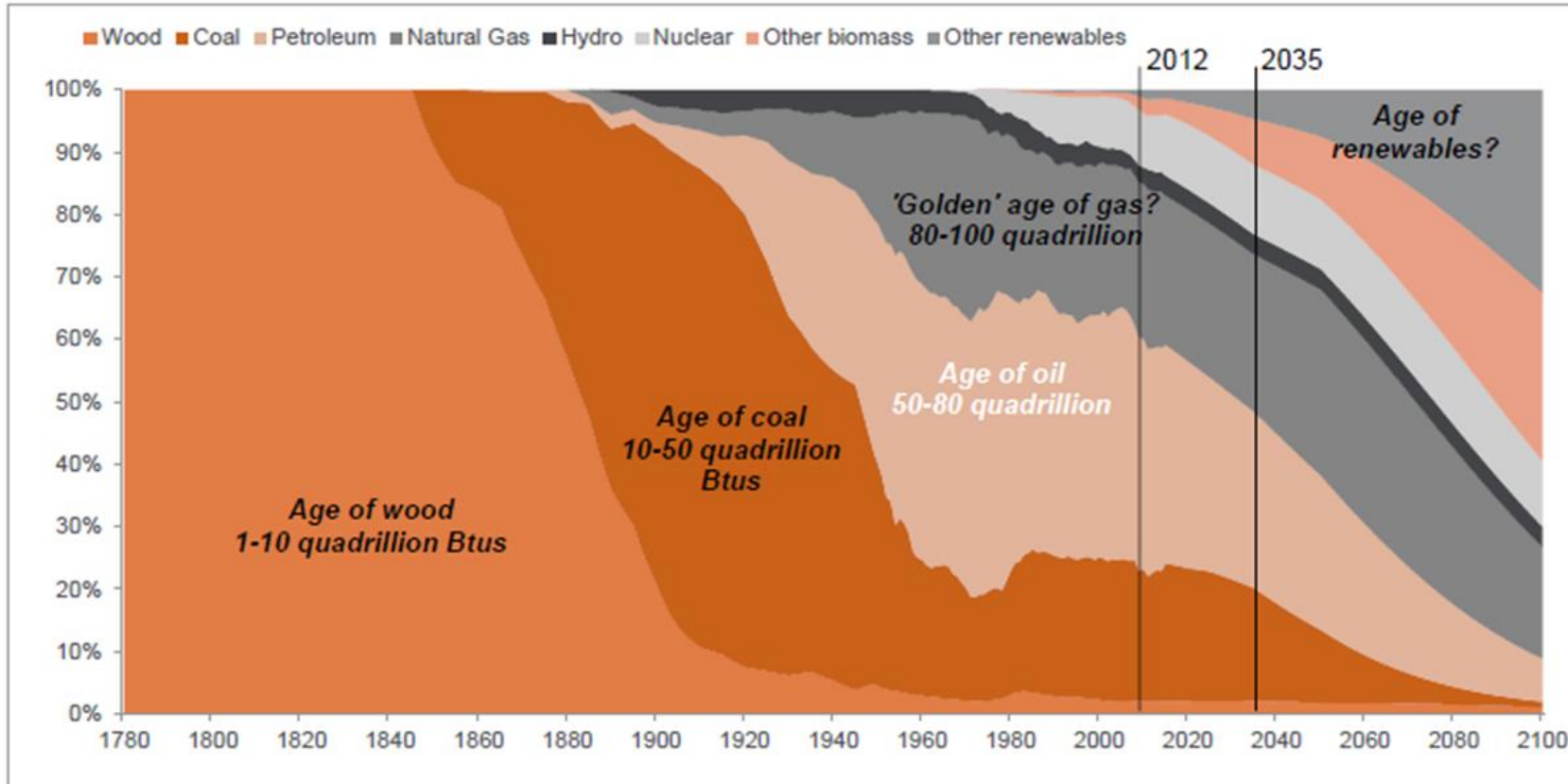
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- **Phase-out of Fossil Fuel Generation**
- Renewable Energy
- A New Paradigm



Evolution of Energy Use

History of Fuel Substitution in the U.S.



Evolution of the U.S. primary energy mix (1780-2012) and projection to 2035-2100

Technology has always driven the energy sector's **transition** to **tackle the key issues** of the day, but it has also **set the stage for future challenges and opportunities**

Phase-out of Fossil Fuel Generation



2015
Investor day

2015-19 Strategic Plan
New foundations for growth

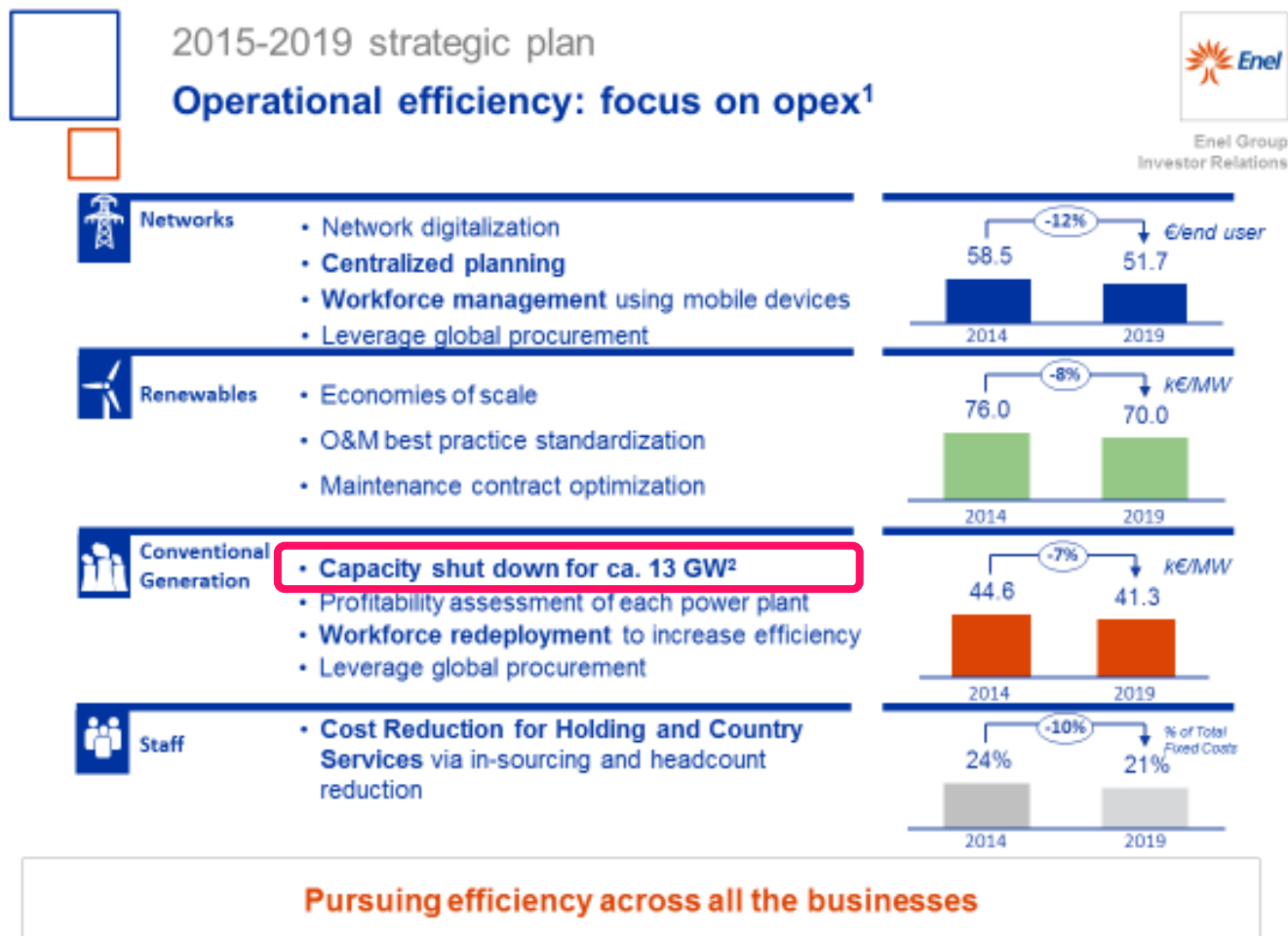
March 19, 2015



Francesco Starace
CEO, Enel Group (2014 – present)

Enel Investor Day Presentation (London, March 2015)

Phase-out of Fossil Fuel Generation



1. In nominal terms
2. Cumulative 2014-19

Phase-out of Fossil Fuel Generation



2015-2019 strategic plan

Industrial growth: main criteria



Decreasing business risk profile: no merchant exposure



De-risk from fuel price (oil, gas, coal) volatility

Increasing optionality based on project size and diversification



< 500 MW, more modularity

Significant flexibility in total spending



Quick execution,
investments from cash flows

Average time to EBITDA less than 2 years and high level of self financing

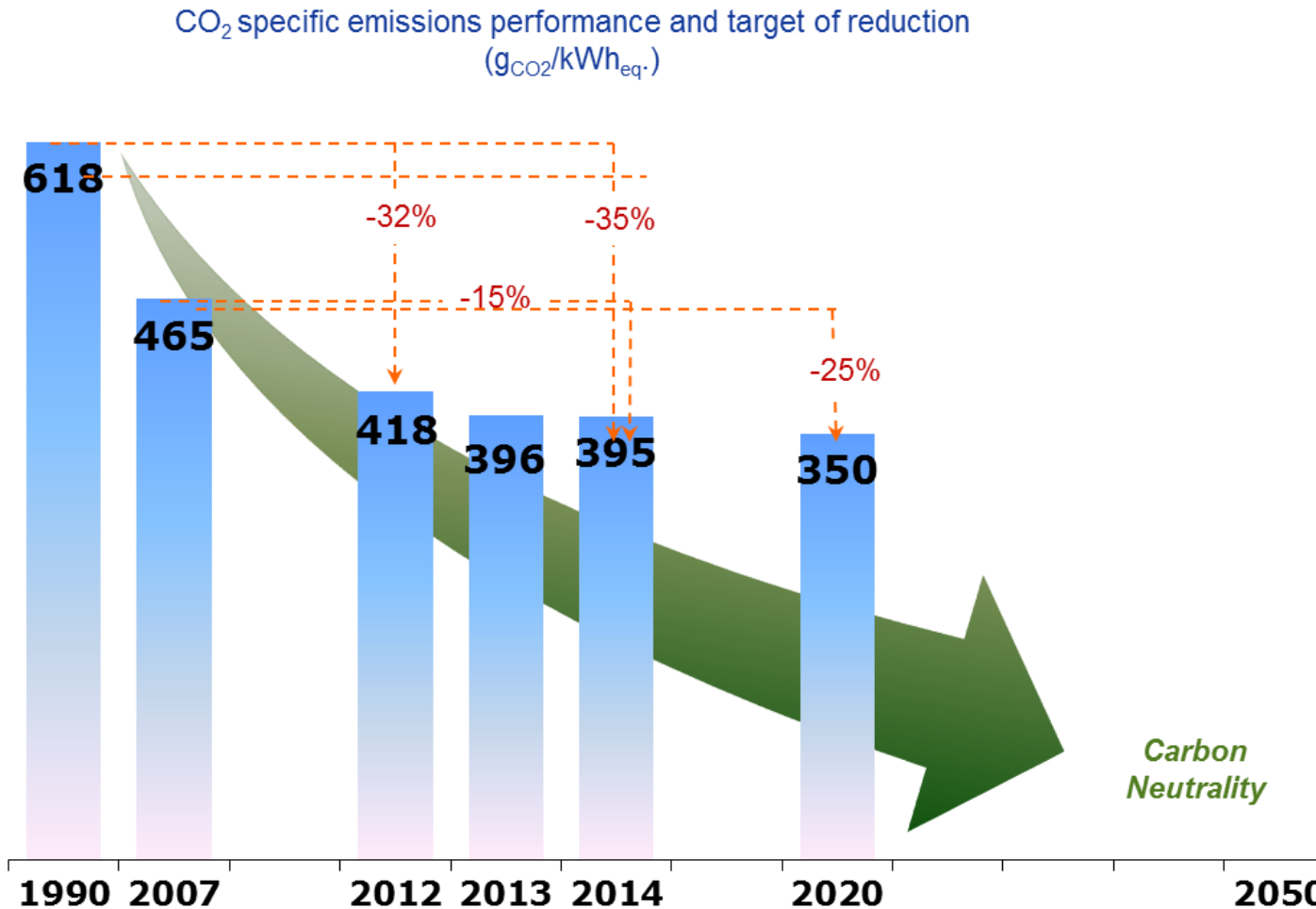


Solid EBITDA growth

No new coal generation
More renewable generation

Phase-out of Fossil Fuel Generation

Towards complete de-carbonization by 2050



Current Strategy on de-carbonization

In alignment with UN Sustainable Development Goals



Enel Investor Day Presentation (May 2017)

Related SDGs



Industrial actions

Development of renewable capacity

Reduction of thermal capacity

Specific CO₂ emissions reduction

Environmental retrofitting of selected plants

Related targets/commitments

+~8 GW of additional renewable capacity by 2019¹

~-16 GW by 2019

< 350 gCO₂ /KWheq by 2020
(-25% base year 2007)

~500 €mn of investment by 2020

1. Including managed capacity

Current Strategy on environment

In alignment with UN Sustainable Development Goals



Enel Investor Day Presentation (May 2017)

Related SDGs



Industrial actions

Reduction of SO₂ specific emissions

Reduction of NO_x specific emissions

Reduction of particulates specific emissions

Reduction of water specific consumption

Reduction of waste produced

Related targets/commitments

-30% by 2020 (vs 2010)

-30% by 2020 (vs 2010)

-70% by 2020 (vs 2010)

-30% by 2020 (vs 2010)

-20% by 2020 (vs 2015)

Challenge into Opportunity

Futur-e



23

Power Plants
involved

13GW

total power to be
decommissioned

11 GW already shut-down

4 Sites already requalified

6 sites under reconversion through a “Calls for Projects” procedure

2 sale process in advanced stage

Internal requalification for logistics or other energy opportunities



Unique requalification program worldwide

Challenge into Opportunity

Possible use of requalified thermal generation sites



Extreme Sports theme park



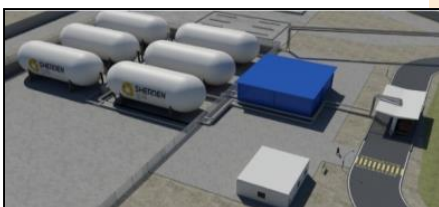
Motor race track



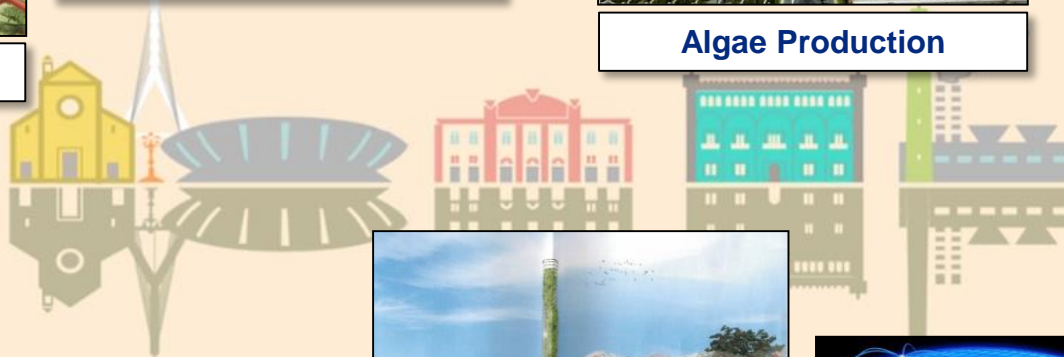
Algae Production



Shopping Centers



Gas storage



Arts and cultural complex



Sport City



Data Center



3D Printing

Broader exit from fossil fuels

Disposal of upstream gas assets



#BUSINESS NEWS NOVEMBER 13, 2013 / 2:56 PM / 4 YEARS AGO

Enel completes SeverEnergia sale to Rosneft for \$1.8 billion

Reuters Staff

1 MIN READ



MILAN (Reuters) - Italy's biggest utility Enel (ENEL.MI) said on Wednesday it had completed the sale of its stake in SeverEnergia to Russia's Rosneft (ROSN.MM) for \$1.8 billion.

Sale of Stake in Operating Upstream Gas Fields in Russia

ALEANNA COMPLETES ACQUISITION OF UPSTREAM GAS ASSETS IN ITALY FROM ENEL

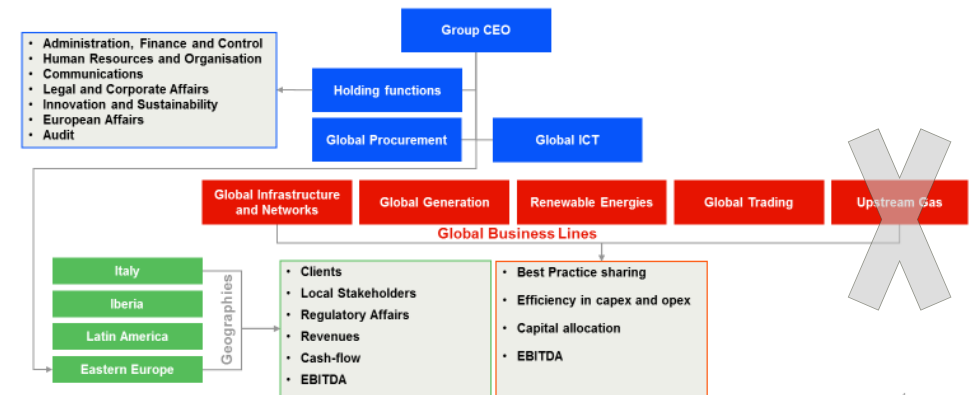
JULY 13, 2016 BY TMHOWARD 0 LIKES 0 COMMENTS

Rome, July 13th, 2016 – BRS Resources through its membership interest in AleAnna Energy's wholly owned subsidiary AleAnna Resources LLC, and newly formed AleAnna Europa SrL, announces it has completed the acquisition of all of the Italian assets in the upstream gas sector held by ENEL, through ENEL's wholly-owned subsidiary ENEL Longanesi Developments SrL ("ELD").

Sale of Exploration Upstream Gas Assets in Italy

Enel's organisation

Simple and effective organization



Broader exit from fossil fuels

Sale of Thermal Assets in Eastern Europe



Sale of Majority Stake in Slovakian Utility

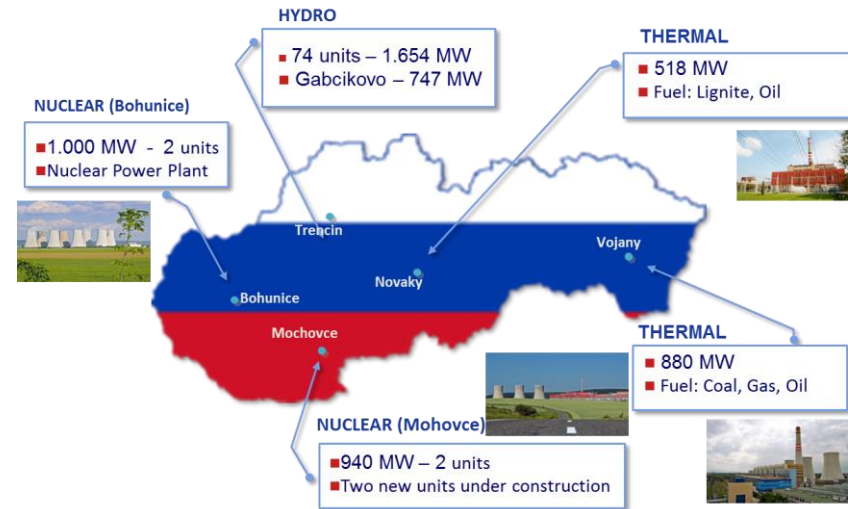
Enel aims to sell Russia's Reftinskaya power plant in 2017: CEO

Katya Golubkova

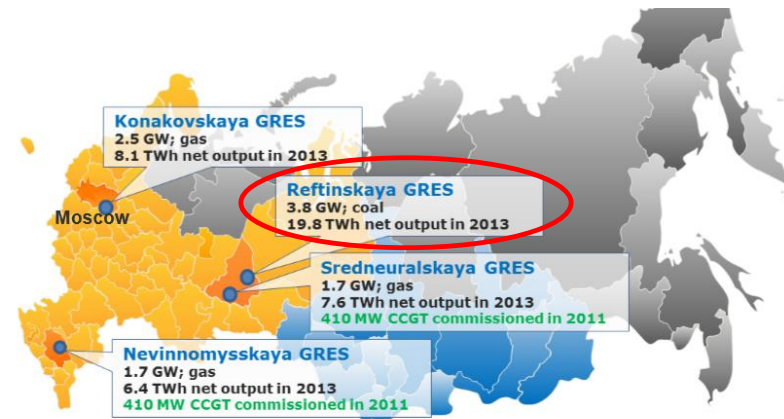
2 MIN READ

ST PETERSBURG, Russia (Reuters) - Italy's Enel (ENEL.MI) has mandated Sberbank (SBER.MM) to arrange the sale of its Reftinskaya coal power plant in Russia and hopes to do the deal in 2017, Enel Chief Executive Francesco Starace said.

Plan to divest in Russian coal generation asset



Slovenske Elektrarne portfolio



Enel Reftinskaya (3.8 GW coal)



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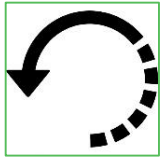


A record year for renewables

Key figures for 2016



+161 GW of new renewable capacity installed
+9% vs 2015 of which 30% is new solar PV installed



For second consecutive year, more than 50% of
new installed capacity comes from renewable
energy



146 countries have introduced regulation to
incentivize or otherwise support renewable
energy development



3 times more competitive auctions were
conducted compared to 2015

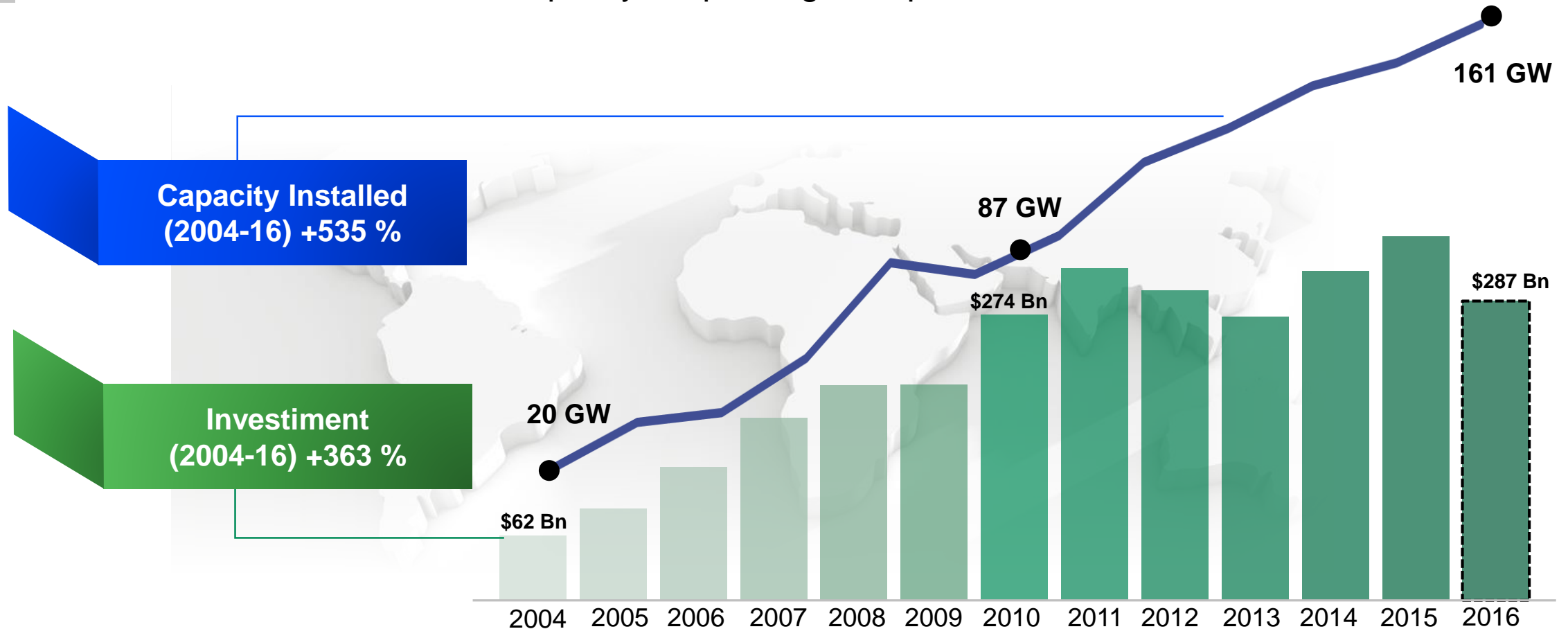


Wind turbine costs have reduced 1/3 since 2009,
while solar panel costs have reduced 80% in the
same period. Reductions ongoing



Investment in Renewable Energy

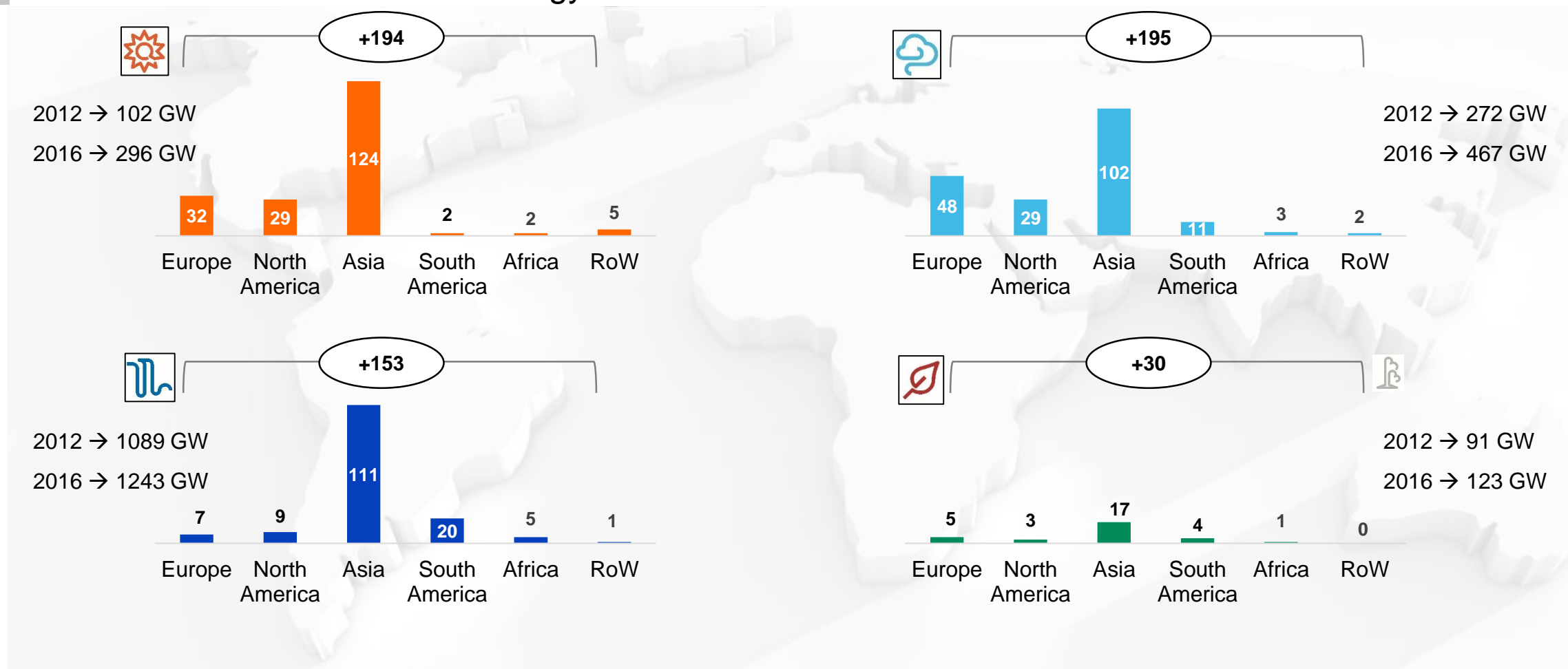
2016 – New record in installed capacity despite slight drop in investment amount



Installed capacity continues to grow against backdrop of investment amount reduction – thanks to reduction in costs in technology and financing

Growth in renewables (2016 vs 2012)

– across Continents and Technology



More than 2100 MW installed around the world, +40% since 2012

Renewable Energy: getting more competitive

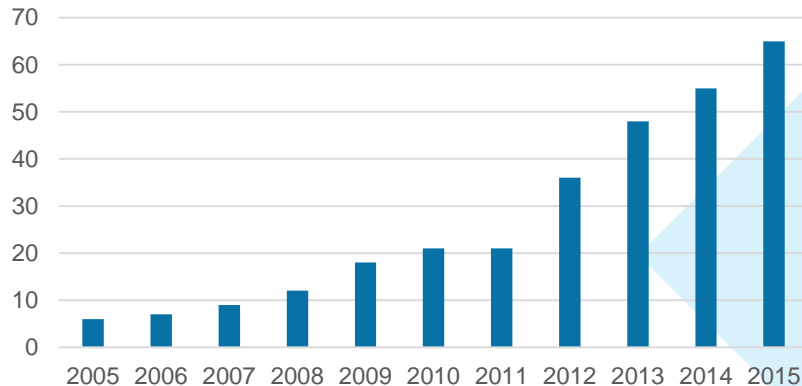
Price \$/MWh from the main auctions around the world



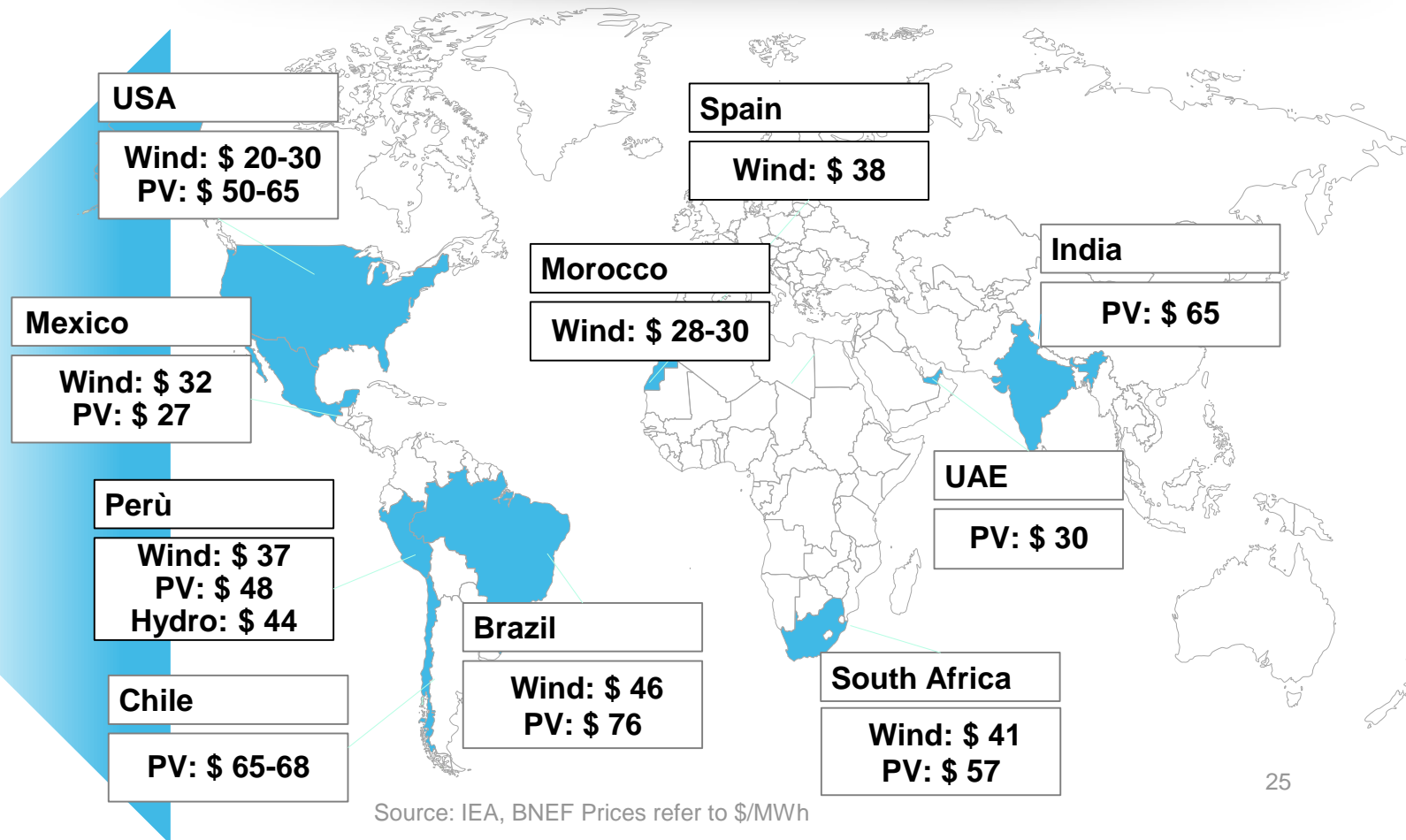
Results from recent tenders



Number of countries with competitive auctions introduced



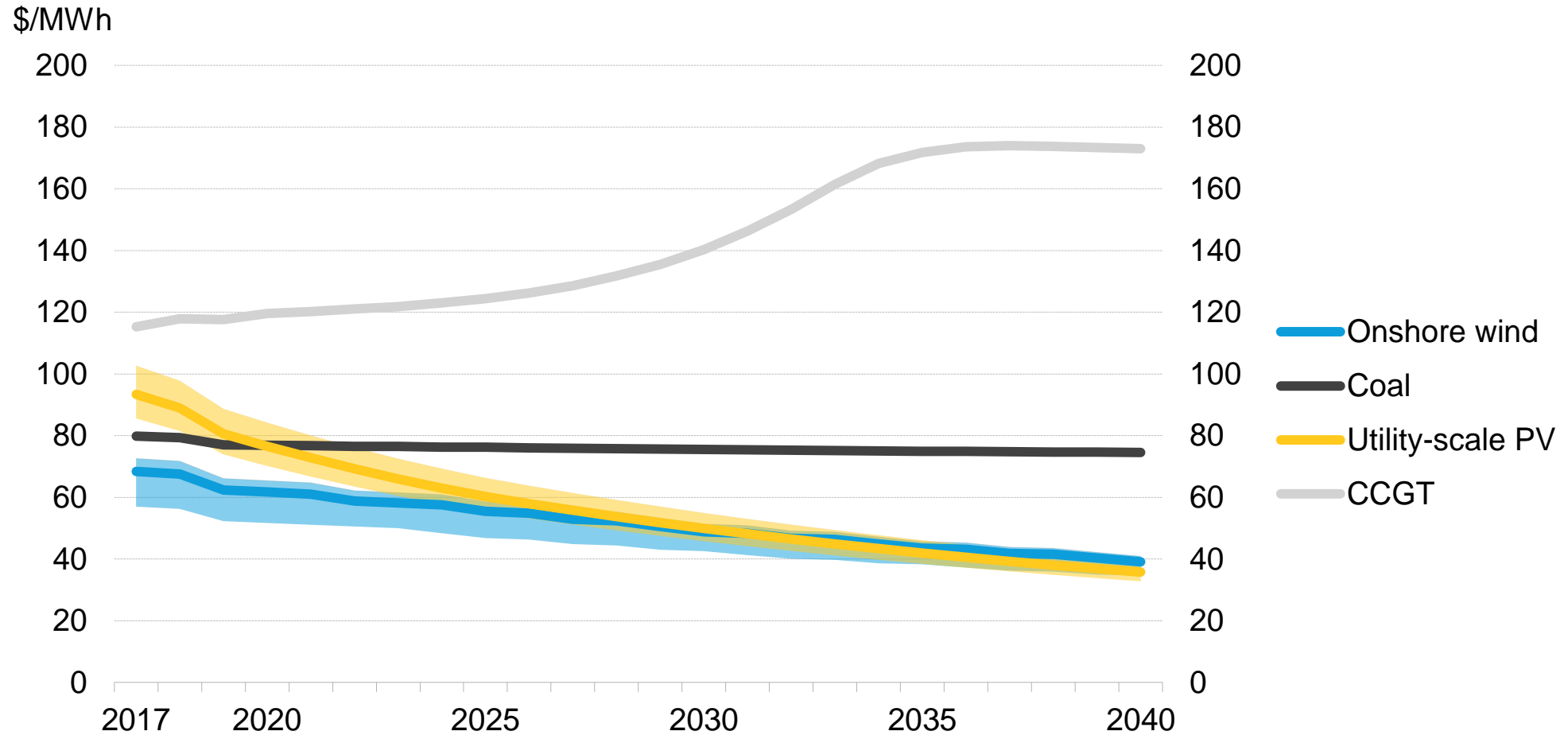
Fonte: REN21; BNEF



Source: IEA, BNEF Prices refer to \$/MWh

Renewables nearing Cost Parity

Levelized Cost of Energy Comparison Projection



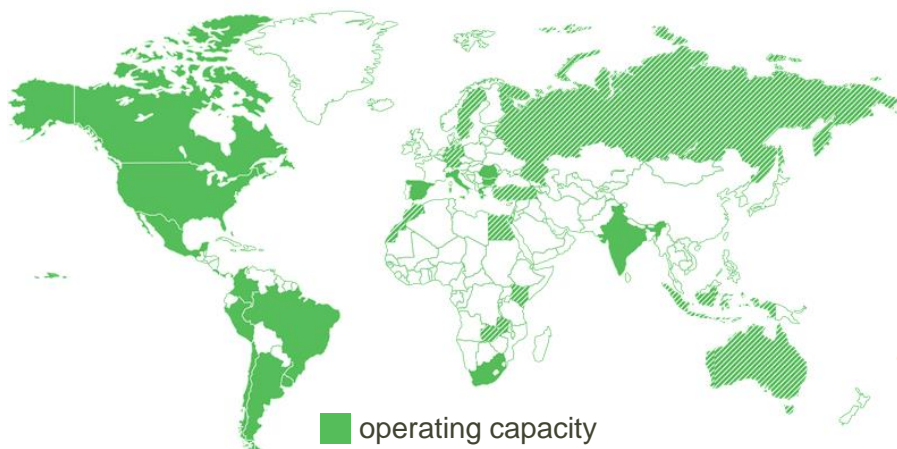
Enel Green Power

Leading Company in Renewable Energy



North America
1.5 GW

Latin America
12.5 GW



■ operating capacity
▨ capacity under execution/construction

Europe and
North Africa
21.2 GW

Sub-Saharan
Africa and Asia
0.6GW



Hydro⁽²⁾
27.7 GW



Wind
8.0 GW



Solar
1.5 GW



Geothermal
0.8 GW



Biomass
0.2 GW

29

Countries

36 GW⁽¹⁾

Installed Capacity

85 TWh

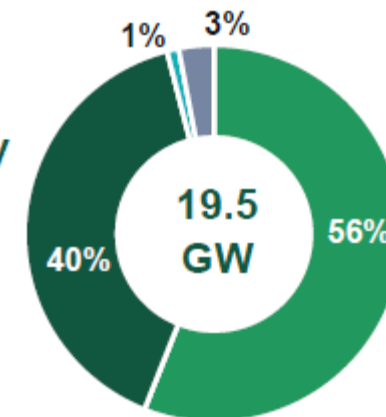
Production

+1200

Operative Plants

Pipeline by technology

■ Wind ■ Solar
■ Hydro ■ Geothermal



World leader in Renewables

Source: Company, Data as of April 2017

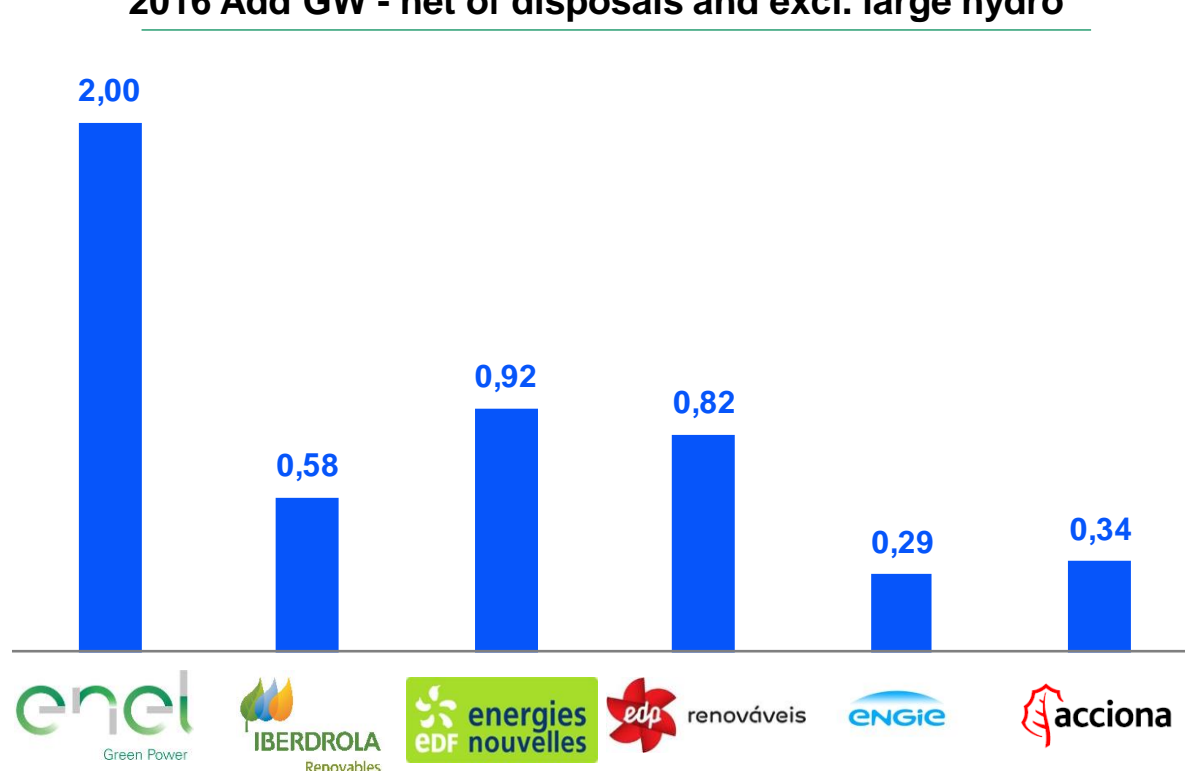
1. Does not include 2.2 GW of managed capacity. 2. Including Large Hydro

Enel Green Power: sector leader

Fastest growing renewable player vs. European peers



2016 Add GW - net of disposals and excl. large hydro



Source:

Enel Green Power
Iberdrola Renovables
EDF énergies nouvelles
EDP renováveis
Engie
Acciona

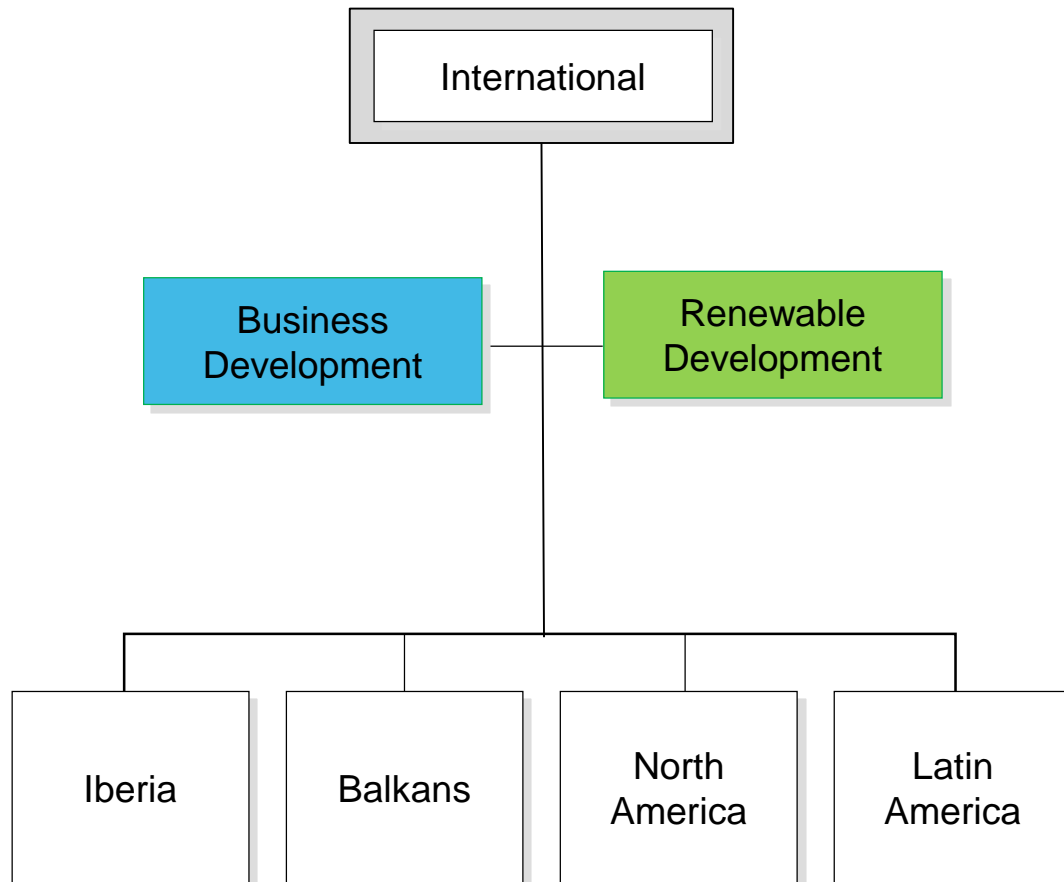
Relazione finanziaria annuale 2016 (April 2017), Investor presentation 2017-19 strategic plan (March 2017)
Results 2016
Bloomberg New Energy Finance
2016 Results (February 28th, 2017)
Appendices FY 2016 Results (March 2nd 2017)
FY 2016 January-December Results presentation (March 1st 2017)

The Business Development in ENEL (2004)

Thermal projects crowding out Renewable projects



2004



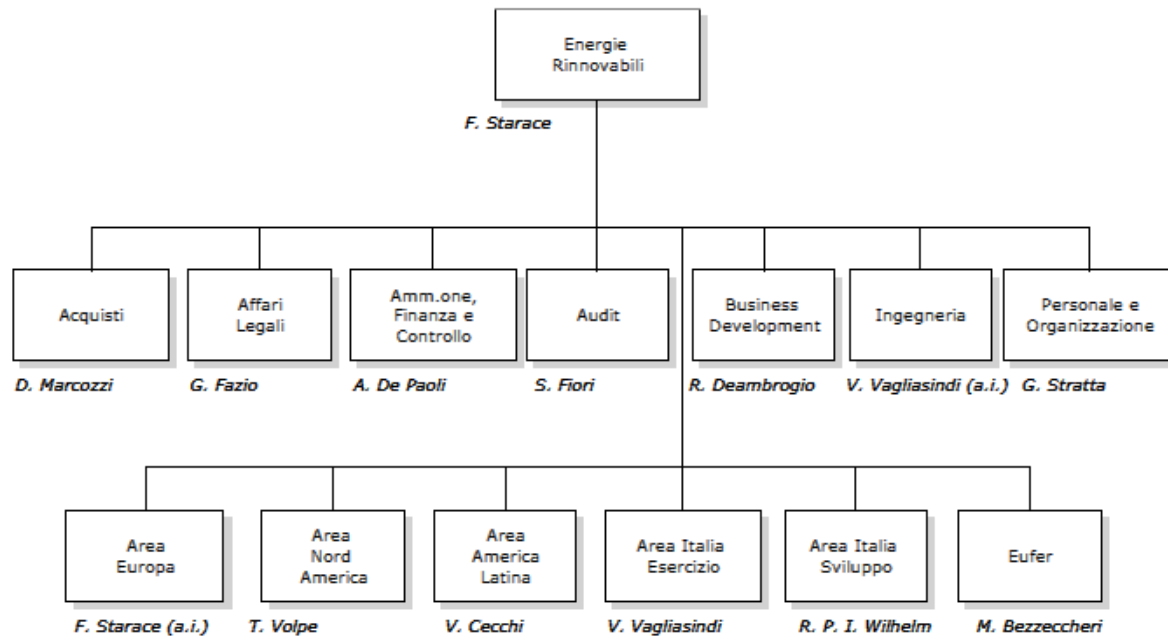
- RES and Conventional projects developed by the ***Business International Operations & Business Development Area***
- **Small team for renewables:** ≈20 people worldwide; focus on **4 hubs: Rome, Madrid, San José and Boston**
- **Opportunistic approach** to global expansion
- Entry strategy based on **M&A operations**
- **Multi-tasking management:** no clear repartition of roles and activities
- **No processes and procedures set**
- Focus on **countries with stable regulatory framework and incentive schemes**

2009: ENEL Green Power

A New Company Focused on Renewables Market

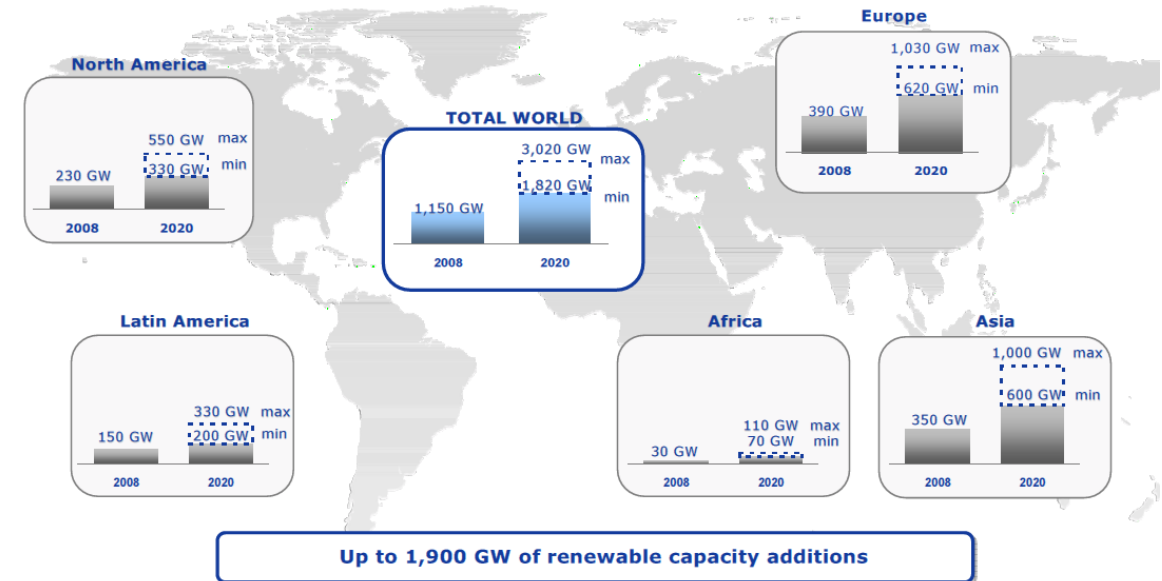


EGP ORGANIZATION IN 2009



MARKET ESTIMATED GROWTH IN 2009

Renewable energies:
strong fundamentals in all geographies
 Estimates of renewables installed capacity, 2008-2020



- **2009: ENEL GREEN POWER** is the new company of the ENEL Group fully dedicated to renewable energies
 - EGP was funded in order to capture the **sustained RES market growth**
- The RES market mechanisms as well as the increasing competitiveness forced to think **a new paradigm of expansion**

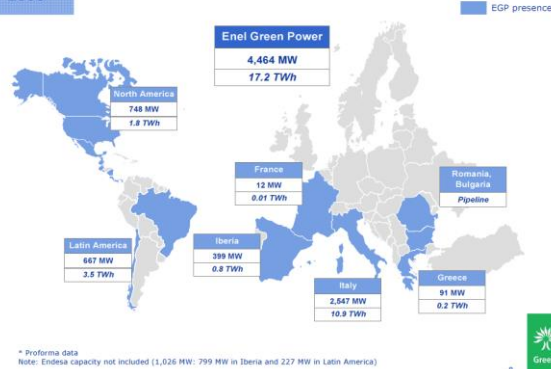
EGP Evolution: New Approach to Development

2009-2016



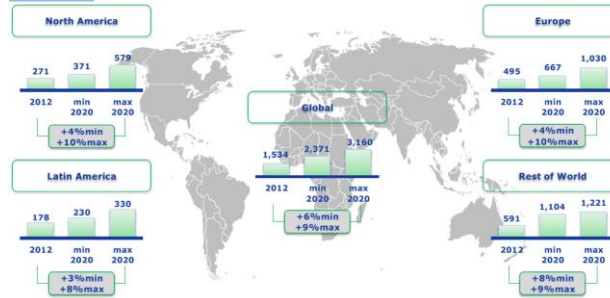
2009

Enel Green Power: large renewable player well positioned in growth geographies 2008*



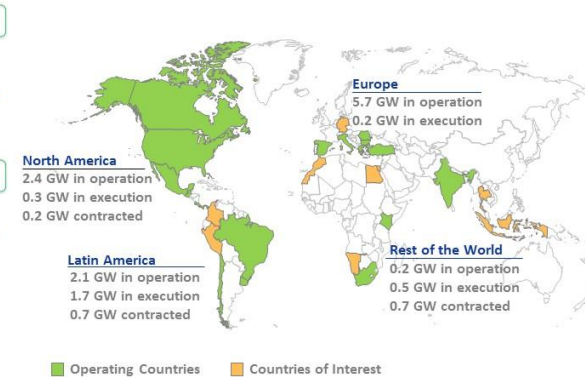
2013

Expected growth in renewables (GW)¹

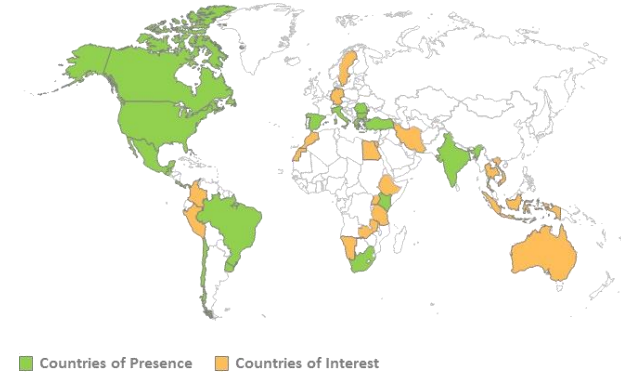


2015

Enel Green Power at a glance



2016



- Focus on mature markets with supporting policies
- Development activities based on M&A opportunities
- First PPAs in emerging markets, e.g. Central America, Brazil.
- 2009: first Leilao in Brazil

- 2012: first tender RSA (Round 2)
- Development teams organized by area to cope with increasing competitiveness
- Co-development agreements and greenfield projects as core BD operations

- Creation of the Tender Management team
- Consolidation of the EGP position in Africa and LATAM
- Enter into the 1st Asian market: India
- Scouting of new business models and technologies
- 4 new countries open in 1 year: India, Kenya, Germany, Morocco

- 34 countries with ongoing BD activities out of the 17 countries of EGP presence
- More than 65% of BDs on the field
- A new country: Peru, Australia

Enel Green Power Growth

2009-2016¹

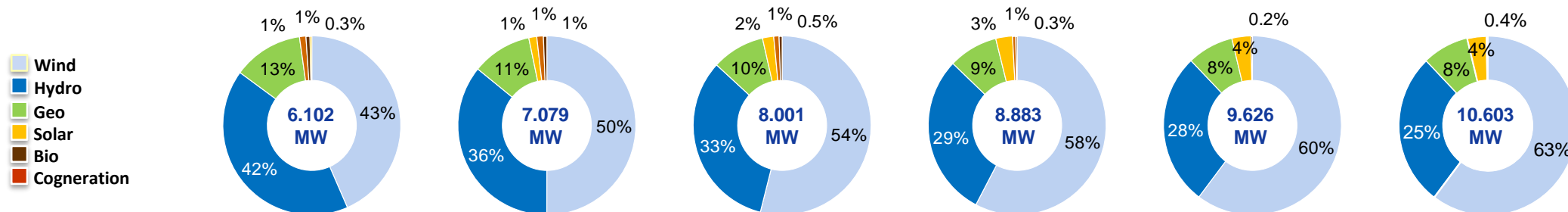


INVESTMENTS BY AREA (€/BN)



Over €8.5bn CAPEX since 2010, of which an increasing share is allocated to emerging markets

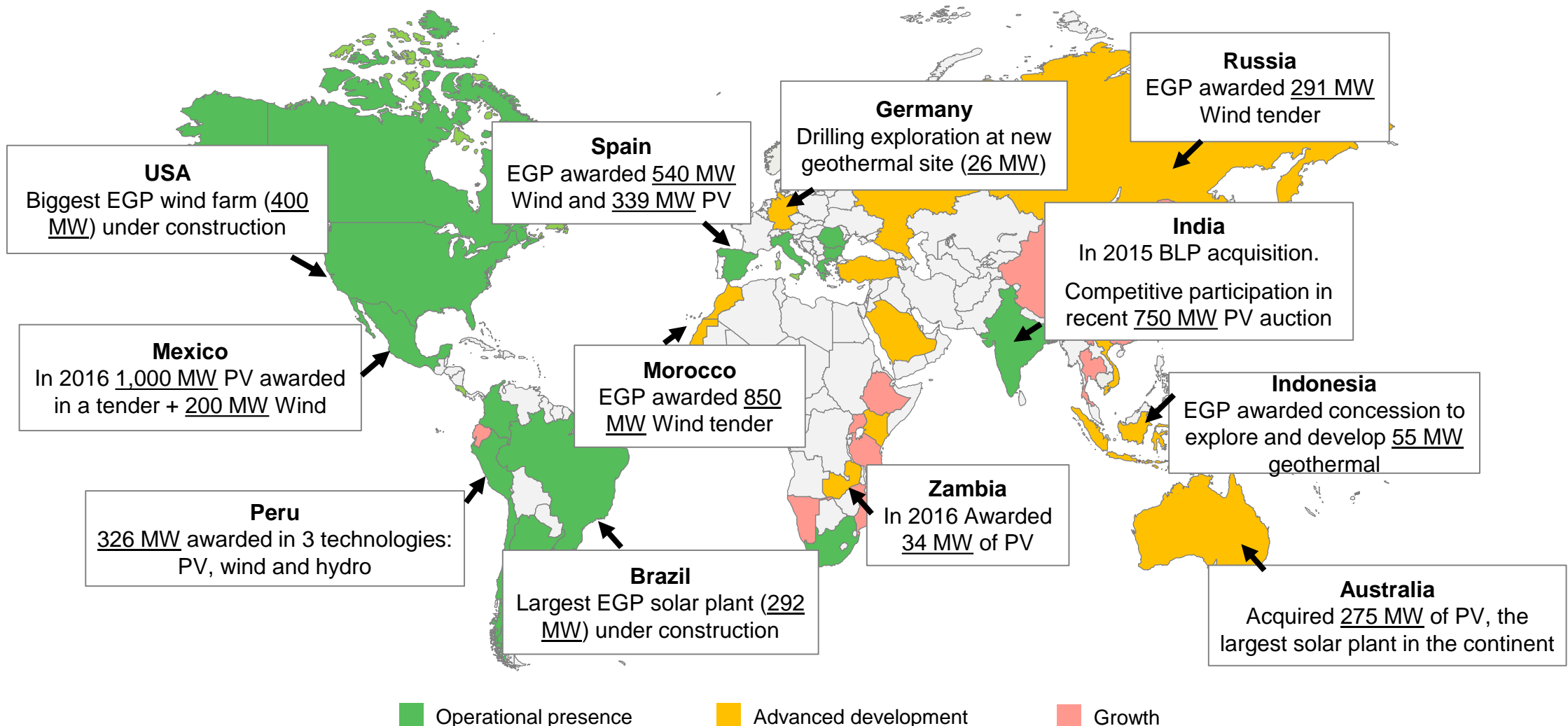
INSTALLED CAPACITY BY TECHNOLOGY (MW)



- EGP caught most of the RES market growth acting as **first mover** and **diversifying both geographically and technologically**
- The **constant interaction among functions and areas** allowed EGP to exploit cross-country synergies and economies of scale

Enel Green Power

Recent achievements (2015 - Present): 4,628 MW in two years!



Integrated business model



Financing

Business Development

- Identification of projects
- Screening of opportunities
- Development and evaluation
- CAPEX allocation

Engineering & Construction

- Realization of approved projects
- Technology development
- Acquisition integration
- CAPEX expenditure

Operation & Maintenance

- Operation of plants
- Production optimization
- Operational improvement
- Generation of EBITDA

Commercial Offering

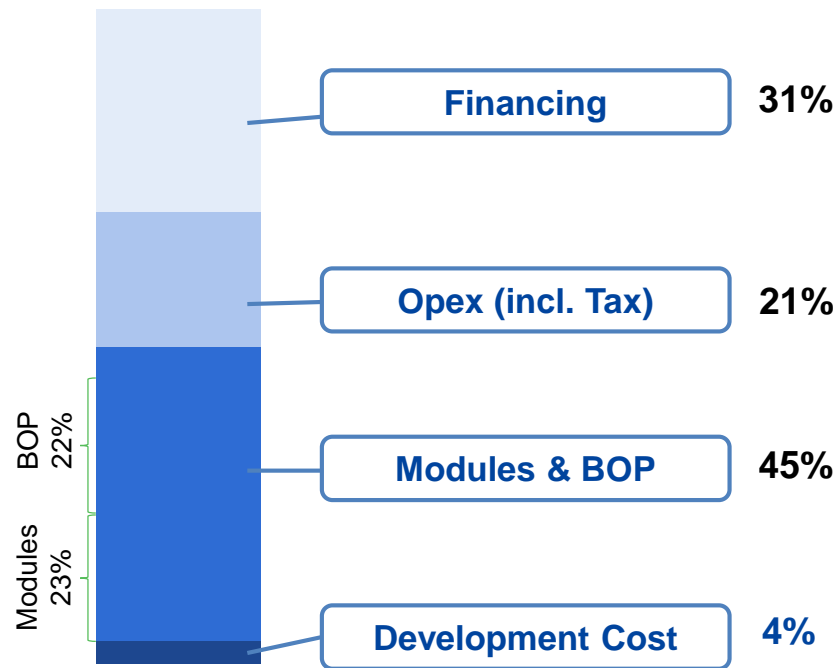
Industrial and commercial approach to the value creation

Managing complexity

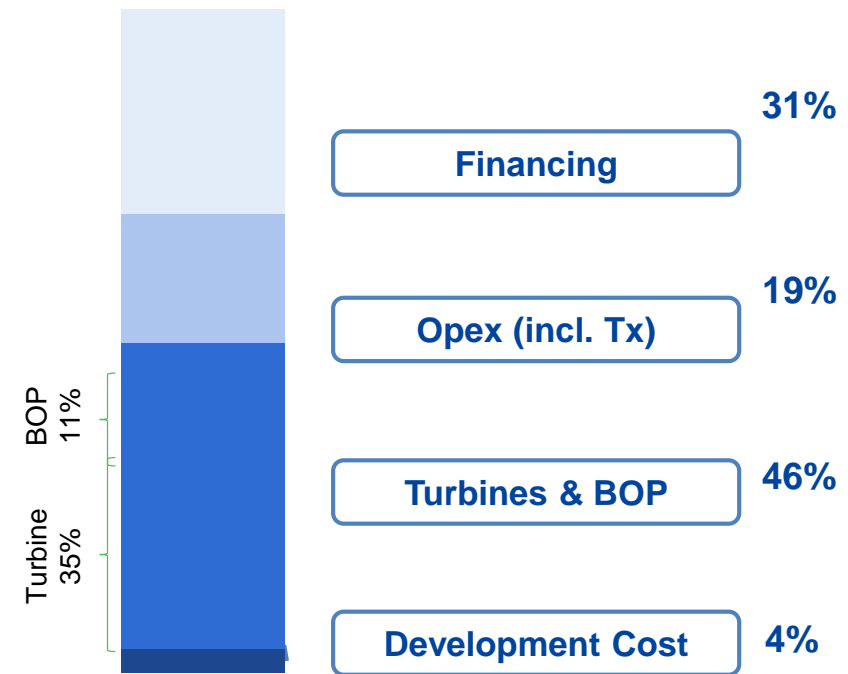
Wind and Solar projects: NPV of cost breakdown



Solar



Wind



Note: approximate values



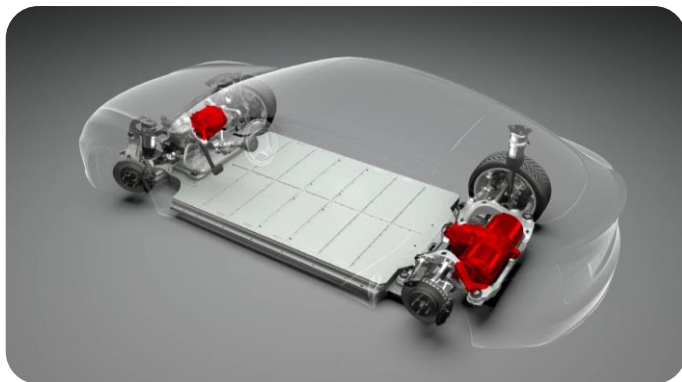
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What are the next big things for the sector?

Disruptive innovation will accelerate the transition towards a low carbon economy



Storage

E-cars are driving storage price tumbling at utility scale



From commodity to service

Utilities could own no networks or generation assets in the future



Digitalization

Digitalization is creating opportunities for smaller players resulting in **increasing competition** in the sector



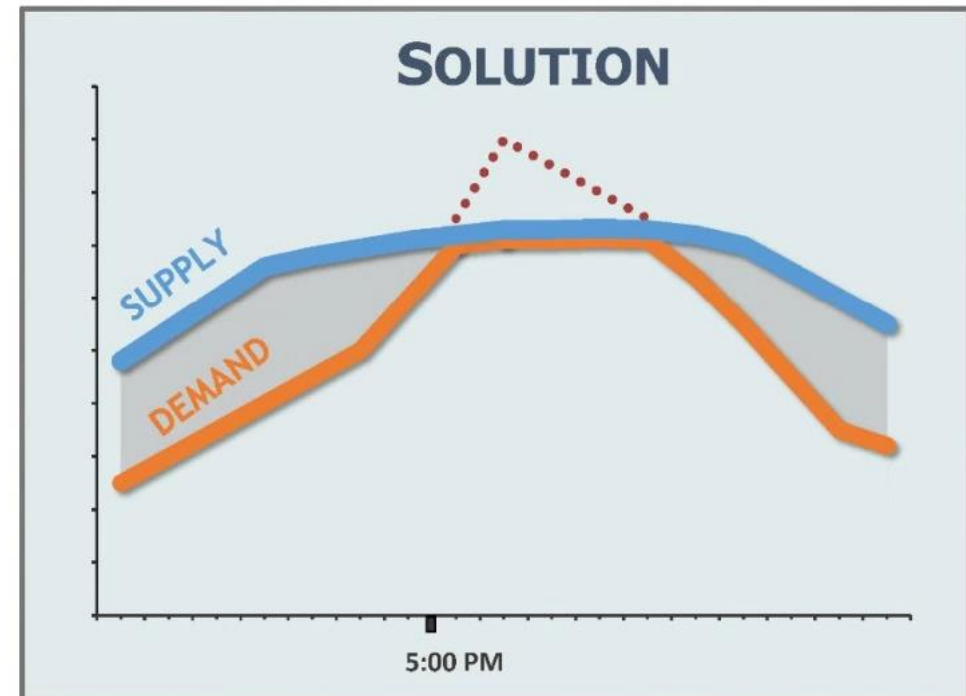
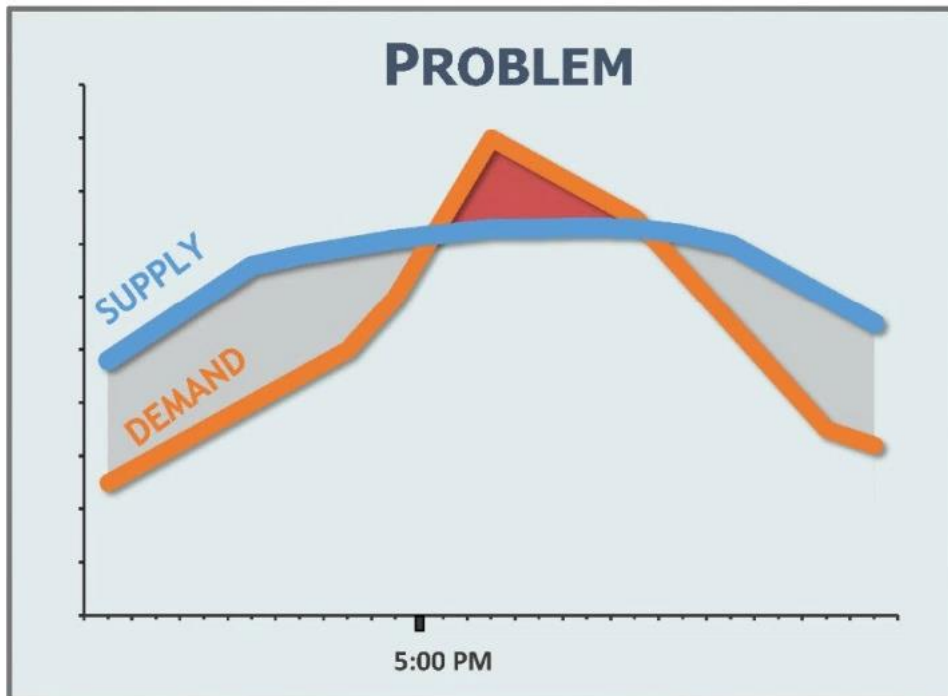
System Integration

New actors such as local dispatchers and aggregators are emerging in the energy sector

Margins are shrinking and utilities are looking for new sources of revenues + monitoring new sectors to survive

Supply meet Demand? Demand meet Supply!

The Case for Demand Response

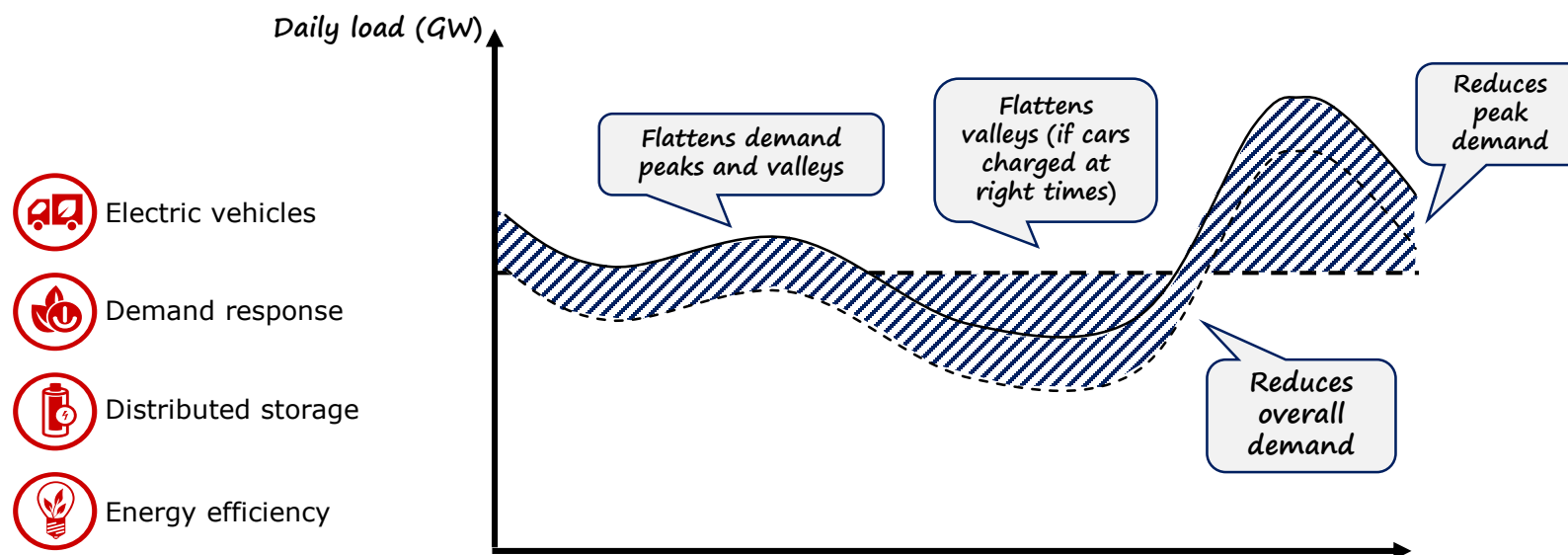


Impact of “Grid edge technologies”

The Case for Demand-side Services



Electricity system built to cope with peak demand, and thus the have an average system utilization rate of 54-55% (in the US)



Grid edge technologies could support peak demand reduction (through overall reduction and shifting/flattening) – a **10% decrease in peak demand** equates to **~\$80B of value in the US alone**

Presented at World Economic Forum (January 2017 Davos Annual Meeting Session), Grid Edge Transformation Initiative (Presented by Francesco Starace, CEO of ENEL, and Jean-Pascal Tricoire, CEO of Schneider Electric)

Note: Average US asset utilization rate of 54-55% is from the EIA showing values for 2015 for coal and natural gas fired combined cycle plants; peak demand in the US is ~710,000 MWh (in late July 2016); EIA estimates \$1,110 per kW for combined cycle natural gas plants installed in recent years; value creation is equivalent to savings from cost avoidance of building traditional peaking plants, savings on energy costs (~\$40/MWh), and savings from avoided transmission costs; Source: EIA; Bain analysis

Electric Vehicle Charging Infrastructure

Deploying all charging technologies



Charging stations



Quick charging

3.7 kW AC - 22 kW AC



Quick charging

22 kW AC - 22 kW AC

Fast charging

43 kW AC - 50 kW DC

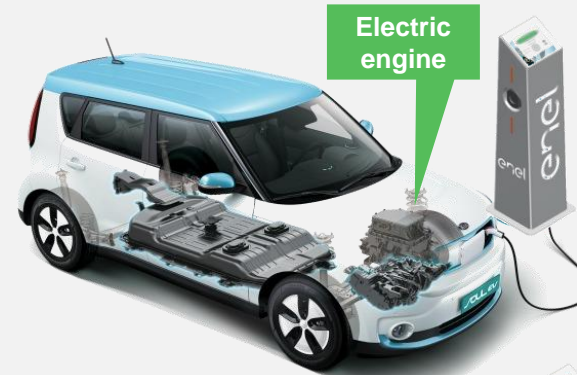


Ultra Fast charging

150 kW DC – 350 kW DC

Vehicles

Battery Electric Vehicle (BEV)



Plug-in Hybrid Electric Vehicle (PHEV)

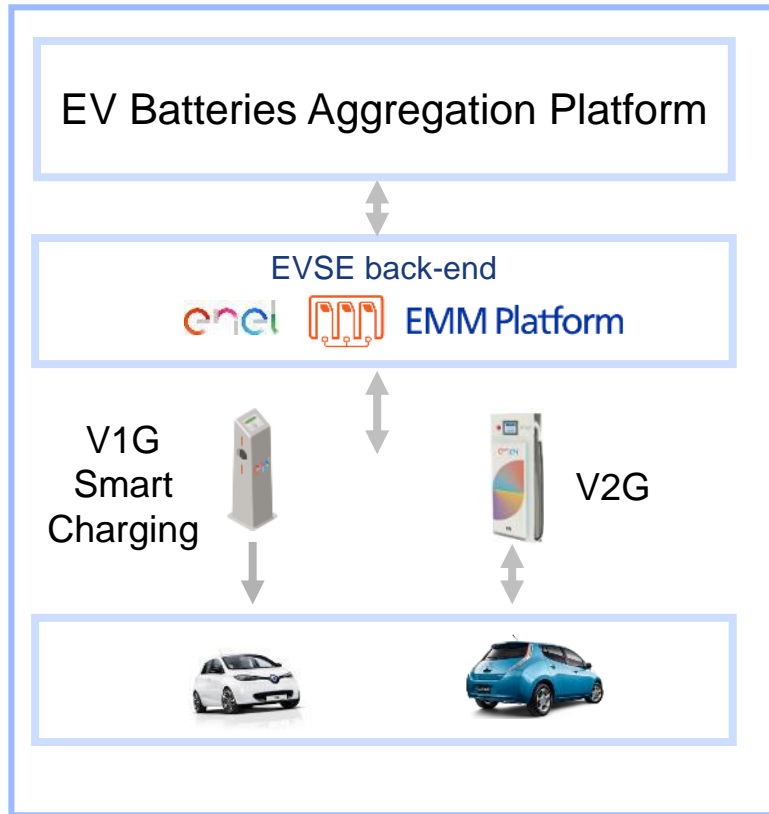


We have built a deployment plan for rollout of charging stations in Italy and our captive markets

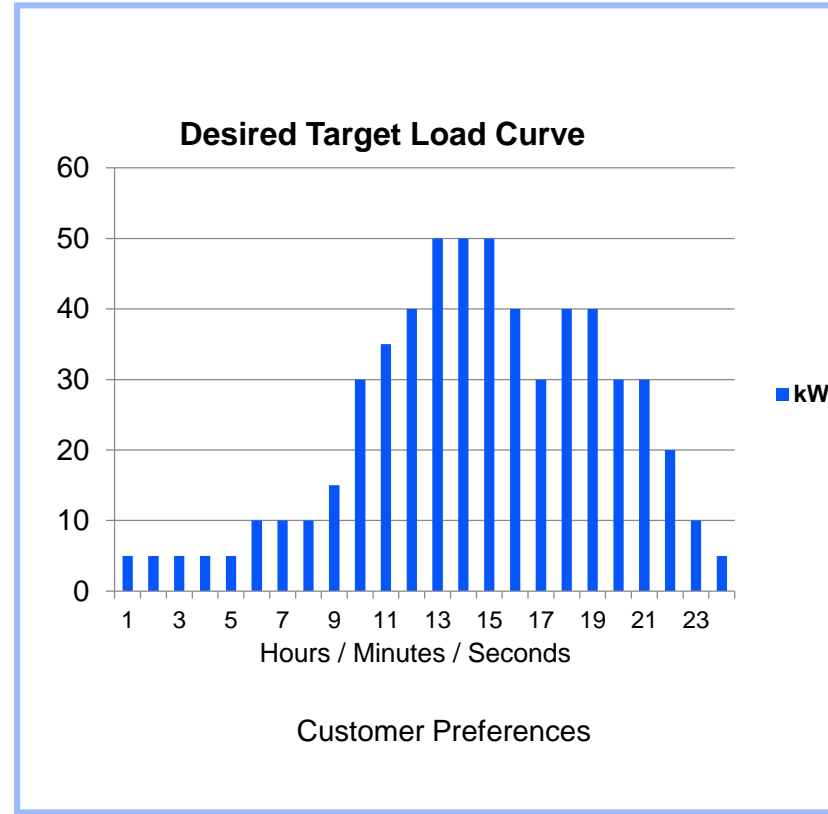
EV Battery Monetization



Aggregating Capacity...



...to unlock flexibility



...and provide services



Grid Regulation services

- Primary Frequency Regulation
- Demand Response

Customer Assets Optimization

- Demand Charge Management
- Grid Connection optimization
- Renewables Plant integration

Aggregation capabilities will be key to monetize through unidirectional and bidirectional services while EV not used (90% of lifetime)

V2G pilot project in Denmark and UK

In pictures



Electricity sector is in transition

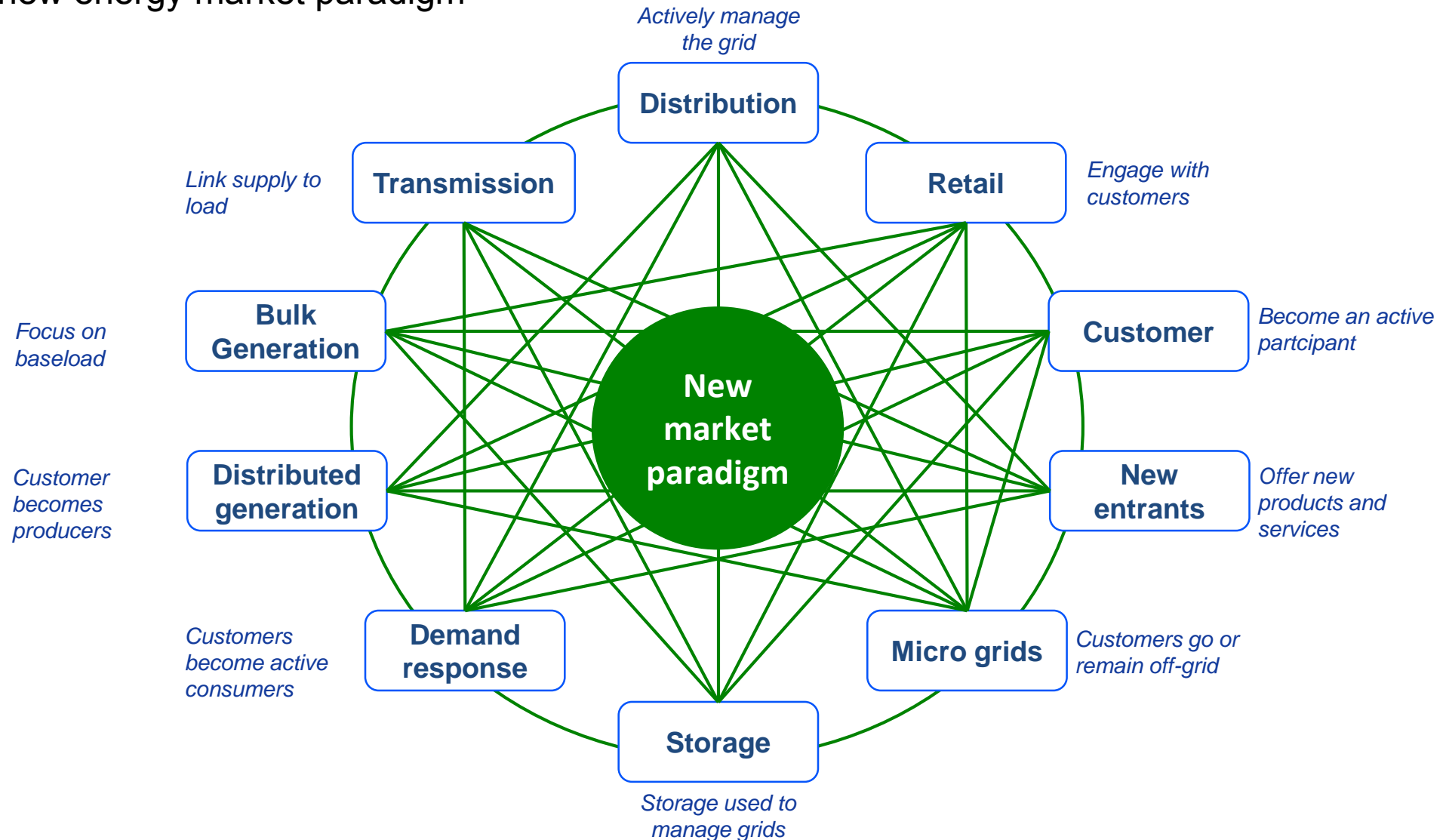
From the old model...



A simple and linear model

Electricity sector is in transition

...to a new energy market paradigm



ENEL has already started to transform itself three years ago to operate in the new energy paradigm, but...



Open Power approach & values

Responsibility

Innovation

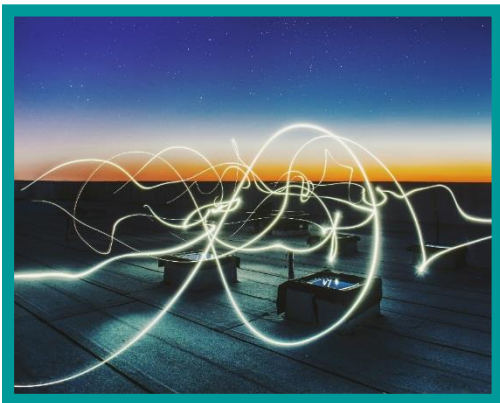
Trust

Proactivity

... the great acceleration of market changes and the increasing competition requires more focus through a dedicated organization



Global E-Solutions mission







- The **Global E-Solutions Business Line** focuses on offering a wide range of both non-commodity and digital solutions to residential customers, small/medium/large enterprises, as well as public administration, and is responsible at Group level for:
 - **managing the portfolio of solutions, as well as growing the customer base both in existing and new countries**, in accordance with security, safety and environmental guidelines and regulations, maximizing customer value and operational efficiency, sharing with Countries the growth and profitability targets;
 - **innovating and developing all solutions by managing the entire lifecycle**, from ideation to technological development, from testing to commercialization, sales, operations and post-sales activities, leveraging on best practices;
 - **scouting new technologies and developing new business models and revenue streams**, both in existing and new countries also through equity transactions.

Global E-Solutions

Four solutions portfolios



Portfolio	Some solutions	Some lever
e-City 	<ul style="list-style-type: none">– Public Lighting– Artistic Lighting– B2M Energy Efficiency Solutions– Smart Signaling– Smart Security– Fiber optic– ...	<div>Technology aggregator</div> <div>DSO infrastructure</div>
e-Industries 	<ul style="list-style-type: none">– Off Grid Solutions– Limited Grid Solutions– Energy Management Systems– B2B Energy Efficiency Solutions– Distributed Generation– ...	<div>Flexibility</div>

Portfolio	Some solutions	Some lever
e-Home 	<ul style="list-style-type: none">– “Smart Home”– Energy Monitoring– Home Electric appliances– Lighting B2C– Energy Management Consumer Platforms– Health and Well-being– ...	<div>Bundle with commodity</div> <div>Invoice</div>
e-Mobility 	<ul style="list-style-type: none">– E-vehicle (e.g. car, bus, drone)– Recharge services– Recharge infrastructures– Vehicle-to-grid– Integrated mobility– Second life battery services– ...	<div>Electrification</div>

Main messages



Change is constant.

Energy transition is already here.

sustainable, flexible and affordable

Change takes effort (and trial & error)

Electricity sector is undergoing shift in paradigm.

networks, demand-side, services



Thank you

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