Making the Energy Transition Happen – Smart Technologies and New Business Models

PETROL

Energy for life

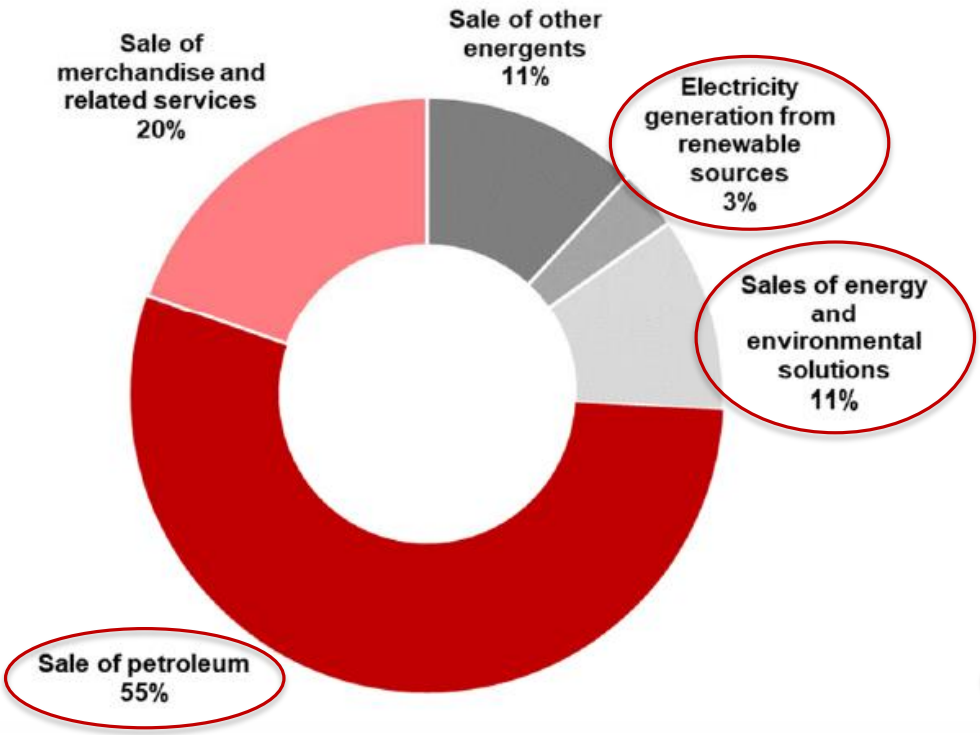
Gašper Artač, PhD

Vision

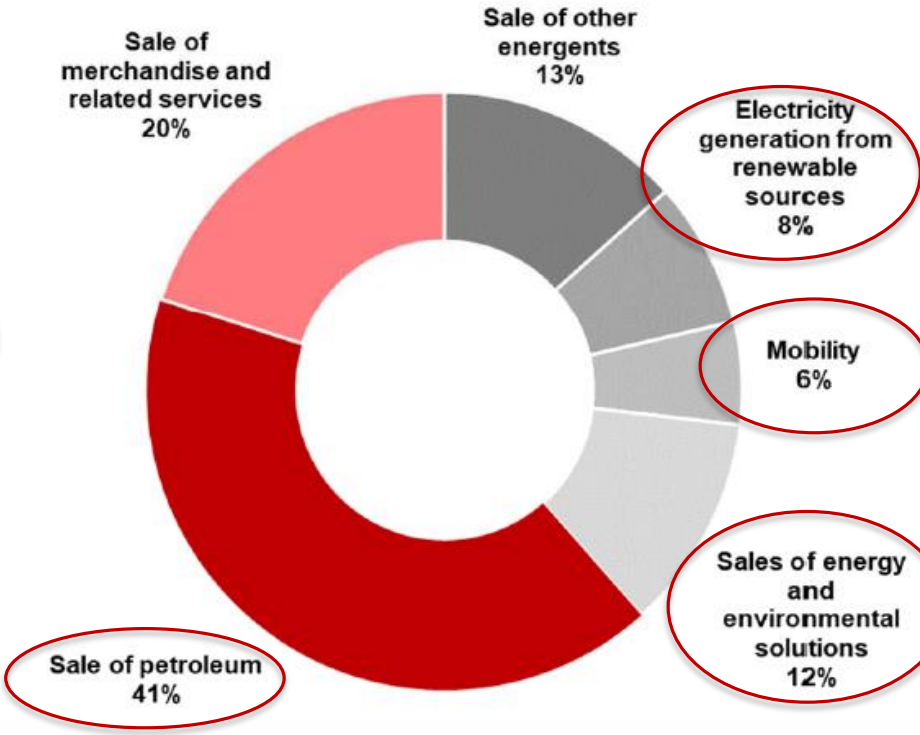
Petrol's vision for 2022 is a commitment to integrate **energy, trade, mobility and advanced services** into an excellent user experience as an important regional provider of **comprehensive and sustainable solutions**.

Financials: EBIDTA by activity: Strategy 2018-2022

EBITDA in Plan 2018: EUR 170.1 mm



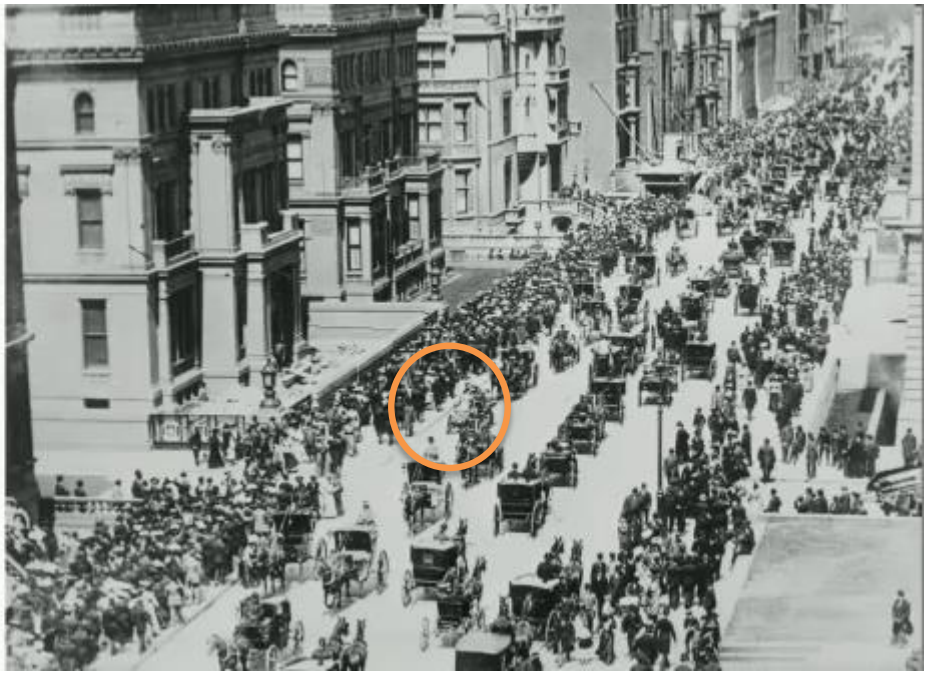
EBITDA in 2022: EUR 233 mm



5th AVE NYC

1900

Where is **the car?**



5th AVE NYC

1913

Where is **the horse?**

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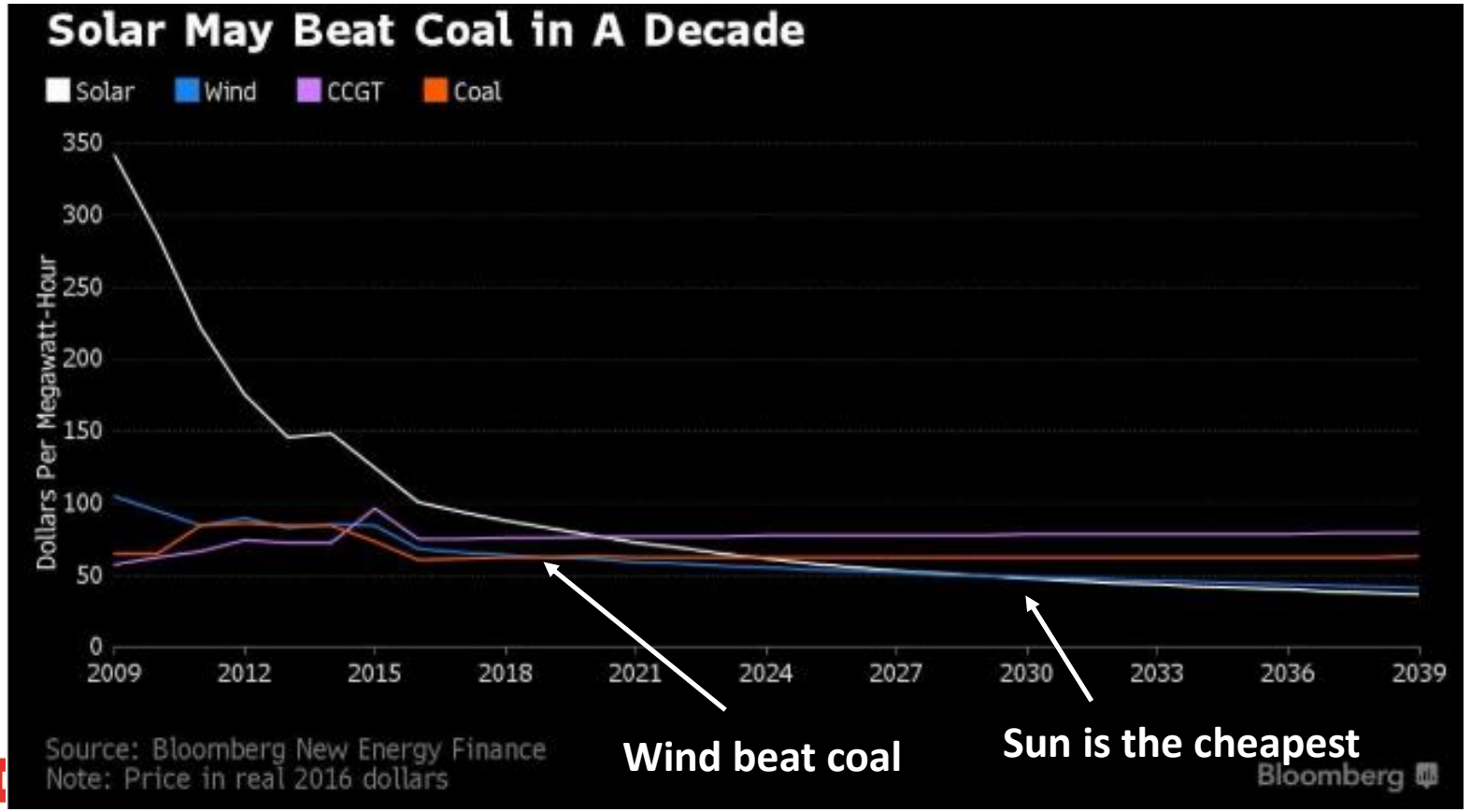
1. Trends and strategies in different industries

Technology trends - RES

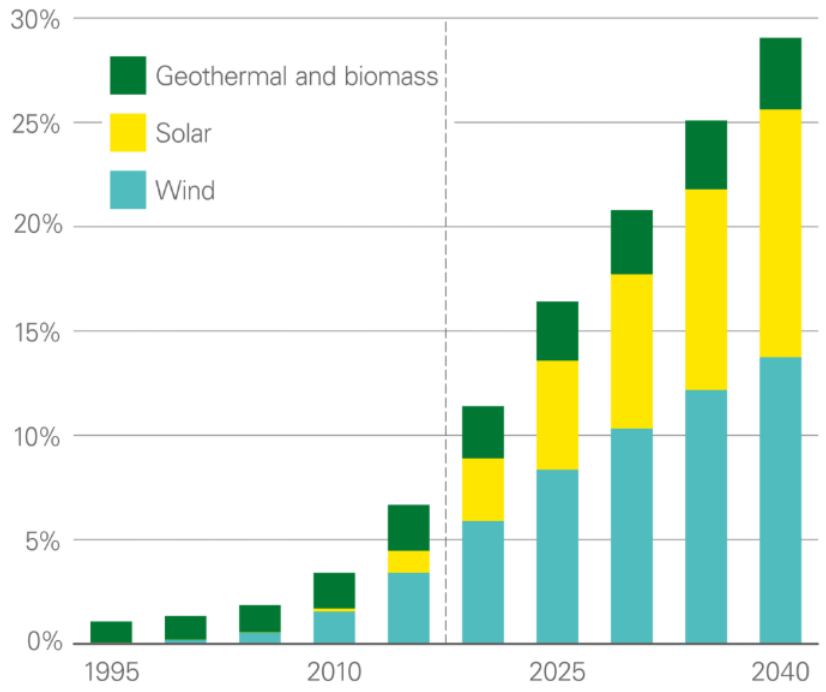
- Onshore wind is the lowest-cost form of the electricity, both clean and conventional.
- The IEA estimates that the price of wind energy will decline by at least 12% between 2015 and 2020, Siemens estimates it of 3-4% per year.
- In 2017, more was invested in solar than in all other low-carbon technologies combined.
- Within a decade, the sun will probably be the cheapest source of energy.



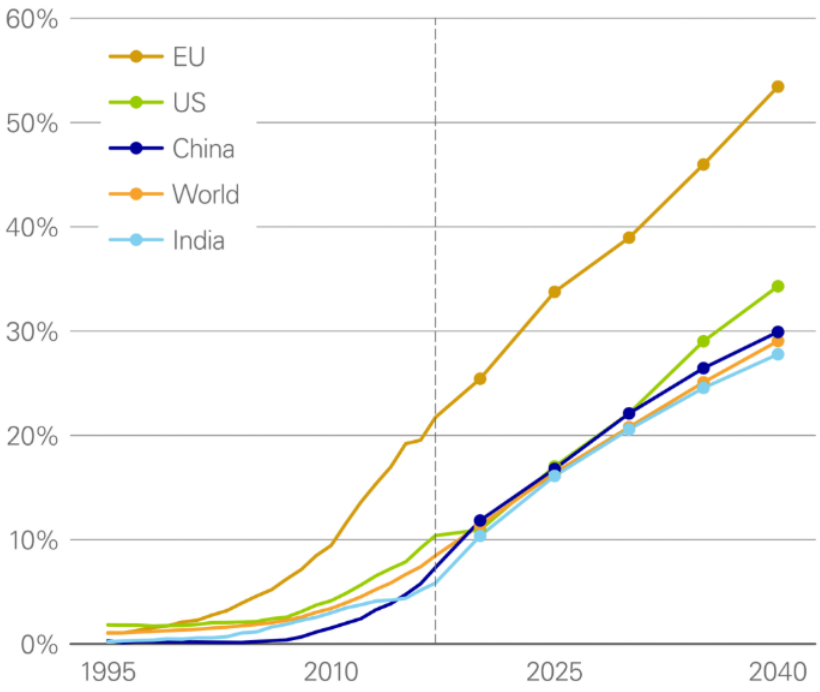
Technology trends - RES

- RES will be the world's main source of power within two decades and are establishing a foothold in the global energy system faster than any other fuel in history.
- RES will account for about 30% of the world's electricity supplies.
- In regions such as Europe, the figure will be as high as 50% by 2040.

Renewables share of power generation by source



Renewables share of power generation by region



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Source:www.bp.com

Technology trends – Energy Storage

- Efficient energy storage may be very important component to reduce a market's reliance on non-renewable energy sources and helping to ensure the grid stability.
- Tesla's Big battery farms disrupted the market when it went online.
- Battery price will reflect the system balancing costs on the power markets.

Tesla built the world's biggest battery power plant in just three months. Source: Tesla

A Fossil-Fuel Disaster

Gas generators were unable to dictate the price of backup energy services.

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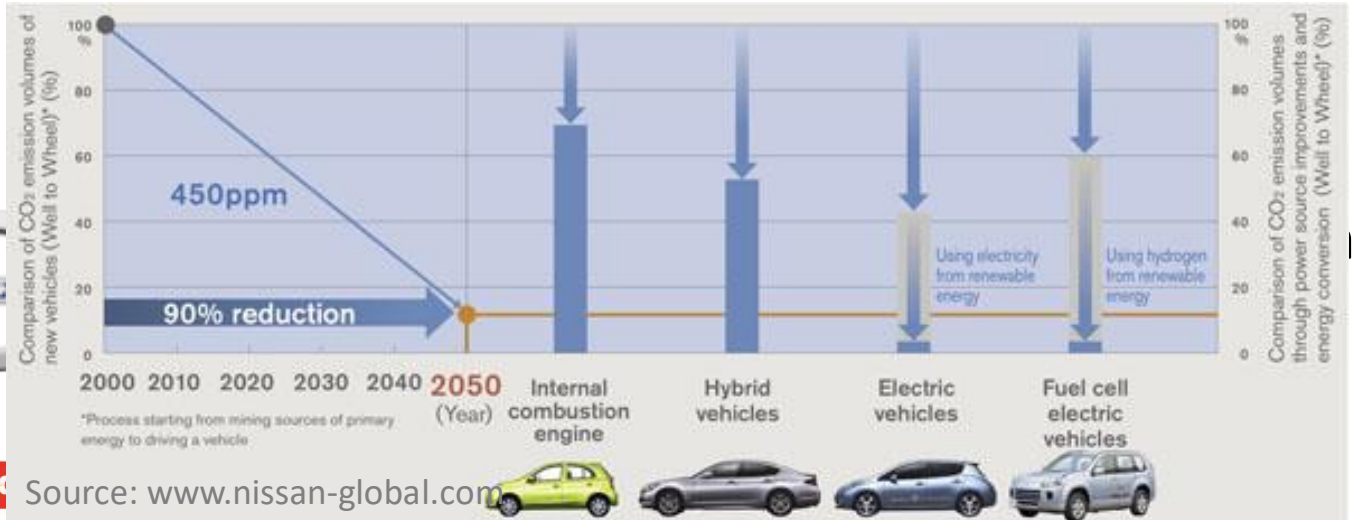
Transportation trends – EV cars

VOLKSWAGEN GROUP

VW Group is looking to become the world leader when it comes to electric vehicles.

NISSAN MOTOR CORPORATION

Nissan leads the pack towards a zero-emission society.



Source: www.nissan-global.com

Transportation trends – EV buses

Electric Buses Are Hurting the Oil Industry

By Jeremy Hodges
24. april 2018 1:01 *Corrected 25. april 2018 15:42*

- About 279,000 barrels a day of fuel won't be needed this year
- China adds a London-sized electric bus fleet every five weeks

▲ Buses in Shenzhen Bus Company's main charging depot in Futian. Photograph: Matthew Keegan

All 16,000 buses in the fast-growing Chinese megacity are now electric, and soon all 22,000 taxis will be too

By the end of 2019, electric buses will have saved **98.55 million barrels of diesel** = more than **42 million tons of CO2**.

Source: Bloomberg New Energy Finance

Transportation trends – new services

BMW to launch 'grid integrated' and 'solar-optimised' EV charging service next year

Source:/www.energy-storage.news

HOME / MEDIA / ELECTRIC MOBILITY: ENEL X, NISSAN AND RSE LAUNCH ITALY'S FIRST TEST OF VEHICLE-TO-GRID TECHNOLOGY APPLIED TO INNOVATIVE SERVICES

Electric mobility: Enel X, Nissan and RSE launch Italy's first test of Vehicle-to-Grid technology applied to innovative services

Published on Friday, 24 May 2019

Porsche enters smart home space

September 29, 2017 . 0

Sourcewww.smart-energy.com

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EV perspective

Slovenia:

Retail (2016): 1,600,000 tons of motor fuel

Approx. 19.1 TWh

(The EV has approx. 4x higher efficiency)

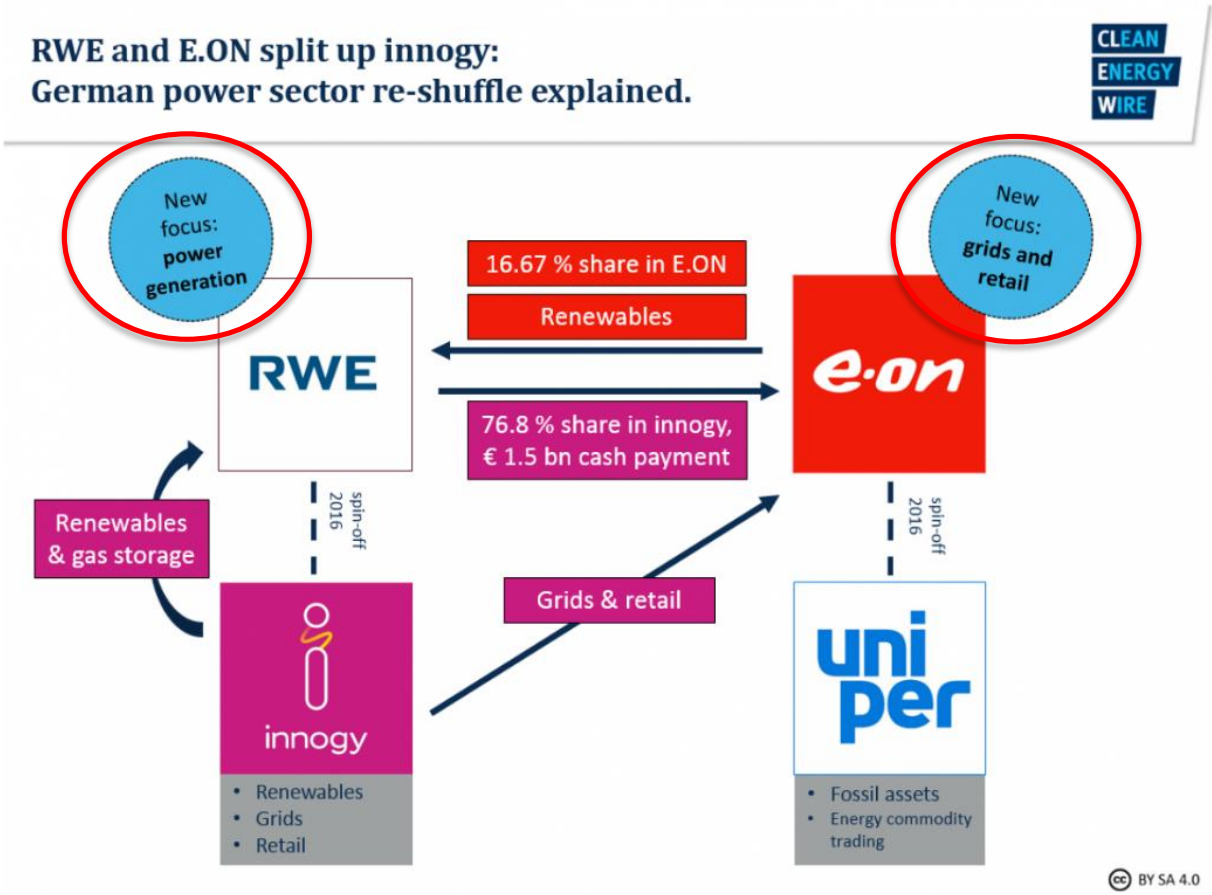
Approx. 4.8 TWh

Required approx. 1,600 MW of RES

(Considering wind availability)

Trends in energy companies

Transformation of the energy companies into the "energy of the future" → reduction of conventional resources and establishment of the spin-off companies.



Trends in energy companies

enel Green Power

ENEL is undergoing a switch to renewable energy with the goal of being **carbon neutral** by 2050!

"We are entering a new transition phase: in the coming decade, generation will be renewable above all, with less and less from thermal plants."

– Francesco Starace, CEO and Director General of Enel

Trends in energy companies

How?

The solution lies in marrying green power generation with digitalization → **ENEL** works with **Schneider Electric** achieving higher levels of control. RES like solar and wind can be added into the generation mix smoothly.

The results?

More than **40% of Italy's energy** is now **renewable**. CO2 emissions have been reduced by 75,000 tons CO2 per year.

Trends in oil companies

- The major trend in oil companies are gas, electrification and RES.
- **Shell's New Energies business** - investing, acquiring and supporting cleaner energy related projects around the world.

Shell acquires German battery start-up Sonnen

Move part of energy major's shift towards cleaner fuels

© Bloomberg

EDITION: UNITED STATES

REUTERS

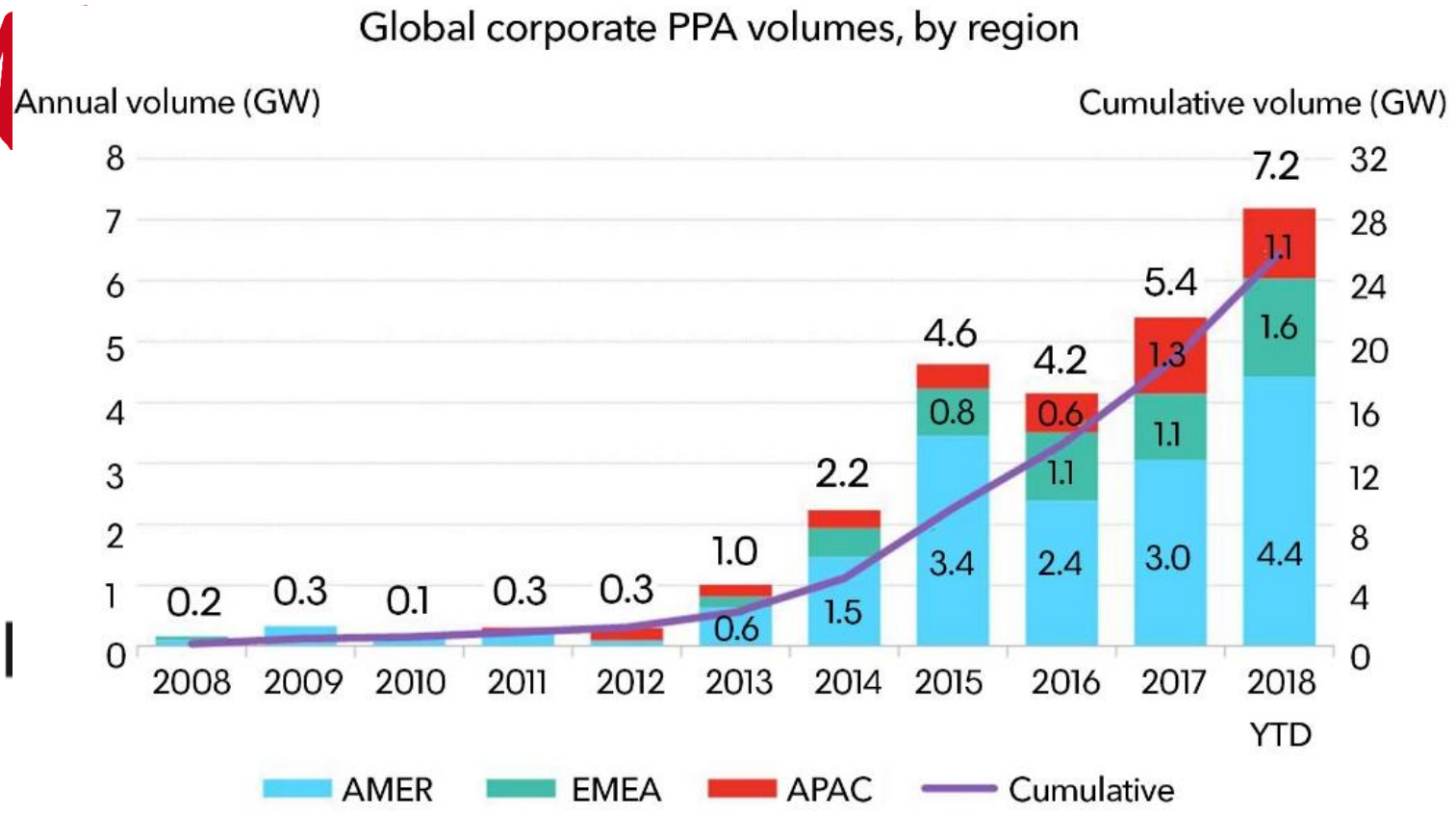
Business Markets World Politics Tech Commentary Breakingviews Money Life

COMMODITIES | Tue Apr 19, 2016 | 2:05pm EDT

Total targets gas, renewables and power expansion

Trends in non-energy companies

RE100 - 191 companies have made a commitment to go '100% renewable' (Google, Ikea, Lego, Coca Cola, eBay, Facebook, Philips, BMW Group, Helvetia,…) by 2050 at the latest.



New business cases

Microgrids and **Energy Communities** have been identified as a key component of the renewable energy transition for improving power reliability and quality and increasing system energy efficiency.

- Netherlands: Smart Integrated Decentralised Energy Systems (**SIDE**).
- State-of-the-art microgrid pilot projects that focus **on sustainability, self-sufficiency** and **smart energy management**.
- **Smart**: managed intelligently through a local energy management system.
- **Integrated**: maximising synergies between all components.
- **Decentralised**: the system operates at the local level and has a clear system boundary.
- **Energy**: heat and power systems powered by sustainable technologies.

2. What we do

IMPLEMENTED PETROL'S PROJECTS THAT DRIVE SMART CITIES

Petrol has developed smart solutions which are implemented in 60 cities in the region.

Legend:

- Smart district heating system
- Smart water supply system
- Smart buildings
- Smart public lightning

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E-Mobility

Continue marketing „Car as a service“:

- Launch of corporate vehicle sharing
- E-Taxi pilot phase Ljubljana, Zagreb

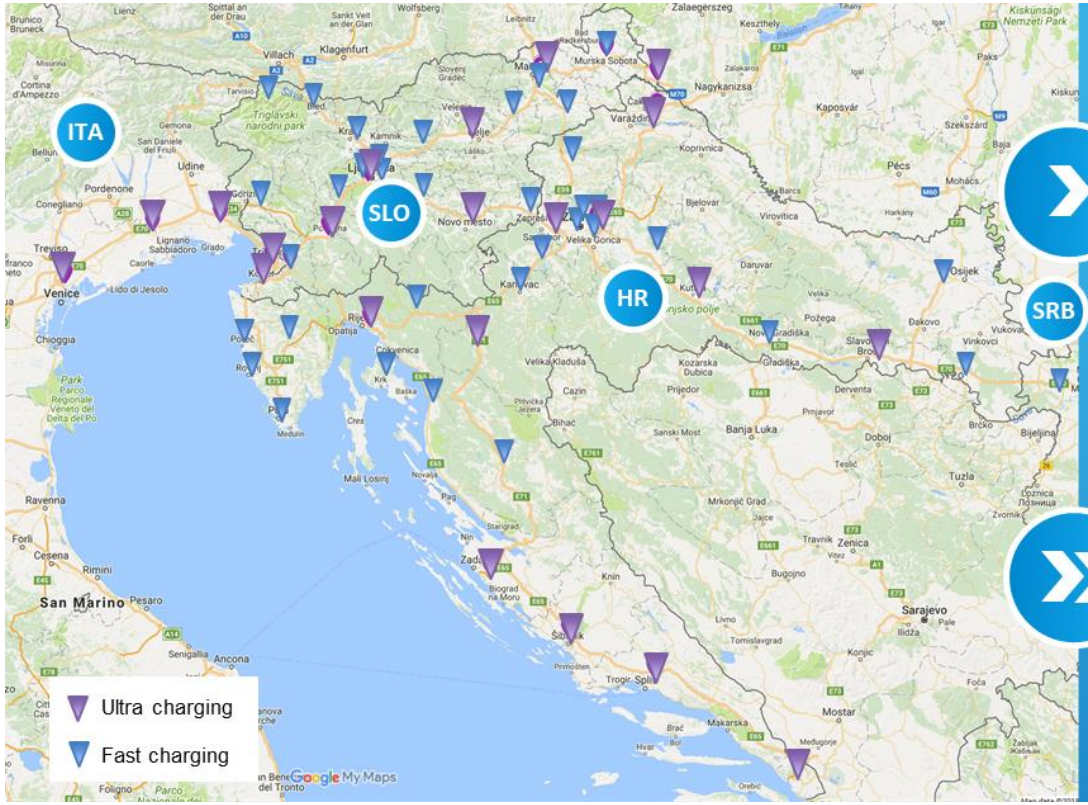
Branched EV charging infrastructure.

2 strategic areas

EV charging infrastructure

Mobility services: Complete solutions for cities and companies

E-Mobility



SLOVENIA

+50 locations in towns
34 locations on highways

ABROAD

10 locations in Croatia (by the end of 2019)
Expansion into Italy in 2019
1 fast charger in Belgrade

E-Mobility

NEXT-E

To create interoperable and non-discriminatory EV charging network, as a viable alternative to the combustion engine vehicles (SI, HR, CZ, SK, HU, RO)

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SI 16 fast, 4 ultra-fast charging points,

HR 14 fast, 2 ultra-fast charging points

URBAN-e

E-Mobility, infrastructure and innovative intermodal service in Ljubljana, Bratislava and Zagreb.

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LJ and ZG 2x9 fast and 2x47 classic charging points

E-taxi services

multi-e

To establish ultra-fast charging hubs (for EV and CNG) on the corridor from Venice via Ljubljana and Zagreb to Budapest. To establish e-carshering and e-shuttle links between cities nearby airports.

Petrol

29 ultra-fast and 698 classic charging points

17 charging points for CNG

920 vehicles for e-taxi

RES electricity production

Wind Power Plant Glunča (Šibenik) - Croatia

- Total rated **power** 20.7 MW.
- Annual **electricity production** 45-50 GWh.

Small Hydropower Plant Jeleč – BiH

- Total rated **power** 4.85 MW.
- Annual **electricity production** 17 GWh.

Ongoing projects:

Location	Country	Type	MW	GWh
Knin	CRO	SPP	11	15
Ljubač	CRO	WPP	30	90
Krivača	SRB	WPP	103	300

Integrated energy solutions

- With an increasing number of distributed RES
  - New challenges are emerging on the electricity network.
  - Ensuring network stability is becoming more challengeable.
- **Flexibility management**
  - Virtual power plant.
  - Manage active demand & distributed generation & other flexible resources.
  - Maintain the stability of the electricity network and optimize the use of resources on the energy market.
  - Creating benefits to all the actors.
- **"Smart" solutions** (energy of the future)
  - Smart city;
  - Smart grid;
  - Home Energy Management System and
  - Energy community.

Integrated energy solutions

Compile

The main aim is to show the opportunities of **energy islands** for **decarbonisation** of energy supply, **community building** and creating **environmental** and **socioeconomic benefits**. Our vision is that flexible energy community supported networks interplay with current centralized system, and with optimized planning, increasing societal benefit.

X-flex

The main aim is to propose integrated solutions, that will **facilitate the optimum combination of decentralised flexibility assets**, both on the generation (DER) side and on the demand side (V2G, power-to-heat/cold/gas, batteries, demand response), enabling all parties, including final prosumers, to **offer their flexibility in the market creating benefits to all the actors** in the smart grid value chain.

Welcome to COMPILE! The European project building energy communities.

Back to the future

2019

We are here


“We cannot solve our problems with the same thinking we used when we created them.“
- Albert Einstein
Thank you for your attention
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