Energy Efficiency: EU strategies and best practices

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EU framework for EE: 4 main pillars

1. **Energy Efficiency Directive**: 2012 directive, amended in 2018, sets rules and obligations for the EU's 2020 and 2030 EE targets, with a 20% target for 2020 and a mandatory 32.5% for 2030.

2. **Energy Performance of Buildings Directive**: EU main piece of legislation to make buildings more energy efficiency and reduce the climate impact of buildings (40% of Europe's energy consumption and 36% of CO2 emissions)

3. **Ecodesign and Energy labelling**: energy labels provide an indication of the EE of products at the point of purchase to encourage manufacturer to drive innovation and use more EE technologies + ecodesign sets requirements and mandatory minimum standards for EE of products (e.g. Lighting, heaters, power transformers, freezing equipments, televisions, battery chargers, domestric refrigerators, diswhashers)

4. **Financing EE**: mobilising private financing for EE investments with the Smart Finance for Smart Buildings initiative + use of EU funds such as ESIF (€18bn for EE in 2014-2020).

Energy efficiency at the core of the Clean Energy Package

	2020 Target	2016 Status	2030 Target
Reduction in GHG emissions (from 1990 levels)	-20%	-23% (on track)	-40%
Renewable Energy (% of final consumption)	20%	16%	32%
Energy Efficiency (reduction in primary energy consumption compared to 2005)	20%	12%* (2014 status)	32,5%

Regulations

1) Energy Efficiency:

- Review of the Energy Performance of Buildings Directive
- Energy Efficiency Directive

2) Renewables:

- Revised Internal Market for Electricity regulation
- Revised Common rules for the internal Electricity Market Directive
- Revised Renewable Energy Directive

Trends

Boost EE

- EE first principle
- Mandatory target
- Renovation strategies
- Smart solutions deployment
- Energy Efficiency Obligations

Energy efficiency targets under the EED

The EED's three main cross sectoral targets*are:

1. **The 20% EU energy savings target.** The EED's overarching objective (Article 1.1) is “to ensure the achievement of the Union's 2020 20% headline target on energy efficiency and to pave the way for further energy efficiency improvements beyond that date”. The 20% target is defined in Article 3.1(a) as a maximum of 1483 Mtoe primary energy or 1086 Mtoe final energy consumption in 2020*.
2. **The indicative national efficiency targets.** In terms of making this operational, the EED stipulates that MSs must set their own overall indicative national energy efficiency targets, which the Commission will assess as sufficient or not to reach the EU target and thereafter consider proposing a binding target (Article 24.7).
3. **The national binding target for end-use savings**. Article 7 sets a general binding target to deliver 1.5% cumulative annual energy end-use savings.

Revision of the EED as part of the Clean Energy Package

2012 Energy Efficiency Directive

- 20% not-legally binding targets
- an annual reduction of 1.5% in national energy sales
- EU countries making energy efficient renovations to at least 3% per year of buildings owned and occupied by central governments
- mandatory energy efficiency certificates accompanying the sale and rental of buildings
- the planned rollout of close to 200 million smart meters for electricity and 45 million for gas by 2020
- obligation schemes for energy companies to achieve yearly energy savings of 1.5% of annual sales to final consumers
- large companies conducting energy audits at least every four years or deployment of energy management systems

Clean Energy Package

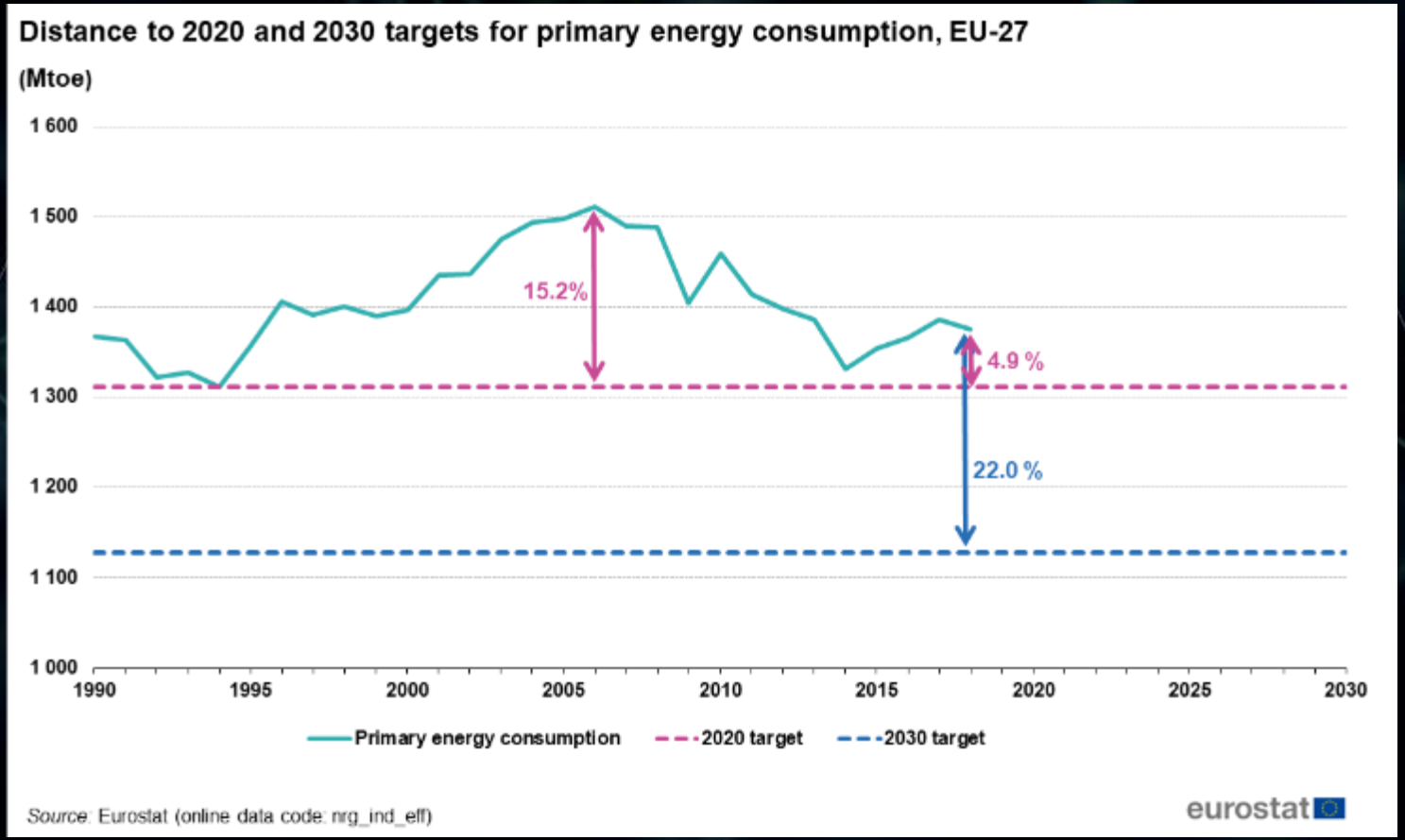
2018 Energy Efficiency Directive

- 32.5% binding target for the EU but not Member States
- Extension of energy savings obligation: EU countries to achieve new energy savings of 0.8% each year of final energy consumption for 2021-2030.
- Metering and billing of thermal energy by consumers: more requirements for the deployment of priced meters for district heating, district cooling and domestic hot water to reflect the final customer's actual energy consumption.
- Updated primary energy factor (PEF) for electricity generation of 2.1 (down from the current 2.5) to push electricity for heating & cooling

EU to miss EE 2020 target and not on track for 2030

⇒ Energy consumption had been gradually decreasing since the beginning of the century - but this trend changed in 2014.

⇒ As a result, Europe consumes more energy today than when the 2020 target was adopted in 2012.



Revision of the Energy Performance of uildings Directive (2018): make buildngs more energy efficient

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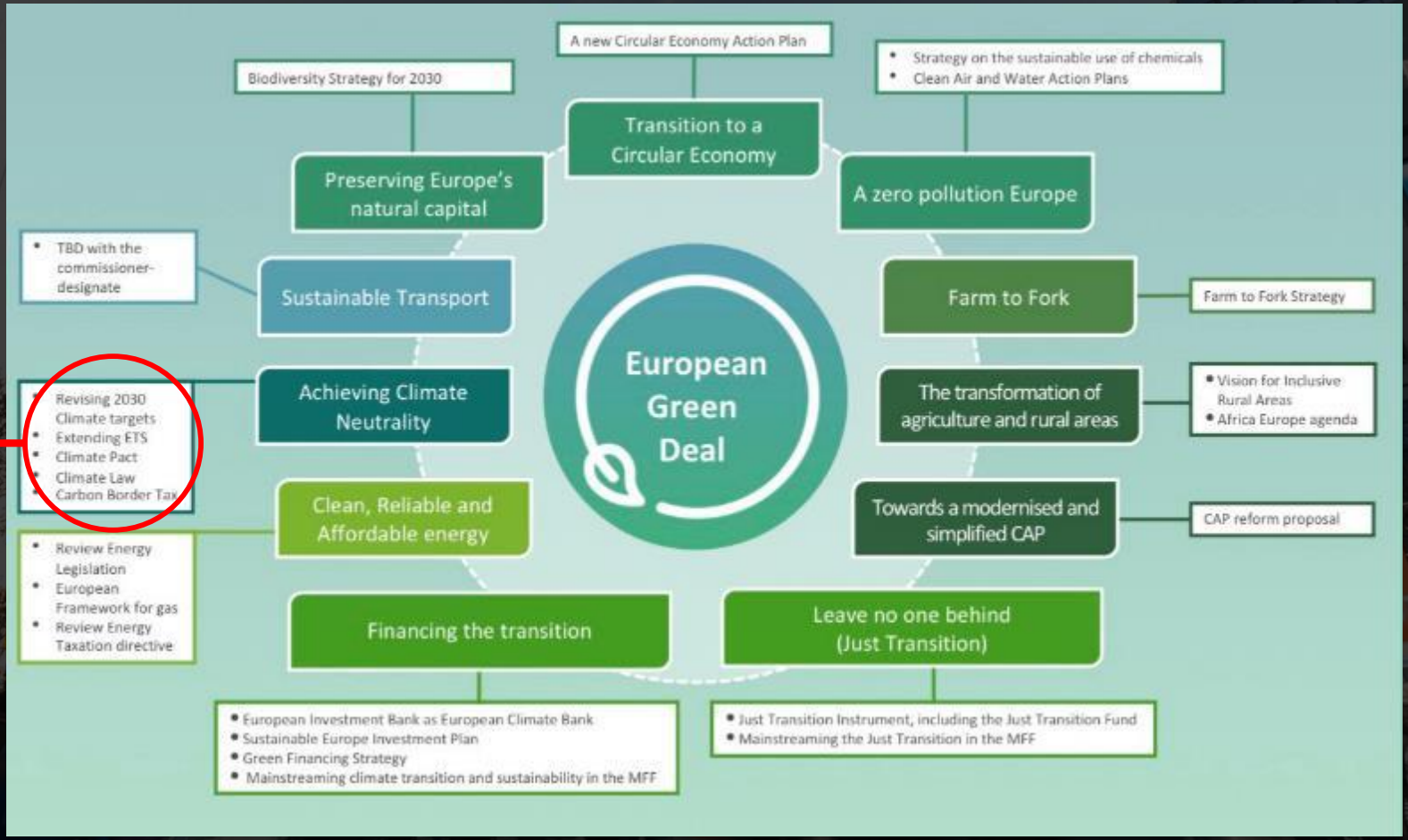
To achieve climate neutrality, EU ambition and actions on EE will have to be increased



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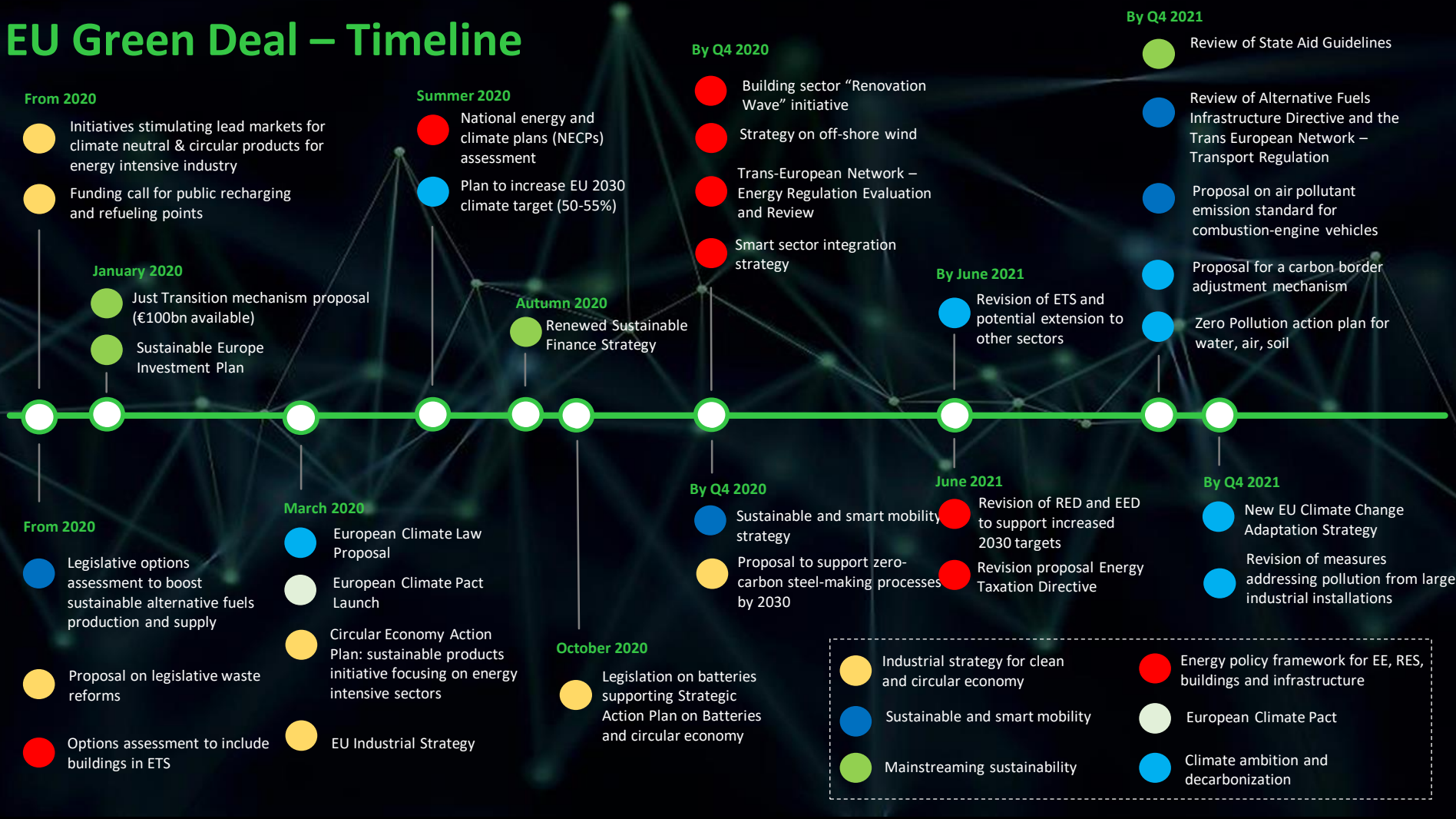
EU Green Deal – Timeline



Renewable Energy Sources: EU strategies and best practices

Jules Cordillot, EU Government Affairs Officer, Schneider Electric

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EU framework for renewable energy: the RED

20%
by **2020**

- Original renewable directive (2009) requires the EU to fulfil at least 20% of its total energy needs with renewables by 2020 – to be achieved through the attainment of individual national targets
- Each EU member state has its own Europe 2020 target. The national targets take into account the member states' different starting points, renewable energy potential and economic performance.

✓ 11 of the EU Member States have already hit their 2020 targets: Bulhaia, Croatia, Czech Republic, Denmark, Estonia, Finland, Italy, Hungary, Lithuania, Romani and Sweden.

⇒ **Renewable energy made up 18% of the EU's power consumption in 2018 ⇔ but slow pace of development, might not meet 2020 target**

32%
by **2030**

- Revised Directive (December 2018) entered into force as part of the Clean Energy Package: binding renewable enerty target for the EU of at least 32% + clause for a possible upwards revision by 2023.
- New Governance regulation requires EU contries to draft 10-year National Energy & Climate Plans (NECPs) for 2021-2030, outlining how they will meet the targets.

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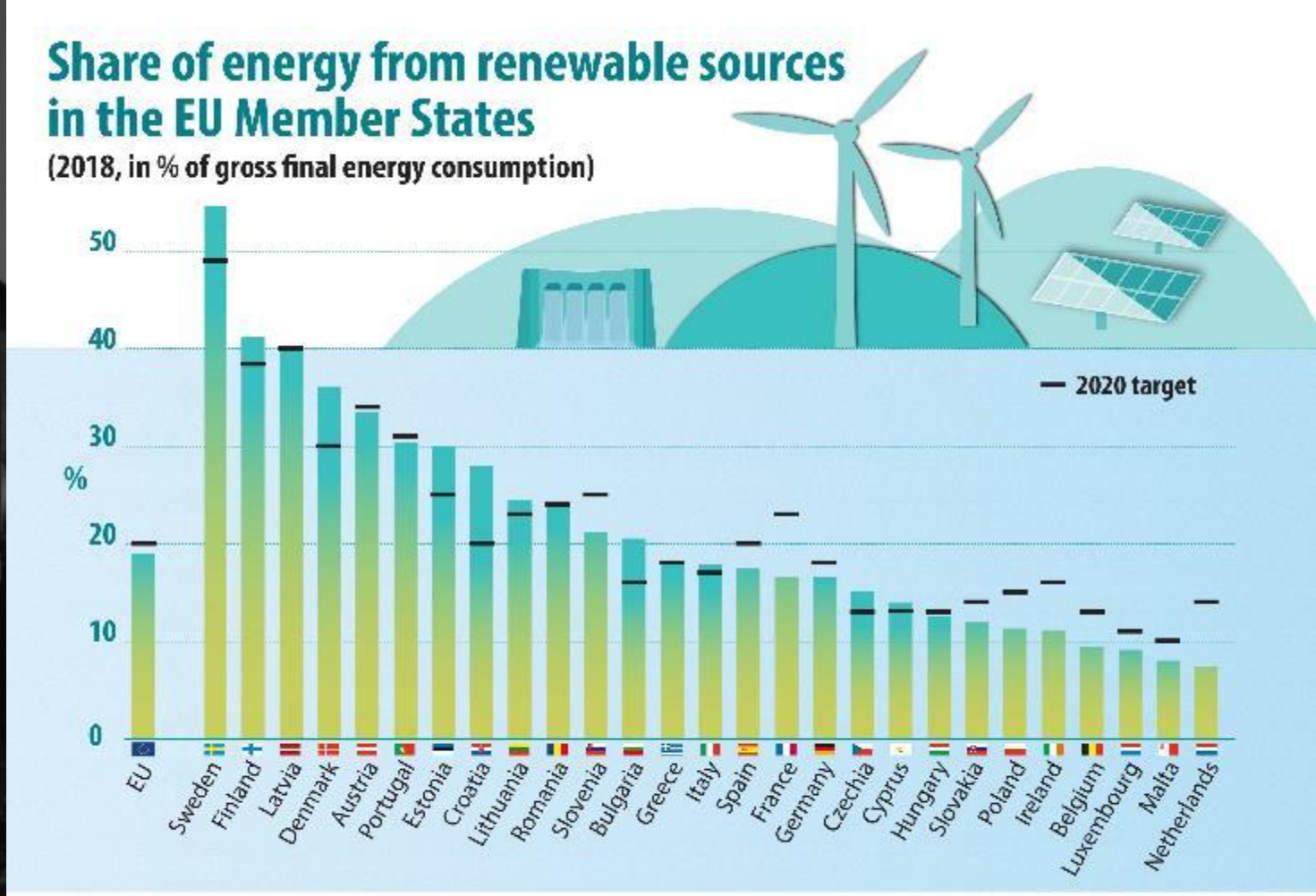
Renewable energy made up 18% of the EU's power consumption in 2018 ⇔ but slow pace of development, EU might not meet 2020 target.



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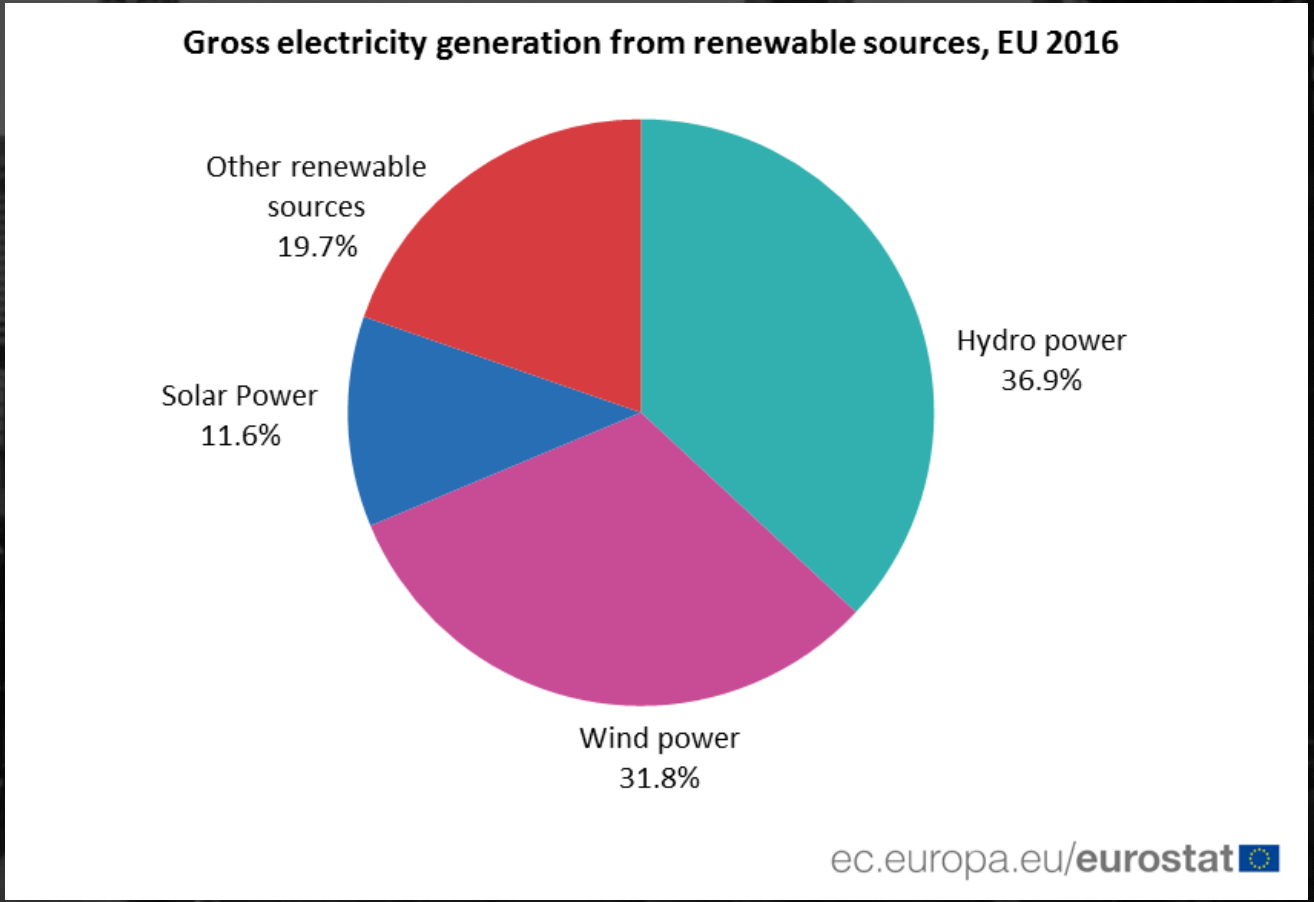
- ⇒ Electricity generation from RES contributed more than one quarter (30 %) to total gross electricity consumption in the European Union (EU).
- ⇒ Hydro power is the most important source, followed closely by wind power and then solar power.
- ⇒ Other renewable sources for generating electricity include wood, biogas, renewable waste and geothermal energy.



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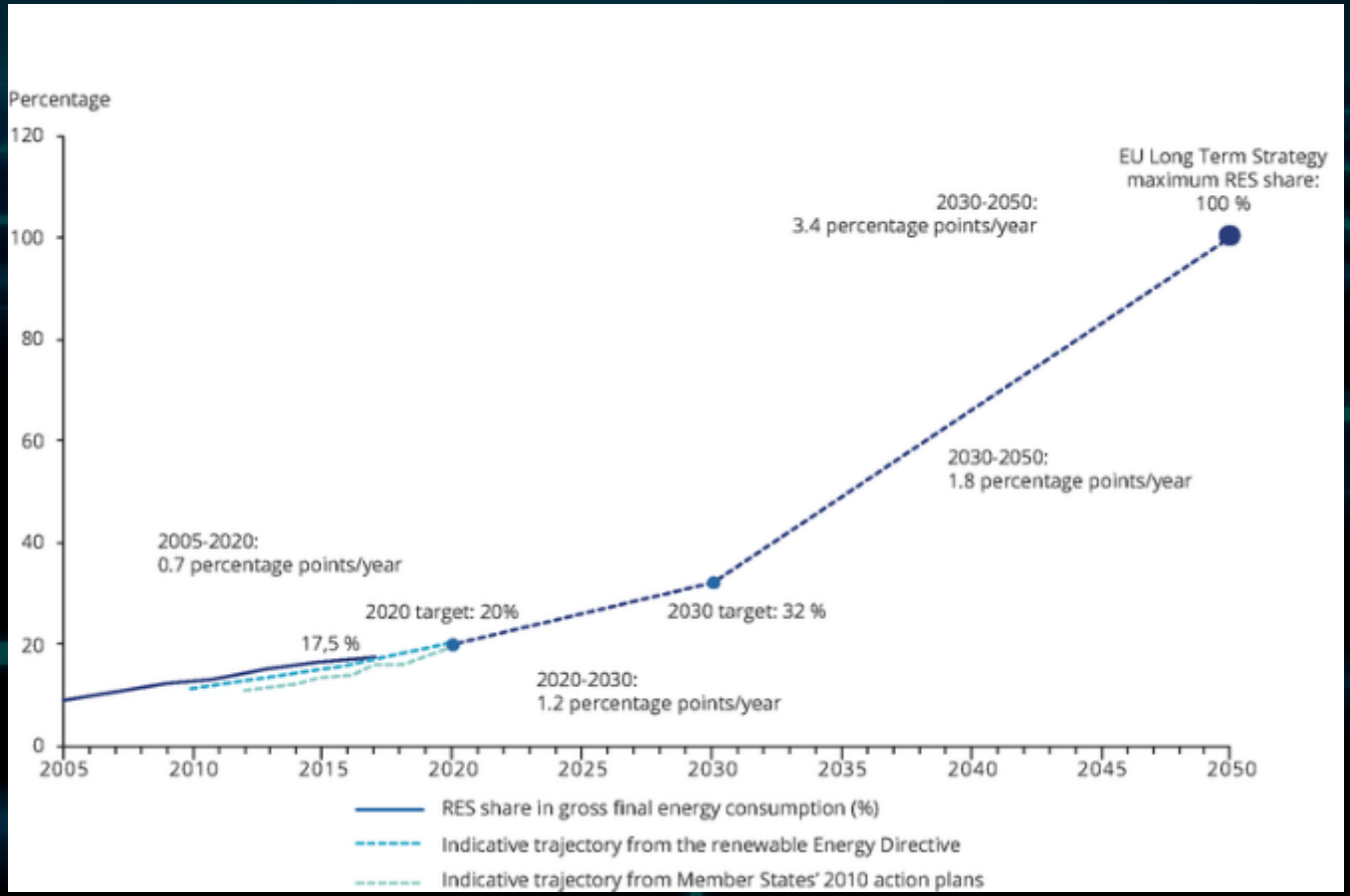
Revision RED: EU to become a global leader in RES ?

1. Contribute to the EU political priority of “world leadership in renewables”;

2. Achieving at least 32% EU-level binding renewables target.



RED II: measures for self-consumption

Right enshrined in EU law to produce electricity using solar panels, sell any excess production to the grid and get a market price for it.

- ✓ No discrimination or disproportionate charges.
- ✓ Electricity behind the meter not be charged. Exemptions:
  - Installations larger than 30 kWp
  - Risk of financial instability of the system (after December 2026)
  - Electricity that benefits from support schemes
- ✓ Remuneration when feeding into the grid;
- ✓ Self-consumers active in the market:
  - Power Purchase Agreements
  - Peer-to-peert rading
  - Other possibilities of MDI (demand response)
- ✓ Enabling framework by the end of 2019.

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RED II & Electricity Directive: measures for energy communities

Energy communities entitled to generate, sell and store renewable energy:

⇒ Final customers can participate in a renewable energy community;
⇒ Right to produce, consume, store and sel renewable energy;
⇒ Remove regulatory and administrative barriers.

Electricity market directive / provisions on electricity sharing

⇒ “Citizens energy communities”: natural persons, SMEs or local authorities, including municipalities;
⇒ Possibility for communities located in the same building or neighbourhood to own, rent or purchase their own electricity distribution network.
⇒ Network charges will by default not apply when electricity is consumed on location, for example in the same building or complex.

Commission estimates that by 2030, more than 50 GW of wind and more than 50 GW of solar could be owned by local energy commuities, representing 17% and 21% of installed capacitiy.

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RED II: measures for public purchase agreements (PPAs)

PPAs ? Direct contract with an energy generator towards the purchase of renewable electricity (e.g. Corporate PPAs

⇒ Help secure RES investments and reduce deployment costs

MS must facilitate uptake of RES PPAs:

- Assessing administrative and regulatory barriers to the development of corporate RES PPAs and direct investments in renewable energy eneration
- No disproportionate procedures and charges
- Policies and measures in NECPs

Role of Guarantees of Origin (Gos) in tracking renewable electricity

- Import for PPAs: GOs can provide traceabiity including for electricity benefitting from public support
- GOs enable the companies directly investing in renewable electricity generation to comine their reneable electricity generaiton with consumption

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EU to become a global leader in renewable energy

Ursula von der Leyen, European Commission President, July 2019

*"I want Europe to strive for more by being the first climate-neutral continent (…) To help us achieve our ambition, I will propose a **European Green Deal** in my first 100 days in office. This will include the first European Climate Law to enshrine the 2050 climate neutrality target into law."*

EU Green Deal presented in December 2019 – What's in for renewables ?

1. **First priority of the Commission**: enshrine climate neutrality by 2050 in law by 2050 + achieve 50%/55% of CO2 emissions reductions by 2050;
2. **NEED TO IMPLEMENT THE CLEAN ENERGY PACKAGE TOLD COMMISSIONER** Kadri Simson yesterday at the emPOWER Summit in Brussels
3. **Assessment of what climate neutrality means for 2030 targets**: Climate Law in March, revision of the Renewable Energy Directive scheduled for June 2021.
4. **Smart Sector Integration Strategy (mid 2020):** look at increasig the role of electricity and sectors in a more integrated way where RES will take a bigger place;
5. **Strategy for Offshore wind:** look at regulatory framework to build new wind parks;
6. **Bulding Renovation Wave:** 40% of EU energy, and 80% still be here in 2050. Renovation wave to tripple the renovate rate focusing not only on EE but also RES.

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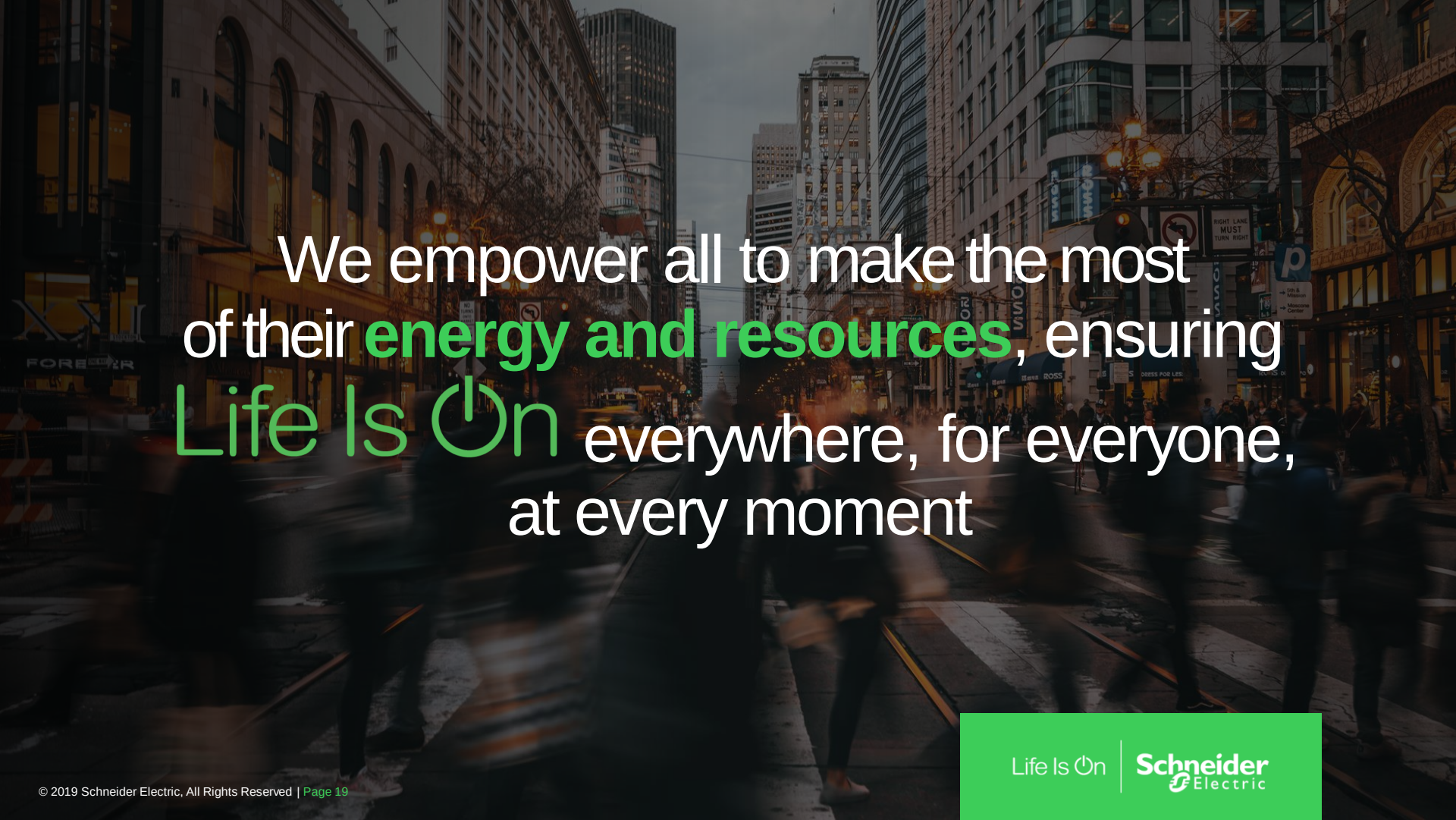

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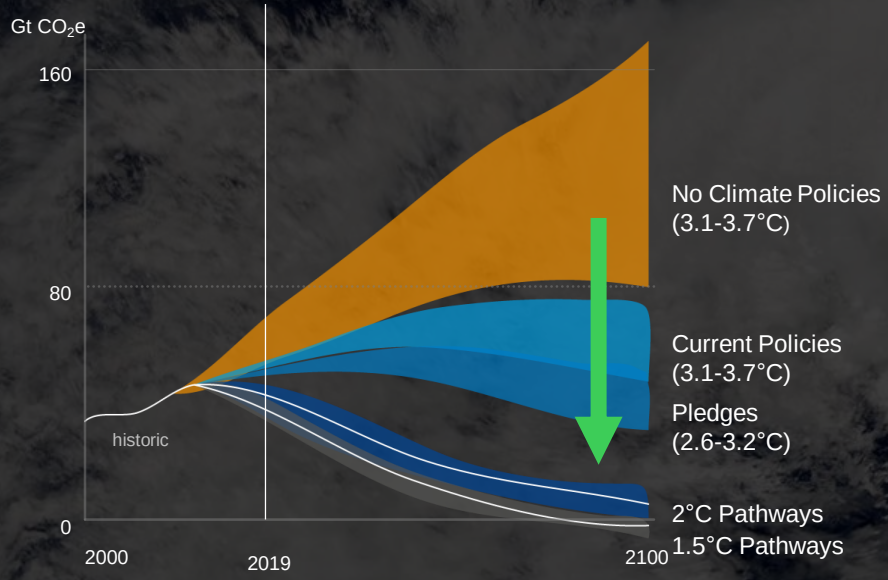
One Planet

A sense of emergency

Climate change & Earth Overshoot Day



>80% **Energy Issue**

Total CO_2 emissions

40x **Unbearable Trend**

More energy consumed by 2100 vs 1900

60% **Inefficient**

Current fossil-based end to end energy system losses

Sources: International Energy Agency, Schneider Electric

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Make It Possible: -50% CO_2 by 2040 (globally)

Save

30% - 50%
efficiency in buildings
vs historical stock

50%
of the stock

Electrify

2x
efficiency vs other sources
(building heat, road transport)

Decarbonize

6% → 40%
electricity from Wind / Solar by 2040

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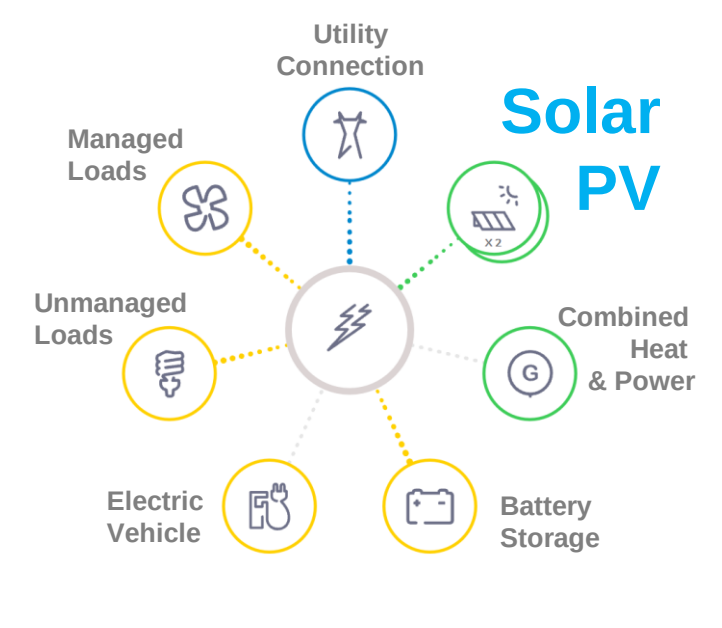
Renewable integration

Policies should cover all dimensions



Cost

- Lower / More Predictable Energy Costs
- Energy / Fuel Source Arbitrage
- Flexibility drives savings / incremental revenue

Sustainability

- Reduced carbon footprint
- Improved brand image
- Attract / Service carbon sensitive customers

Citizen acceptance

- Energy awareness / Energy sharing
- Inclusivity in cities, associated jobs

Resilience

- Serve loads during times of grid instability
- Oasis for employees / customers – shelter in place
- Protect critical assets from poor power quality

The **New Electric World** is already here
The Lidl Case

Customer needs

- Solar Energy
- Microgrid
- Storage
- Heat Management
- Power Management

Solar energy

A building that uses 100% renewable with solar panels

CO_2 Reduction goal: 40%
Energy efficiency: 30%

Active demand response management

JAKELUKESKUS Logistics center

Heating/cooling

Energy storage

Energy load management and forecasts
- Cooling/Heating
- HVAC
- Lightning

Weather Forecasts

Energy prices

Demand response

Generators

City of Järvenpää

Lauhdelämpö Koteihin

Condensation heat

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Lidl Finland Logistics Center

in collaboration with Ramboll, Sweco, Fortum and Fingrid)

Energy efficient

commercial industrial microgrid operating on

100% renewable energy sources

Customer Challenge

- A flexible, future-proof, environmentally friendly and energy-efficient new logistics center in Finland.
- Ability to optimize heating and cooling and to participate in demand response markets for energy with a microgrid solution for solar energy.
- EE gains, optimize energy usage, and reduction of CO2 emissions.

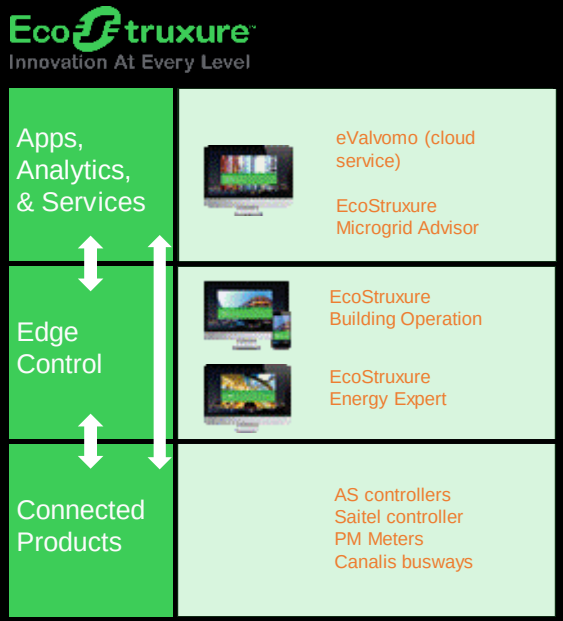
“Our goal is to build the Nordic countries’ most environmentally-friendly grocery distribution center”

Simo Siitonen, Energy Management Manager, Lidl Finland

The First Commercial Industrial Microgrid solution in Finland

Smart microgrid

- A microgrid operating on **100% renewable energy sources.**
- 1600-panel solar power plant on the building's roof.
- Battery energy storage system.
- Co-generation of heating and cooling. Heat recovered from the refrigeration equipment and systems to participate in **local demand response market.**
- **CO2 emissions cut by 40%** the logistics center uses **50% less energy** than current two operational centers.



Smart building management system

- EcoStruxure Building Operation software to reach high level of energy efficiency.
- An **open building management platform** that incorporates multiple systems for centralized, real-time control and management across one to many enterprise buildings.
- Analytics services to further improve energy efficiency.
- **Energy cost savings goal of >50%**

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