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Power Barometer 2021 – detailed

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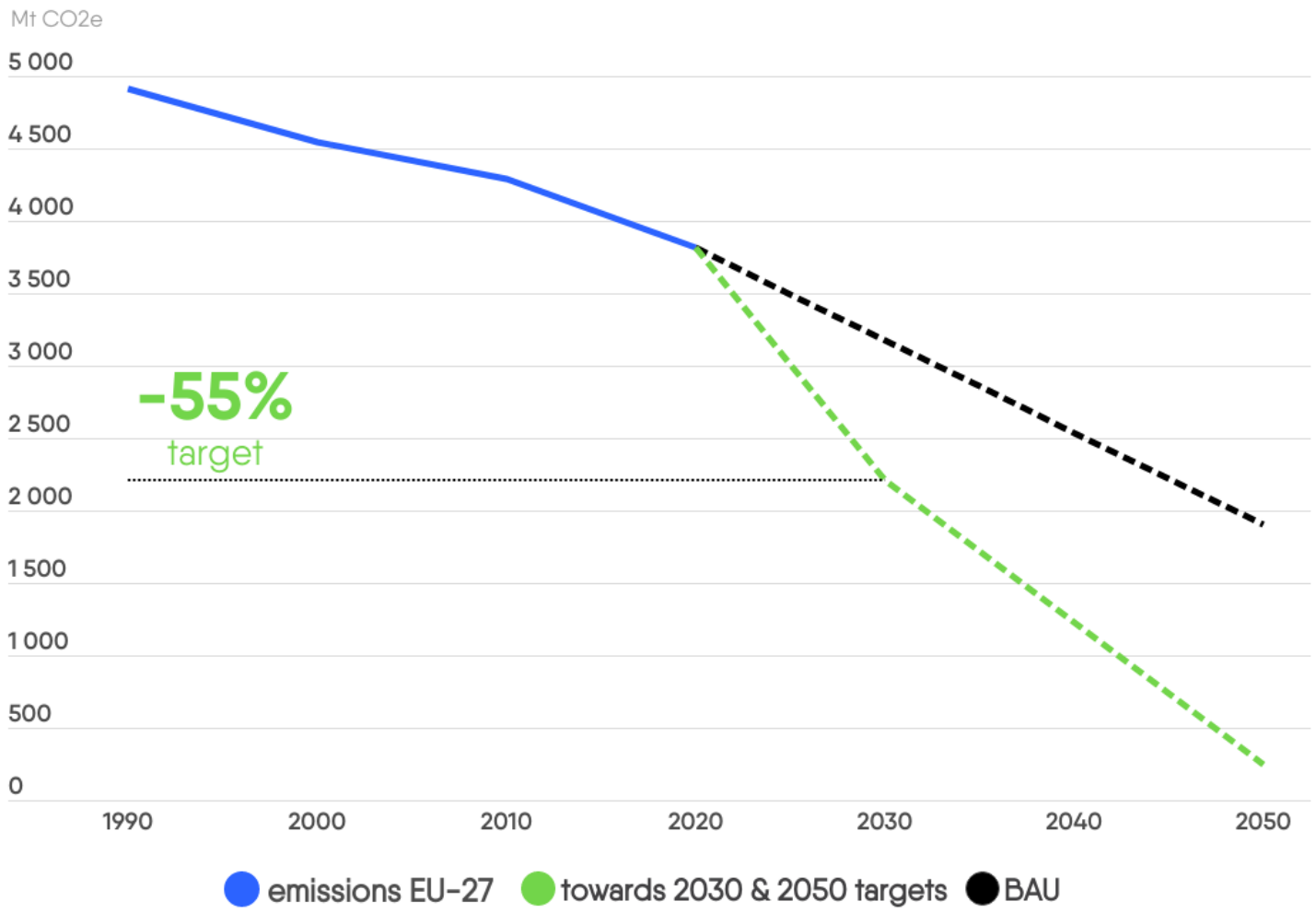
55% by 2030: A steep emissions decline



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Source: Calculation from European Environmental Agency (2020) Total greenhouse gas emission trends and projections in Europe

Fully decarbonised power 5-10 years early

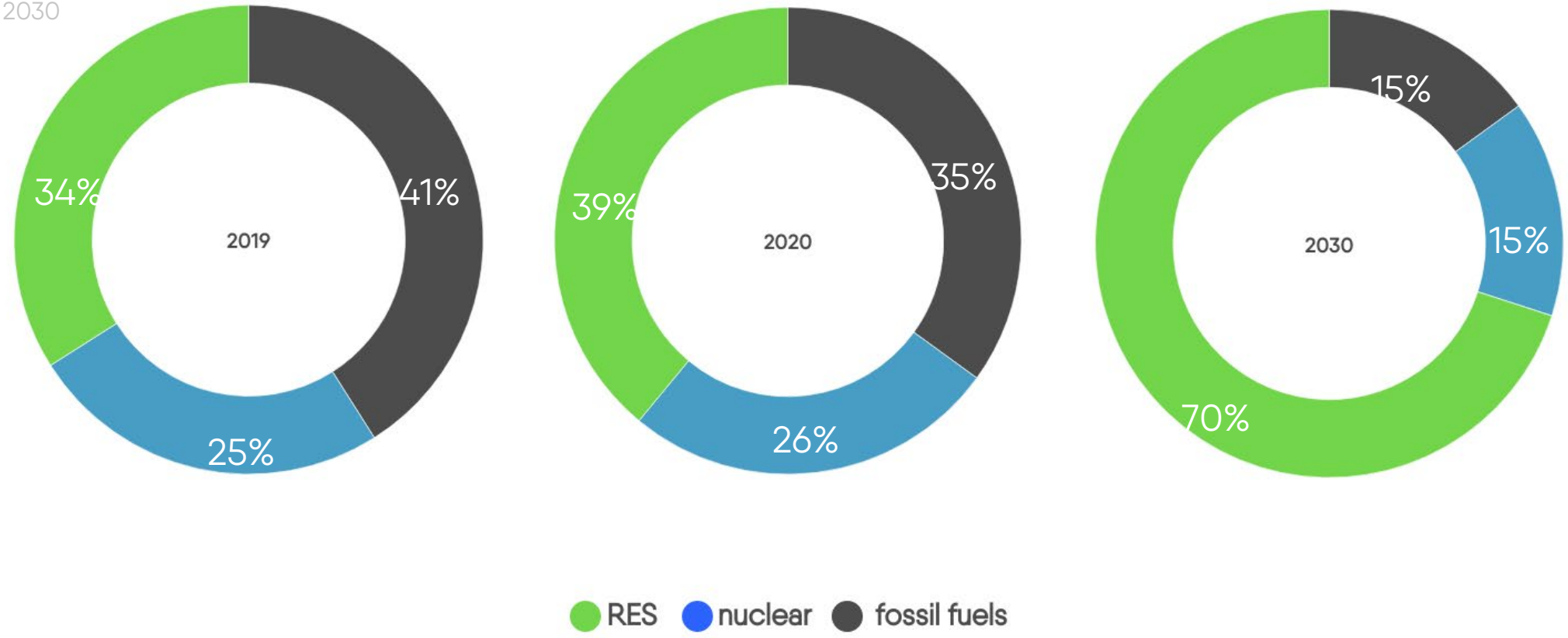
- The new EC proposals would make the power sector carbon neutral between 2035-2040

gCO_2/kWh

Source: Eurostat (2000). Ember-Agora Report (2020), ALLBNK scenario of EC's 2030 Climate Target Plan Impact Assessment (2030), Eurelectric's estimation (2035-40)

85% clean energy by 2030

EU 27 + UK for 2019 & 2020
EU-27 for 2030



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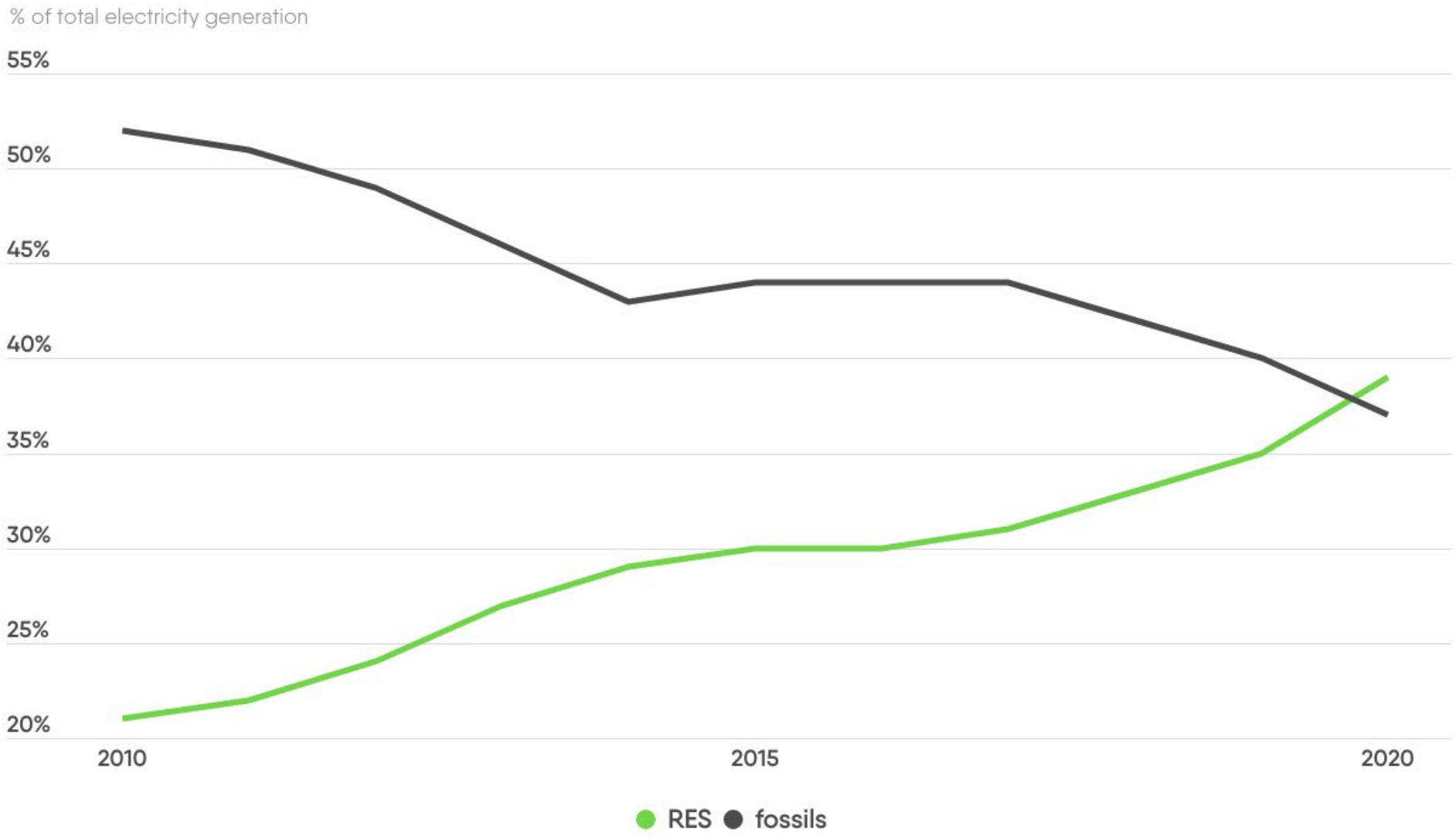
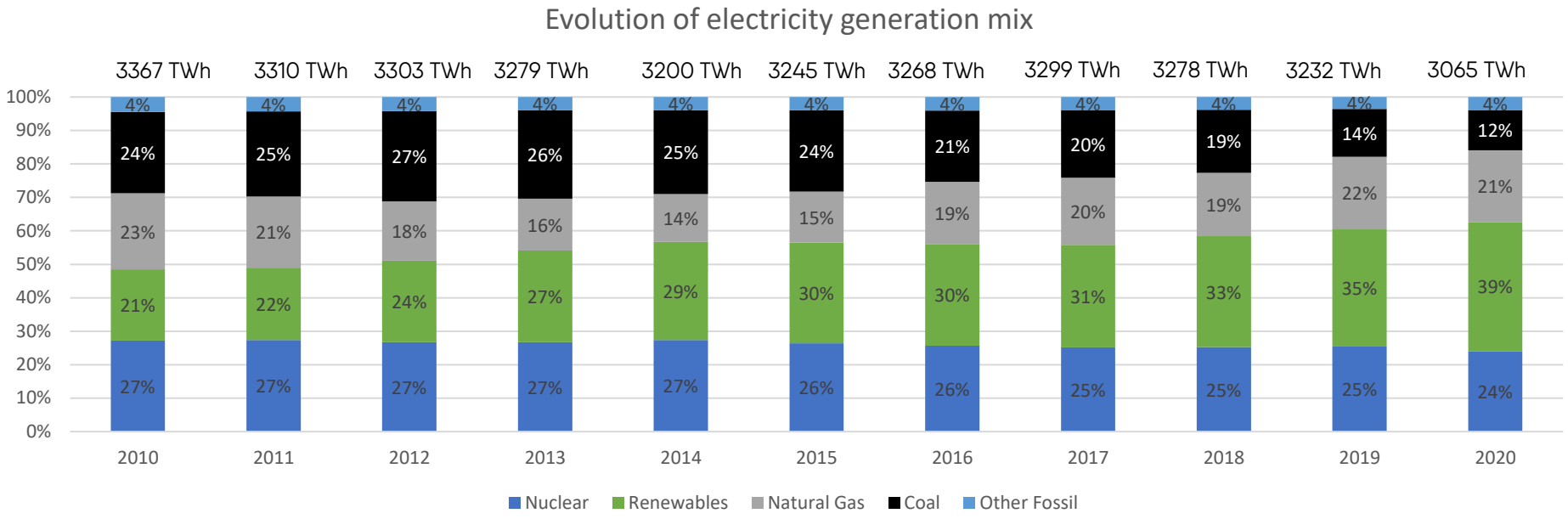
Source: Estimation from Eurostat (2019), Ember-Agora (2020), EC's 2030 Climate Target Plan Impact Assessment (2030)

Breaking news: RES overtook fossils!



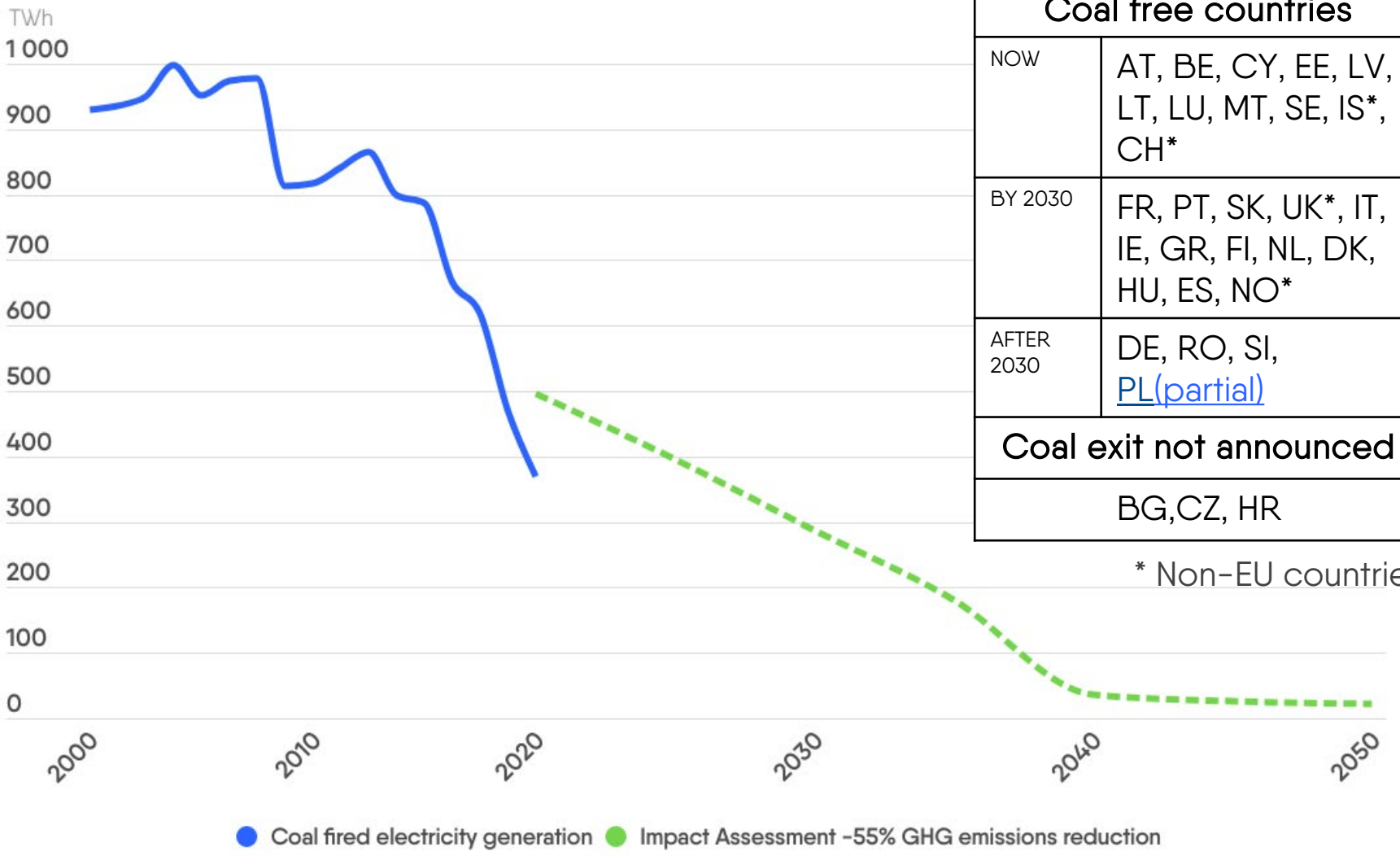
Source: Eurelectric calculation from Eurostat (2010-2019); Ember-Agora (2020)

Share of generation from coal halved while renewables doubled over the past decade



Source: Eurelectric's calculation based on Eurostat until 2019 and Ember-Agora report for 2020

Coal generation declining faster than expected



Coal free countries	
NOW	AT, BE, CY, EE, LV, LT, LU, MT, SE, IS*, CH*
BY 2030	FR, PT, SK, UK*, IT, IE, GR, FI, NL, DK, HU, ES, NO*
AFTER 2030	DE, RO, SI, PL(partial)
Coal exit not announced	
BG,CZ, HR	

* Non-EU countries

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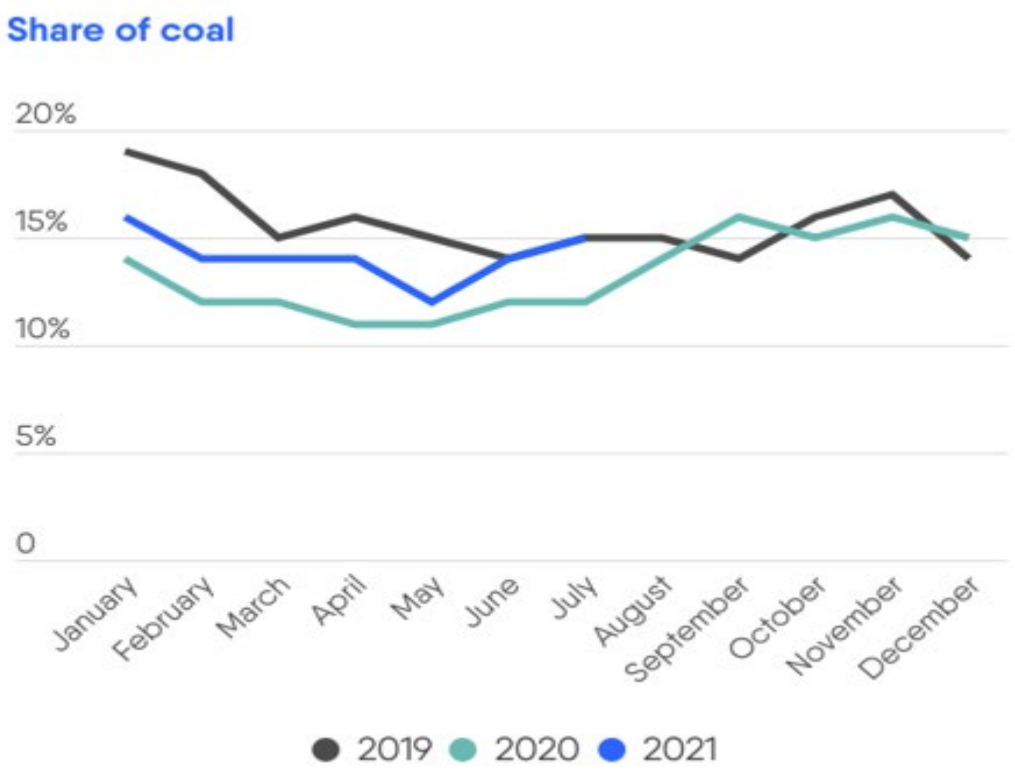
Source: Eurelectric's analysis based on BSL scenario of EC's 2030 Climate Target Plan Impact Assessment; Eurostat; EMBER Climate

Demand recovers but not for coal



- Coal and gas generation increased in 2021 compared to 2020 due to the recovery in demand and decreased wind & nuclear generation
- However, Covid-19 accelerated coal's decline and renewables' rise throughout 2020. The coal generation in H1 2021 was 16 % lower than that of H1 2019. This shows that coal generation is declining in the EU despite the slow recovery of the economy.

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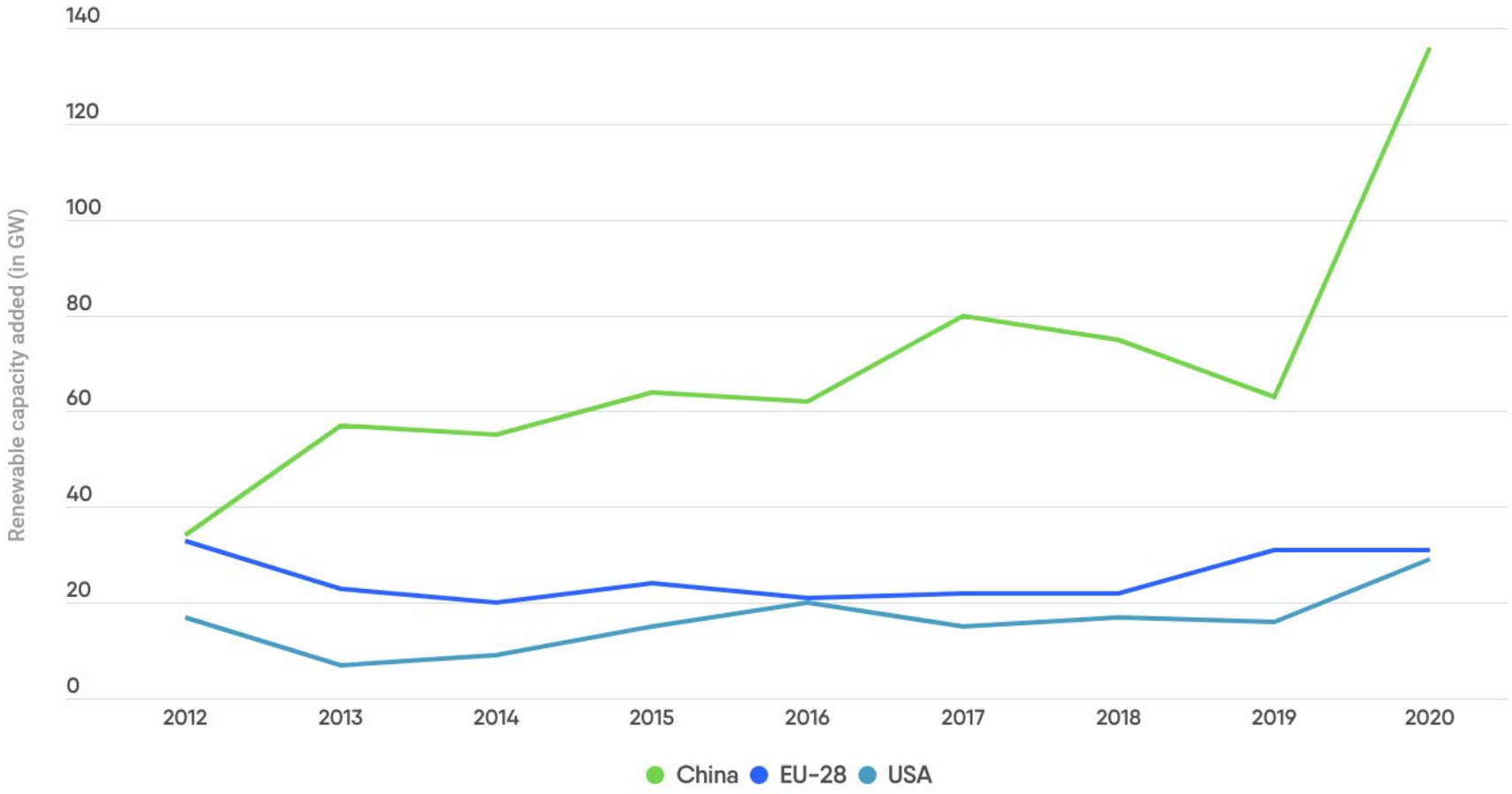
Source: Calculation from Wartsila's ENTSO-E transparency platform data (for electricity Demand), Ember (for share of coal)

Europe lagging behind?



- During the pandemic, renewables installation in Europe have shown strong resilience without any reduction in the annual average RE installations. However, the RE installation in 2020 did not see a significant surge compared to the 2019 levels
- In the same period, China's renewable capacity additions surged from 63 GW in 2019 to 136 GW in 2020

Source: IRENA (2021): Renewable Capacity Statistics 2021

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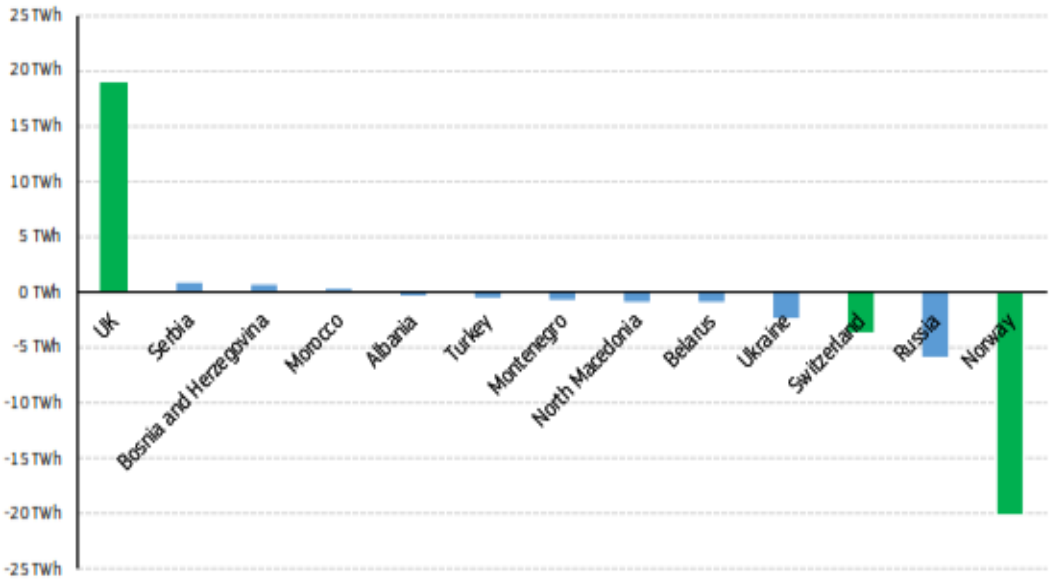
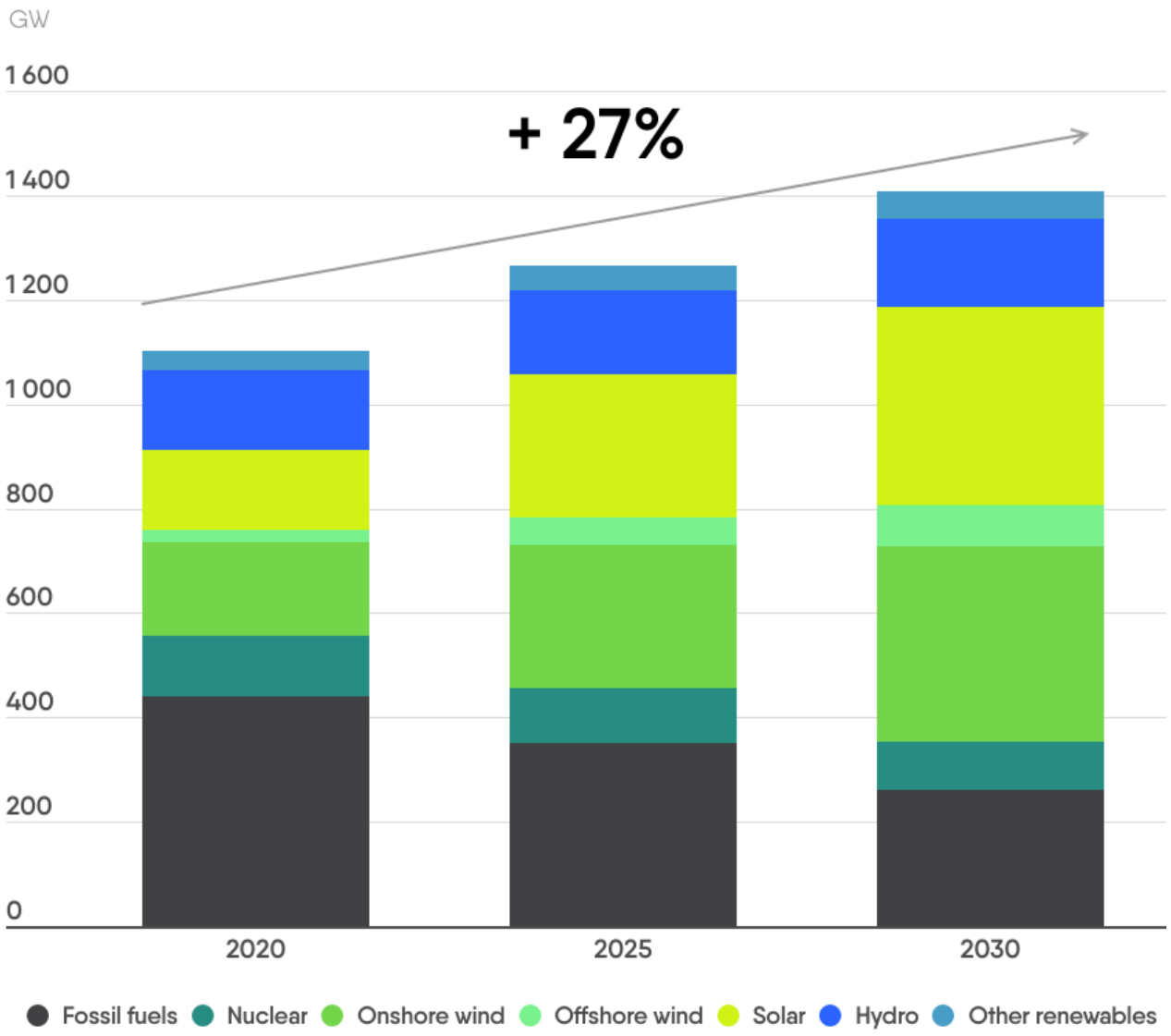
Carbon intensive imports from non-EU countries decreased in 2020

- Carbon intensive imports decreased compared to 2019
- UK was the EU's biggest export market in 2020
- EU imported large amounts of electricity from Norway (high hydro+ wind) in 2020
- Norwegian imports and falling consumption in Finland reduced imports from Russia
- Low electricity prices in Hungary and Romania reduced cross border trade with Ukraine



Source: Quarterly report on EU electricity market – European Commission

All clean technologies are needed to reach the 2030 targets



2020-2030

-40% fossils

+93% RES

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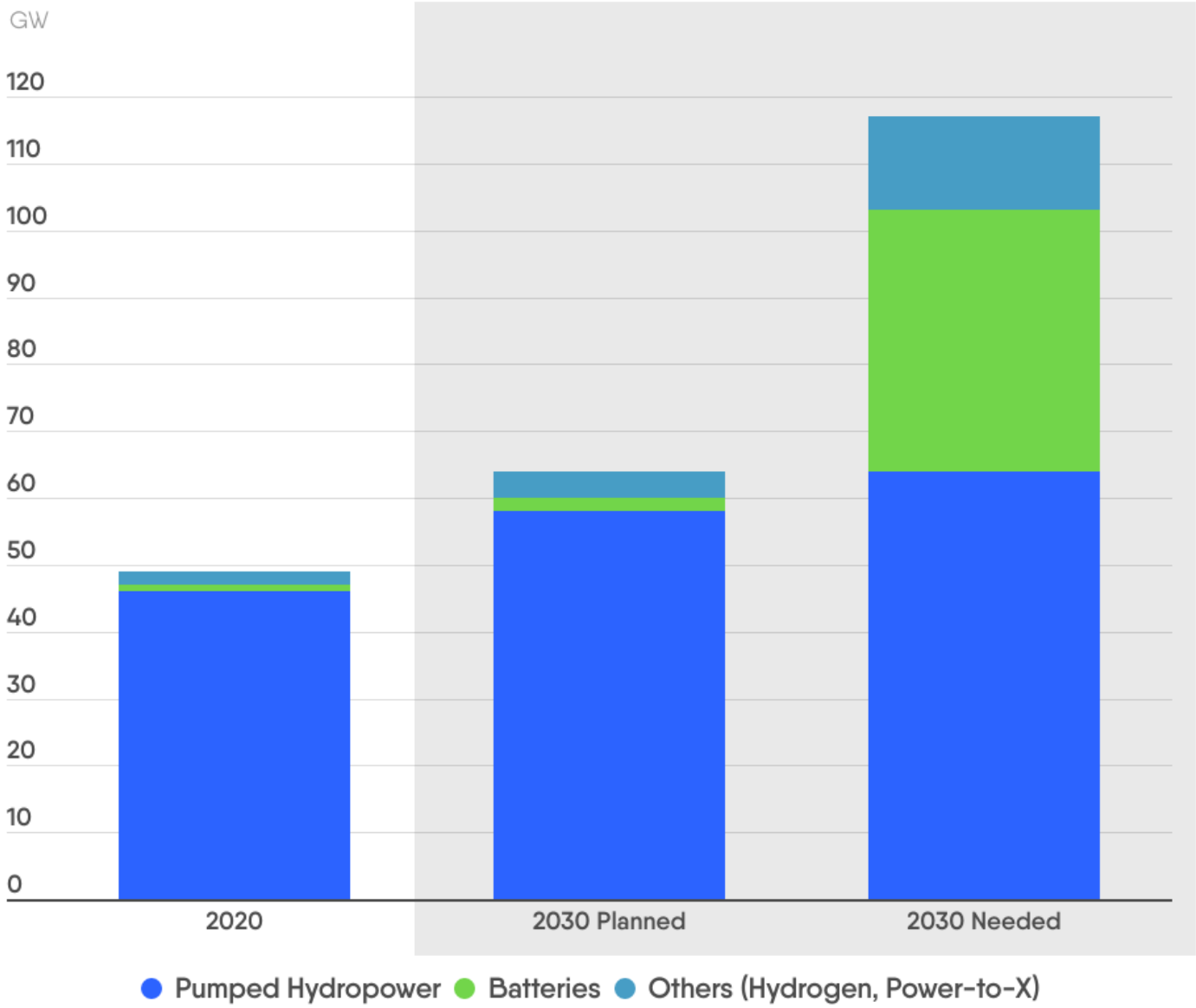
Sources: Eurelectric's analysis based on Eurostat (solar, hydro & other RES), Wartsila, WindEurope (offshore & onshore), most ambitious scenarios from the EC's 2030 Climate Target Plan Impact Assessment

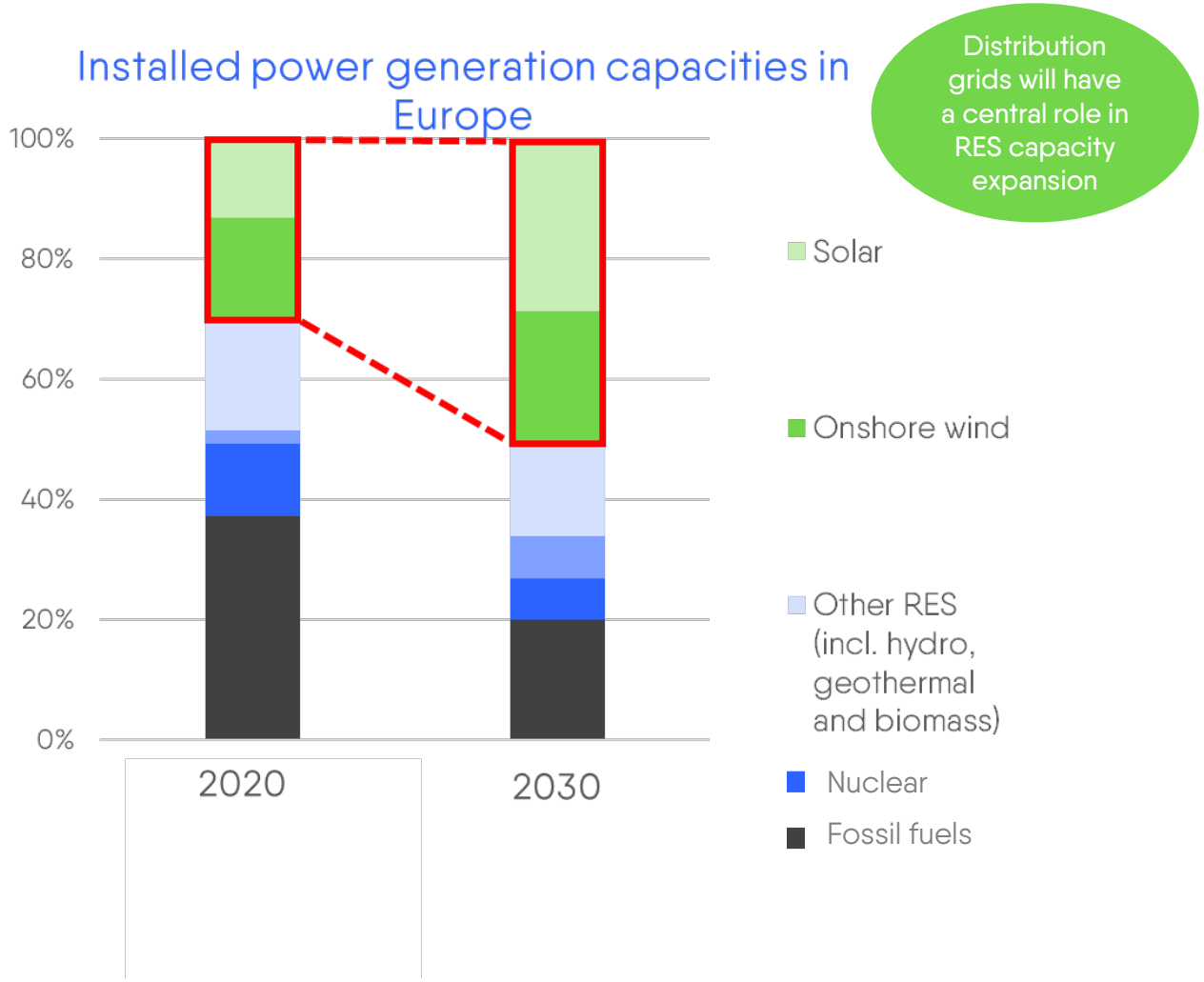
Potential bottleneck: electricity storage



- Energy storage enables the development of smart grid solutions, system flexibility and energy efficiency
- Currently, an ambition gap of 53 GW inhibits the achievement of the energy storage target foreseen by the Commission to reduce GHG emissions by 55%

Source: European Commission (2020): EC's 2030 Climate Target Plan Impact Assessment

Distribution grids will enable the bulk of RES capacity expansions across Europe



Source: Eurelectric, E.DSO, Monitor Deloitte – Connecting the dots

- By 2030, distributed renewable power installations will account for around 70% of installed capacity additions
- Hence, it is imperative to modernise and expand distribution grids by investing EUR 34-39 BN per year to effectively harness the potential of distributed renewable power
- Furthermore, the Eurelectric's study 'Connecting the dots' identifies EUR 500 M in annual investment needs for LV-network energy storage solutions

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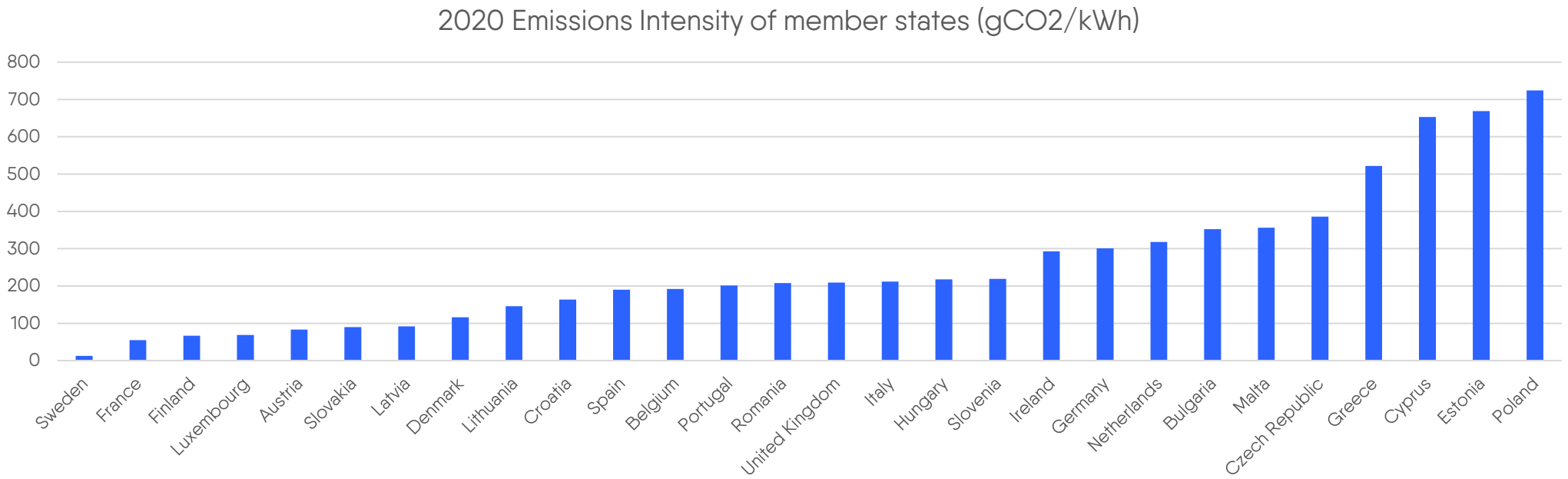
Decarbonisation: the challenge of different starting points



Differences in the carbon intensity of the member states in 2020 showcase the different starting points for member states in the energy transition

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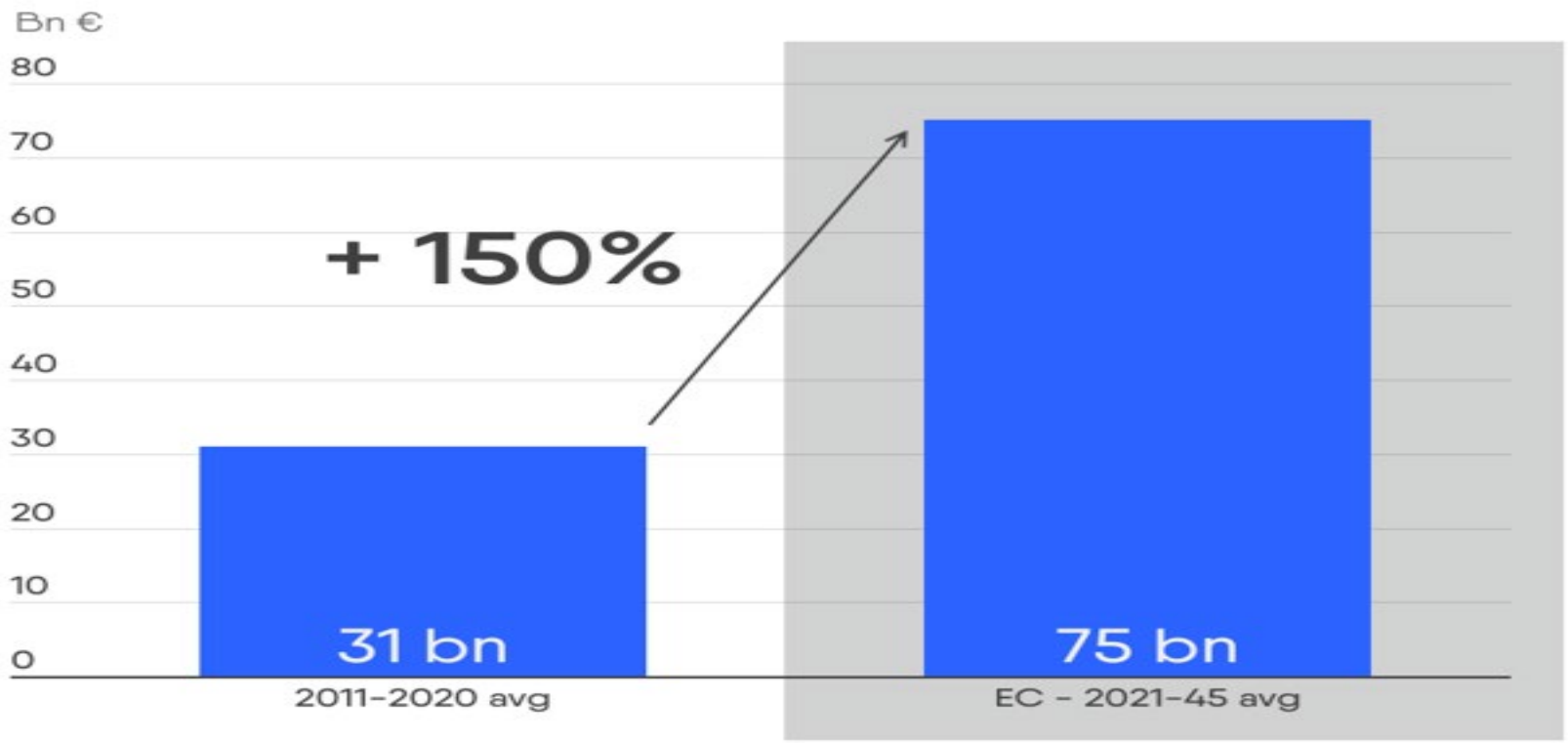
Source: Ember-Agora data 2020

Investment in generation

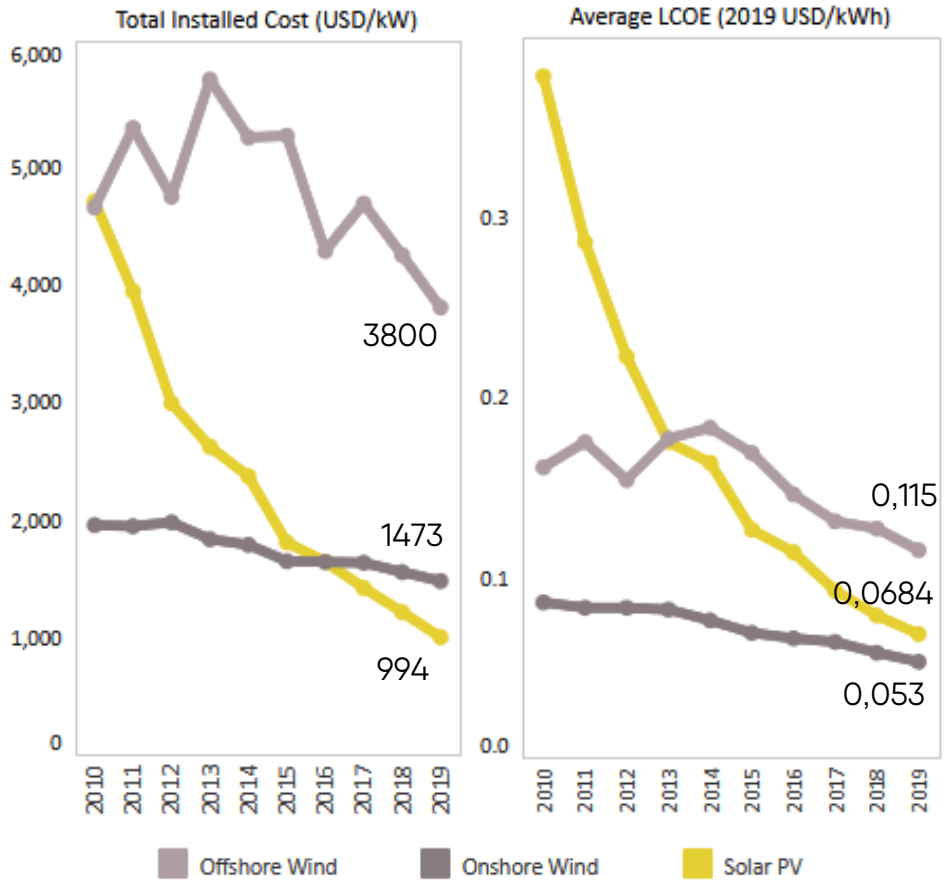


A huge uptake in power generation investment is needed. EC's policy scenarios projects an annual average investment of 53 bn euro in the power generation during 2021-30 and the 89 bn euro during 2031-50.

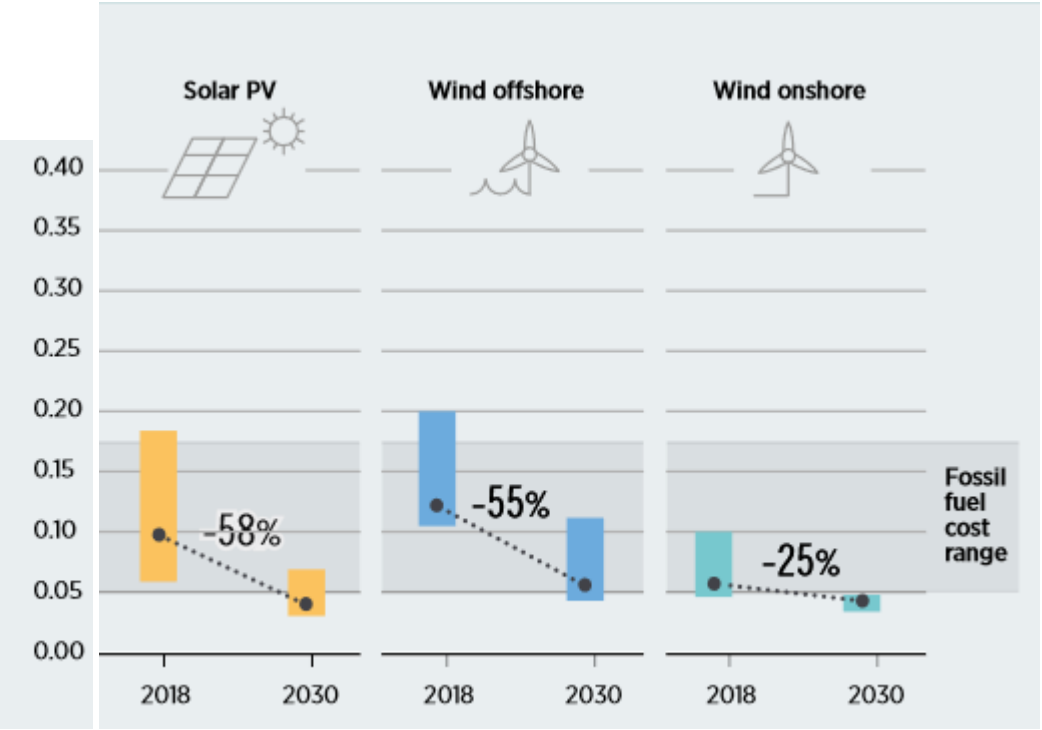
*includes storage +EU + UK + EEA counties

Source: EC's 2030 Climate Target Plan Impact Assessment (2011-2020), EC's 2030 Climate Target Plan Impact Assessment & Eurelectric (2021-2030)

The cost of PV and wind will continue to decrease



Expected decline in LCOE for G-20 countries



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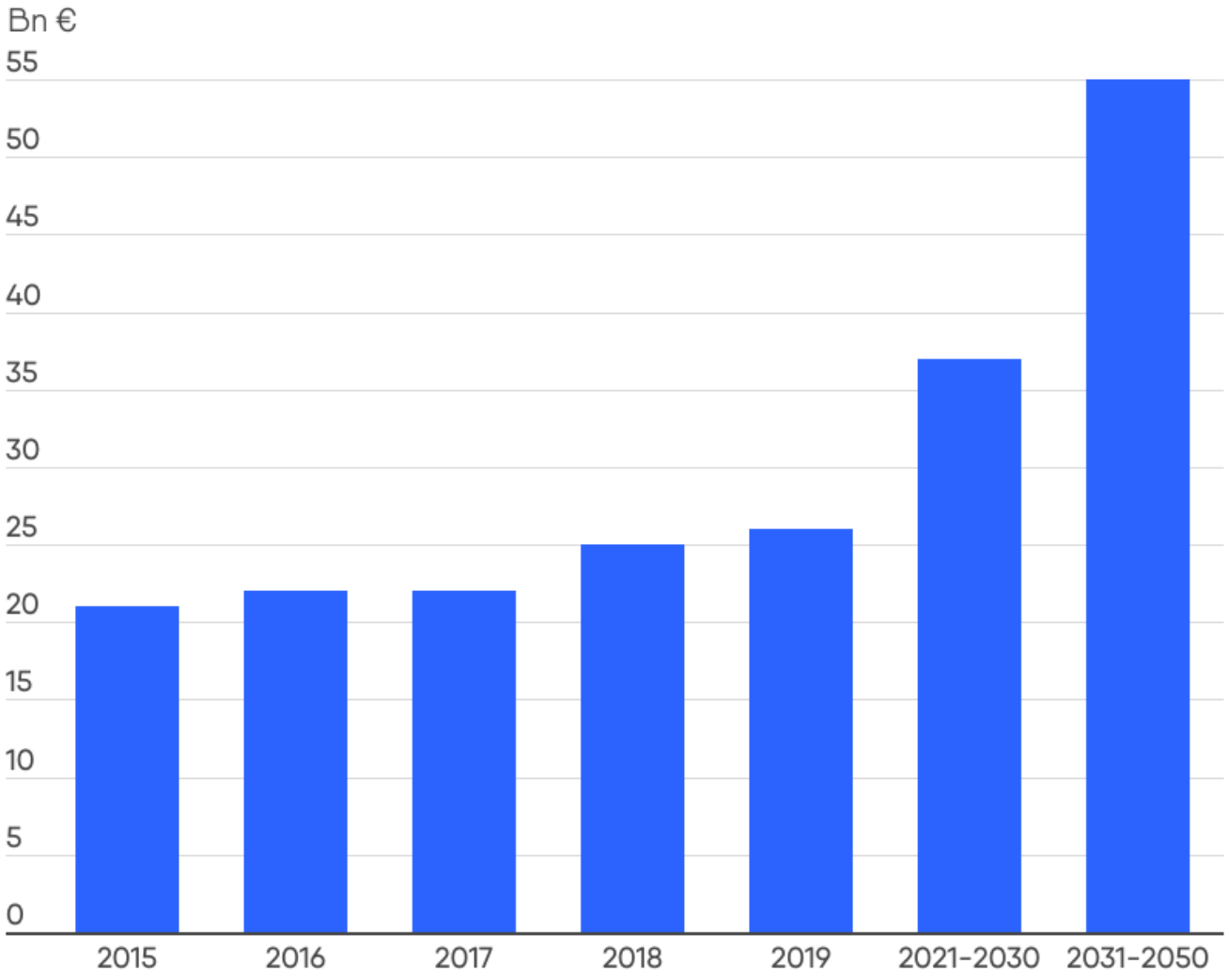
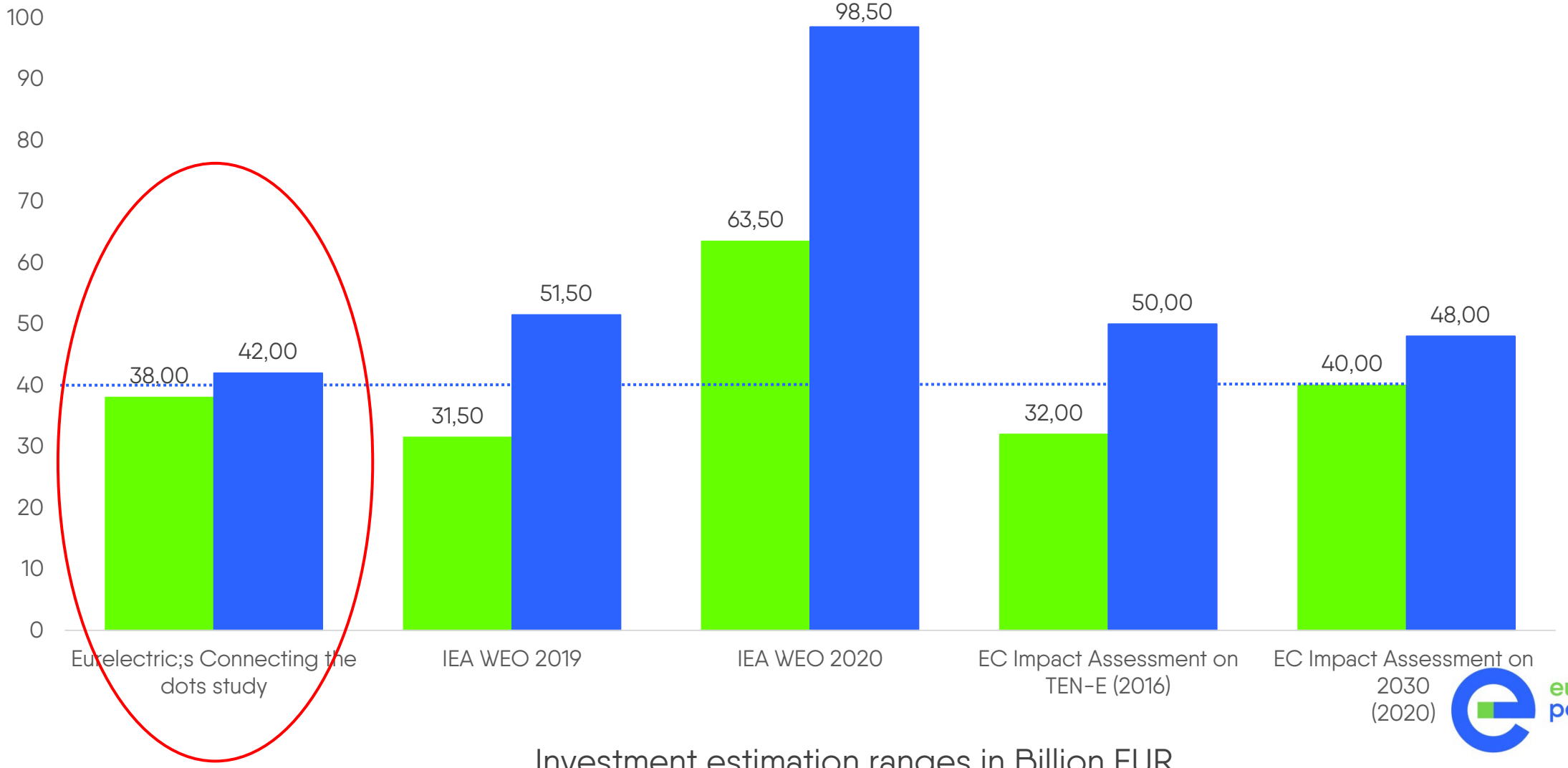
Source: IRENA RE cost database, IRENA Renewables outlook

Investment in distribution grids



Source: Calculation based on Eurelectric's Connecting the dot study & IEA WEI (2018, 2019, 2020). Connecting the dot study (2021-2030), Based on EC's 2030 Climate Target Plan Impact Assessment (2031-2050)

Other distribution investment studies underline the urgency and project even higher investment needs



Investment estimation ranges in Billion EUR p.a. by 2030, EU-27 & UK

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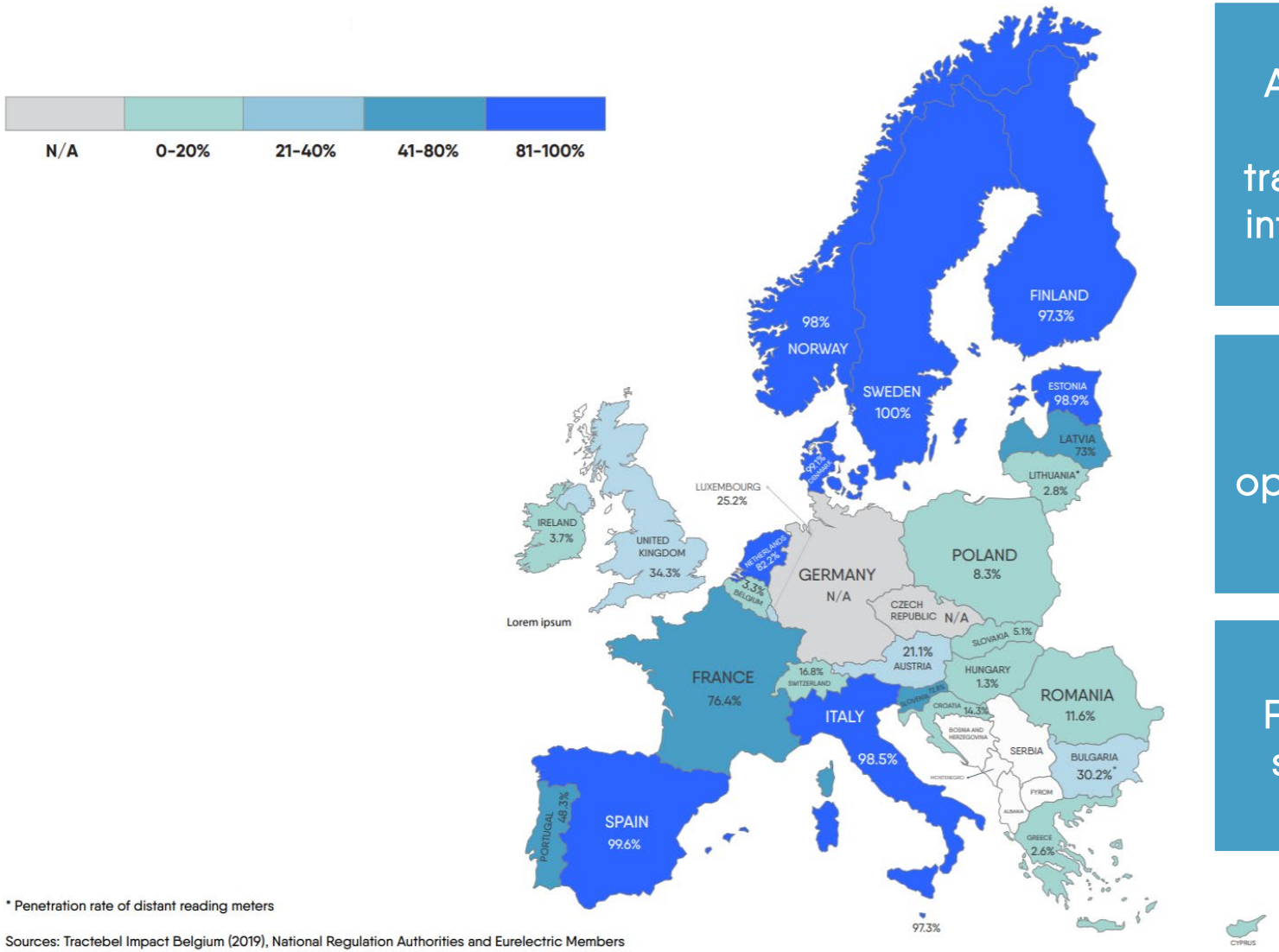
The need to advance grid digitalisation

Smart meters are key to increasing distribution grid observability, optimising grid investments and enabling flexibility services



Accurate and transparent information

- **More transparent, accurate, secure and faster access to data** related to LV and MV grids
- **Greater observability of the LV and MV distribution grid** key parameters (consumption, voltage, frequency)
- **Enabler of two-way communication** for maintenance and control

Cost optimisation

- **Optimisation of the distribution grid planning, management and maintenance** through monitoring and remote control with faster access to data
- **Fraud prevention** and detection
- **Consumption optimisation by end-customers**

Flexibility services

- Key enabler to foster **demand participation** through real-time monitoring **and the development of new flexibility services** (e.g. smart charging, generation flexibility, EV batteries flexibility)

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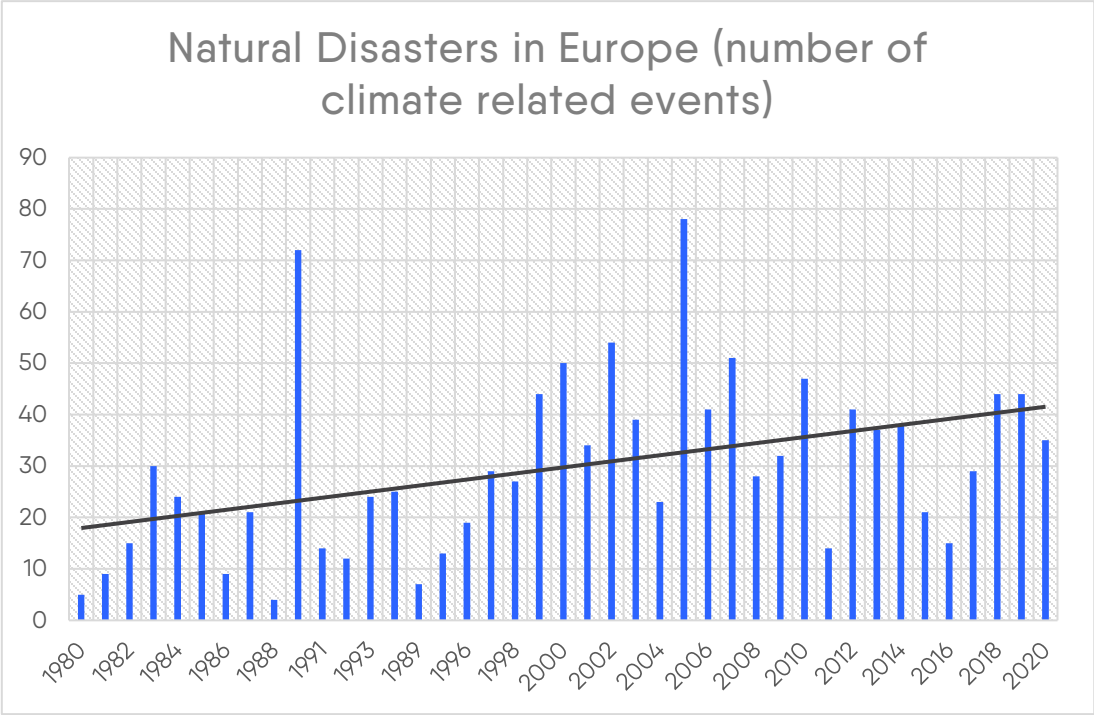
* Penetration rate of distant reading meters

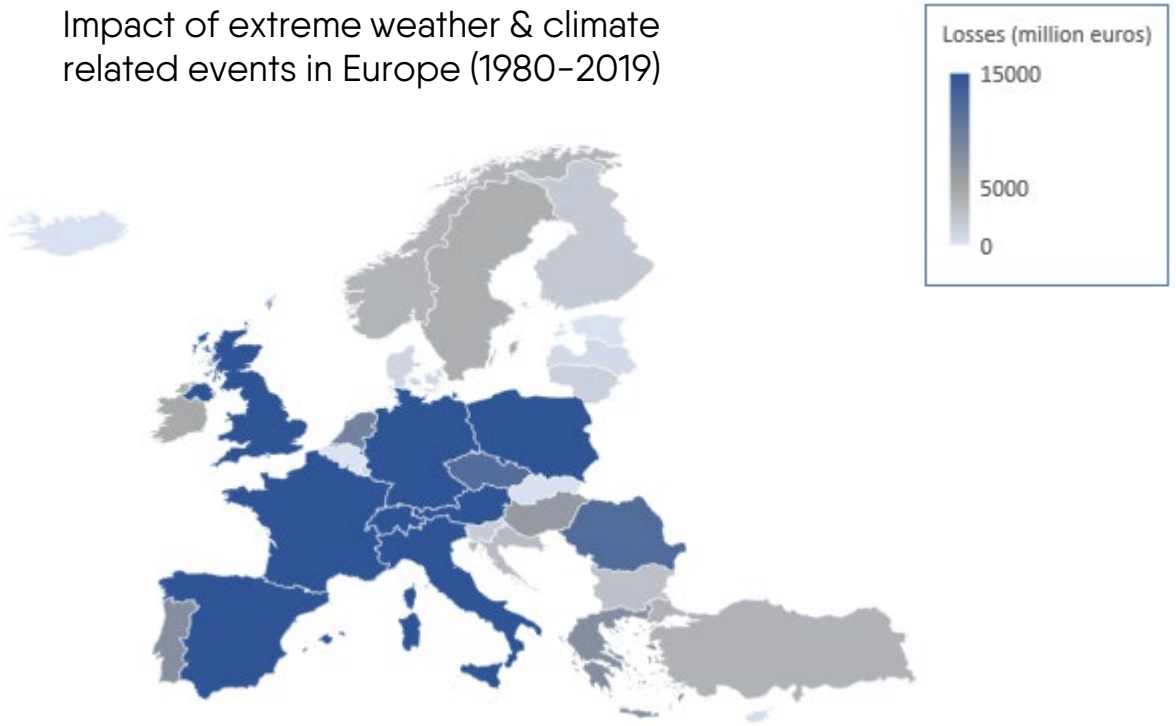
Sources: Tractebel Impact Belgium (2019), National Regulation Authorities and Eurelectric Members

The need for more resilient grids

The increase in natural disasters and extreme weather events makes it necessary to invest in more resilient grids to ensure security of supply



Impact of extreme weather & climate related events in Europe (1980-2019)



Click here for interactive map

Resilience is key for climate change adaptation, but also for building stronger and safer energy infrastructure at the European level

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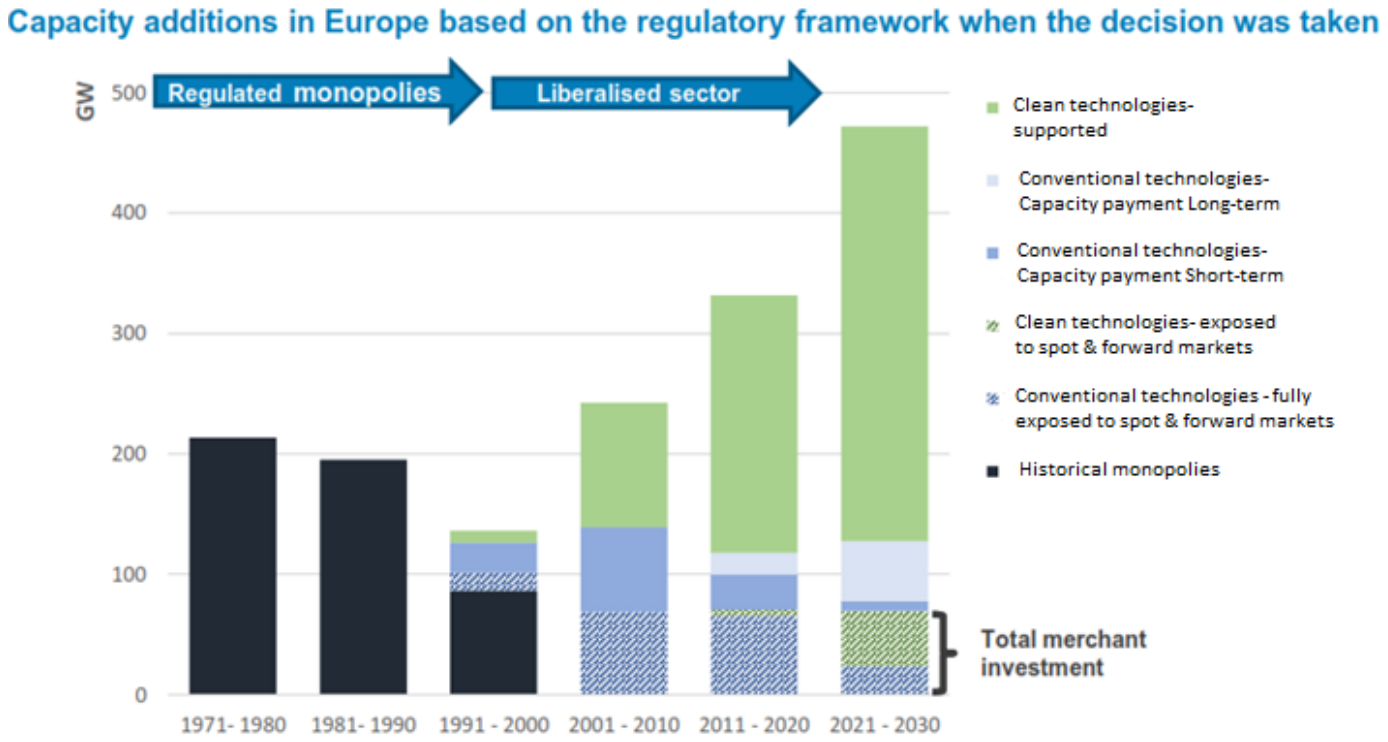
Source: EM-DAT - CRED

Need for long term price signals & robust investment frameworks

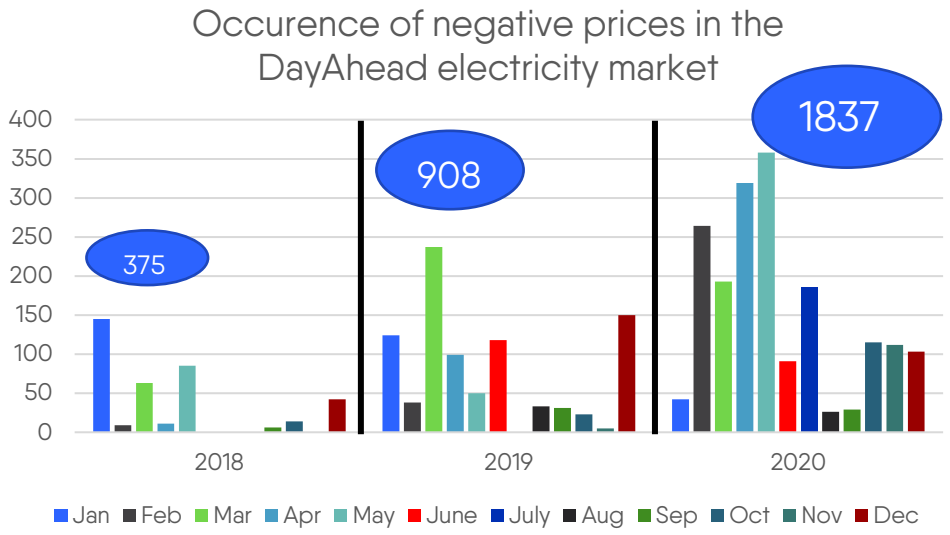


- Historically, most EU investments in the power sector were made under regulations or supported by long term contracts
- Based on the current regulatory framework, only a small share of total generation investments in the next decade are expected to be fully exposed to spot and forward markets
- Some form of long-term price signals/de-risking mechanisms are needed to reach the EU policy targets

Source: Compass Lexecon-Enel

The need for flexibility and grid reinforcement

- Number of negative price hours doubled in 2020 (1800 hours) from the amount in 2019
- Low electricity consumption due to Covid and rising renewable penetration are the drivers
- Even markets which traditionally do not have high occurrence of negative prices saw a sharp growth (e.g. Netherlands 3 in 2019 to 100 in 2020 due to solar capacity additions)
- Ireland (382), Germany (298) and Danish mainland zone (192) had higher numbers in 2020
- This shows the need and potential for flexibility in the European power system and should indicate a proper value of flexibility
- This also underlines the need for reinforcing grid infrastructure



Number of negative hourly wholesale prices in 2018-2020

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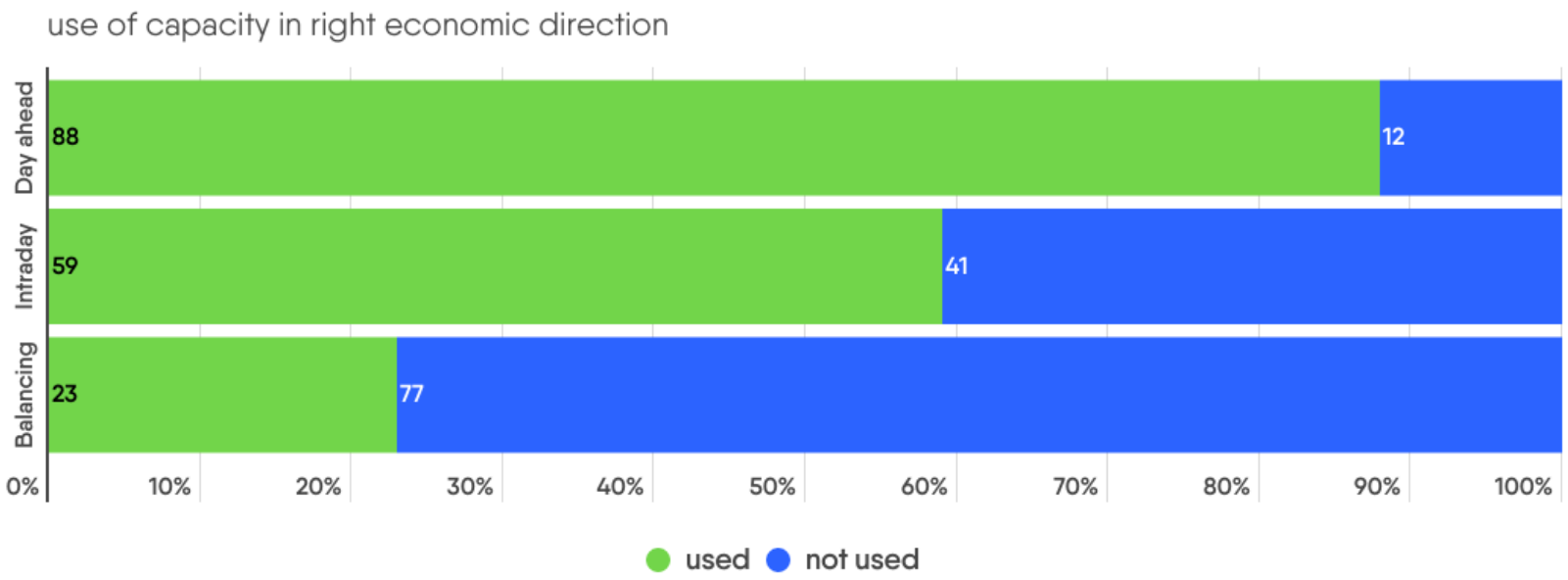
Source: Calculated from Wartsila's ENTSO-E transparency platform data

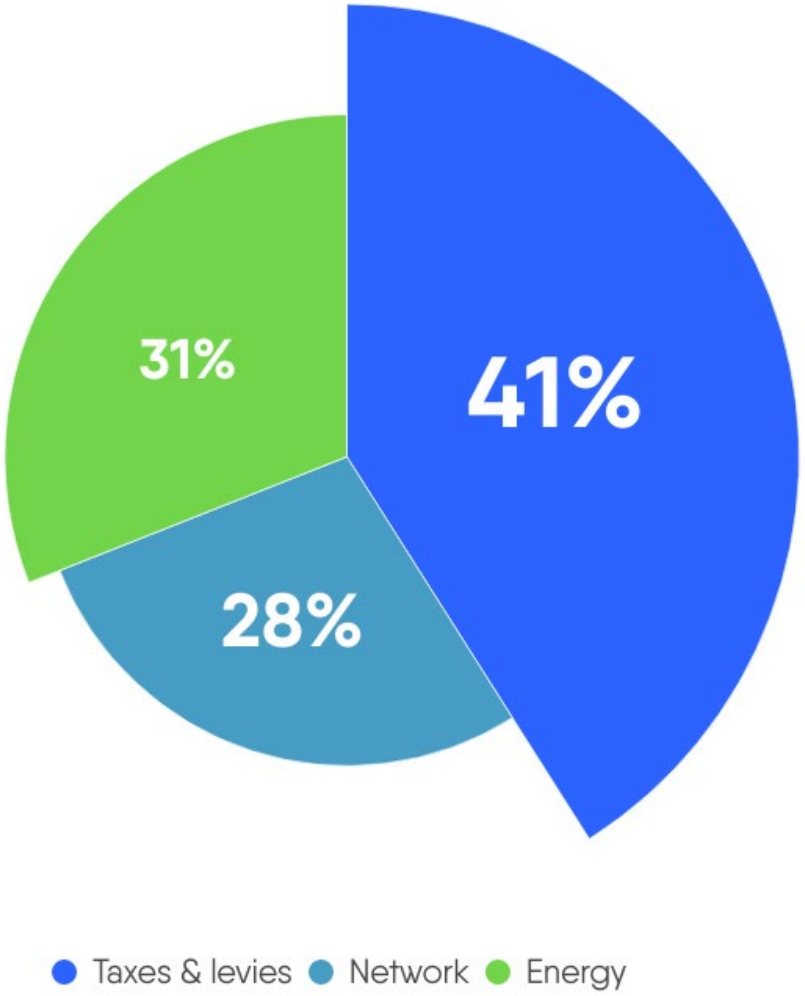
Inefficient use of interconnections



- Thanks to various market coupling projects, the level of efficiency in the use of cross-zonal capacity has improved, especially in the day-ahead market timeframe
- However, efficiencies remain low in the intraday and balancing markets.
- Coordination in cross-border capacity calculation and allocation is still lacking
- Quick implementation of the market network codes is key to achieving a Pan-European target electricity model.

Source: ACER's Market Monitoring Report 2019

Excessive taxes and levies



Components of the electricity Bill 2019

Since 2010

-1% energy

+11% network

+29% taxes & levies

- Given the decreasing carbon intensity of power generation, levies wrongfully burden European households seeking to electrify(/decarbonise) final consumption choices.
- Lessening the burden on electricity prices would enable more market incentives for electrification-based decarbonisation solutions

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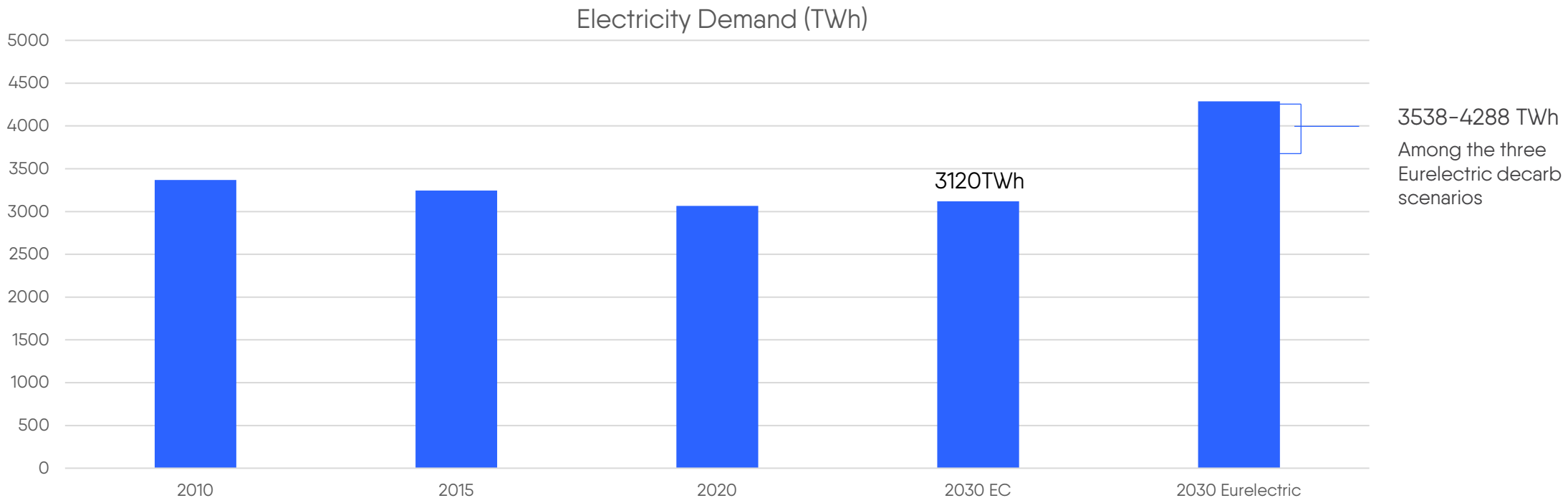
Source: European Commission (2020): Staff Working Document accompanying the 'Energy prices and costs in Europe' report

Large gap between EC and Eurelectric on 2030 electrification: A decade without much electrification?



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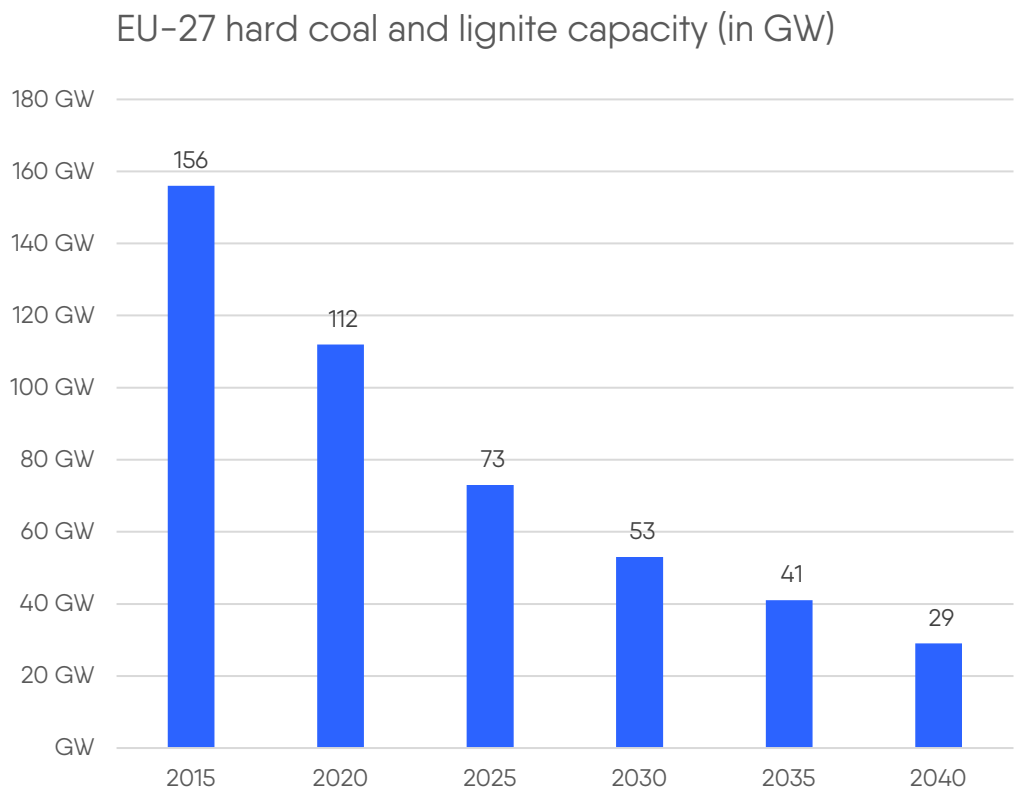
Source: Eurostat (2010-2020), Eurelectric's decarbonisation scenarios & EC's 2030 Climate Target Plan Impact Assessment (2030)

75 % decrease in coal capacity between 2020 & 2040



- According to Ember, in the last 5 years coal generation in the EU-28 steadily decreased from 705 TWh to 365 TWh in 2020, and according to the analysis of NECPs submitted last year, by 2030 coal generation is expected to decrease to 282 TWh
- 20 out of 27 EU Member States have pledged to become coal-free by 2030 (& the UK by 2025)
- Member states coal phase out commitments will decrease 75 % of the current coal capacity by 2040
- An adequate policy framework is needed for remaining coal fleets to be replaced by clean generation by 2040

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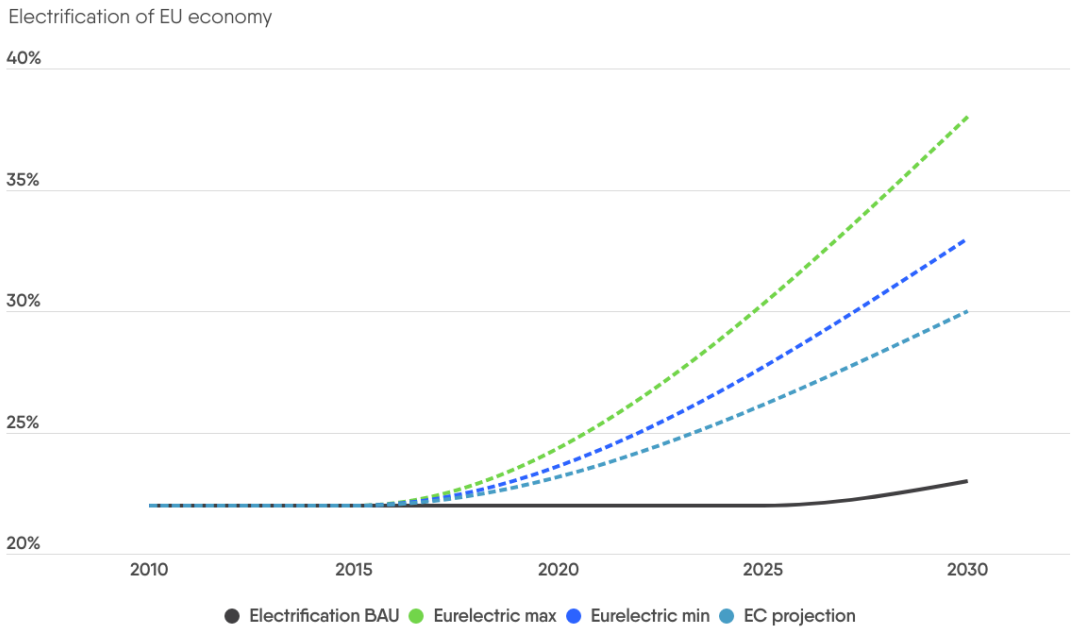
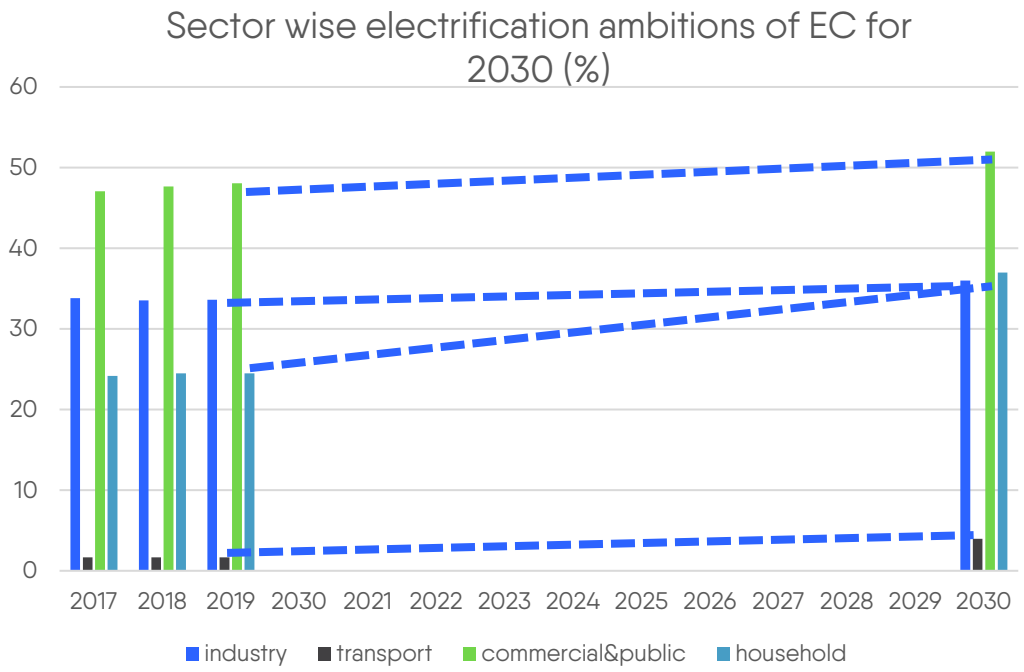
Source: Eurostat (2010-2020), EC's 2030 Climate Target Plan Impact Assessment (2030

The Electric Decade: Faster, deeper electrification





Quicker electrification is essential to European decarbonisation, however, looking at 2019 and 2020, the pace needs to urgently pick up.
Eurelectric's decarbonisation scenarios show that an electrification rates as high as 38 % by 2030 is possible.

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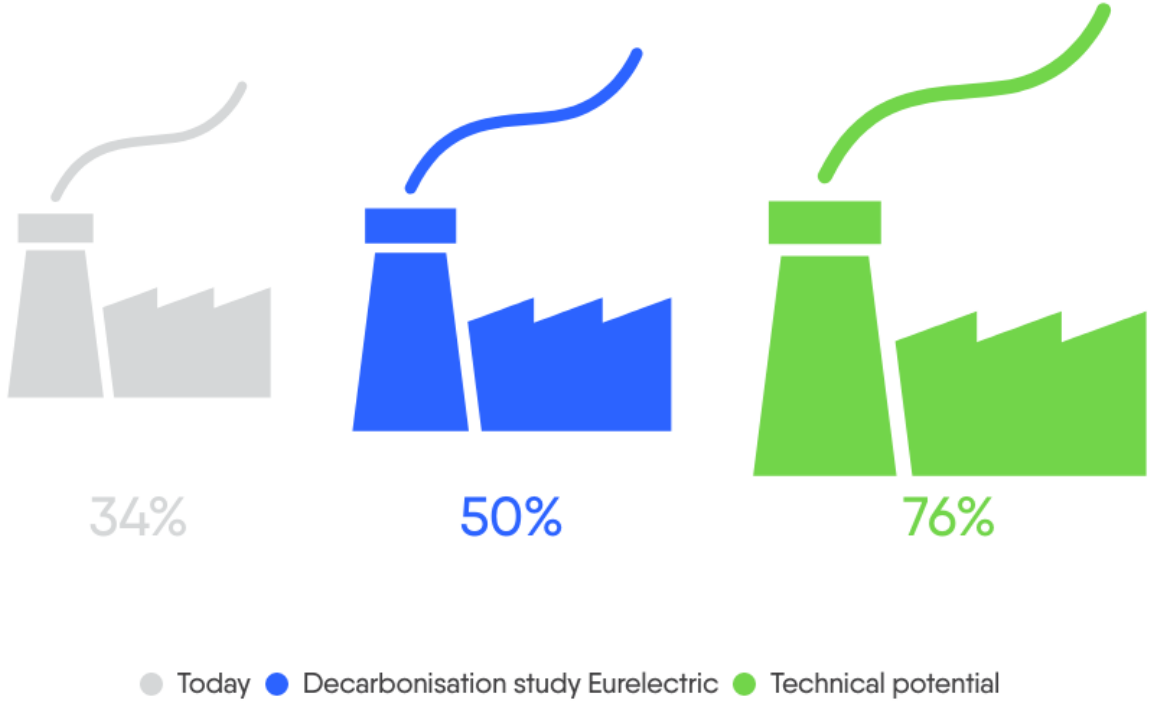
Source: Eurostat (2010-2019); Eurelectric & EC's 2030 Climate Target Plan Impact Assessment & Eurelectric (2020-30)

Electrification can achieve significant industrial decarbonisation



-7% industries' final energy demand

-43% industrial emissions

- Industries account for one-third of EU emissions which is considered as one of the hard-to-abate sector. However, electrification can bring down significant emission reduction of 43 % using the established technologies
- Established technologies alone can bring up the industrial electrification to 76 % which is 34 % today

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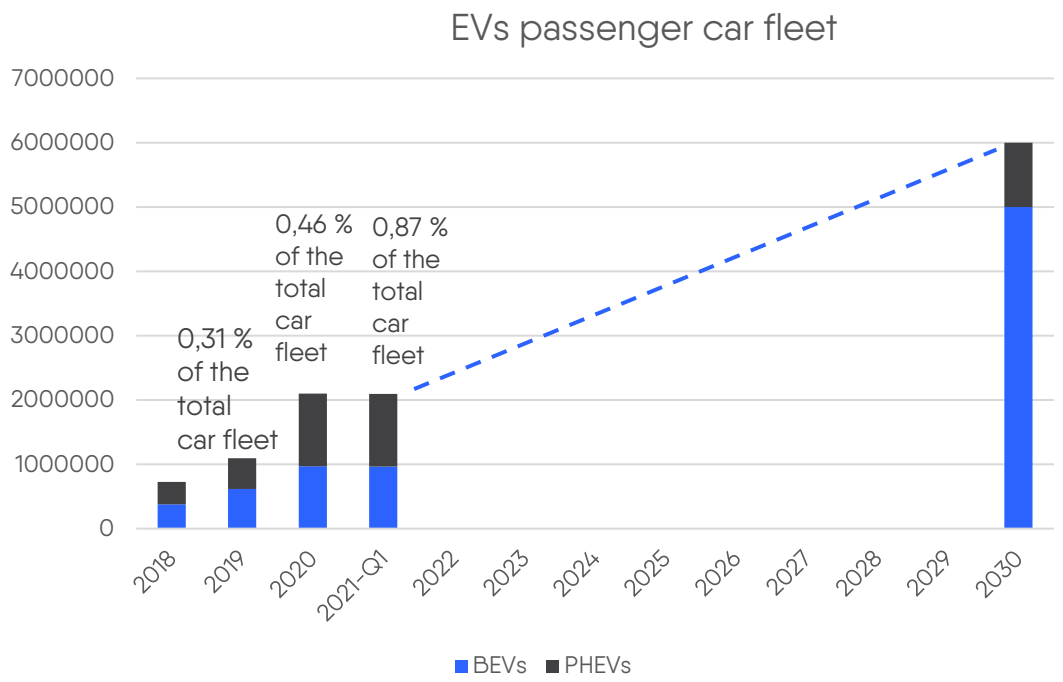
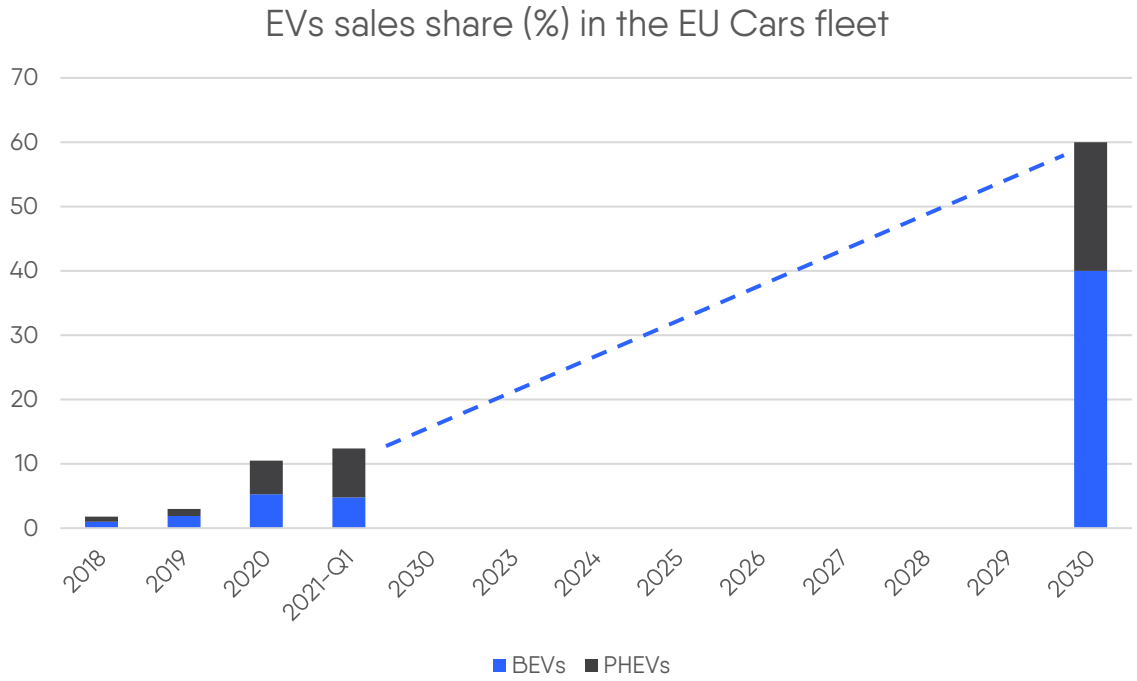
Source: Eurostat (today), Eurelectric's decarbonisation study, Getting fit for 55 and set for 2050:ETIP Wind & Wind Europe (technical potential)

1 in 10 cars sold in 2020 were EVs





- More than 2 million EVs on the road among the total 243 million passenger cars in the EU
- Looking at overall car fleets, the share of EVs still looks very small

- 1 out of 10 cars sold in EU in 2020 was either a pure electric or a plug-in hybrid
- Share of BEVs in EVs decreasing since 2020

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Source: European Alternative Fuels Observatory (2019, 2020); T&E (2030)

EV share of medium and large vehicle segments still low

Share of EVs (%) in the sale of new Buses, Trucks and Vans in 2020

	Electric[1]		Hybrid electric		Diesel		Petrol		Alternative Fuels[2]	
	2019	2020	2019	2020	2019	2020	2019	2020	2019	2020
Buses	4,3	6,1	5,7	9,5	82,4	72,9	0	0,1	7,6	11,4
Trucks	0,2	0,4	0,1	0,1	97,5	96,5	0	0,1	2,1	2,9
Van	1,3	2	0,3	0,9	91,7	92,4	5,1	3,4	1,6	1,3

Share of EVs (%) in the total fleet of Buses, Trucks and Vans in 2019

Buses	0,6
Trucks	0,04
Van	0,3

Around 2,5 million EVs by the end of 2020

1. BEVs, PHEVs. FCEVs
2. natural gas, LPG, biofuels and ethanol vehicles

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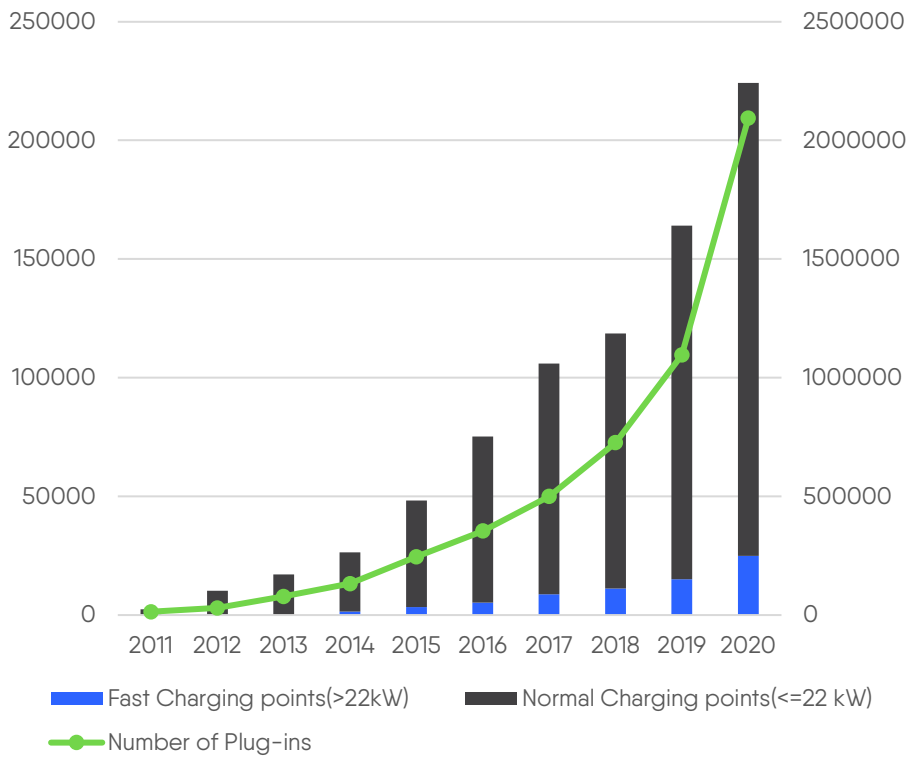
Source: European Alternative Fuels Observatory, T&E, Eurelectric

Charging stations

- As of 2020, 225,000 public charging points. More than 60,000 new charging points were installed in 2020. A growth of 37 %
- However, this doesn't match the growth of EVs which has doubled in 2020 compared to 2019.
- The number of high power charging points per 100 km of highways rose from 12 to 20 in 2020

3,58 million is EC's ambition for by 2030



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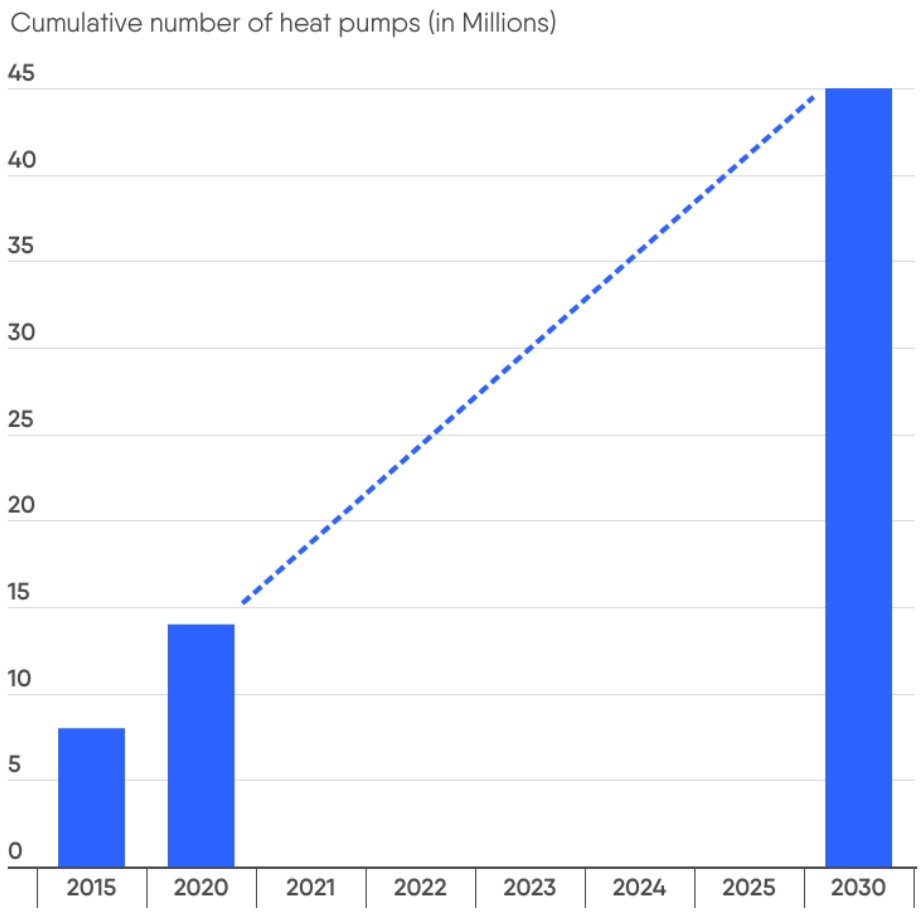
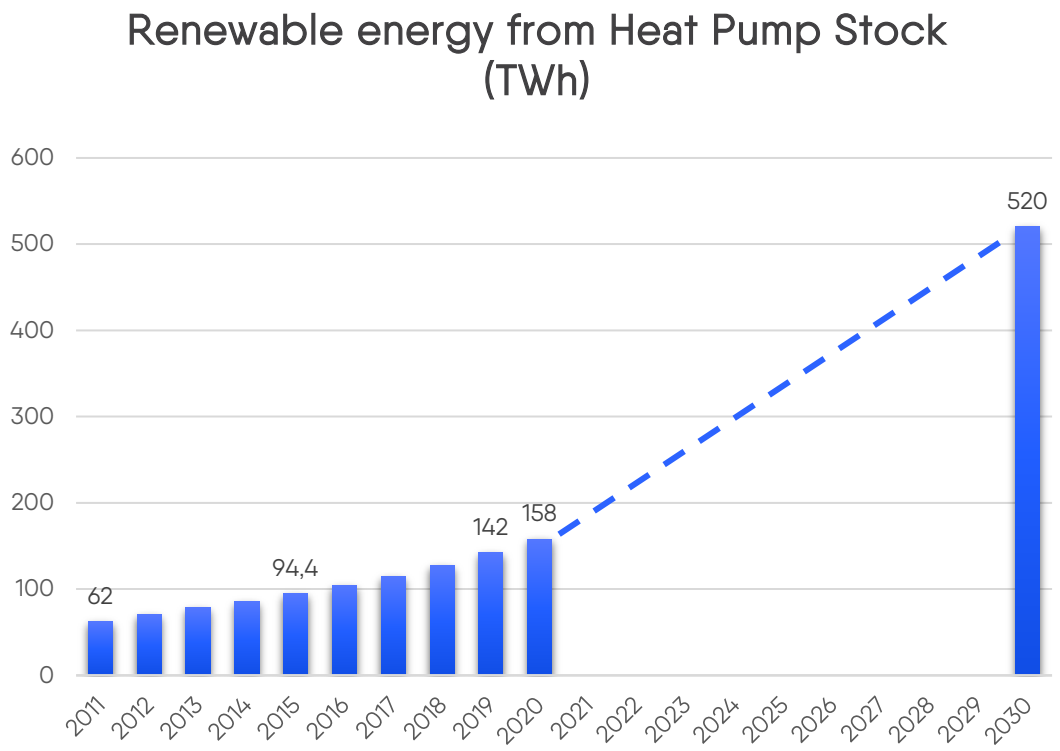
Source: European Alternative Fuels Observatory ,T&E Europe

Heat pump sales: still long way to go





- Average annual addition in renewable energy from HP should triple to achieve EC ambitions

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Source: Historic figures from European Heat Pumps Association, EC's 2030 Climate Target Plan Impact Assessment (2030)

Renewable hydrogen

end of 2018

1 GW of installed electrolyser capacity according to latest data collected by Hydrogen Europe (until the end of 2018)

2024

2,4 GW (40 % is RE & 60 % us grid connected) electrolyser capacity planned by 2024 compared to

6 GW target in the EC's hydrogen strategy

2030

Planned projects until 2030 – 24 GW (88% RE) compared to

40 GW target in the hydrogen strategy

2035

70 GW in 2035, 528-581 GW in 2050

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Source: Hydrogen Europe & EC's 2030 Climate Target Plan Impact Assessment

Policy recommendations

1. Remove barriers for renewables deployment: facilitate permitting
2. Establish predictable, long-term market-based investment frameworks for all technologies
3. Ensure necessary investment in grid infrastructure by modernising tariffs and ensuring access to EU funds
4. Implement network codes quickly to achieve a Pan-European electricity market model
5. Establish a comprehensive regulatory framework for flexibility solutions
6. Boost deployment of public (fast)charging points for electric vehicles along TEN-T networks and in urban areas
7. Accelerate electrification in buildings, transport and industry
8. Reduce taxes & levies on electricity
9. Ensure proper functioning of the ETS by avoiding national measures that jeopardise its final objective

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