CZECH BUSINESS COUNCIL FOR SUSTAINABLE DEVELOPMENT: DISCUSSION – ENERGY

15. November 2019

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MAJOR TRENDS IN THE EUROPEAN POWER SECTOR

Energy market factors

Commodity prices | **Political decisions of EU** | **Technological development**

Key trends

Conventional energy is stagnating but remains essential part of the sector

- Environmental legislation for operations of coal plants and mines is getting stricter
- Safety requirements for operations of nuclear plants are increasing
- In countries with emphasis on energy safety new mechanisms to support conventional capacity are being introduced, in other countries capacities are being decommissioned

Renewables and decentralized generation is growing

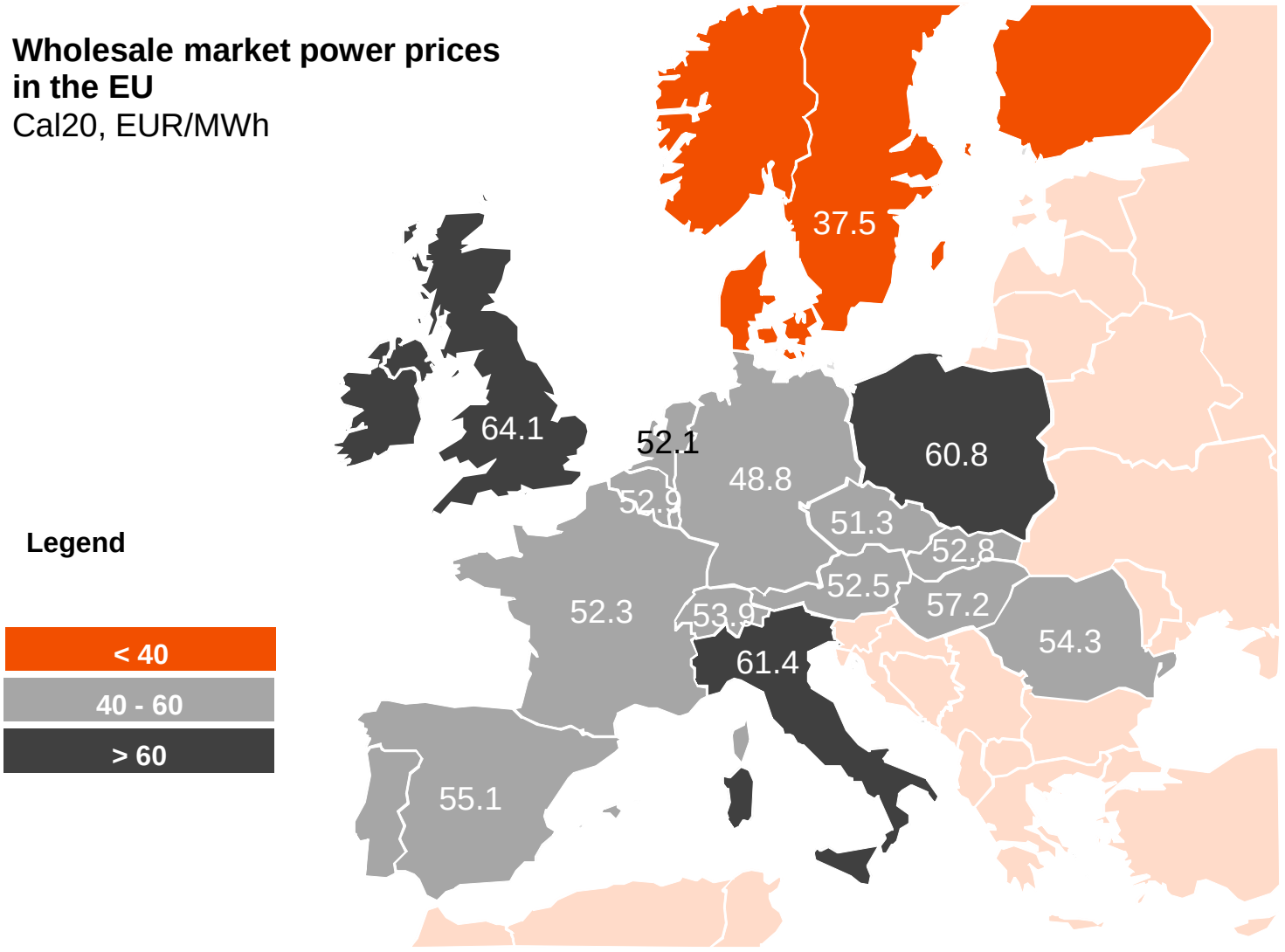
- Continued pressure of regulation and EU political decisions create new opportunities for growth of renewables and decentralized generation
- Technological development of renewables and decentralized generations means that investments to their construction is profitable at market conditions
- New competitors from oil and gas sector are entering renewables and decentralized generation

Costumers focus on complex services connected to energy usage

- Continued pressure of European legislation on energy efficiency and social responsibility of companies lead to growth of energy services
- New technologies enable significant energy savings and concurrently lead to higher usage of electricity
- Not only individuals but mainly business, public administration and public institutions are the target customer segments
- Increasingly, specialized players are being established on energy services market

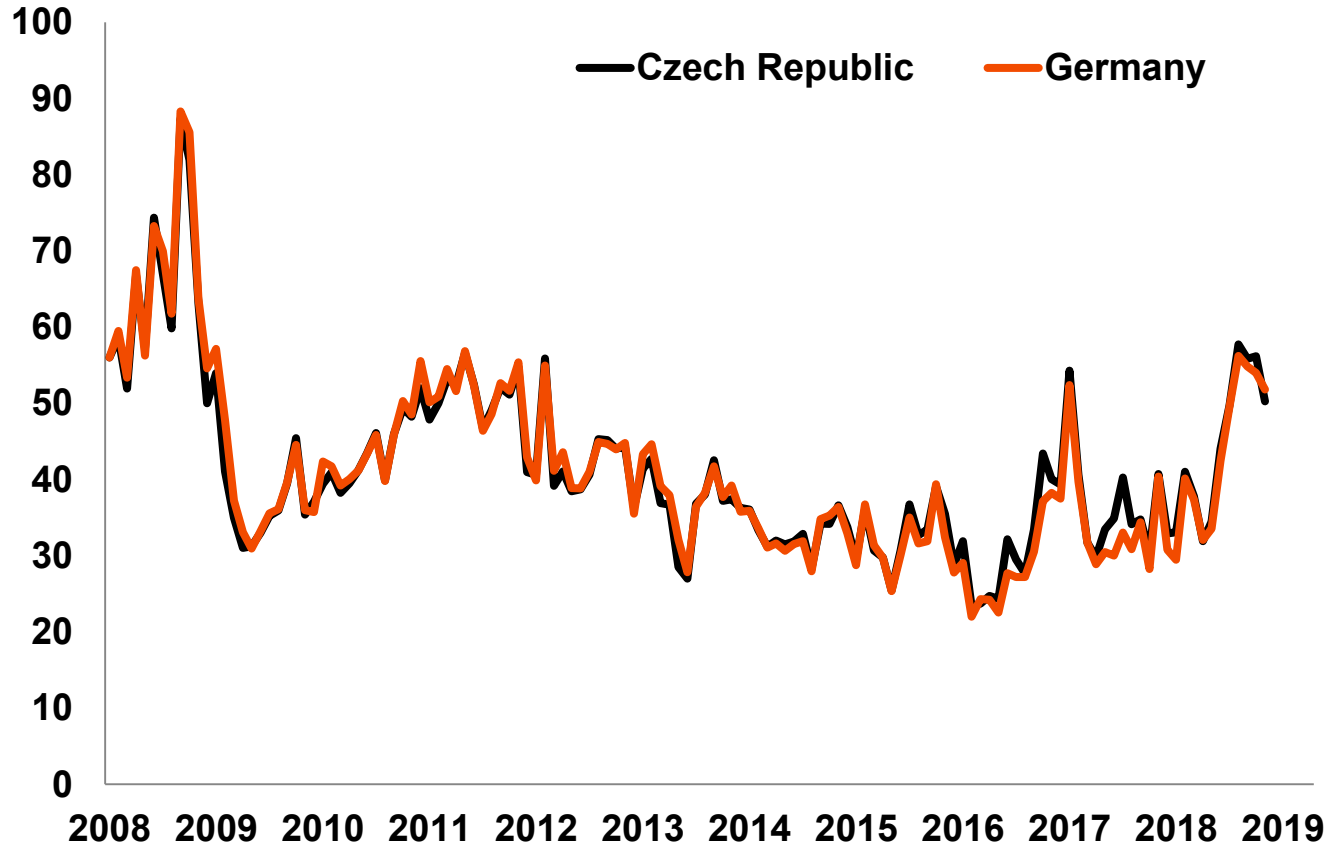
WHOLESALE ELECTRICITY PRICE IN THE CZECH REPUBLIC IS „PRETTY NORMAL“ IN EUROPE

Wholesale market power prices in the EU
Cal20, EUR/MWh



CZECH MARKET IS AN INTEGRAL PART OF WIDER EUROPEAN ELECTRICITY MARKET AND THEREFORE THE LOCAL PRICE IS HIGHLY CORRELATED WITH GERMANY

Monthly averages of spot prices in DE and CZ
EUR/MWh



- Annual electricity consumption in Germany (**545 TWh**) is one order of magnitude higher than in the Czech Republic (**67 TWh**)
- There is a strong cross border connection between these two markets, and this is why prices converge

SUSTAINABLE DEVELOPMENT IN POWER SECTOR IS DRIVEN BY CHALLENGING EU CLIMATE & ENERGY TARGETS FOR 2030

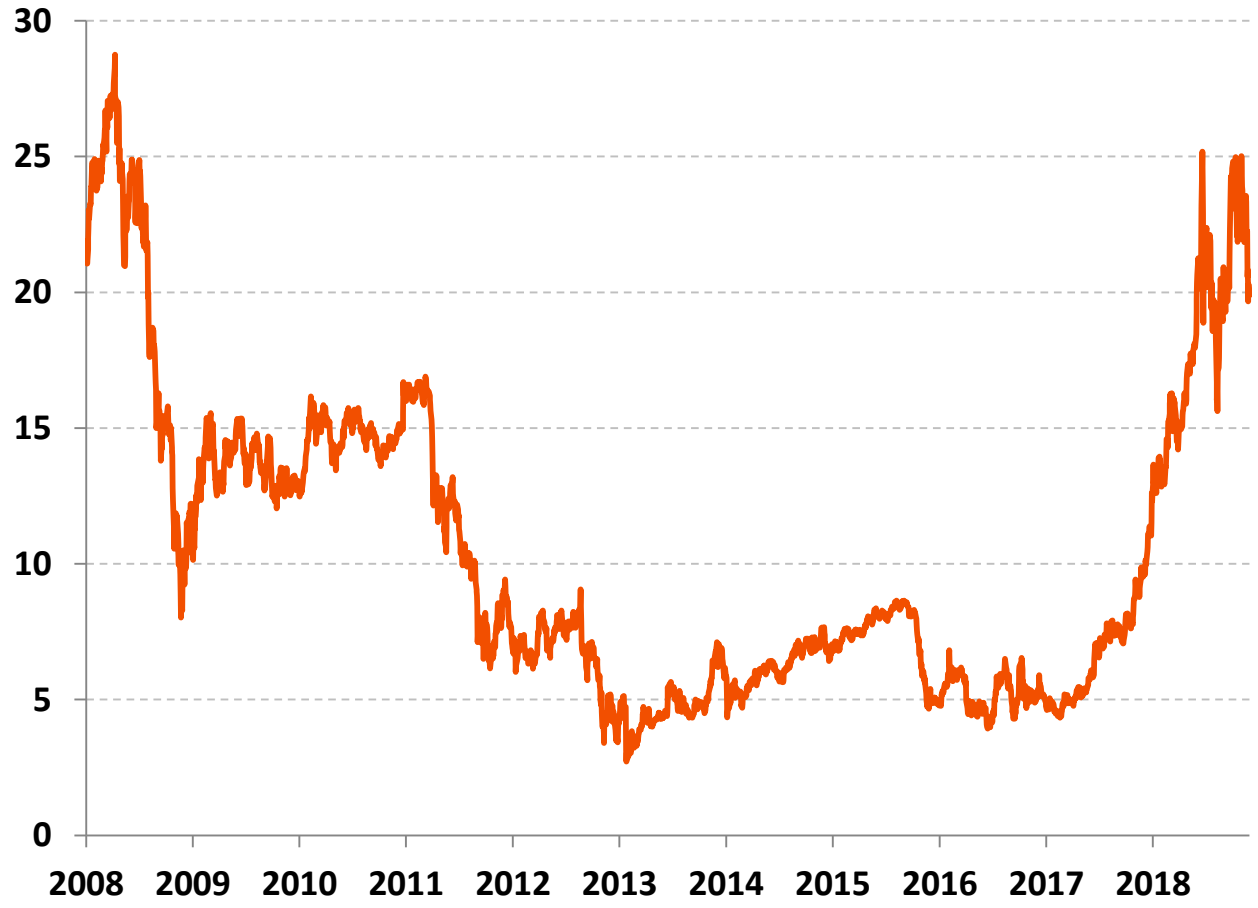
	2020	2030*
A **Greenhouse gas emission reduction compared to 1990**	**20 %** ▪ **Binding** on the **pan-European** level ▪ Partial target for EU ETS: 21% reduction compared to 2005 ▪ Target already accomplished	**min. 40 %** ▪ **Binding** on the **pan-European** level ▪ Partial target for EU ETS: 43% reduction compared to 2005 ▪ May be accomplished as a side effect when fulfilling other two climate targets
B **Renewables share of total final energy consumption**	**20 %** ▪ **Binding** on **national** level ▪ Target will likely be achieved on EU level ▪ Target translates to **RES-E share of 34%**	**min 32 %** ▪ **Binding** on the **pan-European** level, but will translate to national targets ▪ Applies to heat, electricity and transport ▪ Target translates to **RES-E share of 55%**
C **Energy savings compared to 2007 BAU predictions**	**20 %** ▪ **Indicative** on **national** level ▪ Mandatory savings in the final energy consumption	**min 32.5 %** ▪ **Indicative** on the **pan-European** level ▪ **Mandatory annual savings 0.8%** in consumed energy on **national level**

* 2030 targets may be revised (i.e. increased) in 2023

A PRICE OF THE EMISSION ALLOWANCE HAS INCREASED BY MORE THAN 150% SINCE THE START OF 2018, AND REMAINS UNPREDICTABLE

CO_2

EUA price development
EUR/t, spot



- Market Stability Reserve causing primary deficit of allowances since 2019
- Historical oversupply of allowances is more than sufficient to cover this primary deficit, but **current holders don't want to sell** when the EUA price is rising
- New players (speculators) entering the market
- Utilities increasing their hedging

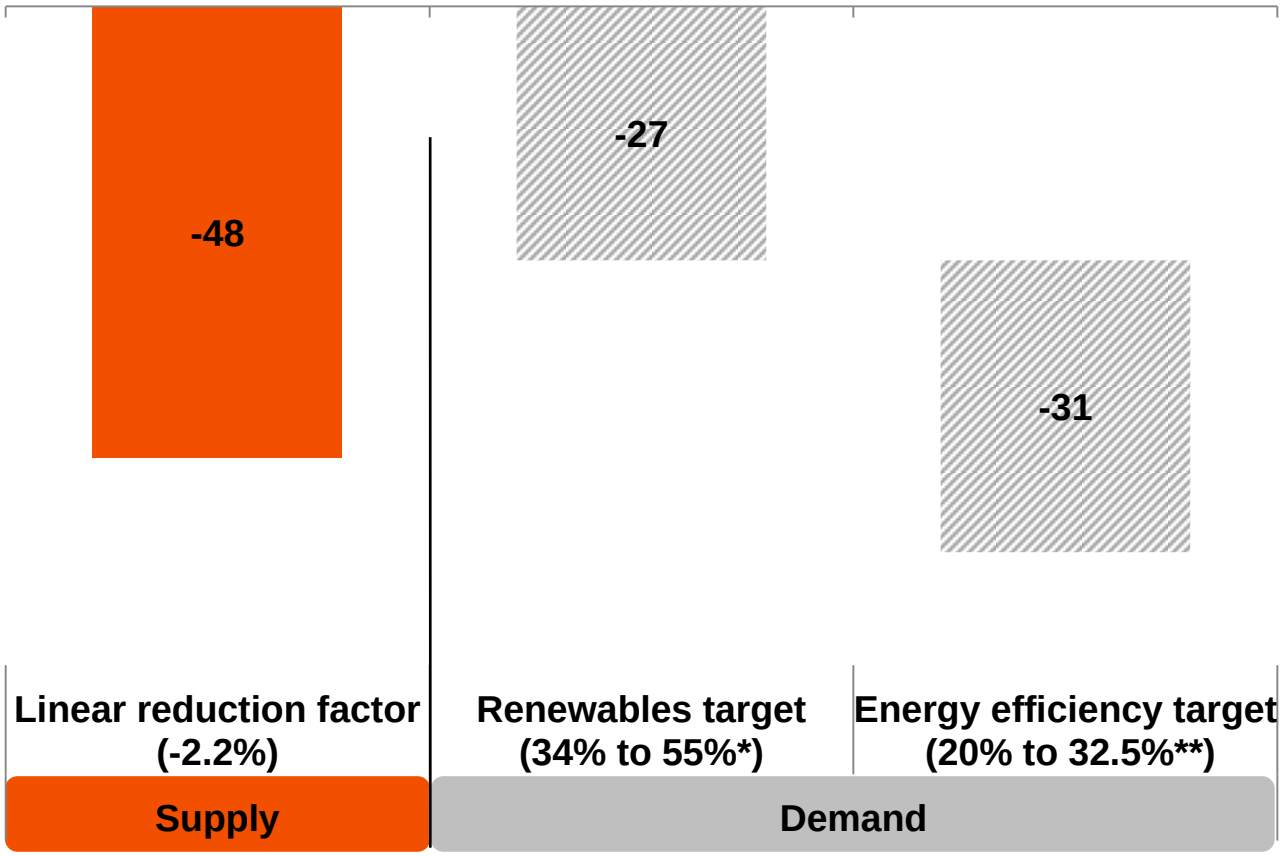
- EUA price is rising despite significant oversupply on the market

A ANNUAL BALANCE: LOSS OF THE EUA DEMAND CAUSED BY HIGHER RENEWABLES AND ENERGY EFFICIENCY TARGETS WILL BE HIGHER THAN THE FALL OF SUPPLY

CO_2

Impact of more ambitious RES and EE targets on the EU ETS annual balances (2030 vs 2020)

Mt



- The annual emission reduction achieved just by RES growth and energy efficiency measure is higher than the required CO2 production decrease
- No reason for scarcity, i.e. price

* Cca 660 TWh in 2030 ** Cca 515 TWh in final electricity consumption in 2030 (assuming savings will translate proportionally)

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2021-2030 BALANCE: EU ETS WILL BE STRUCTURALLY OVERSUPPLIED

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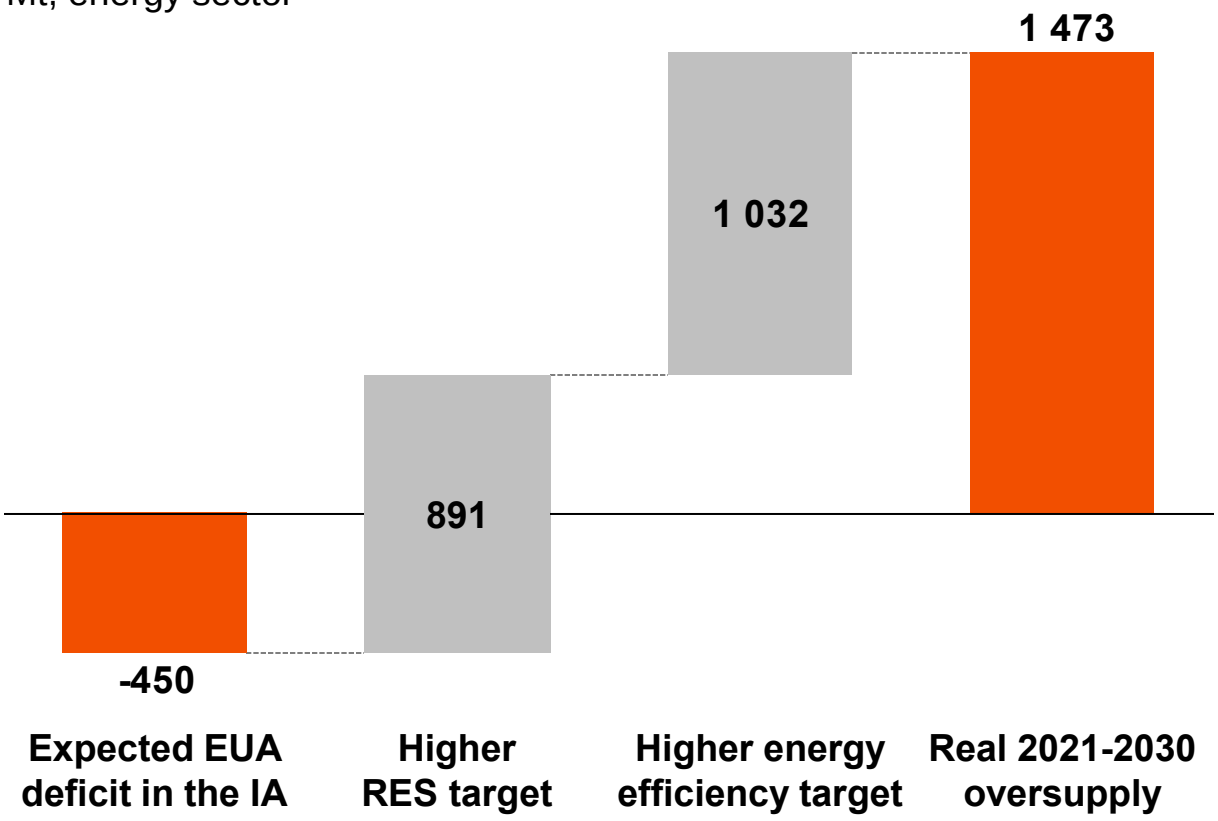
Impact of more ambitious RES (32%) and EE target (32.5%) on the overall 2021-2030 EU ETS balance

Mt, energy sector



- More ambitious RES and EE targets will cause more than **1 900 Mt of additional CO2 savings** in the energy sector (further savings can be expected in other industrial sectors)
- **EU ETS will be structurally oversupplied** (available supply is higher than the demand)
- Market Stability Reserve is able to withdraw the accumulated oversupply from the market, but that is **insufficient to restore the scarcity of allowances in the EU ETS**

- **The effect of more ambitious RES and EE target should be neutralized by a more ambitious EU ETS target**

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MOREOVER, MANY EUROPEAN COUNTRIES HAVE ALREADY ANNOUNCED COAL PHASE-OUTS

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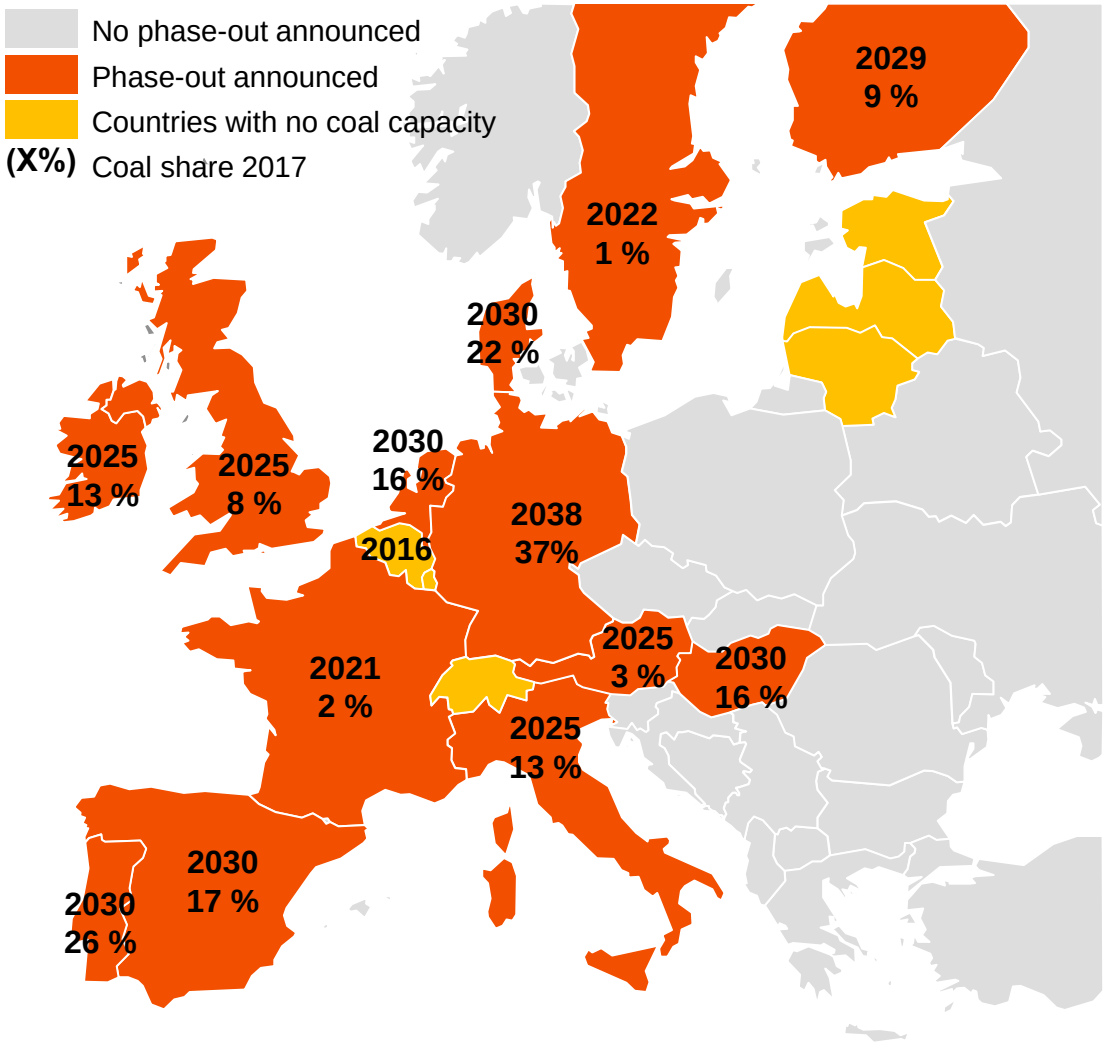

- Announced phase-outs will lead to a retirement of around 90 GW of coal capacity in Europe

Coal phase-out in Germany

- Germany has an internal decarbonisation target for both 2020 (-40% compared to 1990) and 2030 (-55%)
- 2020 target will not be reached, emissions will fall „only“ by some 32%
- A coal phase-out timeline was announced in order to reach the 2030 emission target
  - 5,5 GW (12,5 including already announced closures) until 2022
  - 13 GW until 2030
  - 17 GW until 2038

Source: beyond-coal.eu, Euractiv

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MITIGATION OF PARALLEL CLIMATE POLICIES: HIGHER DECARBONISATION TARGET

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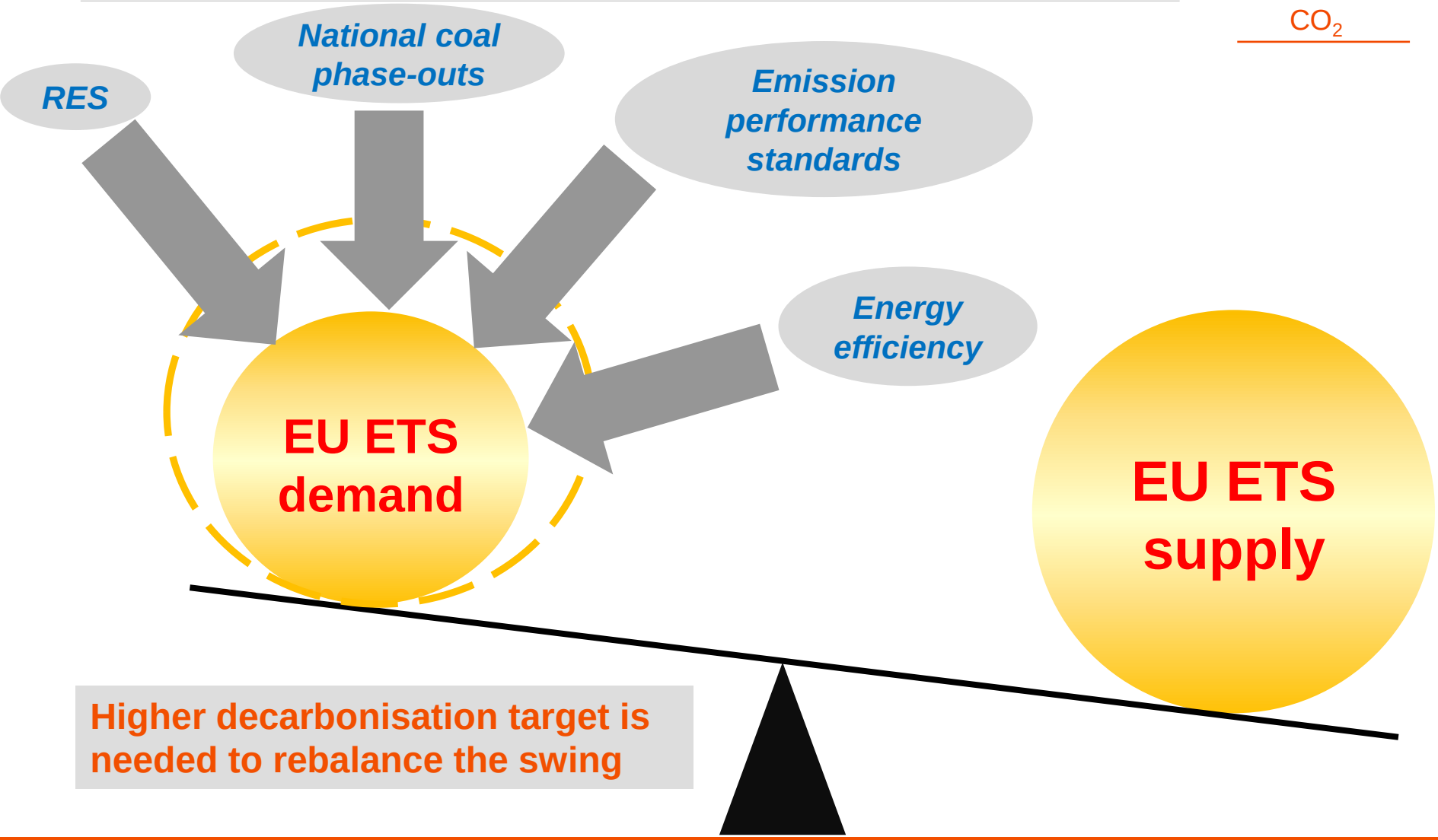
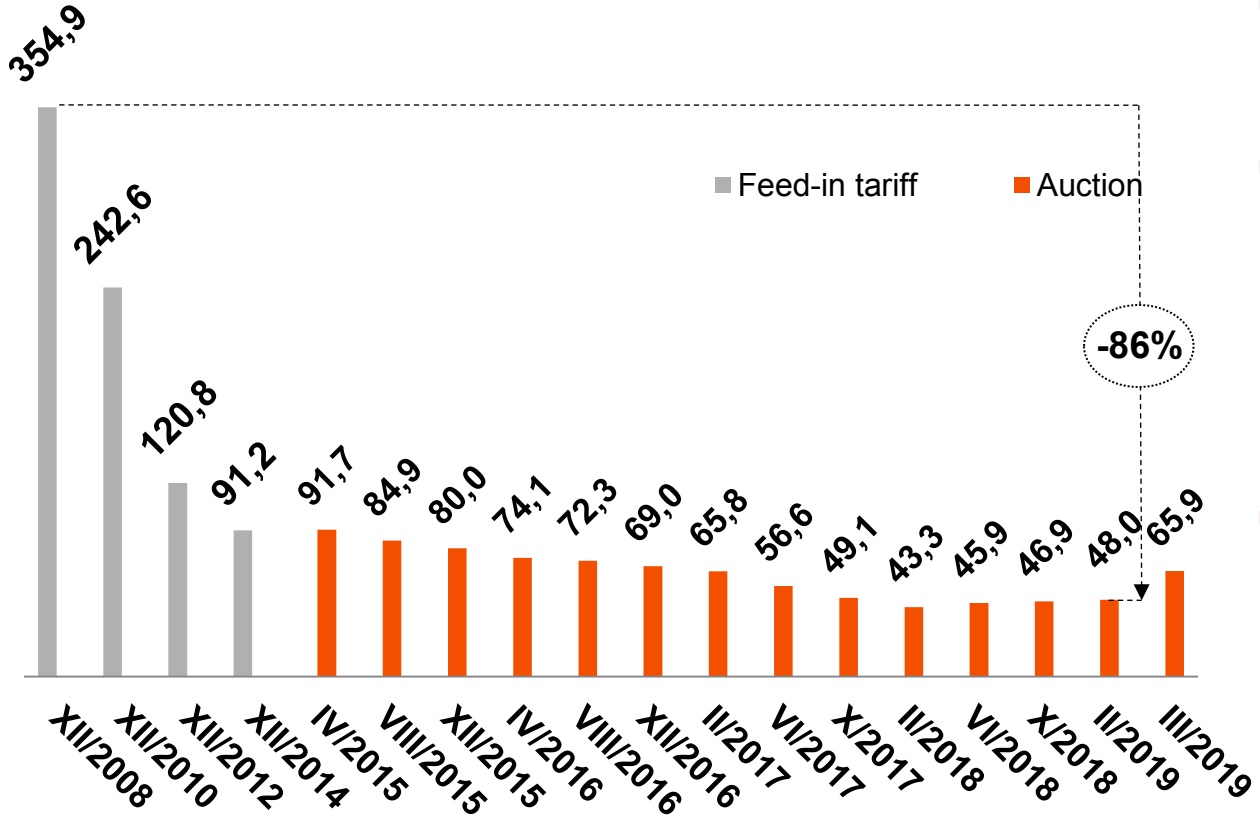


Higher decarbonisation target is needed to rebalance the swing

B THE TECHNOLOGICAL PROGRESS IS IMMENSE: COSTS OF PV PLANTS HAVE REPEATEDLY DROPPED WELL BELOW 50 EUR/MWH

RES

PV support in Germany
EUR/MWh, installations with capacity over 1 MW

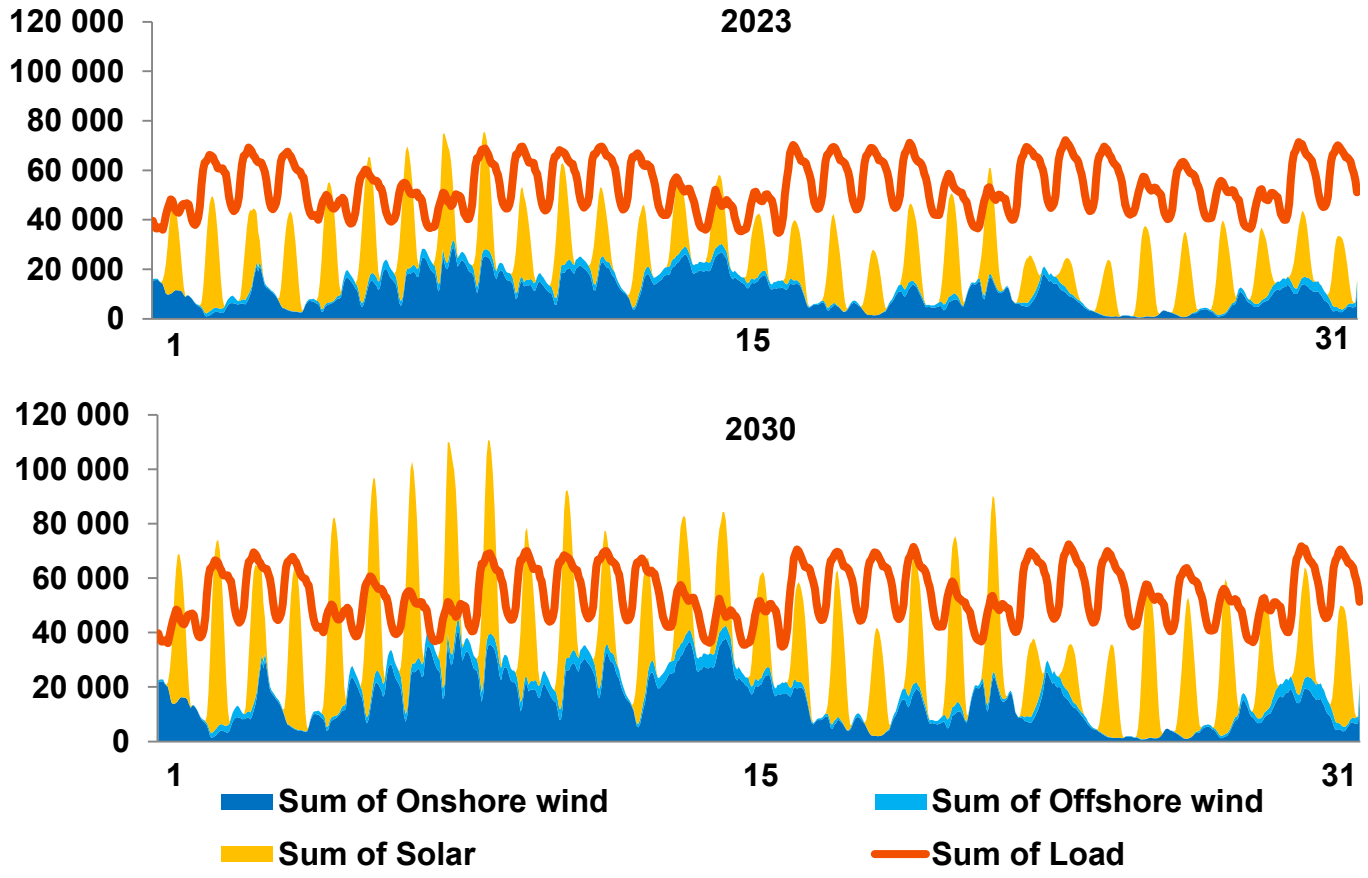


- The support for PV plants was relatively stable in the range 45-50 EUR/MWh in the last year
- The last auction was result was significantly higher, +17 EUR/MWh. The main reason are the strict limits for agriculture land use and higher margins driven by a stable and high governmental demand
- EnBW intends to built a new PV plant **175 MW without any state support.** This would be the biggest photovoltaic plant is Germany. Operational: 2020

B THE GERMAN TARGET REACHING 65% OF ELECTRICITY FROM RES IN 2030 WILL HIGHLY IMPACT THE DAILY BUSINESS OPPORTUNITY

RES

RES Production in Germany in May
MW, hourly, based on 2016 real data



- German renewable energy sources will fully cover the power demand for about **1 000 hours in 2030**
- The business environment in 2030 will be highly **unfriendly to baseload plants**
- The role of **flexibility** of power plants, storage and demand side response will grow

FULFILMENT OF THE 2030 EED OBLIGATIONS WILL REQUIRE SUBSTANTIAL INVESTMENTS FROM EU MEMBER STATES

EED

Investment costs needed to fulfill higher of the EED 2030 obligations
(32.5% decrease of final consumption or 0.8% p.a. savings obligation)
% GDP 2017

% GDP	AT	BE	BG	CY	CZ	DK	EE	FI	FR	DE	GR	HU	IE	IT
Average estimate*	21%	31%	23%	20%	16%	16%	16%	26%	18%	19%	12%	16%	5%	9%
Lower estimate*	7%	11%	8%	7%	6%	6%	6%	9%	6%	7%	4%	6%	2%	3%
Upper estimate*	33%	48%	35%	31%	25%	25%	25%	40%	27%	30%	18%	24%	8%	13%

% GDP	LV	LT	LU	MT	NL	PL	PT	RO	SK	SI	ES	SE	UK
Average estimate*	19%	15%	29%	8%	12%	50%	11%	15%	30%	14%	9%	15%	11%
Lower estimate*	7%	5%	10%	3%	4%	17%	4%	5%	11%	5%	3%	5%	4%
Upper estimate*	29%	23%	45%	13%	18%	77%	16%	24%	47%	22%	14%	23%	18%

32.5% target > 0.8% p.a. obligation** 0.8% p.a. obligation > 32.5% target

* IA estimates of energy efficiency intensities (table 12, IA Annexes p. 159):

Average (5 studies):	364 M EUR/PJ
Lower:	127 M EUR/PJ
Upper:	564 M EUR/PJ

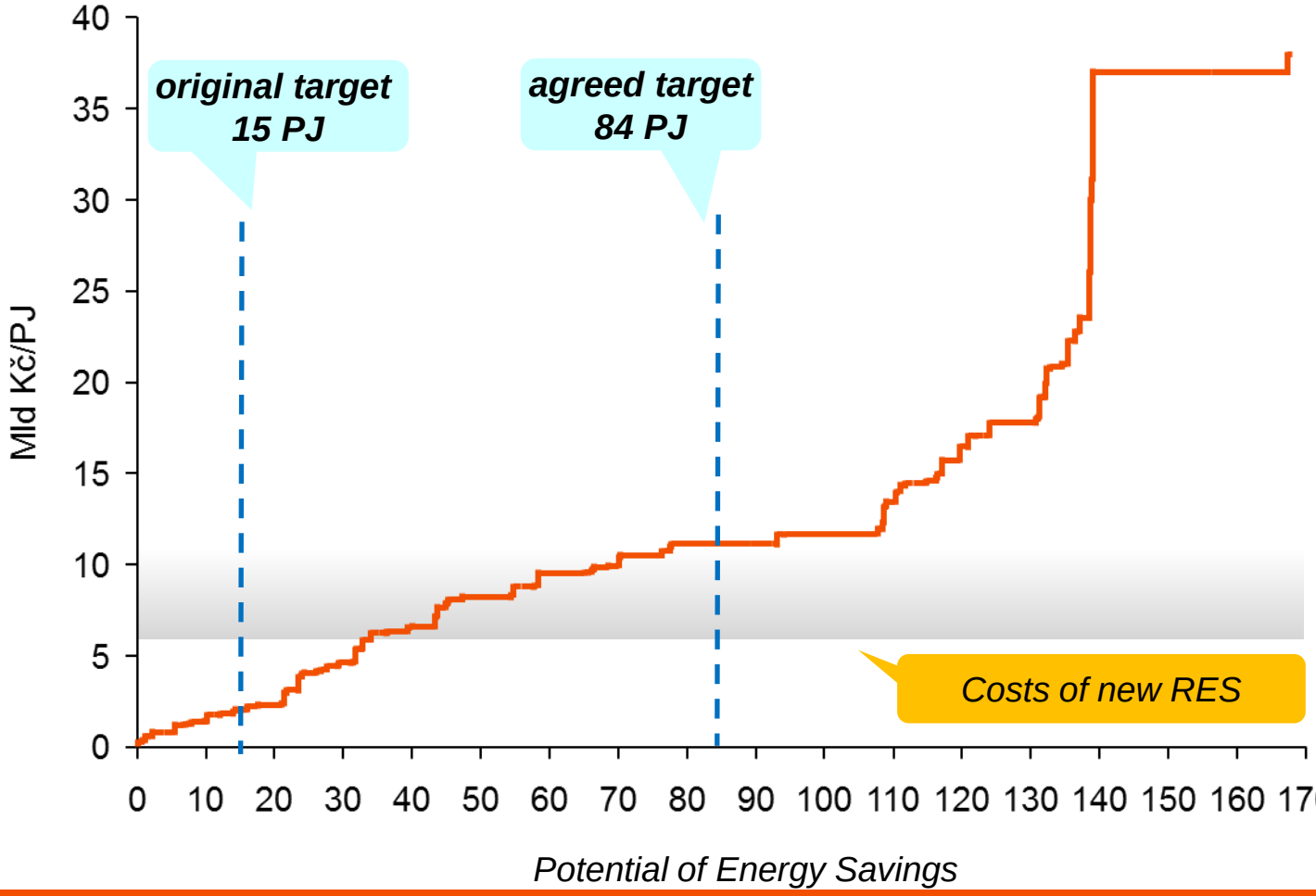
EC estimates an additional total investment expenditure of €78 billion/year for increasing the target from 27% to 30% (IA p. 65) which translates into 440 M EUR/PJ

**Rough estimate: 8% from the base consisting of 2015-2020 average final consumption by PRIMES 2016

A CZECH EXAMPLE: THE COSTS OF REQUIRED ENERGY SAVINGS ARE HIGHER THAN THE COSTS OF THE SAME AMOUNT OF ENERGY PRODUCED BY THE NEW RES

EED

Cost curve of the Energy Efficiency Measures in the Czech Republic
Final energy consumption



- **Costs of energy efficiency** measures in the Czech Republic**: 25-48 bln. EUR**
- **Most of the measures have no payback,** and this is why the state will have to subsidy them, The needed support will reach **38-67% or 10-32 bln. EUR**

CLIMATE & ENERGY TARGETS CREATE AN OPPORTUNITY TO MODERNIZE CZECH POWER SECTOR

ČEZ Strategic priorities

- **Modernization and digitalization of distribution grid** in the Czech Republic, implementation of innovative solutions, smart grids and integration of energy services, decentral RES and e-mobility
- Development of **energy services** solving the needs of customers and modernisation of industry and buildings
- **RES growth** and also the growth of the RES industry
- **Electrification of transport** as a decarbonisation tool plus EV industry development
- **Energy storage development** for EV and grid stabilisation