



Energiantuotannon päästöt, päästökauppa ja Fortumin strategia

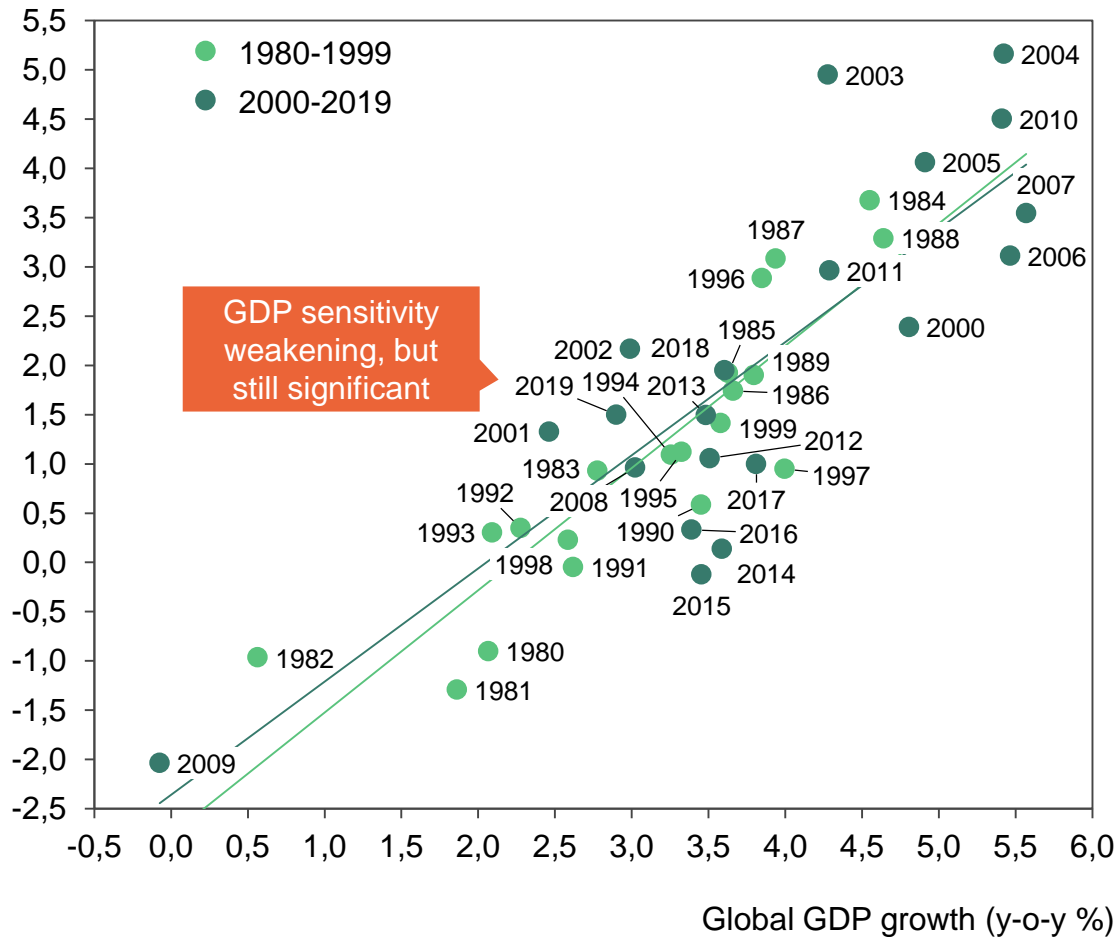
Sähköinsinöörit – SIL ry:n seminaari 18.8.2020

Esa Hyvärinen

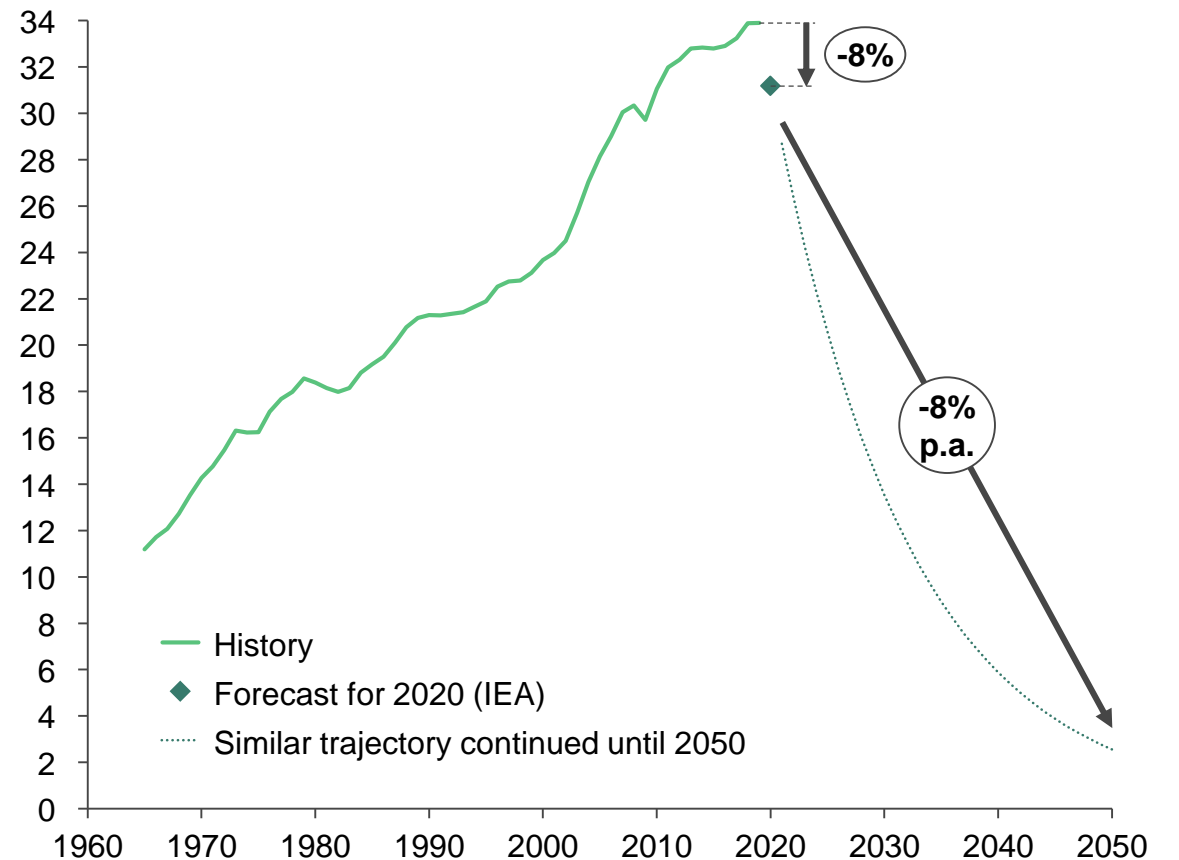
Fortum Oyj

The world will this year see a significant decline in carbon emissions due to lockdowns and economic slowdown – continuing similar path for the next 30 years would bring us to carbon neutrality

Change in emissions (y-o-y %)

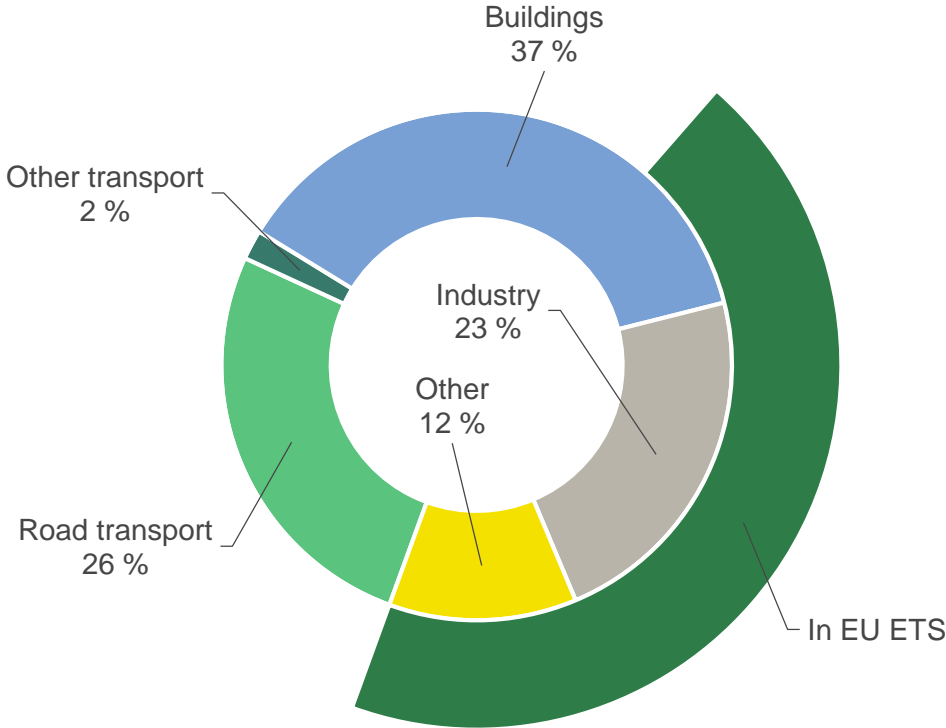


Global energy-related CO₂-eq. emissions (Gton)



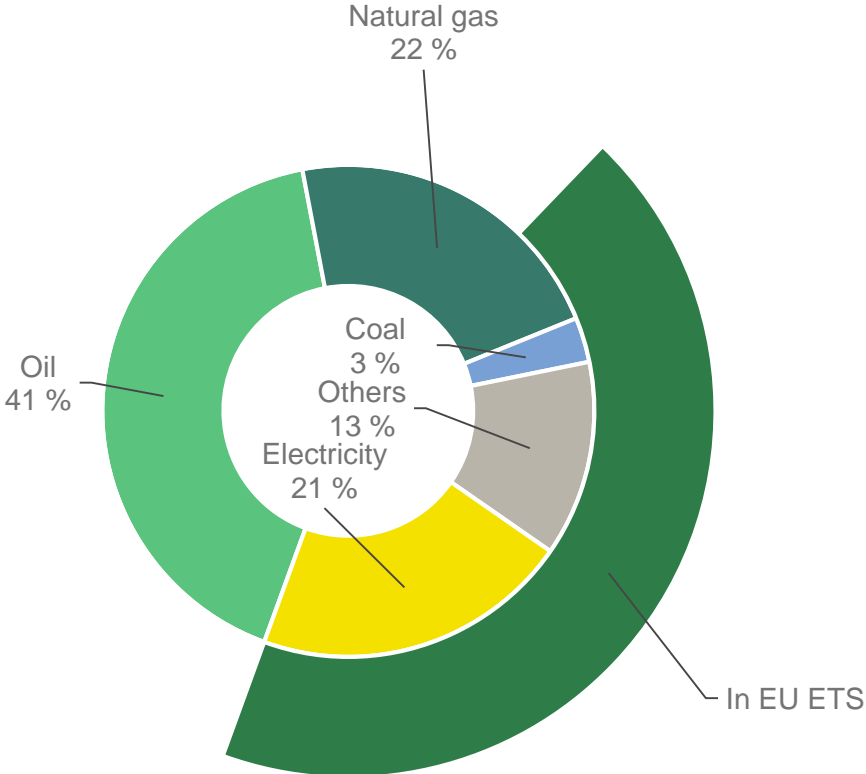
Electricity is merely a fifth of EU final energy consumption

EU28 final energy consumption by sector



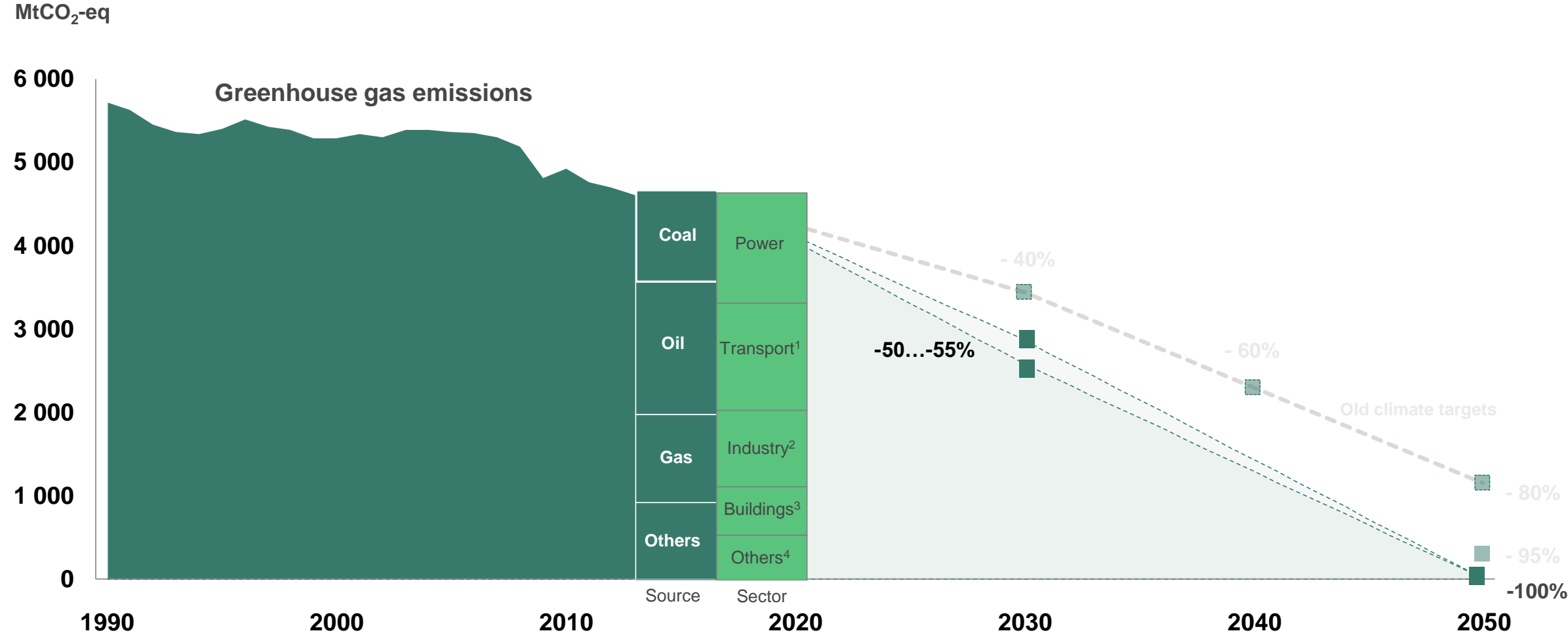
Note: EU28 final energy consumption equals 13 000 TWh/a.

EU28 final energy consumption by fuel

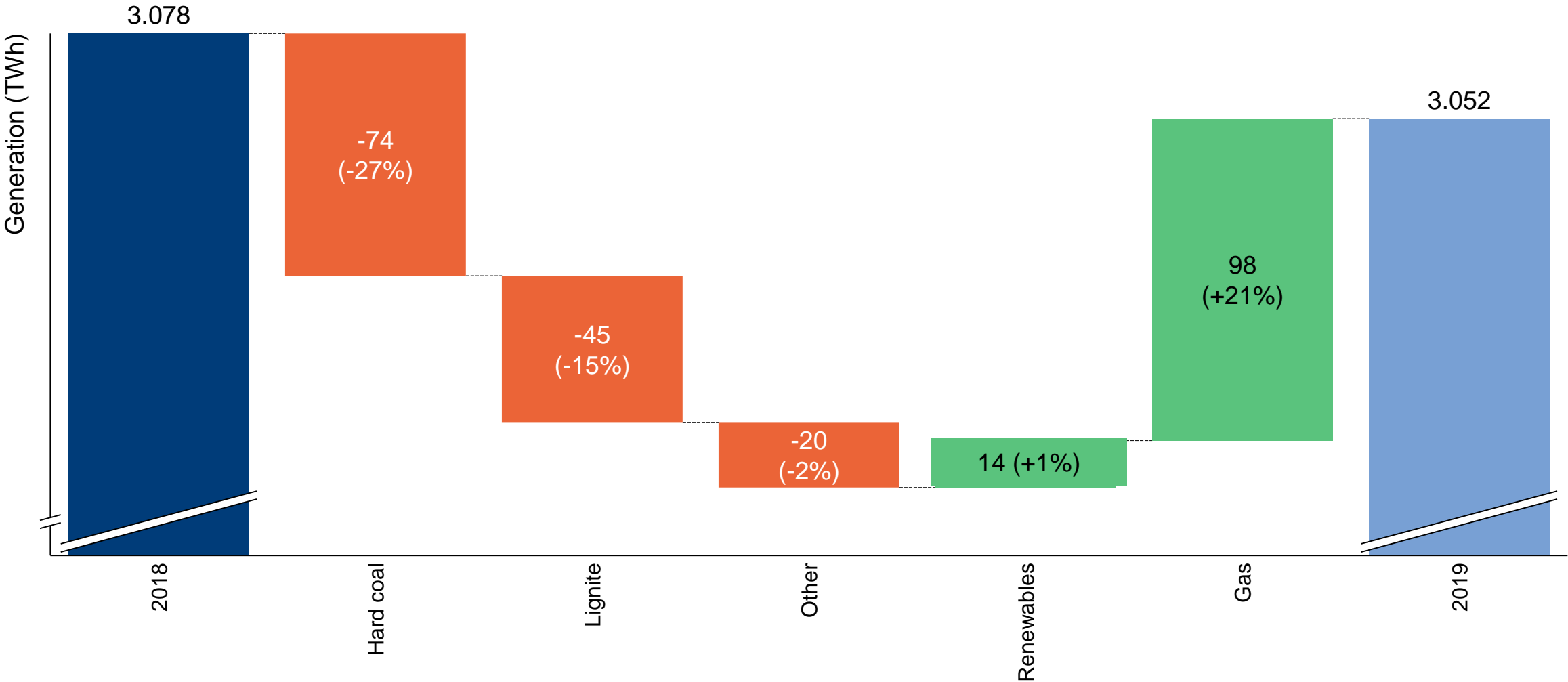


Source: Eurostat.
Share of EU ETS coverage is a Fortum estimate.

Europe needs to eliminate CO₂ emissions to reach climate goals – this requires actions from all sectors

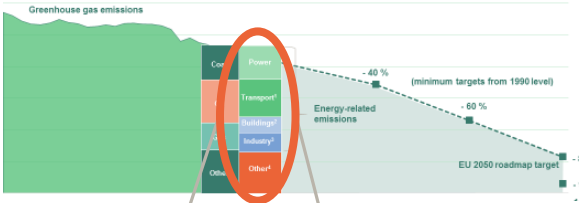


Energy transition proceeds in Europe with gas and renewables replacing coal and lignite – power sector emissions down by c. 83 million tonnes CO₂



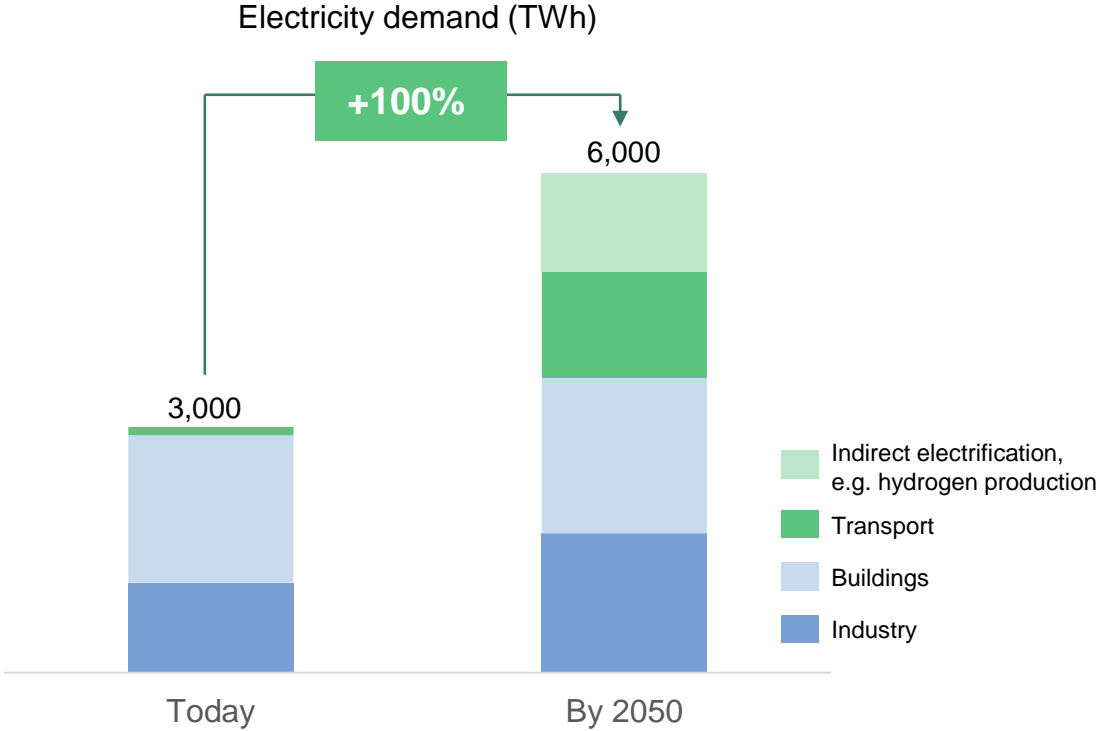
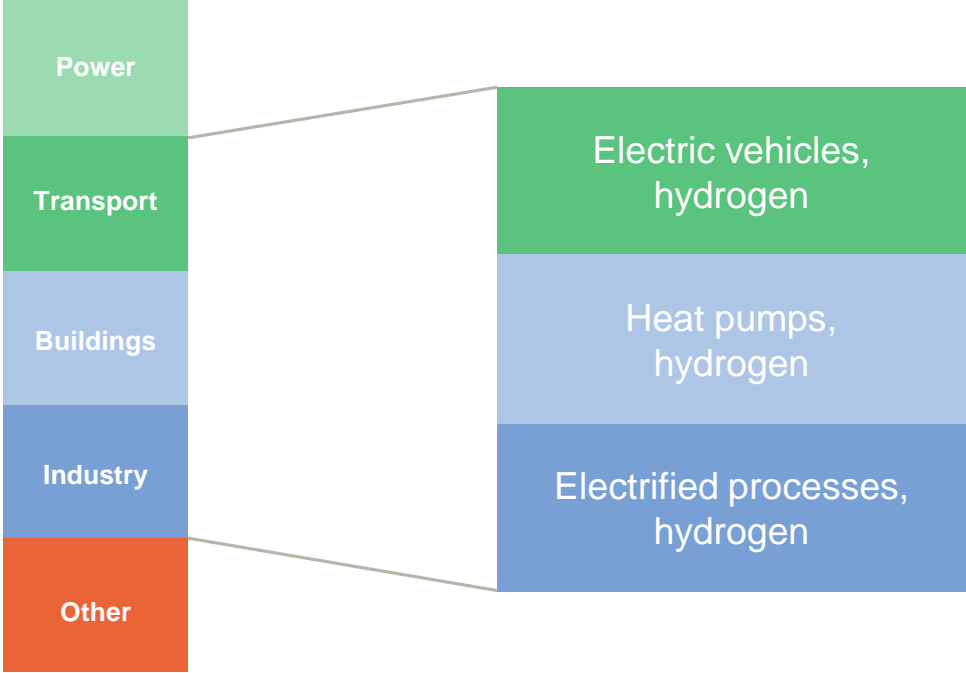
Source: ENTSO-E; Fortum Market Intelligence
Note! Top-down approximation using standard emissions factors, not bottom-up calculated

Decarbonisation of energy production, industries and transportation is needed – with clean gas / hydrogen in a key role



Means to decarbonise via electrification

Carbon neutrality could double electricity demand by 2050

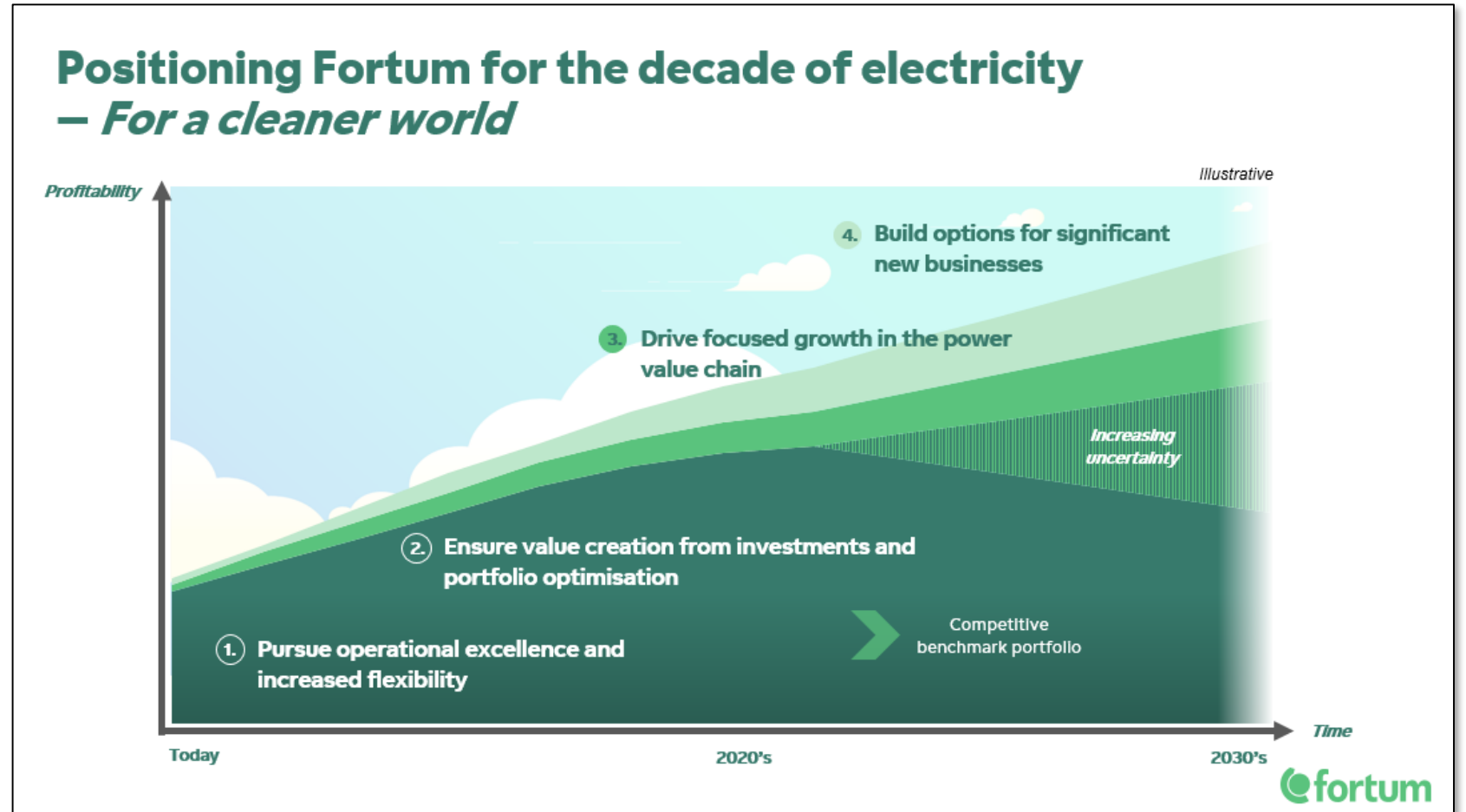


Source: Eurelectric study, May 2018, Scenario 3

Main strategic steps since 2013

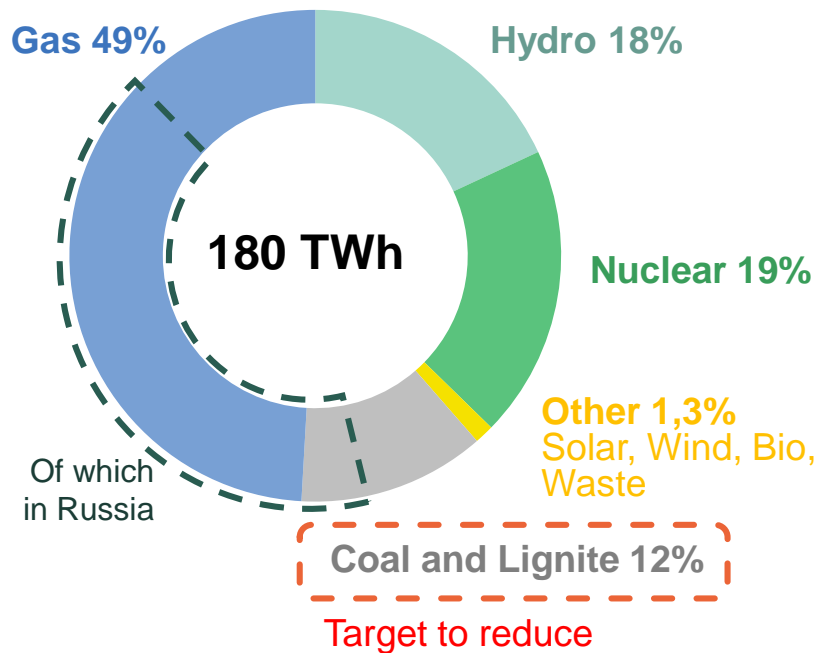
- Decision in 2013 to divest distribution network assets
- Proceeds of > 9 bn euro from divestments were targeted to re-invest in
 - Businesses we know
 - Geographically close
 - Existing cash flows
- Target was to create a solid base from which to develop the clean / renewable business portfolio further
- Investments made in
 - Uniper 2017-20
 - Recycling and waste solutions (Ekokem) 2016 onwards
 - Hafslund restructuring: Consumer Solutions and District heat in Oslo
 - Bio and W2E CHP
 - Wind and solar

End of 2018 strategy update defined 4 priorities:

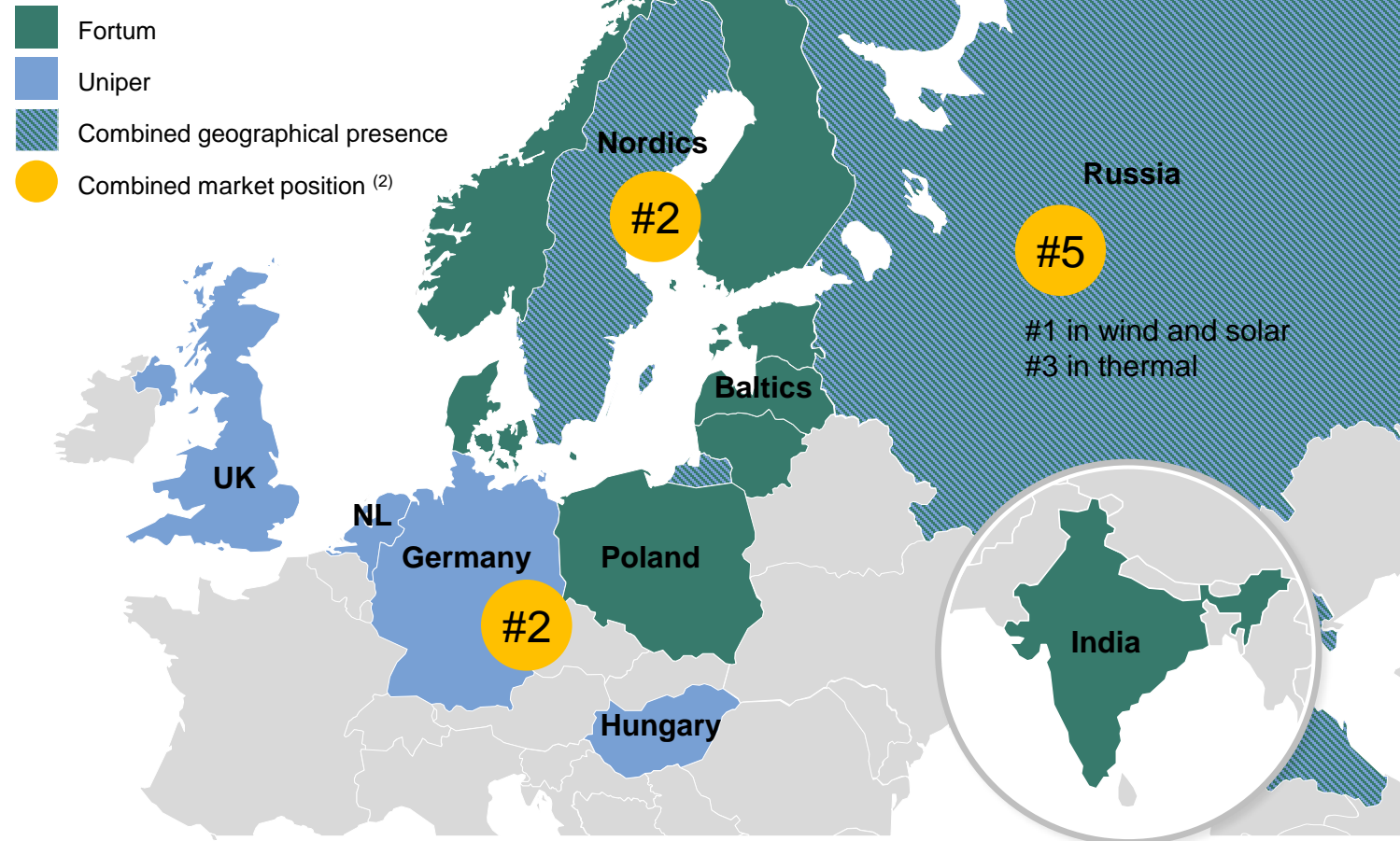


Fortum and Uniper together create a strong European and Russian power and heat generation player

Combined power generation (2019)⁽¹⁾



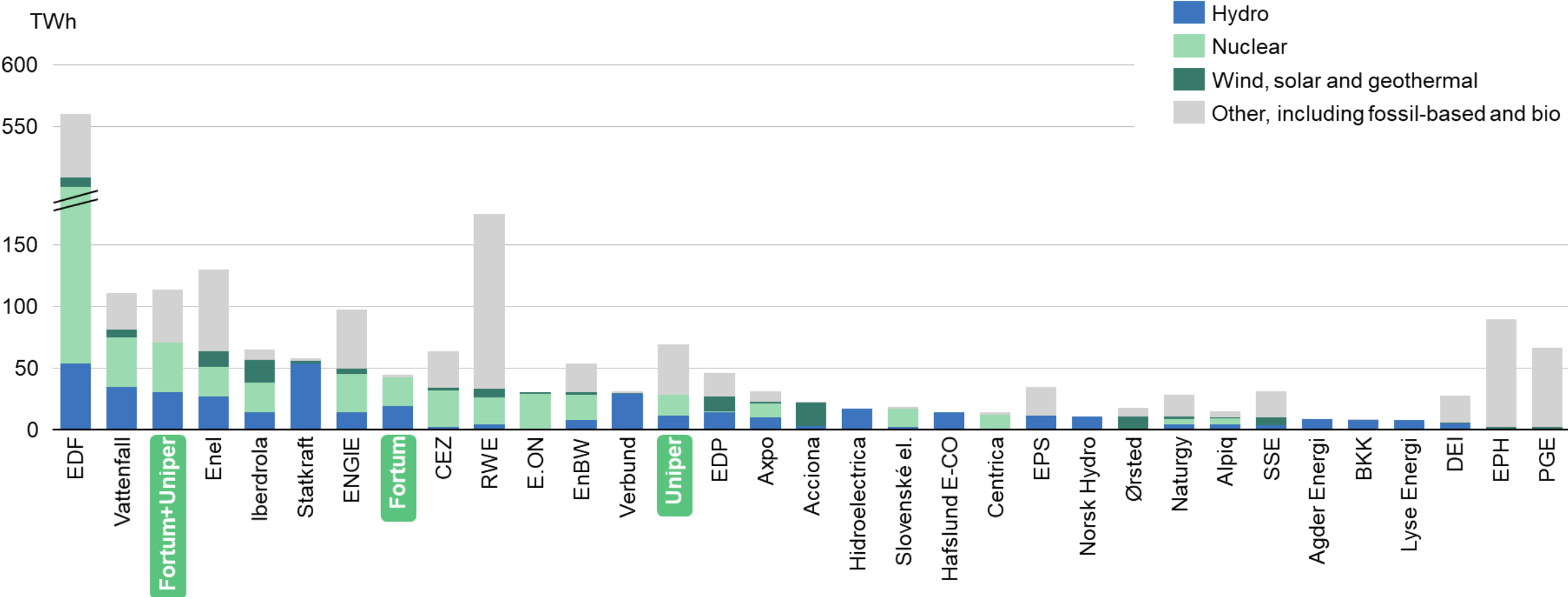
Combined power generation assets



(1) Based 2019 reported power generation, accounting view. Accounting view omits net ~5-6 TWh of Nuclear generation for Uniper from minority owned power plants, and Fortum reported generation is ~+1 TWh higher than pro rata. (2) Market positions for Central-Europe/Europe and Nordics are based on combined power generation (TWh); the market position in Russia is based all generation (TWh).

In Europe, Fortum Group is the 3rd largest CO₂-free generator and 4th largest generator overall

Power generation by type in Europe



Source: Company information, Fortum analyses, 2018 figures pro forma.* Excluding Russia and Ukraine. EPH incl. LEAG



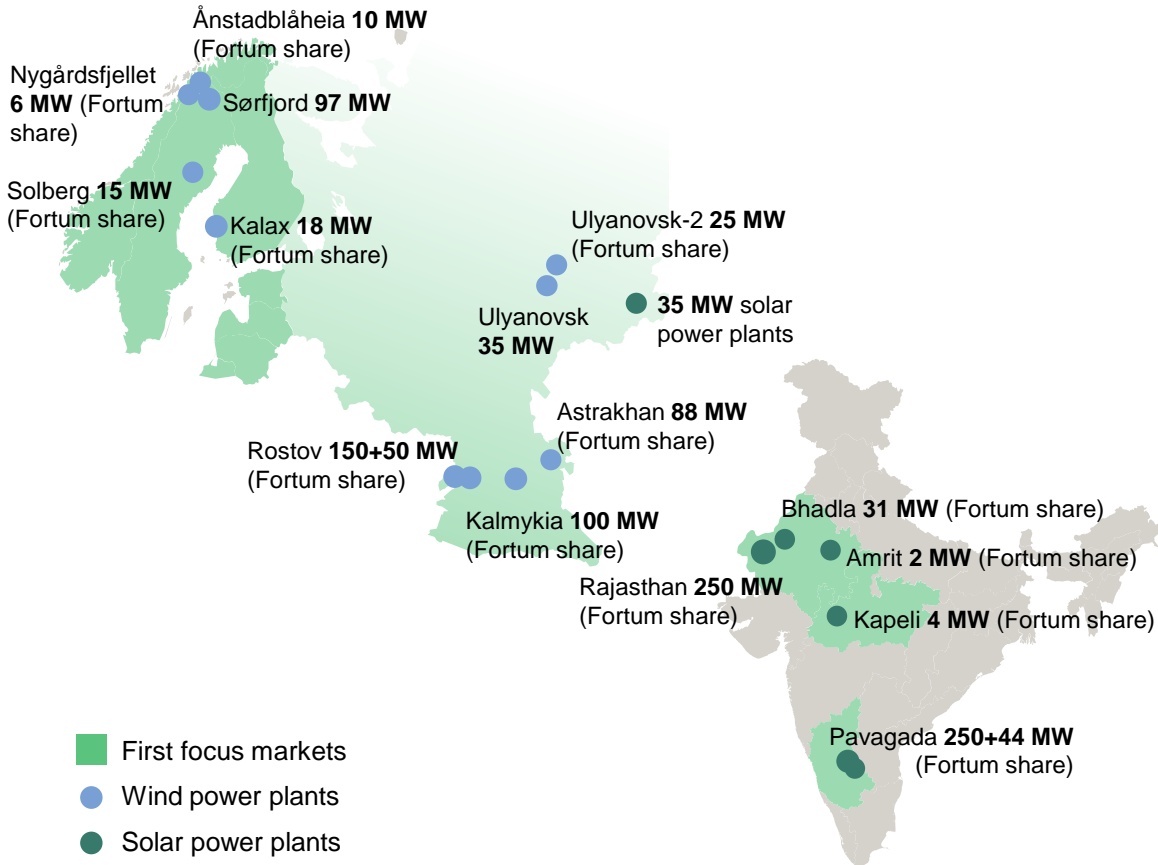
The Germany *energiewende* is not an easy task

– 40% of German electricity is produced by lignite, hard coal and nuclear



All figures for full year 2019.
Source; BDEW Bundesverband der
Energie und Wasserwirtschaft e.V.

Fortum is growing towards gigawatt scale target in solar and wind power generation



PORTFOLIO	STATUS	CAPACITY, MW	FORTUM SHARE, MW	SUPPLY STARTS/STARTED
FINLAND		90	18	
• Kalax	Under construction	90	18 (20%)	Q1 2021
NORWAY		179	113	
• Nygårdsfjellet	Operational	32	6 (20%)	2006 and 2011
• Ånstadblåheia	Operational	50	10 (20%)	2018
• Sørfjord	Under construction	97	97	Q4 2019-Q3 2020
SWEDEN		76	15	
• Solberg	Operational	76	15 (20%)	2018
RUSSIA		2,009	1,098	
• Bugulchansk	Operational	15	15	2016-2017
• Pleshanovsk	Operational	10	10	2017
• Grachevsk	Operational	10	10	2017
	Under development	110+6	110+6	2021-2022
• Ulyanovsk	Operational	35	35	2018
• Ulyanovsk 2	Operational	50	25 (50%)	1.1.2019
• Rostov	Operational/Under construction	300+100	150+50 (50%)	Q1 2020-Q4 2021
• Kalmykia	Under construction	200	100 (50%)	Q4 2020
• Astrakhan	Under construction	176	88 (50%)	Q4 2021
• Rusnano JV	Under development	997	499 (50%)	2021-2023
INDIA		685	581	
• Amrit	Operational	5	2 (44%)	2012
• Kapeli	Operational	10	4 (44%)	2014
• Bhadla	Operational	70	31 (44%)	2017
• Pavagada	Operational	100	44 (44%)	2017
• Pavagada 2	Operational	250	250	Q3 2019
• Rajasthan	Under construction	250	250	Q4 2020
TOTAL		3,039	1,825	
	Under development	1,113	615	
	Under construction	913	603	
	Operational	1,013	607	

*) NOTE: Table numbers not accounting; tells the size of renewables projects. All not consolidated to Fortum capacities. All figures in MW and rounded to nearest megawatt. Additionally, target to invest 200 – 400 million euros in India solar and create partnership for operating assets. Under construction includes investment decisions made.

Lack of ambition in grid planning

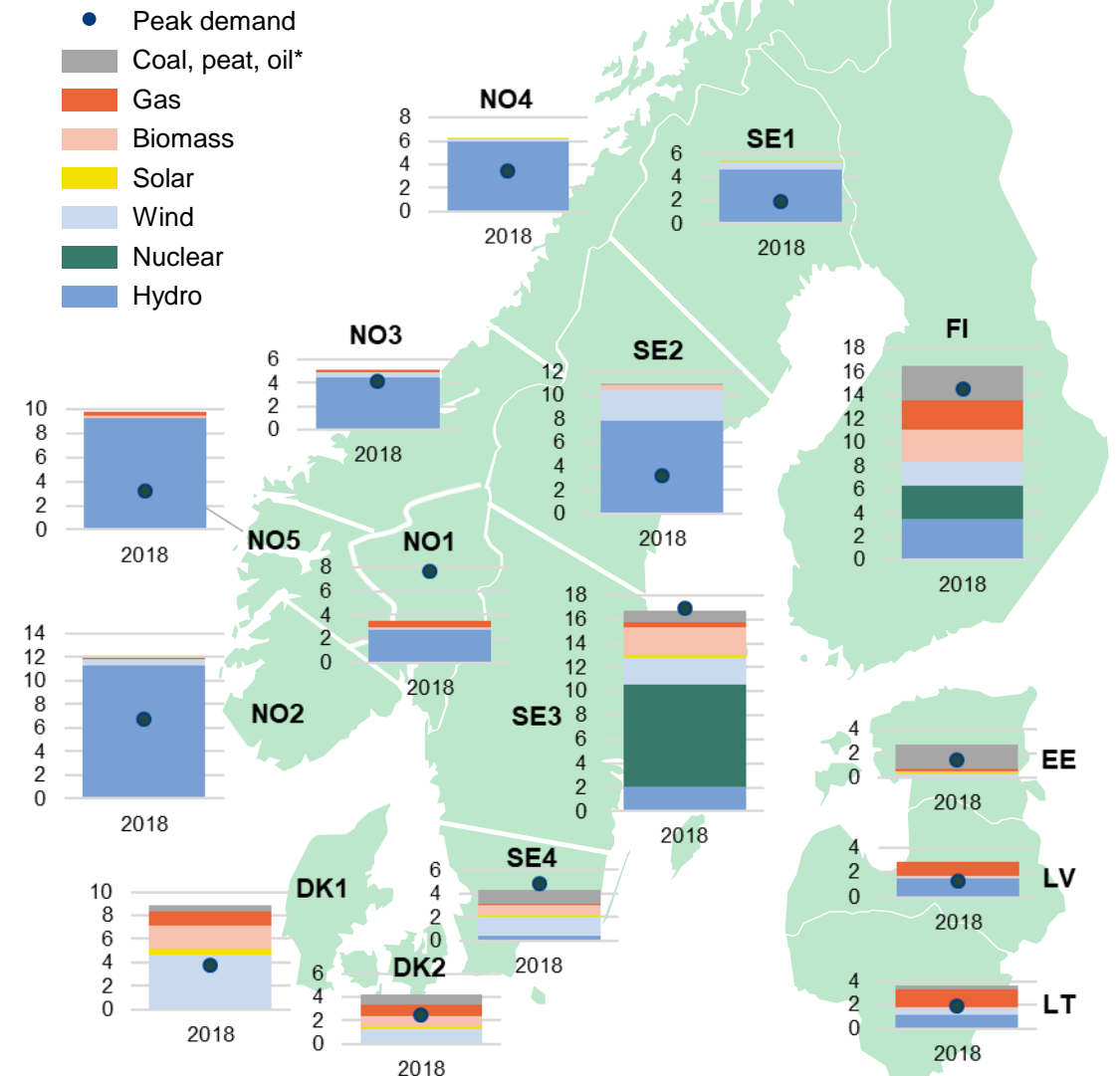
Slow Nordic transmission grid development delays RES expansion

- Despite Nordics having one of the strongest transmission grids, **grid congestions and structural supply-demand imbalances are growing inside the Nordic area**
- This raises an **urgent need to further strengthen the grid** – otherwise some price areas will be oversupplied and wind investment slow down
- Improving internal grid connections to be able to benefit from cheap and clean energy is ultimately a **Nordic competitiveness issue** – and an enabler to keep merchant investments in northern Nordics feasible
- **Higher ambition level to develop the regional market and supporting infrastructure**



Unbalanced Nordic Price Areas

Nordic & Baltic generation capacity and peak demand by bidding zone, GW in 2018



A close-up photograph of a grey plastic component, likely a part of a water filtration system. The component is curved and has the text "Fortum C-IRCO" embossed on its surface. The background is a soft, out-of-focus green.

Fortum
C-IRCO

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