

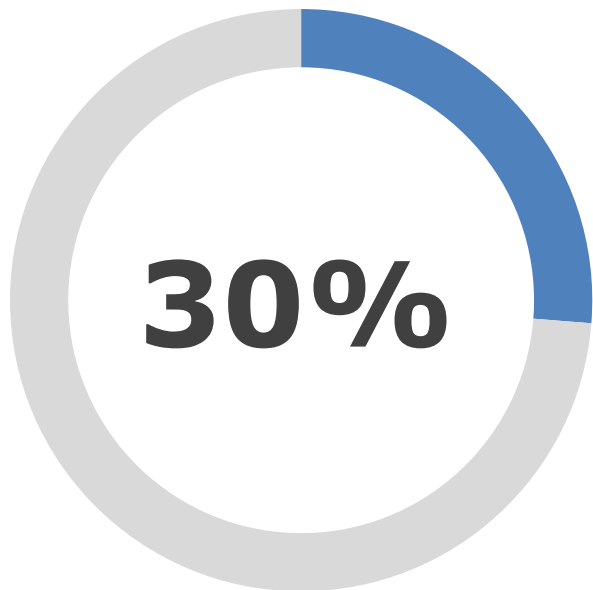


Renewable energy development and energy connectivity in EU

2019.10.24

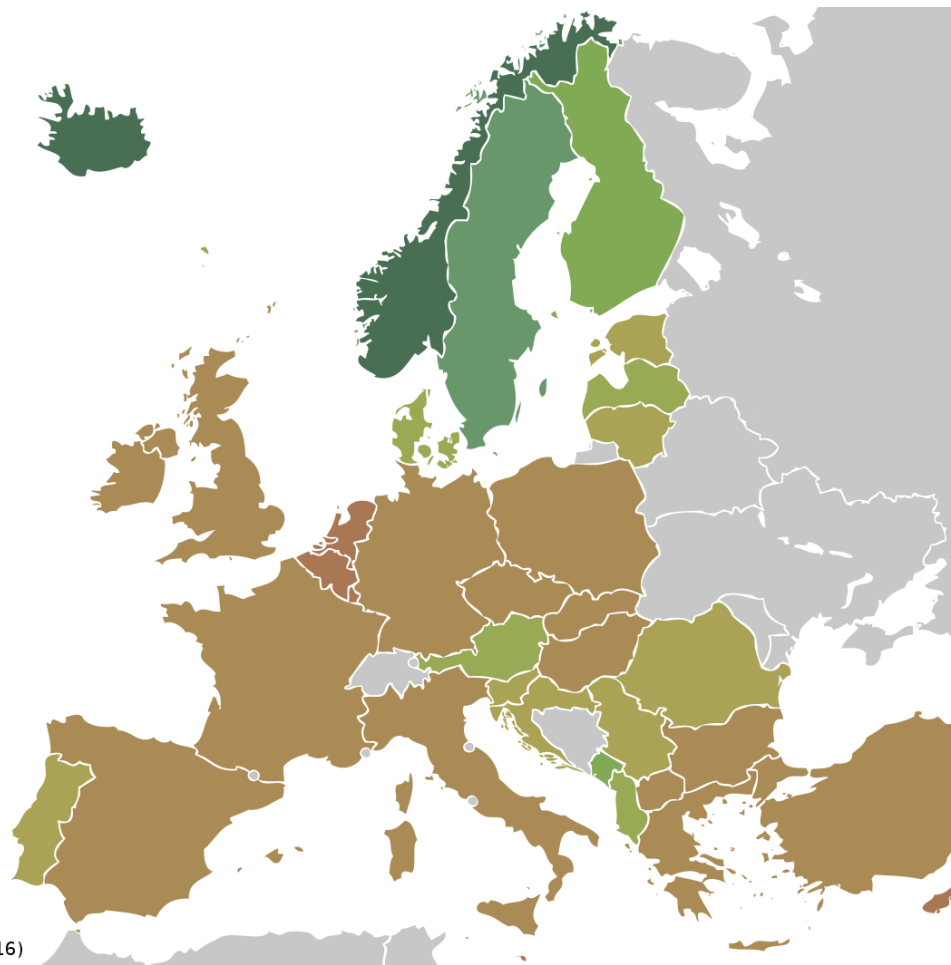
ESCAP Workshop on The Development of the Common Energy Markets and
Role of the Renewables in Energy Security

Electricity market milestone in EU – 30% renewables share reached in 2018



Renewables share in electricity balance

- <5%
- 5-10%
- 10-20%
- 20-30%
- 30-40%
- 40-50%
- 50-60%
- >60%

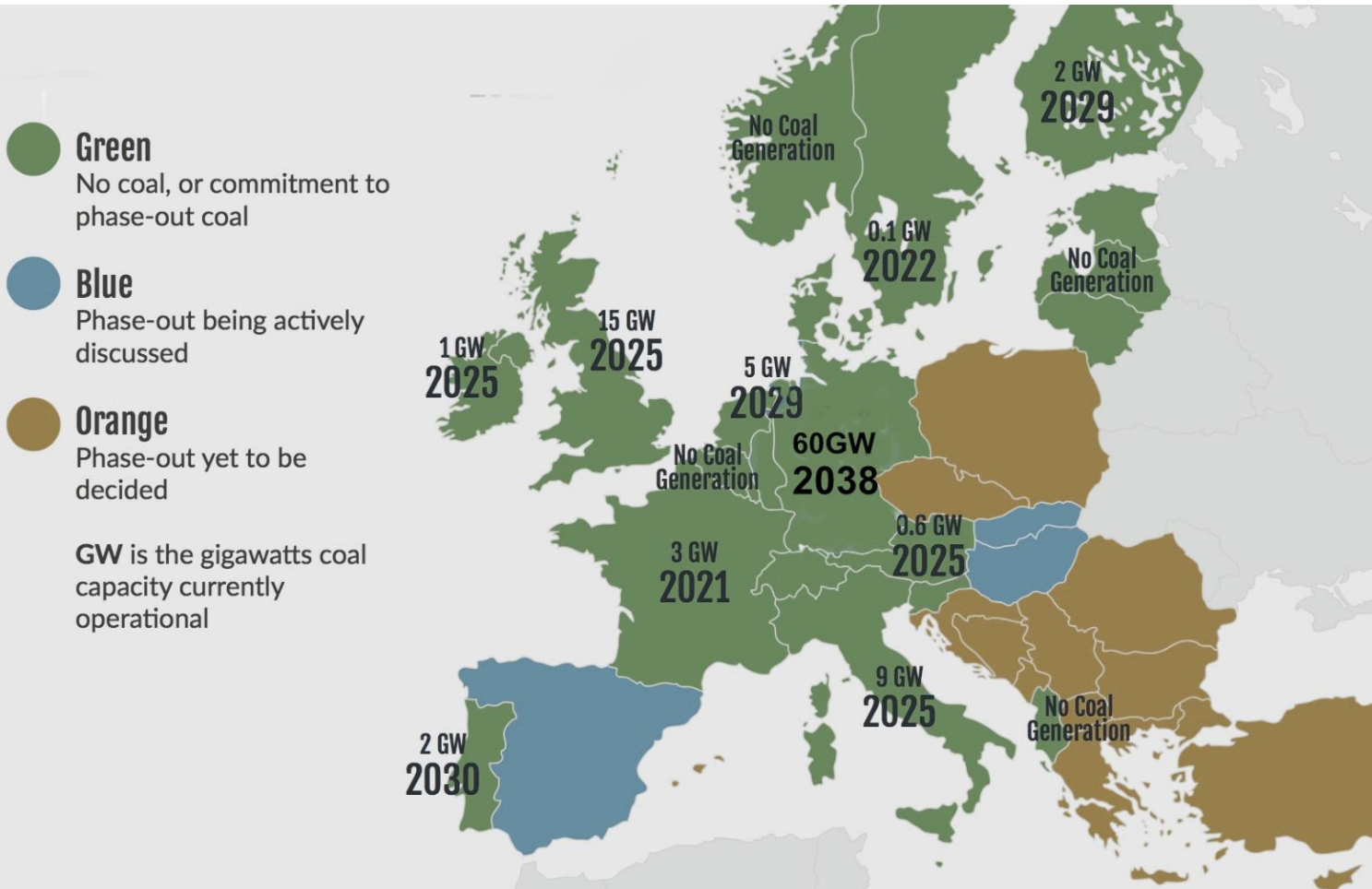


Eurostat, 2017
(Iceland, Norway: 2016)

European Union generated more electricity from wind, solar and biomass than from coal in 2017 – 669 TWh Coal and 781 TWh renewables

EU's phasing out of coal plants

Commitments by country



Europe is progressing with phasing out hard coal and lignite in power generation, but needs to move further faster, especially certain regions

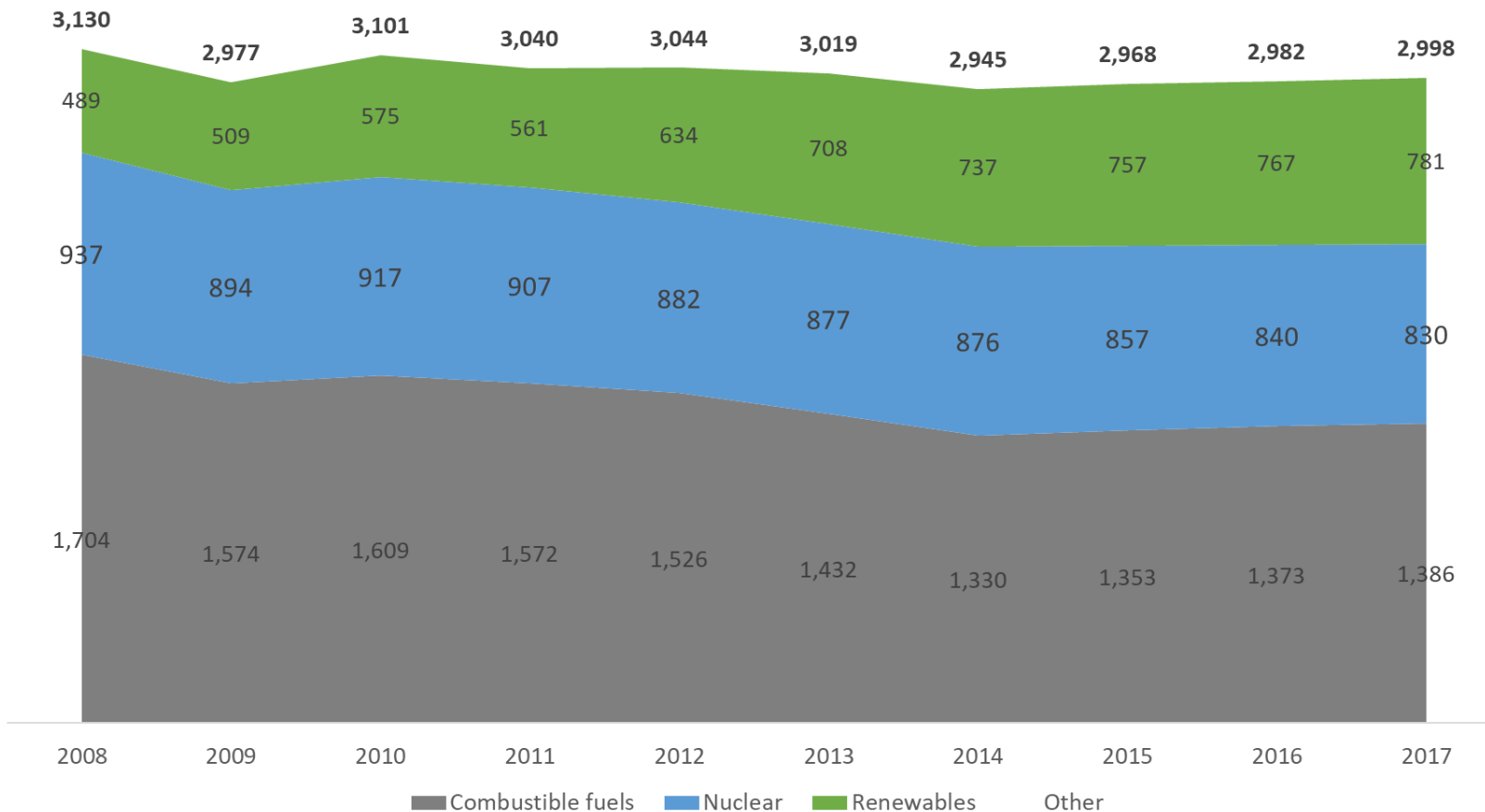
- Germany has now committed to coal phase-out. But full phase-out might be as late as 2038.
- Poland currently looks unlikely to make any commitment to complete phase out
- No commitments by Slovenia, Bulgaria, Slovakia, Czech Republic and Hungary.

Things that need to be improved

- Further strengthening the CO2 price impact
- Tightening regulations on pollutants
- Strengthening phase out commitments
- Further enabling renewables

EU Electricity generation

Electricity generation in TWh, by fuel type

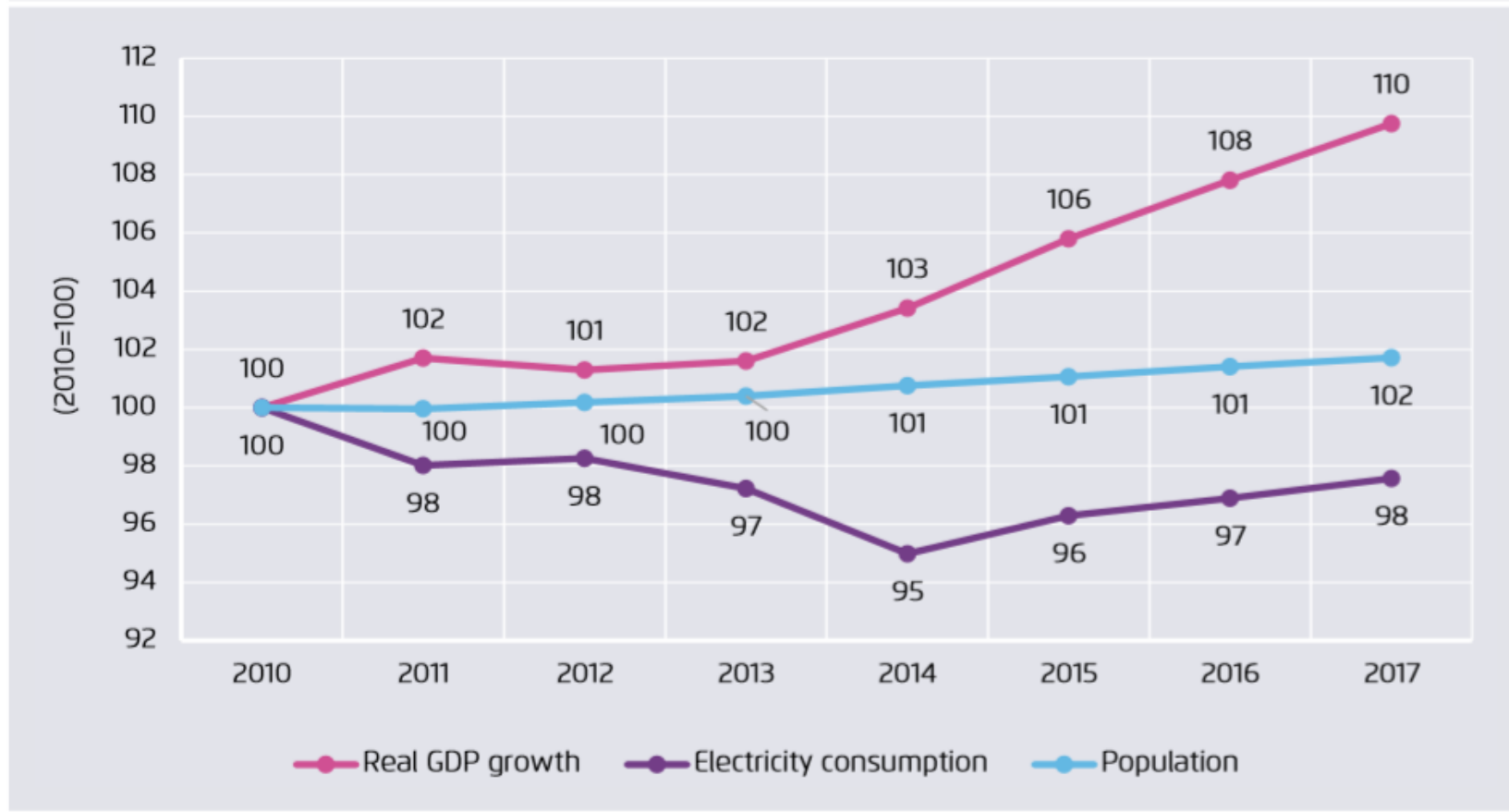


Electricity generation has decreased, but gradually reaches 2010 level:

- Renewables share growth was around 38% during past 10 years
- Combustible fuels decreased 20% during past 10 years, phasing out of coal makes its impact
- Nuclear energy availability continues to struggle due to safety reasons
- Gas fills in the gaps of the energy demand

EU Electricity consumption (indexed)

Real GDP vs Electricity consumption vs Population growth

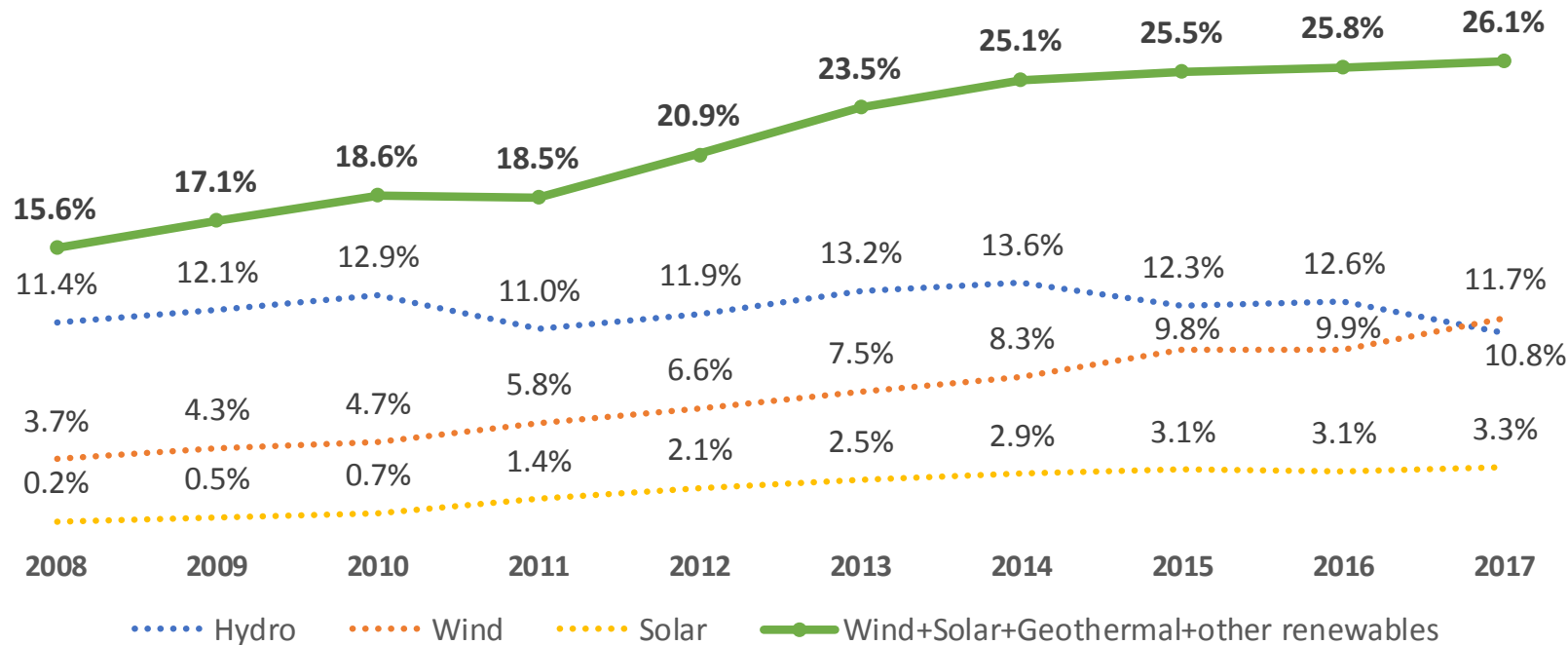


Electricity consumption in EU is rising for 5 main reasons:

- Progress in EE is insufficient with economy recovery
- Industrial production rose faster than GDP
- Population in EU is rising
- Additional power demand from new sectors (digitalization and data centers growth)
- Additional power demand from population (electric vehicles)

Renewables in EU

Renewable energy growth is in average 1,7% of gross electricity production, with forecasted trend till 2050

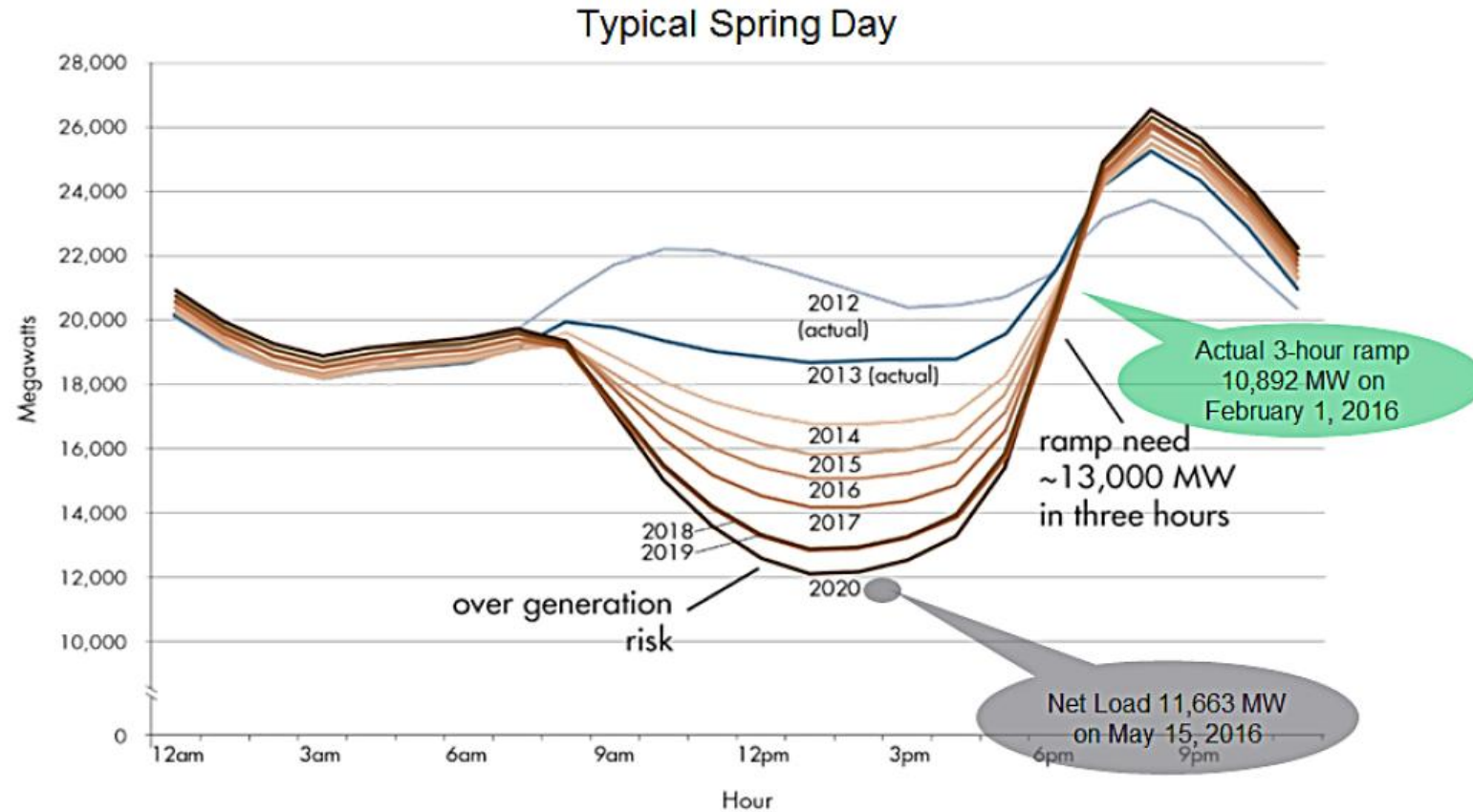


Overall renewables growth:

- Wind, solar and biomass energy grew by 38% in past 10 years, with average growth of 1,7% per annum
- Past 5 years massive growth of wind energy (72% growth during 2014 and 2017)
- Solar energy needs a kick
- The biomass boom is almost over and growth slows down, given concerns over biomass sourcing
- Hyrdo energy reducing due to unfavorable conditions for hydro

Challenge 1 - Energy demand spikes

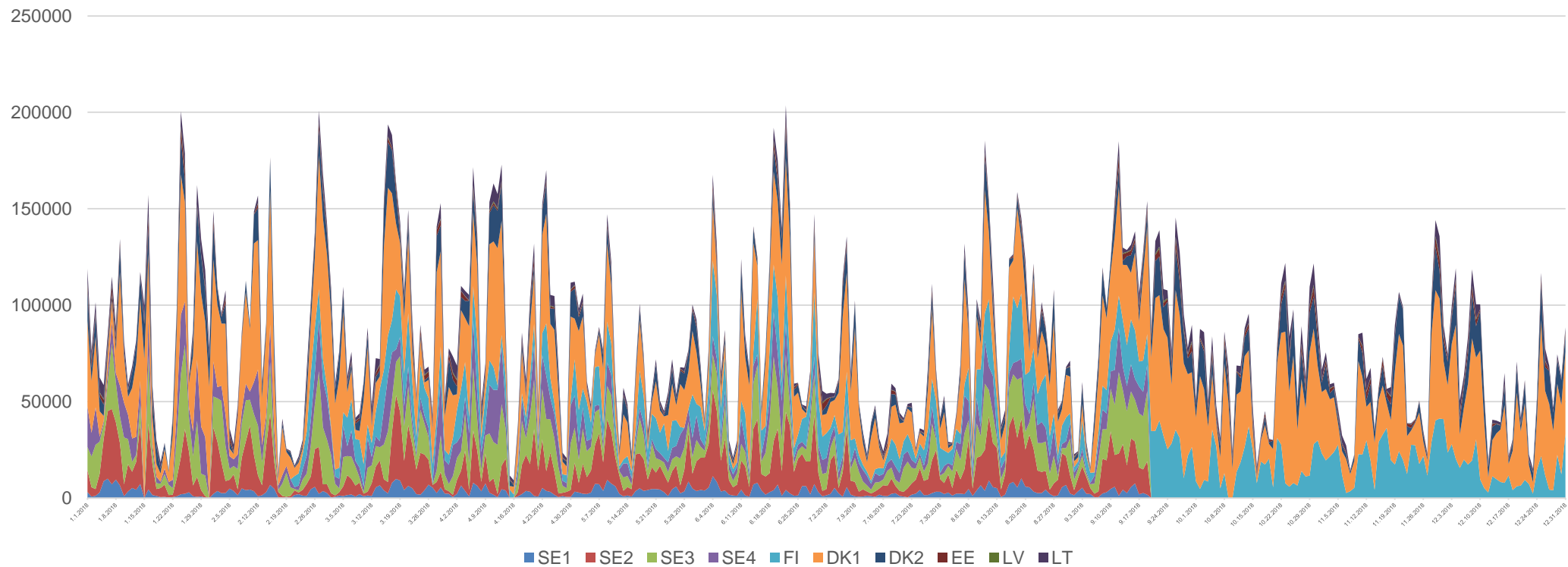
Solar electricity impact



Challenge 2 - Energy generation spikes / Wind

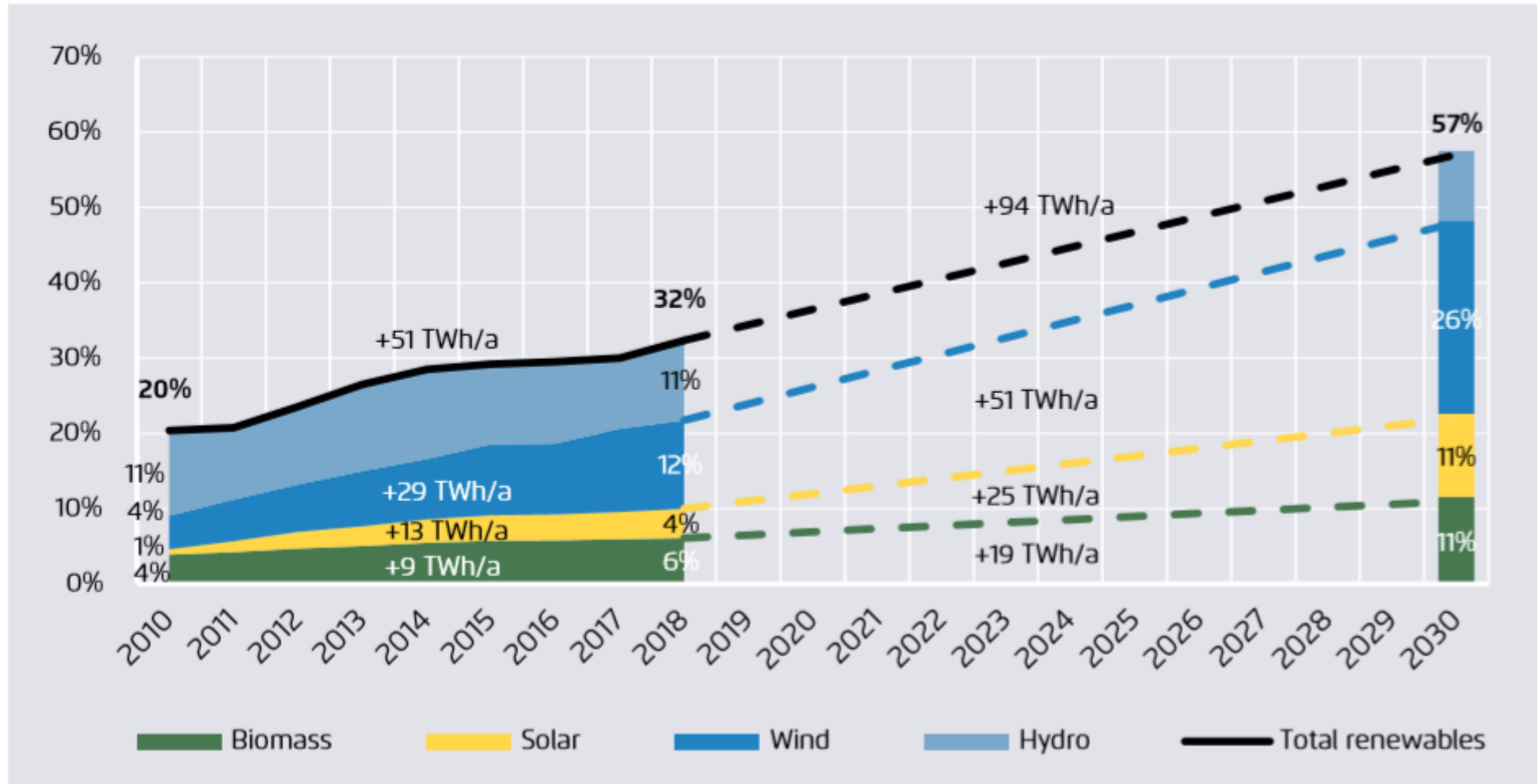
Nordpool

Nordpool - Wind power per country in MWh, Daily production 2018



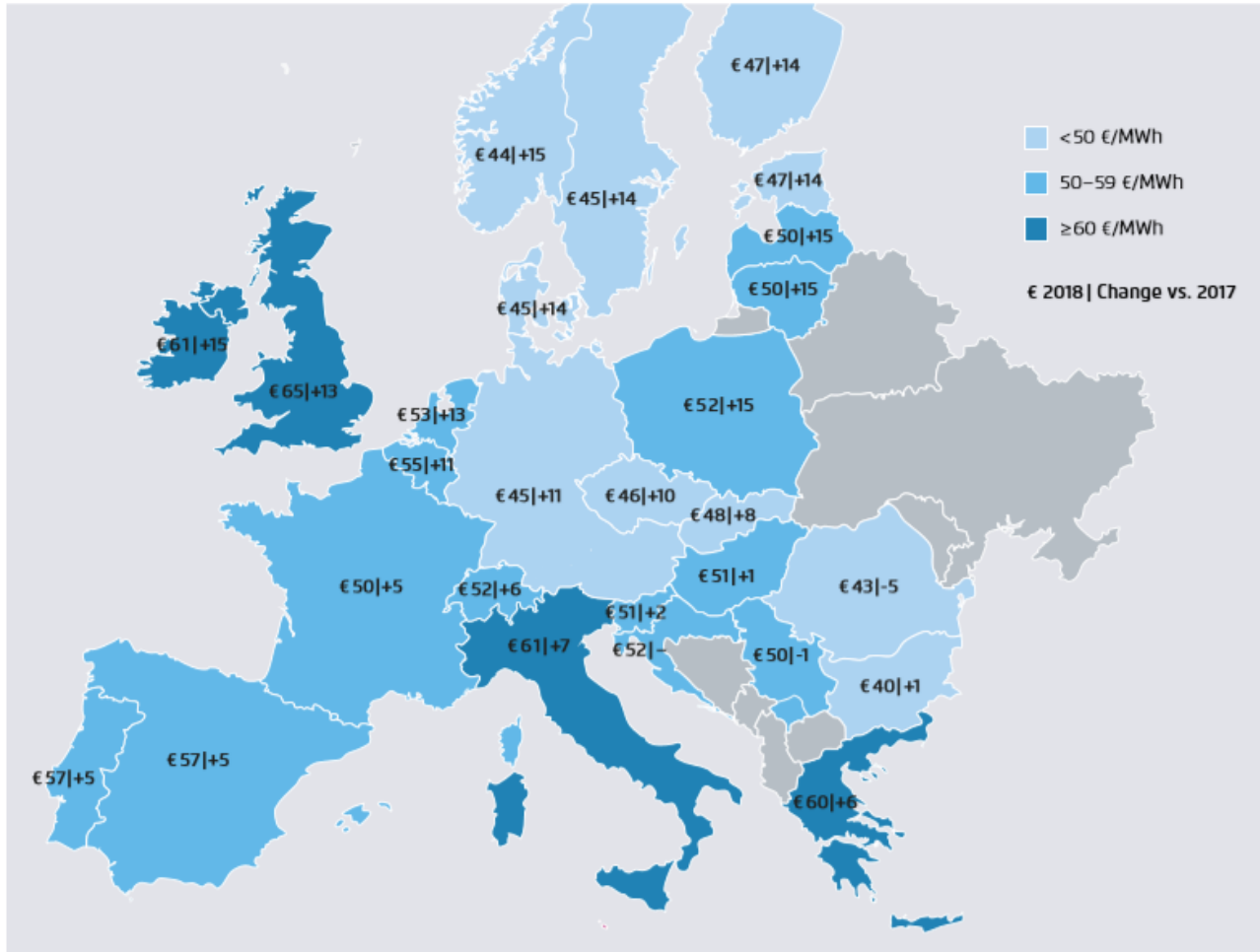
Renewables in EU Long term strategy

2030 projection of renewable electricity share in EU



Prices and Interconnection

Average day-ahead wholesale electricity prices in selected countries in 2017 and 2018



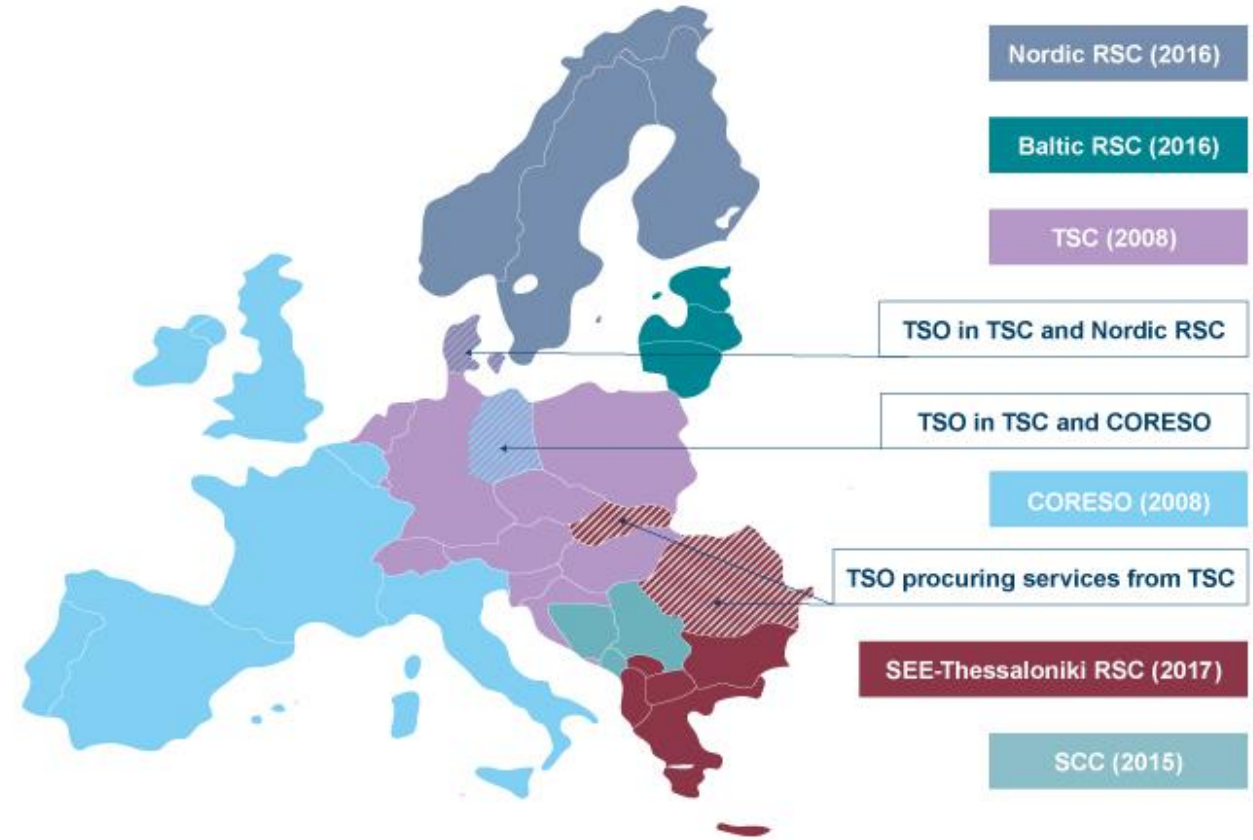
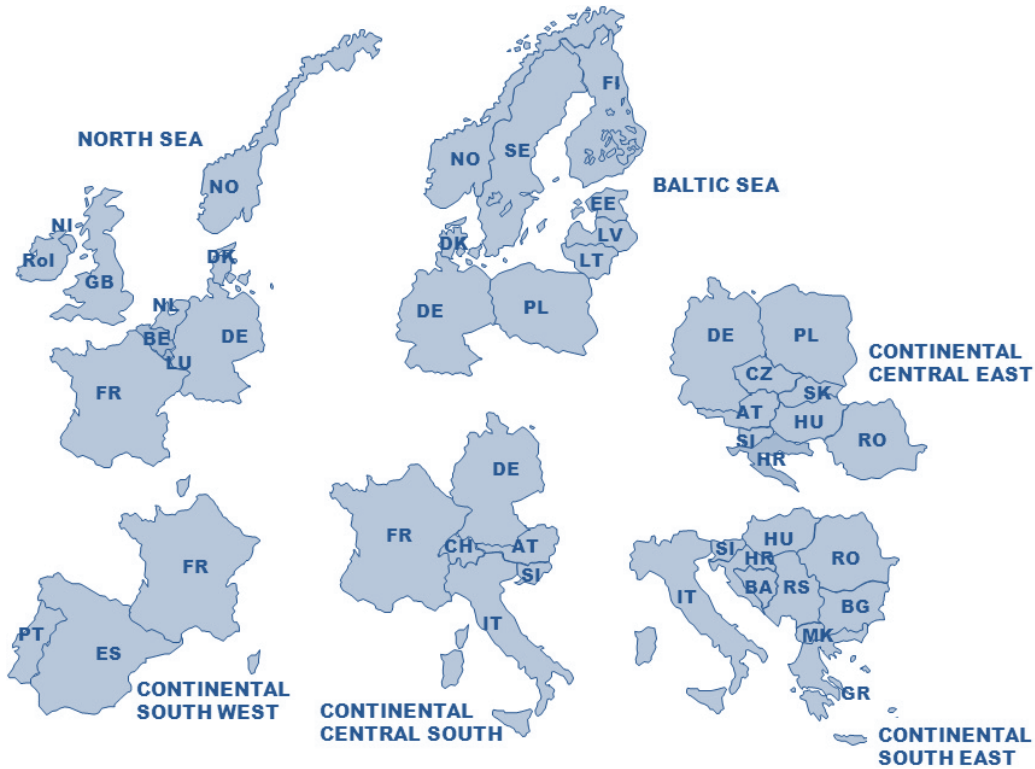
Overall electricity prices growth compared to 2017:

- Electricity prices rise on higher coal, gas and carbon prices
- Low hydro levels due to dry summers and unfavorable weather
- Cold temperatures resulted in extraordinarily high electricity consumption levels
- Prolonged cold weather
- Bad winds
- Large number of nuclear capacity outages

Interconnectivity

ENTSO-E Regions

Electricity RSCs



Nordic RSC (2016)

Baltic RSC (2016)

TSC (2008)

TSO in TSC and Nordic RSC

TSO in TSC and CORESO

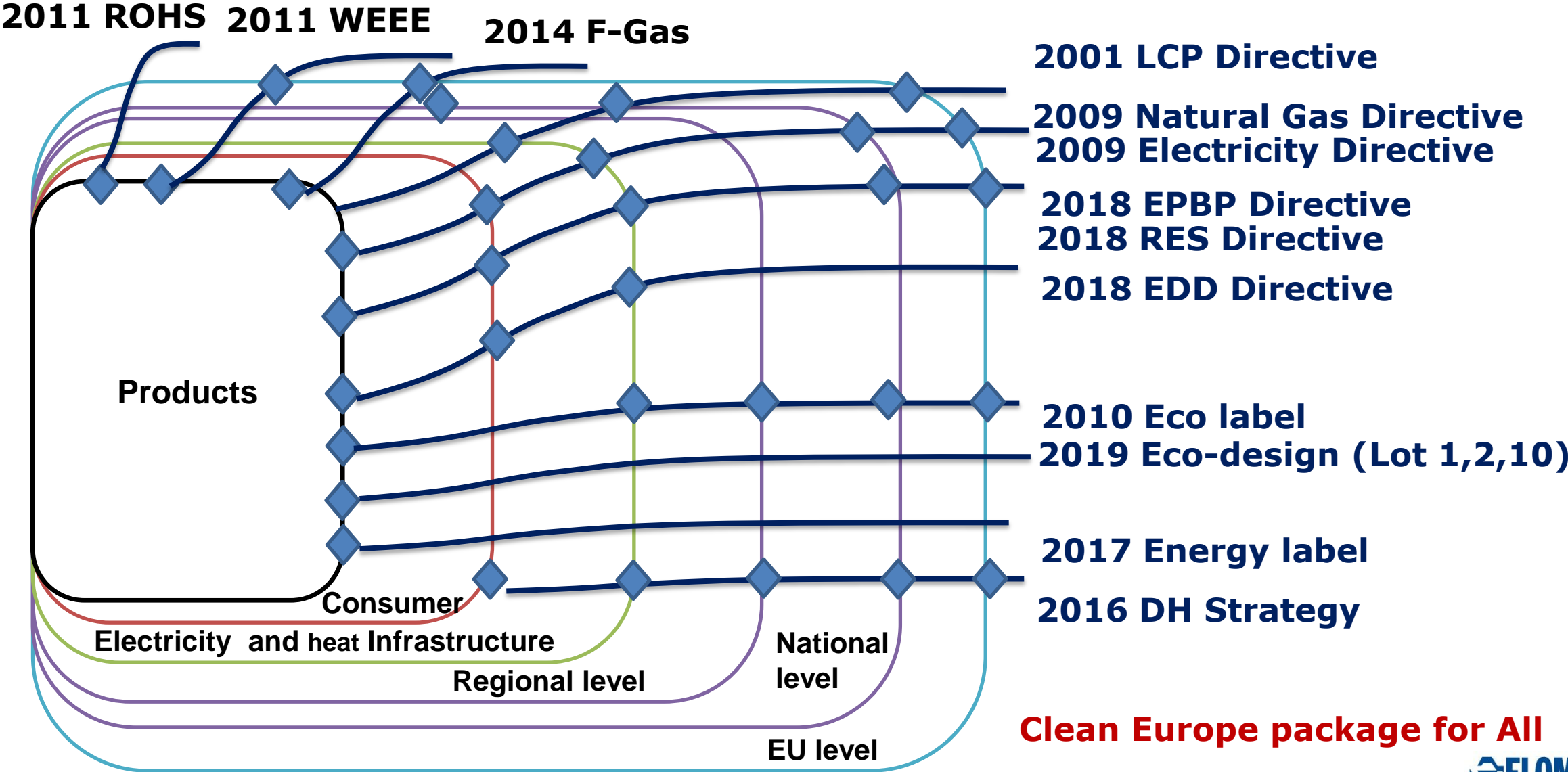
CORESO (2008)

TSO procuring services from TSC

SEE-Thessaloniki RSC (2017)

SCC (2015)

Policy framework



Clean Europe package for All

Policy Framework Directives

Name of Policy / strategy	Latest version year	Target area*	Level	Target
Clean Energy for all Europeans package	2016	EE, RES, GHG, Energy Security, R&D	EU member states	Improve energy interconnections between Member States to different actors in the energy field: environmental, economic, security of supply, consumer, international, and for longer time scale.
Renewable Energy RES Directive	2018	RES	EU member states	The new directive establishes a new binding renewable energy target for the EU for 2030 of at least 32%, and binding targets to cut emissions by at least 40%.
Energy performance of the buildings EPBD Directive	2018	EE, RES	Buildings	Increase of the proportion of nearly Zero-Energy Buildings (nZEBs), Starting 2021 all buildings must be nZEBs. Renovation target of existing buildings.
Energy Efficiency Directive (EED)	2018	EE	EU member states	Improving EE at member states, with target of primary energy demand reduction. Collective reduction of 20% till 2020.
Energy Labelling Directive	2017	EE	Products / systems	Targets to reduce energy demand of the buildings.
Eco-design for energy related products - framework directive	2019	EE	Products / systems	Regulations on minimum Eco-design requirements for products. Regulations set minimum requirements required efficiency, and methods to calculate the efficiency.
Eco-Labelling Directive	2019	EE	Products / systems	Targets to reduce energy demand of the each product group, with minimum requirements that must be fulfilled.
F-Gas regulation	2014	GHG	EU member states	Regulations on Fluorinated Gases to reduce the amount of F-Gas use by 79% by 2030.
Green Public Procurement	2014	EE, RES, GHG	Products / systems	Helps public stakeholders to make purchasing decision for products with a reduced lifecycle environmental impact
WEEE	2012	Waste	Products / systems	Promote re-use, recycling and other forms of recovery of waste electrical and electronic equipment.
Restrictions of Hazardous Directive (ROHS)	2013	Waste	Products / systems	Restriction of the use of certain hazardous substances in electrical and electronic equipment.
LCP Directive	2001	GHG, Emmisions	Infrastructure	Restrictions on emissions on Large Combustion Plants



Thank You

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