European Commission

PANEL II: Emerging Issues

Part I: International Perspectives

Market integration of renewables in the EU

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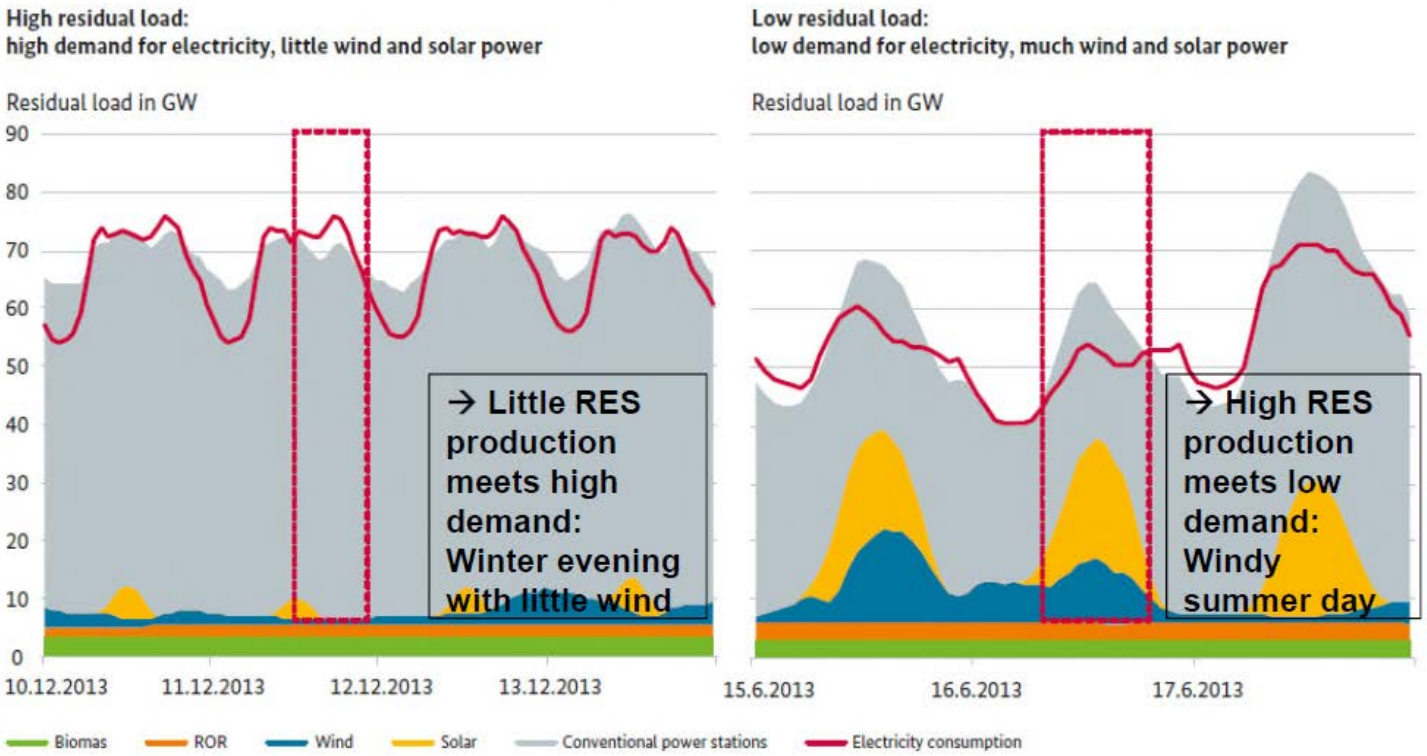
Energy

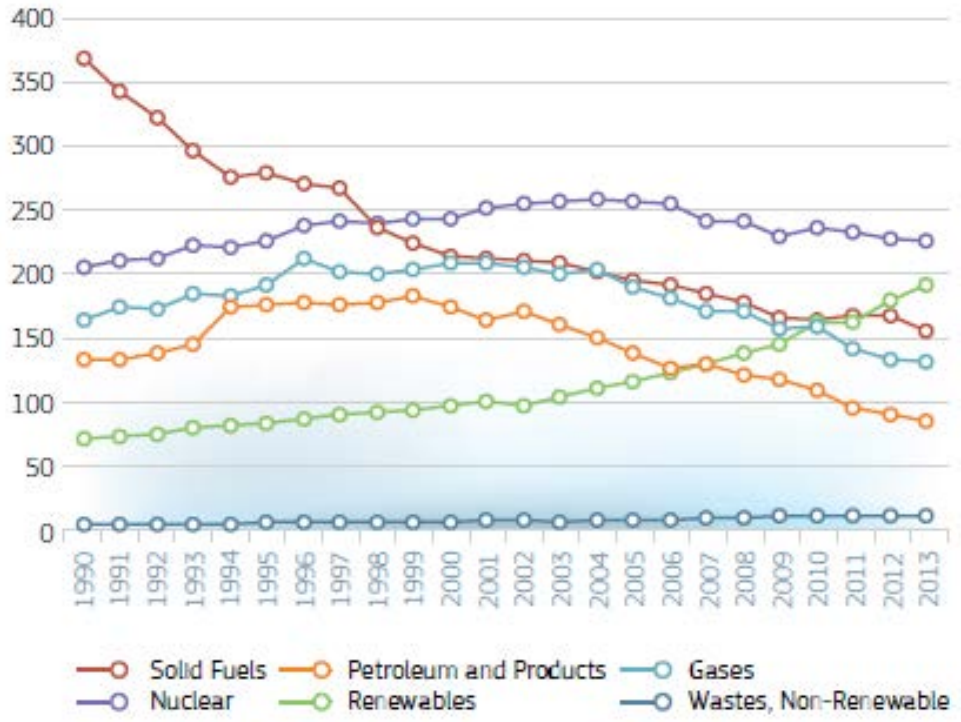
Integrating variable renewables requires new thinking

Figure 2: Examples of situations with high and low residual load



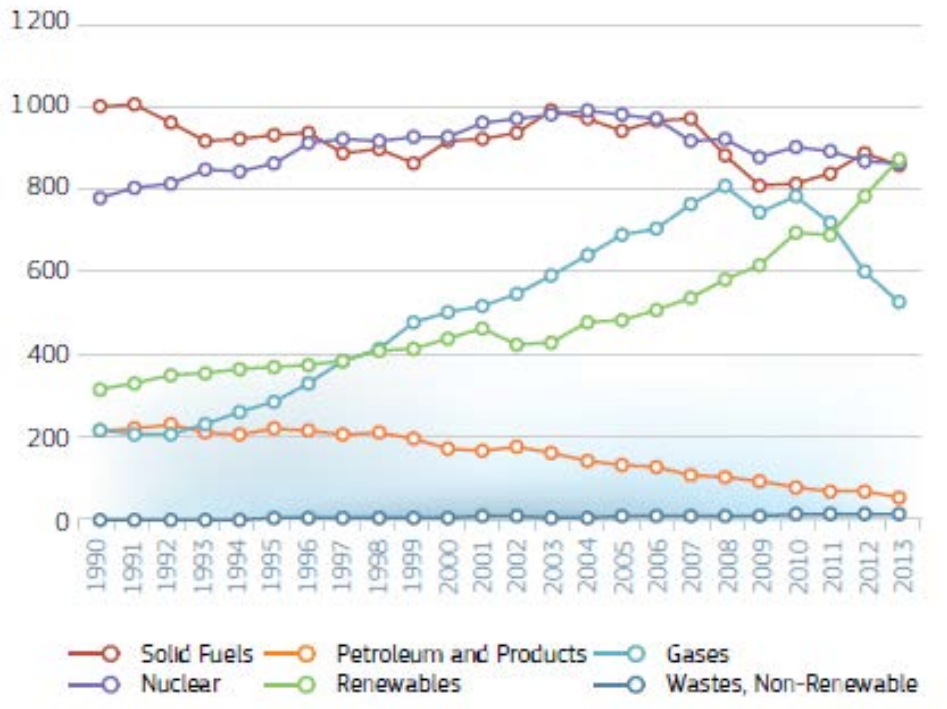
Source: Connect Energy Economics

Increasing RES…



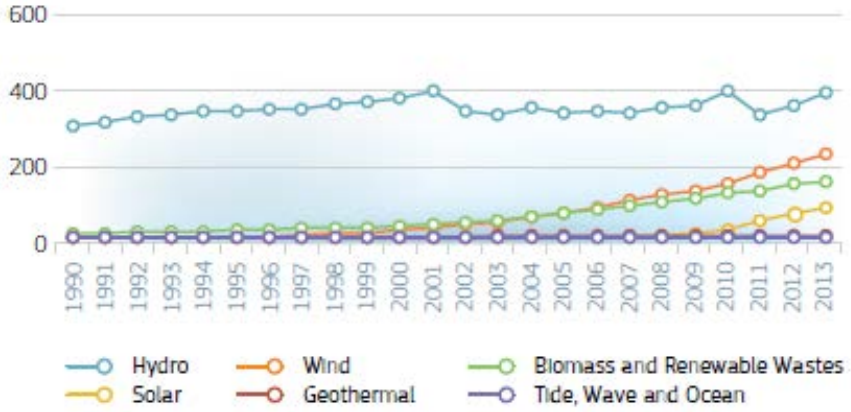
Energy production *by fuel 1990-2013 (EU 28, Mtoe; Eurostat 2015)*

…notably in electricity…



*Gross **electricity generation** by fuel 1990-2013 (EU 28, TWh; Eurostat 2015)*

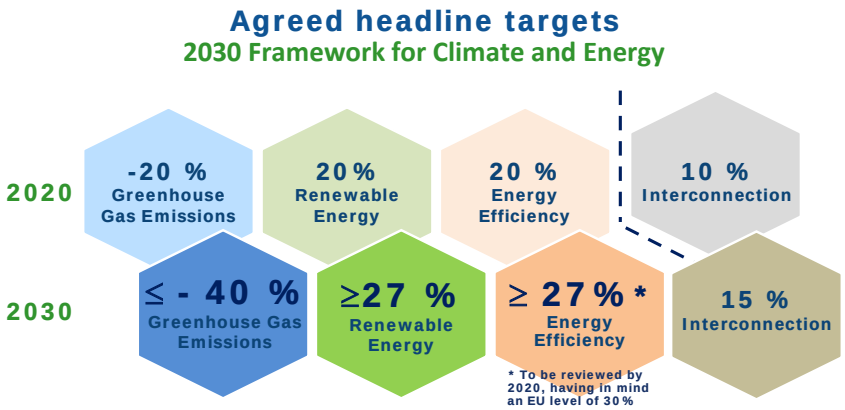
…with a focus on wind (and solar)



*Gross **electricity generation** by fuel – RES only*
1990 -2013 (EU 28, TWh; Eurostat 2015)

***Cumulative solar and wind capacity** – share of total*
1990 -2013 (EU 28, %, Eurostat 2015)

The new market design needs to be the foundation of the 2030 framework



For 2030 we will move from today's 15% (25% of its electricity requirements coming from RES) to at least 27% renewables share (around 50% of RES produced electricity)

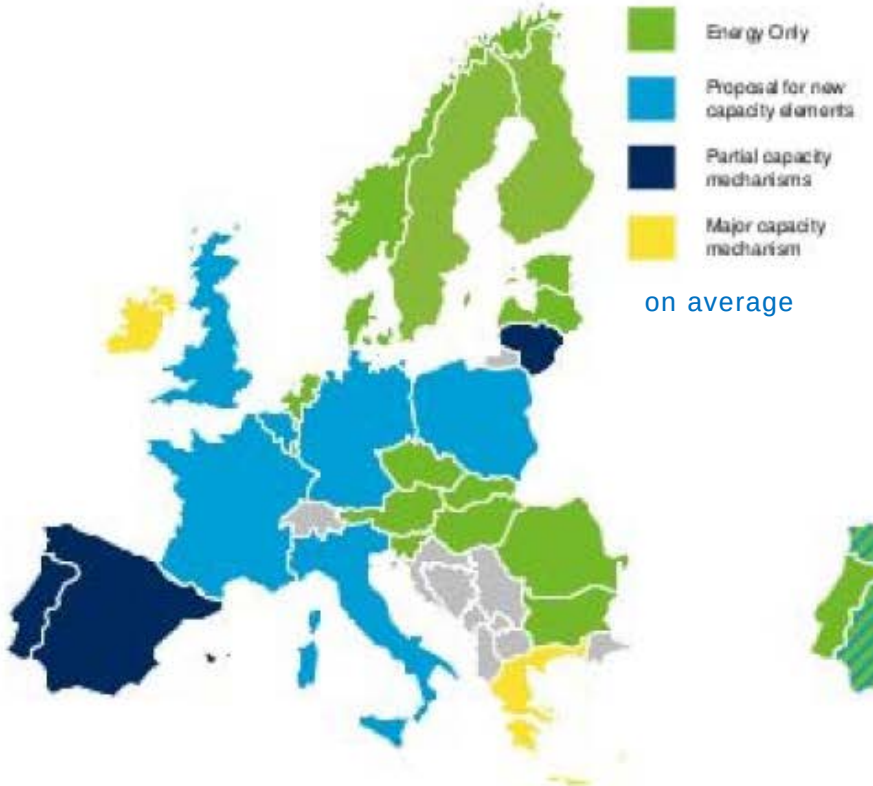
The new market design:

1) Need to make this happen at least cost by removing the remaining obstacles for renewable energy to better integrate into the internal market.

2) Set the conditions that will allow RES investments to be eventually be driven by the market.

The EU energy system TODAY

Capacity Market proposals

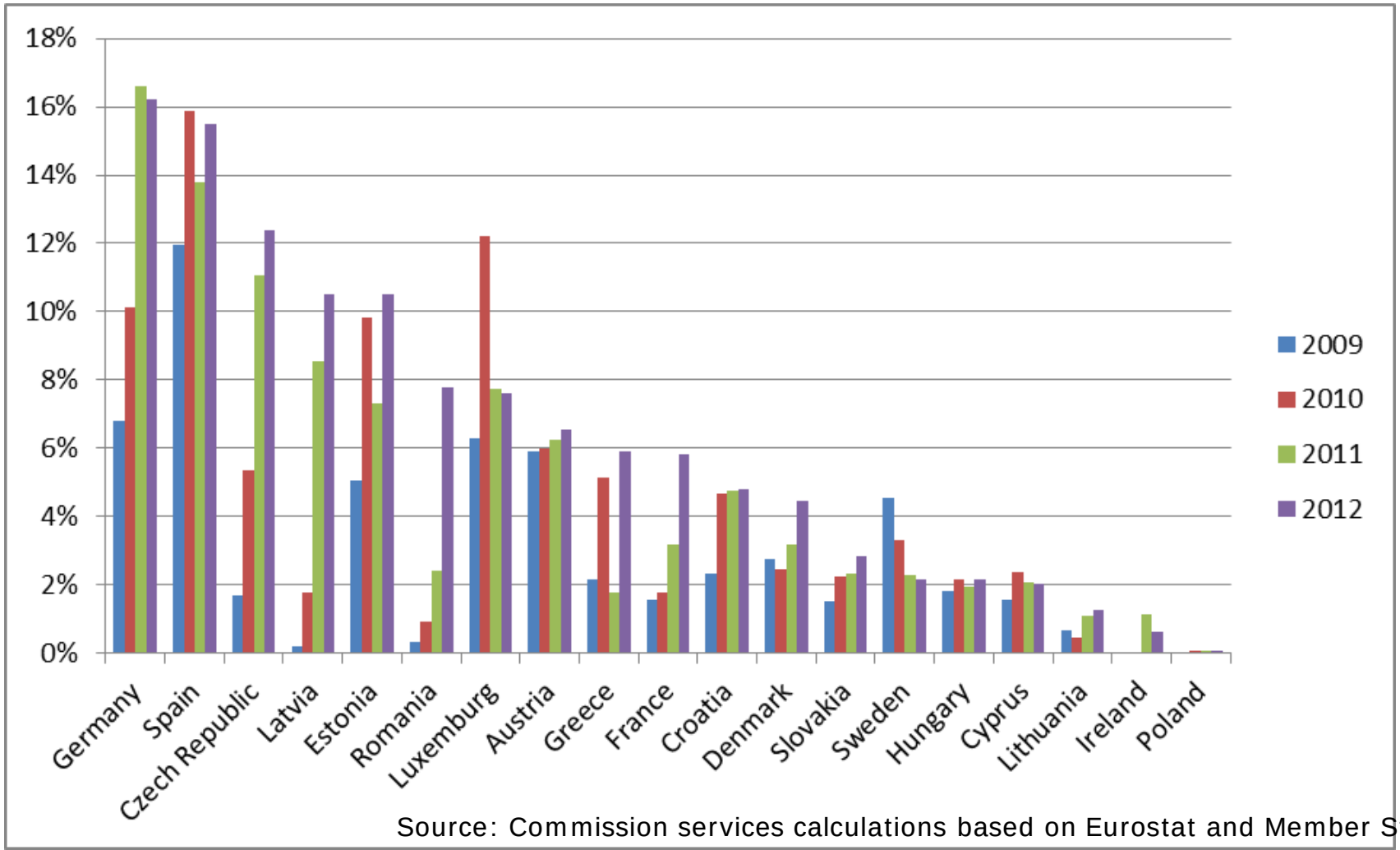


on average

RES-support schemes

Source: Fortum Industrial Intelligence, Fraunhoffer ISI , Ecofys

Renewables costs as a share of electricity price



Source: Commission services calculations based on Eurostat and Member State data

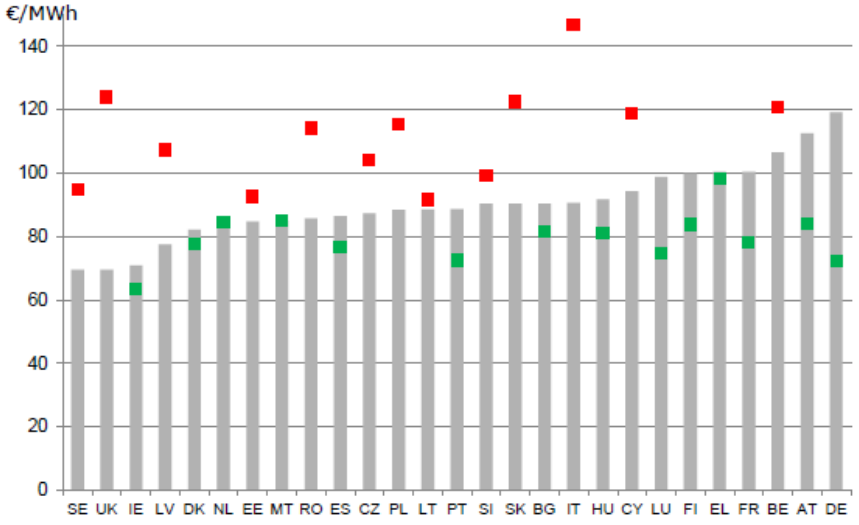
Cost-effective use of renewable sources

Production costs versus subsidies for renewables

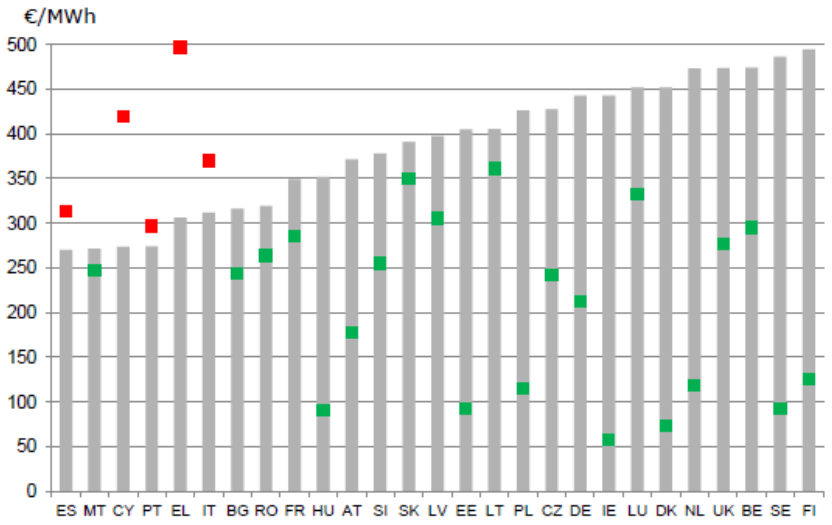
(averages, in €/MWh, latest year available)

Production costs | Subsidies over production costs | Subsidies below production costs

Wind energy on-shore

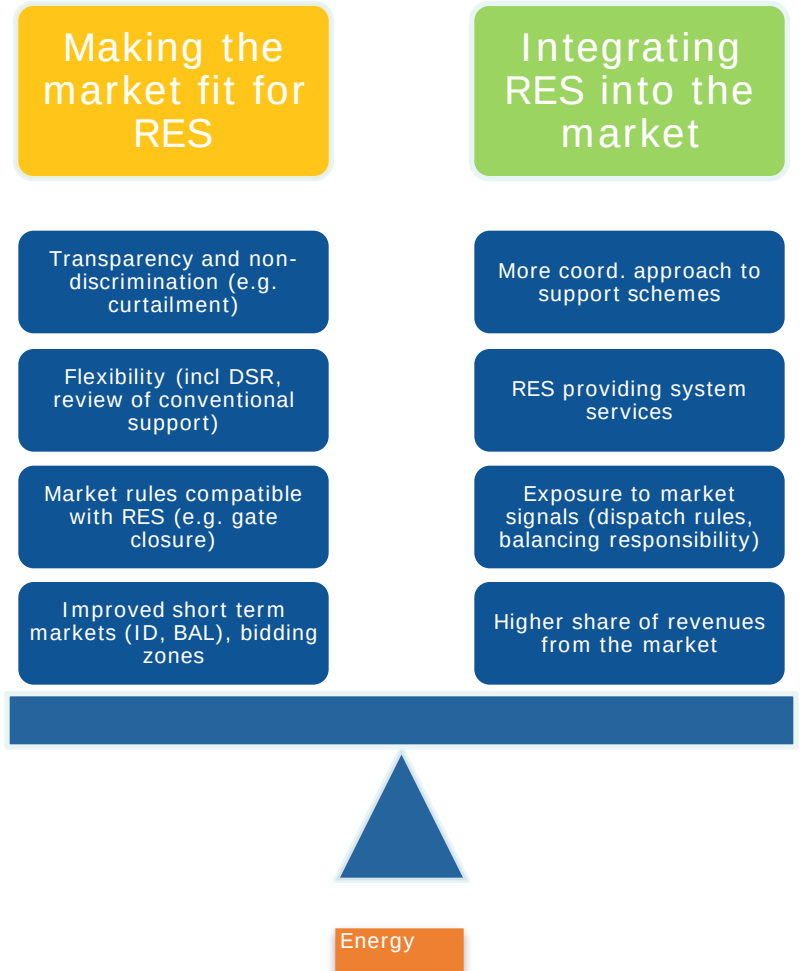


Solar energy (photovoltaics)



Source: Fraunhofer

A market for renewables and renewables in the market



System operation with high RES

Better integrating renewables in markets

- *Price signals to direct production and investment decisions*
- *Market based and harmonised support schemes*

Better adapting the system to renewables

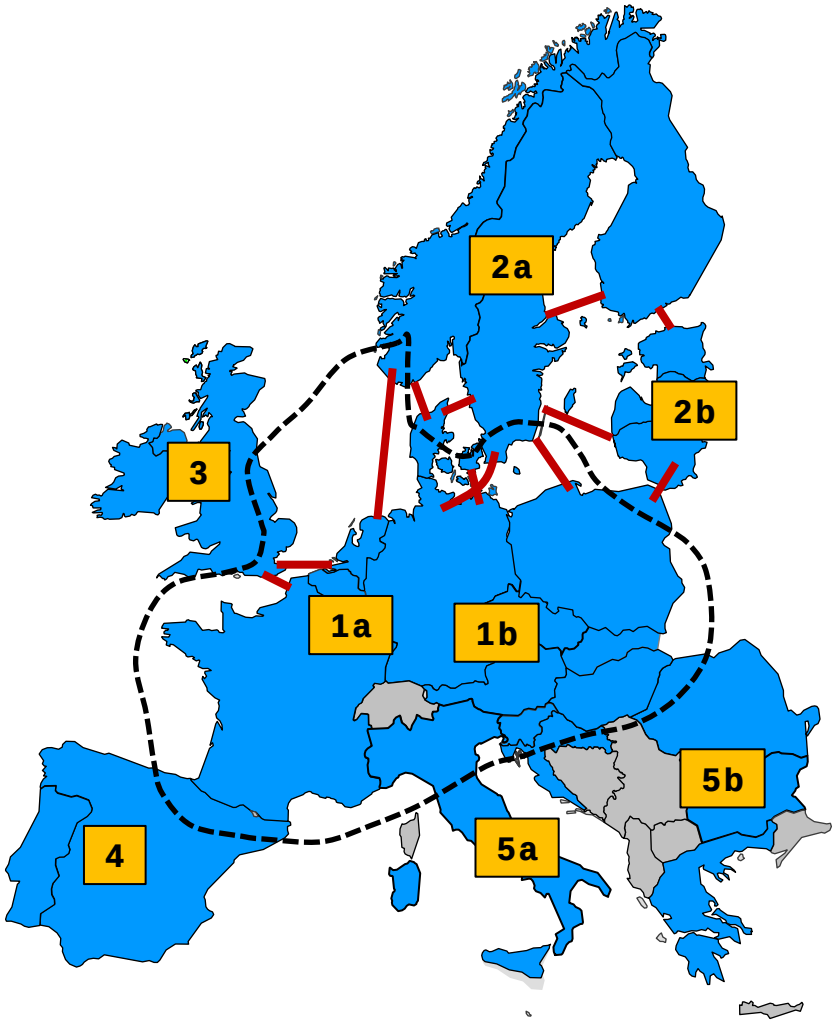
- *Efficient use of infrastructures*
- *Cross-border market integration*
- *Closer to real-time trading*
- *Liquid balancing markets*
- *Flexibility incentives*

Market integration of renewables

- Generally subject to normal market rules
  - Still a need for priority dispatch?
  - What conditions for full balancing responsibility?
- How to align subsidies with market functioning?
  - regional schemes
  - no "buffer" from market signals
- Objective: competitive markets

A system ready for renewables

- *Better use of existing infrastructure*
  - *flow-based market coupling*
  - *allocation of capacitites across timeframes*
- *Closer integration of system operation*
  - *two-step approach: SO Guidelines and MD initiative*
  - *Establishment of regional security cooperation centres*
  - *coordinated congestion management and capacity allocation*
- *Opening of system services (e.g. short-term reserve procurement)*
- *Increased integration of balancing markets*
- *Facilitating demand response*



Regional TSO coordinators

= Border between regional coordinators

1 = Regional Centre (RC)

2a = Sub Centre of a Regional Centre

Functions	
RCC	Regional capacity calculator
RSC	Regional security coordinator
RAC	Regional adequacy coordinator

+ RBC: Regional balancing coordinator (responsible for common dimensioning, procurement of automatic and manual reserves, and development of secondary markets)

Other relevant topics in MD initiative

Ensure adequacy of systems

- *Common generation adequacy assessments*
- *Setting adequacy standards*
- *Coordination framework for CRMs*

Governance (ACER/ENTSO-E/Role of DSOs,…)

Retail markets (Transparency, smart meters & DSR,…)

Network tariffs (DSR, self consumption,…)

European Commission

Thank you for your attention