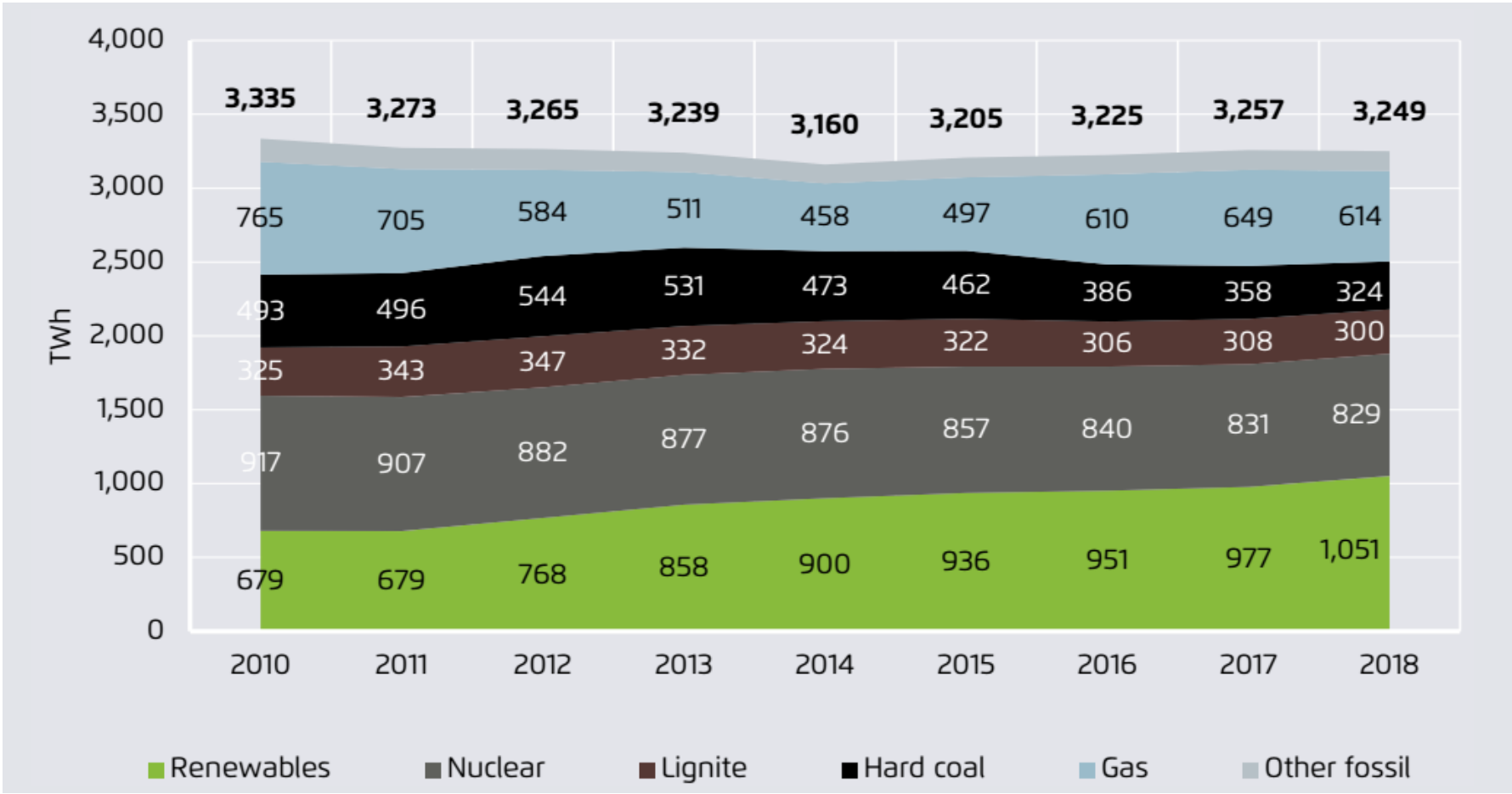
Ημερίδα ΙΕΝΕ:
Οι Προκλήσεις στην Λειτουργία της Αγοράς Ηλεκτρικής Ενέργειας

Πέμπτη 9 Μαΐου 2019

Παρουσίαση:
Ανδρέας Πετροπουλέας
Energy Management Director

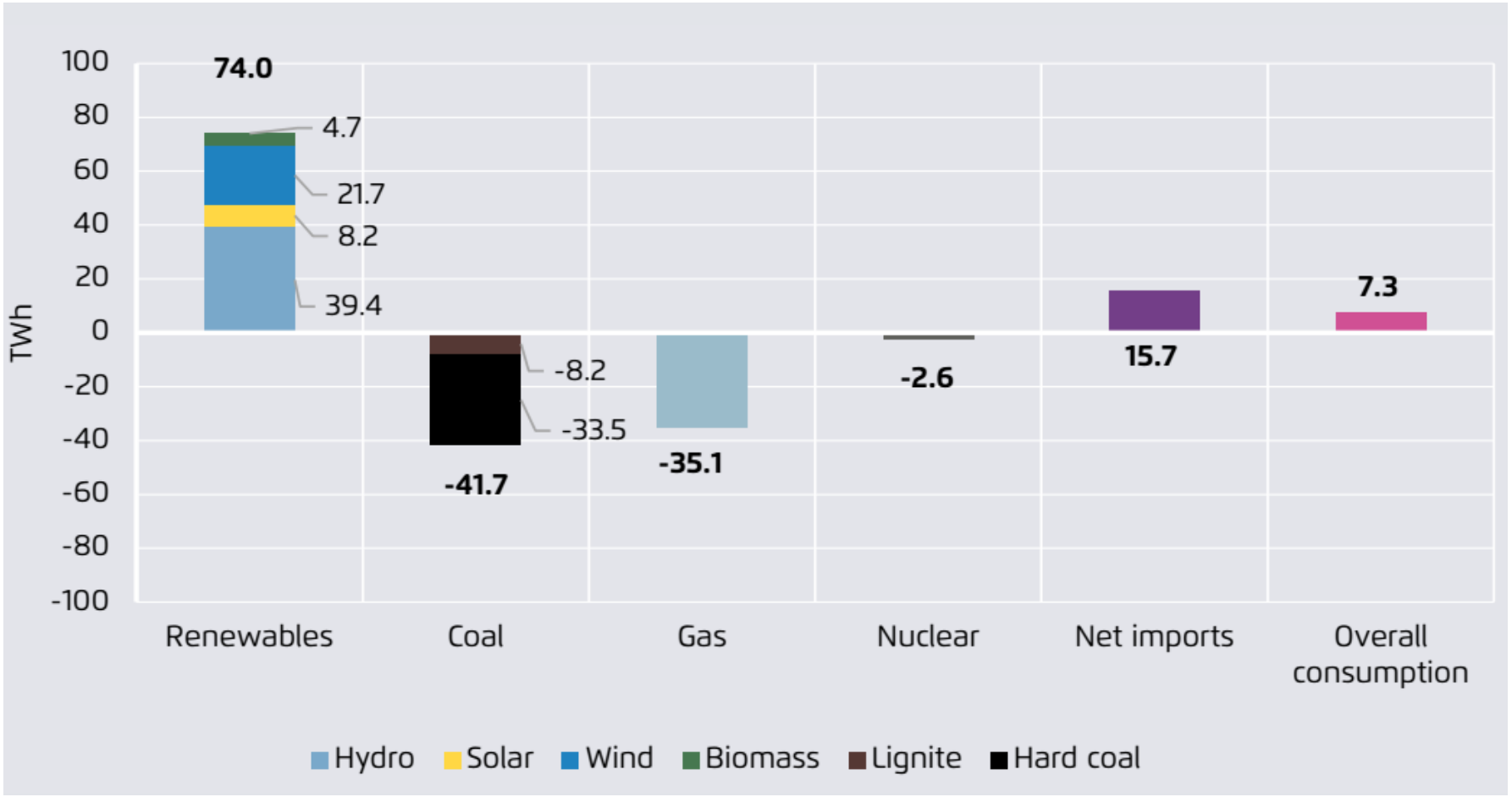
elpedison

EU electricity generation 2010-18, by fuel type



Source: Agora Energiewende & Sandbag

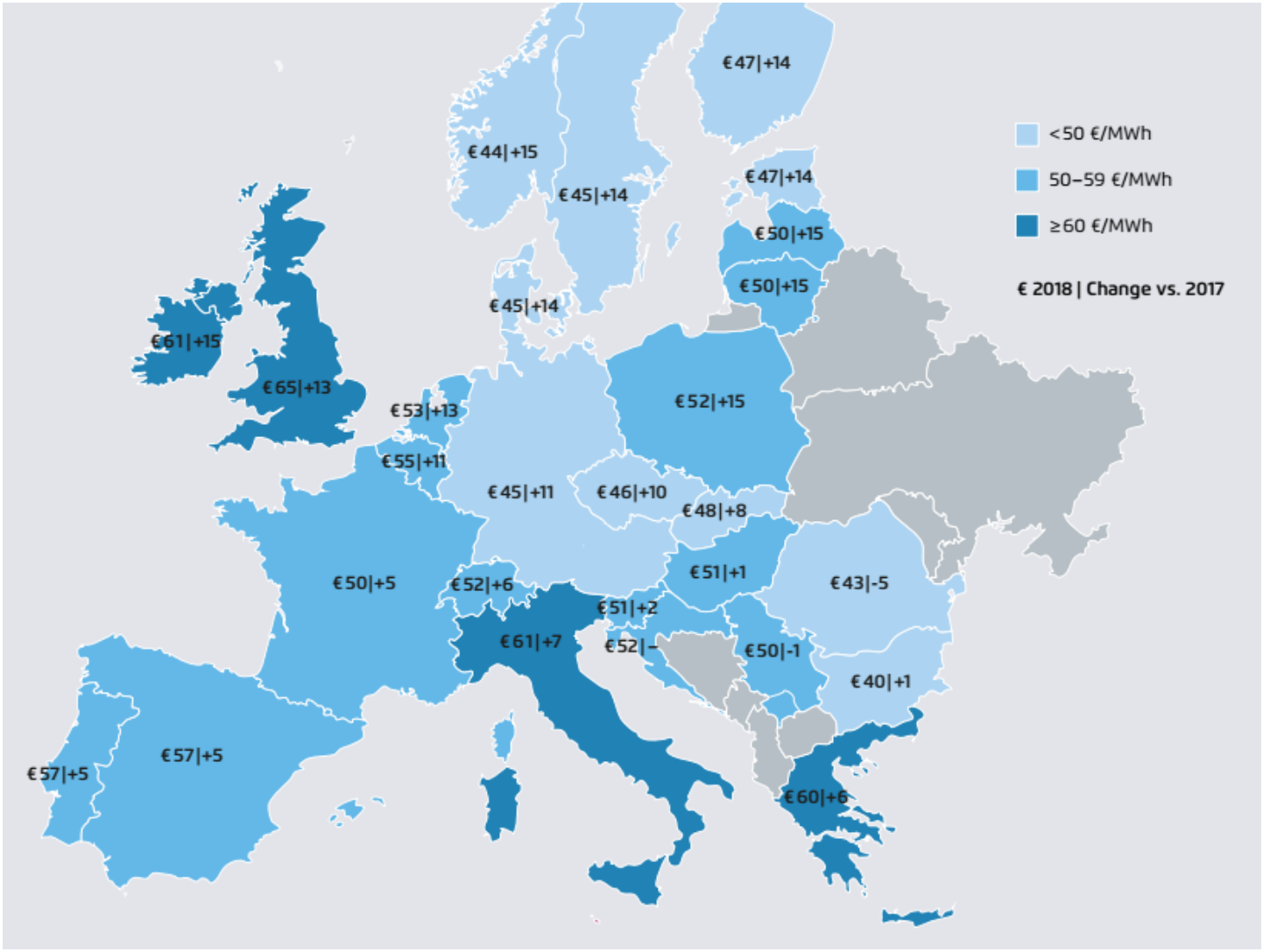
Changes in EU28 electricity production, from 2017 to 2018



Source: Agora Energiewende & Sandbag

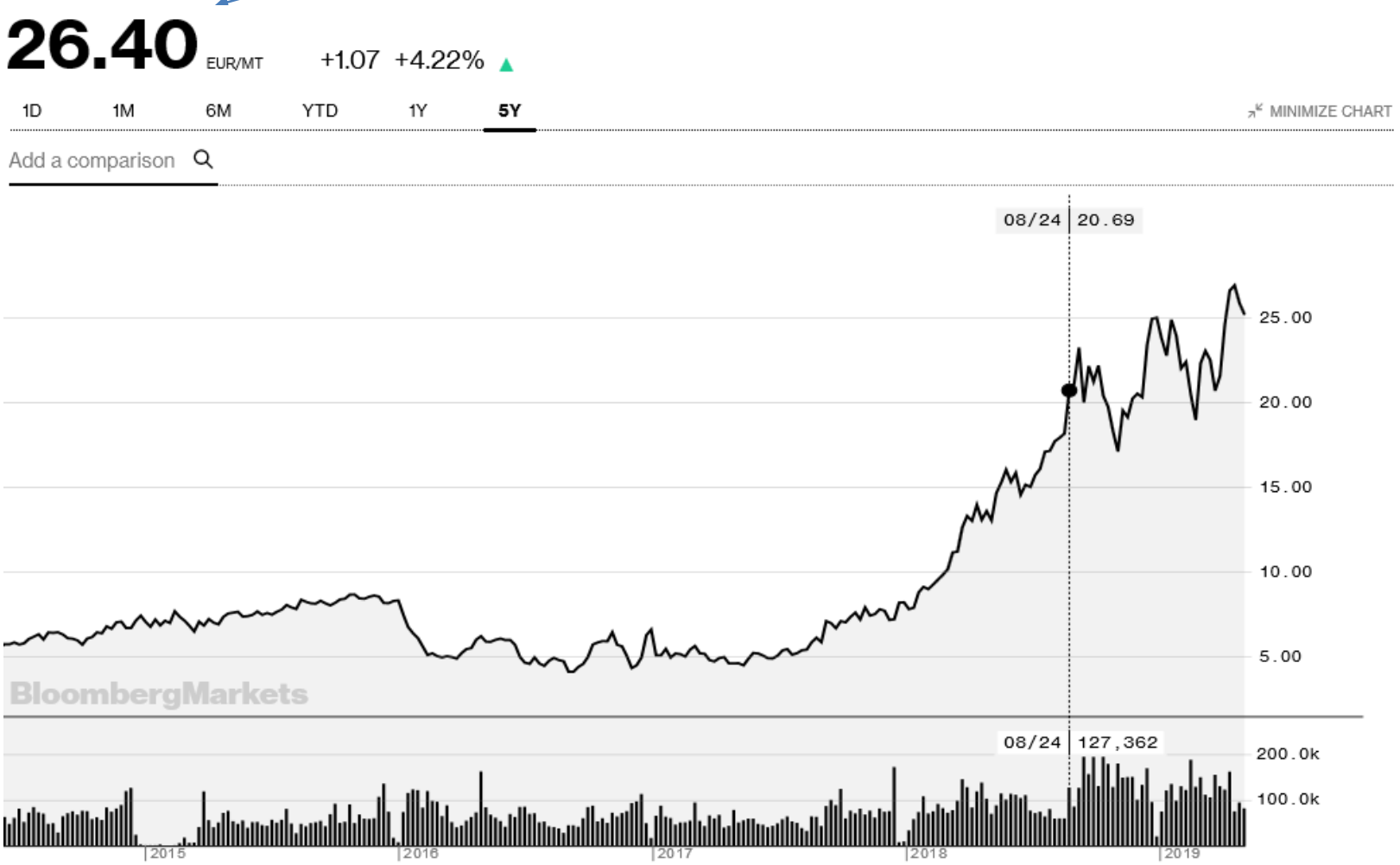
Average Day-Ahead wholesale electricity prices (EU28)

The rise in coal, gas and carbon prices pushed up the out-turn power prices in almost every EU country in 2018

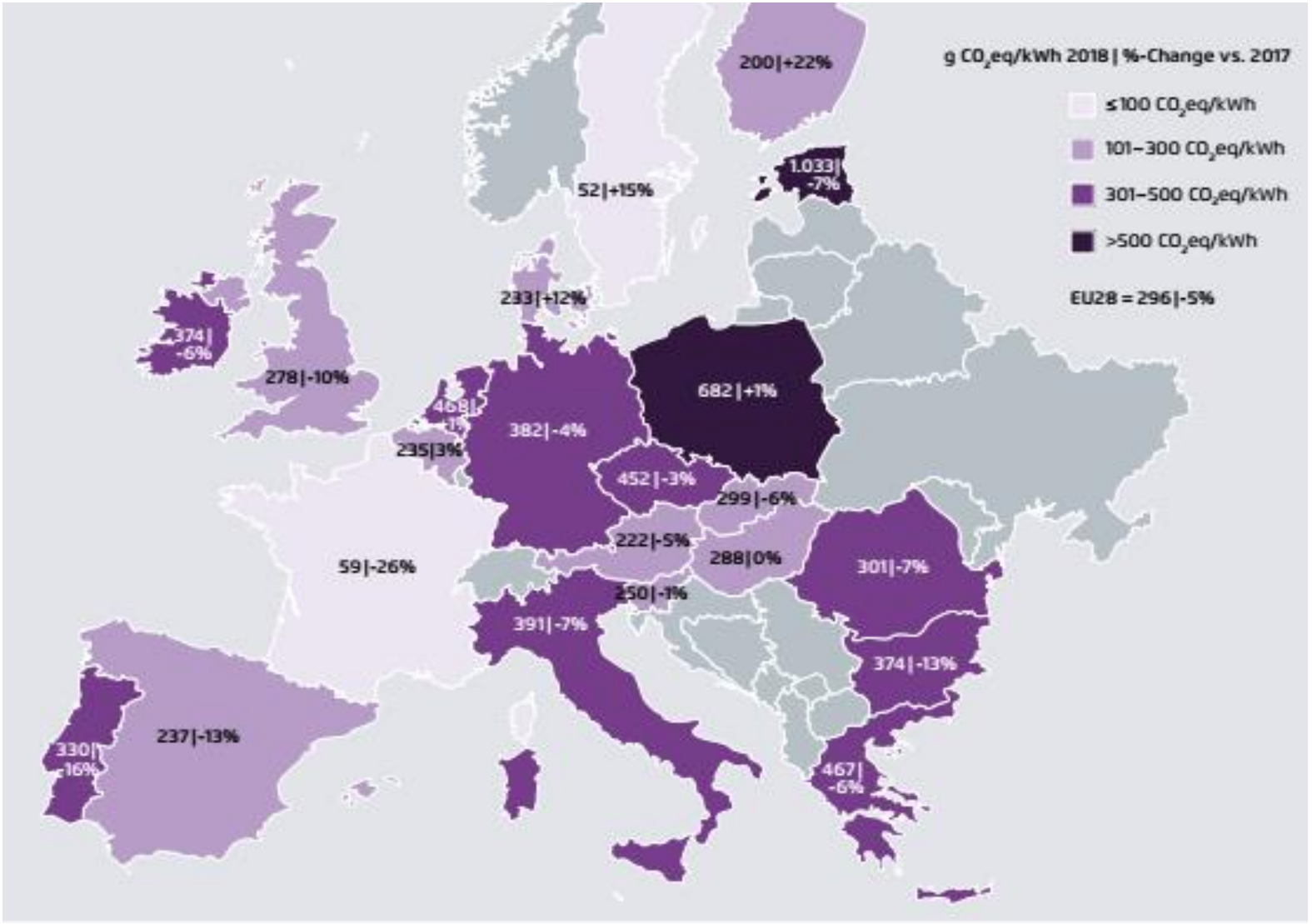


CO2 Price evolution over the last 5 Years

7th of May 2019

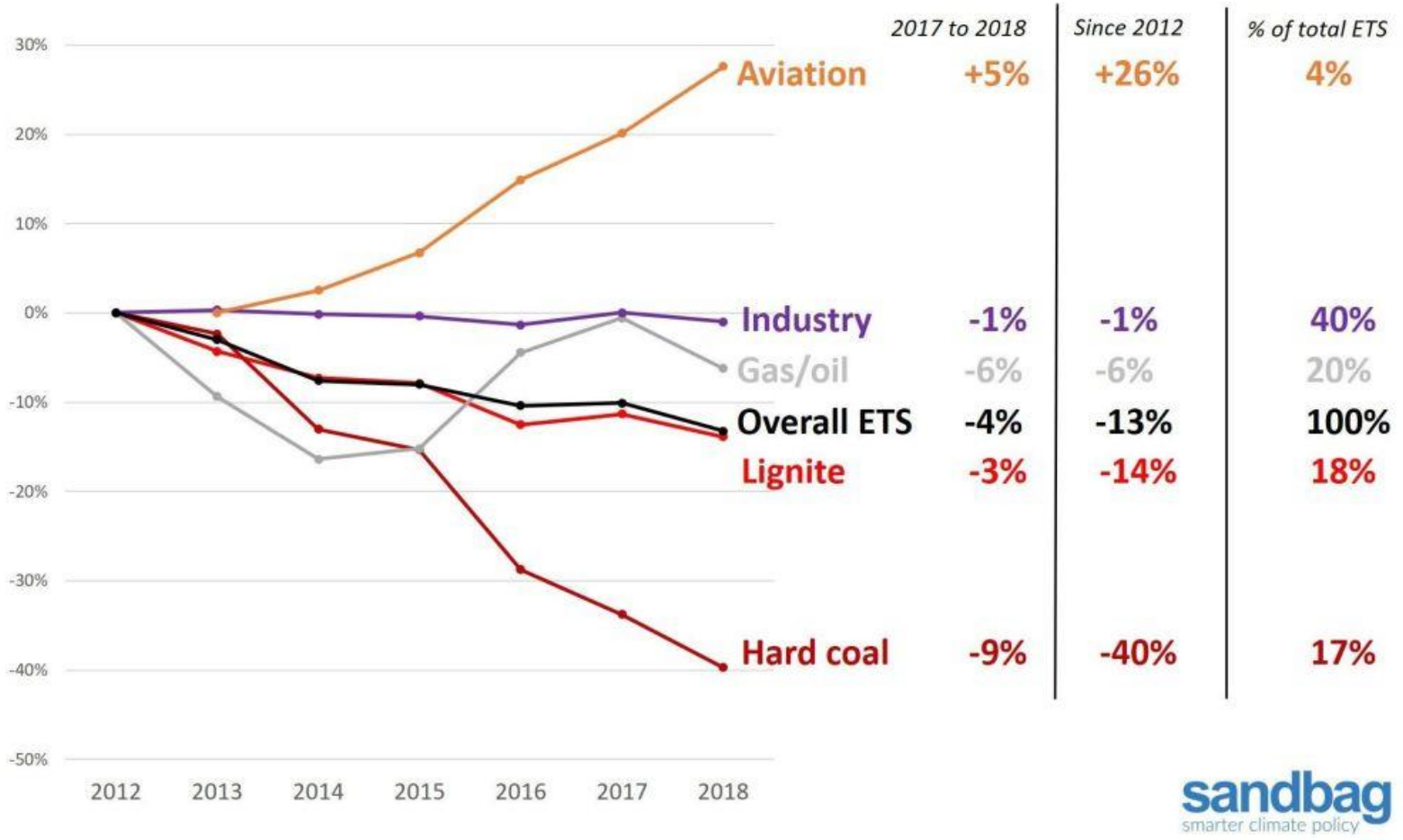


CO_2-intensity of electricity consumption



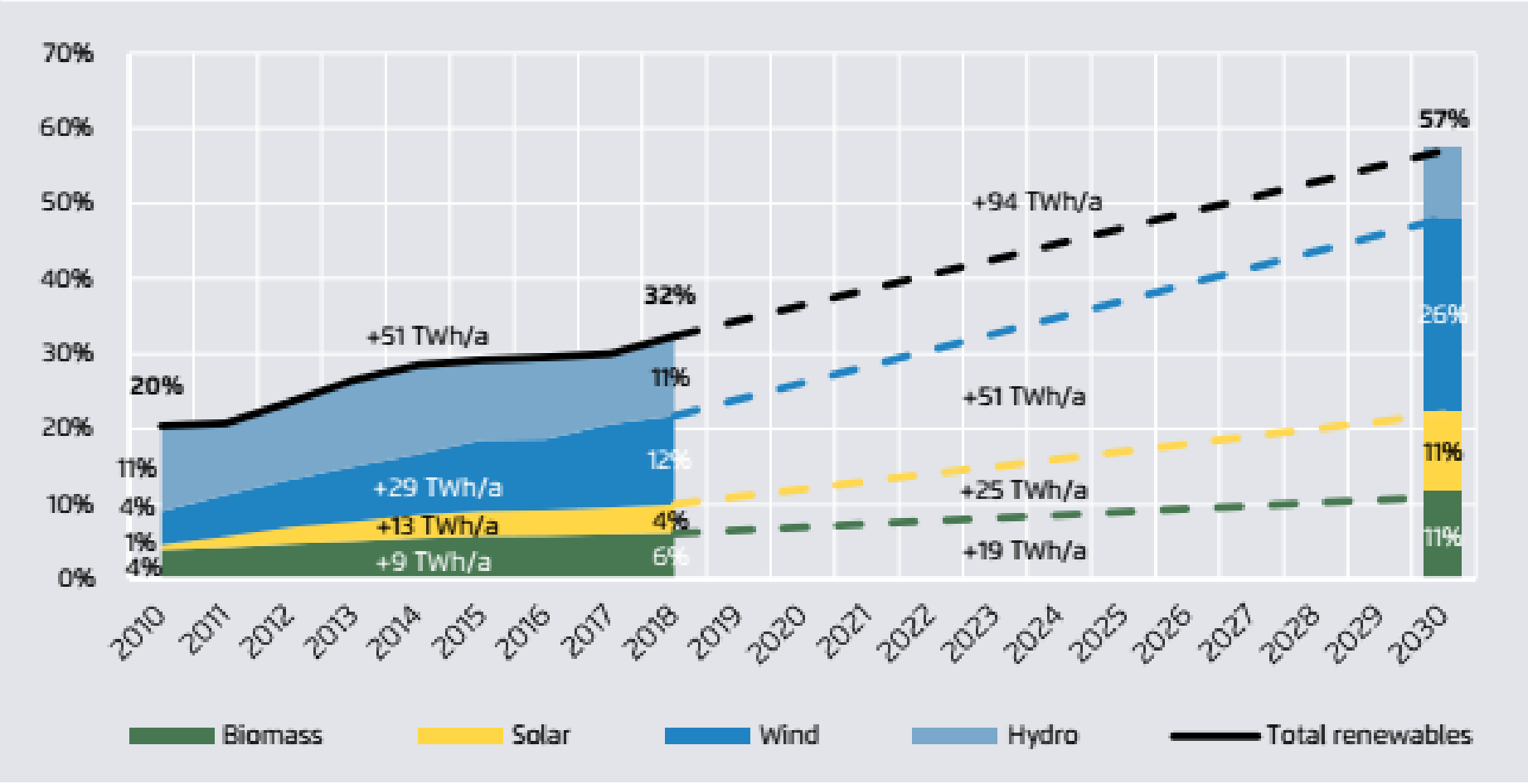
Source: Agora Energiewende & Sandbag

Overall ETS emissions



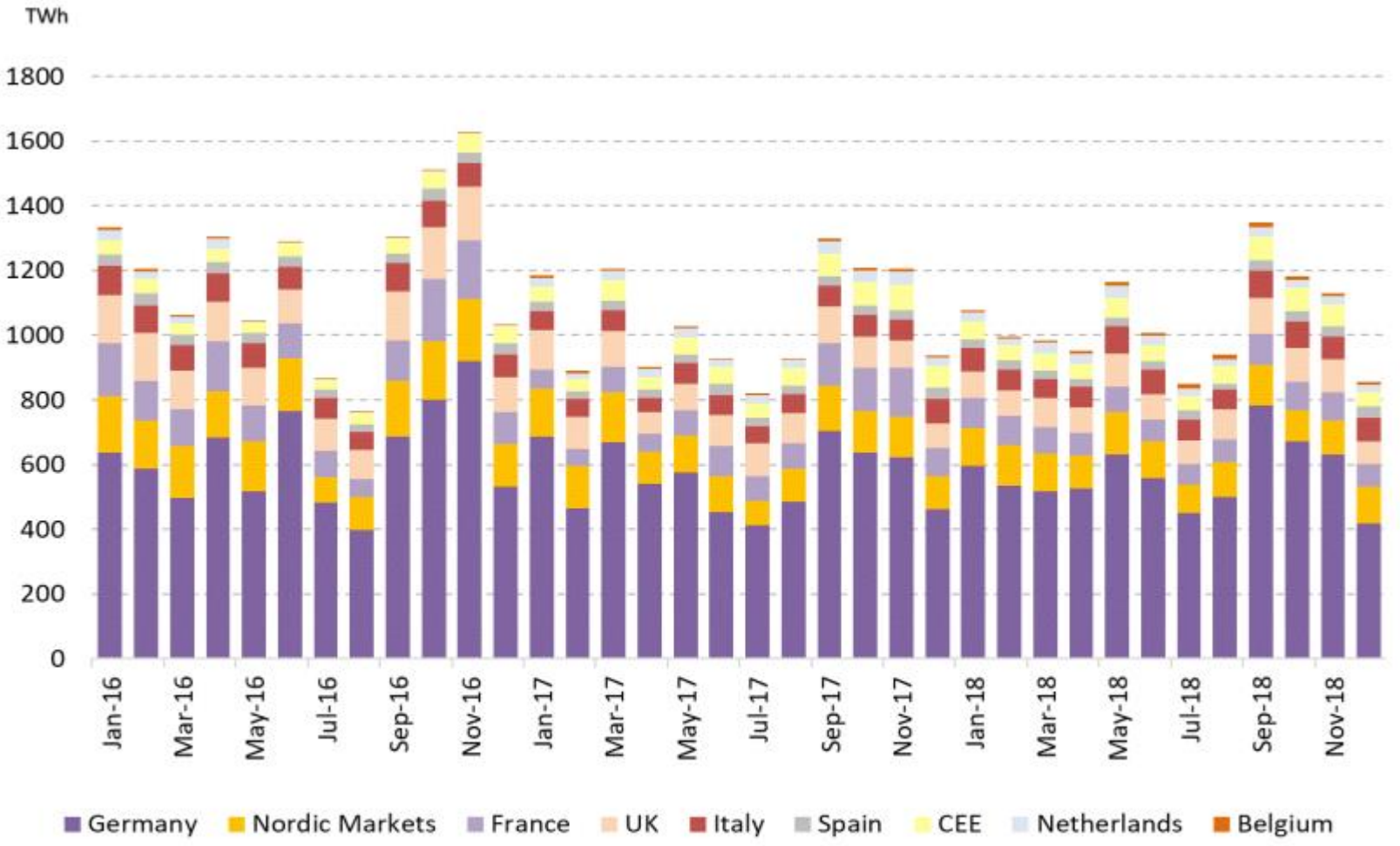
Emissions falls are almost single-handedly a result of reduced generation from hard coal power plants. Lignite power plant emissions remain stubbornly high, industrial emissions are almost unchanged since 2012, and aviation emissions continue to soar.

2030 projection of renewable electricity share in European Commission's Long Term Strategy



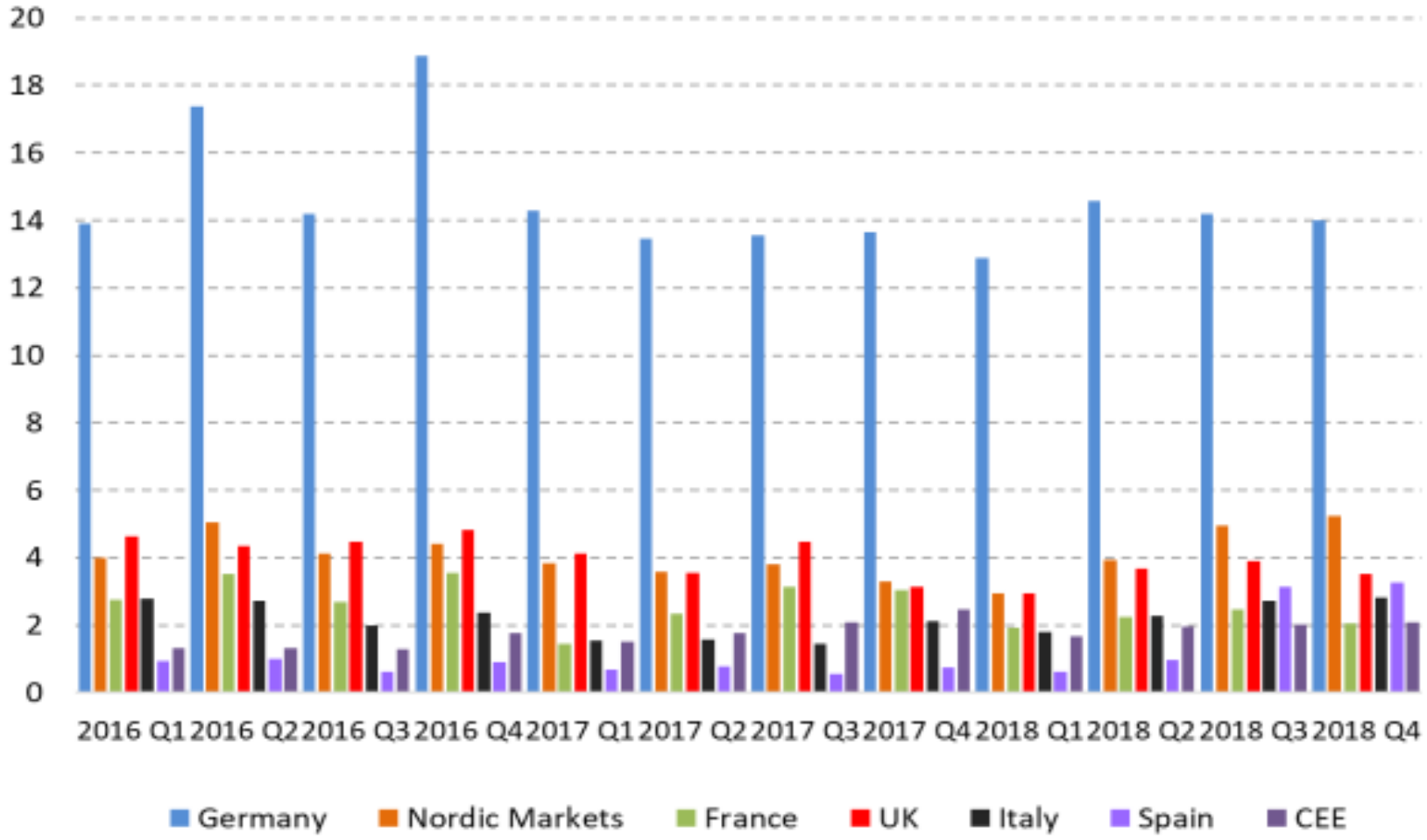
2030 projection from "Long Term Strategy", European Commission 2018, dashed lines show projection

Monthly traded volume of electricity on the most liquid European markets



Source: S&P Global Platts, wholesale power markets, Trayport, and DG ENER computations
CEE: Central Eastern Europe

Quarterly churn rates on selected European wholesale electricity markets



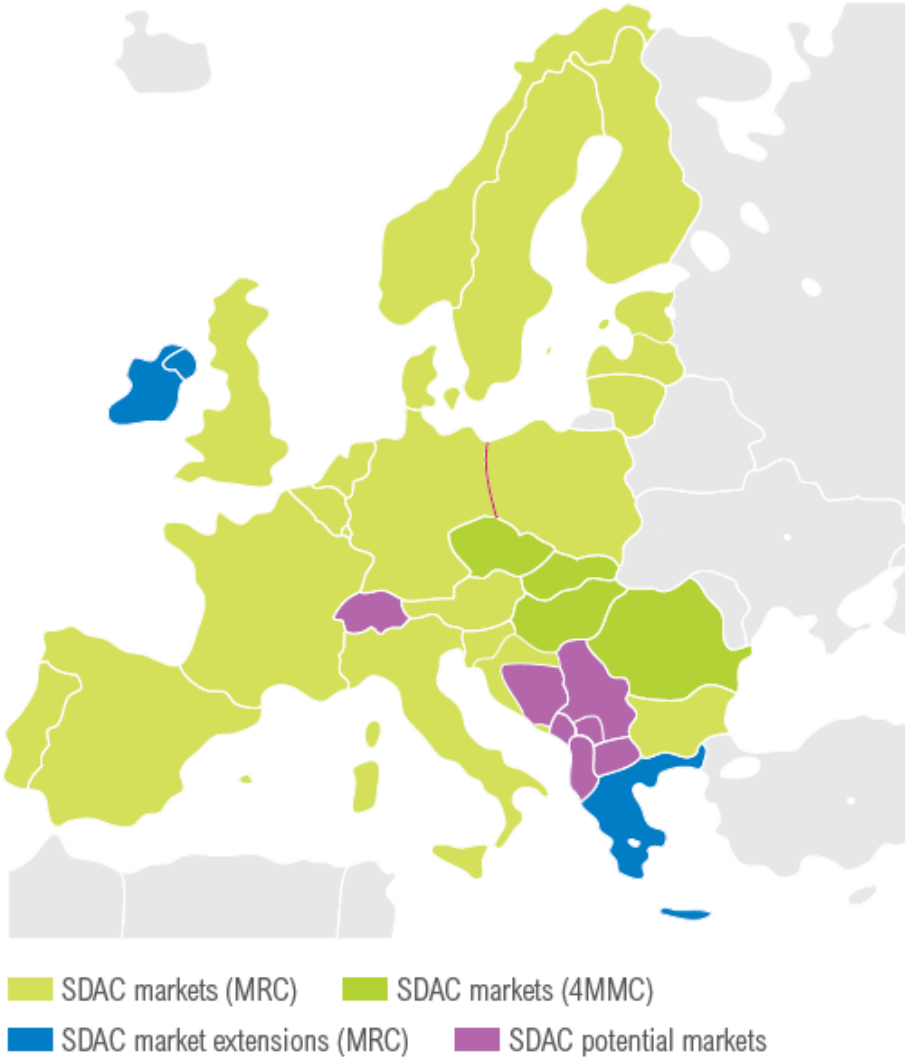
Source: Trayport, London Energy Brokers Association (LEBA), ENTSO-E and DG ENER computations

- **The churn rate measures how many times a unit of electricity is traded before it is finally consumed.**

Market Coupling - Current state-of-play of Single Day-ahead Coupling (As of July 2018)

Two coupling projects are in parallel in operation using infrastructure based on EUPHEMIA. These projects are **MRC** and **4M MC**

- **MRC** integrates 20 countries, representing close to 90 % of the European electricity consumption.
- **4M MC,** since 19th November 2014. It has operated successfully



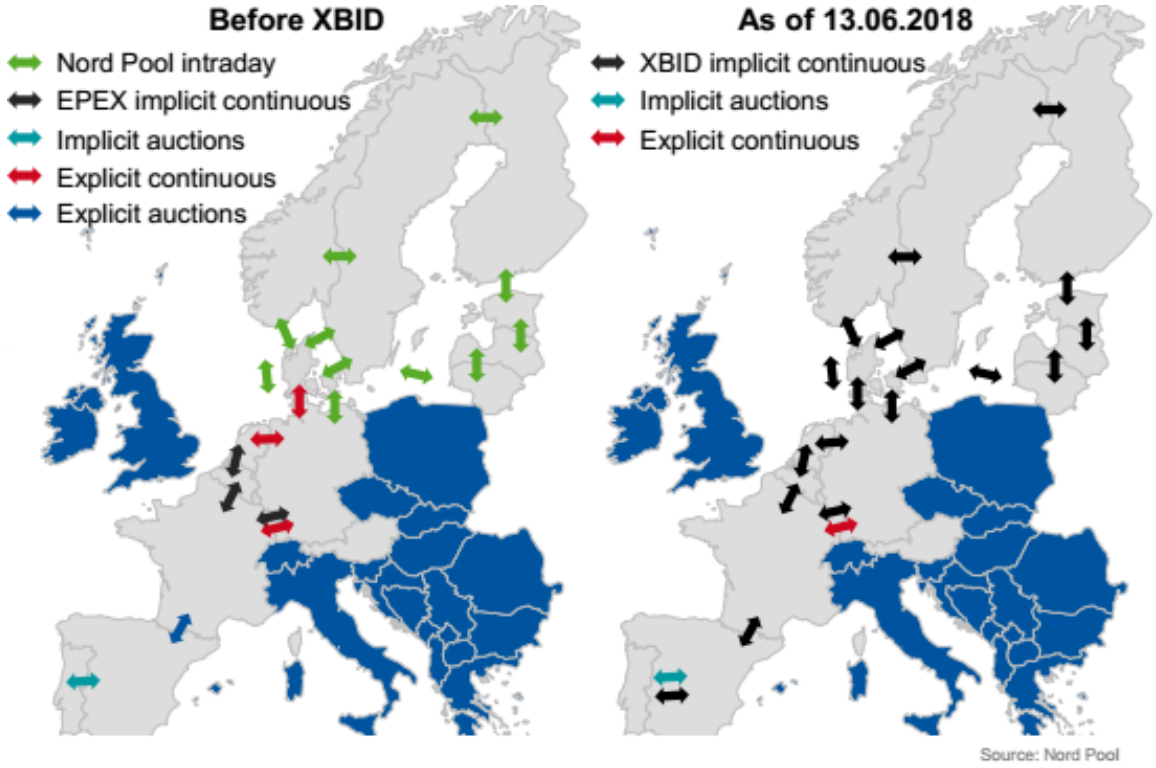
The **4M MC** Day-ahead ATC based price coupling covering Czech-Slovak-Hungarian-Romanian market areas.

The **MRC** operational countries are: Austria, Belgium, Croatia, Denmark, Estonia, Finland, France, Germany, Great Britain, Italy, Latvia, Lithuania, Luxembourg, Netherlands, Norway, Poland, Portugal, Slovenia, Spain and Sweden.

Market Coupling - Current state-of-play of Single Intraday Coupling (As of July 2018)

XBID Market Coupling Intraday

- Market Coupling in intraday markets as one major project within Europe
- Goals
  - Increase in market liquidity
  - Increase efficiency of intraday markets
- IT solution supports explicit as well as implicit continuous trading
- First go-live with indicated countries in June 2018
- 2nd go-live wave with more countries (especially from eastern Europe) planned for 2019



The borders have not been confirmed yet but Bulgaria, Croatia, Czech Republic, Hungary, Poland, Romania and Slovenia are actively involved in this expansion

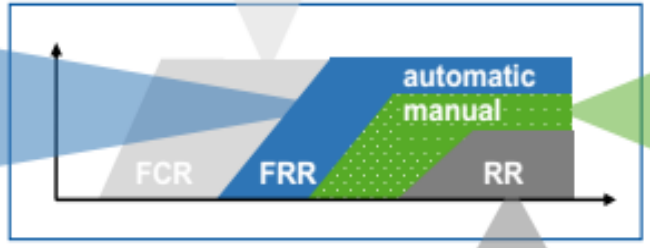
Cross-border projects in electricity balancing

FCR Cooperation

- Common market for procurement and exchange of Frequency Containment Reserve
- Regional project currently involves ten TSOs from seven countries

PICASSO

- **P**latform for the **I**nternational **C**oordination of the **A**utomatic Frequency Restoration Process and **S**table **S**ystem **O**peration
- 17 member TSOs and ten observers



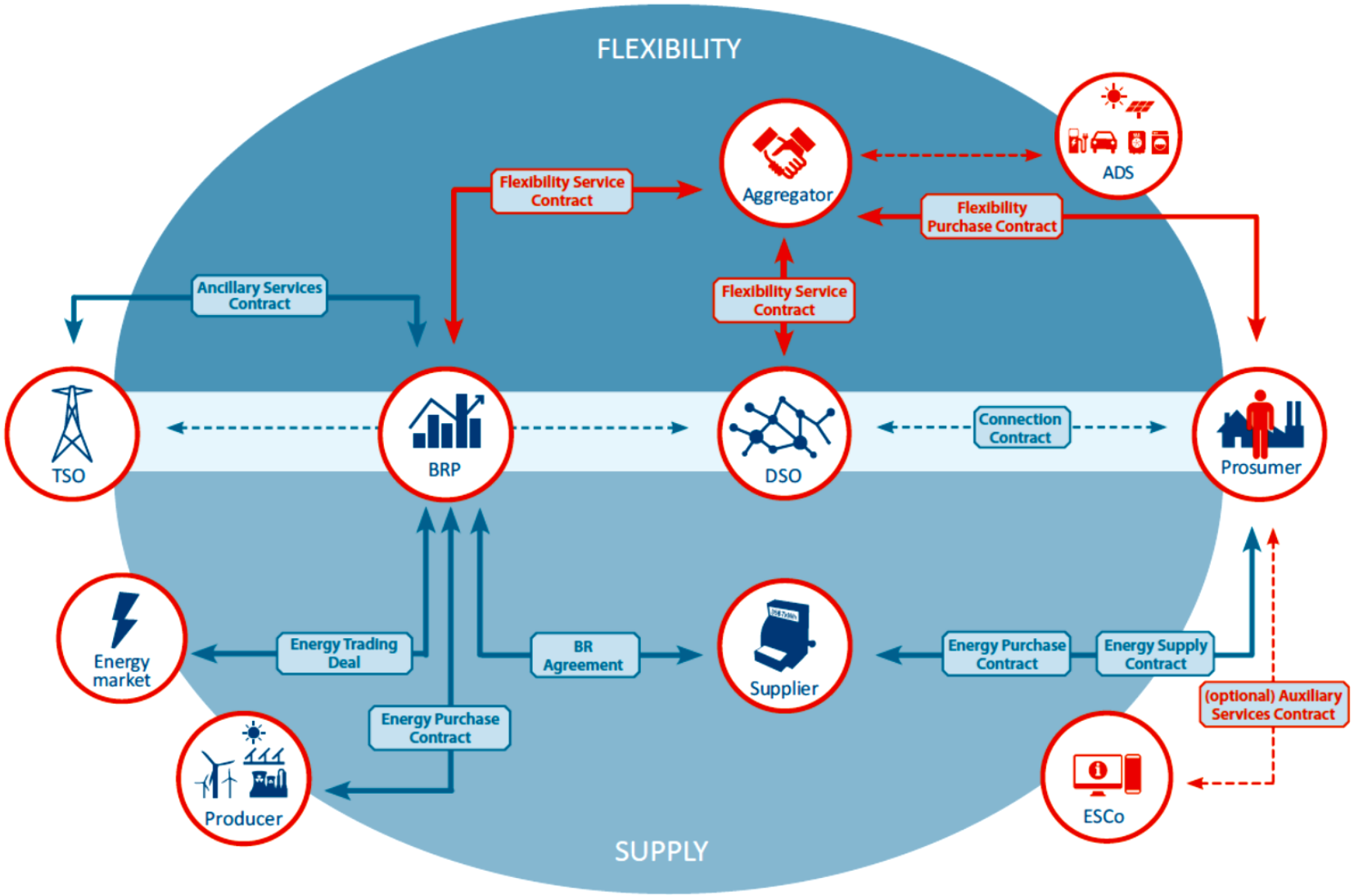
MARI

- **M**anually **A**ctivated **R**eserves Initiative
- 19 TSOs decided to work on the European mFRR platform

TERRE

- **T**rans **E**uropean **R**eplacement **R**eserves **E**xchange
- European implementation project for exchanging Replacement Reserve by building the RR platform and balancing market
- TERRE involves six full members and four observers

The Future: Flexibility & Supply value chains interaction model



Source: USEF (Universal Smart Energy Framework)

System Adequacy - Development of Power Plant Capacities

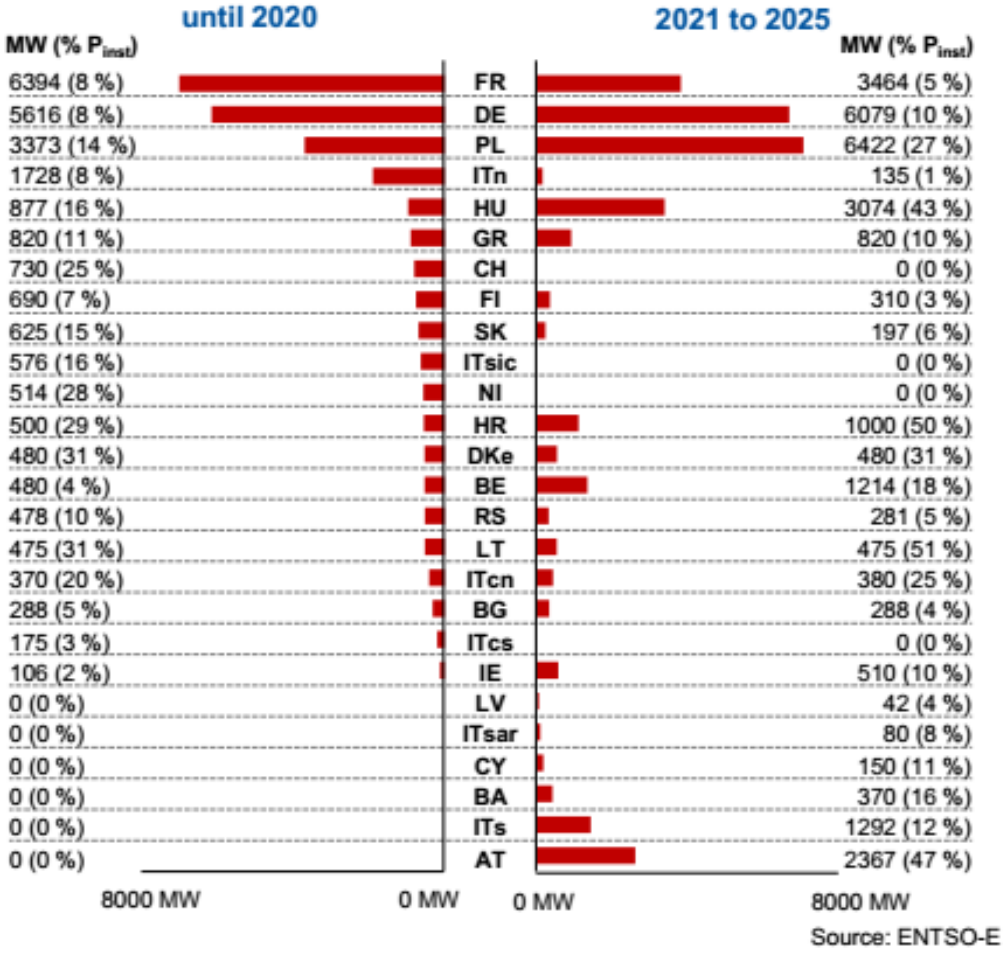
Energy Only Market and Capacity Mechanisms

Consequences of the Liberalization of Electricity Markets

- Complete competition on the electricity markets
- Energy Only Market (EOM) carries danger of missing money problem
- Decrease in conventional generation capacity due to age structure
- Concerns whether an EOM can guarantee long-term security of supply

Capacity Mechanisms

- Measures to ensure security of supply
- Monetary compensation for provision of available generation capacity
- Different design options for capacity mechanism are discussed and implemented in Europe



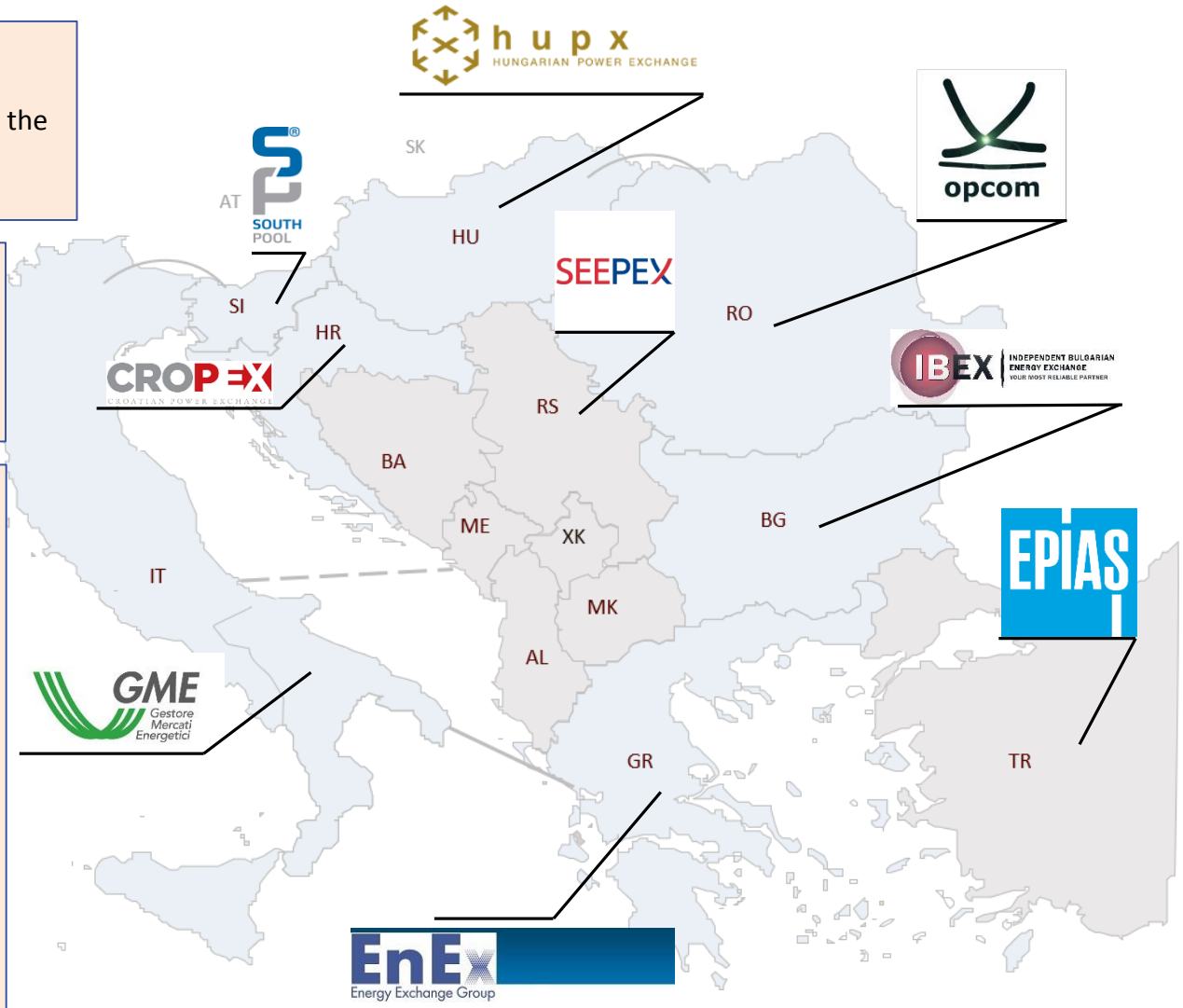
Generation Capacity at risk of being mothballed, absolute [MW] and relative [% of the thermal generation capacity]

Overview of SEE markets – Power exchanges

14 Countries:
- 7 EU Members States
- 6 non-members of EU in the Western Balkans (WB6)
- and Turkey

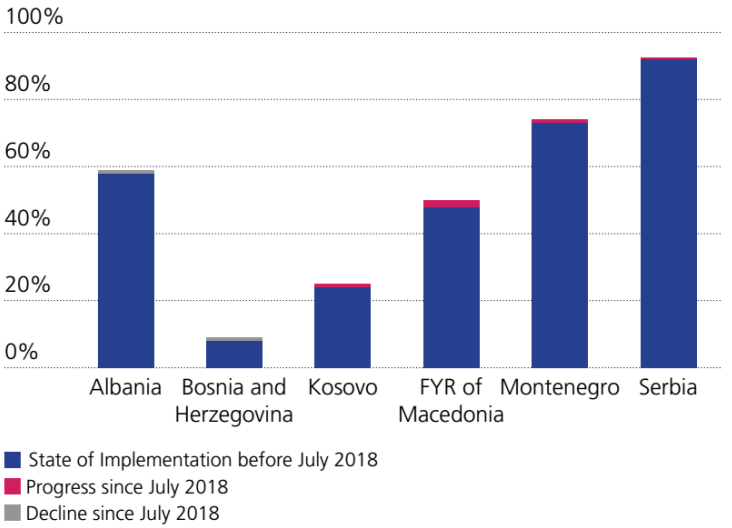
Operational power markets:
- in the EU MSs
- in Serbia from WB6
- in Turkey

Coupled markets:
- Hungary and Romania, form "4M-MC" together with Czech Republic and Slovakia
- Italy and Slovenia participate in MRC (Multi Regional Coupling)
- Internal market splitting in Italy due to systematic transmission constraints; Greece is connected to the Brindisi ("BRNN") zone

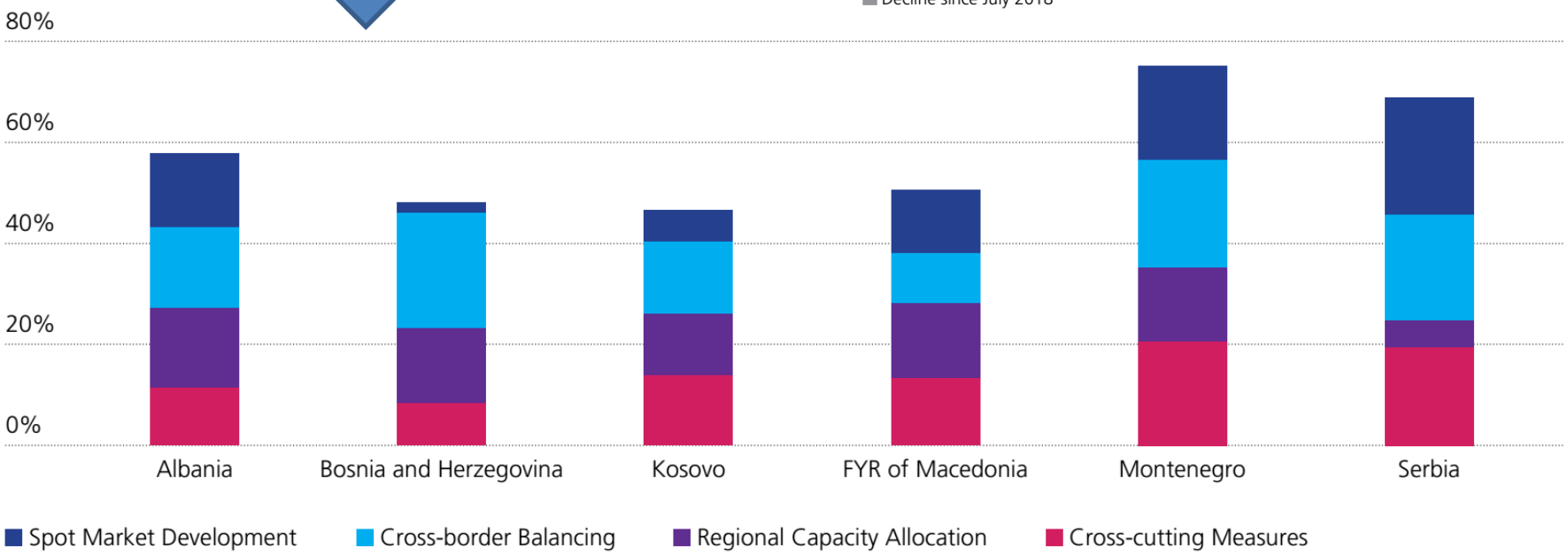


WB6 - Electricity Market Progress (November 2018)

Spot Market Development

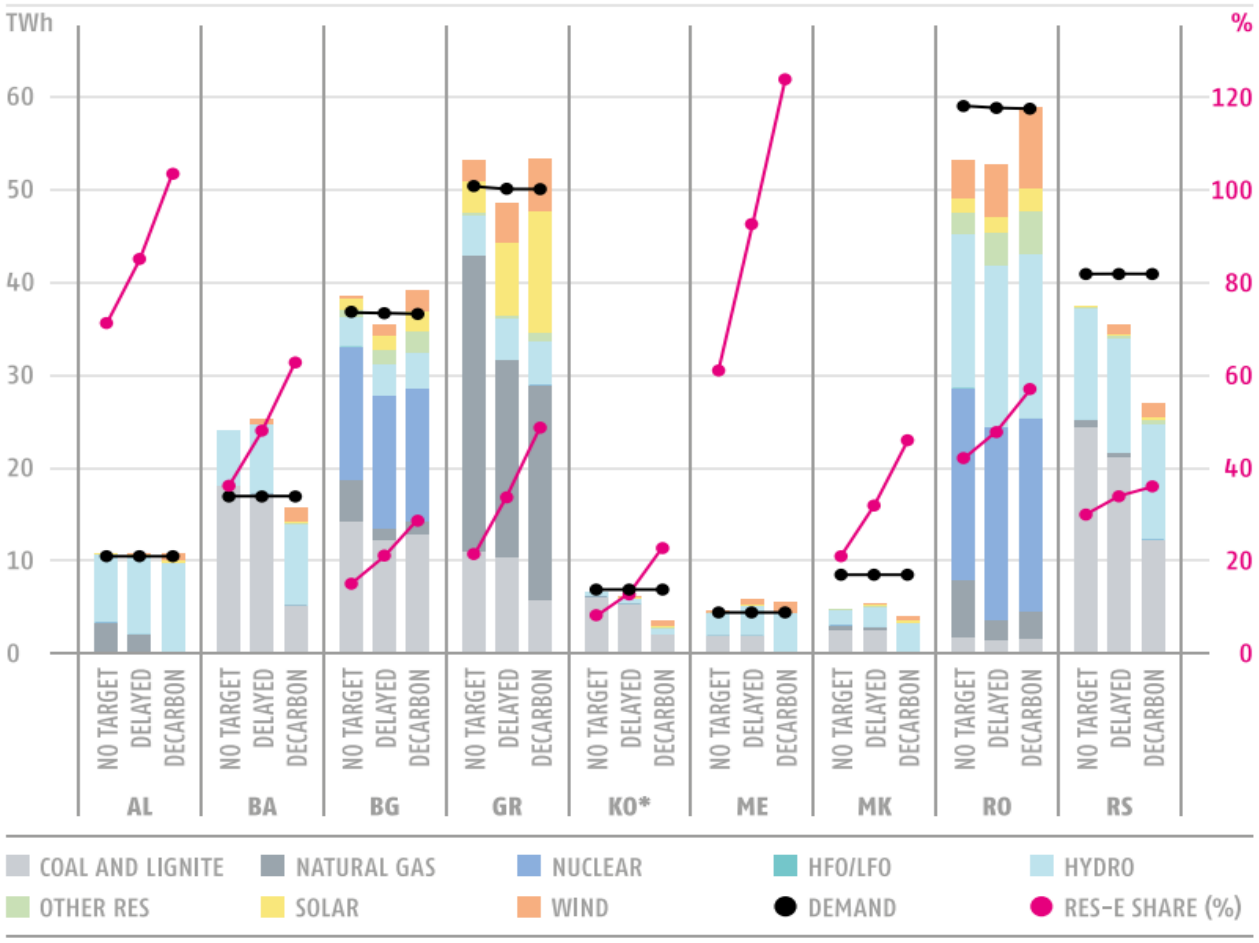


Overall Implementation of Soft Measures



Developments in SEE; regional Outlook studies, generation mix by country in 2030

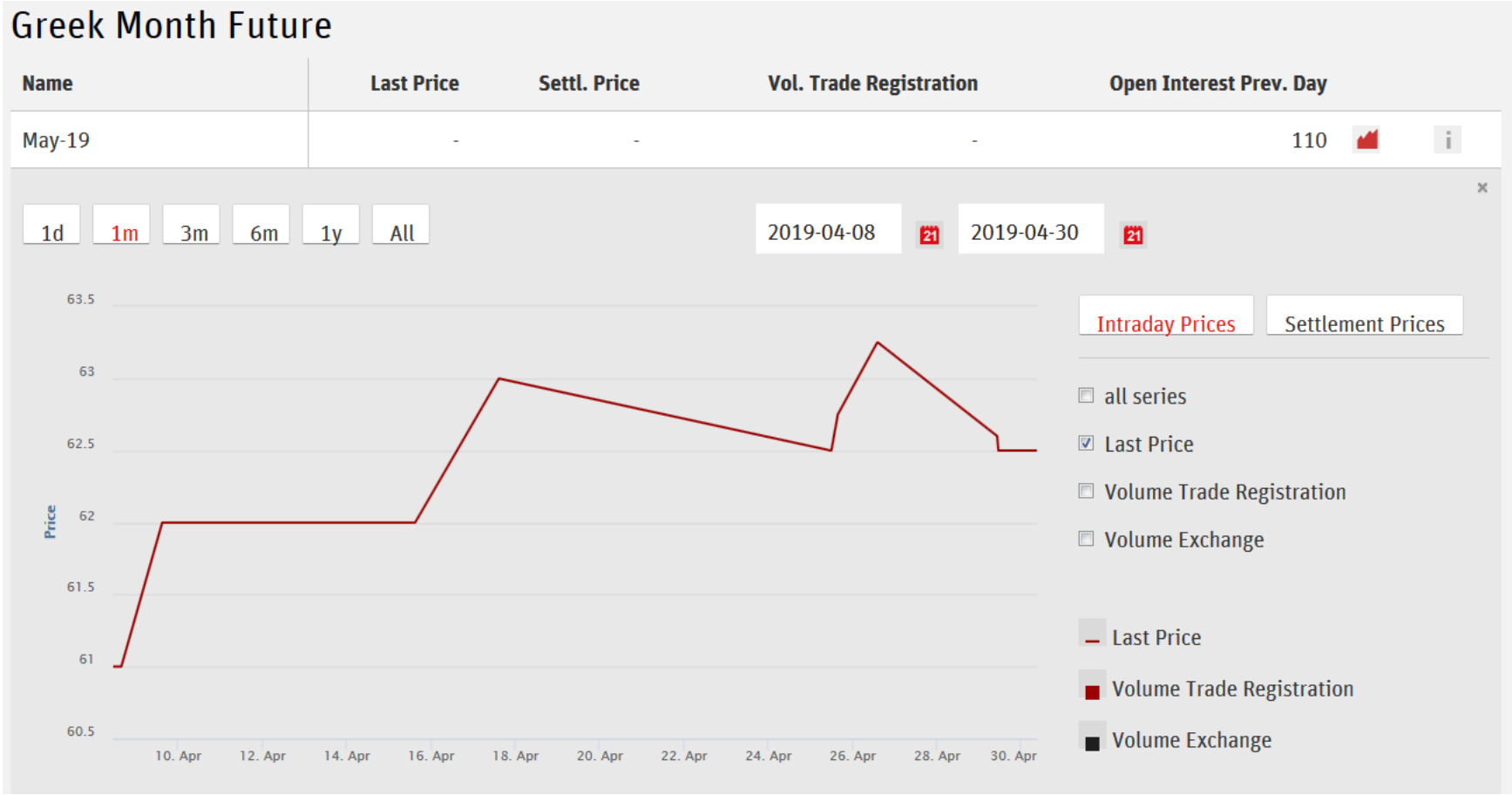
Greece is estimated to be effectively the only country in the region with considerable gas-to-power generation; electricity generated by CCGTs is expected to increase significantly by 2030



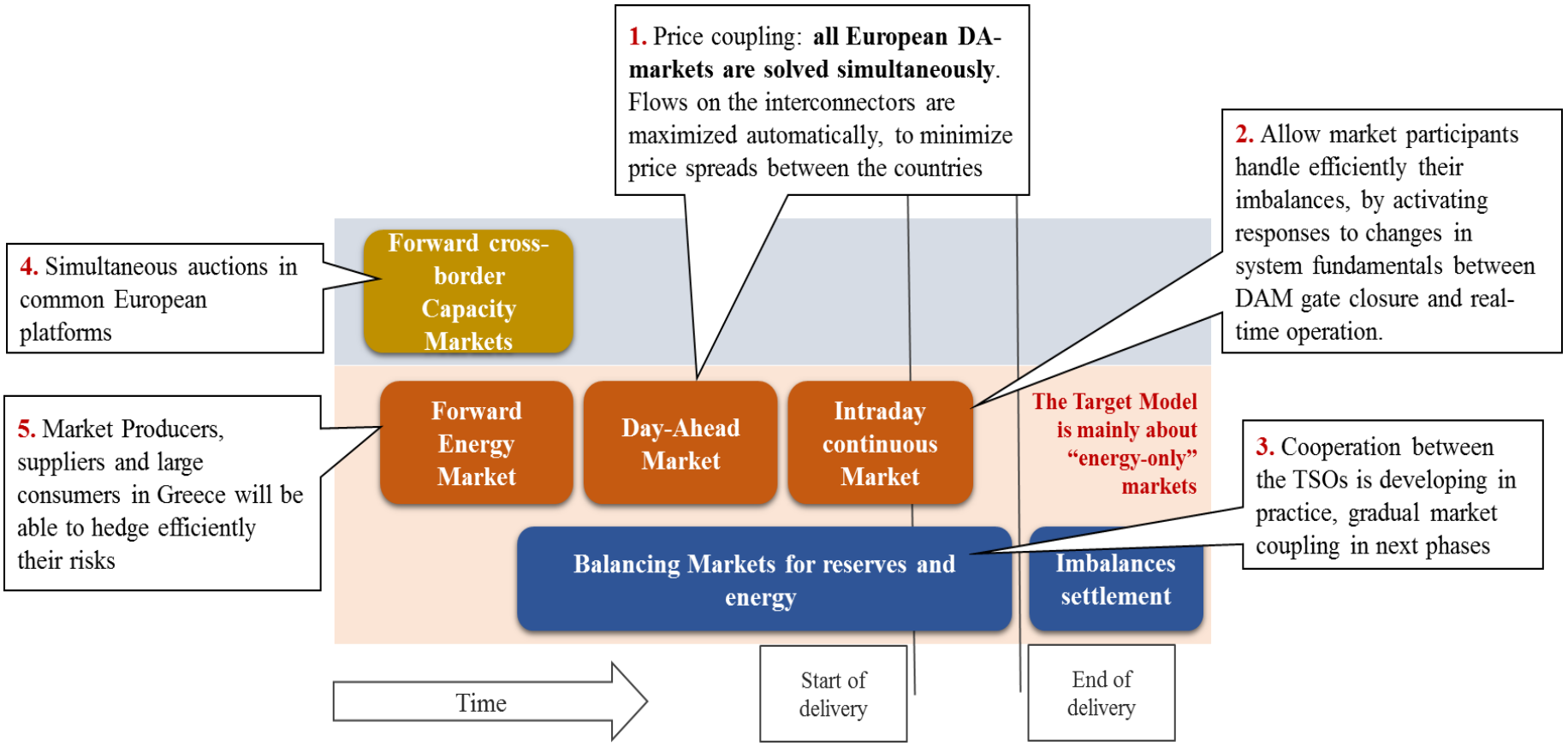
ELECTRICITY GENERATION AND DEMAND (TWh) AND RES SHARE (% OF DEMAND) BY COUNTRY, 2030

Source: SEERMAP Study (REKK, EEG, EKC, OG Research, ERRA)

On 8 April 2019, EEX launched order book trading for the Greek Power Market



A new business environment under the Target Model



Market Distortions - Lignite Operation

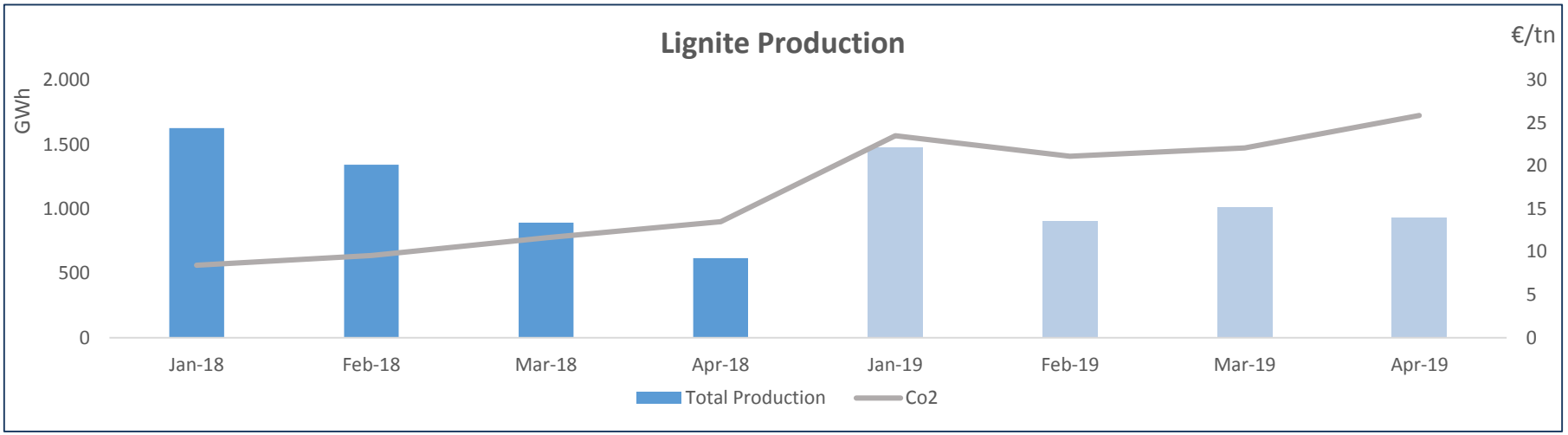
1. PPC keeps operating Amyndeo complex despite otherwise foreseen under the strict and explicit conditions set by Directive 2010/75/EU regarding industrial emissions.

2. On 26/11/2018, the Greek Ministry of Energy issued an amendment to the Ministerial Decision 360/2013 (implementing Directive 2010/75/EU) according to which the conditions of article 33 para 4 of the Directive have been distortively interpreted in a way to award Amyndeo units 32000 hours of operation instead of 17500.

3. Kardia complex has a remaining 1-2 months of operation.

	Kardia 1	Kardia 2	Kardia 3	Kardia 4	Amyndeo
limit	17.500	17.500	17.500	17.500	17.500
Oper. Hours 1/1/2016-5/5/2019	17.245	16.869	17.127	16.186	21.013
Remaining hours	255	631	373	1.314	-3.513
Remaining days	11	26	16	55	-146
Remaining months	0	1	1	2	-5

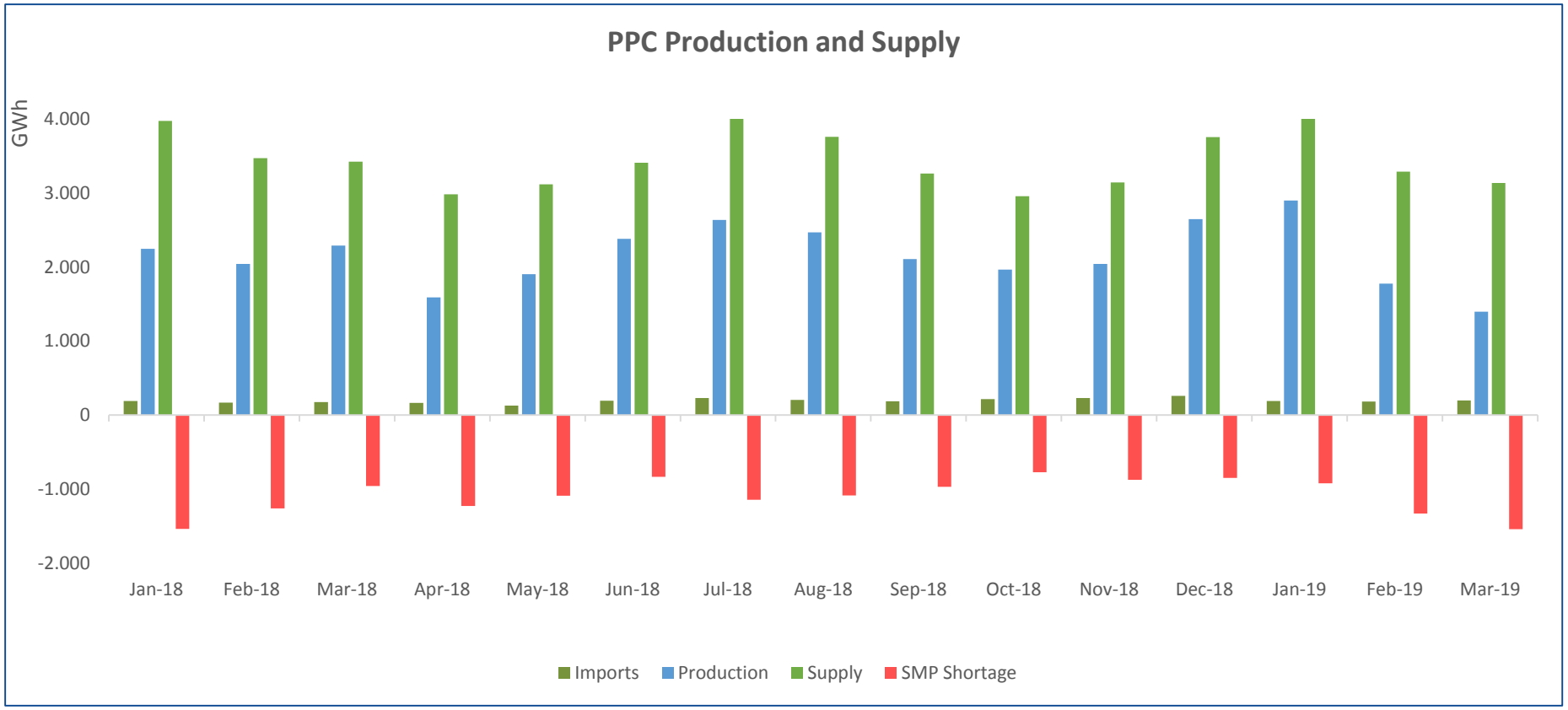
Lignite Production



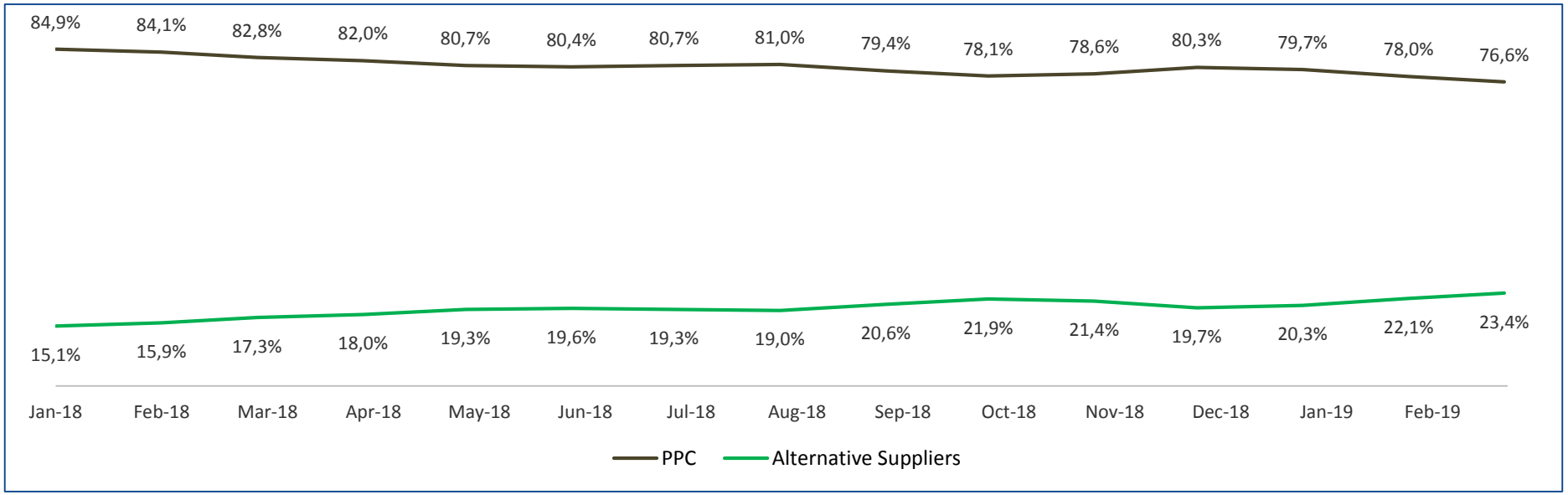
(Jan-April)	2018			2019		
	Emissions Costs €	Production MWh	Emissions Costs €/MWh	Emissions Costs €	Production MWh	Emissions Costs €/MWh
PPC_Lignites	60.974.509	4.483.896	13,60	150.944.084	4.266.838	35,38
PPC_NG	5.284.358	1.496.942	3,53	20.906.807	2.346.370	8,91
IPPs_NGs	7.799.939	2.344.680	3,33	23.758.577	2.823.020	8,42

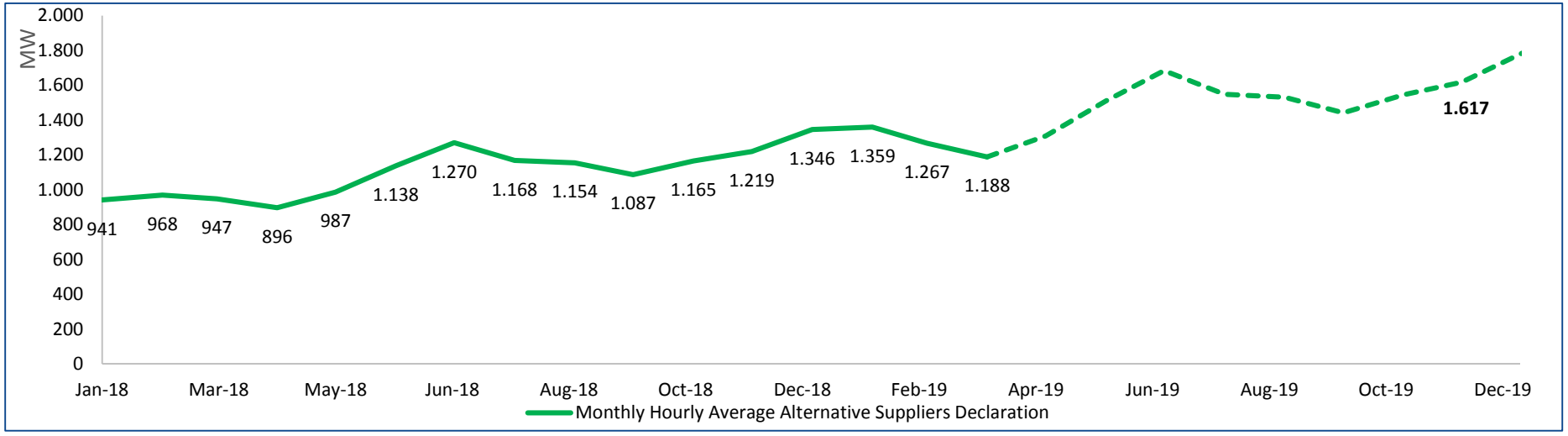
Lignite Unit	CO2 Cost (€/MWh) If CO2 price =26,4€/tn
Kardia 1	42,8
Kardia 2	43,3
Kardia 3	40,5
Kardia 4	40,5
Megalopoli 3	48,6
Megalopoli 4	55,0

PPC Shortage of Supply



Retail, Market Shares





Source: HEnEX, Projection based on increase rate of last 8 months

Critical Issues of the Target Model Design

1. **Maximum limit on forward/OTC contracts for the dominant player** : Very critical measure to mitigate the market power of the dominant player (PPC). Introduction of maximum limit **(0-5%)** on PPC's "internal" Forward contracts is absolutely necessary. It should be, however, combined with an obligation to sell Forward minimum volumes to 3rd parties.
2. **Centralized dispatch, unit-based offers**: production units will participate separately in the DAM, IDM and BM. Model design in the right direction, in order to mitigate market power of PPC, the only participant with diversified portfolio.
3. **Absence of floor price for production offers in DAM and IDM**: Power producers will be able to submit orders on prices lower than the minimum variable cost of the corresponding unit. **Close market monitoring is necessary to ensure rational bidding strategy of the dominant player.**
4. **Physical and financial products**:
   - Complex products should be included in the FM(e.g. peak, offpeak,workdays)
   - Liquidity of the Forward Market is uncertain
   - Forward Market Code not published yet
5. **Orders types in DAM:** the uncertainty of the available type of orders in DAM and IDM remains. The downsizing of the order types could lead to non-optimal Power Plant programming.
6. **Participation of load, RES and aggregators in zones**: The regulatory framework for niche markets like RES aggregation and Demand Response is not clear. The submission of orders in the DAM and the IDM per will be done by system zone and losses zone. Aggregation per zone & per technology creates barriers for development of this activity.

Ευχαριστώ

Ανδρέας Πετροπουλέας