



European Union Agency for the Cooperation  
of Energy Regulators

# Update on the amendment of the algorithm methodology for co- optimisation

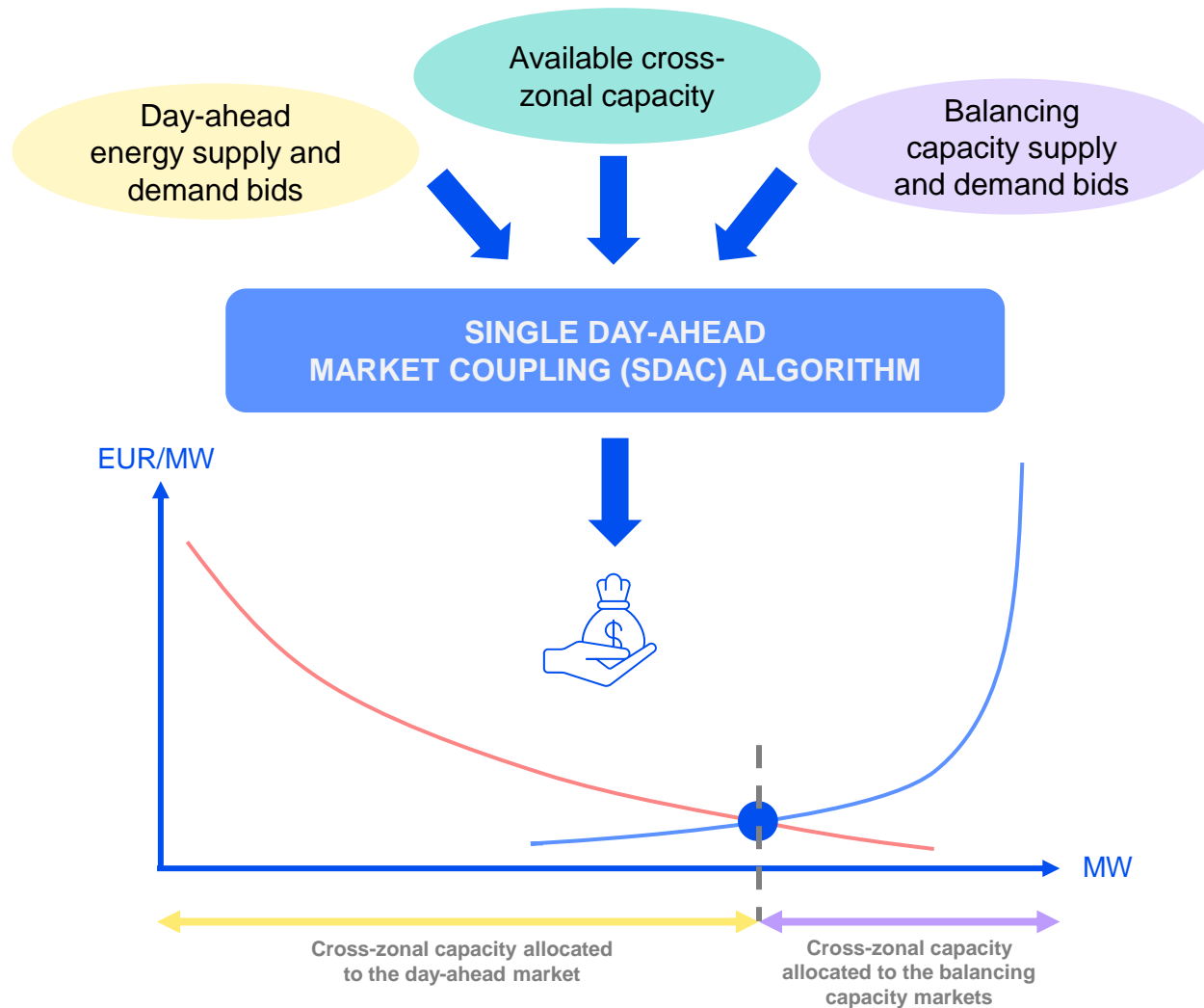
EBSG meeting

17 April 2024

- On **25 November 2022**, **ACER sent a letter to NEMOs** requesting the amendment of the algorithm methodology for the **inclusion of co-optimisation**
- Considered the foreseen time required for further R&D as described in the [roadmap study](#), ACER asked NEMOs to submit the amendment **by 25 November 2023**
- Between 31 July and 25 September 2023, **NEMOs ran a public consultation** on the proposal
- **ACER and NRAs submitted a joint shadow opinion** to NEMOs on their consulted proposal
- On **24 November 2023**, NEMOs submitted the proposal for amendment to ACER

- Balancing capacity prices are mainly defined by the **opportunity costs** resulting from foregone day-ahead market profits when bidding into the balancing capacity market. As such, both day-ahead and balancing capacity markets can, in theory, be cleared based on the **same bids representing underlying costs** (both for portfolio and unit-based bidding)
- Co-optimisation covers two aspects: i) allocation of **cross-zonal capacity**; ii) optimisation of **reserve and energy** markets
- Co-optimisation overcomes the drawbacks of market-based allocation with regard to **forecast errors** and **coordination inefficiencies**
- Co-optimisation allows the **liquidity** of the day-ahead market to also be directly accessible to balancing capacity markets

# Benefits of co-optimisation



- Integrated balancing capacity markets
- No need for price forecasts
- Lower cost for procuring balancing capacity:
  - Cheaper bids from other areas
  - Sharing of reserves
  - Implicit consideration of opportunity costs

# Inefficiencies in sequential clearing: Price forecast errors

**Anticipating energy prices** becomes a tall ask for market participants, especially in the presence of multiple **interacting balancing capacity products** and with markets of **higher time resolution**. Forecast errors may alter the **merit order curve**, leading to suboptimal results.

**G1:**  $MC_1 = 20 \text{ EUR/MWh}$ ,  $\lambda^*_1 = 50 \text{ EUR/MWh}$

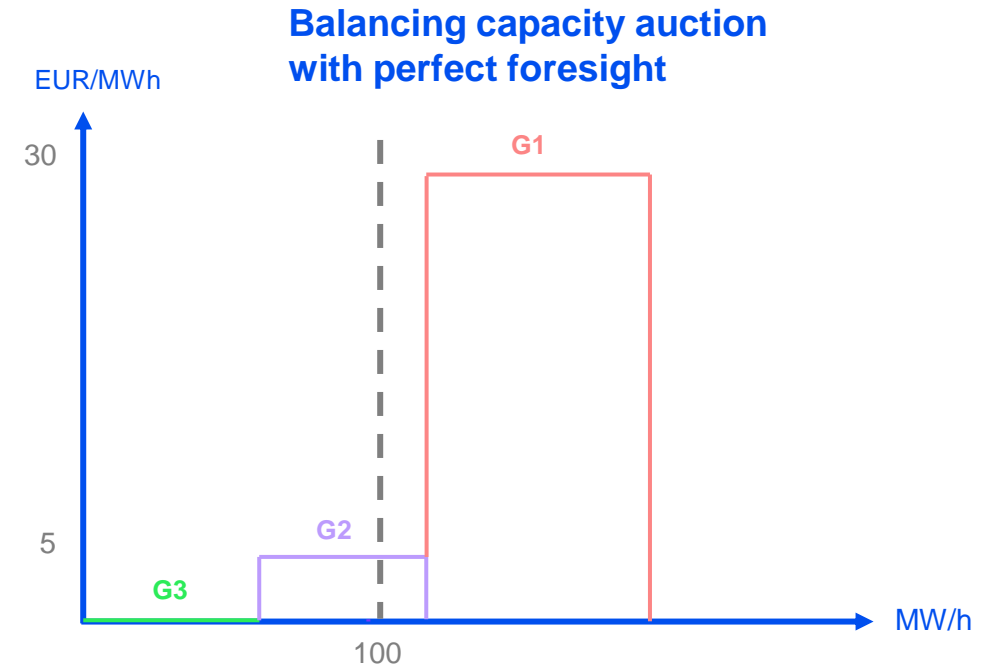
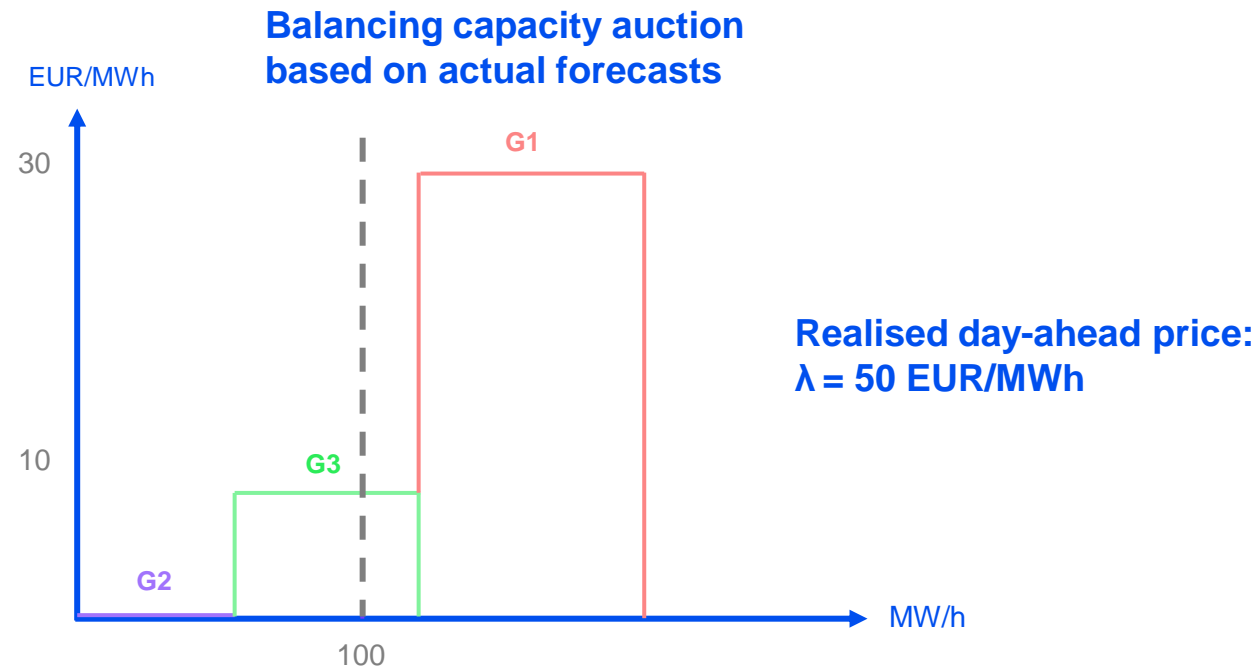
**G2:**  $MC_2 = 45 \text{ EUR/MWh}$ ,  $\lambda^*_2 = 45 \text{ EUR/MWh}$

**G3:**  $MC_3 = 50 \text{ EUR/MWh}$ ,  $\lambda^*_3 = 60 \text{ EUR/MWh}$

**OC<sub>1</sub>** =  $\max(0, \lambda^*_1 - MC_1) = 30 \text{ EUR/MWh}$

**OC<sub>2</sub>** =  $\max(0, \lambda^*_2 - MC_2) = 0 \text{ EUR/MWh}$

**OC<sub>3</sub>** =  $\max(0, \lambda^*_3 - MC_3) = 10 \text{ EUR/MWh}$



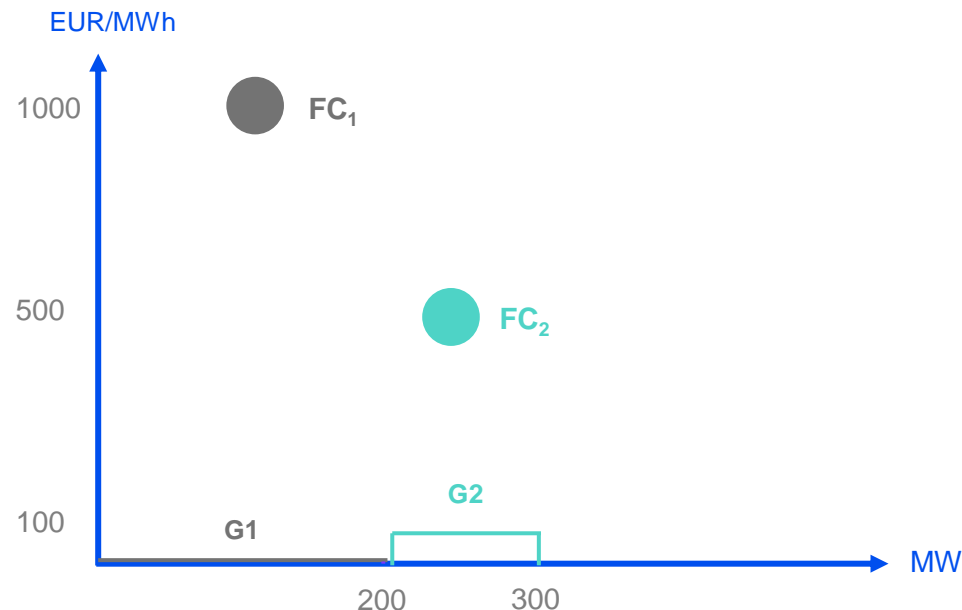
# Inefficiencies in sequential clearing: The role of fixed costs

Even in case of accurate price forecast, **coordination inefficiencies remain**. **Fixed costs**, which are incurred for providing both balancing capacity and energy, **are fundamentally non-separable**. Forcing their separation can lead to an **inefficient allocation of units in the two markets**.

**G1:**  
 $C_1 = 200 \text{ MW}$   
 $MC_1 = 0 \text{ EUR/MWh}$   
 $FC_1 = 1000 \text{ EUR}$

**G2:**  
 $C_2 = 100 \text{ MW}$   
 $MC_2 = 100 \text{ EUR/MWh}$   
 $FC_2 = 500 \text{ EUR}$

**DA load = 100 MW**  
**BC requirement = 100 MW**



Model	DA costs [EUR]	BC costs [EUR]
Co-optimisation	1000	
Seq. clearing	1000	500

**Co-optimisation: Only G1 is committed** as it can cover both energy and balancing capacity needs at the lowest cost, **despite its higher fixed cost**

**Sequential clearing: G2 is dispatched for balancing capacity** due to its lower fixed cost. This commitment is independent on the expected day-ahead energy price

- The study on the **expected welfare gains** from co-optimisation is close to be finalised. A **public workshop** is planned for 17 June to present the study and discuss its findings
- **The timeline for ACER's decision has been extended** to allow for informed discussions with NEMOs, TSOs and market participants
- Some specific elements of R&D, related to **bid design** and supported by the findings of the welfare study, will be subject to stakeholders' feedback via a **public consultation** in May and June
- Additional R&D work is needed to allow for the **implementation** of co-optimisation in SDAC, which is a legal requirement under Article 40 of the EBGL. Its **application** by two or more TSOs is voluntary
- **R&D work** by NEMOs and TSOs is expected to **restart later in 2024**, allowing to gain a deeper understanding on the impact of co-optimisation on the algorithm's performance
- ACER intends to revise NEMOs' proposed **next steps** for the implementation of co-optimisation **in its upcoming decision**

# Updated timeline for ACER Decision



28 November 2023: Initiation of the procedure



18 January – 15 February 2024: Public consultation



1 February 2024: Public workshop



27 May 2024: Publication of external study on expected welfare gains of co-optimisation



27 May 2024 – 19 June 2024: Follow-up public consultation on specific R&D elements



17 June 2024: Public workshop on the external study



August – September 2024: Approval process



# Thank you for your attention!



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