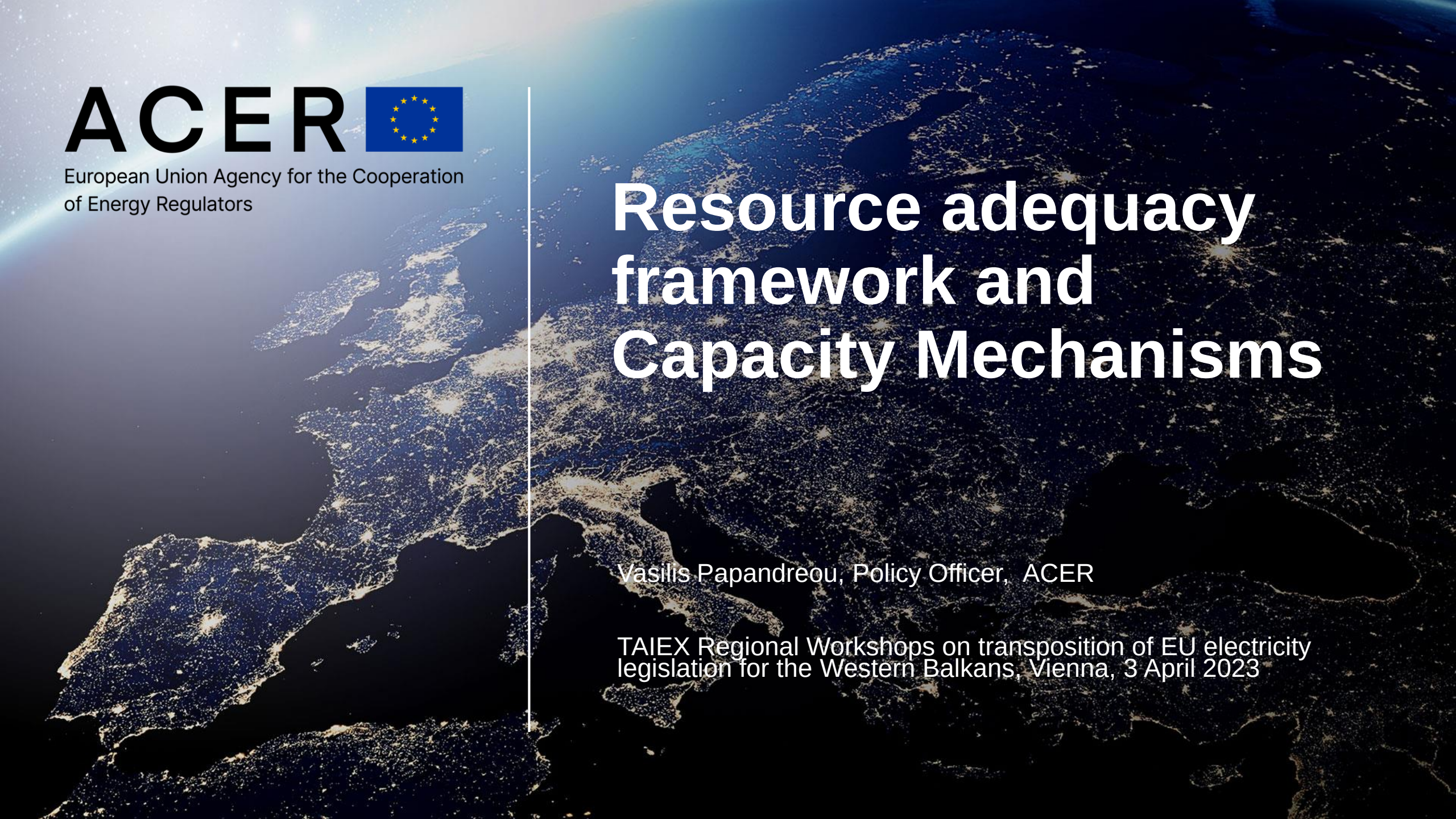

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Resource adequacy framework and Capacity Mechanisms

Vasilis Papandreou, Policy Officer, ACER

TAIEX Regional Workshops on transposition of EU electricity legislation for the Western Balkans, Vienna, 3 April 2023

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ACER's role regarding resource adequacy

- Approving/amending methodologies underlying the decision-making process (Regulation 2019/941, Art.23(6), Art.26(11))
- Approving the European resource adequacy assessments (Regulation 2019/941, Art.23(7))
- Monitoring the performance of Member States in the area of security of supply (Regulation 2019/942, Art. 15(1))
- Monitoring security of supply measures (Regulation 2019/941, Art. 18(3))
- **ACER brings value by**
  - **Highlighting the benefits of mutual interdependency and well-functioning markets**
  - **Increasing transparency and understanding of this topic, and**
  - **Putting pressure to deliver these benefits**
- ACER mainly has soft power (with a hard edge). Member States and the European Commission are the main decision-makers.

↓ Latest from ACER

13.10.2022

ACER publishes the 2021 monitoring report on security of electricity supply

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Agenda

- Introduction
- Monitoring resource adequacy
- Introducing capacity markets

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Introduction

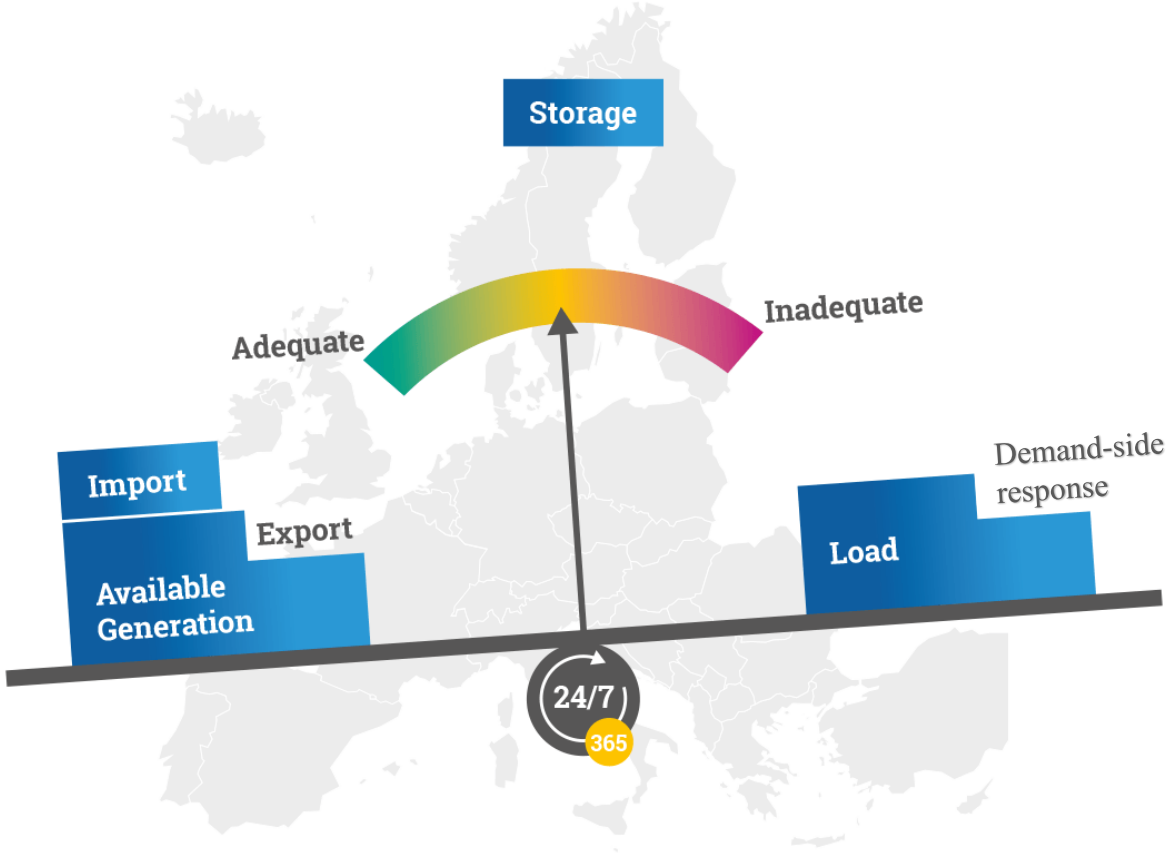
Security of supply: Keeping the lights on

- Risk Preparedness Regulation 2019/941 Art.2(1):

  "*security of supply means the ability of an electricity system to guarantee the supply of electricity to customers with a clearly established level of performance, as determined by the Member States concerned*"

- System Operation Regulation 2017/1485 Art.3(68):

  "adequacy means the ability of in-feeds into an area to meet the load in that area"



Source: ENTSO-E

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From short- to long-term adequacy

Risk Preparedness Regulation
Regulation (EU) 2019/941

Electricity Regulation
Regulation (EU) 2019/943

Short term adequacy
- Day/week ahead

Seasonal adequacy
- Month/season ahead

Long term adequacy
- 10 years ahead

Operational risks
- Short term forecasts (e.g. RES, demand)
- Forced outages
- Other contingencies

Preparedness risks
- Weather (demand)
- Resource availability (e.g. water, gas)
- Maintenance schedules
- Other contingencies

Structural/Market risks
- System evolution (phase-out policies, electrification, decarbonisation, efficiency)
- Market functioning
- Investment risks

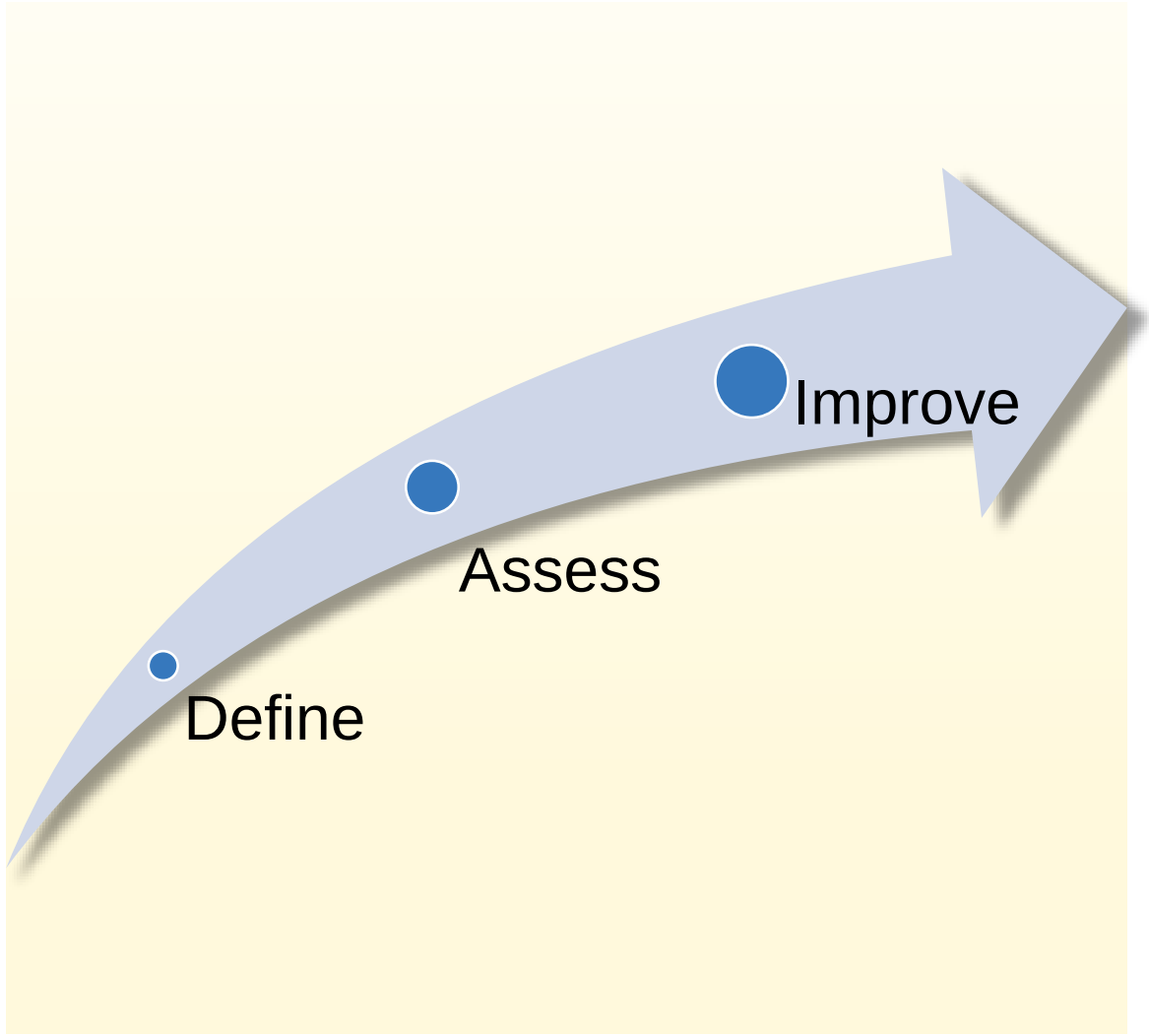
Resource adequacy framework in a nutshell

The Electricity Regulation provides a clear framework to:

1. **Define** the desired/necessary level of resource adequacy at Member State level

2. **Assess** the expected adequacy over the long-term horizon (through an EU wide assessment & optional national assessments)

3. Setting principles for selecting and designing the measures to **improve** adequacy and cope with potential adequacy concerns



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Treating the problem, not the symptom

- **What is the root cause?**
  - Imperfect markets
  - Uncertainty: changing energy landscape
- **Address root causes first – develop a market reform plan**
  - Improve wholesale market design
  - Enable participation of all resources
  - Increase interconnection capacity
- As a **last resort**, Contracting Parties can introduce capacity mechanisms

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Monitoring resource adequacy

Electricity Regulation 2019/943 , Articles 20, 23 - 27

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General principles

- Key goal: **markets first**, intervention only on the basis of a **coordinated and harmonised approach**.
- Monitoring of resource adequacy primarily based on the single **European Resource Adequacy Assessment (ERAA)**.
- …against **national targets** that are calculated based on a single European methodology.

- **Security of supply shall be delivered primarily by the market**

  Electricity Regulation, recital 26: *…, short-term markets and scarcity pricing contribute to the removal of other market distortive measures, such as capacity mechanisms, in order to ensure security of supply.*

- **Member States decide on the level of security of supply**

  Electricity Regulation, recital 46: *Member States should have the **freedom to set their own desired level of security of supply**.*

- **Clear adequacy targets shall be in place for capacity mechanisms**

  Electricity Regulation, recital 46: *Member States intending to introduce **capacity mechanisms** should derive **resource adequacy targets** on the basis of a transparent and verifiable process.*

Setting the right level of security of supply

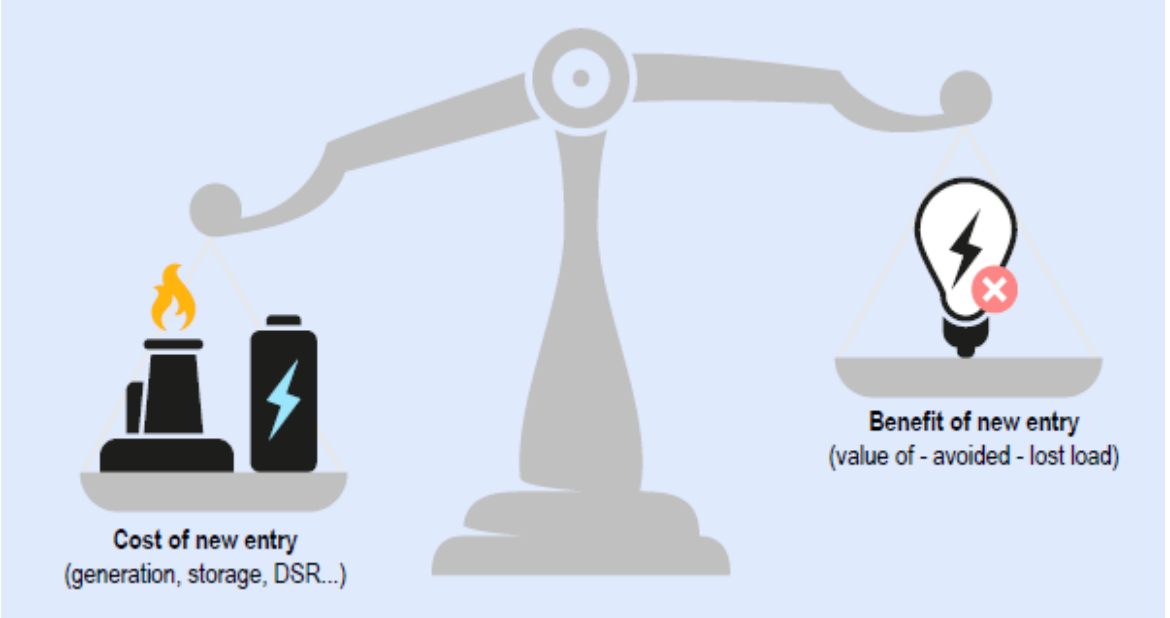
Electricity Regulation Art.25

- When applying capacity mechanisms CPs shall have a **reliability standard** in place:
  - set by the CP or by a competent authority,
  - following a proposal by the regulatory authority,
  - based on a specific methodology (ACER Decision 23/2020),
  - using at least the value of lost load (VOLL) and the cost of new entry (CONE) over a given timeframe and
  - expressed as ‘expected energy not served’ and ‘loss of load expectation’.

If a CM is already in place, VOLL shall be calculated until **25 July 2025** (transposed Electricity Regulation, Art.(11))

Calculating the reliability standard

- The methodology seeks to calculate a socioeconomically efficient reliability standard
- It strikes a balance between the cost of having additional capacity (CONE) and the benefits of having less demand disconnections (measured by the VOLL).
- VOLL estimates are based on appropriate surveys seeking to reveal how consumers value uninterrupted electricity supply.
- CONE estimates are based on techno-economic information of all possible resources that can be deployed in order to reduce demand disconnections (incl. DSR/storage).



Source: ACER, SOS monitoring report.

The reliability standard is expressed as loss of load expectation (LOLE, hours per year.

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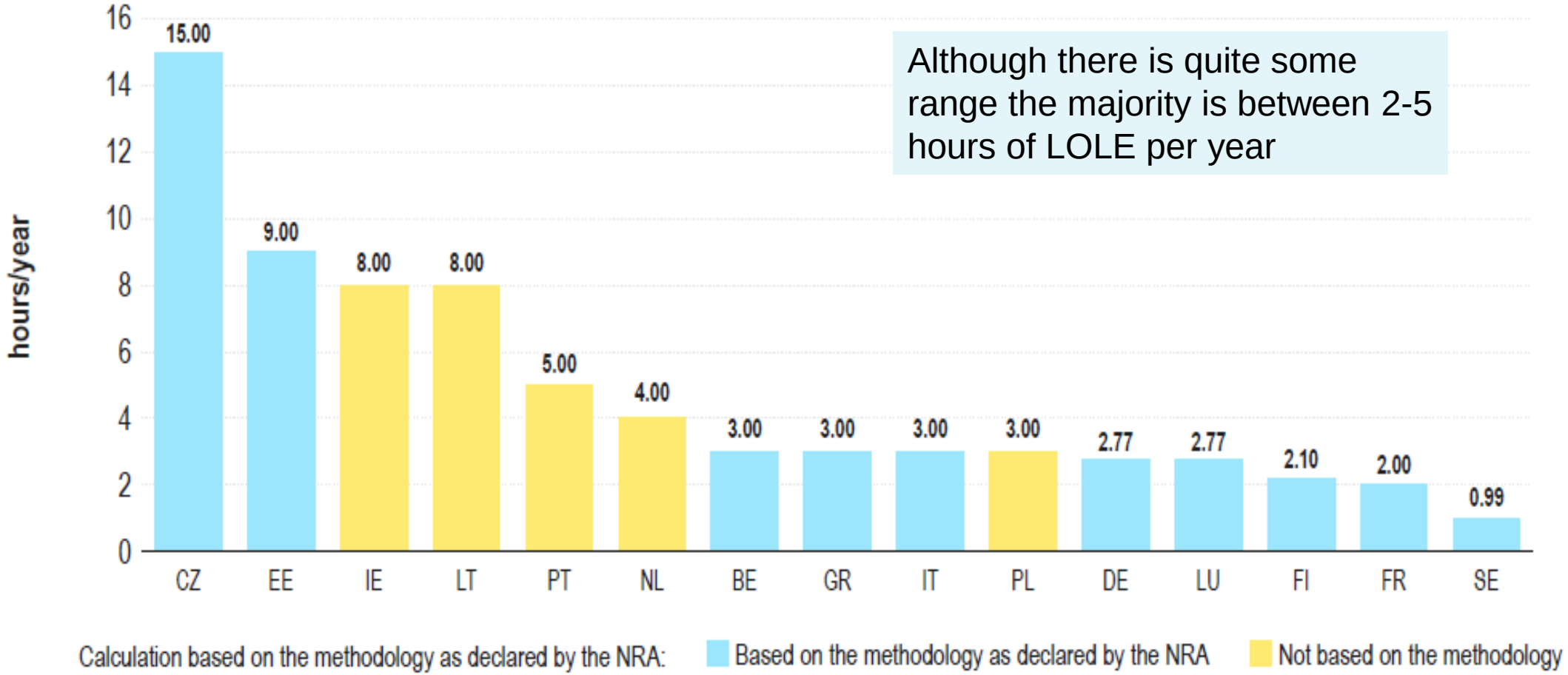
Examples of reliability standards in the EU



Although there is quite some range the majority is between 2-5 hours of LOLE per year

Source: ACER, [SOS monitoring report - 2021], based on NRA data.
Notes: Implementation of the VOLL/CONE/RS methodology based on NRA declarations; the actual degree of compliance is not examined.

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Assessing resource adequacy

Electricity regulation, Art. 24

- CPs shall monitor resource adequacy on the basis of the **European resource adequacy assessment (ERAA)**
- They may complement ERAA with **national resource adequacy assessments (NRAA)**.
- The NRAAs:
  - shall be **regional**
  - shall be based on the **same methodology** (**ERAA methodology**, ACERs Decision 24/2020)
  - shall contain the **same central reference scenarios** as in ERAA
  - may include additional sensitivities considering national particularities using consistent data and tools complementary to the ERAA.

ERAA principles

- Covers EU + Western Balkans + Ukraine + Turkey + Tunisia
- Has a ten year horizon
- Is based on a probabilistic assessment
- Includes central reference scenarios
- May include separate scenarios and sensitivities
- Includes an economic viability assessment of resources EVA)
- Simulates market characteristics

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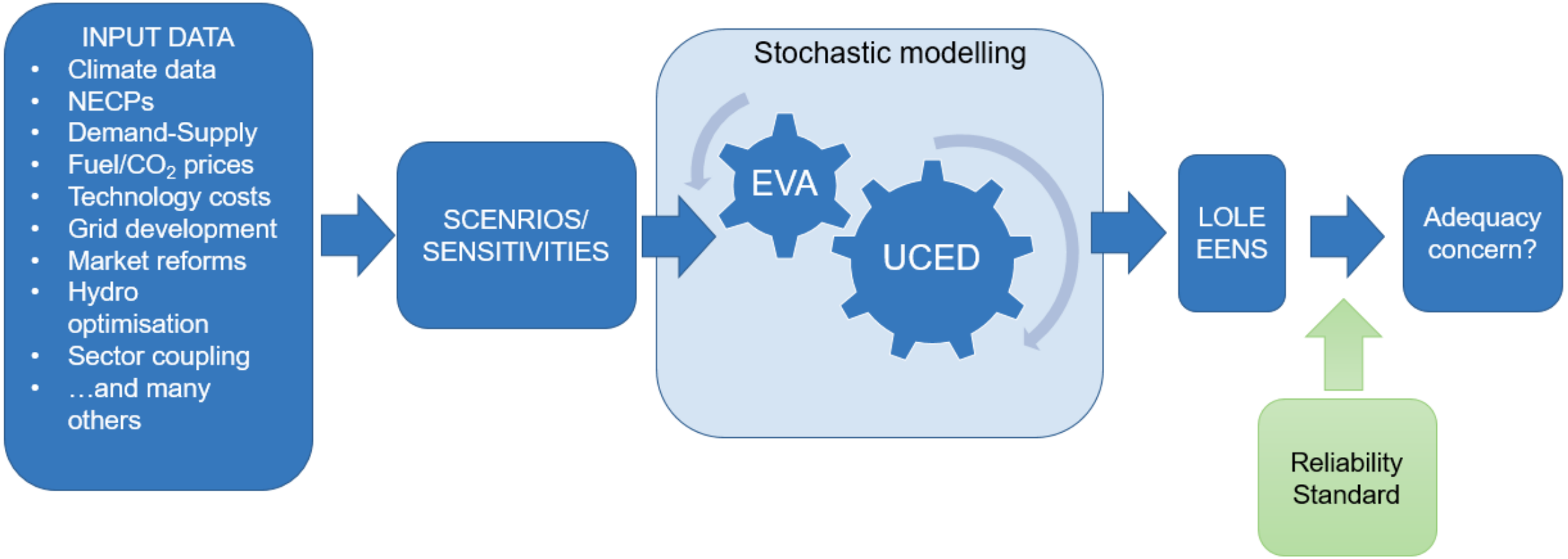
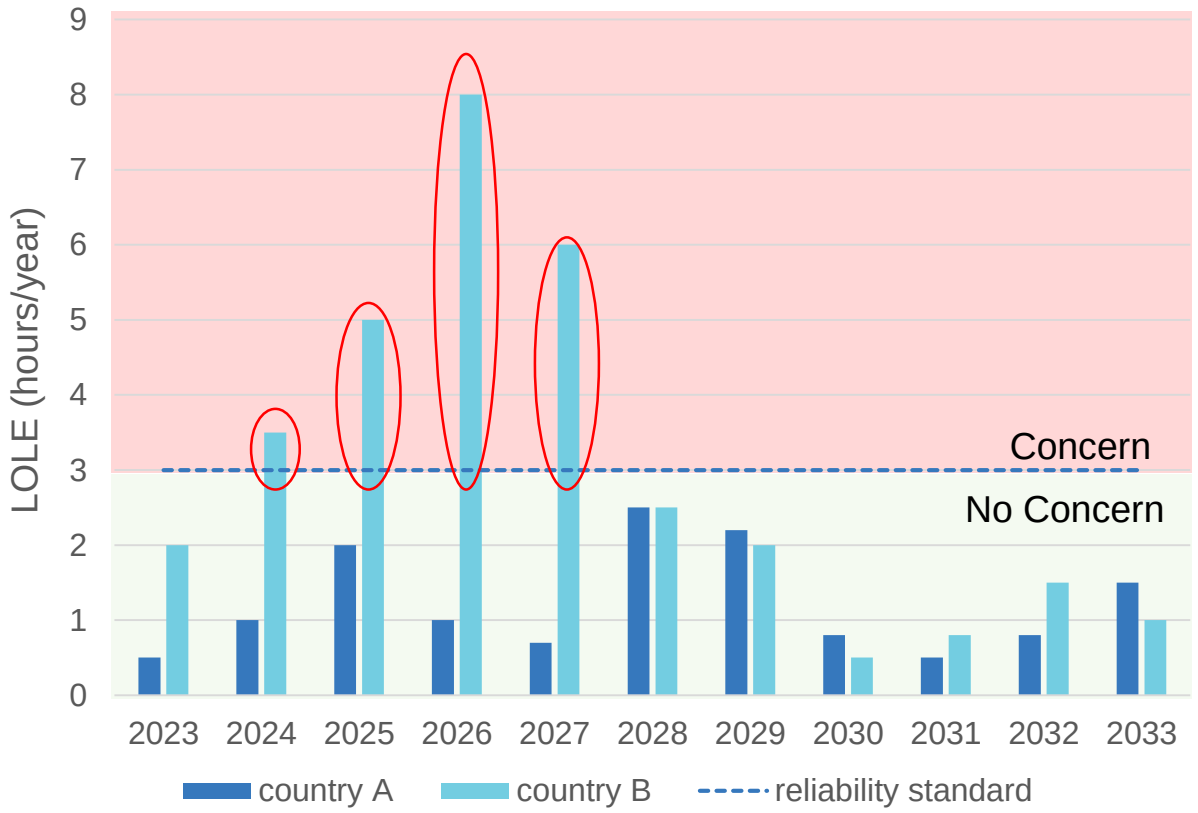
ERAA in a nutshell



EVA: economic viability assessment, UCED: unit commitment and economic dispatch, EENS: Expected energy not served, LOLE: Loss of load expectation

Adequacy concern

- A resource adequacy concern is identified by comparing:
  - the forecast level of adequacy
  - the reliability standard
- The ERAA methodology (Art. 8) defines the adequacy concern **on the basis of the results of the central reference scenario**



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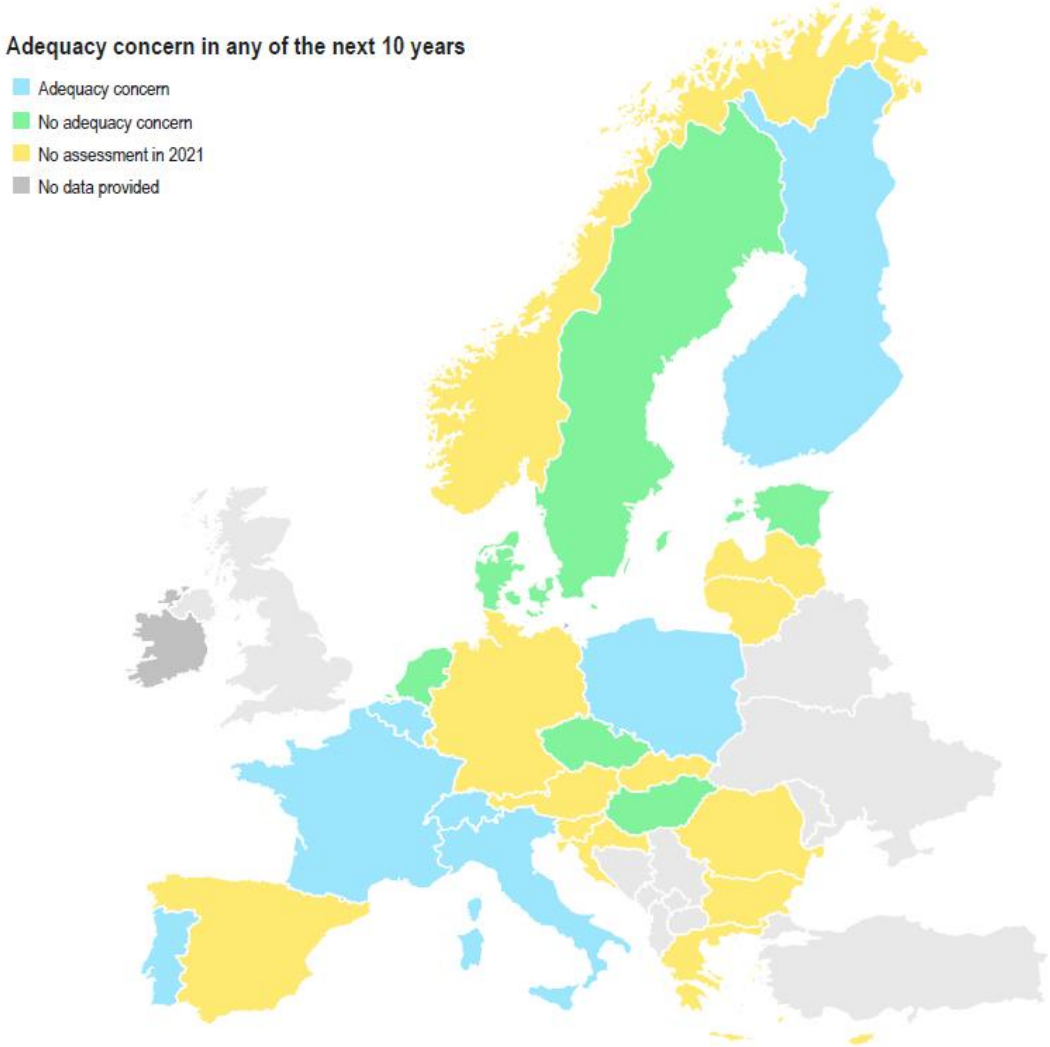
Identifying adequacy concerns

Electricity Regulation Art.24(3)

- Adequacy concerns are identified either in ERAA or in NRAAs
- If NRAA shows concern where ERAA sees none then the NRAA shall justify this divergence
  - assumptions
  - sensitivities
- The NRAA report shall be published and submitted to the Energy Community Secretariat
- Within 4 months the Secretariat will issue an opinion on whether the differences are justified, taking into account ECRB's opinion and ACERs consultation
- If necessary the NRAA shall be amended according to the opinion; if not full reasoning for not doing so shall be provided.

ECRB: Energy Community Regulatory Board

Adequacy concerns in the EU – national context



- The maps shows adequacy concern in Member States in any of the next 10 years indicated by the NRAA performed in 2021.
- Thirteen Member States performed a NRAA in 2021. Seven of these assessments identify adequacy concerns in at least one of the coming ten years.

Source: ACER, SOS monitoring report - 2021, based on NRA data.

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Treating the problem, not the symptom

- **What is the root cause?**
  - Imperfect markets
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- **Address root causes first – develop a market reform plan**
  - Improve wholesale market design
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Market reform plans

Electricity Regulation Art.20(2)-(3)

- Prior to any out of market measures like capacity mechanism, CPs that identified a resource adequacy concerns shall
  - identify **regulatory distortions** or **market failures**;
  - produce an **implementation plan** (marker reform plans) to address these distortions/failures;
  - include **measures** and a **timeline**.
- CPs shall in particular consider the following:
  - removing **regulatory distortions**;
  - removing **price caps**;
  - introducing a **shortage pricing** for balancing energy;
  - increase **interconnection** and strengthen **internal grid;**
  - enable **self-generation**, **energy storage**, **demand side** measures and **energy efficiency**;
  - ensure cost-efficient and market-based procurement of balancing and ancillary services;
  - remove **regulated prices**.

Process

- CPs identify adequacy concern
- CPs submit implementation plan to EnCS
- EnCS issues opinion after 4 months on sufficiency of the measures
- CPS amend the plan if needed
- CPs monitor application of plans and publish annual report
- EnCS issues an annual opinion on implementation of the plans
- CPs to stick to the plan even if adequacy concerns have been removed

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Capacity mechanisms

Electricity Regulation 2019/943, Articles 21-22

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What is a capacity mechanism?

Electricity Regulation. Art. 2(22): *'capacity mechanism' means*

- *a **temporary** measure…*
- *…to ensure the achievement of the **necessary** level of resource adequacy…*
- *…by remunerating resources for their **availability**,…*
- *…**excluding** measures relating to ancillary services or congestion management;*

Advantages:

- Help to secure supplies
- Provide certainty for investors

Drawbacks:

- Costs can be high
- Consistent with the energy transition?
- Distort market functioning?

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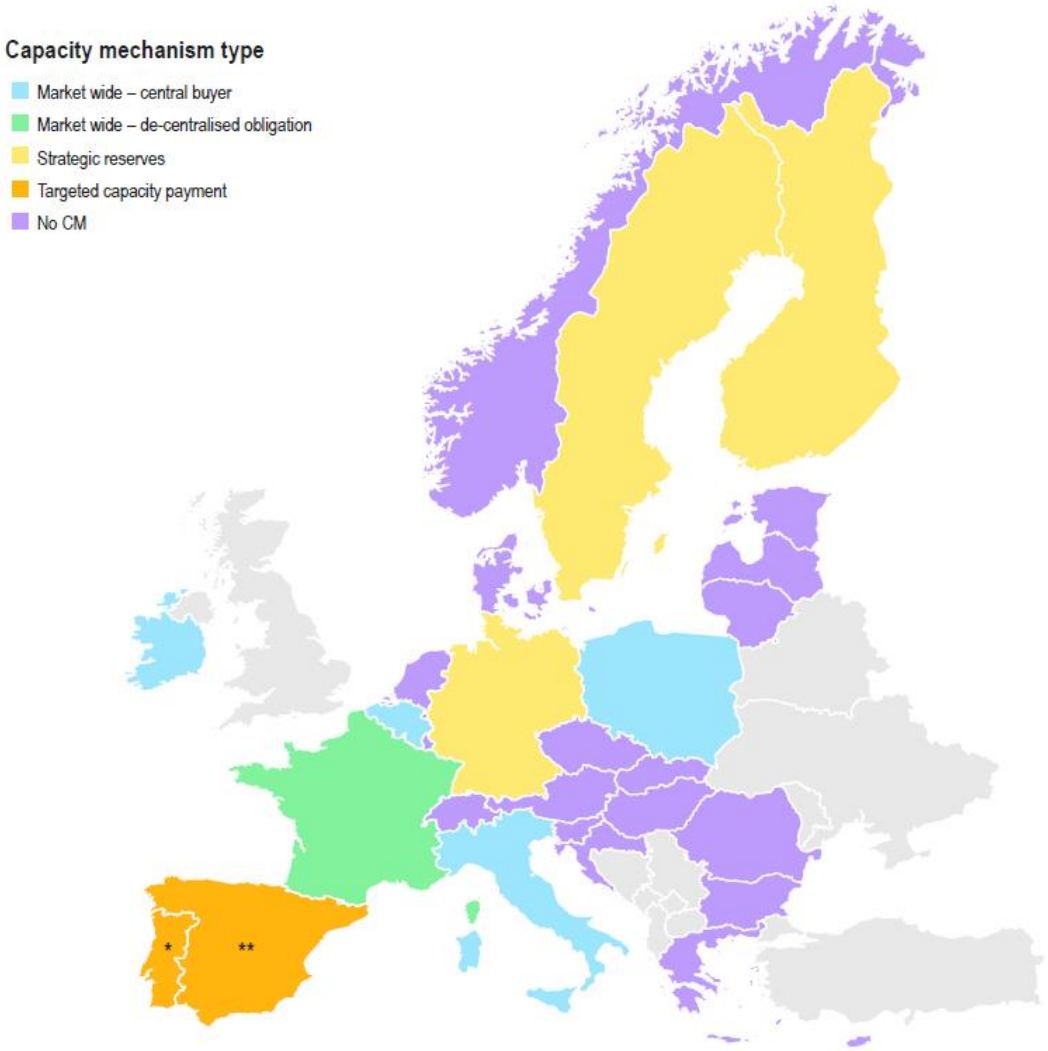
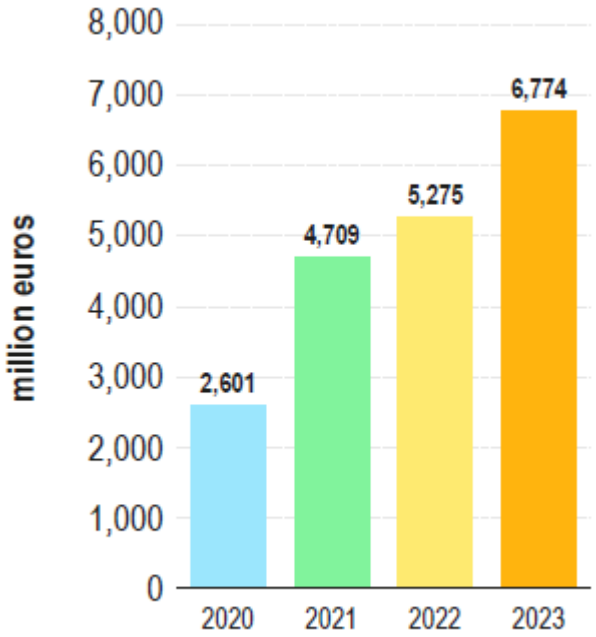
Capacity mechanisms in the EU



Total cost of capacity mechanisms in the EU



Note: 2022-2023 are forecasts

Source: ACER, SOS monitoring report, based on NRA data.
, Portugal and Spain have legacy contracts but no effective mechanism in place*

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When to introduce capacity mechanisms?

Electricity Regulation Art. 21

- **After** adequacy concerns are identified in the ERAA and/or NRAA…
- , **and** implementation plans developed and received opinion by the EnCS...
- …as a **last resort** to tackle **residual** resource adequacy concerns and taking into account State Aid rules…
- … after examining the effect of the mechanism on **neighbouring** markets and **consulting** relevant CPs/MSs

NOTE:

- For **applied** capacity mechanisms no new contracts shall be signed if ERAA and NRAA do not identify adequacy concerns or the implementation plans has not received opinion by the EnCS
- A smooth phase out shall be included in the design of capacity mechanisms
- State Aid approval process shall be applied

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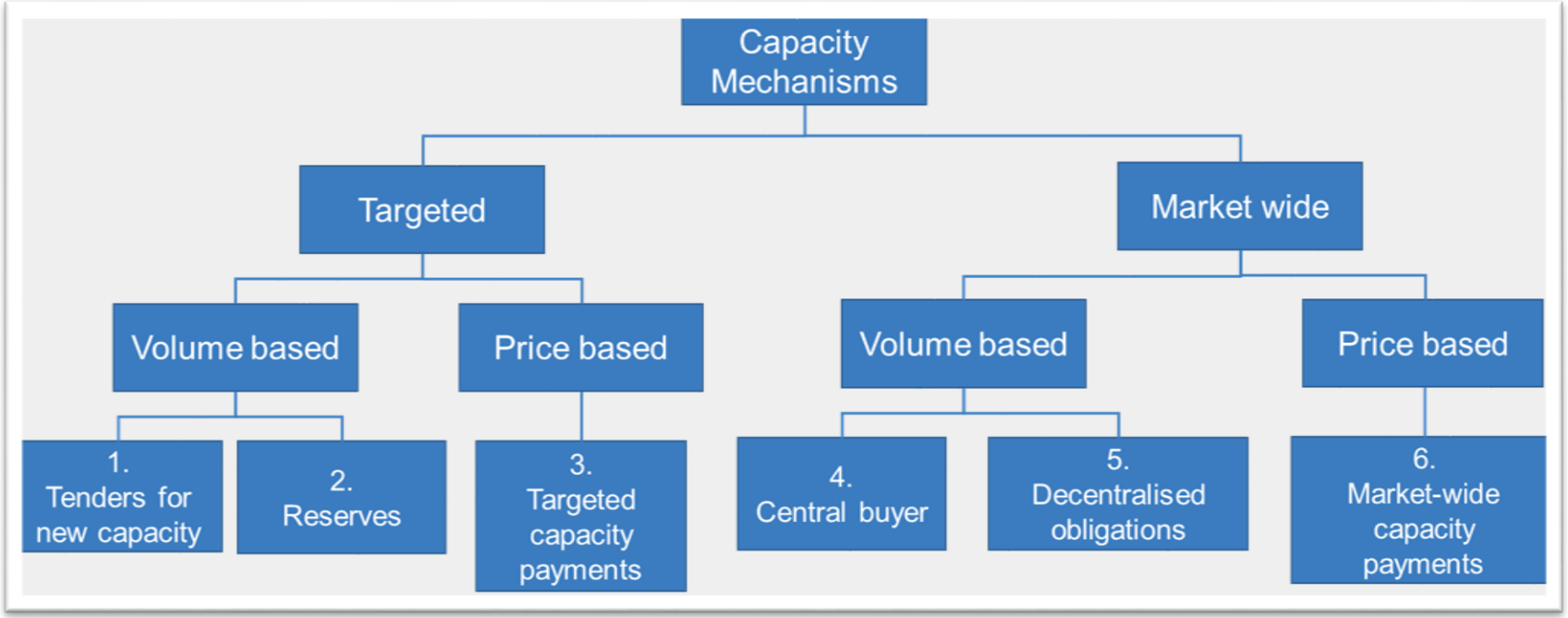
What type of capacity mechanism?

Electricity Regulation, Art.21 (3)

- CPs shall examine whether a **strategic reserve** can address the remaining adequacy concerns
- If not they may introduce other types of capacity mechanisms

Taxonomy of capacity mechanisms*



* Visual adjusted from the final report of the sector inquiry on capacity mechanisms SWD(2016) 385 final

How to design capacity mechanisms

Electricity Regulation, Art. 22 (1)

All capacity mechanisms shall:

- be **temporary**;
- **not create** undue **market distortions** and **not limit cross-zonal trade**;
- not go beyond what is **necessary** to address the identified adequacy concerns;
- select capacity in a **transparent**, **non-discriminatory** and **competitive** way;
- incentivise capacity providers to **be available during expected system stress**;
- ensure **remuneration** is determined in a **competitive** way;
- set eligibility criteria for participation **in advance** of the selection;
- be technology neutral;
- apply appropriate penalties for non delivery.

NOTE !

Article 22(5)**: Existing capacity mechanism** shall be adapted to comply with **Chapter 4** without prejudice to commitments or contracts concluded by 31 December 2022.

Article 25(4)
The amount of capacity procured shall be approved by the CP, on the basis of a **proposal of the regulatory authority.**

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…additional requirements

Electricity Regulation, Art. 22 (2), (3)

For **strategic reserves**

- activation only if TSOs foresee full use of the balancing resources;
- when activated imbalances are to be settled at least at VOLL or higher than the intraday technical price limit, whichever is higher;
- the output of the strategic reserve is to be attributed to BRPs through the imbalance settlement mechanism;
- strategic reserves are **not** remunerated from the wholesale/balancing market;
- strategic reserves are held outside the market for the contractual period (or beyond)

Capacity mechanisms **other than** strategic reserves

- shall ensure that the price for capacity automatically tends to zero when supply for capacity meets the needs;
- remunerate only for availability (not energy) and do not affect decisions on whether or not to generate;
- ensure transferability of obligations (secondary market)

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Emission limits in capacity mechanisms

- **No contracts or payments** if:
  - capacity starts commercial production on or after 15 Dec 2022, and emits more than **550 g of CO2 of fossil fuel origin per kWh of electricity**;
  - from **1 July 2025** at the latest, for capacity started commercial production before 15 Dec 2022, and emits more than 550 g of CO2 of fossil fuel origin per kWh of electricity **and** more than **350 kg CO2 of fossil fuel origin on average per year per installed kWe**.
- Emission limits shall be calculated on the basis of the **design efficiency** of the generation unit (net efficiency at nominal capacity).
- CPs need to **take into account** ACER's opinion on the calculation of the emission limits (ACER Opinion 22/2019 and calculation examples)
- In essence:
  - only efficient gas plants or co-firing power plants (550 g/kWh_e limit)
  - coal/lignite only for strategic reserves (350 kg CO_2/kW_e limit)

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Cross border participation

Electricity Regulation Art.26

- Capacity mechanisms shall allow participation of foreign capacity providers from other CPs or MSs
- Exclusion only for strategic reserves if this is not technically feasible
- Foreign capacity shall compete with domestic capacity in the same process
- For existing schemes **interconnectors** may participate up 4 years after adoption
- CPs can decide whether to allow foreign participation only from neighbouring CPs/MSs or from others
- Participation in **more than one** mechanism is allowed; if not available to fulfil multiple commitments they shall be exposed to non-availability payments
- Maximum allowable cross border participation (maximum entry capacity, MEC) calculated based on specific methodology by RCCs and **recommended** to TSOs
- Technical details on implementation are clarified in Technical Specifications (ACERs Decision 36/2020) (MEC calculation, revenue sharing, TSO-TSO cooperation, registry of capacity providers)

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Concluding

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Key take-aways

- **ERAA is the main resource adequacy assessment tool**
  - Ensure that ENTSO-E gets the necessary information to carry it out
- **Proper NRAAs can complement ERAA**
  - ERAA methodology is demanding
- **In case of adequacy concerns, fix the problems first**
  - Identify why the market is not delivering adequacy
  - Fix the problems (implementation plans)
- **If concerns persist and a capacity mechanism is considered (or already exists)**
  - Calculate VOLL, CONE, and reliability standard according to the methodology
  - Check if a strategic reserve will do the job
  - Respect the design principles of the CMs
  - Allow for cross border participation
- **Monitor the situation regularly and make corrections where necessary**

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