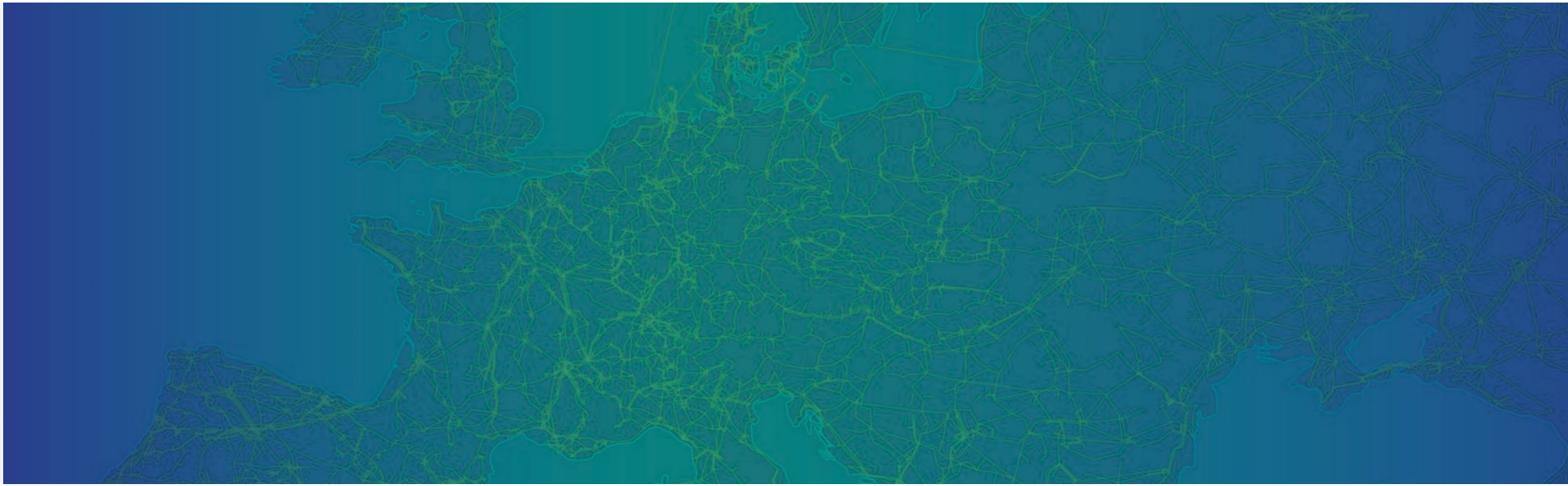
# DSO Entity and ENTSO-E Public Webinar on Flexibility Needs Assessment Methodology



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# Agenda

| Topic | Presenter |
|---|---|
| **Welcome and Introduction** | Shilpa Bindu |
| **Structure of the latest draft version** | Hubert Dupin |
| **Roles and Responsibilities** | Hubert Dupin |
| **Data inputs and needs covered** | Mario Sisinni |
| **System needs** | Mario Sisinni |
| **DSO needs** | Hubert Dupin |
| **Finetuning and guiding principles** | Hubert Dupin & Mario Sisinni |
| **Amendments to the methodology** | Mario Sisinni |
| **Closure** | Shilpa Bindu |
| **Q&A session** | |

# Background

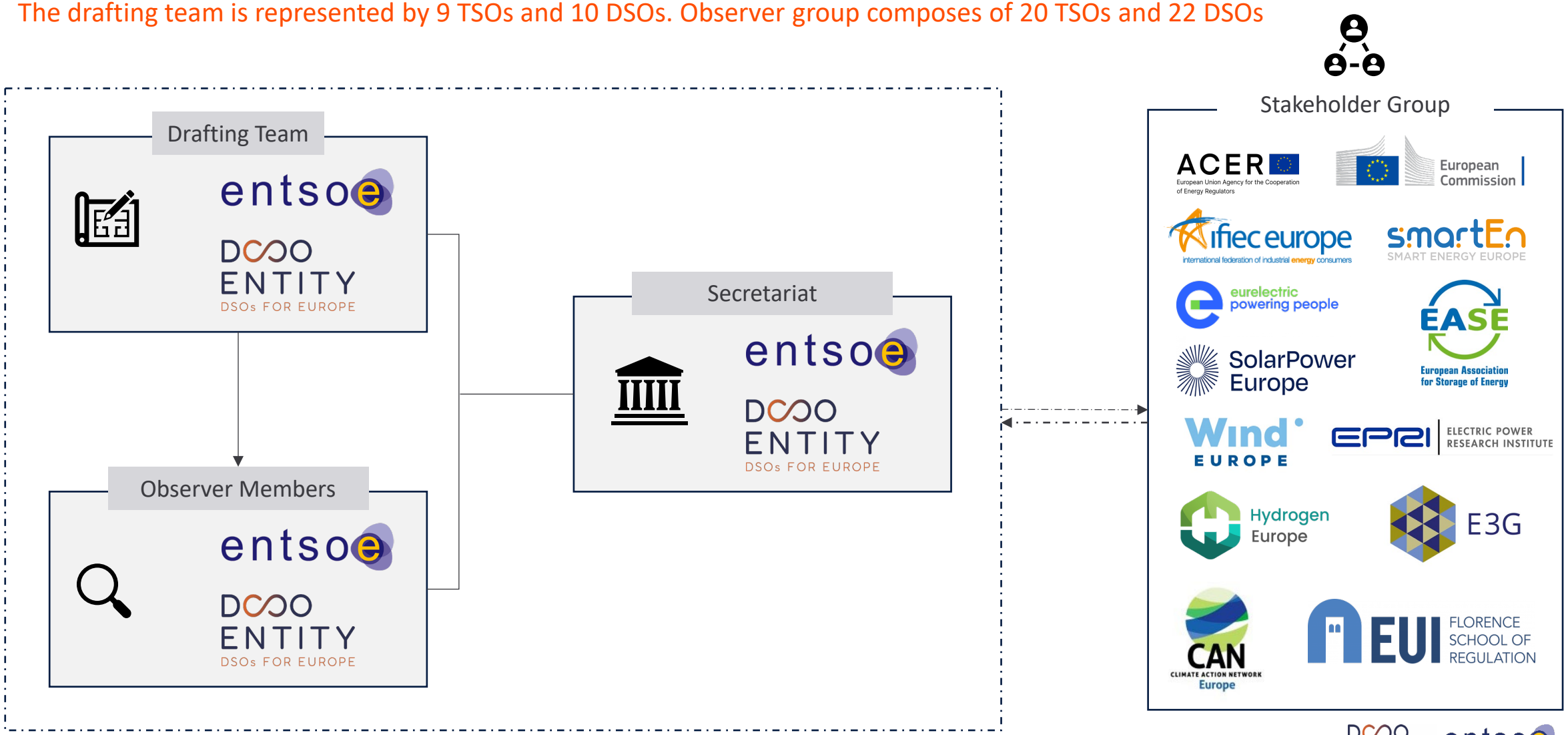
Flexibility is the ability of a power system to adjust to the variability of generation, consumption and grid availability

- **Article 19e of Electricity Market Design Reform** requires Member States to adopt a report on estimated flexibility needs for a period of at least the next 5 to 10 years
- This report shall be based on the **data and analyses** provided by the transmission system operators (TSOs) and distribution system operators (DSOs)
- ENTSO-E and EU DSO Entity shall develop a methodology for the analysis of flexibility needs, and define the type and format of data to be provided to the designated entity/authority to adopt the report
- If Member States identify a lack of investment in **non-fossil flexibility**, they can apply non-fossil support mechanisms (Article 19f, 19g)

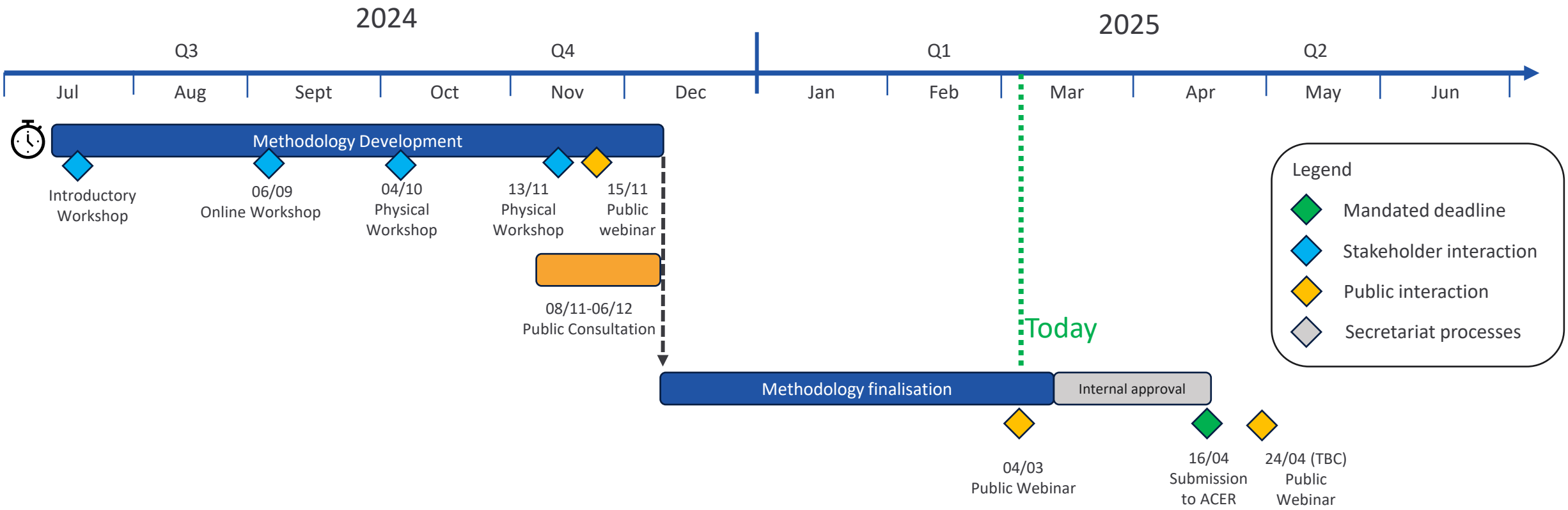
Electricity Market Design Reform (EMDR): EU Regulation 2024/1747

# Organizational structure of the project

The drafting team is represented by 9 TSOs and 10 DSOs. Observer group composes of 20 TSOs and 22 DSOs



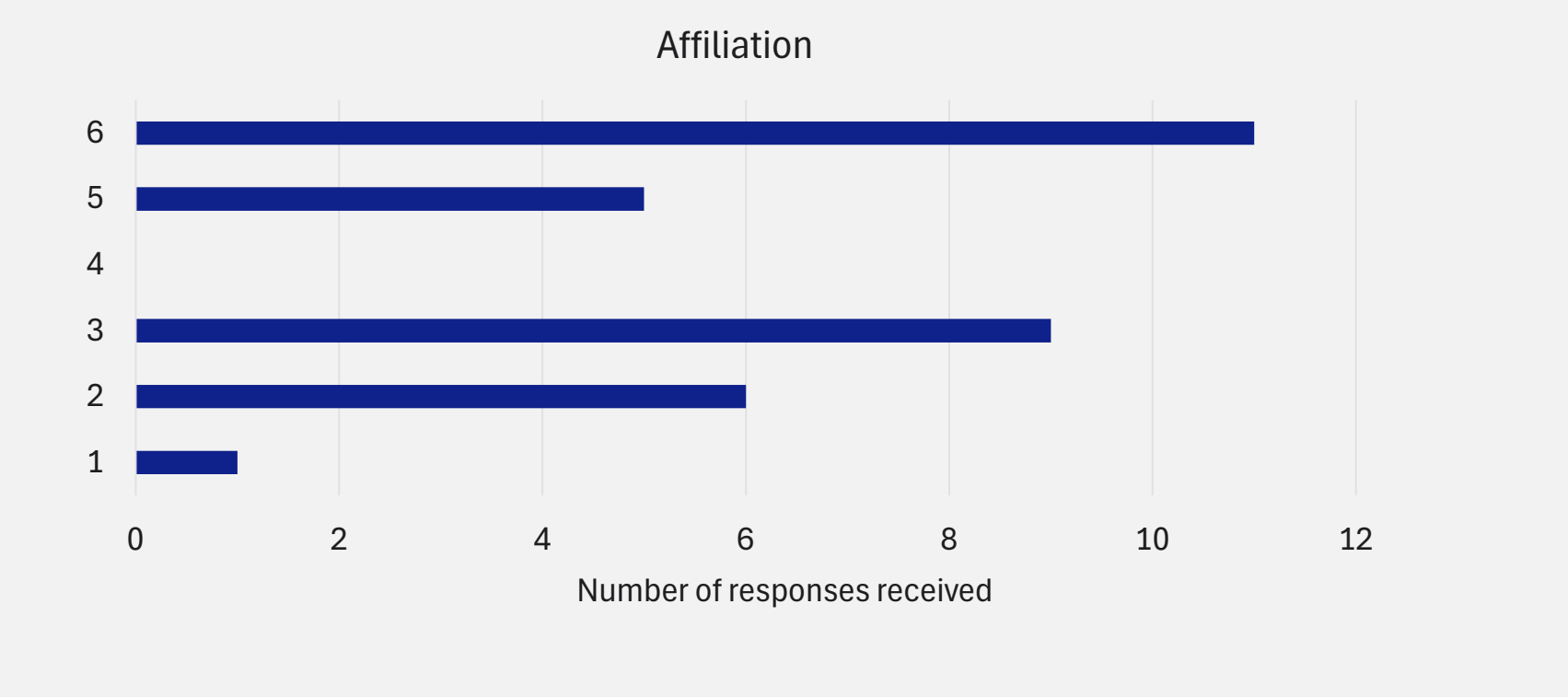
# Flexibility Needs Assessment Methodology – Project Timeline



# Summary of consultation responses

Objective of the public consultation was to get feedback on the technical content of the draft

- Public consultation was open from 08 November to 06 December 2024
- A total of 32 responses were received through the tool during this period



# Overall changes since the public consultation

- The current version addresses the full scope of the methodology with an adapted structure of the document, including articles on
  - National implementation streamlining who does what when
  - Unavailability of flexible resources due to grid prequalification and temporary limits
  - Interaction of system needs with network needs
  - Guiding criteria
  - Market barriers
- The definitions, inputs, outputs, methods, indicators and templates are fully developed
- Consistency is addressed, including
  - aligning TSOs and DSOs on NECP, target years, and building on the intrinsic consistency embedded when performing ERAA, NAA, TYNDP and DNDPs
  - Ensuring temporal, spatial and voltage granularity is coordinated at national level between DSOs

Current structure of the methodology

Whereas

| | |
|---|---|
| Article 1. | Subject matter and scope |
| Article 2. | Definitions |
| Article 3. | Roles and responsibilities |
| Article 4. | National implementation |
| Article 5. | Confidentiality obligations |
| Article 6. | Data and analyses |
| Article 7. | Needs covered |
| Article 8. | System needs |
| Article 9. | System needs – RES integration |
| Article 10. | System needs – Ramping Needs |
| Article 11. | System needs – Short-term flexibility needs |
| Article 12. | Principles to assess DSO network flexibility needs |
| Article 13. | DSO network flexibility needs |
| Article 14. | TSO network flexibility needs |
| Article 15. | Fine-tuning system needs with network needs |
| Article 16. | Unavailability of flexible resources due to grid prequalification and temporary limits |
| Article 17. | Guiding criteria |
| Article 18. | Derogations |
| Article 19. | Amendments of the methodology |
| Article 20. | Language |
| Article 21. | Market Barriers and contribution of digitalisation |

Annex I: Examples of Table 2 to report DSO flexibility network needs

# Definitions

## Synthesis of comments / final version

### Identified problem cluster

- Clarification of the definition of network flexibility needs and their scope.

- Some definitions are not fully consistent with Network Code on Demand Response

- Some definitions are not fully consistent with Regulation 2019/943 and 2024/1747

### Changes made to the draft

New definitions and recitals to better describe network flexibility needs, scope and content.
Also differentiated between upward and downward network flexibility needs.

Some definitions have been updated, but the current draft of NC DR is handled by ACER and still not released to European Commission (March 25?).

Definitions have been improved accordingly

# Main Definitions

## Final approach

The updated draft provides definitions for the keywords that are introduced by this methodology

| *Term* | Definition |
|---|---|
| Network Flexibility Needs | *"flexibility needed to adjust for grid availability, by means of preventing or solving congestion or voltage issues, across relevant timeframe"* |
| System Flexibility Needs | *"flexibility needed by the electricity system to adjust to the variability of generation and consumption patterns, across relevant market timeframe"* |
| RES Integration Needs | *"quantity of flexibility required to achieve annual RES integration targets or maximum acceptable level RES curtailment for the Member State"* |
| Ramping Needs | *"needs associated with hourly variations of the residual load assuming perfect forecast conditions"* |
| Short-term Flexibility Needs | *"needs associated with unexpected variations of the residual load or forced outage of assets during the intra-day or balancing timeframe"* |

# Roles and responsibilities, delegation and national implementation

## Synthesis of comments and related changes made

**Ensure a cohesive and efficient implementation of the methodology, in particular through a coordinating role of ENTSO-E and DSO Entity**

- ➔ ENTSO-E and DSO Entity guidance on how TSOs and DSOs shall interpret and apply the FNA methodology
- ➔ EU DSO Entity guidance of DSOs based on lessons learnt on the methods for the calculation of the flexibility needs

**Specify the role and tasks of the NRA, or another authority or entity designated with adopting the FNA report, in the FNA methodology**

- /!\ Mandate of this methodology restricted to
  - 1) the type and format of data which TSOs and DSOs shall provide
  - 2) outline the methodology for analysis by TSOs and DSO
  - 3) Tasks of EU-DSO Entity and ENTSO-E
- ➔ Refined provisions on coordination between TSOs, DSOs and the designated authority or entity at the national level
- ➔ No ruling on the tasks of the national entity or authority, the NRA, or Member States.

**Ensure overall responsibility**
**Consider assignment by MS rather than DSO delegation**

- ➔ A whole new article on the national implementation : who does what when
- ➔ DSO delegation intrinsically linked to the methods available to provide data
- ➔ Provisions on confidentiality improved

# National timeline

## Synthesis of comments and related changes made

Request for more time for national entity/authority

Insert a public consultation

- TSOs and DSOs need sufficient to define at national level
  - the organisation to process and deliver (can be > 100 DSOs in a country)
  - The common target years
  - the temporal, spatial and voltage granularity of DSOs data,
  - then to perform analysis and provide data
- Providing such data requires to adjust/create methods

Schedule too fast for TSOs/DSOs to provide new data (beyond existing methology)

Request to have different schedule for TSO vs DSOs

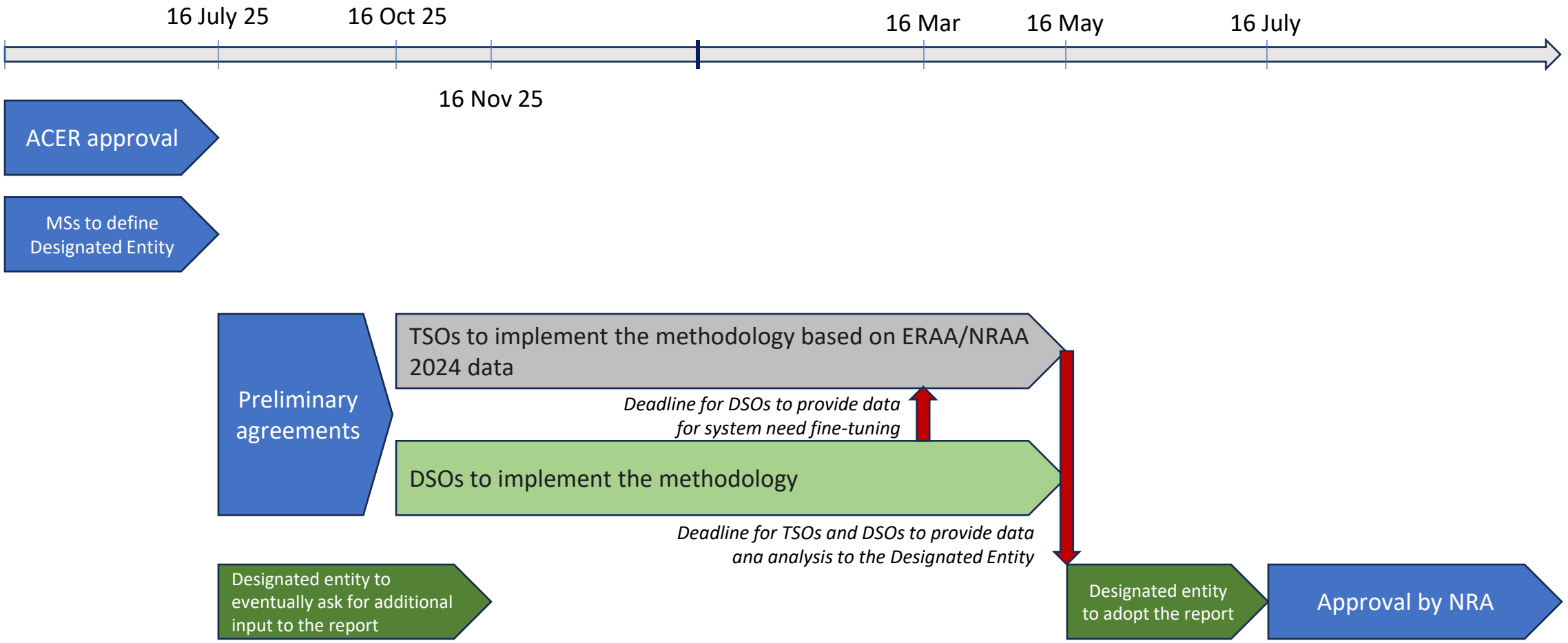
Timeline to be coordinated at national level between TSOs/DSOs, National Entity/Authority and NRA

Upper boundary set at 10 months for TSOs & DSOs to provide data and analysis

No timeframe set in EMDR for NRA to send data to ACER

Public consultation not foreseen

# Art. 3-4 – Roles & Responsibilities and National implementation




- Timing for exchanges between TSOs and DSOs can be agreed at national level
- Deadline for Designated entity to ask for additional input and analysis (duly justified) set at the begin of the process to allow implementation
- Designated Entity/NRA not supposed to run analysis, but only responsible for drafting up the report and include assessment of market barriers and contribution of digitalization

# Overview of data inputs & needs covered

## Synthesis of comments

### Consistency: Align on target year, ensure consistency of scenarios, use latest approved data

- Consistency is now embedded as an essential part of the methodology, to a large extent « by design »
  - FNA is based on DNDP, ERAA or NRAA that in turn use scenario consistent with the National Energy & Climate plan (NEPCs)
  - TSOs and DSOs align on target years, where the minimum corresponds to the policy year considered in NECPs
  - DSOs shall only use latest final published DNDP while TSOs the latest published ERAA or NRAA

### Availability of DSO data: Clarifying interpolation / extrapolation (DSOs); use finer DSO data (hourly data), and extend the outlook beyond 10 years

- DSO data builds on DNDP to get a solid framework and basis for scenario, data, and flexibility assessment
  - DNDP requirement is to develop data for the next for the next five-to-ten year. Extending network flexibility needs beyond DNDP would be without any solid basis, and would jeopardize the relevance of data and of any conclusion
- DNDP does not use hourly data since DSO don't use economic dispatch model. However, new provisions on "Fine-tuning" has been defined in order to transform "time block data" into "hourly data"

### Make data available

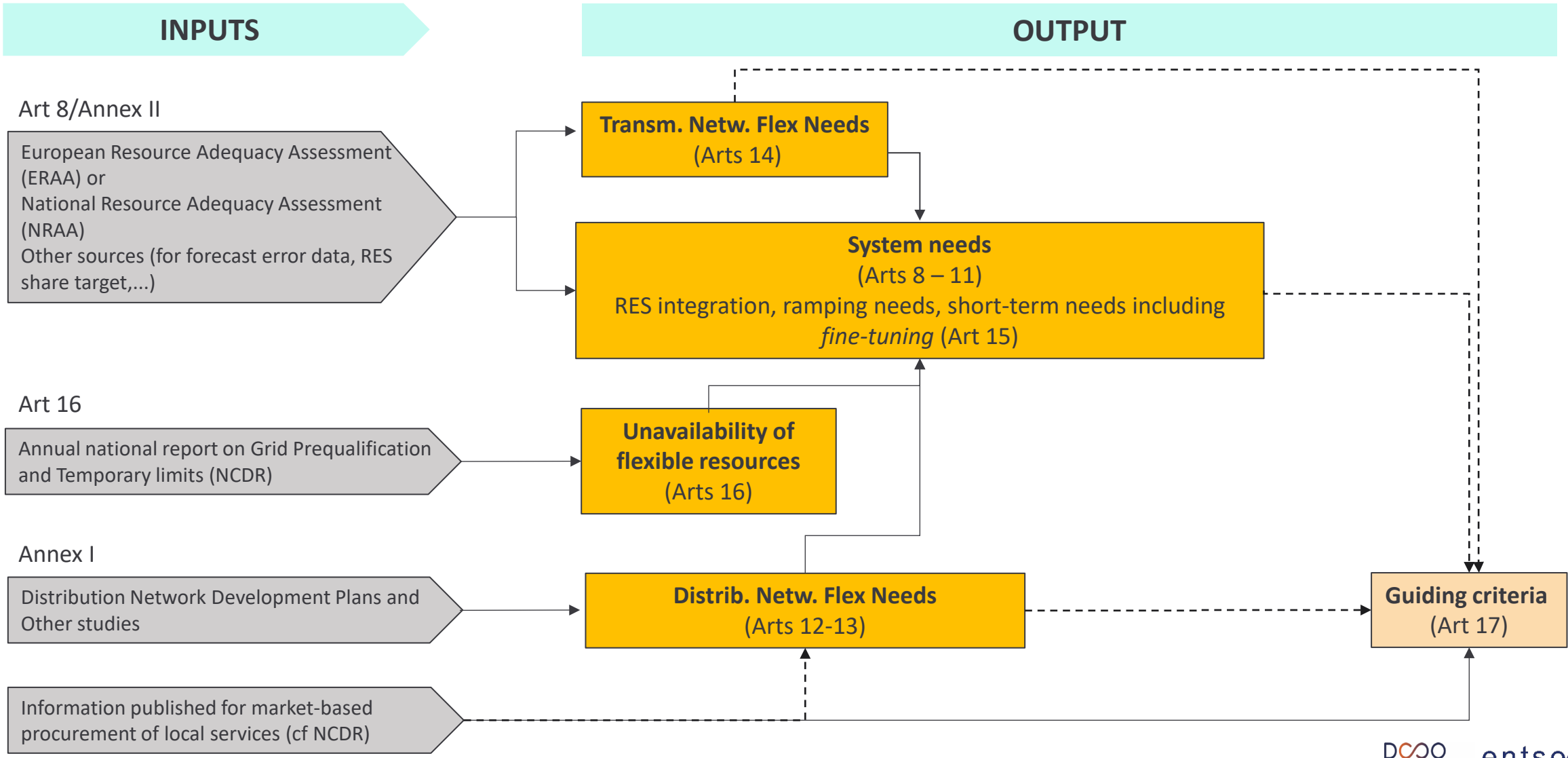
- DSO data is public: DNDP and market information is a core already published input data, while Table 2 will be also public
- ERAA data is public. NRAA must be consistent with ERAA data to be used. The output of the methodology will be part of the FNA report

### Coordination with gas and hydrogen operators

- As stakeholders, Gas and hydrogen operators are already involved in the underlying scenario building and process of ERAA/NRAA and DNDP

# Overview of data inputs & needs covered

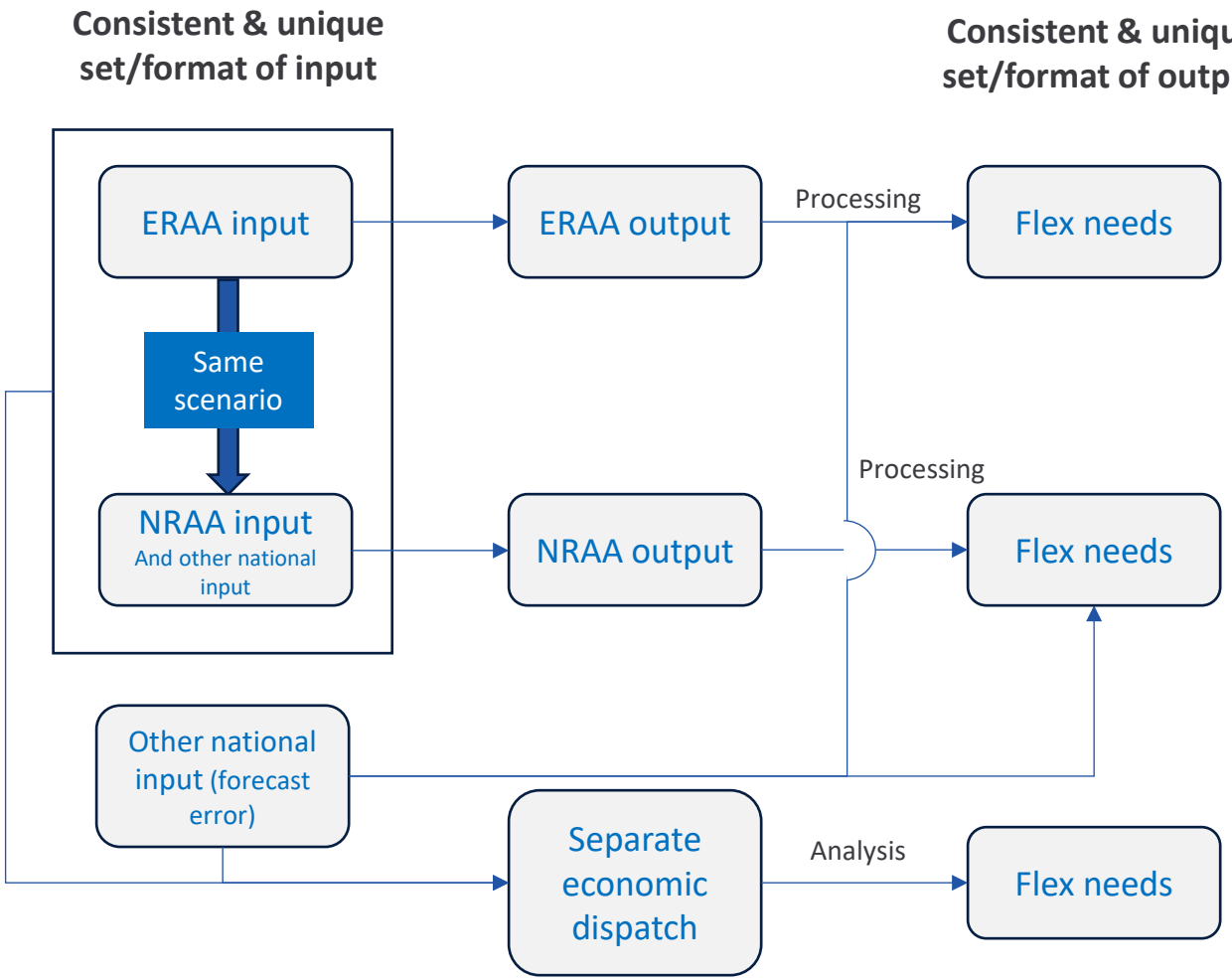
## Final approach




ART 06 - 07

Note: Number of articles correspond to the last working version, but might slightly change in the final release

# Overview of data inputs & needs covered – ERAA/NRAA




- TSOs can choose among the use of ERAA or FNAA outputs to be processed to quantify flexibility needs or can rely on separate economic dispatch simulation using ERAA/FNAA input
- The approach chosen by each TSO does not impact consistency of results and establishment of a European view.

# Summary of general comments

## Identified problem cluster

### RES integration needs

- How dummy flex is characterized?
- How are flexibility solutions identified?

### Long-term flexibility

- How is Dunkelflaute treated within FNA?
- Long-term needs are not addressed

### Input data formats

- How is consistency ensured across Member States?
- Increase transparency for input data

## Changes made to the draft

Updated Article 9 on RES integration need clarifies how to carry out the analysis and Art 16 on Guiding Criteria provides principles for assessing capabilities of different technology-neutral flexible resources to address the needs.

Adequacy studies already take into account periods of shortage of RES within the climate database. In a complementary way, in the FNA Dunkelflaute is addressed in the RES integration needs, that specifically address RES excess and RES shortage period to be covered through flexible resources.

Updated draft requires TSOs to use at least one scenario consistent with the reference scenarios of ERAA.
Input data tables are now provided in the Annex.

# System needs – Main updates

| System needs indicators | Main changes/updates |
|---|---|
| **RES integration needs (Art 9)**<br>• Study downward flexibility needs based on behavior of the ERAA/NRAA RES generation curtailment and residual load indicators<br>• Characterize flexibility needs into different timeframes (daily, weekly, seasonal)<br>• Quantify additional capacity of technology-neutral flexible resources to cover RES integration needs (i.e. RES integration targets) | • Included clarifications on the characterization into different timeframes<br>• Included clarification on the RES integration target and where to source it<br>• Included clarifications on parameters to be considered to assess the additional flex resources in a technology neutral way (at least power, energy, capacity, energy-to-power ratio, availability and roundtrip efficiency) |
| **Ramping needs (Art 10)**<br>• Quantify flexibility shortages associated to the management of up- and downward residual load ramps over a period of 60 minutes or lower based on the margins of dispatched units considering their technical constraints (e.g. ramping constraints) | • Approach aligned with version shared for the Public consultation, but improved to provide more clarity and consistency of terminology |
| **Short-term flexibility needs (Art 11)**<br>• Quantify flexibility shortages associated to the management of up- and downward residual load / generation prediction errors based on the margins on dispatched units (ERAA / NRAA) | • Approach aligned with version shared for the Public consultation, but improved to provide more clarity and consistency of terminology<br>• Included more clarity on balancing requirements |

# General comments – Identified flexibility gap

➢ Why is RES surplus managed and not deficit?

RES deficit falls within the scope of ERAA/adequacy studies, that in turn does not address specifically RES surplus

➢ Output of ERAA already considers fossil-based flexibility

The starting point for the FNA analysis is the set of ERAA input/output, including resources resulting from existing Capacity Remuneration Mechanisms and other support mechanisms. However, it does not include any additional capacity (independently on the source) needed to cover the identified adequacy needs

➢ How needs overlap in different timelines

The proposed approach assesses the benefits of each individual technology-neutral resource (characterized in terms of at least power, energy, capacity, energy-to-power ratio, availability and roundtrip efficiency) to cover RES integrations needs associated to the different timeframes

# Transmission network needs – Main Updates

| Network needs indicators | Main changes/updates |
| --- | --- |
| **Downward transmission network needs (Art 14)**<br>• Correspond to generation curtailment due to transmission network constraints, which are not accounted in copper plate view | • Clarified options and approaches to include these needs for the fine-tuning of RES integration needs |
| **Upward transmission network needs (Art 14)**<br>• Correspond to energy not delivered due to transmission network constraints, which are not accounted in copper plate view | • Include the option and conditions for TSOs to assess this type of needs |

ART 14

# Distribution Network Flexibility Needs

## Comments

### Clarification of the roles and responsibilities of each DSO when providing their data and analysis

- Content from previous Art 11 is moved to Art 3 (Roles and Responsibilities) and new Art 4 (National Implementation) with timeline with roles and responsibilities that each party shall follow.

### Clarification on the conditions under which these data are assessed, scenarios and its sources

- Former Art 11 has been split into new Art 12 and 13, where all the principles shall be decided at national level when providing needs: temporal, spatial, and voltage level. They are part of the national implementation (Art 4).
- New provisions 12.2 and 12.2 related to the assumptions, scenarios, methods and data development. Detailed information shall also be provided by each DSO.

### FNA provisions shall include specific technologies

- FNA shall follow neutrality technological approach
- Guiding criteria includes detailed information to identify potential technologies providing flexibility.

### More clarification on contento to be provided by each DSO. Need to include examples

- Table 2 has been completely updated.
- Distinction between "Mandatory/optional" data has been removed.
- Examples are included in Annex 1.

### Market barriers and digitalization not included in the FNA

- New Art 21 about “Market barriers and contribution of digitalisation”.

# Distribution Network Flexibility Needs

## Final proposal

**DSOS with DNDP**

**Scenarios**

DNDP is a sound basis for DSO flexibility needs, consulted with all stakeholders, and NRA

**Planning Methods**

DNDP shall provide data about flexibility needs (Art 32 ED)

DNDP provides a solid framework and is basis for the methodology
If DNDP is insufficient or unavailable, other methods can be used and must match DNDP

**Other Data sources such as market information for procurement of local services & supplementary methods / studies (If and as needed)**

### Scenario and assumptions

- Consistency with National Energy Climate Plan, set the same targets for TSO and DSO at national level (2030)
- Scenario and assumptions used to identify network development projects and local services needs
- Coordination between concerned DSOs and TSOs
- encompass existing and future demand, generation, storage capacities, consider national energy and climate plans,

### Network planning methods

- Characteristics at national and DSO level, including a distinction between voltage level and/or region
- Is coordinated with the planning methodology and the scenario building process of the national TSOs for the TYNDP
- Considers available grid capacity for connection of new system users
- Considers local services

### Information on future evolution of the grid

- Information on planned and ongoing investments for the next five to ten years
- Description how local services are considered

ART 12

# DSOs shall deliver 5 types of data and analysis

| | |
|---|---|
| The DSO network's flexibility needs<br>"Table 2"<br>→ What we need | • To prevent or solve congestion or voltage issue through active power |
| Reasoning for the DSO Network flexibility needs<br>→ Why we need it | • including the potential effects of existing or planned frameworks and incentives to connect additional assets<br>• If available, information on the expected contractual means to access flexibility |
| Traceability<br>→ How the data is computed | • Source of Data<br>• Methods<br>• Scenarios |
| Contribution to fine-tune system needs (adequacy assessments assessed by TSOs | • DSO network needs (to the extent they do not overlap system needs of TSO network needs) - TSO to assess based on "Table 2" data<br>• Maximum hourly volumes of flexible resources that could be limited under the national implementation of grid prequalification and temporary limits processes |
| Guiding criteria for distribution network flexibility needs being solved by local services<br>→ Which resources can cover our needs | • How to assess the capability of the different sources of flexibility to cover the flexibility needs |

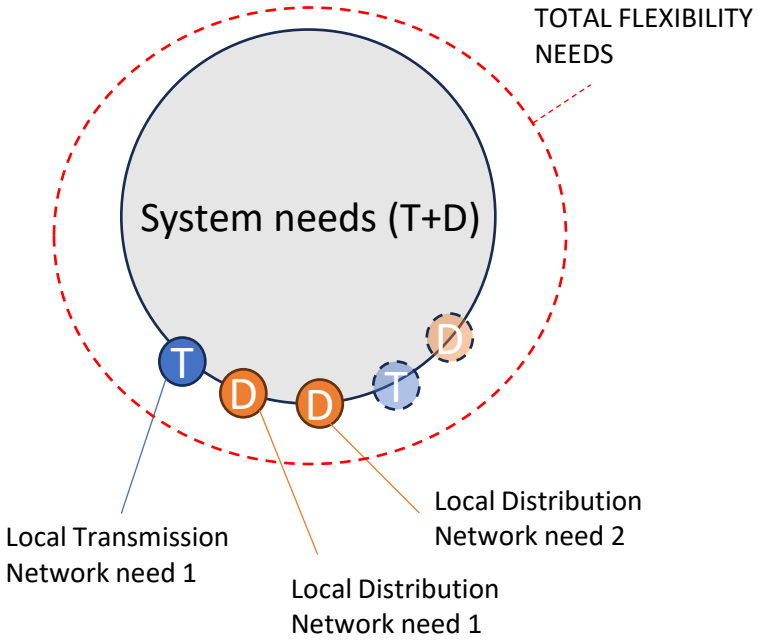
ART 13, 15, 16, 17

# Illustrative example (not real data) of Table 2

## Yearly value – minimum data set

| Direction | Target Year | Time block | Spatial granularity | Voltage level of congestion issue | Type of value | Flexibility network needs |
|---|---|---|---|---|---|---|
| Downwards needs flexibility | 2030 | Entire year | ***Bidding zone*** *= Region 1 + Region 2* | High Voltage 132kV network | Total energy over the year | 4 500 MWh |
| | | | | | Summ. Maximum power | 110 MW |
| | | | | Medium Voltage 20kV network | Total energy over the year | 2 000 MWh |
| | | | | | Summ. Maximum power | 45 MW |
| Upwards needs flexibility | | Entire year | **Bidding zone** *Region 1 + Region 2* | High Voltage 132kV network | No need | |
| | | Oct-March Mon-Sun 00:00-23:59 | | Medium Voltage 20kV network | Total energy over the year | 60 MWh |
| | | | | | Summ. Maximum power | 5 MW |

# Fine-tuning of system needs with DSO & TSO network needs + unavailability of resources




- Total flexibility needs of the power system include both **system needs** and local **network needs**.
- The quantification of system needs is carried out at bidding zone level, considering copper plate conditions. As such it does include system needs occurring both at transmission and distribution level, although not specifically localizing them. These can be covered through resources located anywhere.
- Transmission and Distribution Network needs occurs locally and can be solved only through local resources.

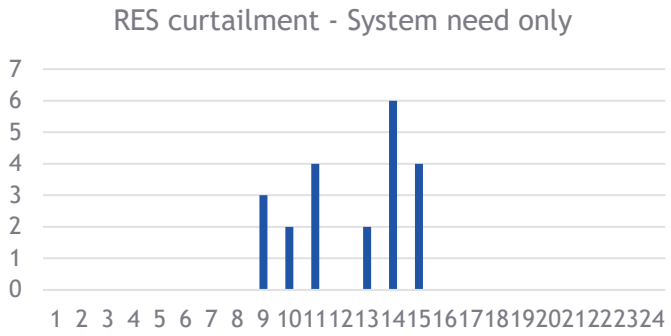
**-> Simply summing up system and network needs is not a correct operation, for it could result in double-counting**

- The approach considered in the methodology provides for fine-tuning of system needs by reflecting network needs on system needs. This is applied to the RES integration need.
- All system needs are also fine-tuned considering the unavailability of flexible resources due to pre-qualification & temporary limits.

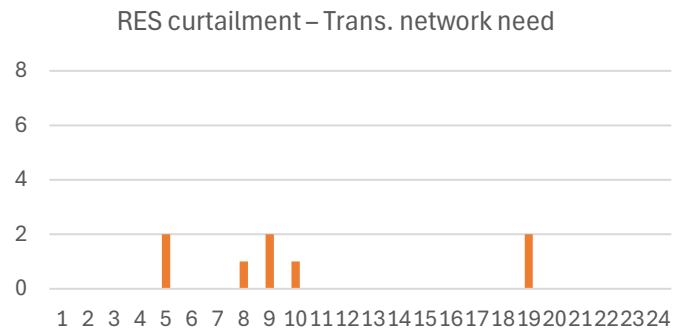
# Fine-tuning of RES integration need (Art 9)

## Final Approach

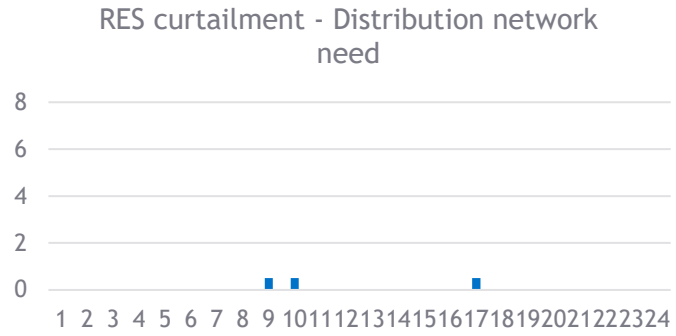
Analysis carried out at BZ level




Time series used for assessment of RES integration needs, without finetuning pursuant to Art 9 of the methodology

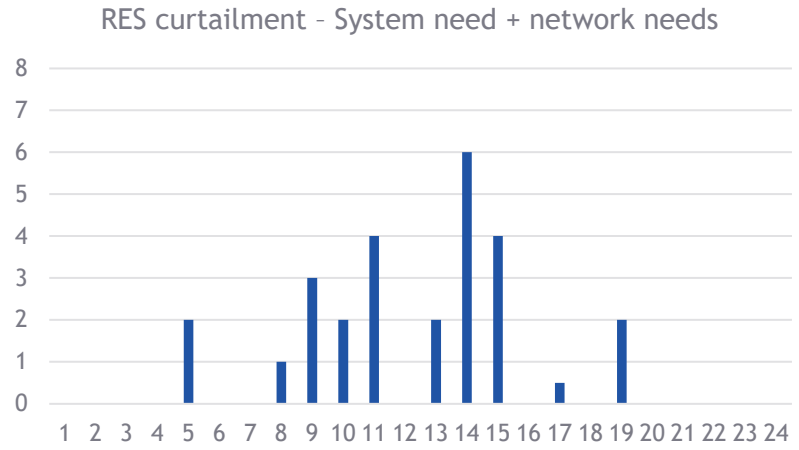



Time-series derived from transmission network simulation, pursuant to Art 14 of the methodology




Data provided by DSOs and converted into hourly time-series by TSOs, pursuant to Art 15 of the methodology

**Both sets of RES curtailment time series have to used to quantify RES integration flexibility needs.**
**Fine-tuning is only done when conditions of Art 15. applies**




For each hour we take the **max** RES curtailment among system need only, transmission network need and distribution network need

Time-series used for assessment of fine-tuned RES integration needs, pursuant to Art 9 of the methodology

ART 15

# Guiding criteria for DSO

## Final approach

**What is the purpose of Guiding Criteria?**

To assess the capability of different flexibility resources to cover the flexibility needs

**Why do we need?**

To provide information to have enough resources to cover our needs

**Main source of data:**

Market information published for the procurement of local services (cf NCDR)

DSO network needs can appear or increase rapidly at any given location.
For DSOs, capability to access needed resources in a timely manner at each needed location is critical and permanent.

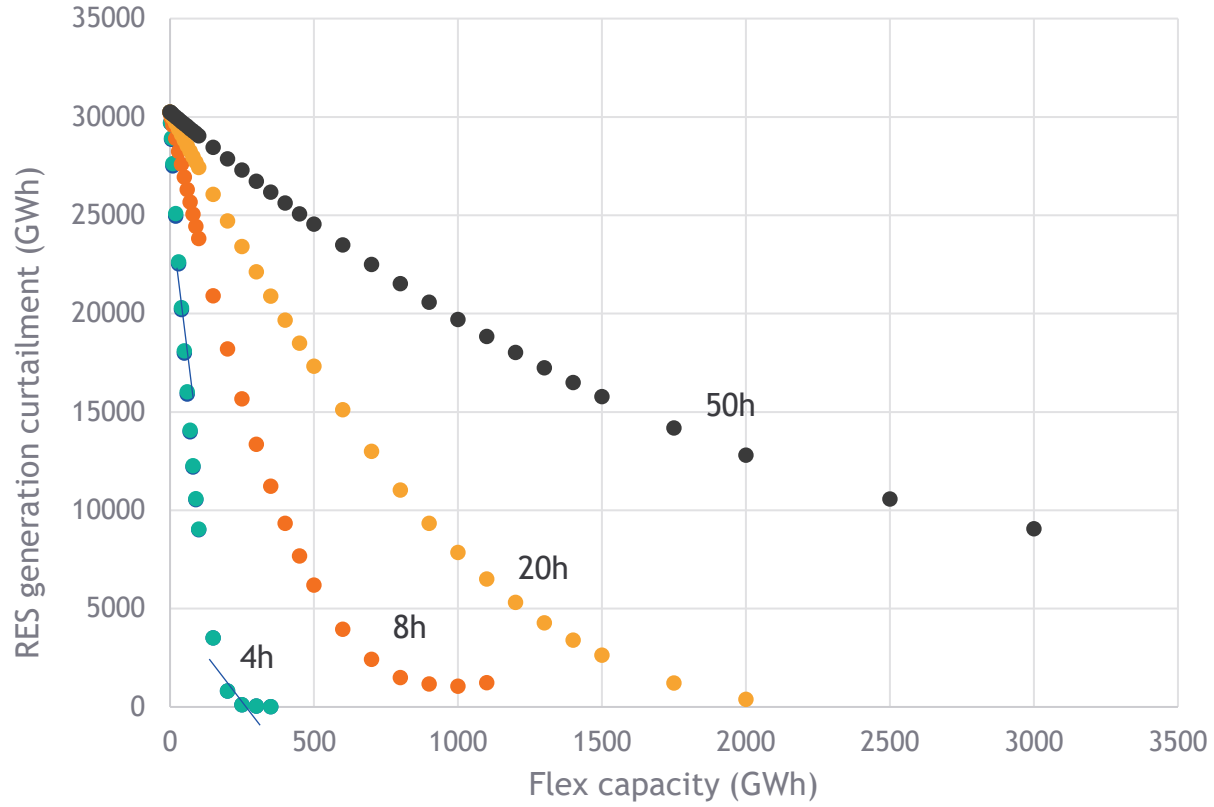
Advocacy for this overarching principle will be done out of this method.

Guiding criteria include the following (available) information:

a. the **direction of activation** (upwards or downwards);
b. the **timeframe** in which the resource shall be available to solve the flexibility need;
c. The **location** of the flexibility need;
d. the **local maximum power** required during the activation;
e. if available, data related to the forecasted use, such as:
    i. the **duration of a continuous need** (in hours);
    ii. the **cumulated duration** of discontinuous need per time block (in hours);
    iii. a measure of the **frequency of activation** (level of recurrence or sporadicity);
    Iv .a **cumulated energy** per time block;
f. the applicable **economic criteria**;
g. other additional relevant criteria.

# Guiding criteria for TSOs

## Final Approach




The proposed approach aims at providing additional information to the policymaker, derived from the implementation of Art. 9-10-11, 15 of the methodology, such as:

- **Sub-indicators** clarifying technical requirements associated to the needs related to frequency, volumes, duration, etc.
- Contribution of the various types of additional flex capacity to reducing needs (e.g. to reducing RES curtailment in the image on the left)
- Approaches to take into account also **cost information** (CAPEX and OPEX of technologies), to be possibly implemented beyond the FNA scope

# Next Steps

- Response to the public consultation by the end of March
- ACER official submission on 16 April
- Next public webinar during the third week of April

For questions and/or more information, please contact: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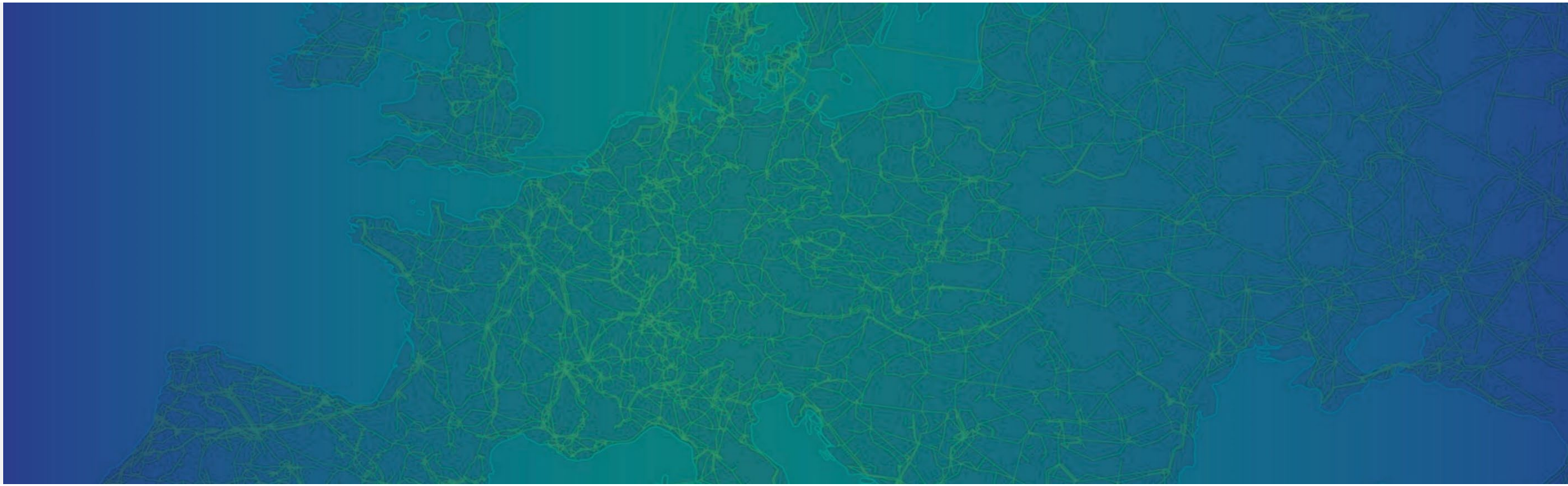
- Mehtap Alper, (mehtap.alper@eudsoentity.eu), Senior Coordinator, DSO Entity.

# Thank you



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