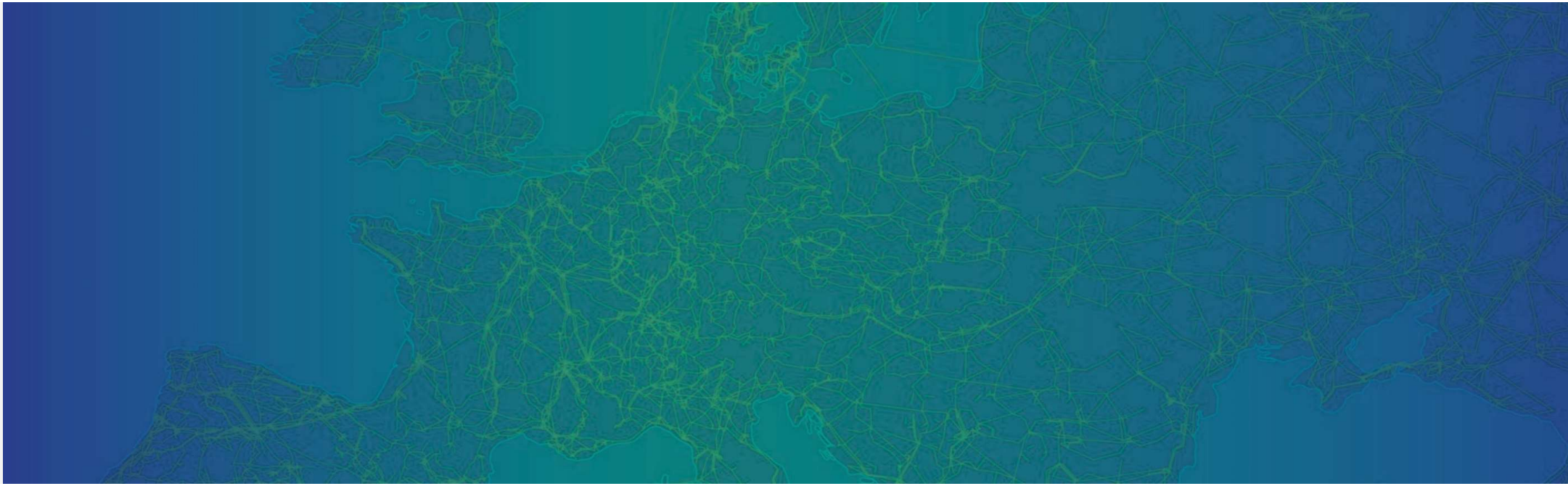
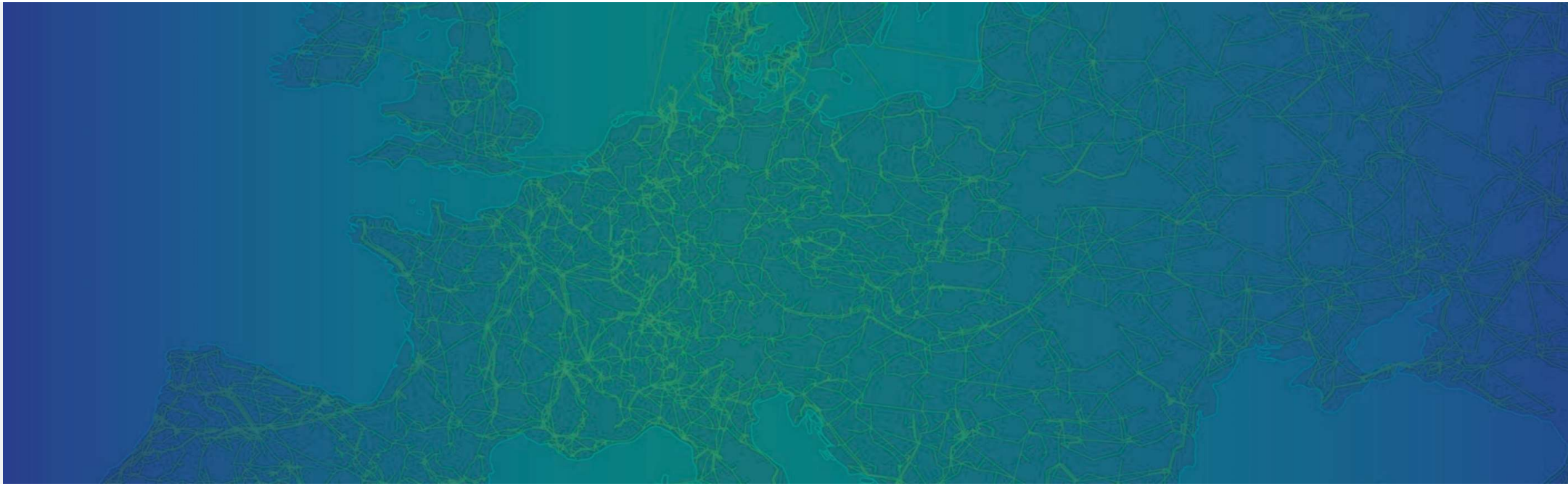
DSO Entity / ENTSO-E Public webinar – 15 November



DSO ENTITY
DSOs FOR EUROPE

entsoe
Reliable Sustainable Connected

Welcome
Intro and objective of the day



DSO ENTITY
DSOs FOR EUROPE

entsoe
Reliable Sustainable Connected

Agenda

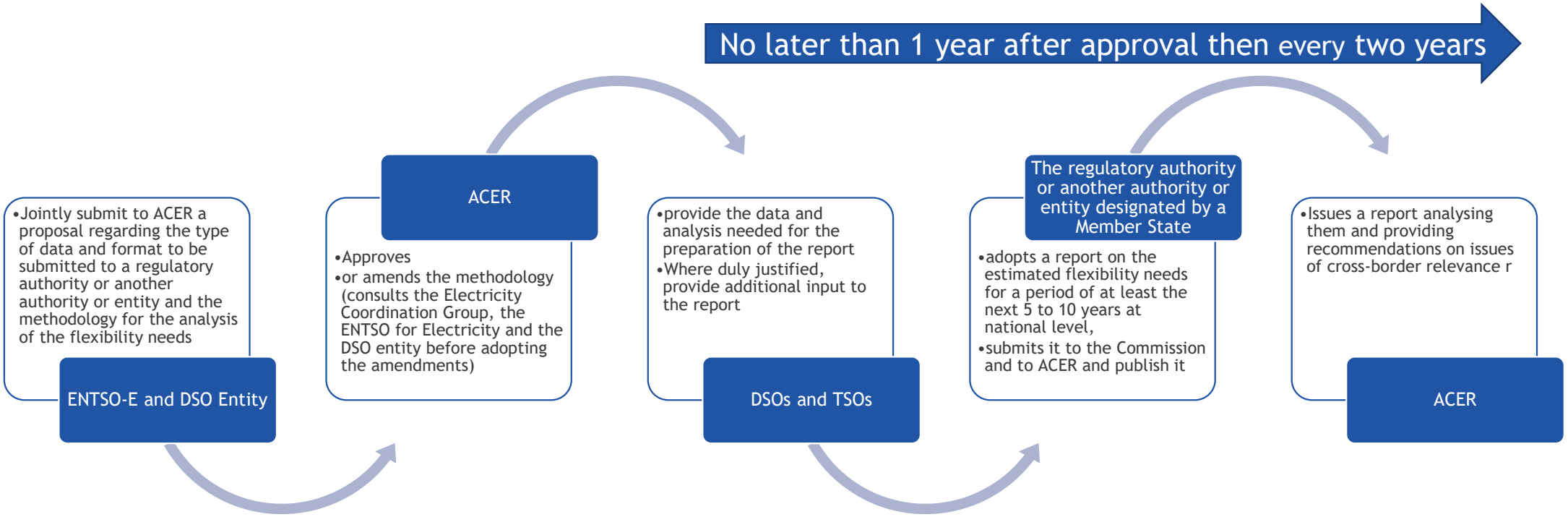
Topic	Time	Presenter
Welcome • **Intro and objective of the day** • **Context of the FNA** • **Way of Working & Timeline**	12:00-12:05	Mehtap Alper, DSO Entity Secretariat
Flexibility Needs Assessment (FNA): Objectives & Scope	12:05-12:15	Hubert Dupin & Mario Sisinni, Convenors of the Drafting Team
FNA Methodology: Network Needs	12:15-12:35	Hubert Dupin, Convenor DSO Entity
FNA Methodology: System Needs	12:35-12:55	Mario Sisinni, Convenor ENTSO-E
Closure	12:55-13:00	Mehtap Alper, DSO Entity Secretariat

Housekeeping

- Workshop will be recorded & published on the consultation page.
- Ideally connect with your laptop - camera on and microphone muted
- Q & A session is not planned for this session.
- For questions and/or more information, please contact:
  - Mehtap Alper, (mehtap.alper@eudsoentity.eu), Senior Coordinator, DSO Entity.
  - Samy Geronymos, (samy.geronymos@entsoe.eu) , Innovation Senior Specialist, ENTSO-E

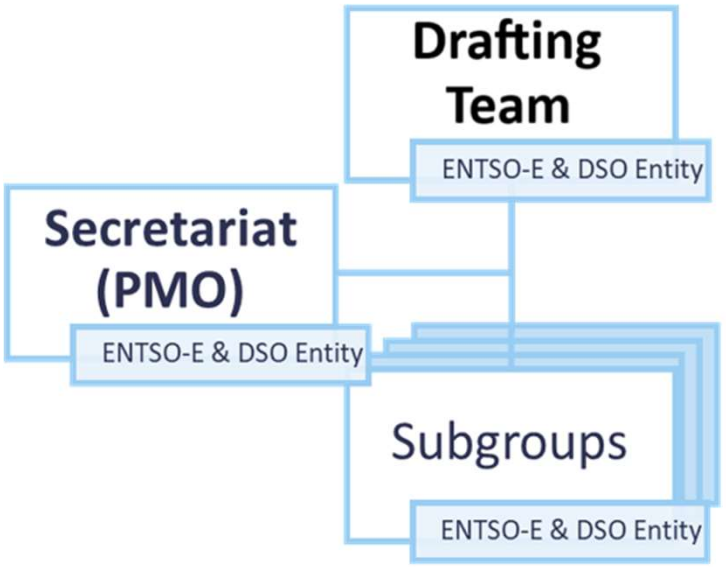
Context

In accordance with Article 19e of the (EU) 2019/943 which entered into force with the (EU) 2024/1724, Electricity Market Design Reform (EMDR), DSO Entity and ENTSO-E have been entrusted to define the data type, the data format, and the methodology for the analysis of the flexibility needs (**Flexibility Needs Assessment Methodology or FNA methodology**)



FNA Methodology-A journey of collaboration

DSO Entity and ENTSO-E established a **Joint Task Force** to carry out their legal mandate by the 17 of April 2025, while engaging with key stakeholders.



Stakeholder Engagement

13 Organizations, 2 representatives from each

- ACER
- EC - Directorate general for energy
- IFIEC Europe
- Eurelectric
- Smarten
- EASE
- Solar Power Europe
- Wind Europe
- Hydrogen Europe
- EPRI
- FSR
- CAN EUROPE
- E3G

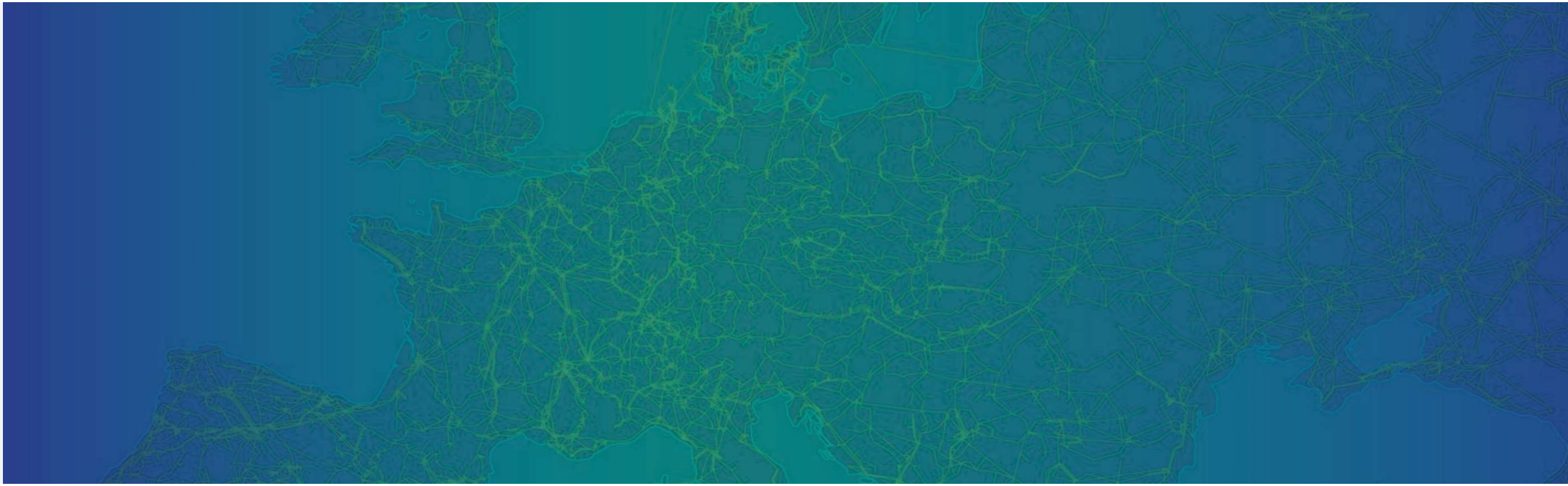
Timeline

08/11-06/12
Public Consultation is open for 4 weeks

This **public consultation** allows all interested parties to submit their opinions on the FNA methodology draft, further ensuring transparency.

Boundaries of the methodology and general approach

Relevant information for Articles 1, 5-12, 14 of the draft methodology



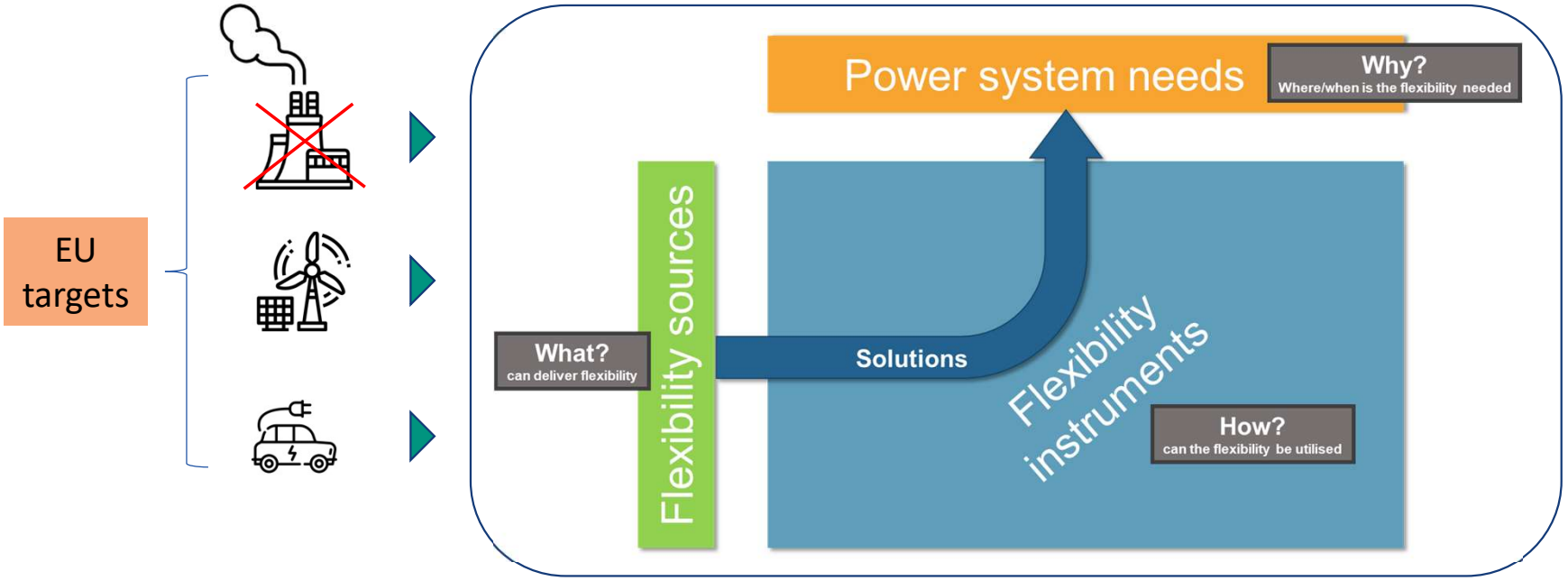
DSOs FOR EUROPE

Reliable Sustainable Connected

Definition of flexibility needs

What is a flexibility need? When does it occur?

In a fully carbon neutral system, based on electrified consumption and variable renewable energy sources, flexibility will be essential to complement the variability of both generation, demand and grid availability and to address the increase of system complexity

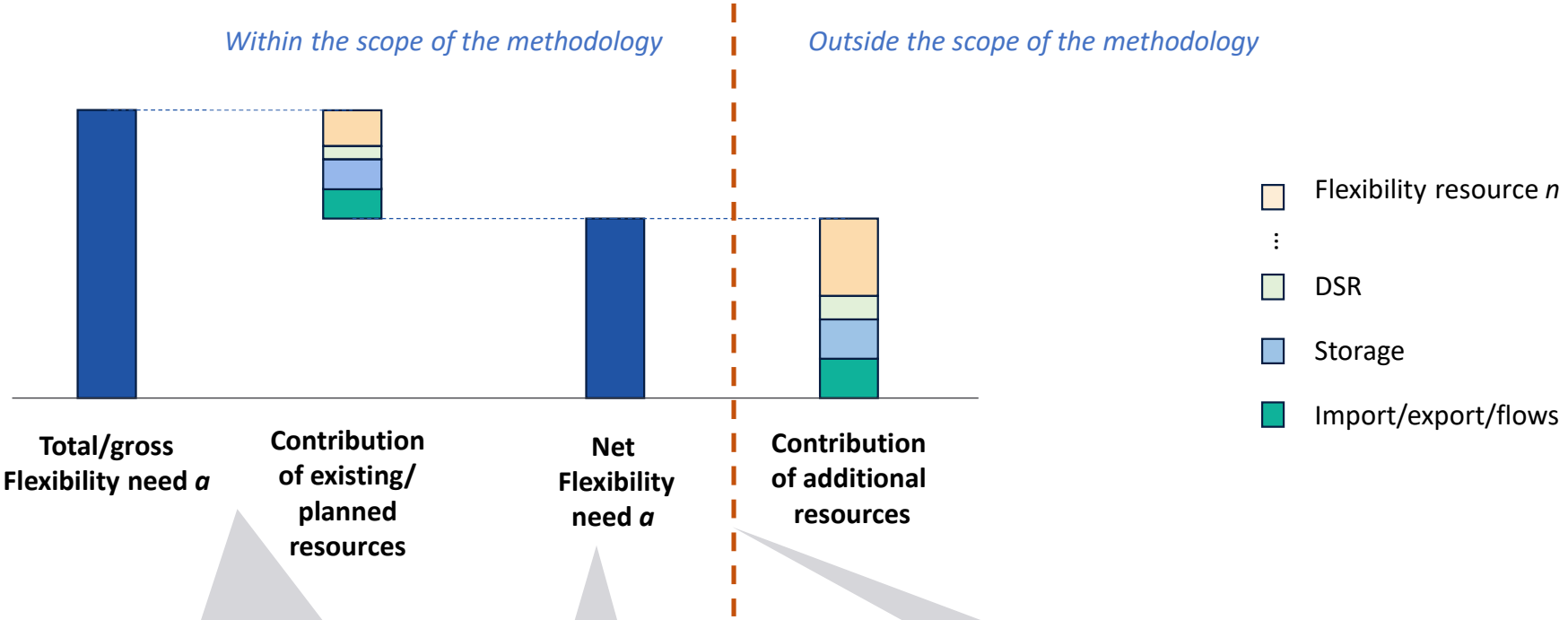


"Flexibility" means the ability of an electricity system to adjust to the variability of generation and consumption patterns and to grid availability, across relevant market timeframes

A flexibility need occurs when the power system is not able to cover this variability and availability

Definition of flexibility needs

Boundaries of the methodology



The methodology will consider appropriate **reference conditions** to account for:

- Planned investments in grid/flexibility
- Cost-efficient contribution of existing/planned flexibility resources
- Different assumptions in respect to electricity market prices, generation and demand

Flexibility needs are to be provided **through capability types**, i.e. actionable metrics (capacity, energy) **useful to policymakers** that keep technological neutrality

The methodology will also provide for **guiding criteria** to best interpret flexibility needs and orient policymakers to the identification of most suitable flex resources to cover them

General approach

INPUTs

ERAA/Adequacy output

- Relevant market simulation results time series

ERAA/Adequacy input

- Installed capacity of generation, flexible resources
- Net transfer capacity between BZs
- Standard Ramping limits

Additional input - TSO

- National ramping limits
- Historical forecast errors of generation and demand

DNDP input/output

- Flexibility needs (grid limitations)

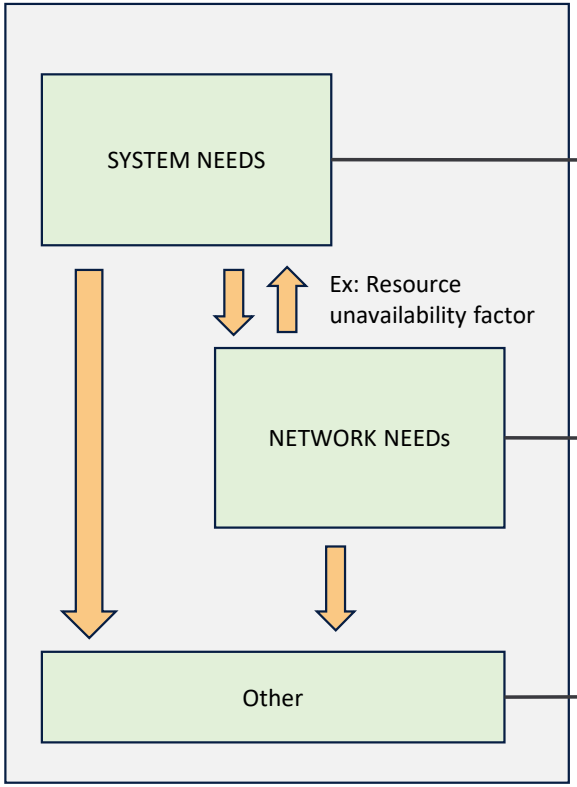
Additional input - DSO

- Flexibility needs from other relevant studies

Additional input

- Additional data needed for guiding criteria

JOINT METHODOLOGY (Post processing of input)



OUTPUTs (Capability types and other indicators)

- RES integration needs: surplus generation (GW, TWh)
- Ramping needs: residual load variations (GW)
- Short-term flexibility needs : prediction errors (GW)

- Congestion needs

- Indicators for guiding criteria

Type of flexibility needs covered

System Needs

- Inertia
- Restoration

Out of scope following very TSO specific nature

- Short-term: prediction errors
- Ramping: residual load variations
- RES integration: surplus generation

Covering both TSO balancing and market portfolio balancing

- Adequacy & RES shortage

Already covered in ERAA/NRAA

Network needs

- Congestion management
- Voltage control*

*Included in DSOs studies

*TSO and DSO **must maintain power flows within operational** limits, which induces flexibility needs to prevent or solve congestion*

Choice of needs to be included in the assessment follows principles of compliance with the EMDR, relevance, complementarity with respect to other assessments and practical implementation

ERAA/NRAA as an input to FNA (1 of 2)

The use of ERAA/NRAA market dispatch output as a starting point for the Flexibility Needs Assessment allows a reliable quantification of needs while complying with the requirements of the EMDR

"…estimated flexibility needs for a period of at least the next 5 to 10 years"

ERAA/NRAA already cover the + 10 years horizon

"…achieve security and reliability of supply"

Adequacy is part of the security and reliability of supply. FNA complements ERAA/NRAA

"The report shall be consistent with the European resource adequacy assessment and national resource adequacy assessments"

Consistency is ensured via use of ERAA/NRAA reference scenario data

"…taking into account the integration of variable renewable energy sources and the different sectors…,… interconnected nature of the electricity market"

"potential availability of cross-border flexibility/ take into account sources of flexibility that are expected to be available in other Member States"

"consider planned investment in interconnection and flexibility at transmission and distribution level; and

the need to decarbonise the electricity system in order to meet the Union's 2030 targets for energy and climate"

ERAA/NRAA are already based on policy scenarios accounting for:

- Sector coupling (e.g. hydrogen, P2G)
- Planned interconnections
- Modelling of all EU and relevant non-EU countries and associated RES, demand, generation and flexibility

ERAA/NRAA as an input to FNA (2 of 2)

The use of ERAA/NRAA market dispatch output as a starting point for the Flexibility Needs Assessment allows a reliable quantification of needs while complying with the requirements of the EMDR

"…consider the potential of non-fossil flexibility resources such as demand response and energy storage, including aggregation and interconnection, to fulfil the flexibility needs"

"…consider all available sources of flexibility in a cost-efficient manner in the different timeframes, including in other Member States;"

"…Consider different assumptions in respect to electricity market prices, generation and demand"

The key input to the FNA is represented by economic dispatch simulations, that already provide as a result the cost-efficient and optimal use of existing available sources of flexibility, including those in other Member States

By considering a wide variety of climate conditions, economic dispatch simulations also intrinsically consider different conditions in respect to resulting electricity market prices, generation and demand, while ensuring compliance with policy targets

DNDP as an input to FNA for DSO network needs 1/2

The use of DNDP output as a starting point for the Flexibility Needs Assessment allows a reliable quantification of needs while complying with the requirements of the EMDR

Article 19e

"…estimated flexibility needs for a period of at least the next 5 to 10 years"

"…consider the potential of non-fossil flexibility resources such as demand response and energy storage, including aggregation and interconnection, to fulfil the flexibility needs"

"…consider all available sources of flexibility in a cost-efficient manner in the different timeframes, including in other Member States;"

"potential availability of cross-border flexibility/ take into account sources of flexibility that are expected to be available in other Member States"

DNDP shares a vision of needs for local services on a technology neutral basis

- "provide transparency on the medium and long-term flexibility services needed"
- "include the use of demand response, energy efficiency, energy storage facilities or other resources that the DSO is to use as an alternative to system expansion"
- "take into account demand response and other relevant resources and assess future needs for local SO services, in particular as an alternative for grid reinforcement"

What DNDP contains

- Information to market participants as to future local services needs in the medium and long-term have been taken
- Needs in DNDP may be aggregated, especially at lower voltage levels where the cinematics of the network can depend on a single actual connection application, or the behavior of a single system user

/!\ Actual local services needs being procured may differ from DNDP → in market info

/!\ Network needs may extend beyond local services, in particular considering flexibility relative to connection agreements

/!\ cross border issues are of little relevance for DSO local services

DNDP as an input to FNA for DSO network needs 2/2

The use of DNDP output as a starting point for the Flexibility Needs Assessment allows a reliable quantification of needs while complying with the requirements of the EMDR

Article 19e

"consider planned investment in interconnection and flexibility at transmission and distribution level;

"…achieve security and reliability of supply"

"…taking into account the integration of variable renewable energy sources and the different sectors…,… interconnected nature of the electricity market"

DNDP "set out the planned investments for the next 5 to 10 years, required to connect new generation capacity and new loads, including recharging points for electric vehicles"

"…Consider different assumptions in respect to electricity market prices, generation and demand"

"be consistent with the European resource adequacy assessment and national resource adequacy assessments"

the need to decarbonise the electricity system in order to meet the Union's 2030 targets for energy and climate"

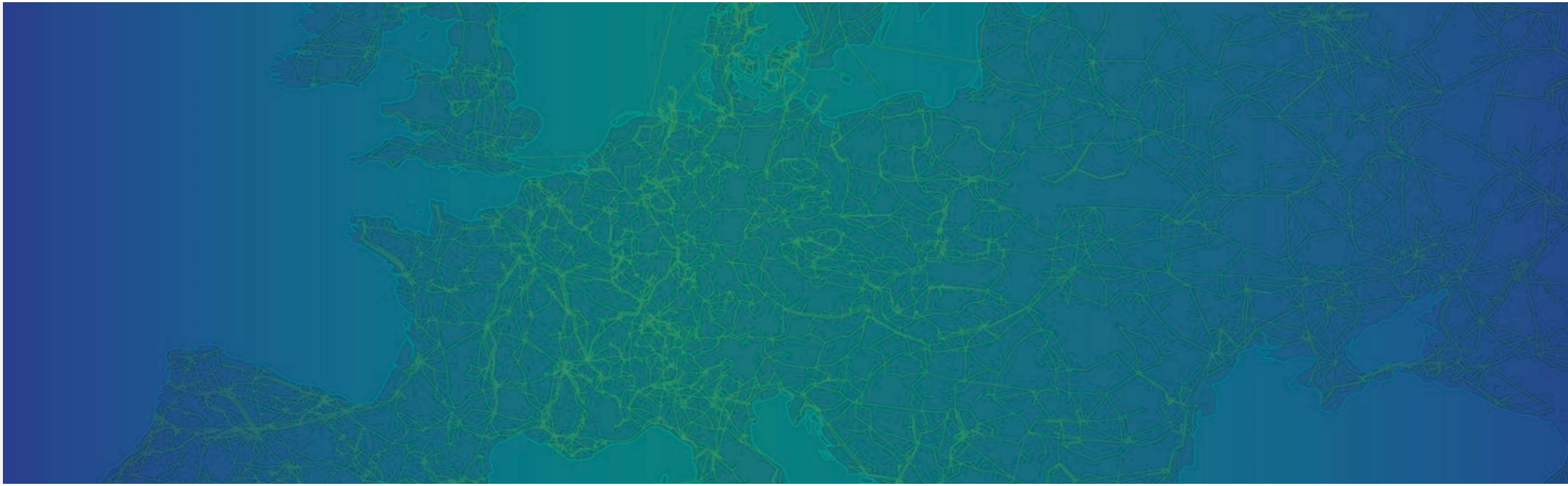
DNDP assumptions and scenarios are consistent with other national existing scenarios, and in particular NECP, and scenario used by TSO in its planning

Scenario data and/or assumptions shall be sufficiently consistent among all DSOs on national level, taking into account the scenarios used by the national TSO in its planning.

/!\ consistent does not mean and cannot be identical

Elements of methodology for system needs

Relevant information for Articles 5-10, 12 of the draft methodology



DSOs FOR EUROPE

Reliable Sustainable Connected

Guiding principles and system needs indicators

Guiding principles

FEASIBILITY
Minimum requirements build on existing tools and post-processing accessible (i.e. ERAA/NRAA) allowing for additional specifications where nationally relevant

CONSISTENCY
Use of scenarios, assumptions and methodologies of existing studies to the extend possible (i.e. ERAA/NRAA)

COMPLEMENTARITY
Complement shortage indicators studied in existing methodologies and studies (i.e. ERAA/NRAA)

APPLICABILITY
Technology-neutral metrics (e.g. MW and MWh of surplus energy) enabling the assessment of policy targets and need for measures

POLICY RELEVANCE
Focus on system needs (variations of generation and demand) and network needs (grid availability) in line with EMDR definition

System needs indicators

RES integration needs : surplus generation
- Study downward flexibility needs based on behavior of the ERAA/NRAA RES generation curtailment indicator in terms of energy, duration and intervals and periods and conditions at risk.
- Characterize flexibility needs into different timeframes (daily, weekly, annual) through the optimization of a dummy flex variable

Ramping needs: residual load variations
- 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 technical constraints (e.g. ramping constraints) of dispatched units

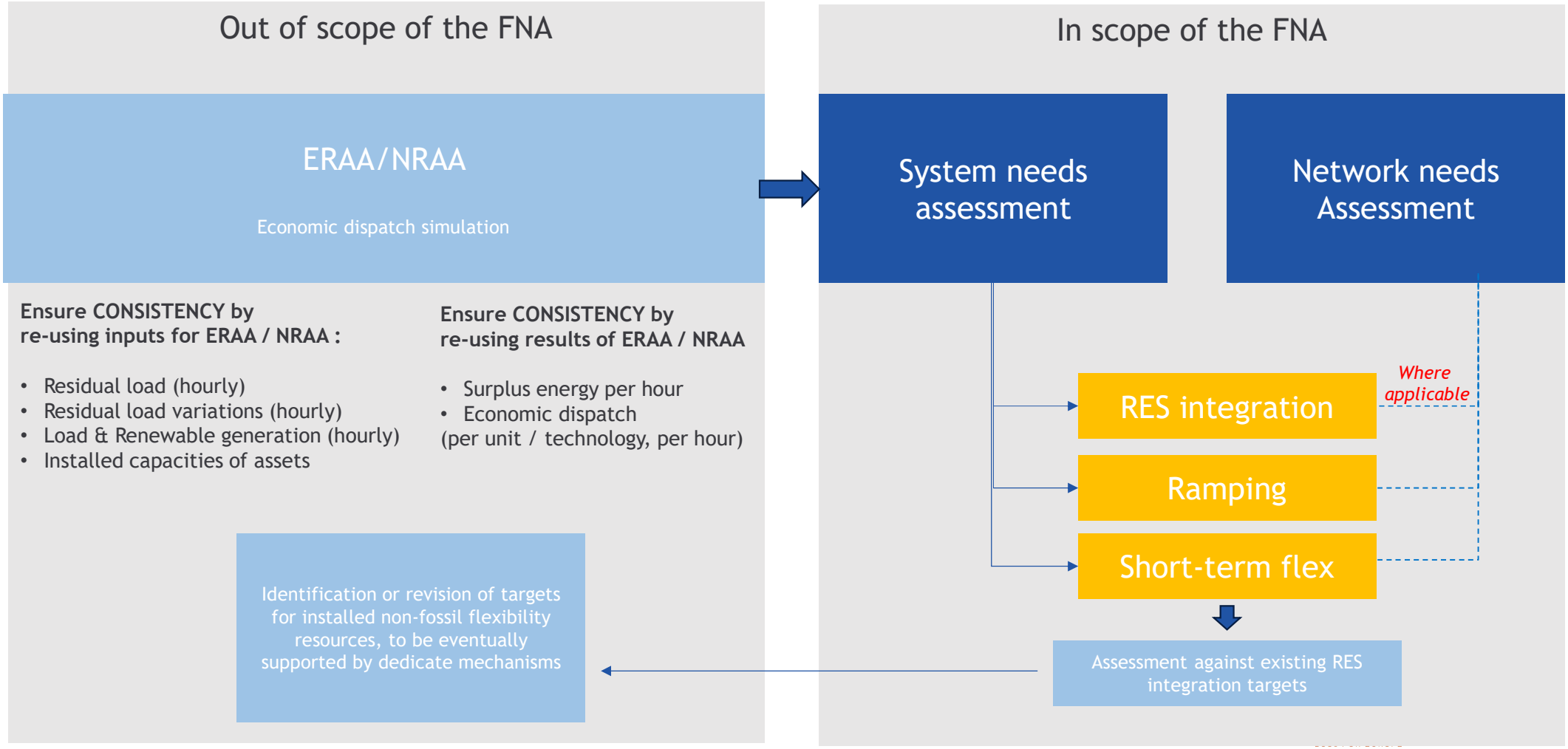
Short-term flexibility needs : prediction errors
- Quantify flexibility shortages associated to the management of up- and downward residual load / generation prediction errors based on the margins of dispatched units (ERAA / NRAA)

Network needs

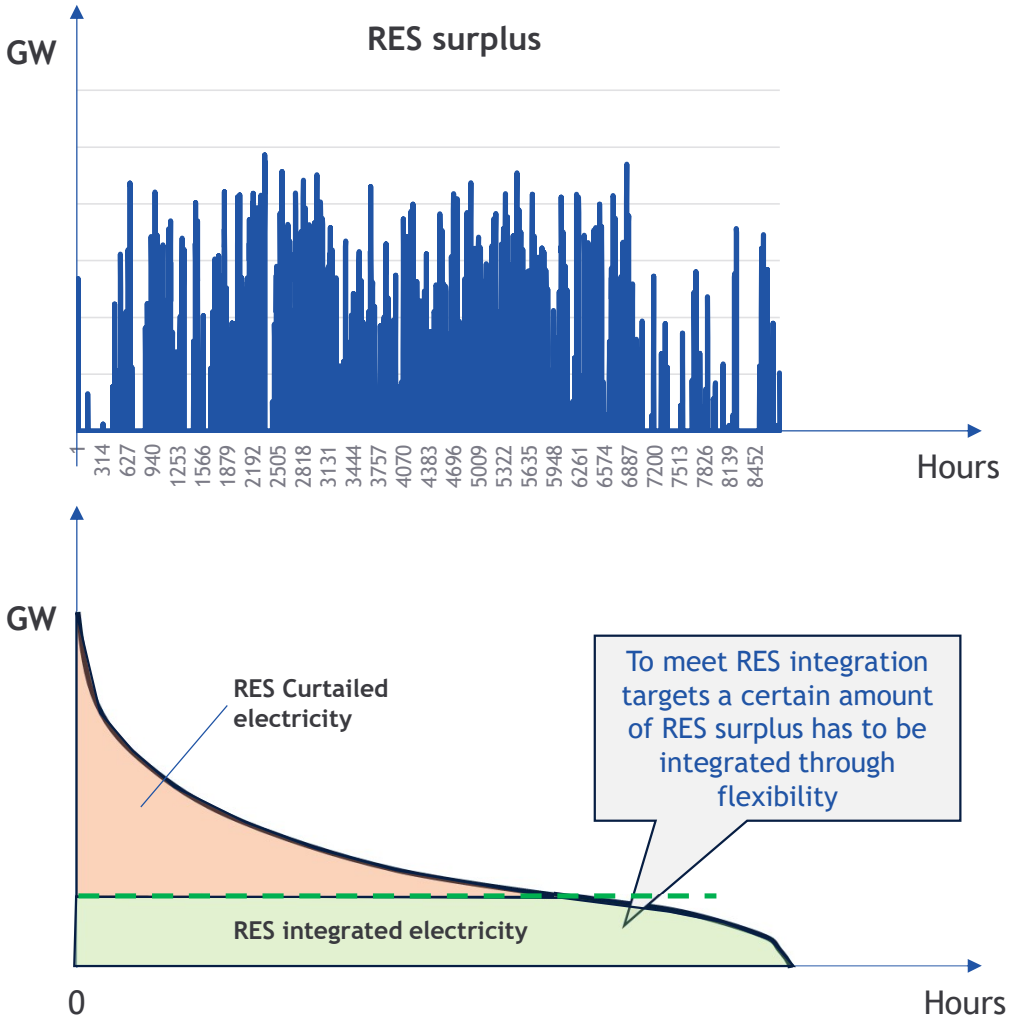
NETWOK NEEDS

RES Injection constraints due to local congestions

General approach – Base case assessment



System needs – RES integration needs



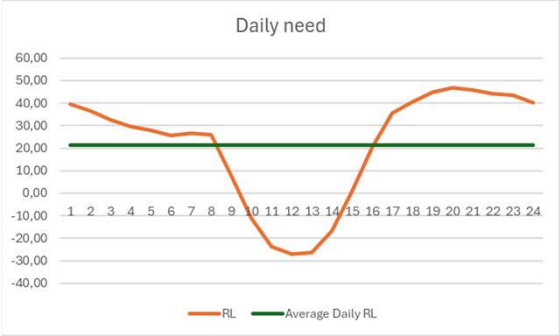
When it occurs? Why is important?

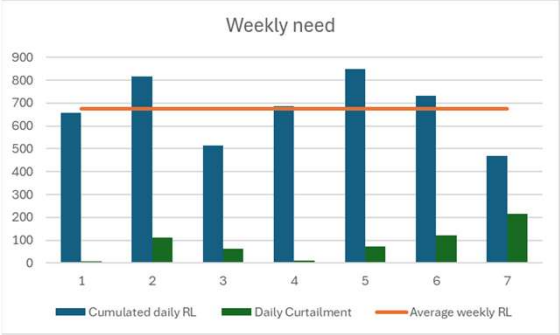
- As a result of the increasing RES installed capacity, **RES surplus conditions will become structural**
- When RES surplus cannot be integrated in the system (technically and economically) it results in **curtailed electricity**
- Member States are requested to meet their individual **RES integration targets** defined in National Energy & Climate Plans or other national policies
- In this context **a flexibility need occur when the RES curtailed electricity does not allow the Member State to meet its RES integration targets**

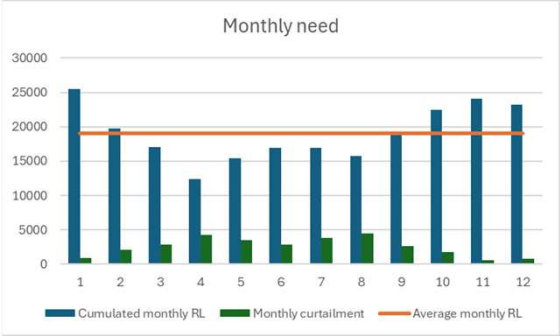
Expected metrics/Capability type

- Max, min, mean percentile values of RES surplus (TWh, GW) across relevant timeframes (hourly, daily, weekly, monthly/seasonal)
- Probabilistic distribution of RES surplus (TWh, GW) across relevant timeframes (hourly, daily, weekly, monthly/seasonal)
- Other relevant representations (heat maps, correlation)
- Capacity of dummy & technology neutral flexibility variable (GW) to reduce daily, weekly and annual needs while meeting RES integration targets

RES integration needs – Dummy flex variable







Besides statistical analysis the methodology provides for the introduction of dummy flex variables representing additional capacity of technology-neutral flexibility resources needed to achieve RES integration targets for each of the analysed timeframes. This can be done through the following actions:

1. Derive Dispatched **Residual Load time series** from market dispatch results, considering contribution of existing storage, DSR, other carbon-free flexible resources and interconnections. This can be derived as follows:
   - Negative RL equals RES generation curtailment
   - Positive RL equals generation from dispatchable units other than Must Run
2. Runs 3 different post-processing optimizations introducing a **dummy flex variable** to quantify :
   - Daily dummy flex capacity (GW)
   - Weekly dummy flex capacity (GW)
   - Annual dummy flex capacity (GW)

Each optimization aims at finding the optimal capacity of the dummy flex variable to:

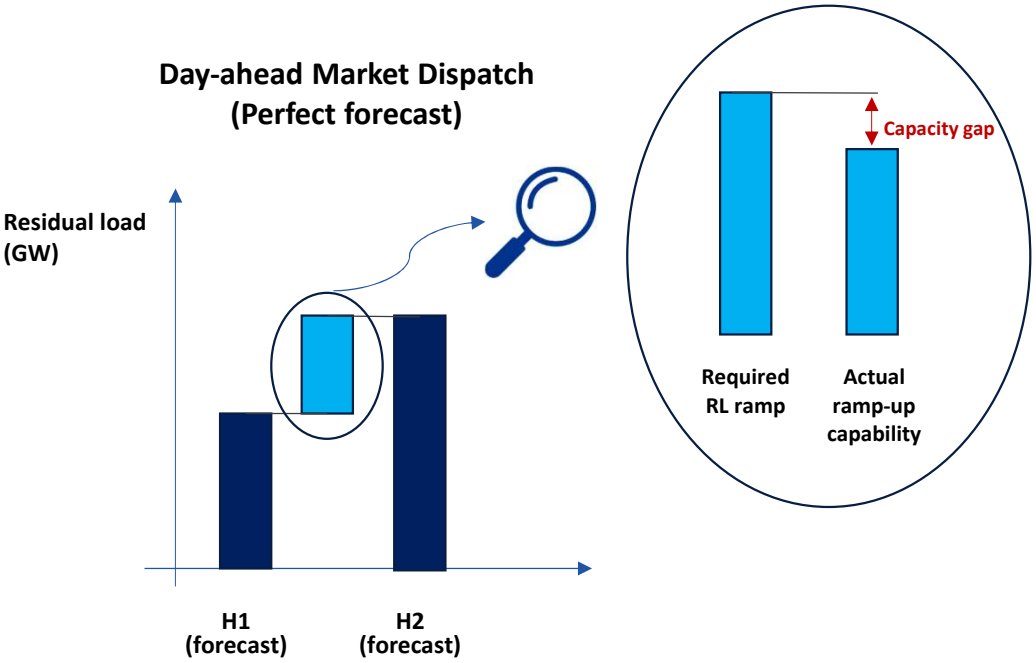
- Achieve the RES curtailment target (Constraint)
- Minimize either daily, weekly or annual needs calculated using Artelys[1] or similar time – decomposition or other approaches (Objective function for each respective optimization)

Daily, weekly and annual dummy flex technologies have different equivalent charging/shifting capacity (expressed in equivalent hours) and behaves differently in each corresponding optimization:

- Daily dummy flex charges/shifts during hours of RES excess and discharges/shifts as soon as hourly RL is higher than the daily average
- Weekly dummy flex charges/shifts during hours of RES excess and discharges/shifts proportionally during days having cumulative RL lower than the weekly average
- Annual dummy flex charges/shifts during hours of RES excess and discharges/shifts proportionally during the months having cumulative RL lower than the annual average

1. Based on Metis Study 2018

System needs – Residual Load variation



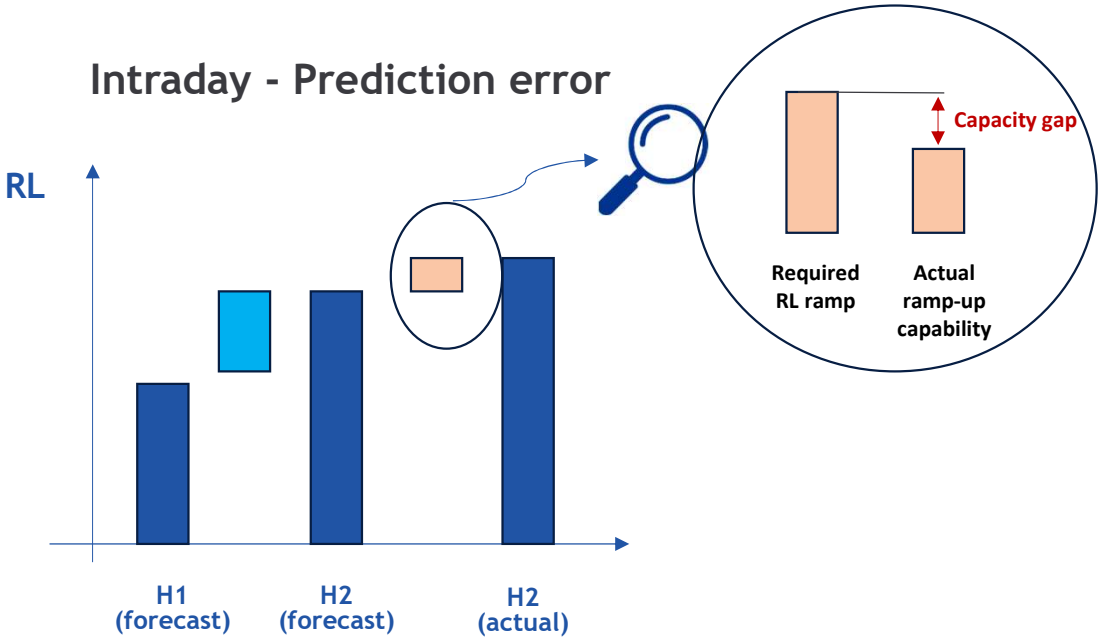
When it occurs? Why is important?

- Flexible units are normally needed and used to **manage forecasted variations of Residual Load (RL)**, broadly defined as the difference between demand, RES generation and Must Run generation
- **Actual ramping capability** of existing/planned flexible generation units **can be constrained** by their **technical limits** and **availability factors**
- In this context **a flexibility need occurs when actual ramping capability is not enough to meet the required RL ramp**

Expected metrics/Capability type

- Technology-neutral capacity gap (GW) to meet ramp-up/down requirements
- Max, min, mean, percentile and other characterization across different Climate Years

System needs – Prediction errors



When it occurs? Why is important?

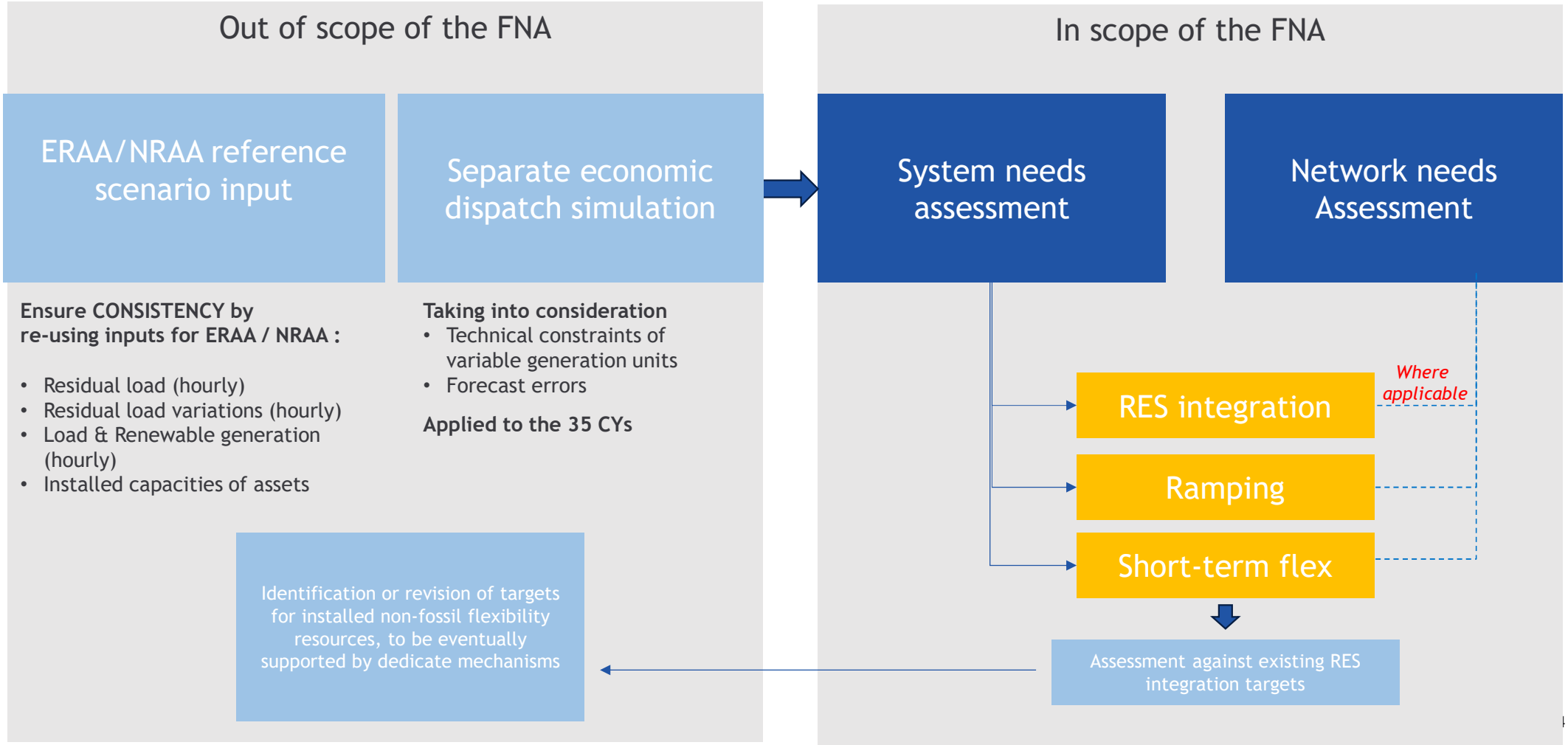
- Flexible units are also needed to **manage unexpected variations of Residual Load** due to **errors in the prediction** of electricity generation and demand and due to outages
- **Actual ramping capability** of existing/planned flexible generation units **can be constrained** by their **technical limits** and **availability factors**
- In this context **a flexibility need occurs when actual ramping capability is not enough to meet the required RL ramp**

Expected metrics/Capability type

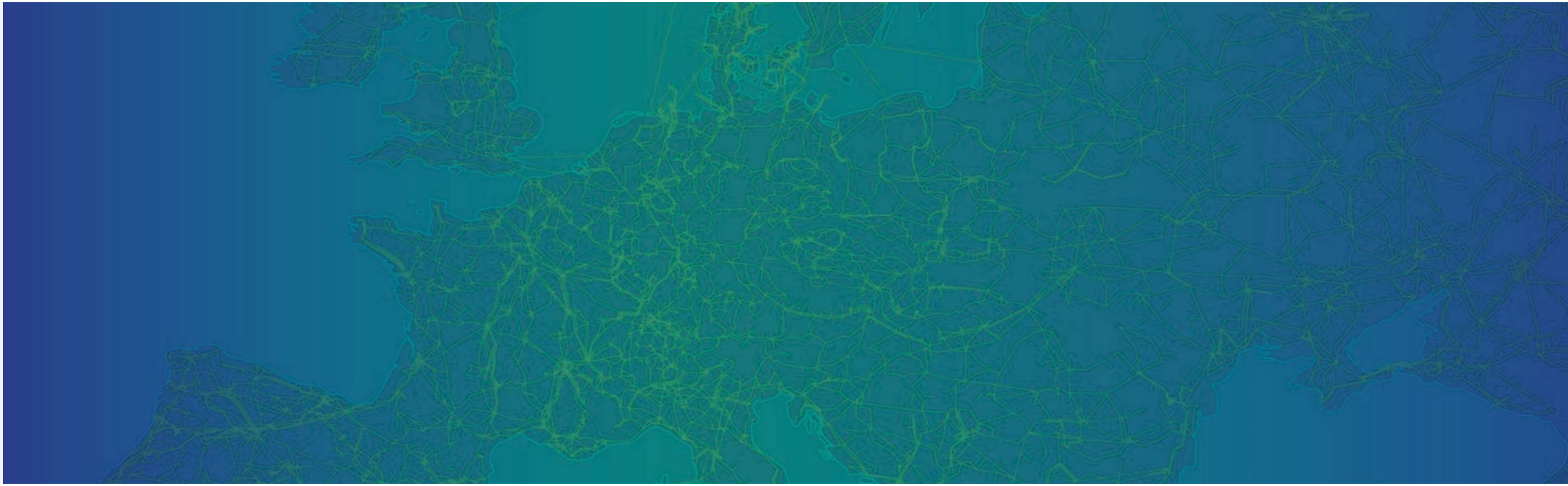
- Technology-neutral capacity gap (GW) to meet ramp-up/down requirements
- Max, min, mean, percentile and other characterization across different Climate Years

General approach – Additional option for TSOs

(still under discussion - currently not included in the draft methodology)



Flexibility DSO network needs



DSO ENTITY
DSOs FOR EUROPE

entsoe
Reliable Sustainable Connected

Key ideas for the methodology for DSO flexibility network needs

3 concerns

Availability and relevance of input data and methods

Relevance of output data: to provide **meaningful and useful** data for the purpose of the FNA

Efficiency to perform the task and make use of data

Context affecting these concerns

DNDP is intended to be a core DSO outlook over the 5 to 10 years, but not all DSOs publish DNDP, or DNDP information is not sufficient or available

=> **Method** needed to provide data **where DNDP information is not sufficient or available**

Providing data detailed both on locational and temporal manner might be meaningless or even impossible to compute

=> **Need to aggregate data** to provide meaningful and useful figures

There could be hundreds of very different DSOs nationally, with many DSOs covering a small geographic area or sharing similar issues

=> May be **more efficient to aggregate the needs of several DSO**, that is to provide the need of several DSOs all together

Overall process to provide DSOs Flexibility network needs

Step 1: DSOs organize themselves on how to gather or produce data

- Making up the "teams" of DSOs (Art 11.2.a)
- Organize the data and methods to represent the needs of the team (Art 11.2.b to 11.2.d)

Step 2: Each "team" of DSOs defines the source(s) of data

- DNDP (Art 11.3.a)
- Other sources (Art 11.3.b)

Step 3: Each "team" defines the granularity of the flexibility network needs while aiming at coordinated granularity

- Dimensions: Temporal (Art 11.4.a), Spatial (Art 11.4.b) and Voltage (Art 11.4.c)

Step 4: Providing the needs

- Fill the Table 2 template (Art 11.5 to Art 11.8)
- If relevant and available : Provide additional data of needs and define relevant metrics (Art 11.9 and Art 11.10

Step 5: Provide supporting material such as scenarios, explanatory document, methods, others (Art 11.11)

Step 6: Provide guiding criteria based on all the previous information (Art 14)

Step 1: DSO Organization

FNA - Arts 11.2.a to 11.2.d

FNA methodology

11.2 At national level, DSOs shall define how they organize to assess network needs and provide the required data and analysis specified in this Methodology. In particular:

a) Each DSO can assess network needs or provide data or analysis **individually or through a group of several DSOs**.

b) To assess network needs, or provide data or analyses, DSOs may **use or aggregate data** collected by, or data or analysis **provided by themselves and other DSOs**.

c) If DSOs uses other DSO's data to assess their flexibility network needs, the DSO using such data from another DSO shall **ensure relevance of the data and the method used to process the data** in a way that it is meaningful and consistent for the relevant needs.

d) Methods to **process data from other DSOs** may consist of **extrapolation, analogy or other relevant method**.

Examples of national implementation

DSOs organize "vertically", with a DSO connected to TSO and all DSOs connected under that DSO

All DSOs in a region, to leverage the energy climate plan implementation or other relevant specific inductors

DSOs with similar concerns, such as urban vs rural

DSOs per DSO organization

Other technical or specific reasons, relevant and efficient to assess flexibility needs.

Step 2: Source of data

FNA - Arts 11.3.a and 11.3.b

FNA methodology

11.3 DSOs shall assess the network needs and provide the required data and analysis in according to the following principles:

a) as a **basis** to produce their DSO flexibility network needs, DSOs that develop DNDPs shall use the scenarios, methods and data developed in their **latest published DNDP** pursuant to Article 32(4) of Directive (EU) 2019/944;

b) Where DNDP information is not sufficient or available, DSOs shall provide the data based on their internal assessments from other sources, which shall be based on the following principles:

   i. **reflect the most plausible futures of the electricity distribution** system for the next five to ten years, including anticipatory needs;

   ii. be **consistent among TSOs and DSOs input data** pursuant to Article 5(6); and

   iii. encompass, at least, current and forecasted electricity demand, generation and energy storage capacities and consider **national energy and climate plans**, local energy strategies.

Examples of national implementation

The requirements "built in" DNDP method should be followed where DNDP is not available or sufficient

Possible other sources of data include data to be provided in support of regulatory tariff settings, EV or DER connecting schemes, other focussed study

Step 3: Granularity of Flexibility network needs

FNA - Arts 11.4.a and 11.4.c

<Work in progress>

FNA methodology

11.4 To provide **meaningful and useful data** of flexibility network needs **to fulfil the purpose of national flexibility needs assessment**, DSOs shall define the relevant temporal, spatial and voltage granularity of data referred in table 2 considering the availability of data and methods, scenario uncertainties, or other relevant criteria. DSO shall aim using a **nationally coordinated temporal and spatial granularity**.

The granularity of data shall have the following characteristics:

a) **temporal granularity** of DSO flexibility network needs shall consist of time horizons (such as specific years within 5-10 years horizon), and for a given time horizon the related event (season/ months, days within a week, hourly period of occurrence); and

b) **spatial granularity** of DSO network flexibility needs shall be smaller or equal to:
   i. the bidding zone when a country has more than one bidding zone; or
   ii. the Member State area

c) **voltage granularity** shall consist of needs per voltage level or aggregating between different voltage levels.

Examples of national implementation

- **Temporal granularity**: time horizons (such as specific years within 5-10 years horizon), and for a given time horizon the related event (season/ months, days within a week, hourly period of occurrence)

- **Spatial granularity**: could reflect the rationale for teams of DSOs such as by regions, rural/urban

- **Voltage range**:
  - Per voltage level, such as HV, MV, or LV: location of eligible resources or location of congestion issues
  - Aggregating over different voltage levels: to take into account the effect of solving higher voltage issues acting at lower voltage level

Step 4: Provision of flexibility network needs data

FNA - Arts 11.5

<Work in progress>

FNA methodology

11.4 DSOs shall provide to the Designated Authority or Entity the data listed in table 2:

- **Mandatory and optional (complementary) data on Capacity**
- **Mandatory and optional (complementary) data on Energy**
- **Optional data: Continuous duration** of network need

With the following detail per type of data

- **Unit**
- When for a given time horizon, **Related event** : Season/ Months, weekly days, hourly period of occurrence
- Time horizon (such as specific years within 5-10 year horizon
- **Location** with respect to the defined spatial granularity
- **Direction** : Upwards or Downwards
- Other relevant description (clarifications)

Examples of national implementation

- Time horizon: year 2-3
  - Summer
    - Weekdays
    - Weekends
  - Winter
    - Weekdays
    - Weekends
- Time Horizon: year 5-6
  - Summer
    - Weekdays
    - Weekends
  - Winter
    - Weekdays
    - Weekends

Step 4: Provision of flexibility network needs data

FNA - Arts 11.6 and 11.7

<Work in progress>

FNA methodology

11.6 Mandatory data on capacity values in table 2 shall be provided as a maximum for one year or season.
It shall describe the needed installed capacity of flexible resources and if available the simultaneous activation of flexible resources over the relevant geographic granularity.

11.7 In addition, optional data on capacity shall be provided, if available, as:

a) a maximum or a range of values for typical days;
b) an hourly profile for typical days;
c) quantitative statistics (maximum, average or other values) instead of hourly profile; or
d) description where quantitative data is not available.

Examples of national implementation

- Time horizon: year 2-3
  - Summer
    - Weekdays
    - Weekends
  - Winter
    - Weekdays
    - Weekends
- Time Horizon: year 5-6
  - Summer
    - Weekdays
    - Weekends
  - Winter
    - Weekdays
    - Weekends

Step 4: Provision of flexibility network needs data

FNA - Arts 11.8

<Work in progress>

FNA methodology

11.8 Mandatory data on energy values in table 2 shall be provided as a maximum or an expected average value per year or per season.

In addition, optional data on energy shall be provided, if available, as:
quantitative statistics (maximum, average or other values); or
description where quantitative data is not available.

Examples of national implementation

- Time horizon: year 2-3
  - Summer
    - Weekdays
    - Weekends
  - Winter
    - Weekdays
    - Weekends
- Time Horizon: year 5-6
  - Summer
    - Weekdays
    - Weekends
  - Winter
    - Weekdays
    - Weekends

Step 4: Provision of flexibility network needs data

FNA - Arts 11.9 and 11.10

FNA methodology

11.9 If available, each DSO shall provide to the Designated Authority or Entity data on flexibility network needs to solve congestion or voltage issues during planned or unplanned availability of assets.

DSOs shall define the relevant metrics, considering such criteria as unpredictable start time and duration for unplanned outages, load on "recovery" assets, and other relevant criteria.

11.10 If available, each DSO may, if it deems it relevant, extend the analysis to other flexibility network needs.

DSOs shall define the relevant metrics, considering such criteria as unpredictable start time and duration for unplanned outages, load on "recovery" assets, and other relevant criteria.

Examples of national implementation

- **<u>Examples of such additional use cases:</u>**
  - Flexibility network needs where investment is not sufficiently or not net sufficiently justified (congestion can occur but impact of lost loads and losses too small wrt to the cost of investment)
  - Alternatives to dispatch of mobile generator, such as for works planning outages, etc.
  - Network needs in case of works delay, or until ongoing reinforcement work is completed

Step 5: Provision of supporting material

FNA - Arts 11.11

FNA methodology

11.9 In addition to the data in table 2, each DSO shall provide to the Designated Authority or Entity the following information:

a) **source of data and the studies** used to provide network needs;
b) **scenario(s)** used to define future generation, loads and energy storages on DSO network;
c) **methods** used to assess the Distributed Flexibility network needs;
d) if applicable, the **data or assumptions** where DNDP data or studies need to be completed;
e) **reasons to provide optional data** in a quantitative manner or describe the **circumstances under which DSO flexibility network needs occur** or other relevant criteria enabling to assess capability types of DSO flexibility network needs; and
f) **relevance of the above points to provide meaningful and useful data to fulfil the purpose** of the national flexibility needs assessment.

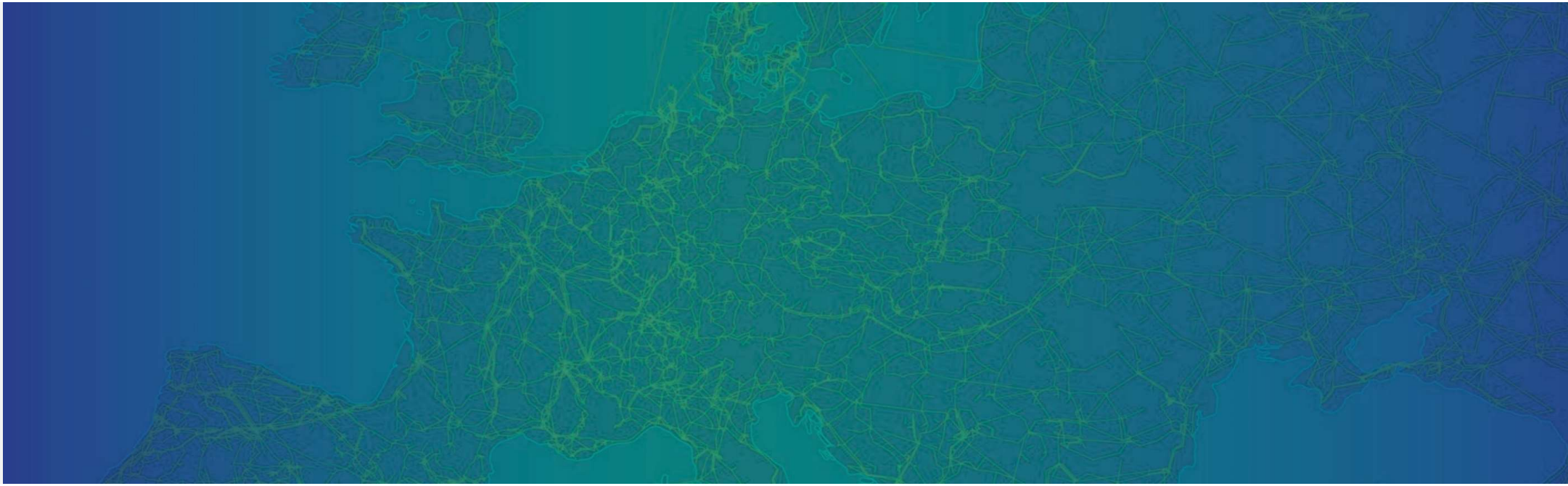
Examples of national implementation

- a) DNDP of DSOs XXX and study YYY produced for the purpose of ...
- b) **Energy Transition Scenarios**, for RES Integration and Electrification of Consumptions, integrated in the different DSOs' DNDPs
- c) methods of DNDP XXX and extrapolation of data of DNDP XXX to cover the needs of DSOs ZZZ
- d) No additional data to DNDP ; interpolation/extrapolation of needs to match time years of TSO system and network needs assessment
- e) Flexibility needs occur during high PV generation at midday in summertime only, or when EV connect at end of day during cold waves
- f) ....

Elements of guiding criteria

(still under development - currently not included in the draft methodology)

Relevant information for Article 14 of the draft methodology



DSOs FOR EUROPE

Reliable Sustainable Connected

Guiding criteria - General approach

Context / Whereas

As defined in Art. 19e (4) of the Regulation, the methodology for the analysis of the flexibility needs shall contain guiding criteria on how to assess the capability of the different sources of flexibility to cover the flexibility needs.

The purpose of the guiding criteria is therefore to characterize flexibility needs through an assessment of the capabilities of flexible resources to cover them, while a neutral technological approach is respected.

Guiding criteria shall provide relevant information on such required capabilities to interpret the results of the needs assessment analyses and drive policymakers in the identification of the most suitable technologies to cover needs.

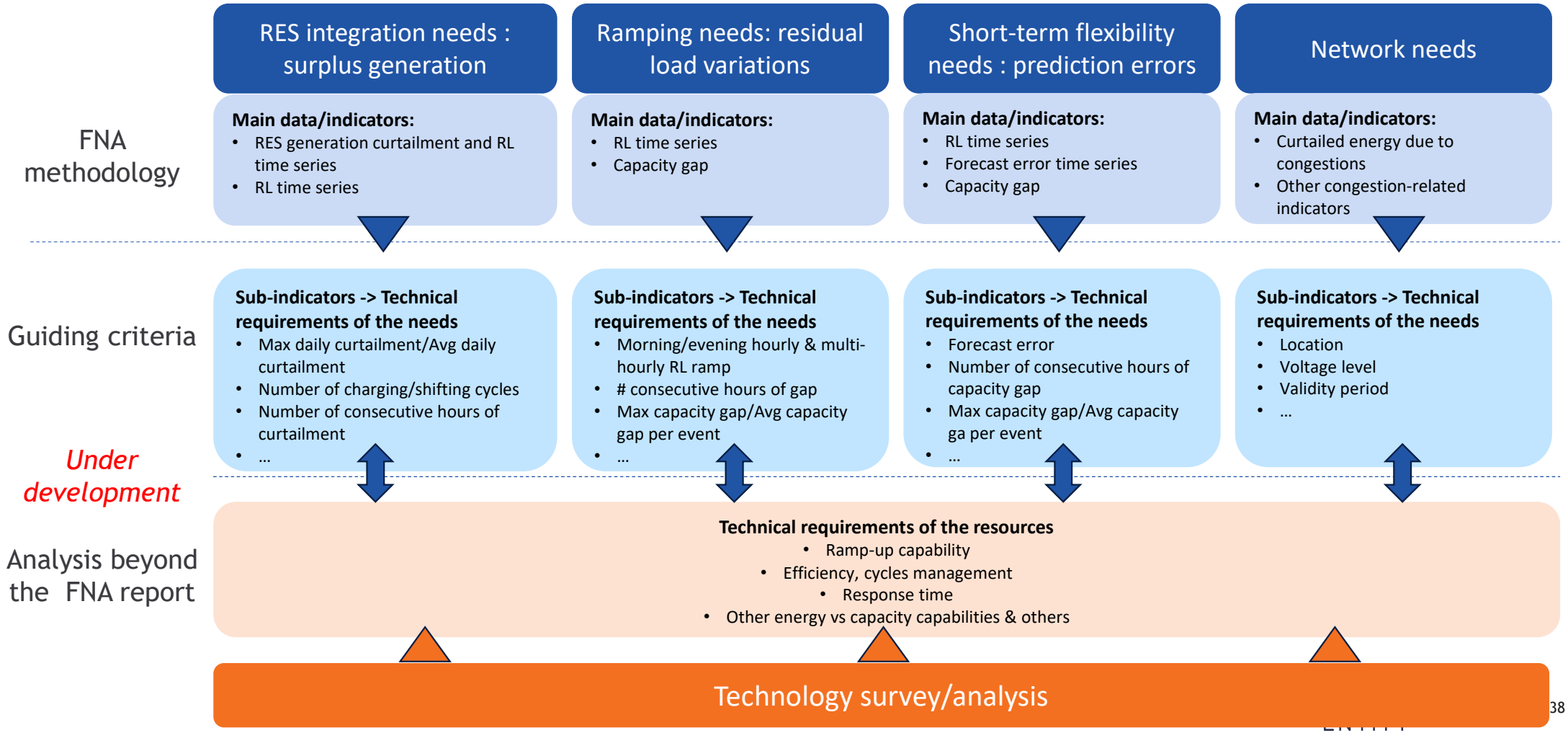
It is out of the scope of this methodology to specify means to access flexibility in each Member State (such as market based, rules based, flexible connection agreements and tariff signals etc.)

Preliminary text of article 14 (currently under discussion)

1. At national level, TSOs and DSOs shall assess the capability of flexible resources to cover the flexibility needs identified in Articles 8 to 11 by:
    a. identifying the most relevant technical requirements, also taking into account the ones reported in paragraph 2 of this article for distribution network needs and paragraph 3 of this article for system needs; and
    b. characterising the technical requirements through relevant metrics, indicators and ranges of values based on the results of the quantified flexibility needs and other quantitative or qualitative considerations.

Guiding criteria – General approach

NEW



Step 6: Guiding criteria

FNA - (/!\ preliminary proposal – early drafting stage)

FNA methodology

2. Requirements to assess the capability of the different sources of flexibility to cover the distribution network flexibility needs may include the following:

- **Location of assets** to cover flexibility network needs: voltage level (vertical dimension) and geographical area (horizontal dimension)
- **Validity period**: in which periods or from when on the resource is available (next year, summer, workdays, Sundays../ immediately, next month, next year etc.)
- **Availability window**: when the resource shall be available (morning, night…)
- **Duration of each occurrence of need**
- **Recovery time or minimum duration between the end of deactivation period and the following activation**
- **Quantity:** ranges of the quantities of flexibility needed
- **Direction of activation**
- **Economic criteria,** if available and relevant

Examples of national implementation

1 example of relevant requirements for flexibility network needs (see next page)

Geographic location of assets to cover needs
Voltage of assets to cover needs
Validity period
Yearly occurrences
Availability window
Duration for each of each occurrence of need
Occurrence between 2 successive needs
Direction of activation
Quantity

Examples of guiding criteria for flexibility network needs

/!\preliminary example – early drafting stage

	Distribution flexibility **Example for peak demand at MV level**	**Distribution flexibility** **Example for injection congestions at HV level**
Geographical area and voltage level of assets to cover flexibility network needs	Urban areas x or y MV or LV	Regions 2, 3 HV, MV or LV
Validity period	Starting Year Y+2	Starting Year Y+3
Yearly occurrences	2 times / year (t>Y+2) 5 times / year (t>Y+4)	10 times / year (t>Y+3) 20 times /year (t>Y+5)
Availability window	Workdays (winter) in evening peak time	Summer, noon time, sunny weekends
Duration for each of each occurrence of need	2 to 4 hours approximatively	1 to 4 hours approximatively
Occurrence between 2 successive needs	1 day	1 hour to 1 day
Direction of activation	Upwards: Higher injection or lower demand	Downwards: Lower injection, higher demand
Quantity	1 MW to 5 MW	10 MW to 20 MW

Guiding criteria – Technical requirements for system needs

Possible sub-indicators

The system needs resulting from the application of the methodology can be further characterized through specific sub-indicators
For example, for RES integration needs

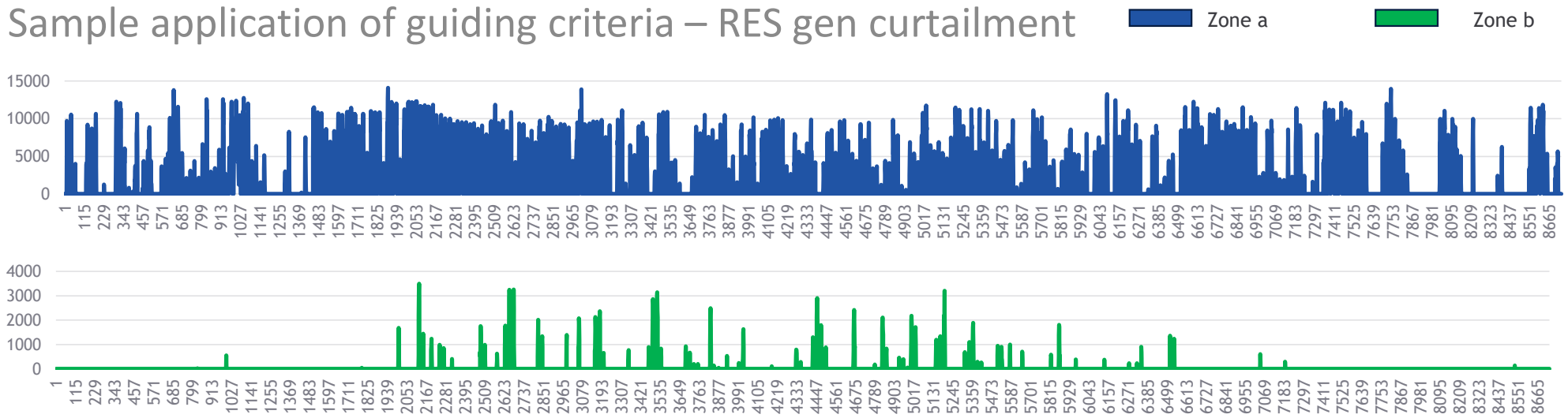
- Number of days when the need occur (e.g. RES generation curtailment)
- Steepness of the Residual Load morning and evening ramps
- Max hourly /Avg daily RES generation curtailment
- Number of Hours with consecutive RES generation curtailment
- Others (*currently under development*)

For each of them statistical analysis can be introduced to facilitate the identification of sets of technical requirements to cover RES integration needs

For the other needs similar sub-indicators can be derived

Guiding criteria – Technical requirements for system needs

Sample application of guiding criteria – RES gen curtailment



Sub-indicator	Zone A	Zone B
Days with RES gen curtailment, %	80%	15%
Interval between two curtailment events [min, max, avg], h	2,122, 27	10, 1430, 201
Duration of the curtailment event [max, avg], h	12, 7	6, 2
Max curtailment/avg curtailment [max, avg for all events]	1, 0,3	1, 0,7
Hourly variation [min, max, avg for all events]/RES capacity, %	10%, 90%, 30%	12%, 90%, 70%
Winter curtailment/Summer curtailment	80%	10%

- The analysis of the sub-indicators suggest the zone A would benefit of short-duration flexibility resources, due to the regular patterns of RES generation curtailment; these should also be capable of storing/shifting energy for 4-8 hours
- For zone B most of the curtailment conditions occur in spring/summer, with limited events lasting few hours

…Sub-indicators can be further characterized per timeframe; other sub-indicators can be added

Closing Remarks

- The Public consultation is open until **6 December.**
- It is an **intermediate step** and both Associations are committed to **consult at an early stage**. Therefore, the document will be subject to changes both on technical and legal content.
- The respondents are kindly invited provide feedback, and rather focus on the technical content considering the **early stage of drafting**.
- **Only feedback received via the consultation platform** within the consultation period will be considered.
- Feedback received and **replies will be published.**