

Resource Adequacy Methodologies

European Network of Transmission System Operators
for Electricity (ENTSO-E)

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Agenda

- 1 New challenges under the Clean Energy Package**
- 2 Methodology for Mid-term Adequacy Assessment**
- 3 Methodology for Short-term Adequacy Assessment**
- 4 Summary – Take-aways**

New challenges under the Clean Energy Package

Methodology package for the implementation of the Clean Energy Package

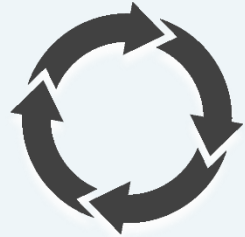
Three main methodologies (to be delivered by ENTSO-E):

- 1 Methodology for the European Resource Adequacy Assessment (ERAA)
- 2 Methodology for:
 - Cost of New Entry (CONE)
 - Reliability Standards
 - Value of Lost Load (VoLL)
- 3 Methodology for calculating the maximum entry capacity for cross-border participation to Capacity Mechanisms

European Resource Adequacy Assessment :

A basis for enhancements of market design and integration & security of supply

Methodologies to be developed within 6 months after entry into force



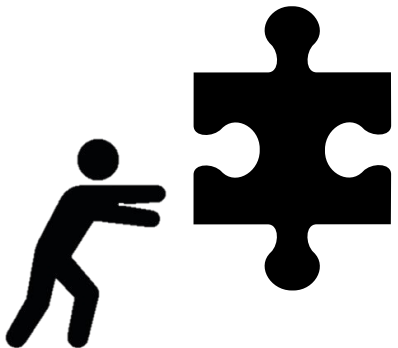
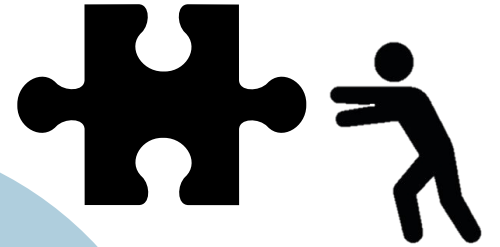
One adequacy methodology for European, regional and national assessments



Common adequacy indicators as a basis for regionally coordinated national security of supply standards



Pan-European and national assessments complementing each other in a consistent approach



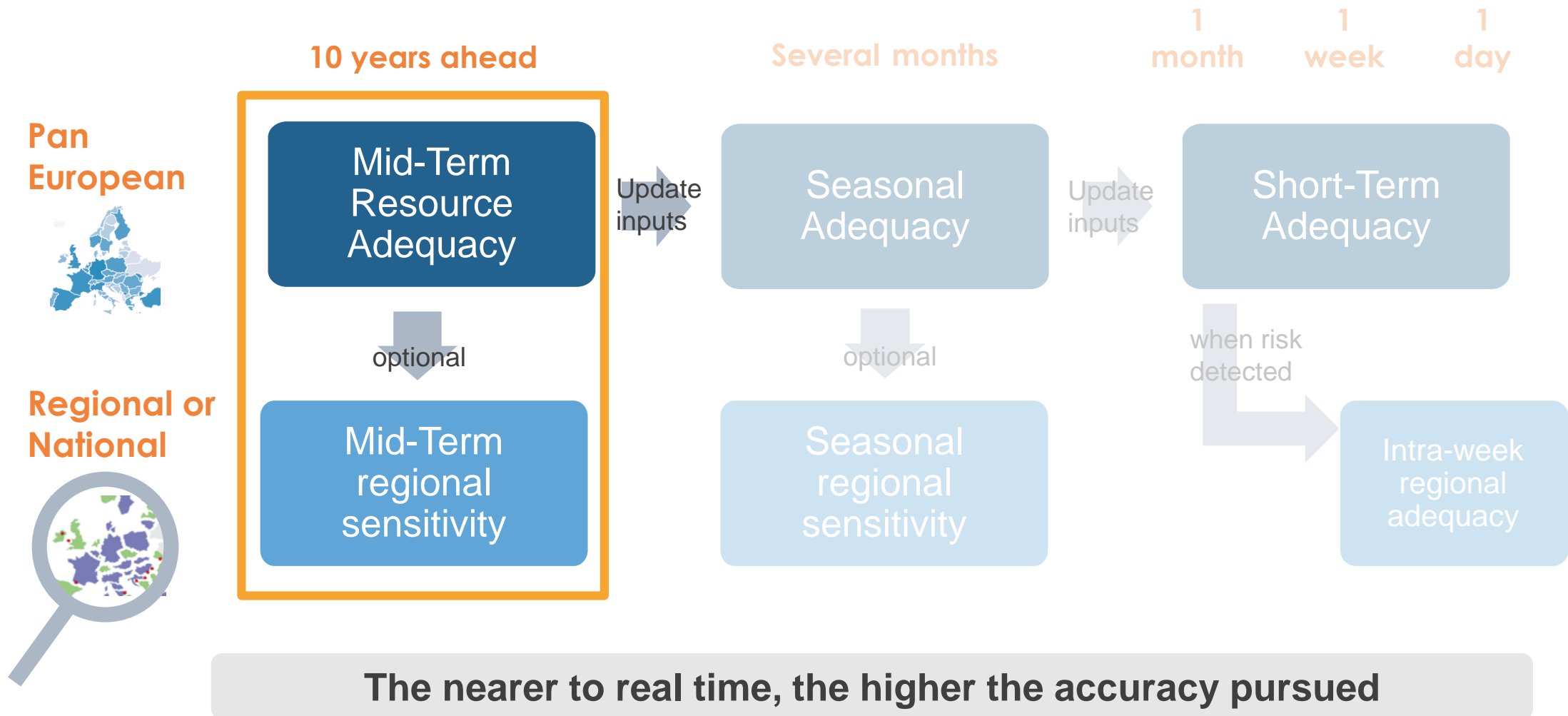
Resource Adequacy methodologies – Timeline



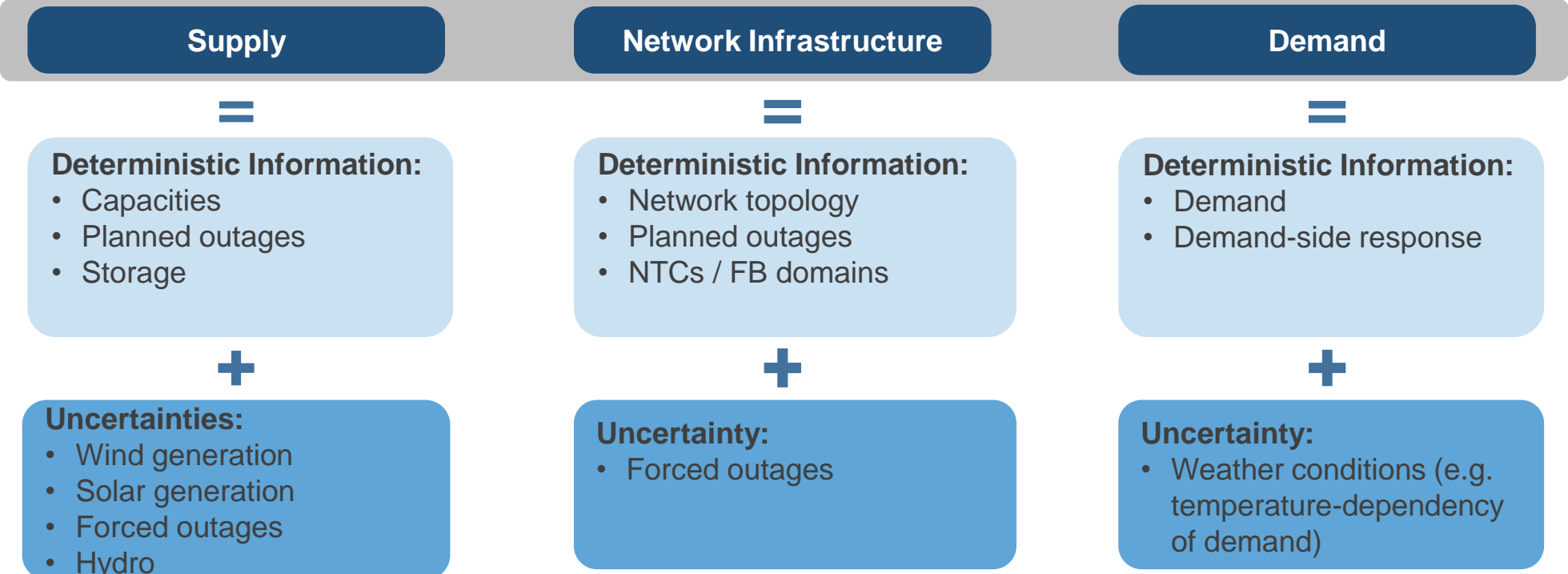
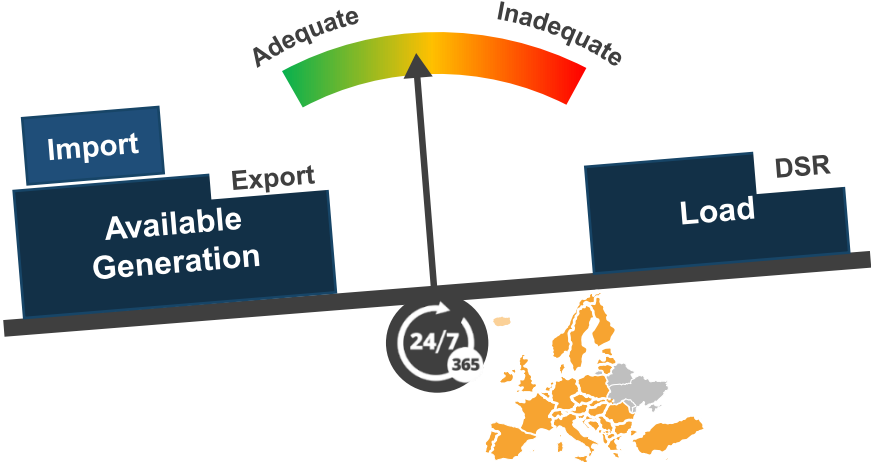
European Resource Adequacy Assessment (ERAA):

Methodology and implementation plan for the mid-term adequacy assessment

Adequacy: different products for specific purposes



Mid-term Adequacy Forecast – current methodology



European Resource Adequacy Assessment: what's new?

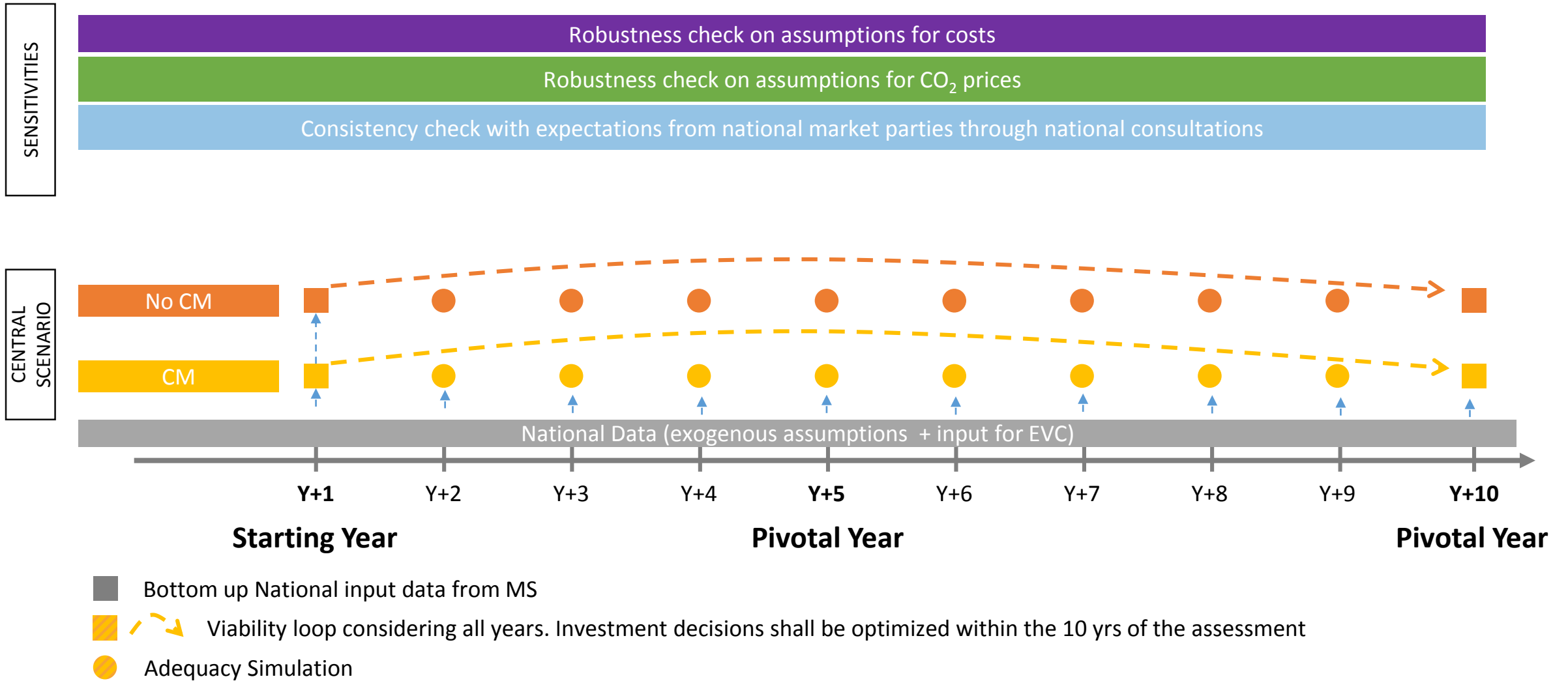
Current Approach (MAF 2019)

- Probabilistic market modelling
- 7 years ahead - 2 simulated years
- Bottom-up approach and expectations of commissioning / decommissioning
- No explicit CM considerations
- NTC approach, flow-based only tested
- No sectoral integration

Target Approach

- Probabilistic market modelling
- 10 years ahead - annual granularity
- Economic viability of generation assets, integrated in the model
- Integrated consideration of CM
- Compliance with FBMC when available
- Sectorial integration (P2X consideration)

ERAA will significantly expand scenario framework



Implementation principles

Feasibility and robustness should be ensured with Proof of Concept tests, prior deployment.

- **Especially economic viability checks will require several years of implementation.**

Innovations that are not mature and robust will not be included.

- **Methodology can be updated at any time later on.**

Reliability Standard (RS)
Value of Lost Load (VoLL)
Cost of New Entry (CoNE)

The Economic approach to define reliability standard

→ **Optimal level of security of supply** determined by the point at which the *incremental cost of additional capacity against load curtailments (CONE) is equal to the incremental cost of load curtailments to customers* (incremental volume of Expected Energy Not Served expressed as LOLE, valued at VOLL).

For a given load duration curve:

$$\frac{dEENS(Q^*)}{dQ} = - \text{LoLE}$$

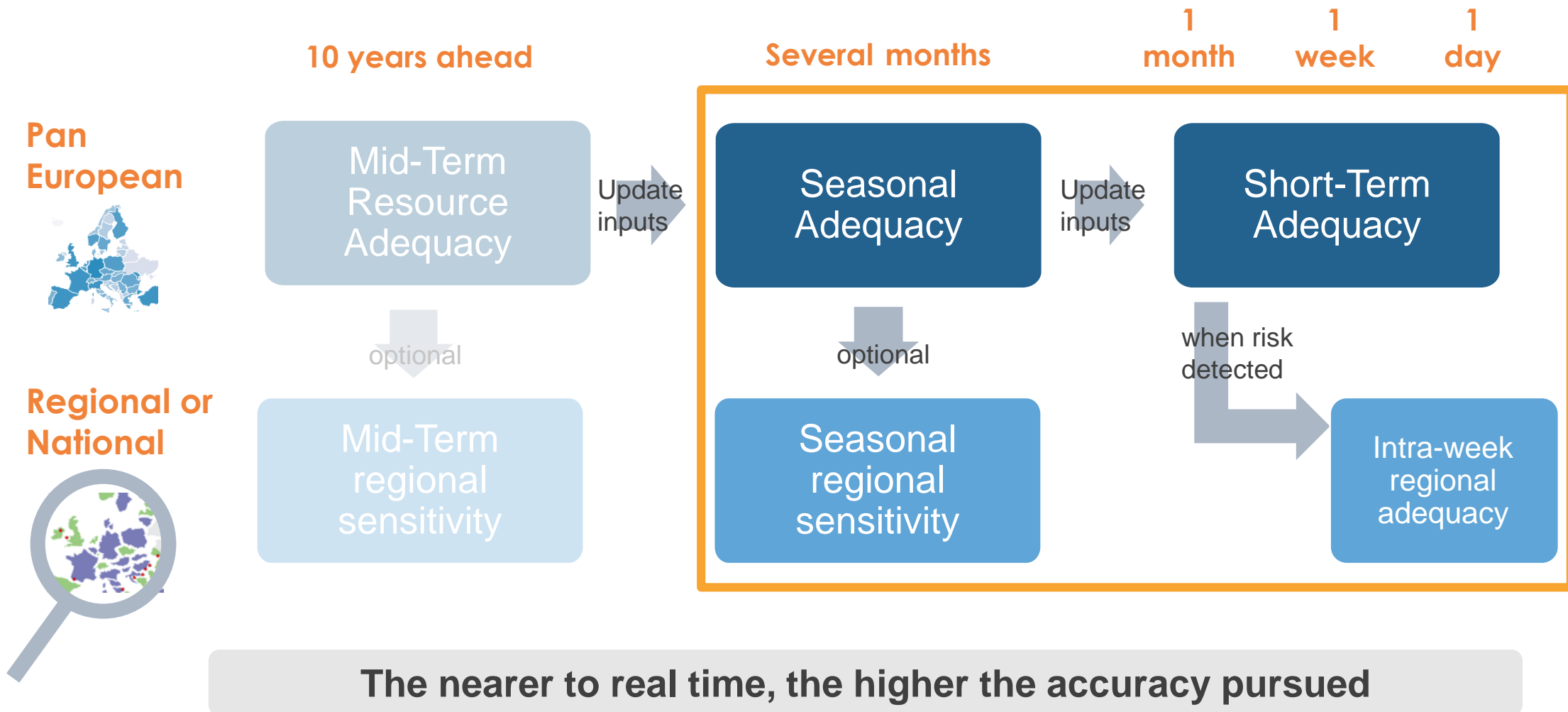
This leads to the following optimal relationship:

$$CONE = \text{LoLE} * \text{VoLL}$$

An economic approach for the reliability standard is based on incremental change of EENS (LOLE in hours per year), derived from the value of CoNE and VoLL only and not on the total EENS

Methodology for short-term and seasonal adequacy assessments

Adequacy: different products for specific purposes



Seasonal Adequacy – current methodology

Inputs from TSOs and Pan-European databases



European constraining scenarios

synchronous peak
(upward) → Wednesdays 7 PM

low demand with high RES
(downward) → Sundays 5 AM and 11 AM



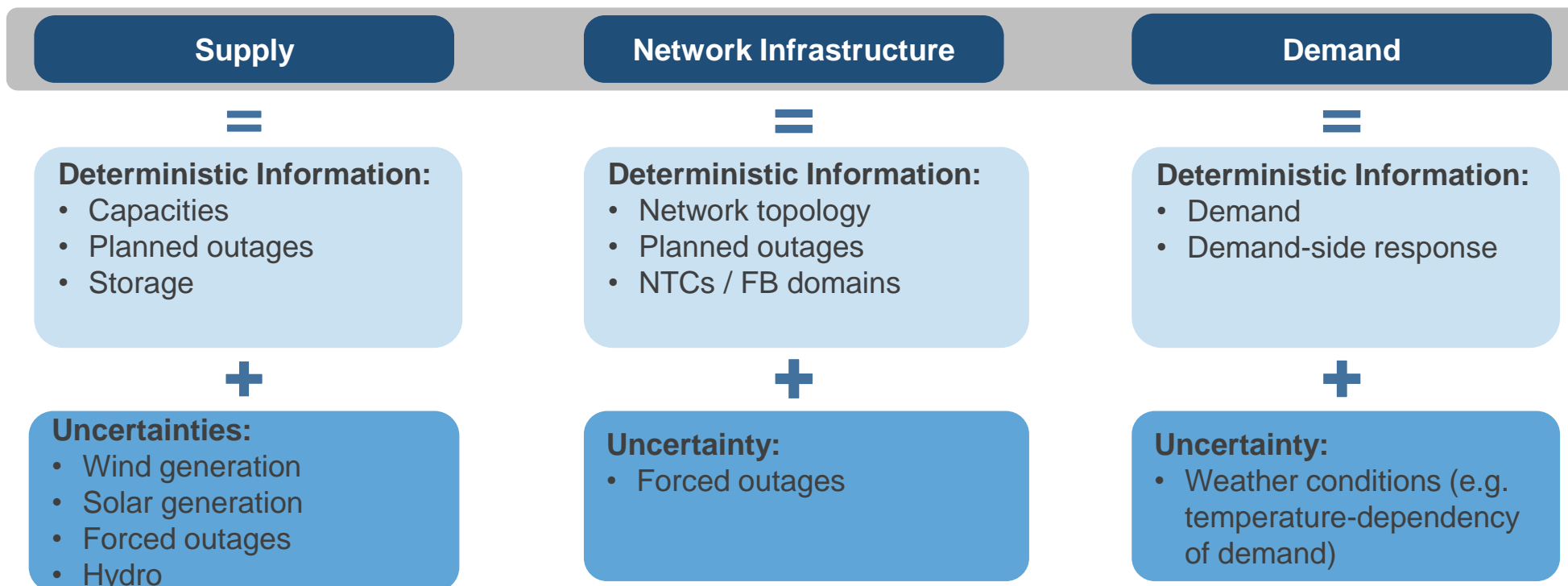
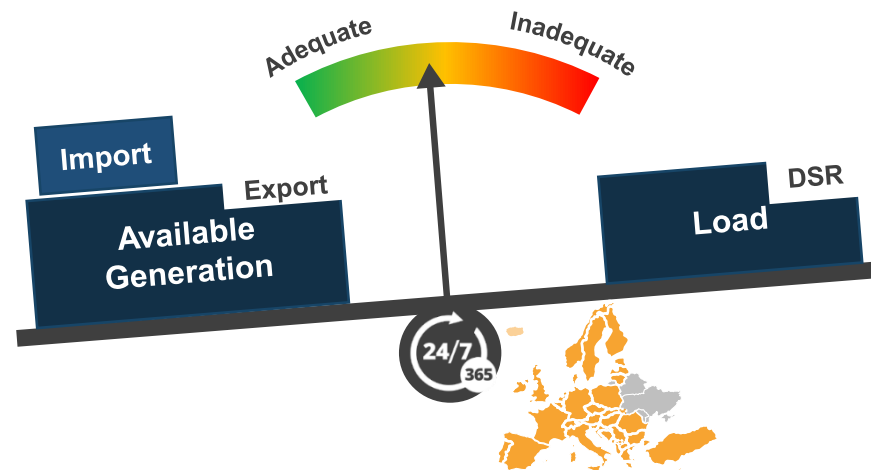
Focused analysis on weeks flagged at risk

Probabilistic approach using
numerous situations
(temperature, wind...)

Aim is to estimate the
probability that an issue could
occur

Main drivers are identified

Short-term/Seasonal Adequacy – target methodology



Methodology for Short-term Adequacy

Consultation

8 responses in the hub and 3 direct to project team

Type	Name
University	Technical University of Sofia, Bulgaria
TSO	PSE S.A, Poland
TSO	Bulgaria TSO ESO, supported by BG permanent representation to the EU
TSO	National Grid, UK
NRA	Energy and Water Regulatory Commission, Bulgaria
NRA	Commission for Electricity and Gas Regulation (CREG), Belgium
NRA	Commission de régulation de l'énergie, France
NRA	Romanian Energy Regulatory Authority – ANRE, Romania
Industry	TPP Varna, Bulgaria
Industry	Barcelona Supercomputing Center, Spain
Industry	EDF, France

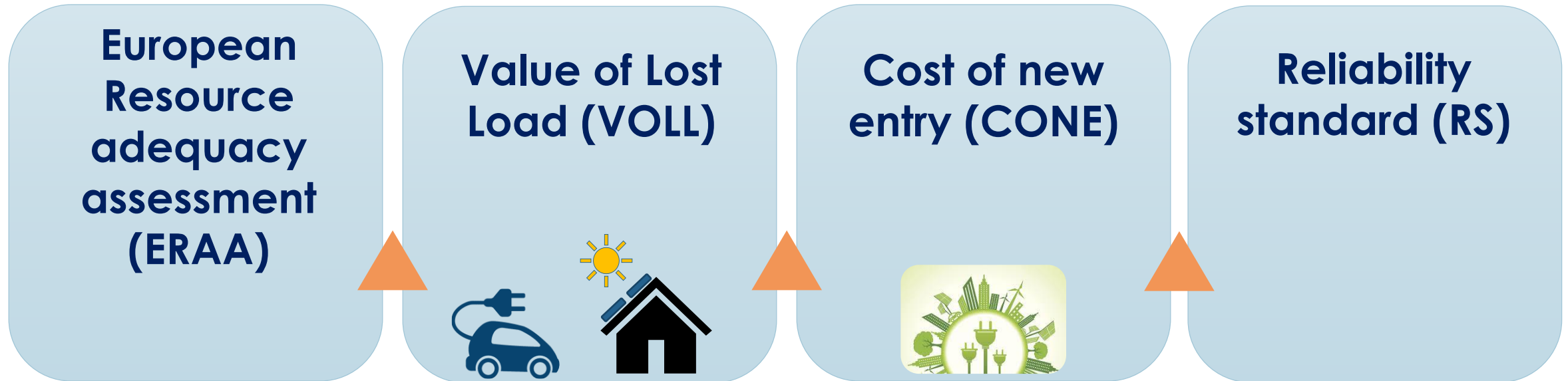
Methodology Update

- Extension of the methodology detail to the extent possible (e.g. on process)
- Consistency with European Resource Adequacy Assessment
- Definition of month-ahead triggering

Take-Aways



European Resource Adequacy methodologies: stay tuned and have your say!



- ▶ **5 December 2019 - Public consultation on all methodologies opens for 8 weeks**
- ▶ **16 December – Stakeholder workshop on the Resource adequacy methodologies**



Thank you for your attention
