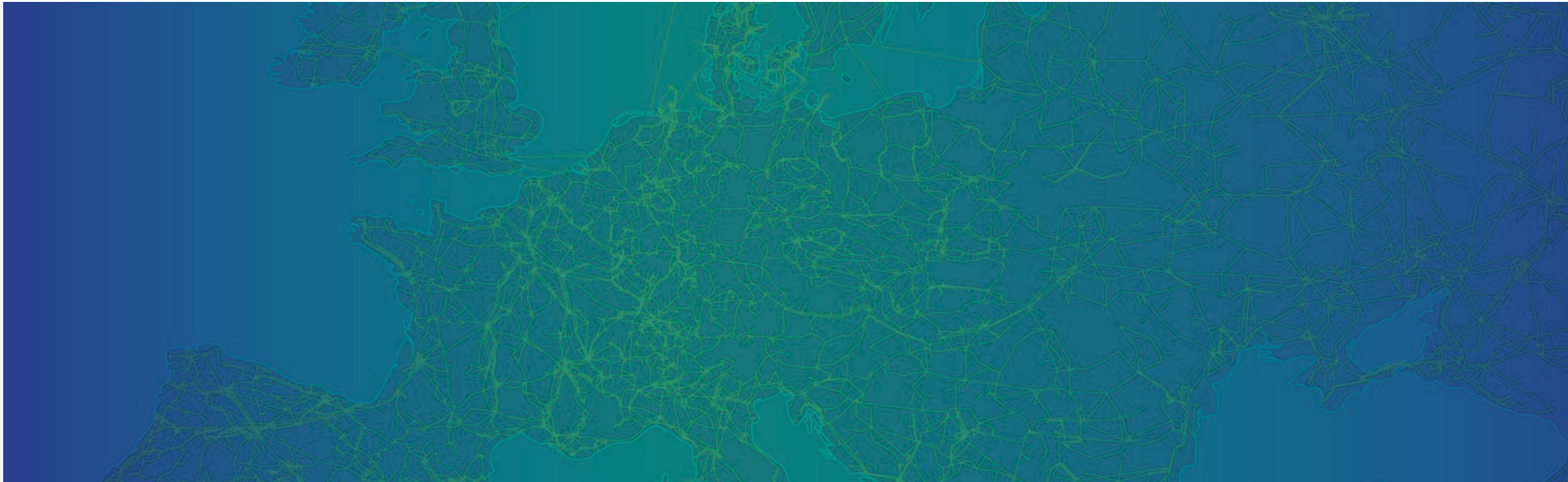


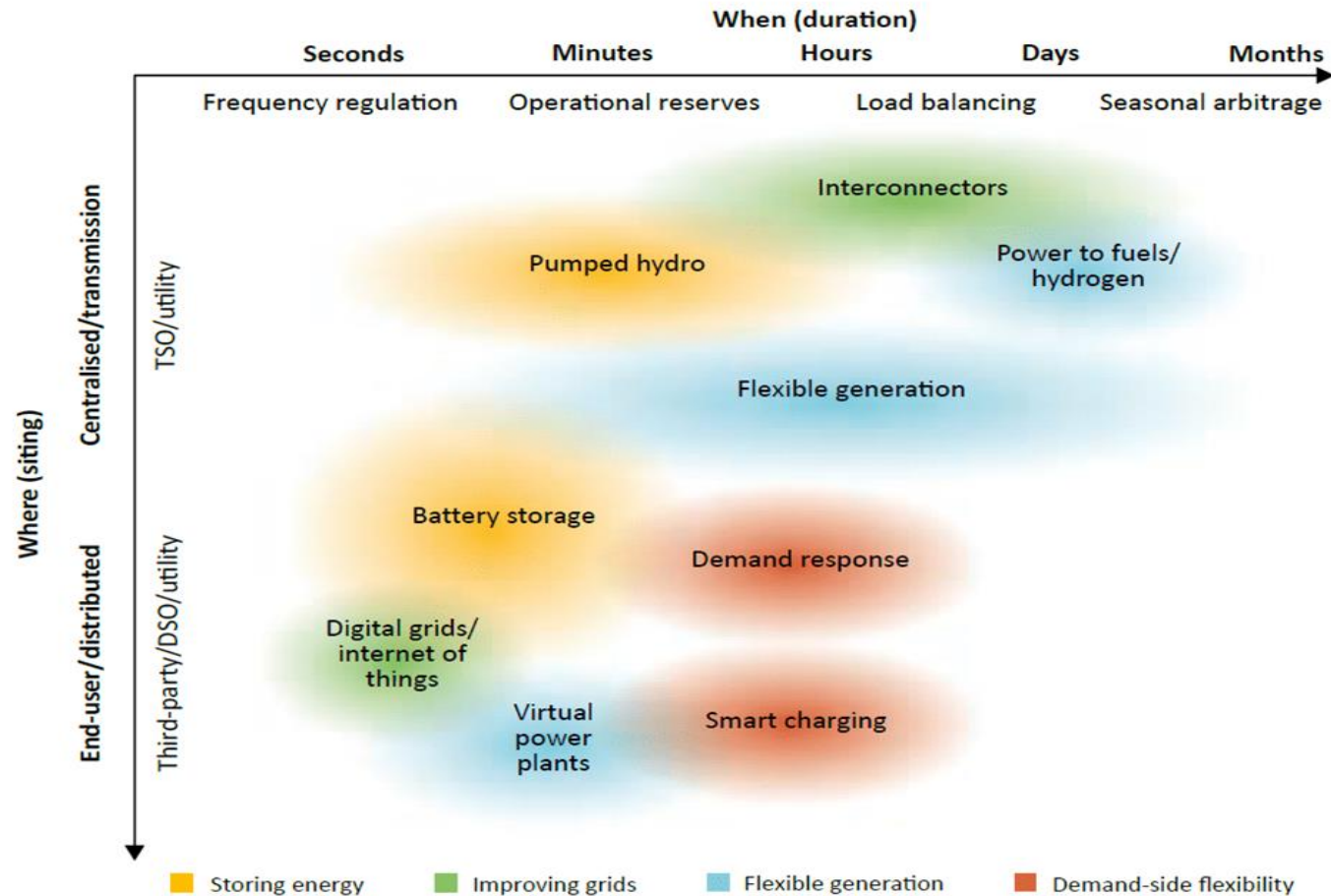
Assessing flexibility needs of the power system

ENTSO-E Stakeholder Webinar: 2030 Market Design to enhance distributed flexibility 12 November 2021

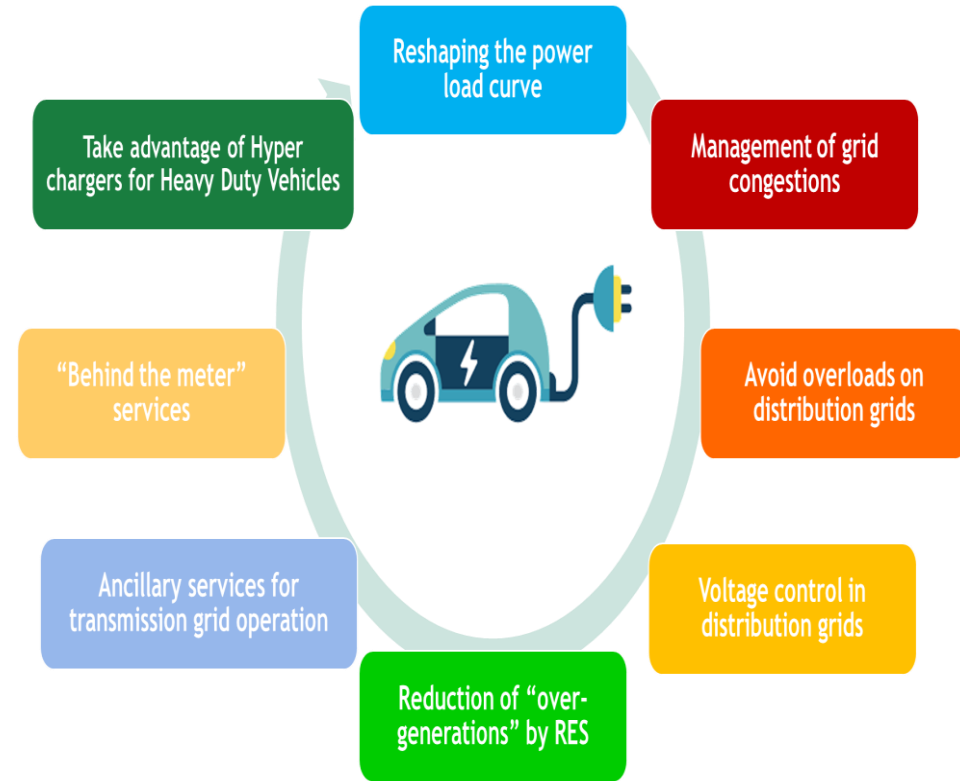


Christos Dikaiakos, Integrated System Manager at ENTSO-E

Power system flexibility enablers in the energy sector/Electromobility as a flexibility mean



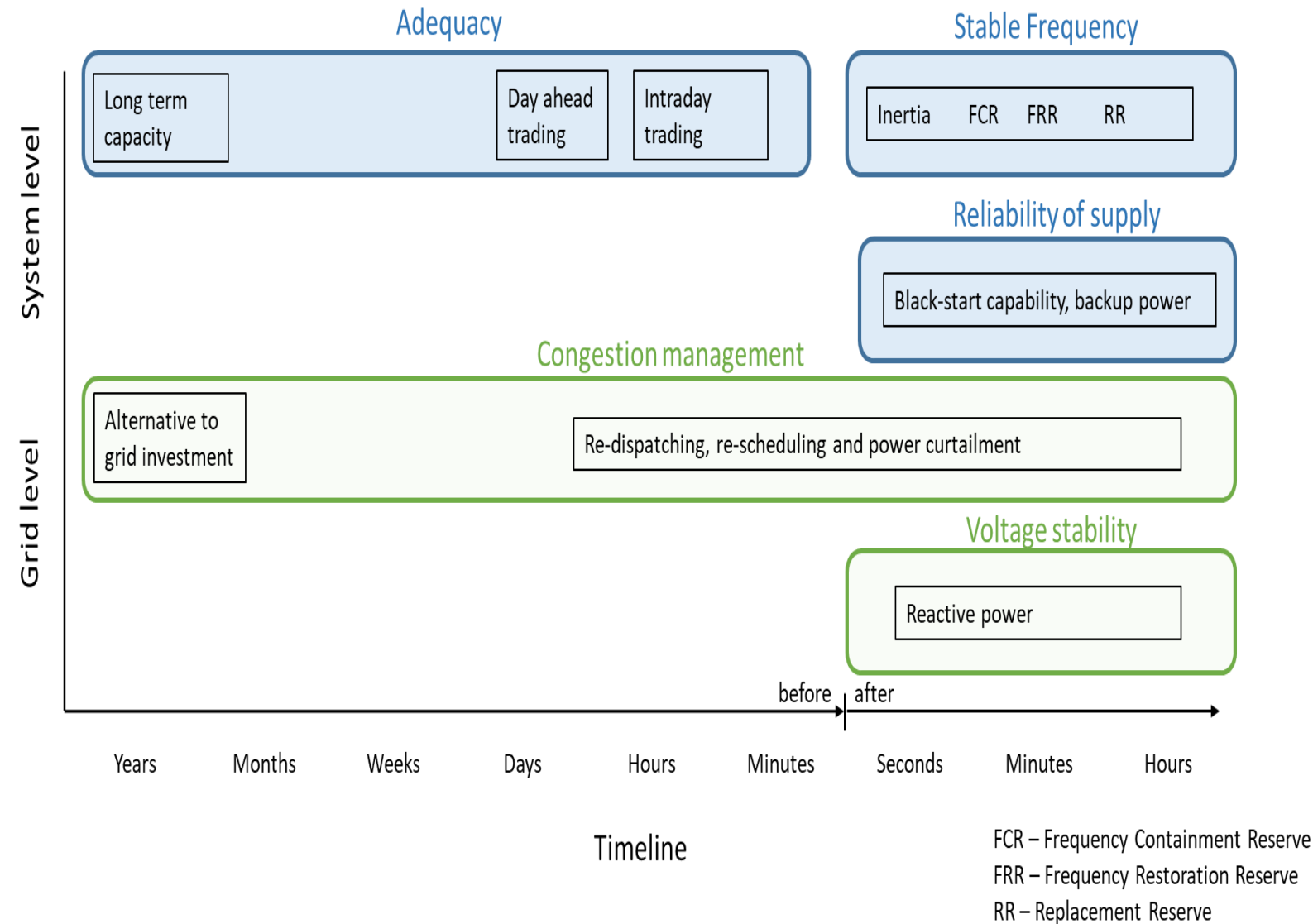
Source: IRENA report on innovation and renewables (2019)



Source: ENTSOE Position Paper on Electric Vehicle Integration into Power Grids

Expansion of electrification, distributed generation and variable renewables will broaden the need and range of flexibility options

Power system needs and services on a timeline



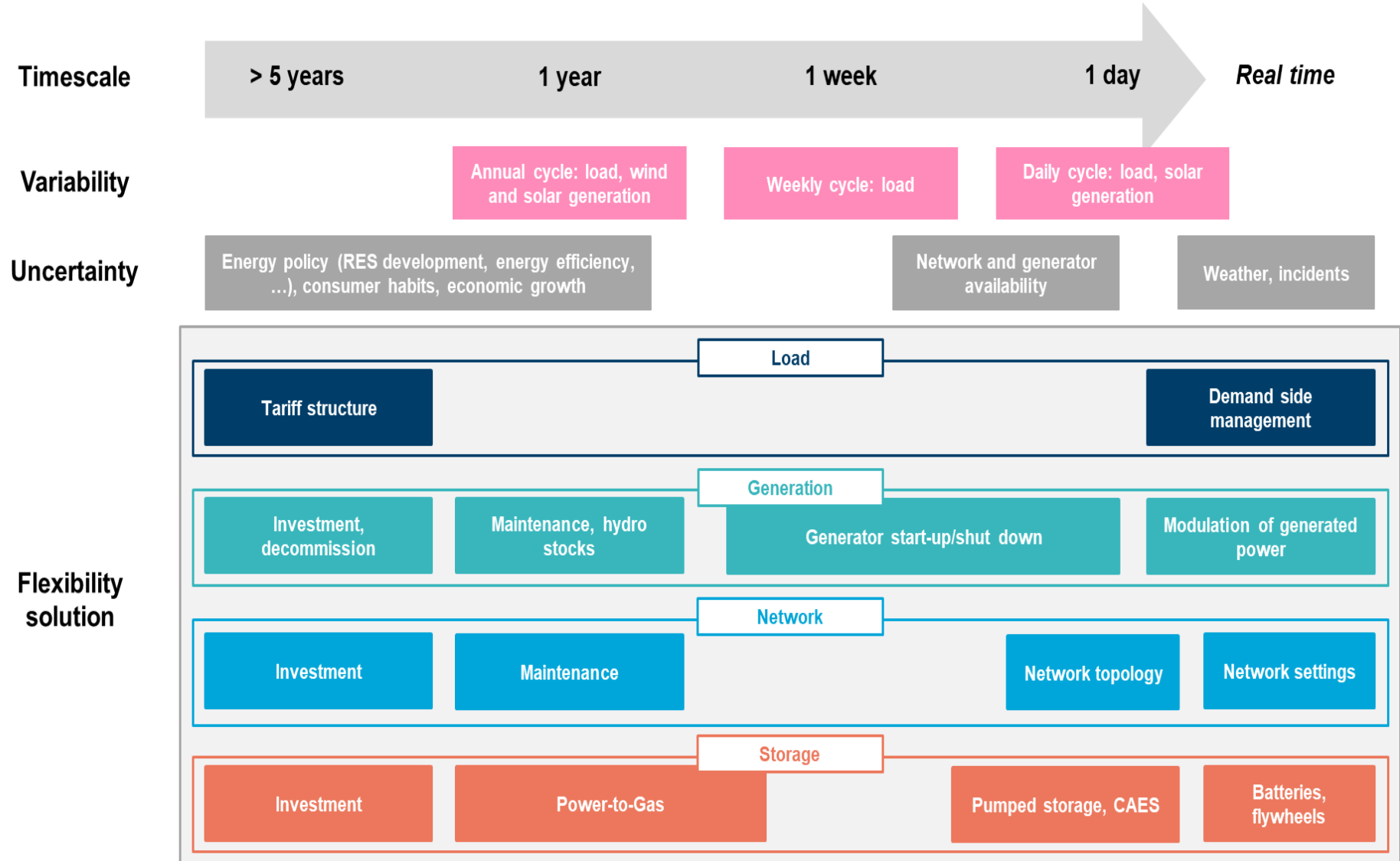
Flexibility Sources

- **Generation:**
 - Dispatchable generation
 - Variable generation
- **Demand:**
 - Small loads
 - Large loads
 - Electric mobility
- **Storage:**
 - Electromechanical storage
 - Electrical storage
 - Mechanical storage
 - Chemical storage
 - Thermal storage
- **Grid:**
 - Flex technologies (FACTS, DLR, etc)
 - Interconnections

Flexibility needs will increase in the future

Flexibility needs increase due to variability and uncertainty in:

- **Demand:** electrification of heating, transport and industries
- **Generation:** more VRE and less dispatchable generation
- **Grids:** Power electronics dominance (less predictable flows, lack of inertia)



Flexibility metrics as a tool to quantify and identify future flexibility gaps

Proposed metrics allow to identify major flexibility gaps to take the best measures to avoid jeopardizing the security of supply, even in cases when no resource adequacy concerns are found in the system

ENTSO-E Position Paper
**Assessment of Future
Flexibility Needs**
October 2021



entsoe

Position Paper:

- **Ramping flexibility needs metrics:** approach partly based on experiences from EirGrid and CAISO.
- **Scarcity period flexibility needs metrics:** focused on scarcity periods, for example windless winter weeks in Northern Europe.

ENTSO-E Report
**The Assessment of Future
Flexibility Needs in Practice**
October 2021



entsoe

Report:

Complements and supports the Position Paper by illustrating the application of the metrics in three countries using actual ENTSO-E European Resource Adequacy Assessment (ERA) data

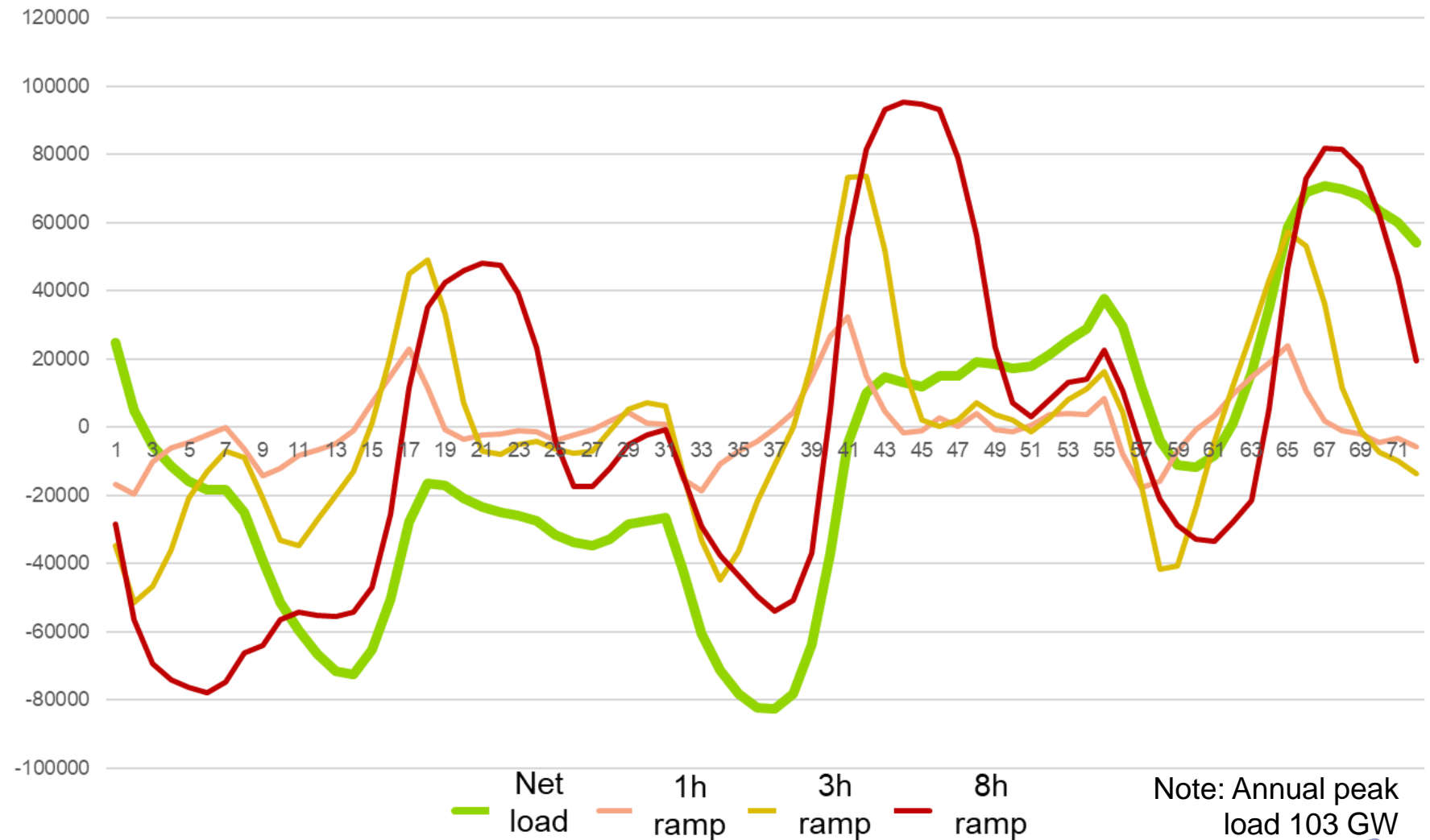
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Why do flex needs increase: Ramping flex needs

Increasing variability and uncertainty bring new challenges to reliability, assessments may need more focus on how large variations at all timescales affect reliability:

- 1-, 3-, 8-hour ramps
- Seasonal scarcity periods
- Rising ROCOF/decreasing inertia

Example Germany 2030*: Net load, 1-, 3-, 8-hour ramps 10 Feb 0h – 12 Feb 24h



“Source: Konstantin Staschus (Guidehouse), ENTSO-E Workshop assessments of future flexibility needs, April 26 2021)”

Incorporating the metrics in future flexibility needs assessments

Recommendations for flexibility needs metrics could support the routine planning, regulatory and grid service products procurement

Introduce new flexibility gaps by post-processing adequacy simulation results, without affecting regulated ERAA methods

Determine if the current flexibility products are sufficient to cover future flexibility gaps

Develop solutions, if needed with regulatory approval, including new flexibility services and products

HOW?

WHY?

Knowing when future various flexibility gaps could occur enable TSOs to:

- ❖ manage regulatory evolution
- ❖ prepare for new flexibility services and products
- ❖ conduct stakeholder consultations
- ❖ seek regulatory approval early enough so the gaps can be covered by procuring flexibility resources