

# ERAA 2021 – Assumptions and Scenarios

Public Webinar, 12 October 2021



**Edwin Haesen, Head of System Development, ENTSO-E**

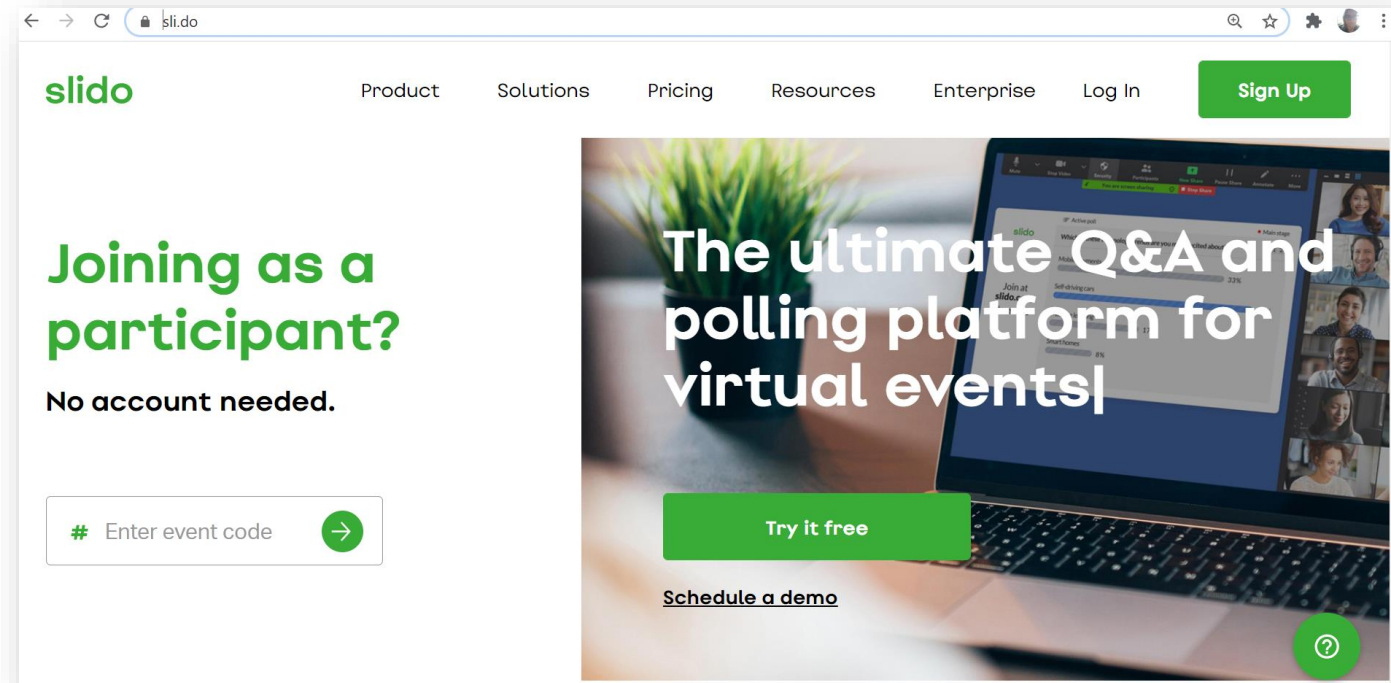
**Kristof Sleurs, ERAA 2021 Steering Group Convener, ENTSO-E**

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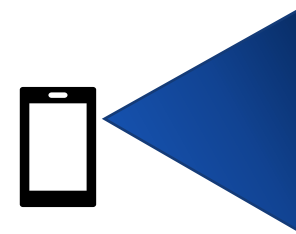
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# Our public webinars

What you will learn today, and after publication

## PART I

- **When? 12 October**
- **Agenda:**
  1. Overview of the ERAA
  2. Timeline and Process
  3. What scenarios will ERAA 2021 use?
  4. Understanding our assumptions
  5. State of play
  6. Next steps and implementation roadmap

## PART II

- **When? November, post-publication**
- **Agenda:**
  1. Overview of ERAA Results
  2. Understanding their implications
  3. Roadmap to ERAA 2022 and beyond



# Background

ERAA is a legal mandate, which aims to understand how the rapid changes to our energy system will affect security of supply

A successor to the MAF, it is a pan-European monitoring assessment of power system resource adequacy, based on a state-of-the-art, globally unparalleled probabilistic analysis

The ERAA methodology, approved by ACER, has introduced significant changes. Stepwise implementation has begun in 2021.

ERAA 2021 already provides an effective tool to identify adequacy risks; future editions will provide further insights as to the potential need for interventions to guarantee security of supply.

By proactively identifying system adequacy challenges, ERAA will support decision-makers in ensuring secure, affordable and sustainable energy to citizens and industries.



# ERAA: delivering crucial analysis in 2021

ERAA 2021: unparalleled worldwide in scope and comprehensiveness, based on a peerless data set, providing essential insights into system adequacy trajectories



## Increasing need

- Member States, NRAs and policy makers facing increasingly complex decisions
- There is no substitute analysis for the pan-European power system which comes close to matching ERAA 2021.



## Ambitious EU climate agenda

Key, long lasting energy and climate policies under debate:

- Fit for 55 Package
- Gas Decarbonisation Package

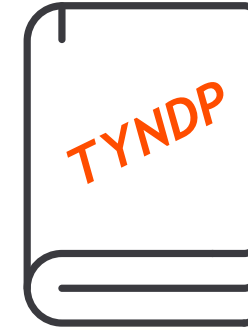


## Essential insights

- The modelling is an enormous leap forward compared to previous Mid-Term Adequacy Forecasts (e.g. on Economic Viability Assessment).
- Highly complex flow-based Proof of Concept (POC) informs outcomes (to be developed to full maturity for ERAA 2022)

# Dedicated assessments at different timeframes

Adequacy assessments



**Short term**

**Mid term**

**Long term**

1 week

6 months

1 year

5 years

10 years

>10 years

Real Time

Operational Decisions

Investment Decisions

Policy Decisions

UNCERTAINTY INCREASES WITH TIME SPAN



# Understanding adequacy is essential

## Identify

- ERAA allows the identification of risks well in advance, as well as a view on how trends will evolve

## Understand

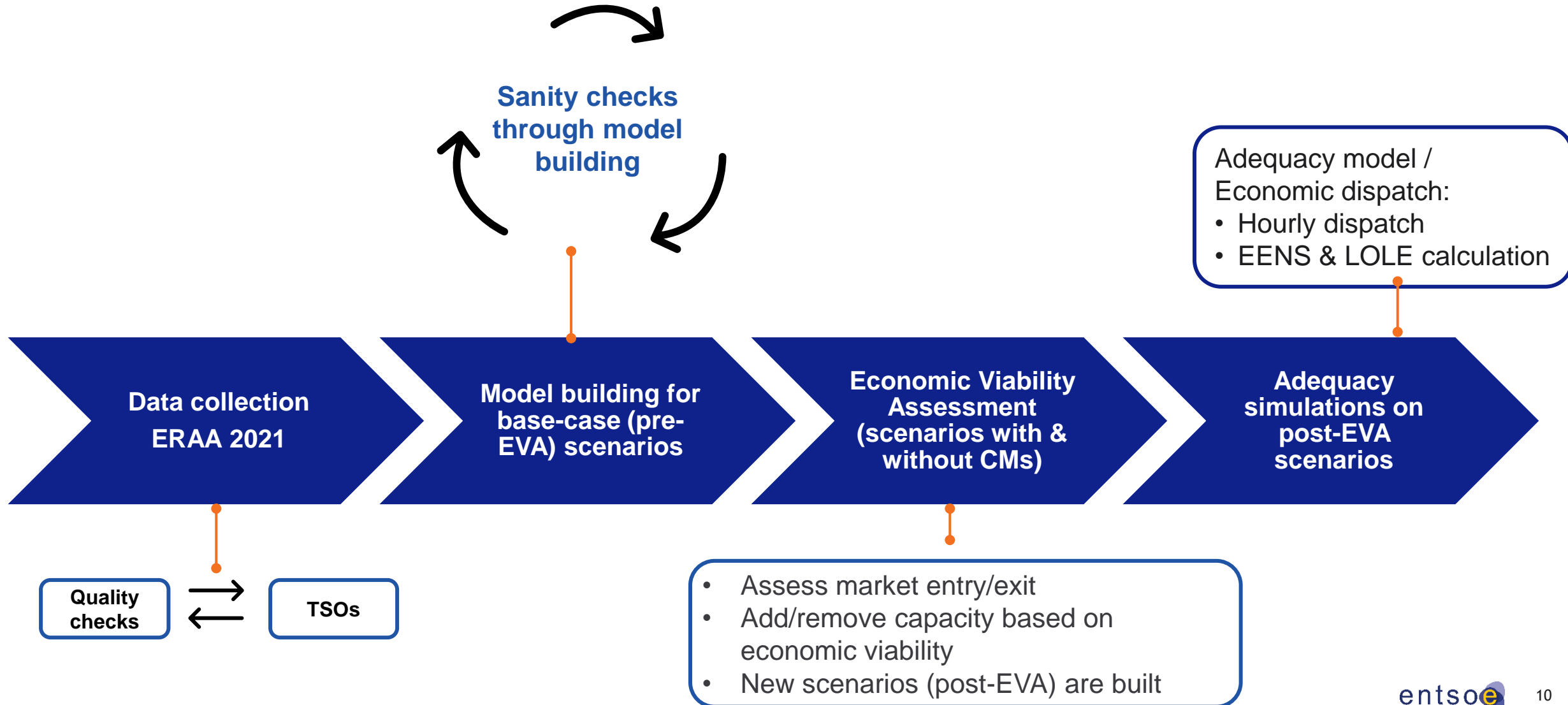
- Cutting edge tools give deeper insights into the drivers of system inadequacy

## Act

- ERAA enables early targeted action by stakeholders using the substantial toolbox available to mitigate risk

ERAA is not a precise prediction – it is an early warning which enables responsible system management decisions

# ERAA 2021 – Principle & Process



## ERAA 2021 webinar – assumptions and scenarios

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# Overview of the ERAA Scenarios





# ERAA 2021 – Scenario overview

	CENTRAL SCENARIOS		OTHER SCENARIOS		
SCENARIO NAME	WITHOUT CM	WITH CM	NATIONAL ESTIMATES	NATIONAL ESTIMATES WITH LOW THERMAL CAPACITY	FLOW-BASED
TARGET YEARS	2025		2025, 2030		2025
EVA STEP	Yes	Yes	simplified viability check	simplified viability check	Yes: without CM scenario
INTERCONNECTION MODELLING	EVA:NTC Adequacy: NTC	EVA:NTC Adequacy: NTC	NTC	NTC	Flow-Based in Core, NTC in other zones
APPLICABLE SENSITIVITIES	EVA: CO <sub>2</sub> prices [€/ton]= <b>40</b> , 60 Price cap[k€/MWh]= <b>15</b> , 3 Adequacy: N/A	N/A	N/A	N/A	N/A
TOOL PUBLISHED IN THE REPORT	Ref tool in main report, other tools in annex	Ref tool in main report, other tools in annex	Ref tool in main report, other tools in annex	Ref tool in main report, other tools in annex	Complementary tool, in annex

Price cap assumptions (15000 €/MWh in 2025 and 2030) are based on a review of wholesale price caps and VoLL estimates in several EU member states<sup>1</sup>  
 CO<sub>2</sub> price assumptions (40 €/ton in 2025 and 70 €/ton in 2030) are average values proposed by Refinitiv during the Expert workshop on the Market Stability Reserve - organized end 2020 on request of the European Commission

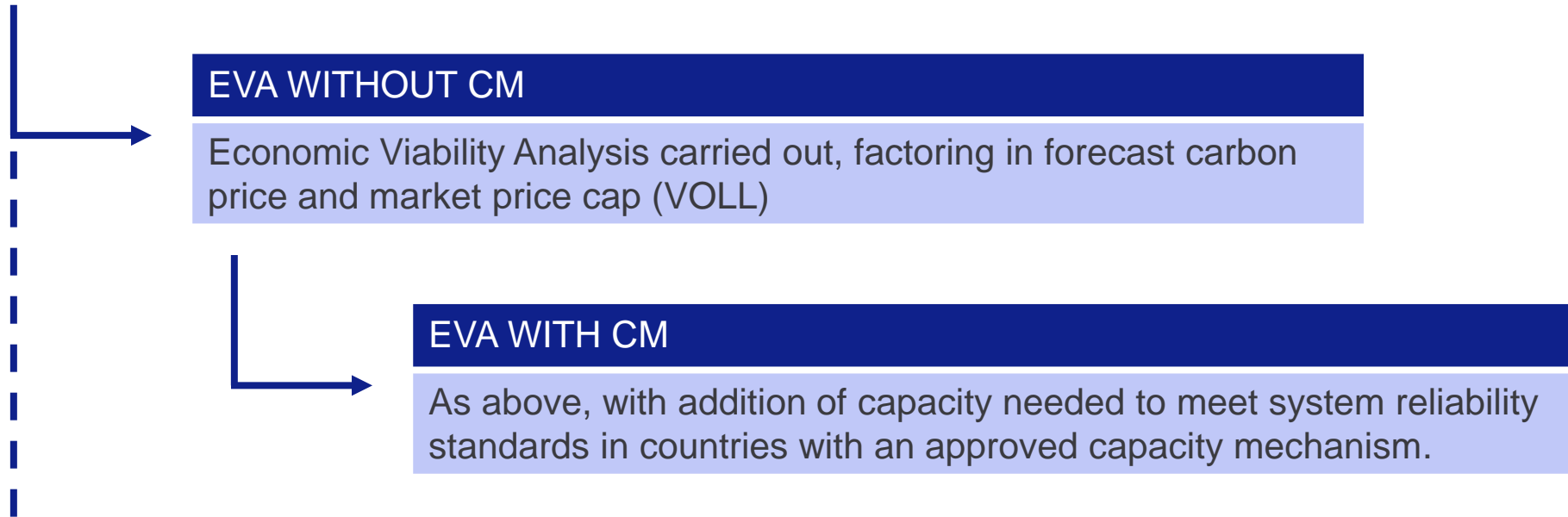
CM = Capacity Mechanism, EVA = Economic Viability Assessment, NTC = Net Transfer Capacity

<sup>1</sup> [https://ec.europa.eu/energy/sites/ener/files/documents/swd\\_2016\\_385\\_f1\\_other\\_staff\\_working\\_paper\\_en\\_v3\\_p1\\_870001.pdf](https://ec.europa.eu/energy/sites/ener/files/documents/swd_2016_385_f1_other_staff_working_paper_en_v3_p1_870001.pdf)

# Scenarios for 2025

## NATIONAL ESTIMATES

TSO's provide forecasts for capacity based on planned lifetime, new generation estimates and National Climate and Energy Plans.



## NATIONAL ESTIMATES WITH LOW THERMAL CAPACITY

Acts as a kind of stress test: bottom-up estimation of thermal generation phase-out through policy measures and economic factors.

# Our scenarios enable new insights



## EVA

*Brings together multiple aspects and interdependencies to give the most comprehensive economic analysis of Europe's generation assets ever*



Considerations within the EVA:

- The possibility to invest in different generation and demand side technologies
- The impact of one investment on another / the interdependency of different investment options
- An estimation of the revenue streams in the energy-only market (EOM)



## Central Scenarios

*EVA with and without capacity mechanisms forms the central scenarios for 2025*

## ERAA 2021 webinar – assumptions and scenarios

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# Understanding the ERAA assumptions



# Why ERAA uses assumptions

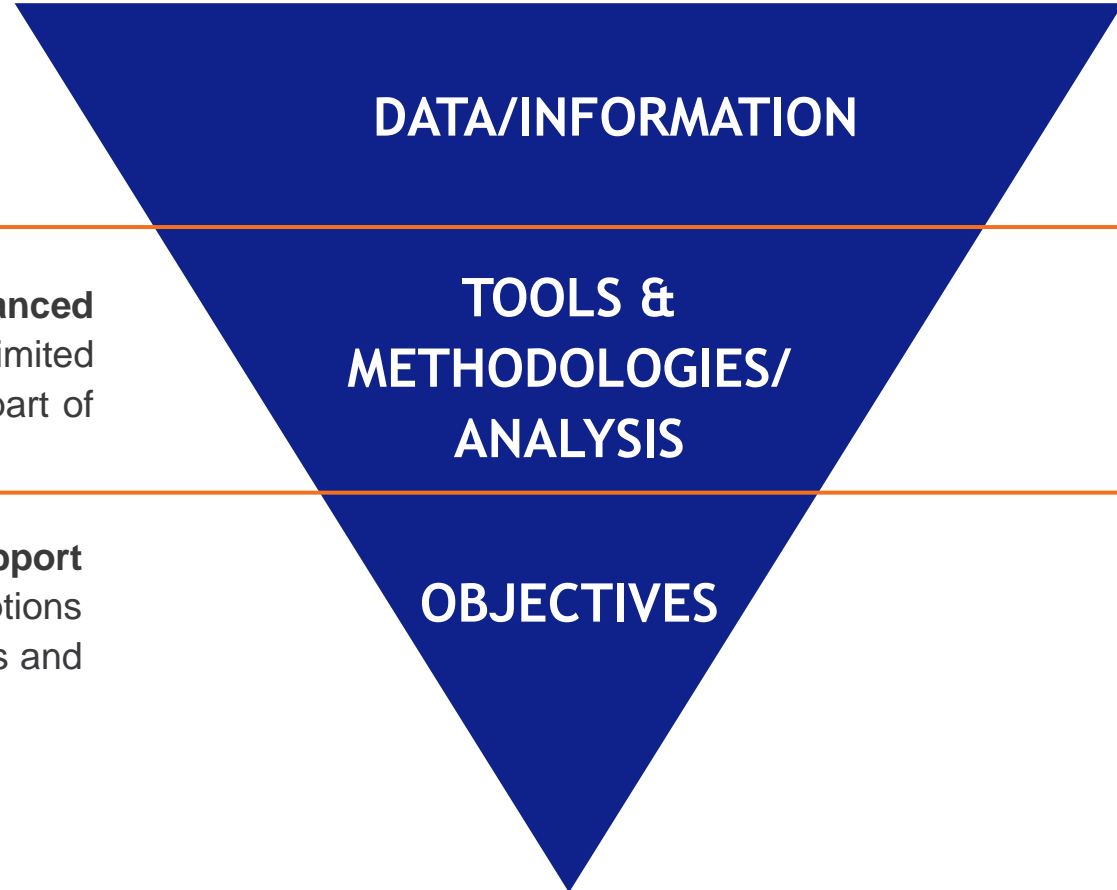
ENTSO-E ran a **data gathering exercise unprecedented in scope** (e.g. European wide viability assessment) to get information needed for the analyses.

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ERAA relies on **innovative new tools and advanced methodologies, subject to a number of** limited simplifications and assumptions (as agreed as part of the Stepwise Approach).

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ERAA is used to **identify risks and support decision-makers**. The use of informed assumptions supports better understanding of future scenarios and impacts of different decisions.







# Main assumptions

ERAA 2021 collects data from NECPs, accounts for climate change and evaluates adequacy for a selected set of scenarios

## Interconnection

*70% of cross border capacity considered by default by TSOs (exceptions explained in report's appendix on assumptions)*



## NECPs

*National Energy and Climate Plans (status November 2020), collected through TSOs*



## Climate

*Climate change accounted for (interim approach with temperature detrending)*



# Assumptions for fuel and CO<sub>2</sub> Prices

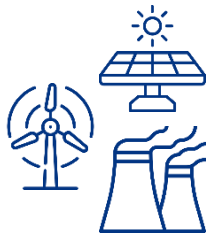


Fuel and CO<sub>2</sub> prices collected from TYNDP 2020, Booze&co, IEA, and EC/Refinitiv

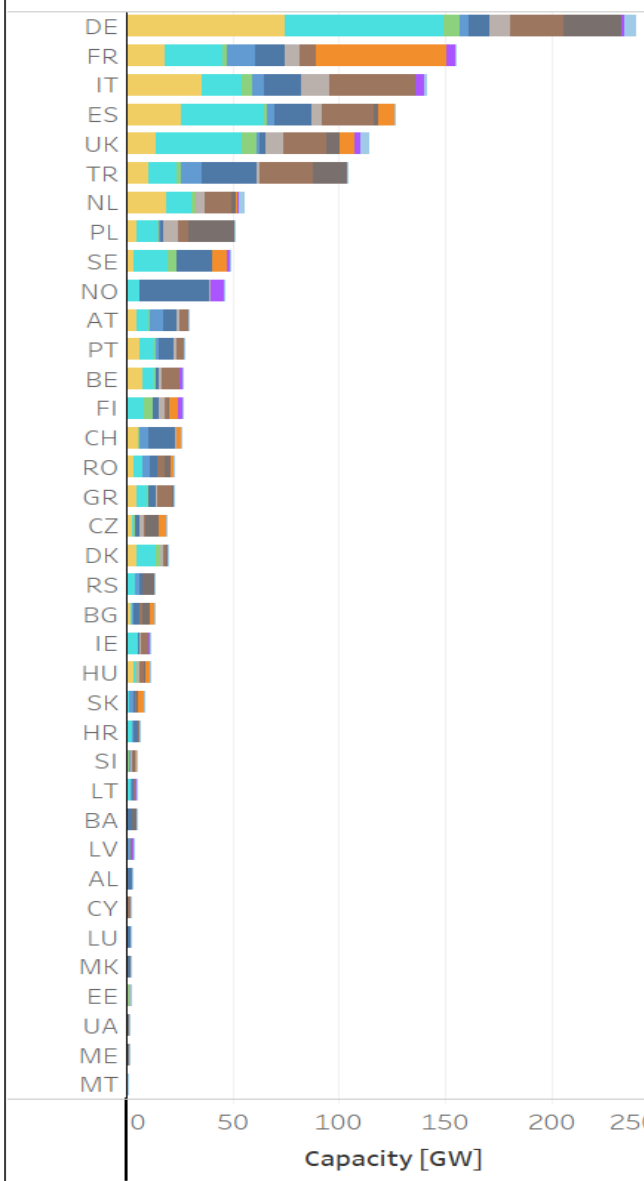
		2025	2030	Reference
€/net GJ	Nuclear	0.47	0.47	TYNDP 2020
	Lignite G1	1.40	1.40	Booze&co "Understanding Lignite Generation Costs in Europe"
	Lignite G2	1.80	1.80	
	Lignite G3	2.37	2.37	
	Lignite G4	3.10	3.10	
	Hard coal	2.30	2.48	IEA Stated Policies Scenario with USD/EUR average ratio 2020 - 0,877
	Natural Gas	5.57	6.23	IEA Stated Policies Scenario with USD/EUR average ratio 2020 - 0,877
	Crude oil	10.05	10.76	IEA Stated Policies Scenario forecast trend
	Light oil	12.87	13.78	IEA Stated Policies Scenario forecast trend applying a 28% increase of price wrt to crude oil
	Heavy oil	10.56	11.30	IEA Stated Policies Scenario forecast trend applying a 5% increase of price wrt to crude oil
€/ton	CO <sub>2</sub> price	40	70	Average values proposed by Refinitiv during the Expert workshop on the Market Stability Reserve – organized in December 2020 by Vivid Economics on request of the European Commission



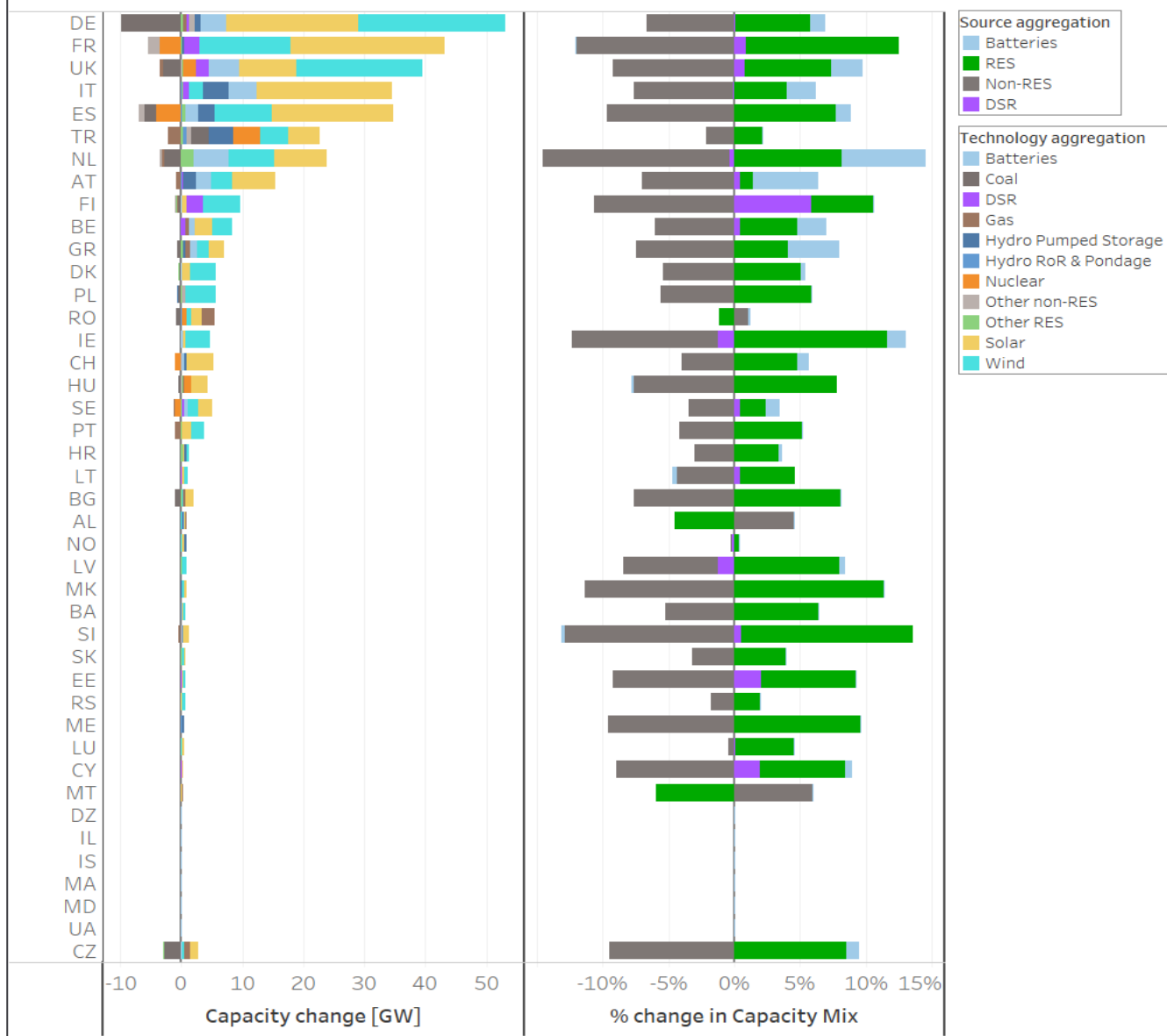
# ERAA 2021 assumptions: resource



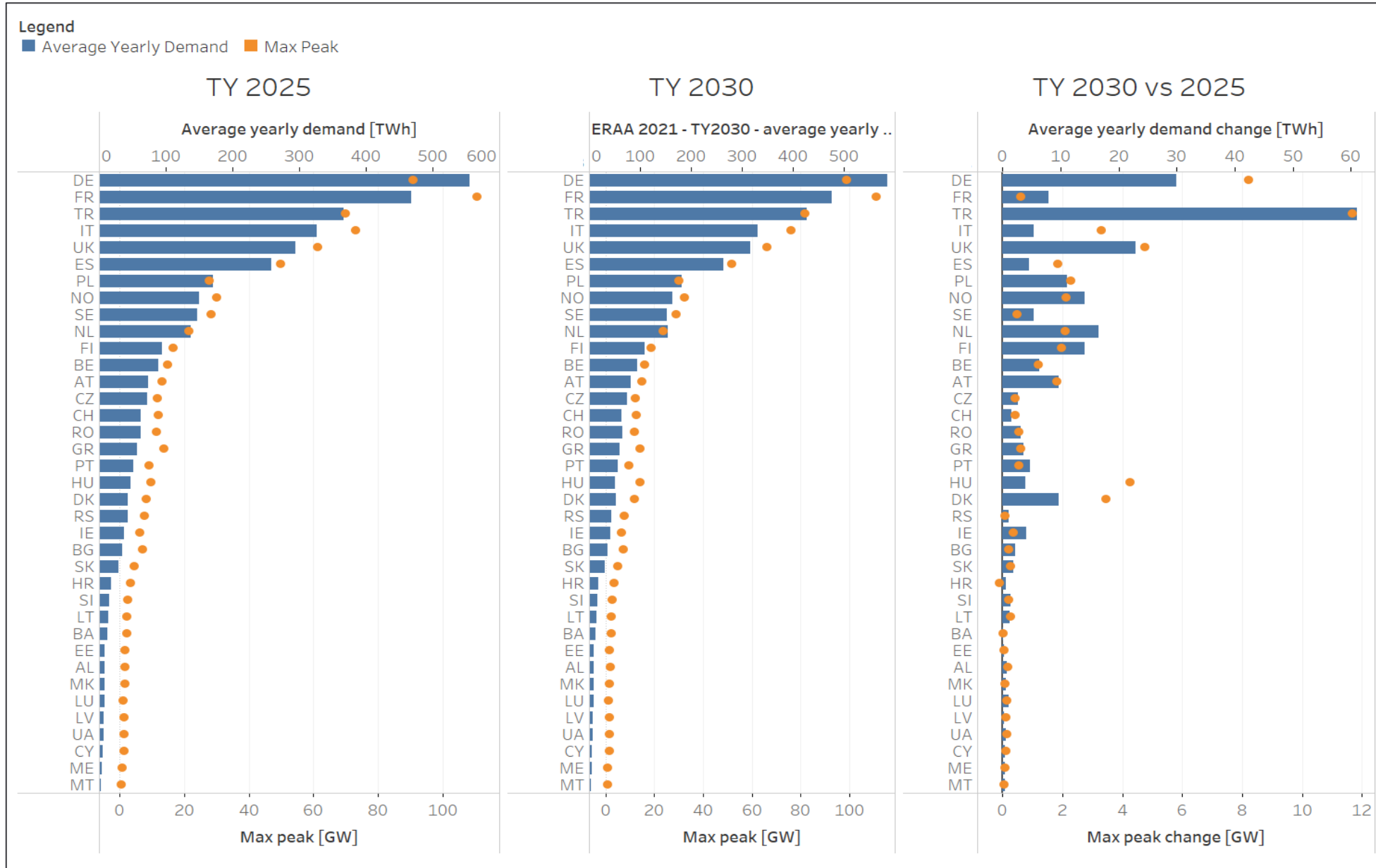
Resource capacity - TY 2025

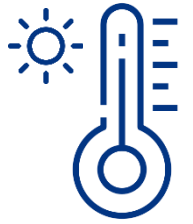


Resource capacities - TY 2030 vs 2025



# ERAA 2021 assumptions: demand

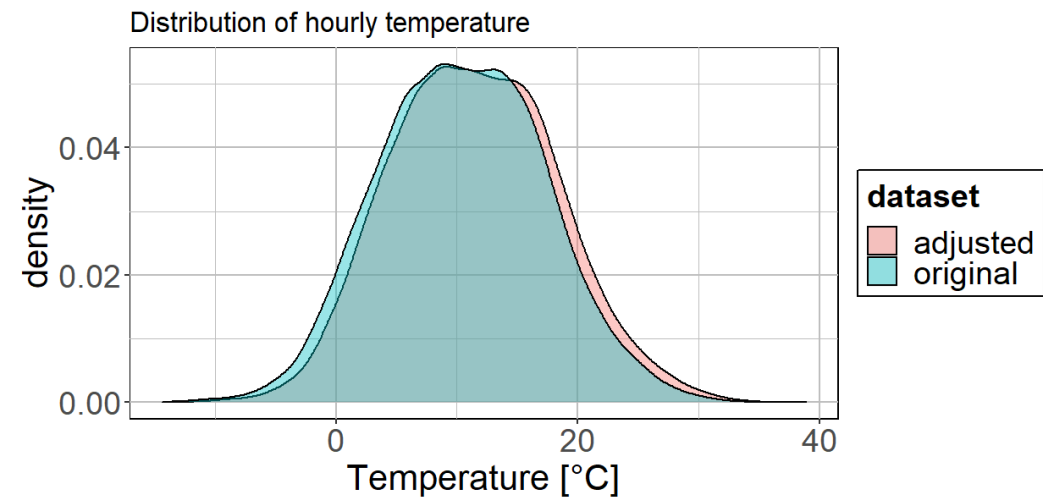
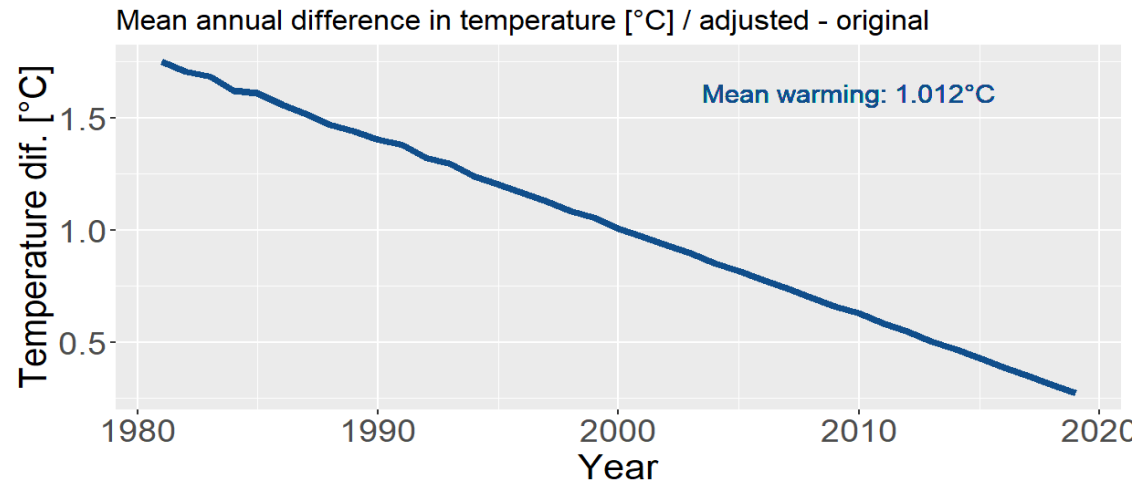




# ERAA 2021 assumptions: climate years

35 historic climate years were detrended to consider recent climate change

Example for Belgium:



This is a temporary solution. ENTSO-E is working with climate projection experts to implement a holistic climate change database by 2023

Icon from Flaticon.com

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# ERAA 2021 assumptions: grid



Deep coordination at  
European Level



Hourly level  
monitoring



Grid outages  
considered

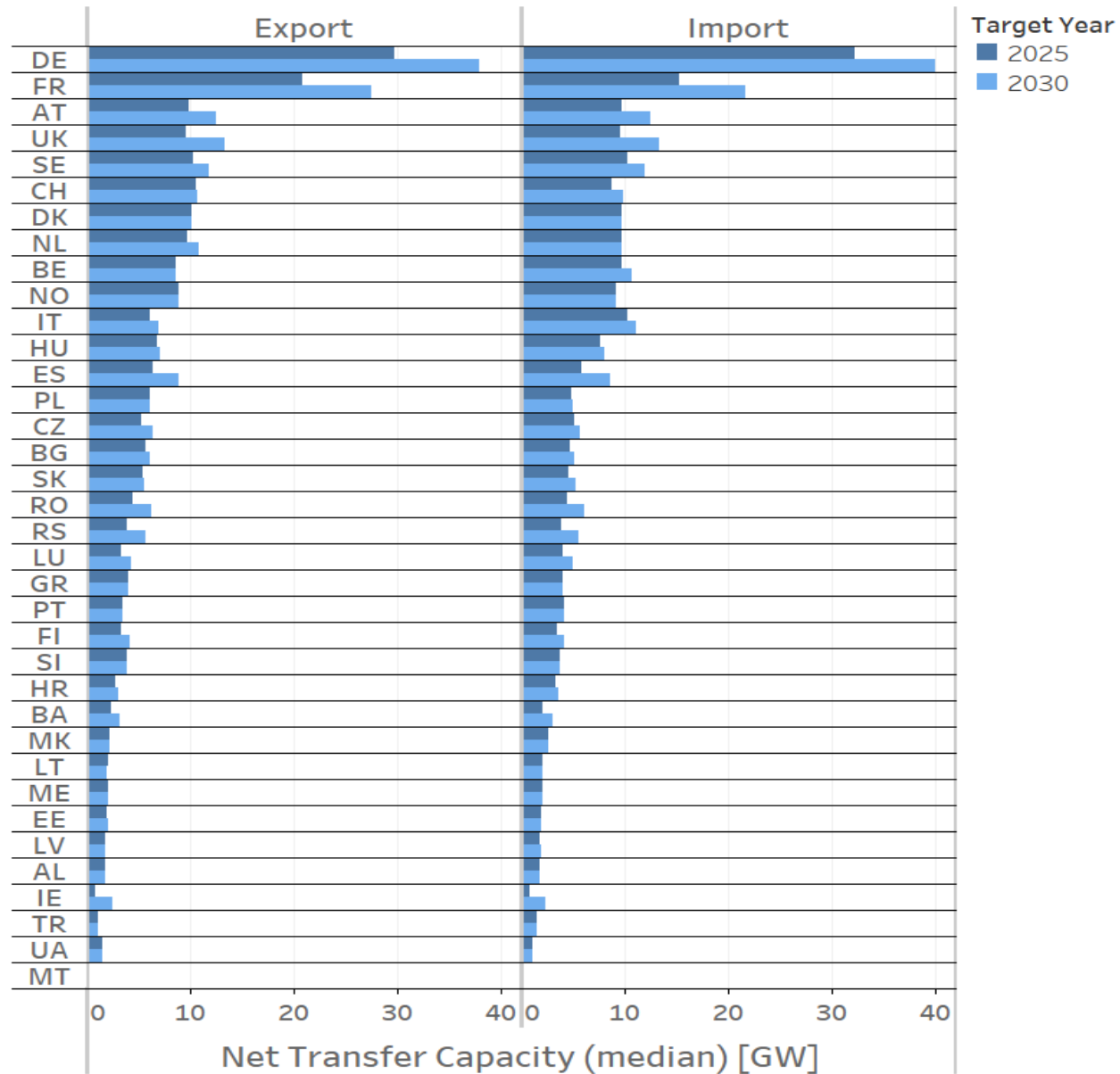
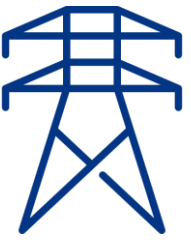


Use of NTC as in TYNDP



Benchmarking NTC with Flow  
Based Analysis

# ERAA 2021 assumptions: grid





## ERAA 2021 webinar – assumptions and scenarios

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# State of play



# Forward look at results



## Operations

*ERAA results underline the need for planning and regional coordination. It offers policy makers a techno-economic assessment of risks when considering interventions to ensure system adequacy.*



## Capacity

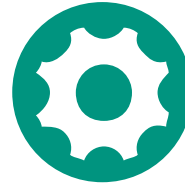
*The evolving economics of thermal generation, increasing integration of RES and flexible resources, and developments in carbon pricing, will put downward pressure on capacity.*



## Regions

*Some regional variation across Europe. Western and Central Europe have lower margins, while Southern Europe has more robust adequacy with notable exceptions.*

# Forward look at results



## EVA as central reference

*The Economic Viability Assessment for 2025 in the central reference scenarios identified significant adequacy risks for the case without capacity mechanisms. This is most notable in Europe's islands.*



## National Estimates

*This bottom-up scenario based on national projections (without EVA check) does not find any significant risks for 2025.*



## Stress test

*Our National Estimates with Low Thermal Capacity Scenario finds significant adequacy risks. This underlines the need for robust planning and reasonable forecasts for the phase out of capacities.*



# Next steps



# ERAA Implementation Roadmap

Alongside the delivery of ERAA 2021, ENTSO-E will deliver an updated roadmap with clear next steps



## Stakeholder Interaction

- *ERAA2021 views feeding into next ERAA*
- *Consultation on input data*
- *International benchmarking*



## Expanded methodology

- *Scenarios heading towards Fit for 55*
- *Enhanced EVA with more target years*
- *Flow-based in central reference scenarios*
- *Role of demand response and electrolyzers*



## Further proof of concepts

- *EVA for other sources incl. storage*
- *Improved climate change modelling*

ERAA 2021	ERAA 2022	ERAA 2023	ERAA 2024
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### Target years



### Economic Viability Assessment



### Flow-based market coupling



### Demand response and sector integration



### Causal analysis



### Climate change impact



# Conclusions and Next Steps



## Conclusions

- ERAA 2021 is the first leap within the stepwise implementation
- Regional interlinkages have deep impacts on decisions/assumptions

## Next Steps

- Along with ERAA 2021, updated implementation roadmap to be published with detailed next steps
- Both will be open for consultation and stakeholder comments

Mid-November

| End November

| 3 Months following publication

ERAA 2021  
release

Implementation  
Roadmap  
update

Stakeholder  
webinar on  
ERAA 2021  
results

Consultation on  
ERAA 2021 +  
Roadmap

ACER approval  
process of ERAA  
2021

Our values define who we are, what we stand for and how we behave.  
We all play a part in bringing them to life.



## EXCELLENCE

We deliver to the highest standards.  
We provide an environment in which people can develop to their full potential.



## TRUST

We trust each other, we are transparent and we empower people.  
We respect diversity.



## INTEGRITY

We act in the interest of  
ENTSO-E



## TEAM

We care about people. We work transversal and we support each other.  
We celebrate success.



## FUTURE THINKING

We are a learning organisation.  
We explore new paths and solutions.

**We are ENTSO-E**