SESSION 1
ELECTRICITY SECURITY ACROSS BORDERS: ASSESSMENT TOOLS

ENTSO-E ELECTRICITY ASSESSMENT IN EUROPE

Expert Workshop VII ELECTRICITY SECURITY ACROSS BORDERS

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ENTSO-E Adequacy Reports

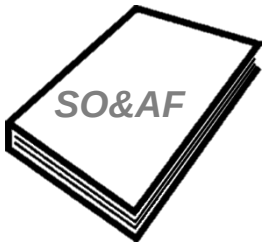
ENTSO-E adopts and publishes on an annual basis the:

"*Scenario Outlook & Adequacy Forecast*" report (SO&AF)
"*Winter Outlook and Summer Review*" report (WOR)
"*Summer Outlook and Winter Review*" report (SOR)

as required by
Article 8 of the EC Regulation n. 714/2009

The goal is to assess the **main adequacy risks** within
seasonal period (6 month – SOR/WOR)
mid-term horizon (5 – max 10 years – SO&AF)

Different risks should be addressed in different time horizons



Short term → **UNCERTAINTY INCREASES** → **Mid term**

6 months | 1 year | 5 years | 10 years

Operational decisions	Investment decisions	Policy/political decisions

Assessment of ENTSO-E adequacy reports

Recommendations of Electricity Coordination Group - Adequacy

- Adequacy reports should capture Security of Supply risks to the pan-European power system
- Assessment of the need for flexibility
- The treatment of electricity interconnection capacities at times of scarcity
- **5 – 10 years** appropriate time horizon for adequacy

ENTSO-Es views

- Fully supports the recommendations of ECG
- Renewables will be key drivers of power system dynamics to be captured by probabilistic methods
- Use of extensive climate data needed
- Modelling of management of transmission in times of scarcity to be improved

ENTSO-E Target Methodology

Market-based stochastic models to assess adequacy

Hourly resolution

Probabilistic method using climate database to assess market prices & functioning, including during times of **scarcity**

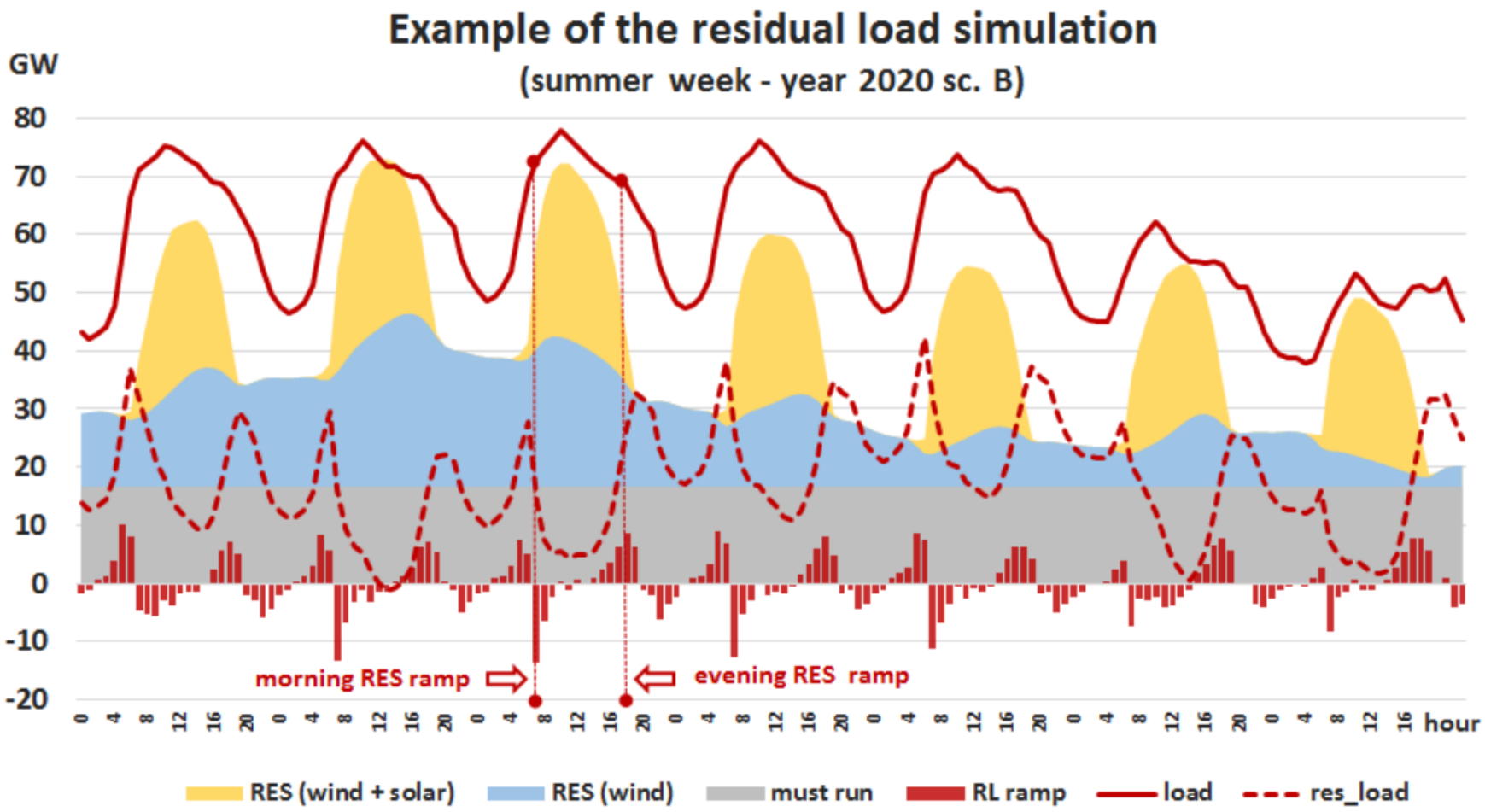
More detailed view of **cross-border contributions** to a country's system adequacy

Assessment informs about the **'need for flexibility'**

Extensive range of indicators**,** e.g. **LOLE/ EENS/ LOLP, RES curtailments**, **capacity factor** (as indicator for likelihood of units staying online)

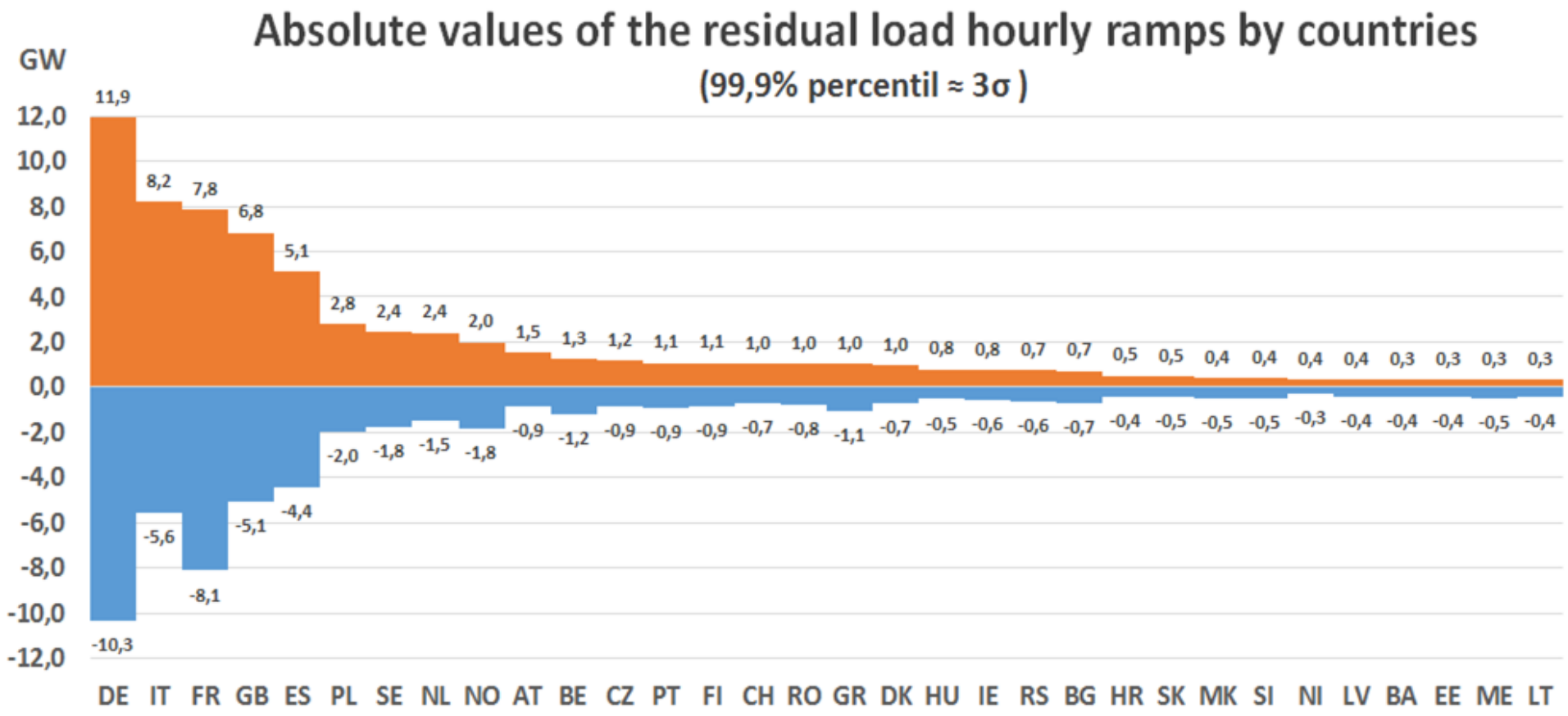
Adequacy Forecast – need for flexibility

$$RL = L - W - S - must\ run$$

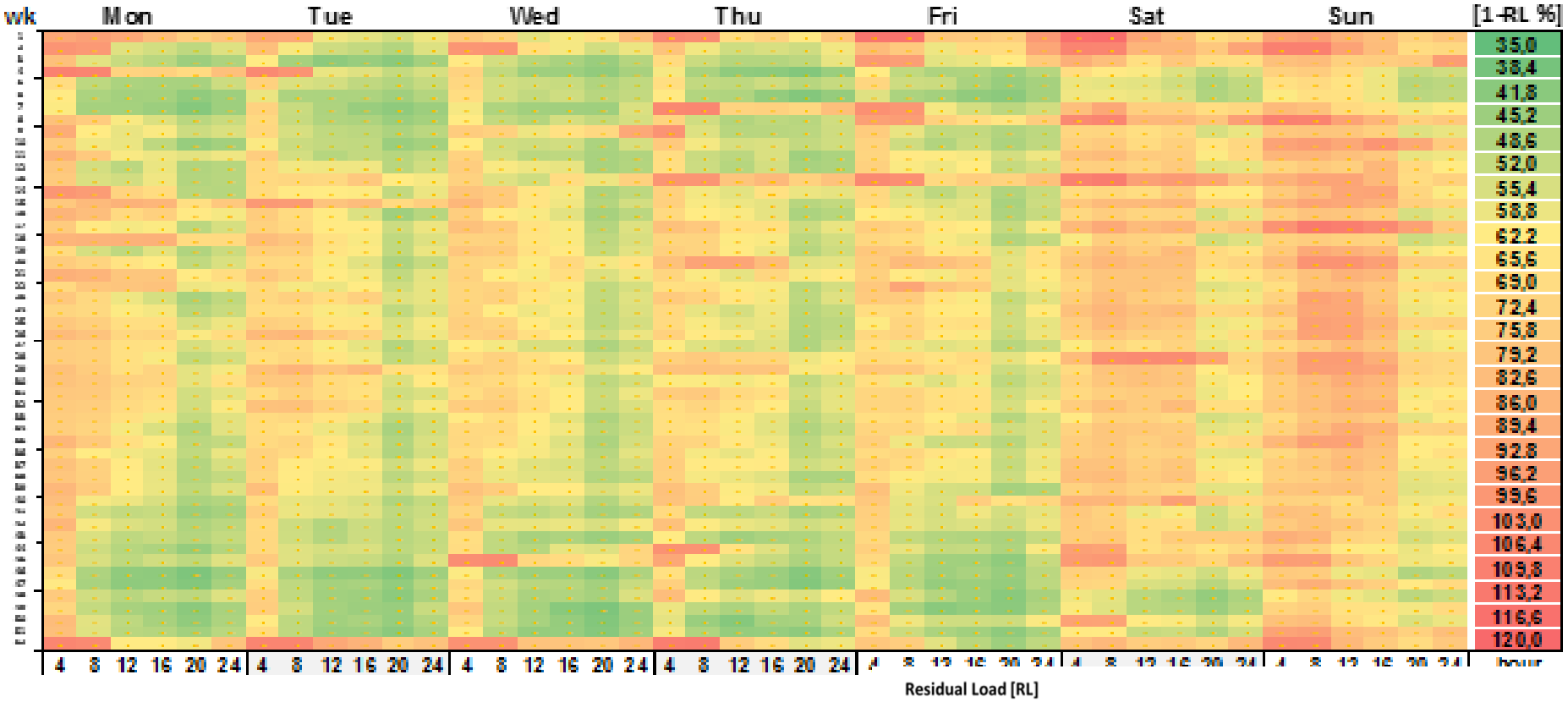


Adequacy Forecast – need for flexibility

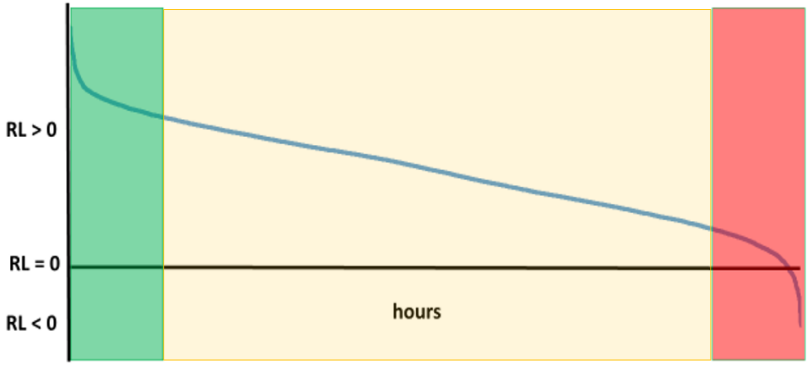
RL load ramps → difference between consecutive hours



Adequacy Forecast – need for flexibility



Chromatic graph to demonstrate the hourly behaviour of the residual load in maximally possible resolution



Implementation in ENTSO-E adequacy reports

A ***common*** regional assessment would give

- Regional adequacy status of each country and associated risks.
- Role of cross-border exchanges between regions / countries and associated possible risks due to limited capacities.

Regional assessments could benefit from improved top-down pan-European assessments

- Results and experience from pan-European assessments could enhance the quality of the necessary regional assessments and ensure interoperability / consistency across regions.

Implementation in ENTSO-E adequacy reports

Market-based probabilistic adequacy assessments

- Pan-EU scope based on regional knowledge of each TSO
- Enhanced transmission management in case of scarcity situations
- State of the art climate databases and RES simulations
- Hourly resolution, different hydro data and load temperature sensitivities
- Probabilistic Monte Carlo based method
- Extensive range of indicators,
  - Loss of Load Expectation (LOLE)
  - Energy Not Served (EENS)
  - Loss of Load Probability (LOLP)
  - Assessment of the need for flexibility

Implementation in ENTSO-E adequacy reports

- **Several (5) market tools based on regional specificities are testing the methodology**
- **Calibration of market tools to ensure robust results**
- **Comparison of Pan-EU results to increase consistency of the results**

Lessons Learned

Added Value

- Several (5) market tools based on regional specificities are testing the methodology
- Calibration of market tools ensures robust results
- Comparison of Pan-EU results increases consistency of the results

Challenges

- Reaching consensus on common regional and pan-EU approaches when designing national policies and during decision making
- Probabilistic simulations are computationally demanding
- Adequacy indicators are sensitive to modelling assumptions & data quality

Role of ENTSO-E assessment in the future

- **ENTSO-E's adequacy methodology provides a common basis for discussions on market design, security of supply and market integration at a regional and European level.**

- **ENTSO-E's regional and European adequacy methodology to be used across Member States, on the basis of their national sensitivities and specificities, to guide their decisions on capacity mechanisms, support schemes, and security of supply.**

Thank you for your attention

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