



WINTER OUTLOOK 2016

13 December 2016

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SETTING THE SCENE...

- **Winter and Summer Outlooks**
 - Analyse in a detailed & consistent way the main adequacy risks within a season
 - EU legal obligation
 - Subject to an ACER opinion

WHAT DO THE OUTLOOKS TELL YOU?

- **Role of interconnection**
- **Influence of external factors:** weather, market conditions, consumer behaviour...
- **Sensitivity analysis:** look for worst case scenario & see how network reacts
- **Review:** deeper understanding of the previous season

WHERE TO FIND THEM?



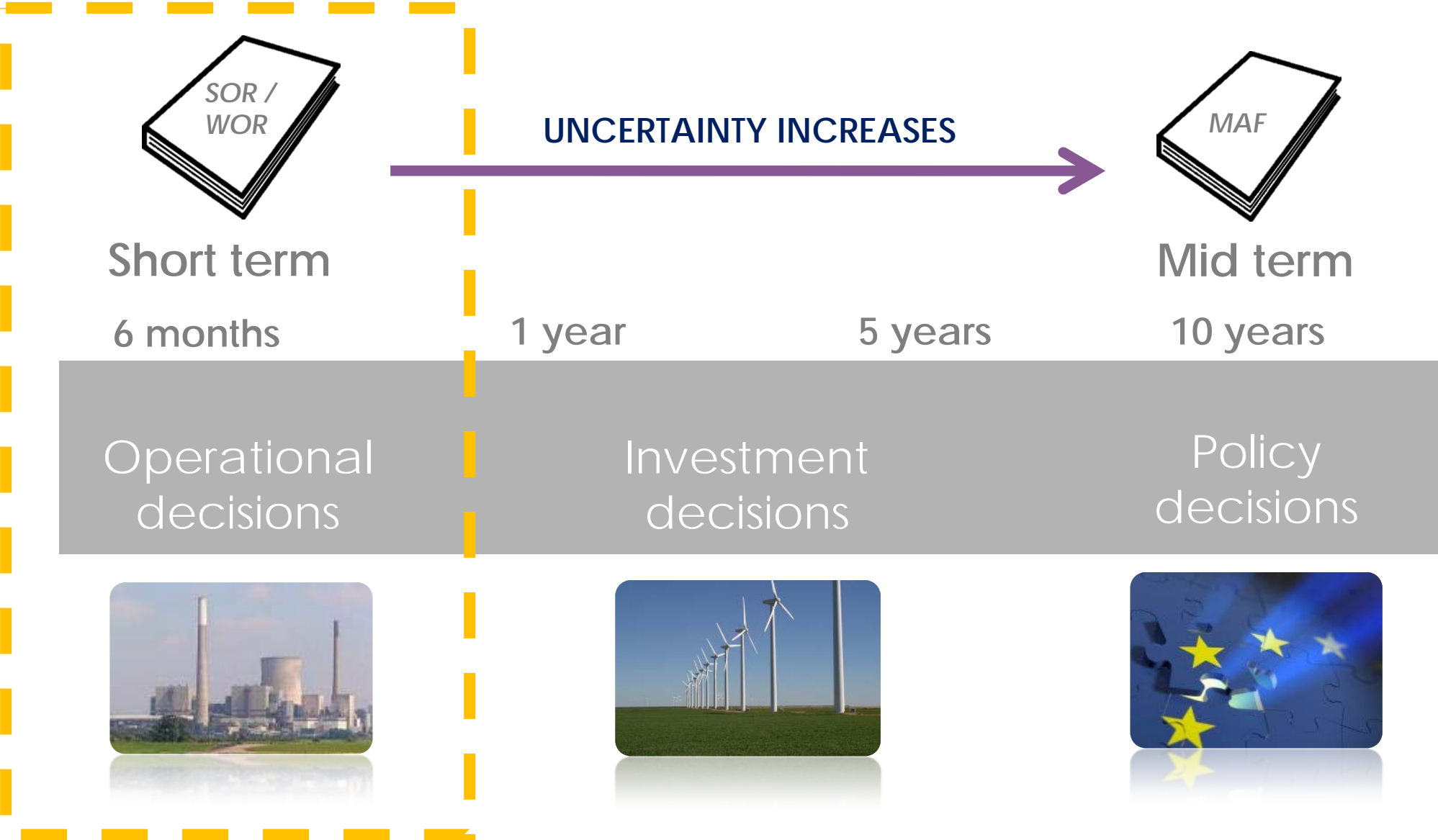
The screenshot shows the ENTSO-E website header with the logo and tagline 'Reliable Sustainable Connected'. The navigation menu includes 'OUTLOOKS', 'MAP', 'ABOUT ENTSO-E', 'MAJOR PROJECTS', 'PUBLICATIONS', and 'DATA'. Below the navigation, a breadcrumb trail reads 'ENTSO-E WEBSITE > OUTLOOKS'. The main content area features a large heading 'Seasonal Outlooks' and a dark grey box containing the following text:

Summer & Winter Outlooks

ENTSO-E analysis possible risk for the security of supply in Europe twice a year: for the summer and winter periods. Because of possible very high/low temperatures and other 'extreme' weather conditions, winters and summers are more the most critical periods for the power grid.

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DIFFERENT RISKS ADDRESSED AT DIFFERENT TIMES



ENTSO-E SEASONAL OUTLOOKS – STEPWISE APPROACH

Collect inputs from TSOs

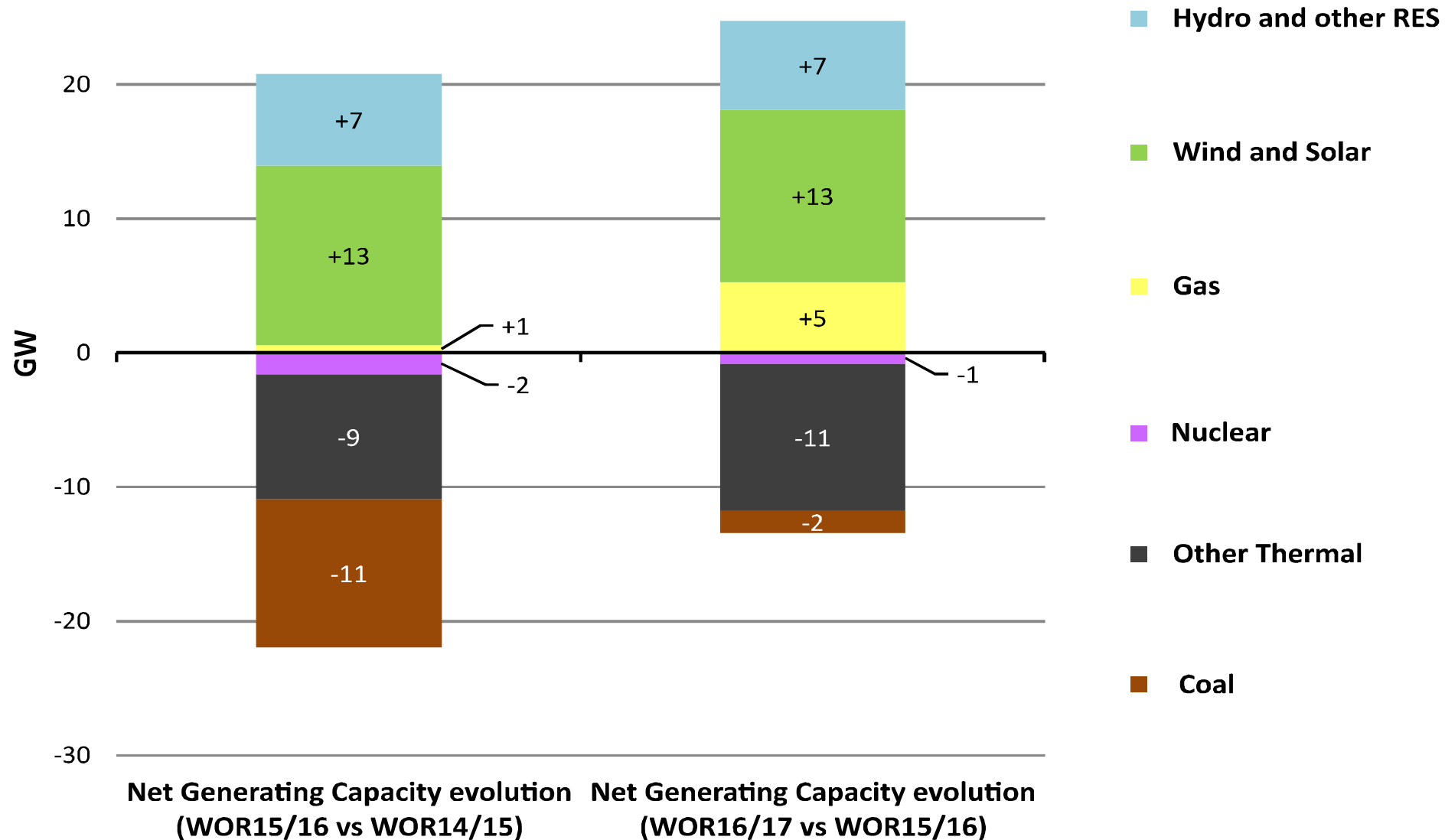
Build pan-European worst-case scenarios

- At peak time (upward adequacy) => Wednesdays 7 pm
- At low demand time + high RES (downward adequacy) => Sundays 5 am & 11 am

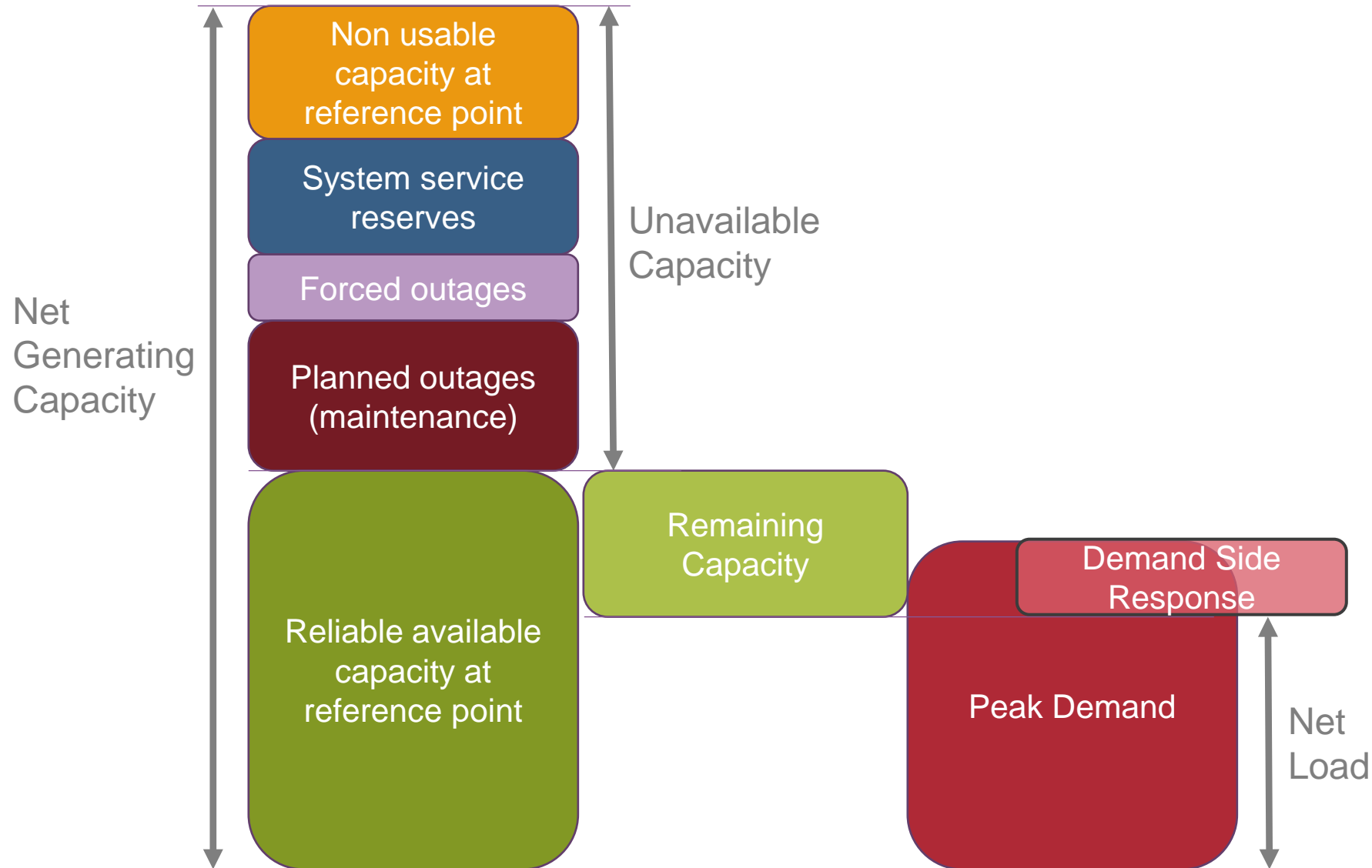
Focused analysis of regions potentially at risk

- Probabilistic approach using a lot of situations (temperature, wind...)
- Aim is to be able to say with how much probability an issue could occur
- The parameters driving the issues are identified

EVOLUTION OF THE GENERATION MIX



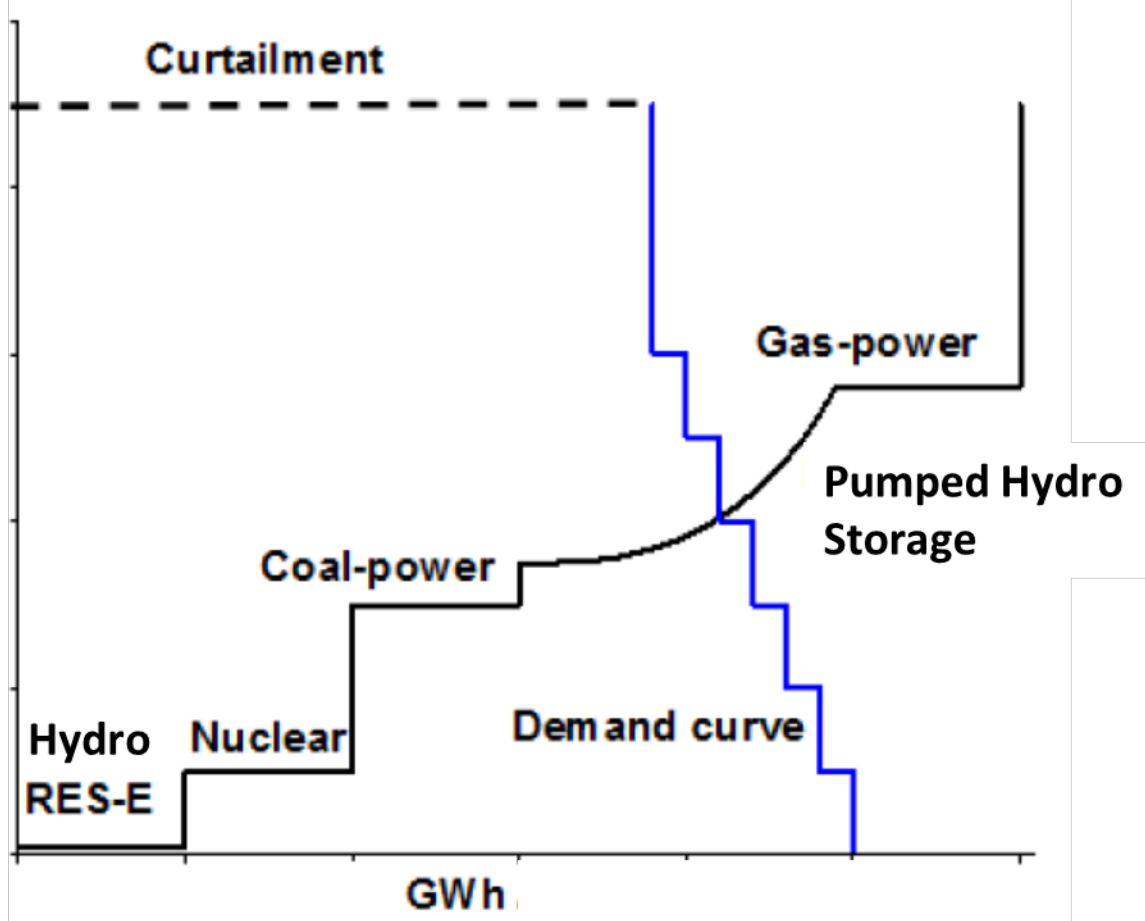
ENTSO-E– General Methodology - Upward adequacy



ENTSO-E Winter Outlook– Severe Conditions & Merit Order

Cross-border exchanges

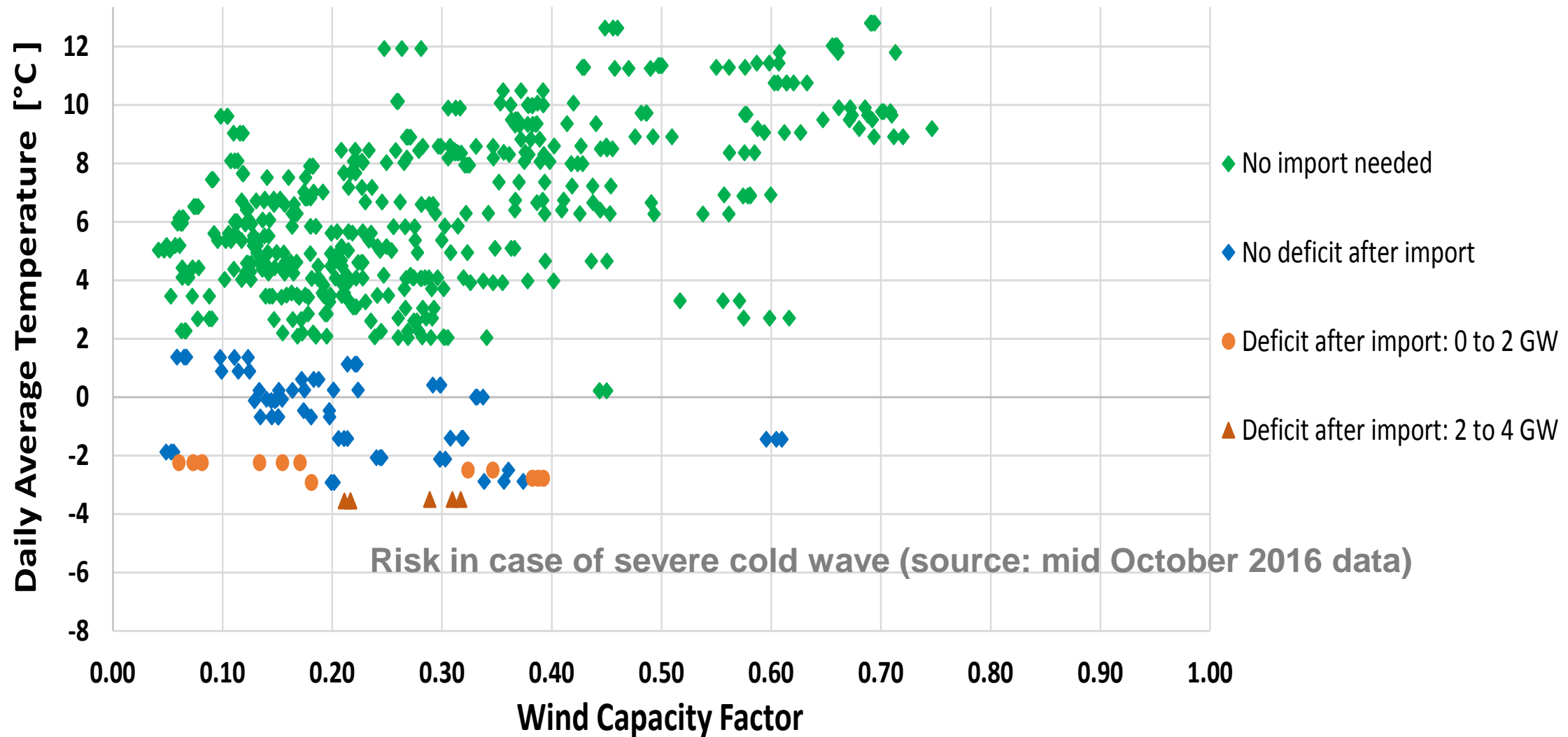
- market driven
- contributions to adequacy



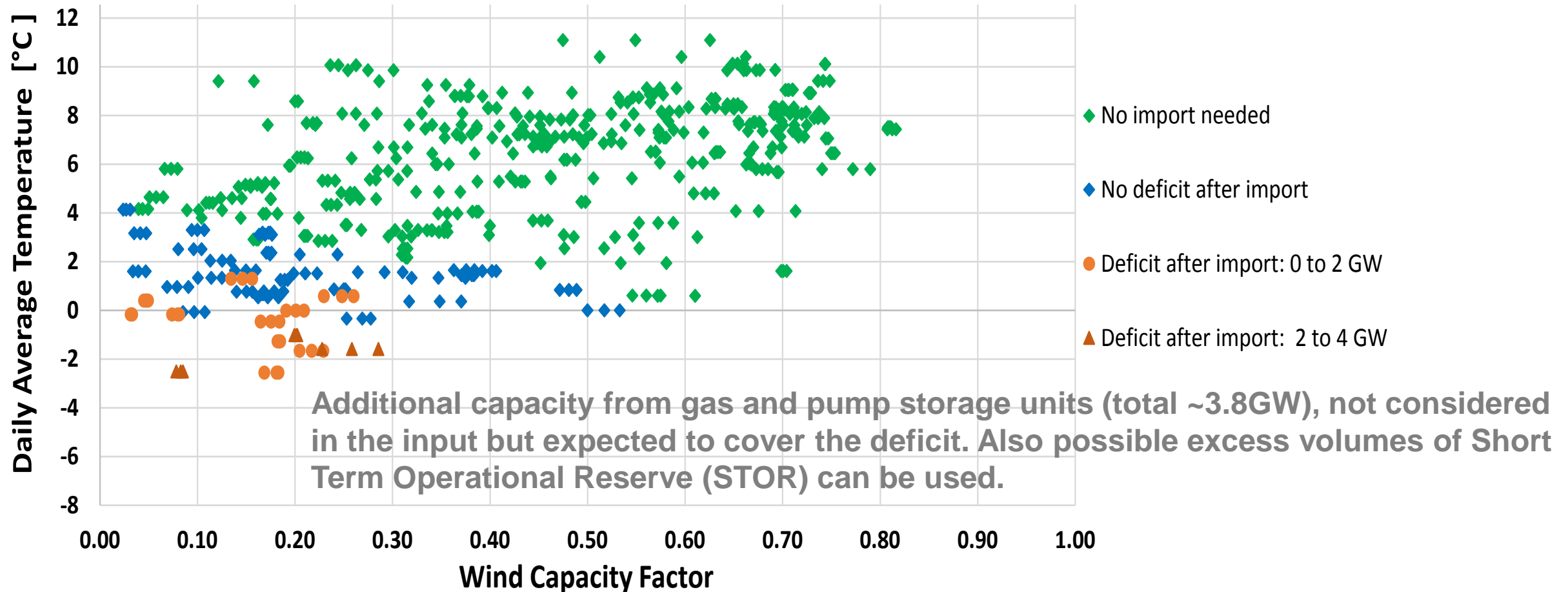
- Excess capacity
- Import driven by market
- Import needed for adequacy

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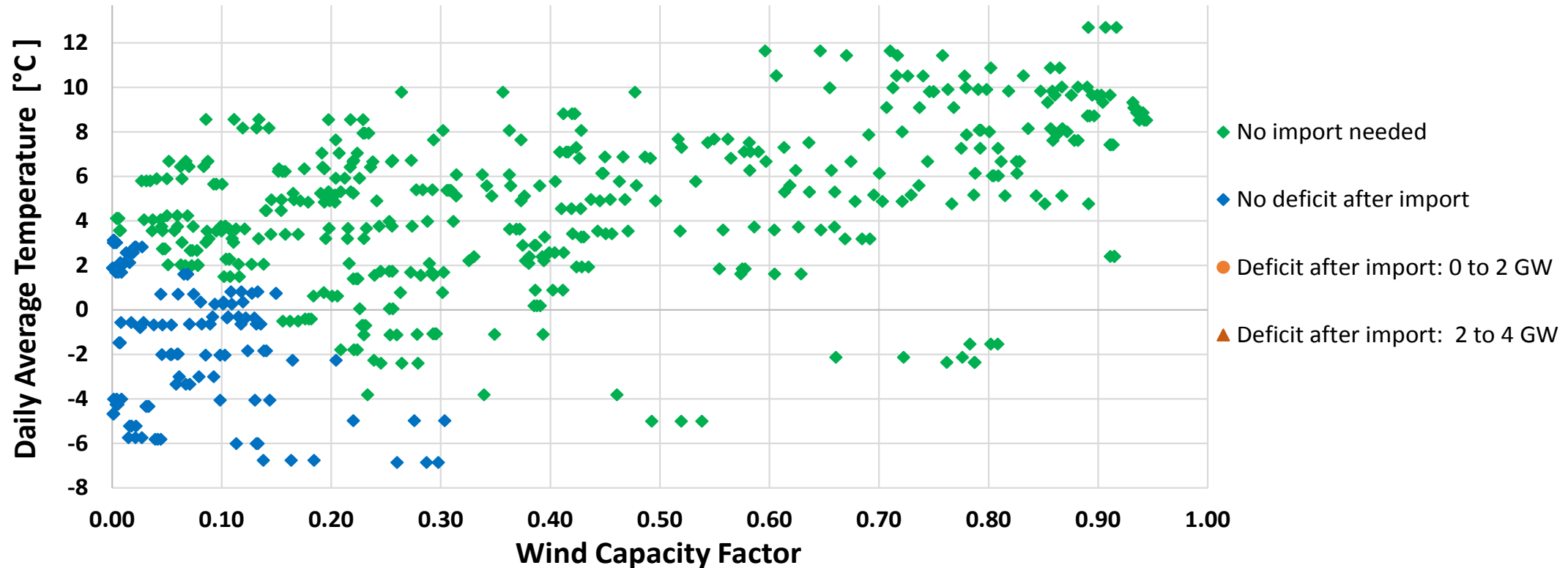
ENTSO-E WINTER OUTLOOK- SITUATION FOR FRANCE (WEEK 2)



ENTSO-E Winter Outlook– Situation for Great Britain (Week 2)



ENTSO-E Winter Outlook– Situation for Belgium (Week 2)



Full availability of the nuclear park was expected at the moment of data collection. Belgium's TSO relies on a range of possible measures.

ENTSO-E WINTER OUTLOOK 2016/17 – KEY FINDINGS

The analysis shows that all considered, even if the situation in France will be tense, Europe has sufficient generation to meet normal and severe demand conditions in the winter of 2016/2017.

France facing lowest nuclear power generation in 10 years

Tense situation in France from early December to early February in case of a severe cold wave

Possible repercussions on several neighbouring countries, but TSOs anticipating appropriate measures

ENTSO-E WINTER OUTLOOK 2016/17 – KEY FINDINGS

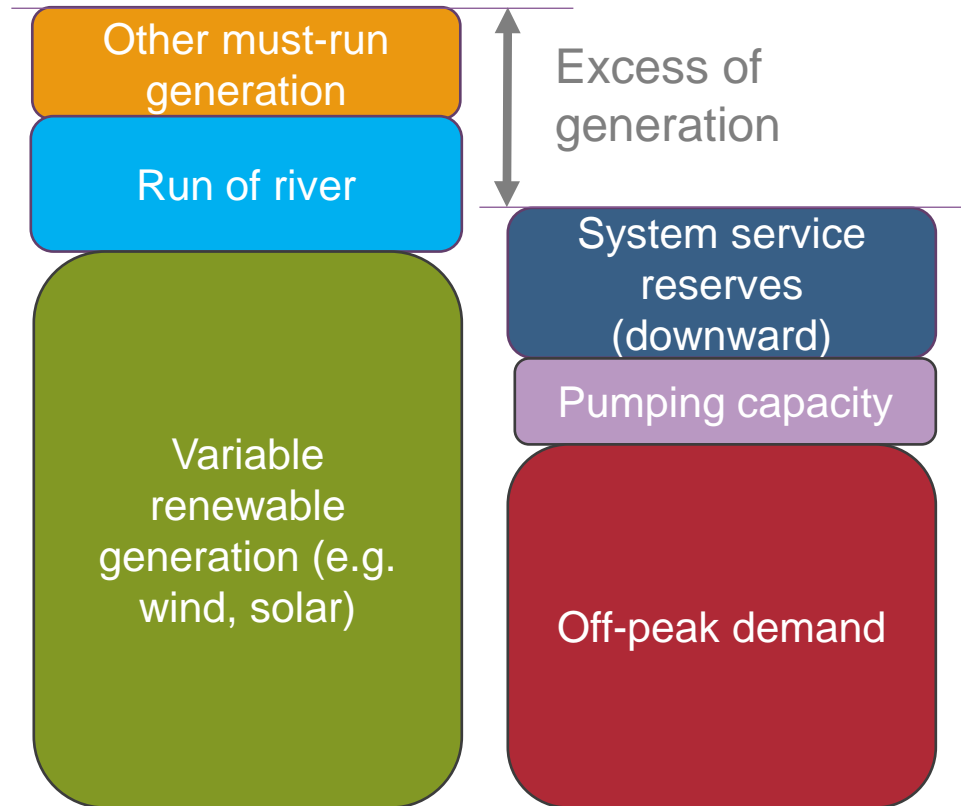
The analysis shows that all considered, even if the situation in France will be tense, Europe has sufficient generation to meet normal and severe demand conditions in the winter of 2016/2017.

Great Britain's adequacy might also be impacted by the French situation

UK will need high imports from all neighbouring countries

Great Britain has additional capacity from OCGTs and Pump Storage

ENTSO-E– General Methodology - Downward adequacy

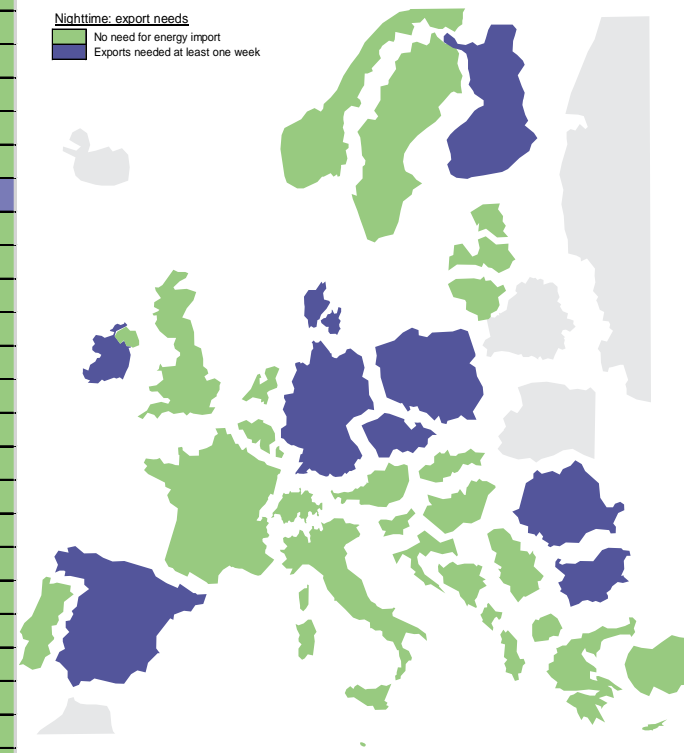


ENTSO-E Downward regulation

Export needs at the night time minimum (Sunday 5 am)

- Ireland possible wind curtailment in case of windy Sunday nights in December and January.
- In Poland, during the Christmas night wind might be also curtailed

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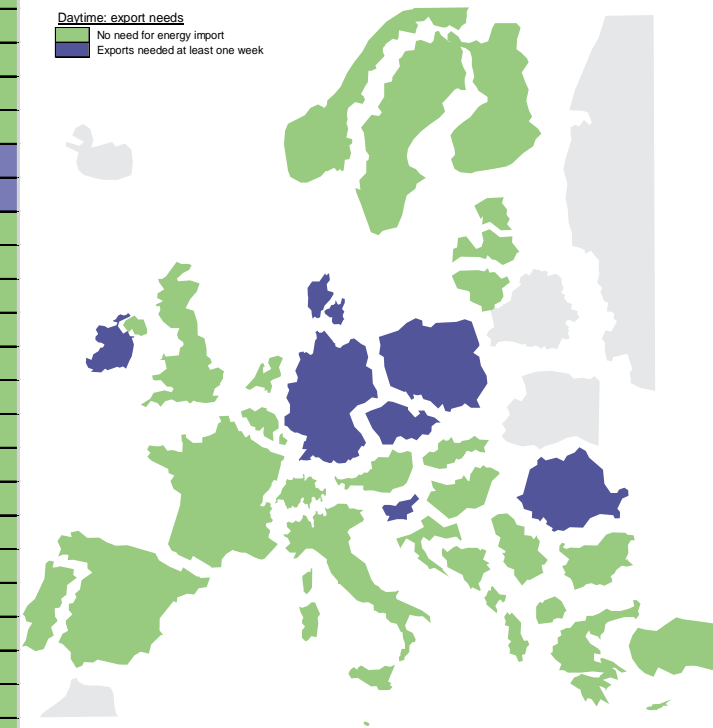


ENTSO-E Downward regulation

Export needs at the day
time minimum (Sunday
11 am CET)

Sunday 26 March at 11
am CET in Germany,
export capacity might not
be sufficient to export
surplus of generation. In
that case, up to 1 GW
renewable might be
curtailed in that hour.

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HOW TO KEEP SYSTEM SAFE FOR THE CONSUMERS?

Knowledge sharing & cooperation at European level essential to maintain safe system

Example of possible gradual measures to maintain the supply that operators can use

Structural grid reinforcement internally & cross border

Local optimisation of the grid

Extra generation reserves

Demand Response

Voltage lowering

Local power cuts

EXCEPTIONAL MEASURES

KEY TAKEAWAYS

- Winter outlooks are not just only a legal mandate
- They inform TSOs, markets, policy makers, public + **contribute to right decisions being taken for security of supply!**
- **ENTSO-E & TSO update & monitor the situation throughout the Winter**
- They build on the **strong cooperation** between **ENTSO-E, RSCs and TSOs**

WHAT ABOUT THE FUTURE?

- Electricity **Regional Security Coordinators** to take a greater role in security analysis
- **Clean Energy For All Europeans package** welcomes the important role of the Seasonal Outlooks regarding Risk Preparedness

ENTSO-E Target Methodology

Integration with appropriate **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)

Thank you for your attention

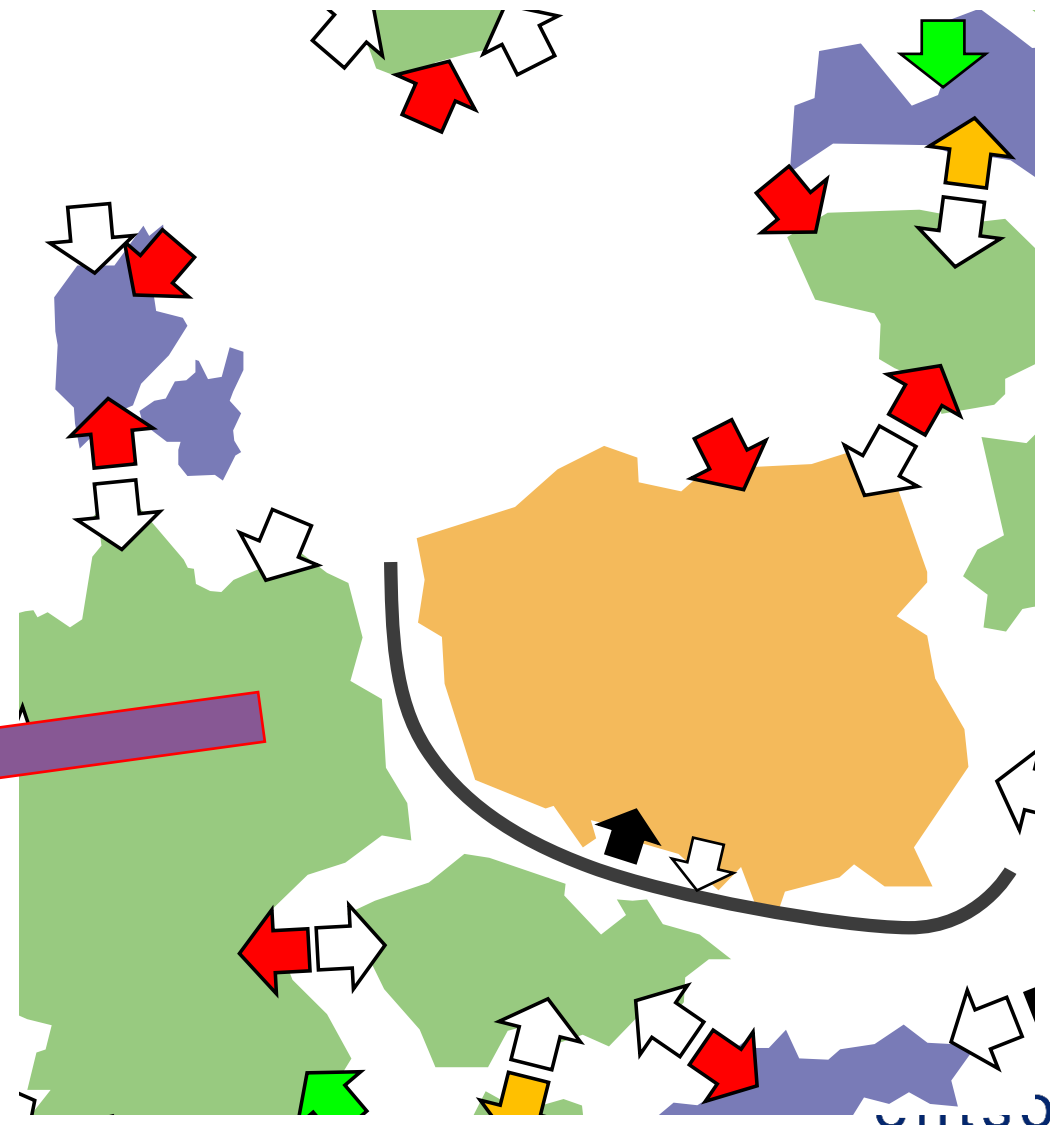


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ENTSO-E Summer 'Outlook' – Severe Conditions (Sensitivity)

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excess capacity
deficit can be fully covered with imports
25% of deficit cannot be covered with imports
50% of deficit cannot be covered with imports
75% of deficit cannot be covered with imports
100% of deficit cannot be covered with imports

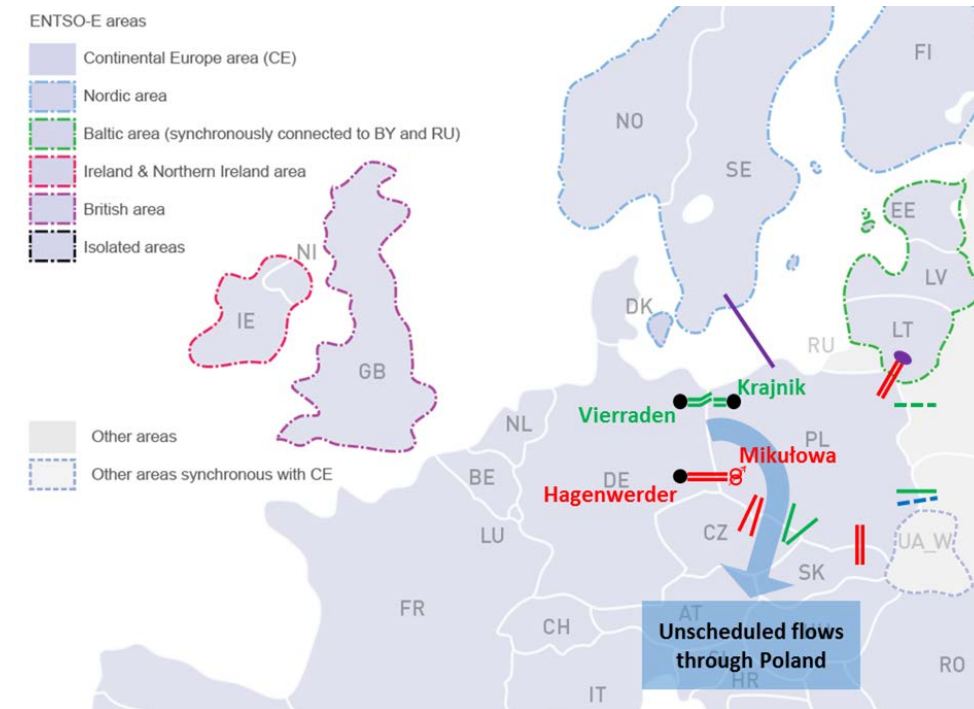


Summer Outlook 2016 – Risk Identified for Poland

- A potential risk is identified for Poland
- Simulation of the Polish situation for **Week 22** (merit order approach)
- **All available cross-border capacities into Poland are saturated** (all import arrows entering Poland are red)
- **No import capacity is available** on the common synchronous profile (with DE+CZ+SK shown as coupled black arrows).

Summer Outlook 2016 – Preparedness by TSOs concerned

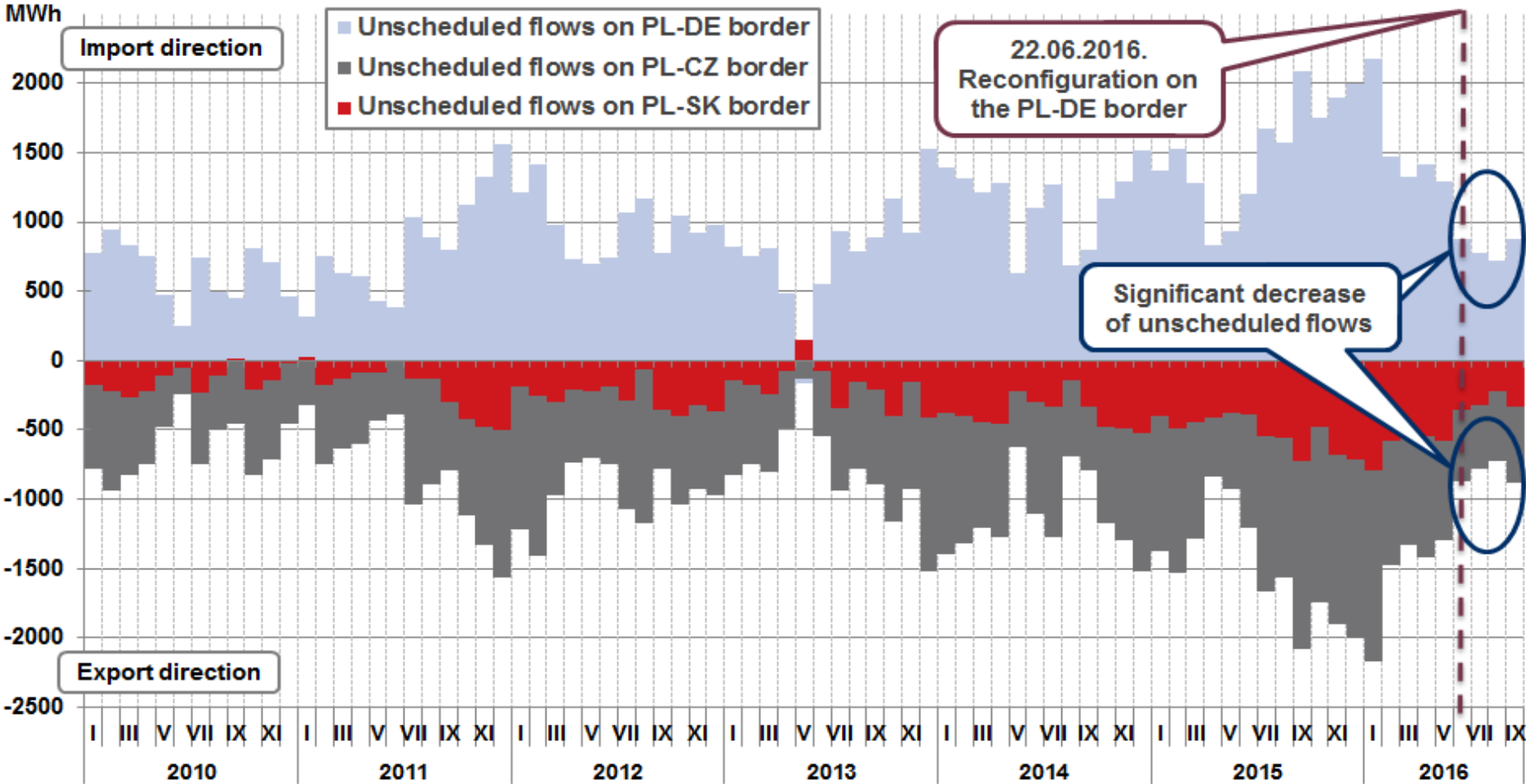
- PST investment project agreed by PSE and 50Hertz in February 2014.
- It foresees among other:
 - PSE installs the PST in the Polish substation Mikułowa (in the PL-DE double circuit 400kV cross border line MIK-HAG),
 - 50Hertz installs the PST in German substation Vierraden (in PL-DE double circuit cross border line KRA-VIE).
- In addition as preventive **measure only** and to decrease the risk of not fulfilling N-1 criteria and to allow increasing commercial transmission capacities to Poland, PSE and 50Hertz agreed to exceptionally and temporarily disconnect the Krajnik-Vierraden line between the two countries.



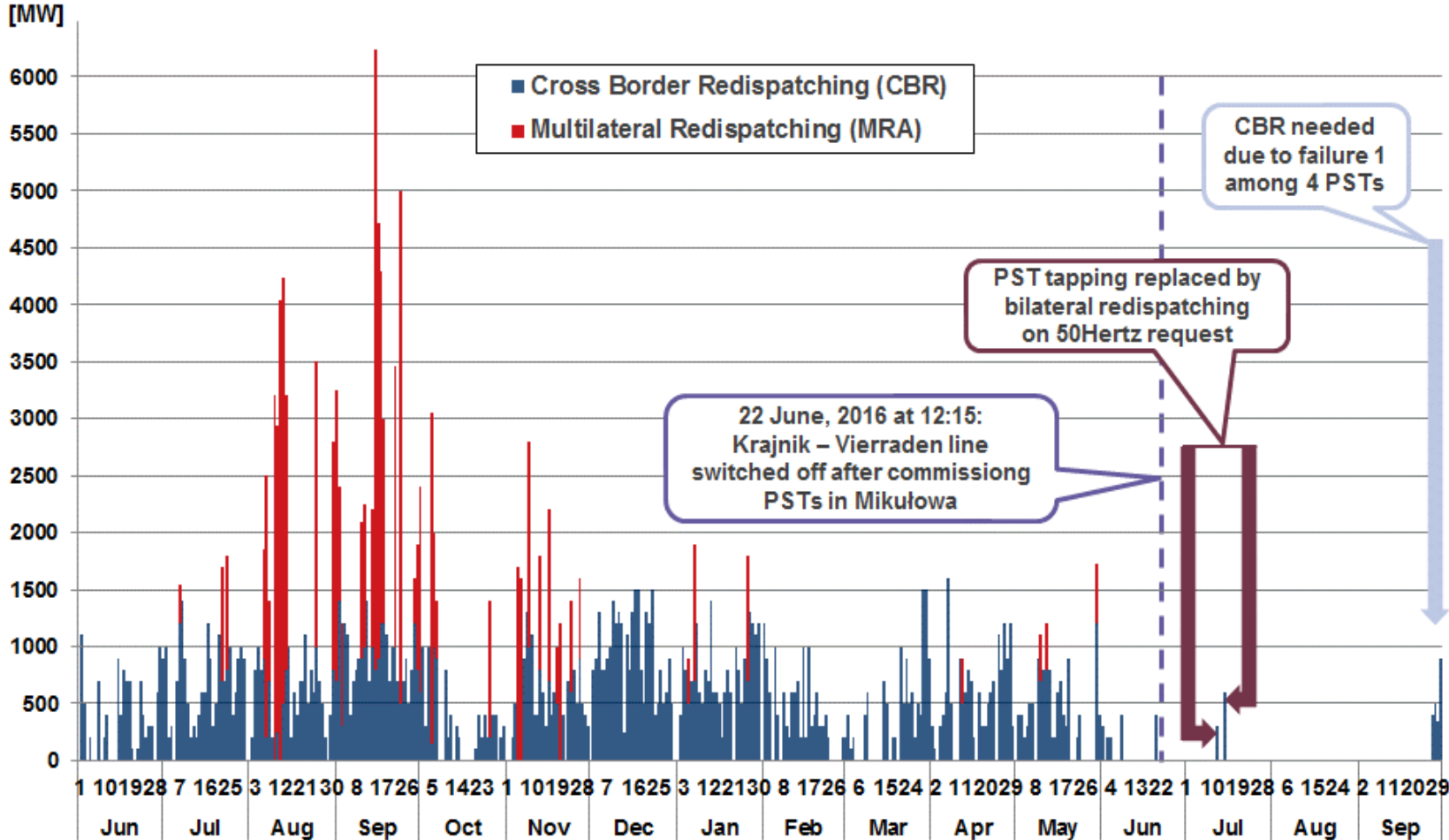
- More information can be found in common PSE and 50Hertz Press

Release: "Disconnection of Krajnik-Vierraden line"

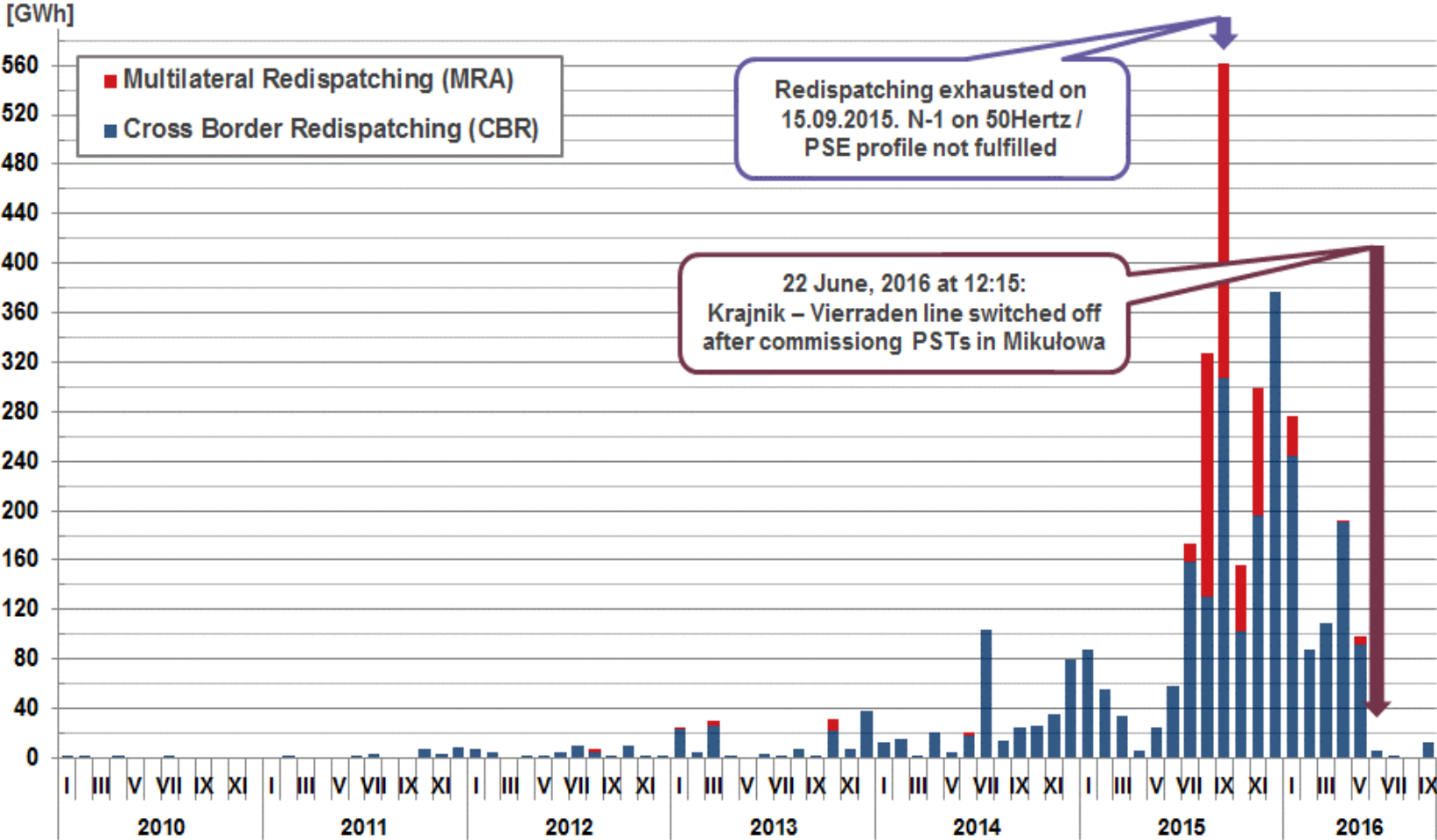
ENTSO-E Summer 'Review' – Status Poland



ENTSO-E Summer 'Review' – Status Poland



ENTSO-E Summer 'Review' – Status Poland



ENTSOE Winter Outlook - Ukraine transit disruption

Assessment of the Ukraine transit disruption

Reminder:

- **Cold Winter** (increasing demand = reference winter +10% at EU level)
- **Peak-Day** (national design case for gas demand, taking place in 1 January)
- **2-week Cold Spell** (14-day period demand, taking place 15-28 February)

Disrupted Demand: Share of gas demand that cannot be satisfied

Households and social services are protected customers and shall be the last to be disrupted (Reg. (EU) No 994/2010)

In case of potential gas disruption, industrial consumers and power producers are expected to reduce their consumption and/or switch to alternative fuels driven by market incentives (high gas prices).

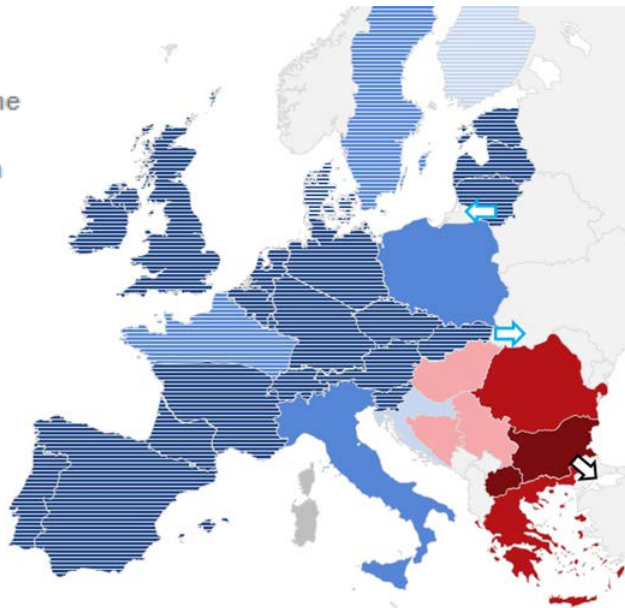
ENTSOE Winter Outlook - Ukraine transit disruption

Low flexibility in South-Eastern Europe

- More countries share the demand curtailment as a result of the cooperative modelling but at a lower disruption rate
- Bulgaria, FYROM, Romania, Greece, Bosnia, Hungary, Serbia face demand curtailment under high demand situations



No significant change in the Remaining Flexibility related to the disruption



1-day Design Case



2-week Cold Spell

Remaining Flexibility

0 - 5% 5 - 20% > 20%

Share of curtailed demand

0 - 5% 5 - 25% > 25%

Transit from Europe

Unrestricted



Disrupted



FID projects will help mitigate the situation in the coming years

Ukraine transit disruption: impact on electricity

South-Eastern Europe electricity system robust

Country	Gas demand curtailment risk in peak conditions with disruption through Ukraine	
	1-day Design Case (peak demand)	2-week Cold Spell
Bulgaria	> 25 %	> 25 %
Greece	5 % to 25 %	No gas curtailment
FYRO Macedonia	> 25 %	> 25 %
Romania	5 % to 25 %	No gas curtailment

In the case of a Ukraine gas transit disruption, the electrical system adequacy and security can be maintained in spite of a high demand (design case) and potential disruption of gas for power generation.