



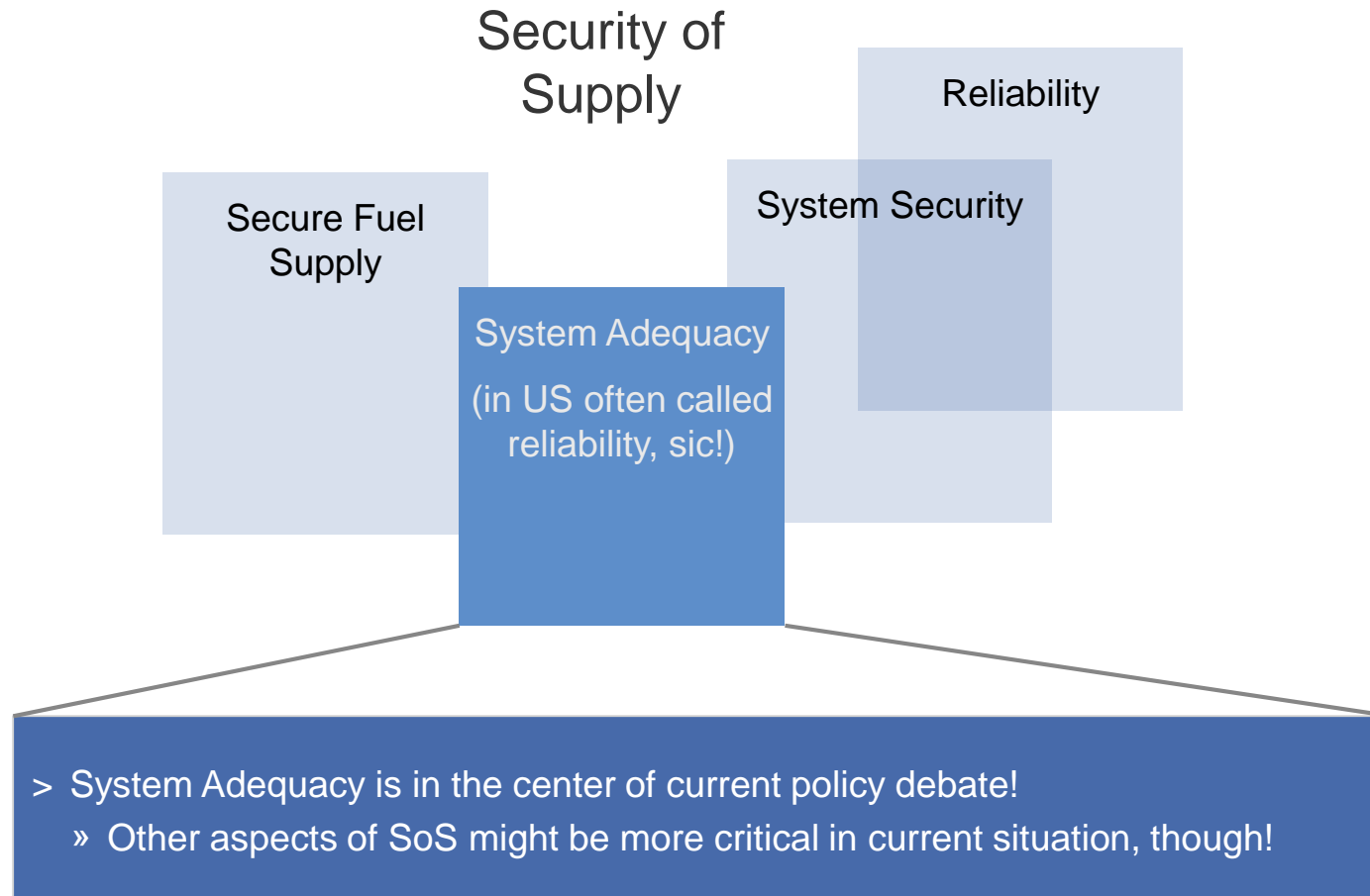
Security of Supply – Concept and Definition:  
On the Way to a Common Understanding?

Presentation for French-German Conference on SoS

Dr. Christoph Maurer | Paris | 21 May 2015

# Security of Supply Cannot Be Underestimated

... but what is exactly meant when talking about SoS?



## When Is System Adequacy Maintained?

Discussion gets more difficult due to intermixed definitions

### Option 1: wholesale prices stay below certain limits

- > low acceptance of price spikes
- > perspective often taken by large consumers, industry associations etc.

### Option 2: possibility to satisfy highest possible demand

- > purely technical perspective
  - » no trade off between costs and benefits for fulfillment of such definition considered
  - » estimation of highest possible demand includes major uncertainties
- > price-elasticity of demand not taken into account
- > traditional approach, stemming from pre-liberalized era

### Option 3: delivery according to customers' price preferences

- > Security of Supply is delivered as long as supply is guaranteed in any situation where market price is below or equal to customers' willingness to pay
- > voluntary reductions of load do not constitute a SoS issue
- > involuntary load shedding, however, not acceptable
  - » discussions might emerge about households etc. without possibility to state their price preferences → VOLL?

## System Adequacy in an Interconnected System

Traditionally, system adequacy was assessed from a national perspective

- > Germany: TSOs report on “Leistungsbilanz”
  - » Comparison of peak load and de-rated capacity (reliably available capacity)
  - » If derated capacity exceeds peak load, system adequacy is confirmed → mainly qualitative criterion
- > ENTSO-E SO&AF
  - » Similar approach
  - » Remaining capacity is compared with a reliability margin for quantitative statements

However, national approaches are no longer sufficient for today’s electricity system

- > Increasing available transmission capacities in interconnected system and Internal Market for Electricity constitute major technical and economic dependencies
- > National excess neither necessary nor sufficient for maintaining system adequacy
- > Today’s investments in power systems decreasingly influenced by national borders
- > Significant portfolio effects of system-wide peak loads compared to national peak loads

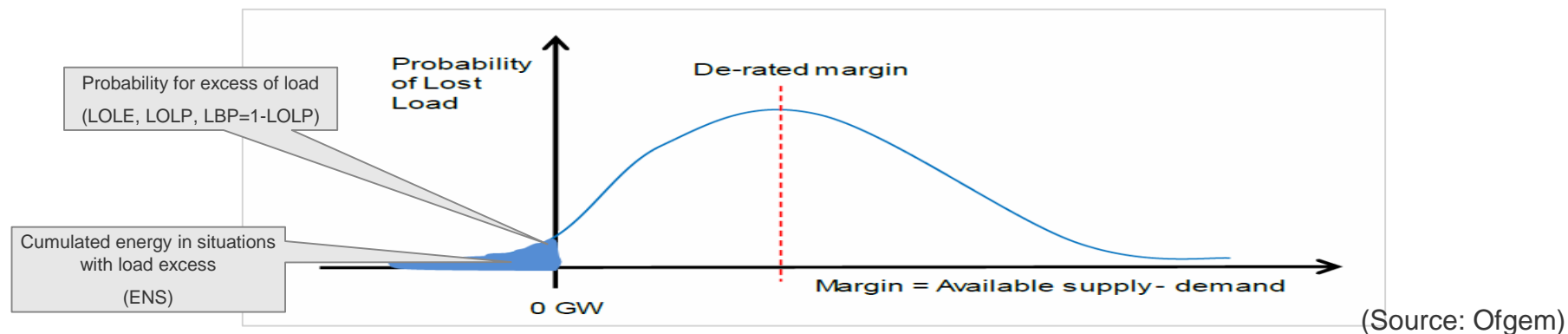
> Only cross-border co-operation allows pursuit of system adequacy at lowest possible costs

## Assessment of System Adequacy Requires Probabilistic Indicators

no black or white classification possible

- > any assessment deals with events of extremely rare occurrence
  - » 100% availability of technical systems not possible
- > importance of stochastic influences has increased and will increase further
  - » weather-dependency of load and, especially, intermittent and hydro generation
- > cross-border approaches will have to take into account availability of transmission capacities

probability distribution of remaining capacity is sensible basis for indicators



> probabilistic indicators like LOLP and ENS clearly superior to past approaches

## System Adequacy Assessments

### prerequisites for appropriate methods widely agreed

- > probabilistic assessment based on sound statistical data
- > consideration of cross-border portfolio effects and transmission capacities
- > joint approach instead of inconsistent national assessments

### status quo different in Europe in general and France and Germany in particular

- > no joint European position on definition and measurement of system adequacy
  - » But valuable contributions from PLEF++ group (recently published assessment is major step forward)
- > France already applies probabilistic methods with cross-border perspective
- > In Germany until recently national perspective was still dominant, but need for adoption has been recognized
  - » BMWi-commissioned assessment by Consentec/r2b applying probabilistic and supranational perspective (similar to PLEF++ report) recently published

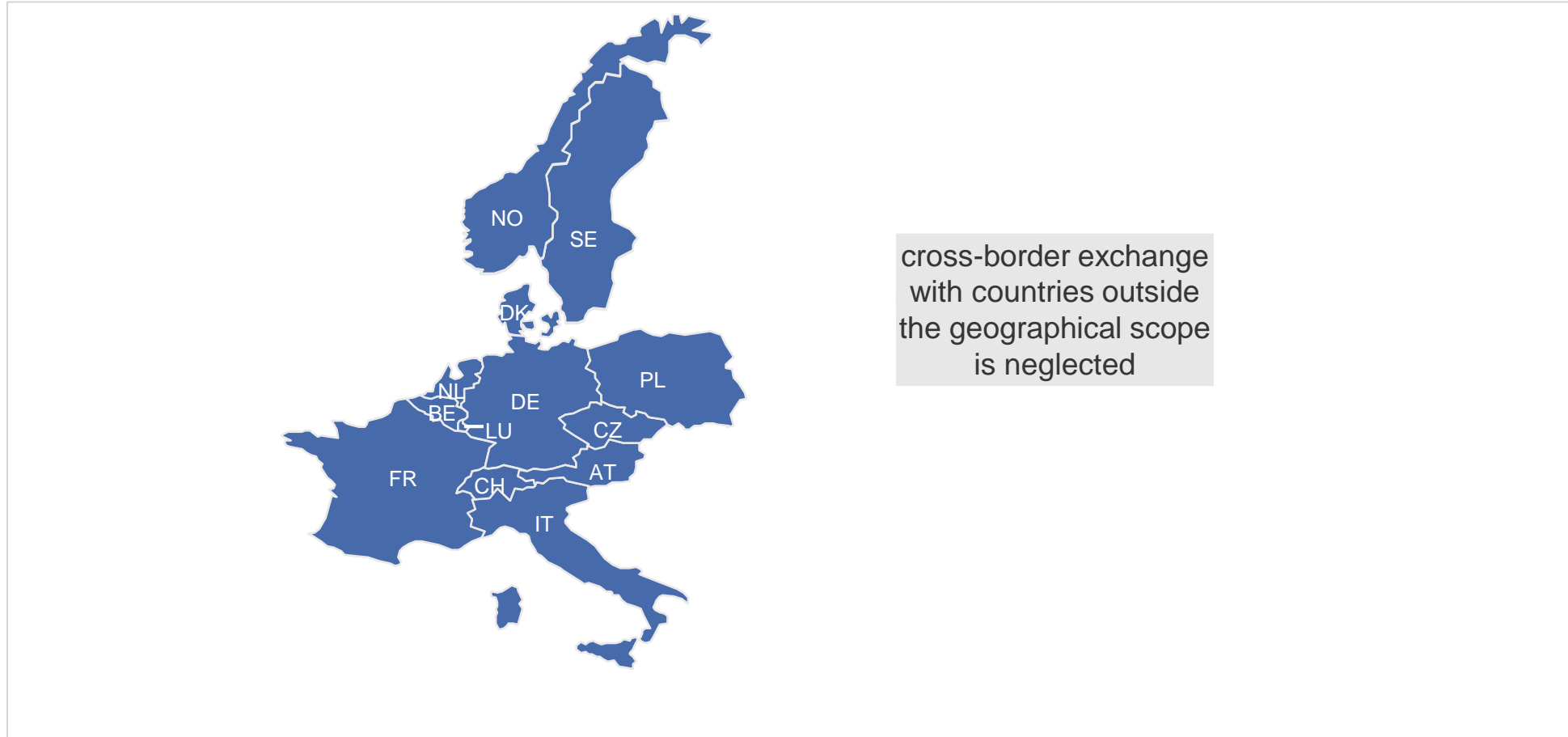
### joint system adequacy assessment alone not sufficient, however

- > also joint understanding of market design objectives necessary
- > adequacy assessment only provide short-term insights, but cannot evaluate long-term functionality of markets
- > joint steps also necessary for all measures taken to maintain system adequacy

# Case Study: Probabilistic and supranational adequacy assessment

Study by Consentec/r2b commissioned by BMWi\*

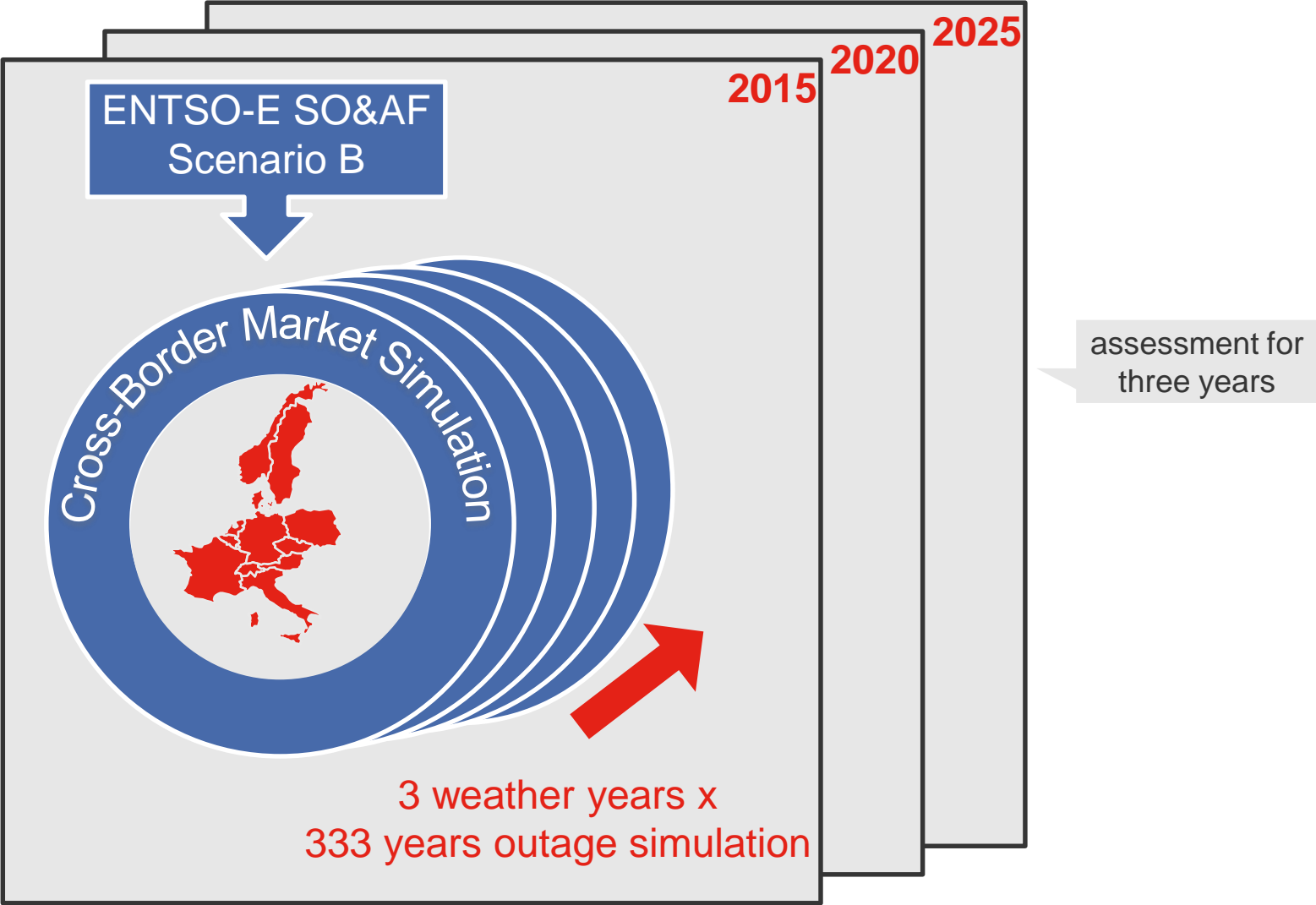
## Geographical scope



\*Consentec/r2b: Versorgungssicherheit in Deutschland und seinen Nachbarländern: länderübergreifendes Monitoring und Bewertung, Aachen/Köln, März 2015, <http://www.en.consentec.de/publications/studies>

# Case Study: Probabilistic and supranational adequacy assessment

Study by Consentec/r2b commissioned by BMWi



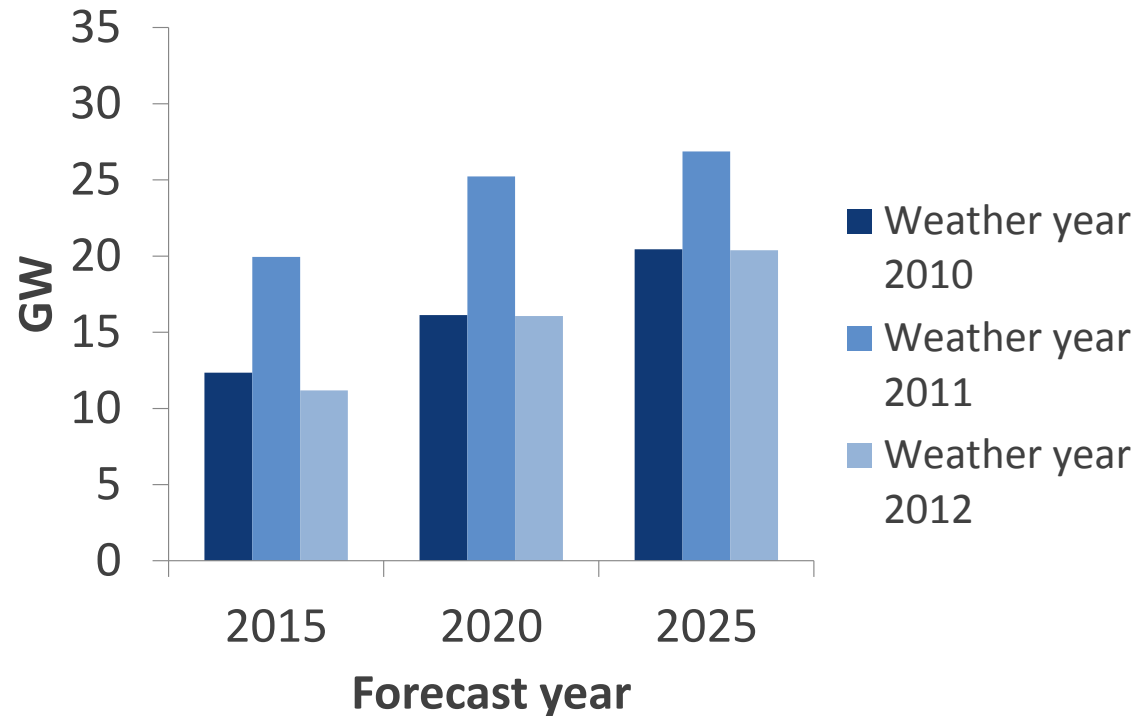


# Case Study: Probabilistic and supranational adequacy assessment

Study by Consentec/r2b commissioned by BMWi

## Balancing effects of RES and load in a supranational context:

- > arise from the difference between the common residual annual peak load and the sum of the national values.
- > result from different load curves and different regional weather conditions.

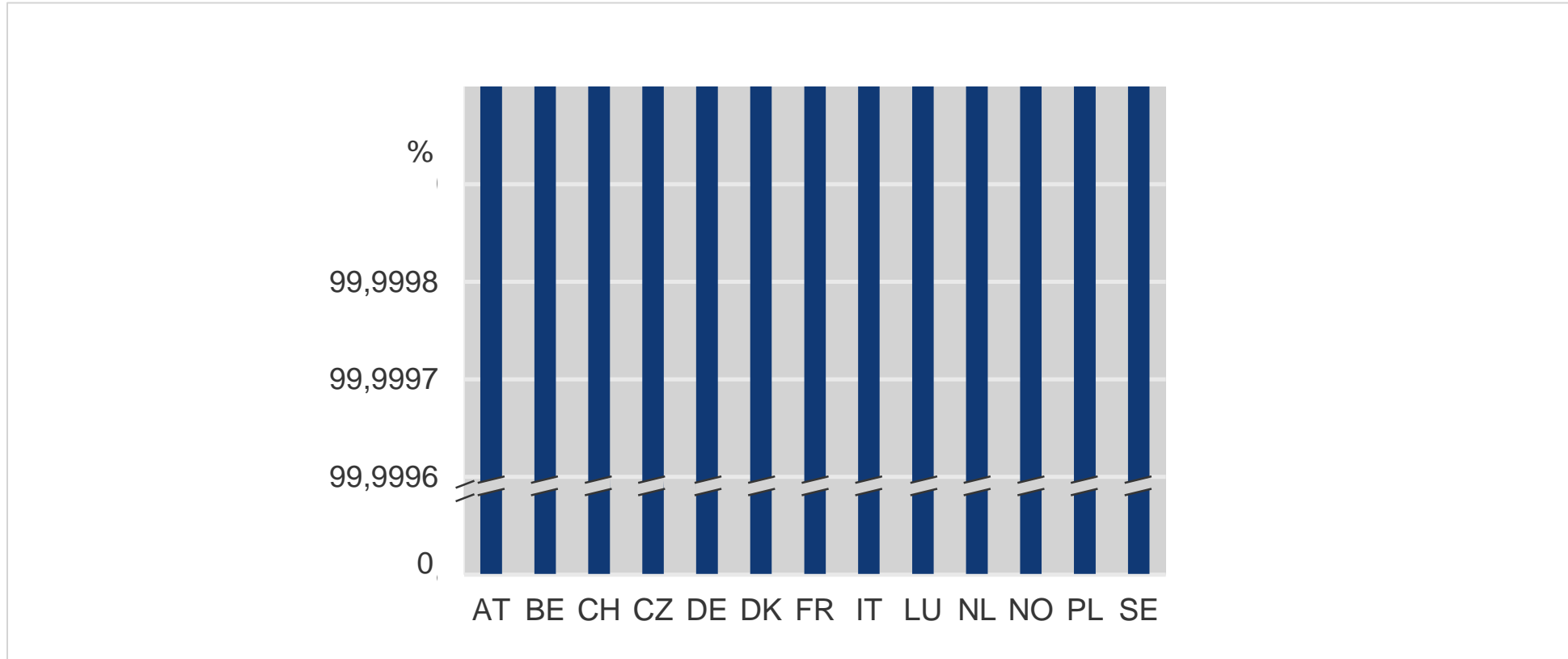


The supranational balancing effects with respect to the residual annual peak load are significant for all weather years and increase by higher RES .

# Case Study: Probabilistic and supranational adequacy assessment

Study by Consentec/r2b commissioned by BMWi

## Probability for system adequacy (LBP) 2015 & 2020

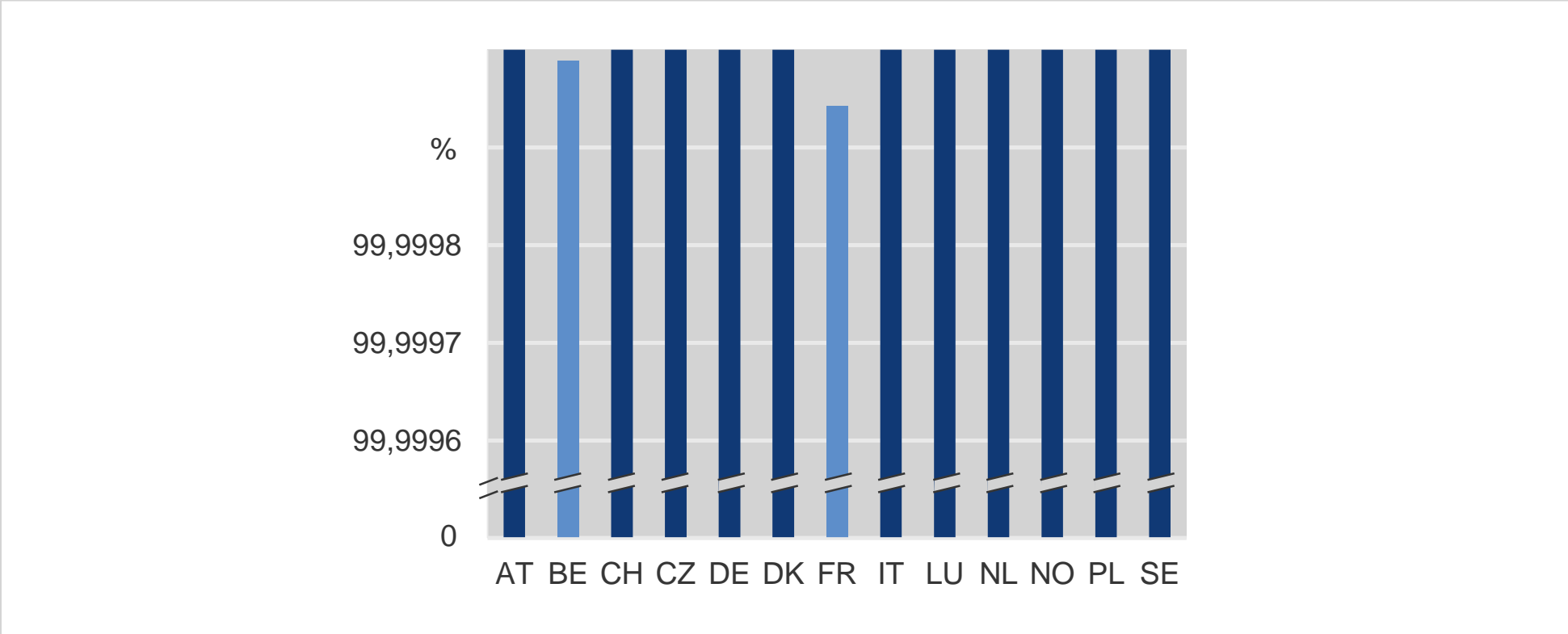


> Load was covered in each hour of the 999 scenarios and in the whole region → no adequacy issues

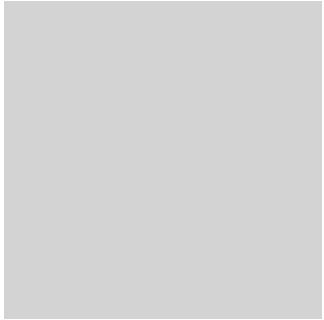
# Case Study: Probabilistic and supranational adequacy assessment

Study by Consentec/r2b commissioned by BMWi

## Probability for system adequacy (LBP) 2025



> Load was covered in each hour of the 999 scenarios in all countries, except FR and BE, where (very few) issues occur



consentec

Consentec GmbH

Grüner Weg 1

52070 Aachen

Germany

Tel. +49. 241. 93836-0

Fax +49. 241. 93836-15

info@consentec.de

[www.consentec.de](http://www.consentec.de)