

# Adequacy calculations for Belgium LOLE and strategic reserves volume

WG Belgian Grid – 23/10/2014

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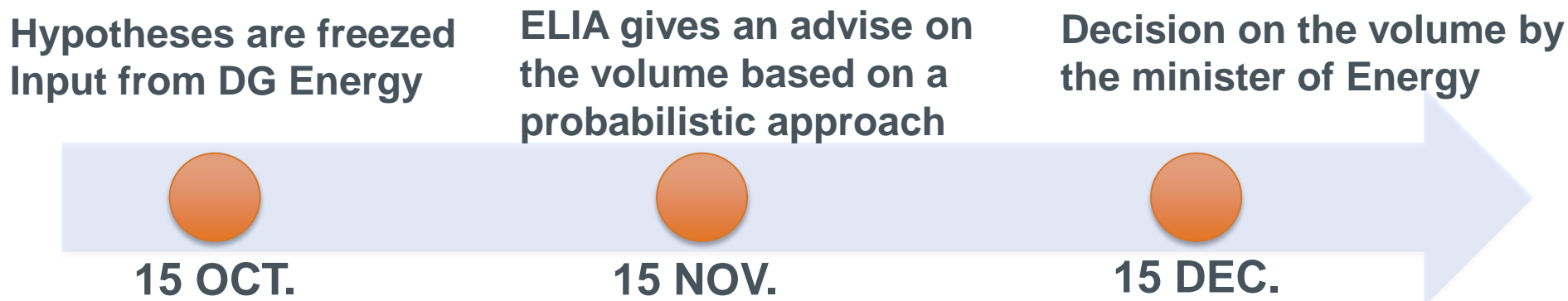
*Adequacy and Market analyst*

# Agenda

- 1. Modelling and hypotheses**
- 2. Strategic reserves volume evaluation**
- 3. Results for this winter (2014-2015)**

# Introduction and timeline

The exercise of strategic reserves volume evaluation is **made every year** in November. The evaluation is sent to the minister of energy in order to take a decision on the volume to be contracted for next year.



A **probabilistic tool** is used to evaluate the adequacy in Belgium. The tool is a market model that can handle different climatic forecasts and is able to generate a big amount of future states.

# Input data for the simulations



## Available sources

- ✓ **Generation**
  - Nuclear and fossil production
  - Renewables
  - Pump/turbine
  - Production in distribution network
- ✓ **Operational reserves**
  - Necessary to balance the system
- ✓ **Interconnections**
  - Market capacities

## Variables



- ✓ **Climatological variables**
  - Solar production
  - Wind production
  - Temperature
- ✓ **Economical activity**
  - Working day/ holiday
  - Day/night
- ✓ **Outage of units**
  - Planned outages (maintenance)
  - Un-planned outage

# Countries modelled



**Belgium and neighboring countries** are detailed modelled.

**Flows** between countries are determined **by the market**.

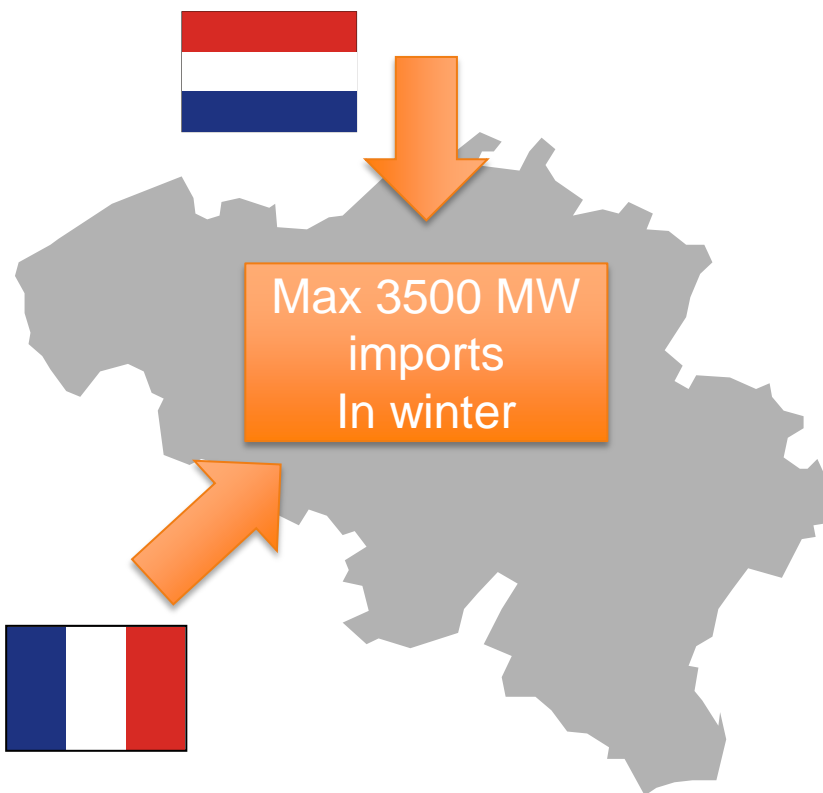
**Strong cooperation** with other TSOs is needed to assess the shortage risk in other countries (that can have an impact on Belgian adequacy).

## Data used from different sources:

- ENTSO-E
- DG Energy
- Other TSOs
- Latest information on decommissioning
- External forecasts

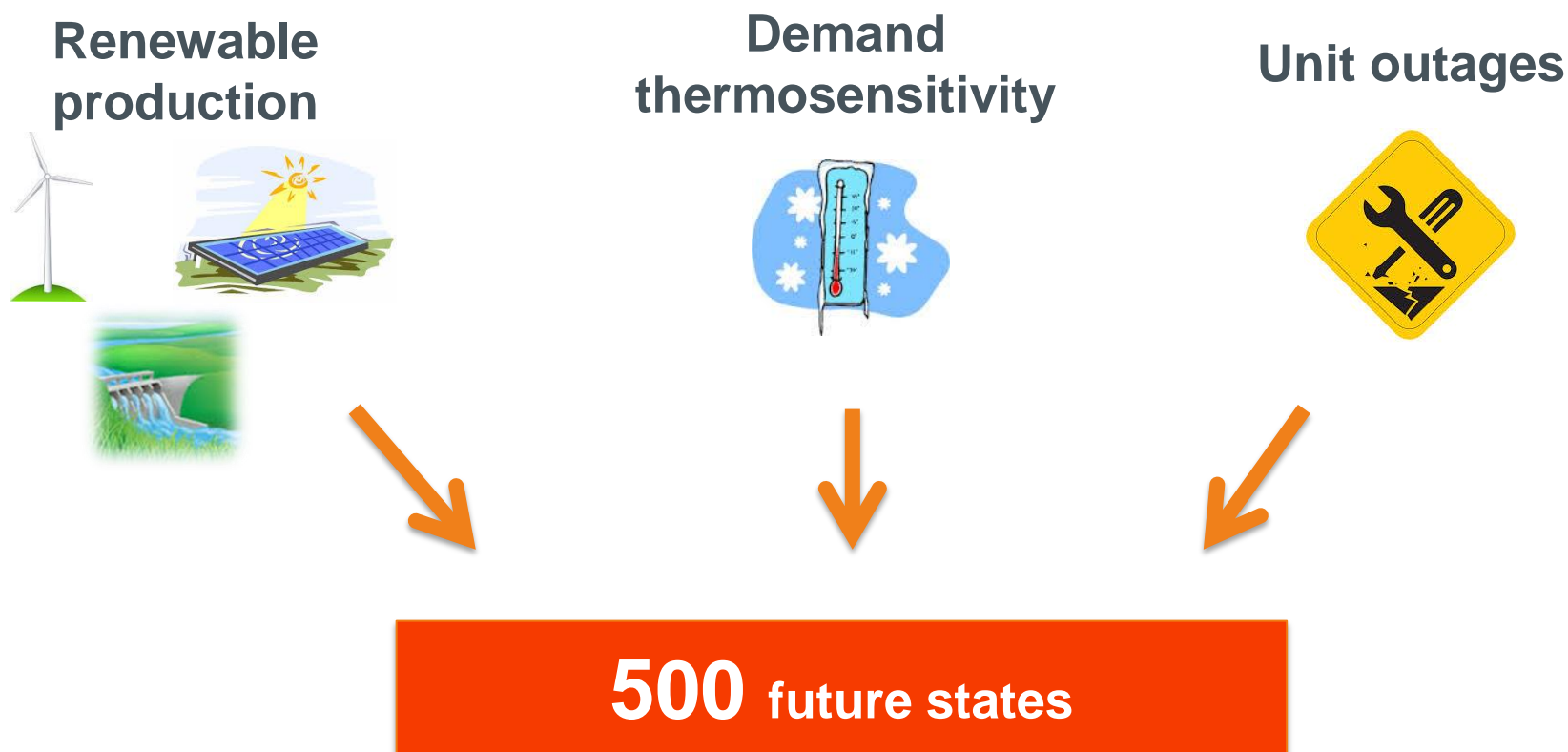
# Maximum simultaneous import capacity in Belgium

Market import capacities are used in the modelling. The Maximum simultaneous import capacity used in the simulations for Belgium (sum of FR + NL flow) is 3500 MW in winter. This value is given by Elia to the market and is complying the European security criteria.



# Uncertainty modelling

A big sets of future states are taken into account by using different profiles of renewable production, demand and outages of units.



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# Strategic reserves volume evaluation

The strategic reserves volume is evaluated for Belgium in order to satisfy the following criteria (according to the law):

**Average LOLE < 3 hours**

**LOLE P95 < 20 hours**

**LOLE** = Loss of Load Expectation. It is the expected total duration in hours of unserved energy over the winter.

**Average LOLE** = it is the average value over the future states simulated.

**LOLE P95** = it is the percentile 0.95 (1 out of 20 probability) over the future states simulated.

# Without strategic reserves these are the LOLE and needed volumes for this winter (14-15)



**With D3/T2**

**No D3/T2**

**No D3/T2**

**With D4**

**With D4**

**No D4**

**LOLE average**

**1 h**

**37 h**

**271 h**

**LOLE P95**

**2 h**

**93 h**

**481 h**

**Needed volume of Strat. Res.in MW**

**0-800**

**1200-2100**

**2100-3000**

**No winter maintenance**

# Impact of Strategic reserves on the LOLE



No D3/T2

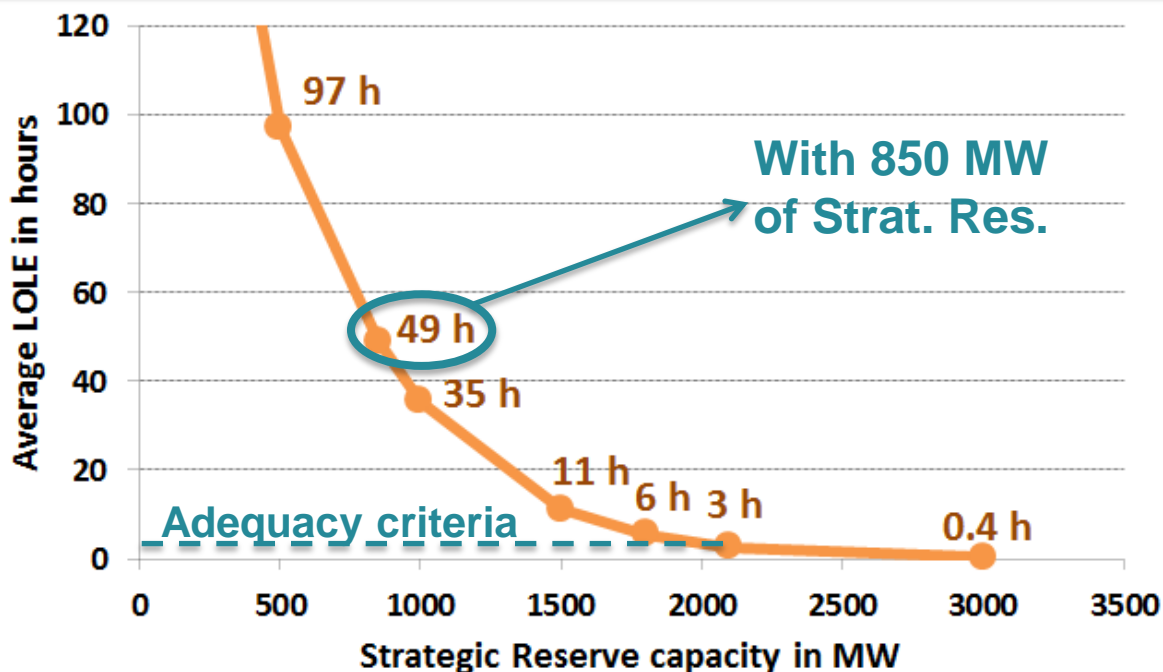
No D4

In the case without D3/T2/D4, the relation between strategic reserve capacity and LOLE is shown on the chart below.

The steepness of the curve is higher when the amount of loss of load is high.

## Impact of Strategic reserves on the security of supply

No winter maintenance

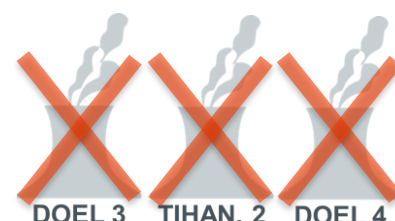


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# Evaluation of the LOLE for this winter

**With 850 MW of strategic reserves**



**No D3/T2**

**No D3/T2**

**With D4**

**No D4**

**No winter maintenance**

**LOLE average**



**LOLE P95**



# Evaluation of the running hours and activation of strategic reserves for this winter

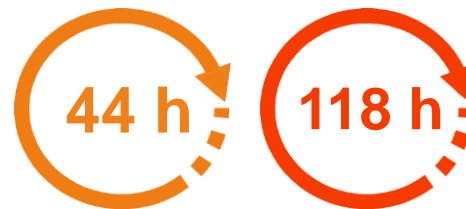


No D3/T2  
With D4

Average P95



Average/P95  
# Activations

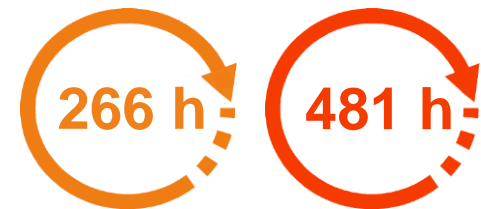
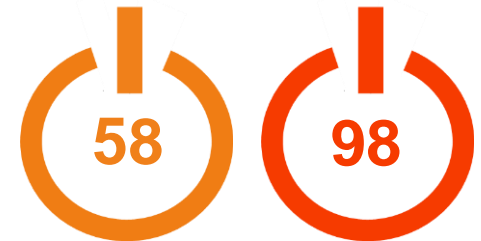


Average/P95  
Running hours  
for the whole winter



No D3/T2  
No D4

Average P95



No winter  
maintenance

# What about next winters?

A exercise is currently held in order to assess the volume needed for the 3 next winters based on the latest information available in order to provide an advise to the minister before the 15<sup>th</sup> of November as stated in the law.

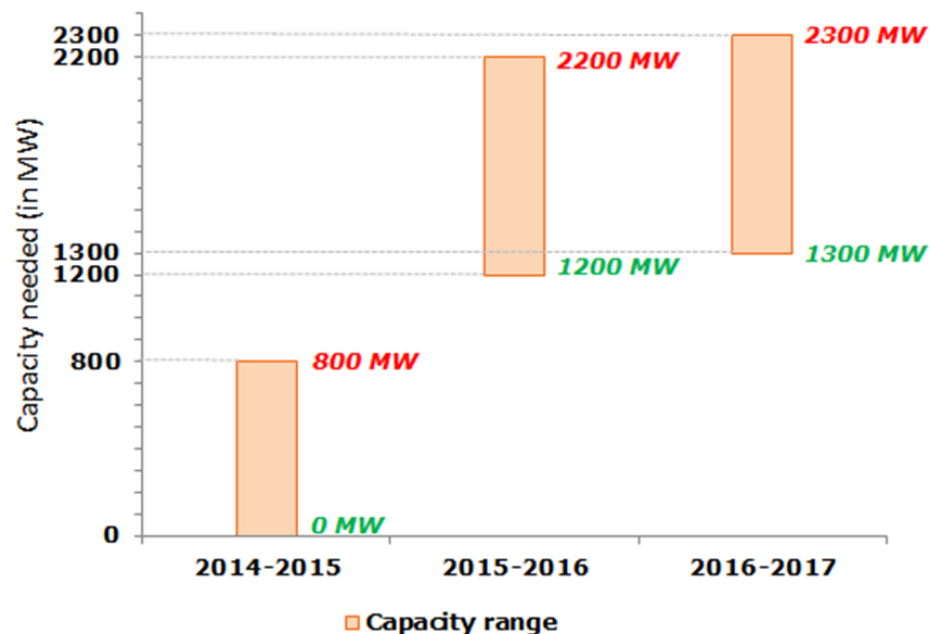
The **previous evaluation** of strategic reserves volume for the next 3 winters was made on 20/03/2014 with the information available at that date. The needed volumes for next winters are shown on this chart.



## Results from 20/03/2014:

- With D4
- With D3/T2

Needed capacity for strategic reserves in Belgium for the next 3 winter periods



# Many thanks for your attention!

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