

# Forecast and actual wind power generation

## Publication on the website

<b>Summary</b>	This document describes the data & hypotheses on which the online publication of forecast and actual wind power generation is based. The added value for market players and for Elia as well as the more specific features of the Wind Forecast Tool are described here.	
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## Previous versions

<b>Version</b>	<b>Date</b>	<b>Author</b>	<b>Summary changes</b>
v1.0	17/02/2012	Pieter-Jan Marsboom	Initial version (Total monitored capacity = 930.65MW)
V1.1	21/03/2016	Kristien Clement-Nyns	Updated version (Total monitored capacity = 1960.91 MW)

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## 1 Introduction

Belgium's installed wind-power capacity, for which Elia owns and shows forecasts and measurements, is currently 1960.91 MW\*. The past few years have seen a steady increase in the already significant level of such capacity, and this is expected to continue in the years to come. In view of its highly intermittent nature, wind power is having a significant impact on system operation for Elia.

Unlike conventional power stations, the electricity generated by wind turbines fluctuates considerably. The inherently variable and unpredictable nature of wind energy obviously poses challenges in terms of maintaining the balance and therefore security of the power grid.

In spite of these challenges, the European Union proposed in its 20-20-20 goals to further increase the share of renewables by 2020. Specifically, pursuant to EU Directive 2009/28/EC, for Belgium this means:

- a 13% target for the overall share of energy from renewable sources by 2020, and a 10% target for energy from renewable sources in transport;
- a 15% reduction of greenhouse gas emissions compared with 1990 levels.

With a view to performing its role as a transmission system operator as effectively as possible and to contributing to these challenging goals, Elia is publishing data in this regard since 2012. Publishing data about this is crucial to ensuring transparency for all the market players and meets the obligation of EU Regulation 543/2013.

## 2 Relevance for market players

In general, the obligation of EU Regulation 543/2013 is intended for the Entso-e transparency platform. However, Elia is publishing the data with respect to wind forecast and actual wind power also on her website. . These data can be used to:

- improve the accuracy of the **estimate of the load** or electricity consumption and related prices both in the longer term (historical data) and in the short term (day-ahead or week-ahead);
- carefully monitor the size and sign of the **aggregate forecast errors** to be able to better balance its portfolio in **near-real time**.

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\* An estimate of the total installed wind-power capacity in Belgium in March 2016 .

### 3 Relevance for Elia

To be able to guarantee the balance of the national grid and therefore the security of the power grid, Elia needs both aggregate wind power forecasts and an estimate of actual wind-power generation. Discrepancies between the two affect the scale of any imbalances in its control area, and Elia has to activate reserves to deal with this problem. A more accurate estimate of the **required reserves** could contribute to a more cost-effective reservation and activation policy, while maintaining the security of the grid.

Also at a more local level, wind power forecasts and measurements play a key role in **congestion management**. This information enables grid security calculations to be made on a day-ahead (D-1) basis and an intraday basis, and for example when planning the maintenance of overhead lines on a week-ahead (W-1) basis, this information can also be put to good use. Promptly identifying potential bottlenecks in the power grid can also lead to better investment and governance policies, which will optimise the integration of renewables and other energy sources.

### 4 Description of the features of the Wind Forecast Tool

The published data feature a graph comprising two curves:

- an aggregate **wind power forecast** in MW;
- an estimate of aggregate **wind power generation or measurements** in MW.

The following parameters can be identified in this graph:

- **time intervals:** quarter-hours
- **forecast horizon:** always starting with the Dforecast (intraday data) and going through to the D+7 forecast (future data)
- **The week-ahead forecast:** this is a snapshot of the forecasted values of D+7 updated at 16h45 (with values created at 16h00)
- **The day-ahead forecast:** this is a snapshot of D+1 forecast updated at 11h35 (with values created at 11h00).
- **the most recent forecast:** this is updated 4 times a day, at at 06h00, 11h00, 16h00 and 21h00 (CE(S)T) and is never updated in the past.
- **measurement updates:** every quarter of an hour, the unique quarter-hourly value for "*Upscaled Measurements*" is updated – this is always the amount of power equivalent to the running average measured for that particular quarter hour; these measurement data always involve an estimate based on an extrapolation, since Elia does not have all the measurement data at its disposal;
- **monitored capacity:** Elia always tries to show the forecasts & corresponding measurements for the most recent, up-to-date installed wind power capacity in the Belgian control area. However, Elia will only show the forecasts and measurements for a total monitored capacity for which it has detailed background

information. This is currently limited to 1960,91 MW. Users can multiply the forecasts and corresponding measurements by a factor that takes into account the wind power capacity actually installed at a given moment in time. The monitored capacity used, depending on the filter selection, is shown in the graph alongside the filter buttons.

- **load factor:** the ratio in percentage between the measured wind power generation in [MW] and the total monitored wind power capacity in [MW].

**Active decremental bids:** this indicates whether wind power was reduced due to the activation of decremental bids on wind parks.

Users also have the option of focusing in on certain details using the following two filters:

- location vis-à-vis the power grid (high-voltage or low-voltage side) by selecting **Elia-connected** or **DSO-connected**;
- location vis-à-vis the physical whereabouts (on land or at sea) by selecting **onshore** or **offshore**.

Finally, users can **export** historical or future aggregate forecasts and corresponding measurements to an Excel file. They can download the historical data on a weekly basis or by selecting for themselves a specific period for some days in the current month. The exported files also show the monitored wind power capacity (given in MW).

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