



How windy was 2018?

An analysis of the "Cumulative" and "Short-term"
wind indexes in Belgium and in France

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1. Introduction

The wind index, as calculated by 3E, is a useful tool to show the wind potential of a certain period compared to the long-term average. The analysis is based on the ERA5 reanalysis dataset and covers the full year of 2018. The results have demonstrated that 2018 was windier than 2017, but still below average. This article aims to look further into the wind performance of last year.

2. Approaches

3E follows two distinct approaches to assess wind index (WI).

The first approach is called the "Cumulative" wind index. It compares the wind performance of a certain month to the average wind performance calculated between 2000 and 2018, which is the reference period. This method is usually used for long-term extrapolation based on the wind index.

The second approach is called the "Short-term" wind index. It shows the wind performance of a given month compared to the average performance of the same month between 2000 and 2018.

The main difference between the 2 approaches is that the second one eliminates the effects of seasonality and is rather used to look at the performance of a specific month.

3. Analysis of the "Cumulative" wind index

In this analysis, the "Cumulative" wind index for Belgium has been calculated based on 50 reference points spread over the country. Results have demonstrated that the Wind Index of 2018 reaches 95.1% of the WI average of the past 19 years (2000-2018). In other words, the wind energy production potential in Belgium during 2018 was 4.9% lower than the previous 19-year reference period. Even though the Wind Index of 2018 is slightly higher than the ones of both 2016 and 2017 (respectively with a WI of 94.7% and 94.6%), it is still significantly below the 19-year average. Moreover, 2016-2018 is the 3-year period with the lowest WI average (94.8%) since 2000. With an average wind index of 95.7%, 2003-2005 is ranked as the second least windy 3-year period.

The "Cumulative" wind index for France is also based on several reference points spread over the country. With an average wind index of 98.1%, the figures for France in 2018 show a similar trend. Even though the WI of 2018 is 1.9% lower than the last 19-year average, 2018 was slightly windier than 2016 and 2017 (respectively 93.7% and 94.5%).

In the following graph, the benchmark, which accounts for the average wind potential of the reference period 2000-2018, is represented by the horizontal yellow line set at a reference index of 100.

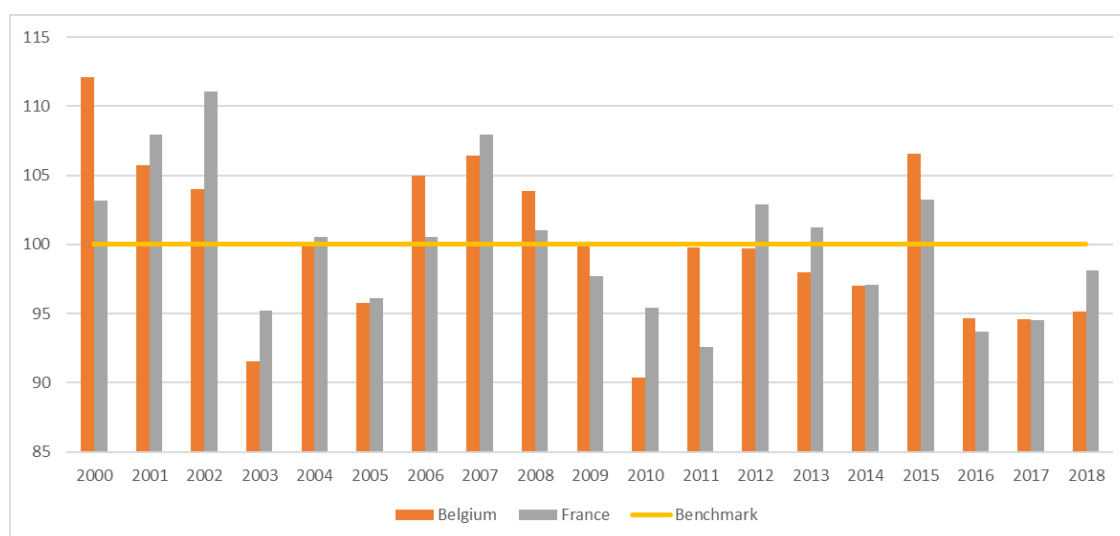


Figure 1: Cumulative wind index of the years 2010 to 2018 in Belgium and in France compared to the average wind performance of 2000-2018

4. Analysis of the "Short-term" wind index

The "Short-term" wind index analysis of the same period and data points provides some more insights into the wind performance of 2018.

In Belgium, the average "Short-term" wind index from May 2018 to October 2018 is 78.0%, which is the lowest 6-month average of the last 19 years. The least performing month of the year was July (with a 58.1% short-term WI), which was also the least windy July since 2000.

As showed in the graph below, a similar scenario is encountered in France. The average "Short-term" wind index from April 2018 to September 2018 reaches 84.0%. The least performing month of the year was also July. With a 60.7% short-term WI, July 2018 accounts, in France too, for the least windy July of the last 19 years.

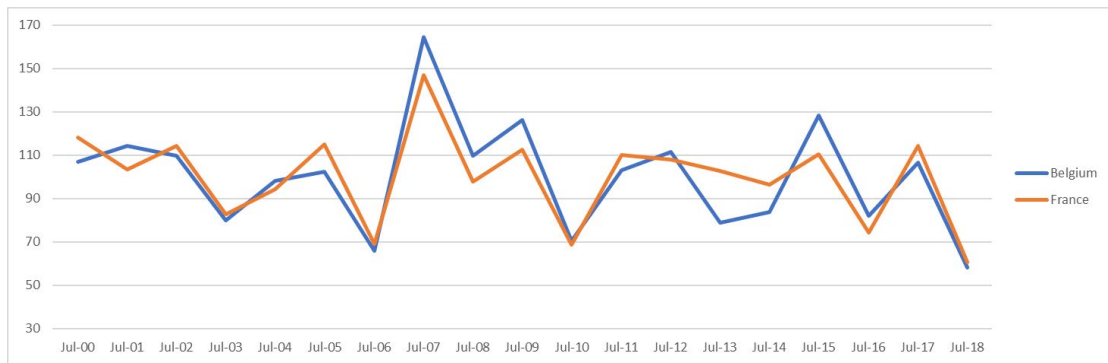


Figure 2: Short-Term wind index of the months of July from 2010 to 2018 in Belgium and in France compared to the average performance of July from 2000 to 2018

In conclusion, the low wind potential of the summer season largely explains the low cumulative wind index of the year 2018. This can also be observed in the graph below that clearly shows that every summer month in 2018 was less windy than their monthly averages (i.e. short-term wind index), with the benchmark line representing the average performance of each month between 2000 and 2018.

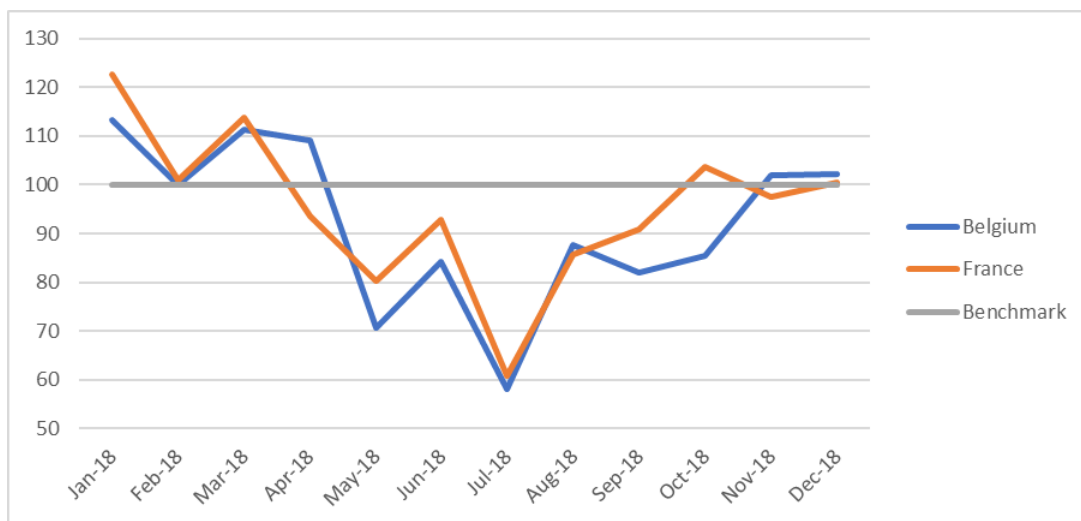


Figure 3: Short-term wind index of 2018 in Belgium and in France compared to the average performance of each month from 2000 to 2018



5. What is the impact on the production?

A decrease in wind index values results in a drop in the wind farm production in the considered period, compared to the expected long-term average. However, such variation in time is a very well-known phenomenon and can be modelled relatively easily. 3E's uncertainty analysis, which is part of a standard P90 calculation, can easily take this into account. Any calculated P90 figure can therefore compensate for these lower wind period.

Quality information

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