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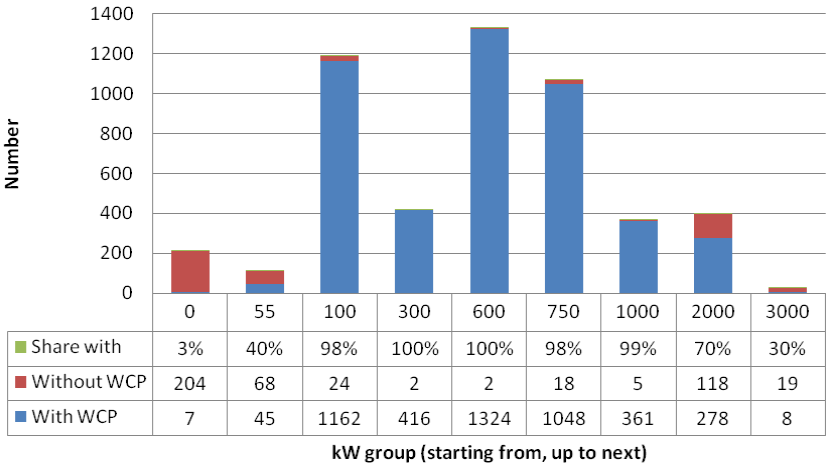
May 28, 2013

# Method for Calculating the Wind Energy Index Corrected Production (WCP)

The expected long term production – WCP - is calculated based on all approved monthly data from January 2002 to the present, i.e. in 2009 a period of a total of 96 months. Each turbine in the database has been subjected to the following approach:

1. Remove erroneous data: In case of months with index corrected production more than 150% above or less than 75% below "simple WCP average of all months", then these months are deleted from the analysis because of assumed data errors or low availability.
2. Turbines that do not deliver directly to the grid have been removed. Some smaller turbines with a rated power less than 25 kW do not deliver their full production to the grid, as they are a part of their owner's installation. For these turbines the WCP is not included. This is caused by the fact, that the DEA database contains only the production delivered to the grid, not including the production, the owner use directly from the turbine. I.e. the database records does not represent full production for these turbines.
3. Now, all approved monthly production data are summed
4. Finally, this sum is divided by the sum of all corresponding wind index for the local region

By following the approach above 1-4, the production data is assumed to be corrected for major events causing loss of availability. Our approach takes into account situations, where a turbine is out of order typically more than 25% of a month.




| kW group (starting from, up to next) | 0 | 55 | 100 | 300 | 600 | 750 | 1000 | 2000 | 3000 |
|---|---|---|---|---|---|---|---|---|---|
| Share with | 3% | 40% | 98% | 100% | 100% | 98% | 99% | 70% | 30% |
| Without WCP | 204 | 68 | 24 | 2 | 2 | 18 | 5 | 118 | 19 |
| With WCP | 7 | 45 | 1162 | 416 | 1324 | 1048 | 361 | 278 | 8 |

*Figure 1: WCP for 91% of the 5109 Existing Danish Turbines as of Ultimo 2009.*

The Figure 1 outlines results from the WCP analysis. In the analysis, 91% of all Danish turbines had an appropriate data quality in order to calculate the WCP – the expected long term production. Typically the very new turbines are missing (still too few data to fulfill minimum requirements, 6 months approved data) and the small ones delivering power direct to owner. The large block from 2000 – 2999 kW without WCP is the new Horns Rev II wind farm with less than 6 months of data. For the block with turbines rated beyond 3000 kW, the new Sprogø offshore wind farm is the largest group without data.

### Analyses Regarding WCP for Danish Turbines

The change in calculated WCP based on end 2008 and end 2009 data inclusion are shown in Figure 2. As seen the changes are very small - only 28 turbines changes more than +/- 5%. This is typically fairly new turbines, where last calculation was based on a somewhat poor data basis. Note: Only turbines with at least 6 approved months of data are included.

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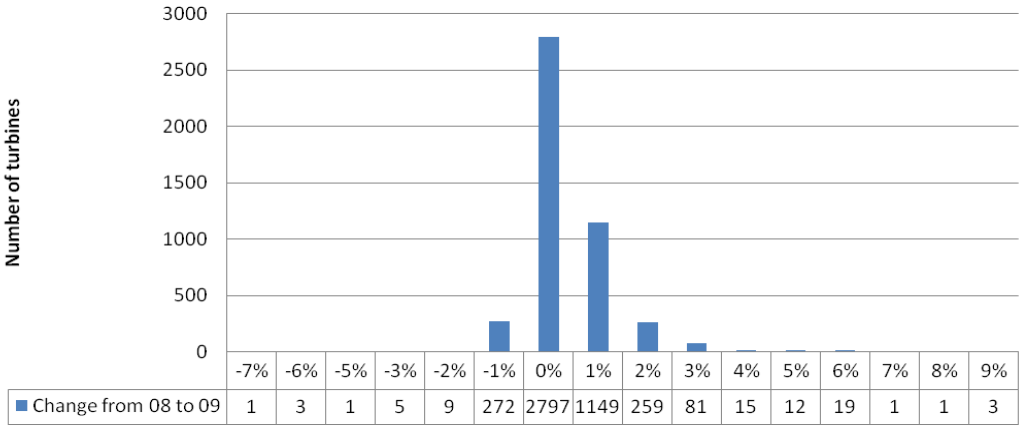


| | -7% | -6% | -5% | -3% | -2% | -1% | 0% | 1% | 2% | 3% | 4% | 5% | 6% | 7% | 8% | 9% |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Change from 08 to 09 | 1 | 3 | 1 | 5 | 9 | 272 | 2797 | 1149 | 259 | 81 | 15 | 12 | 19 | 1 | 1 | 3 |

*Figure 2: The change in calculated WCP based on end 2008 and end 2009 data.*

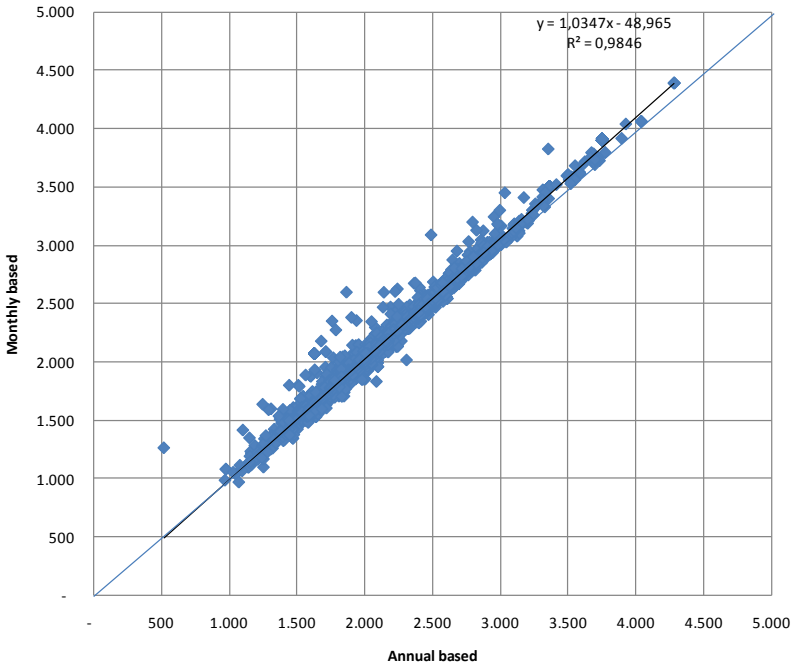


*Figure 3: Wind Index Corrected Full Load Hours Based on Monthly and Annual Data..*

There are some differences in calculations based on monthly and annual values, as annual values typically include more availability loss (this is taken out in monthly data by filtering), see the Figure 3. Looking at all data; the annual based WCP is 1.1% lower than the monthly based. This indicates that 1.1% major availability loss is a “typical value”. In addition to this; there are the minor availability loss events (e.g. service events), which are not taken out by filtering the month data.

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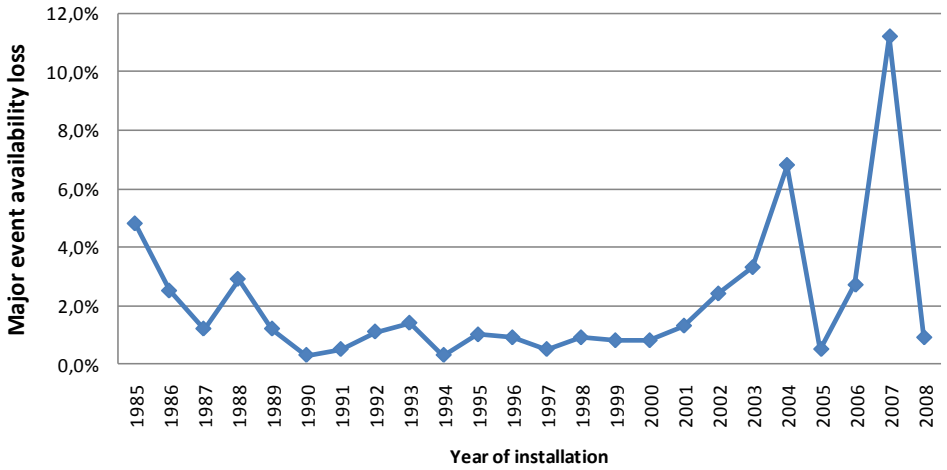


*Figure 4: Analyzing the Major Availability Loss (by Considering Annual versus Monthly Data)*

Considering the Figure 4, the "major event" availability loss is analyzed by observing the difference in WCP based on monthly and yearly data. The monthly WCP can be used to detect major availability losses, like if a turbine is out of order for a week or more. This is the case, as the monthly data will be much lower than the recorded average. Considering the yearly data this is not the case - unless it is a very long out of operation period. Finding the difference in WCP on yearly and monthly data therefore gives a good indication of the 'major event' availability losses. From the Figure 4; it is seen that the turbines established during the last 5 years seem to have an increasing availability loss. In this context, it must be noted, that the data basis is relative weak the most recent years due to few new Danish installations in this period. In the same period, more offshore turbines are included (most installed in years 2002-03).

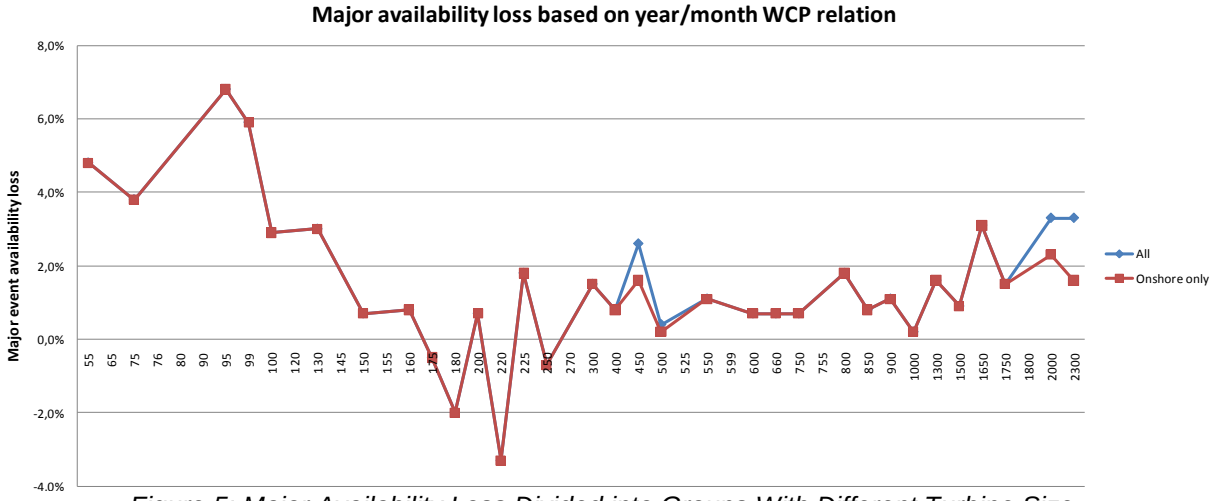


*Figure 5: Major Availability Loss Divided into Groups With Different Turbine Size.*

The Figure 5 shows the "major event" availability loss (as also shown in Figure 4); however the Figure 5 shows the WCP divided into groups with different turbine size. Here we - in addition – also look at the differences between offshore and onshore turbines. It is clear that the offshore has larger "major event" availability losses. It is also clear that the very large turbines in general have larger availability losses compared to the large 600-750 kW generation of turbines, which has below 1%. The very large ones have around 2%. The smaller ones, - below 150 kW - seem to have the highest "major event" availability losses. This group is also very old, and only a few are actually left. In our analysis, we have included only groups with more than 5 turbines. The ones with negative losses are groups with very few turbines; where the statistical basis is very poor.