

Monthly Technical Operations Report

**Windpark Koningspleij**

**September 2022-version 2**

Date 04.10.2022

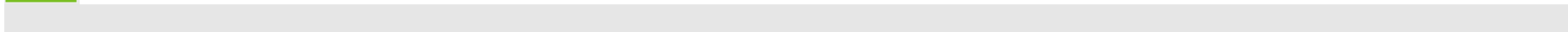
Version 2

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## Windpark Koningspleij- Management Summary

This Monthly Technical Operations Report provides insights in the performance of Windpark Koningspleij, located in a line arrangement north of the high way N325 in the municipality of Arnhem, comprising of 3 wind turbines of the type Enercon E-115 EP3 - 4,2 MW. Emphasis is put upon the key figures, the owners' objectives and the relation of those to the historical trends.

<input checked="" type="checkbox"/> Select all <input type="checkbox"/> January <input type="checkbox"/> February <input type="checkbox"/> March <input type="checkbox"/> April <input type="checkbox"/> May <input type="checkbox"/> June <input type="checkbox"/> July <input type="checkbox"/> August <input checked="" type="checkbox"/> September <input type="checkbox"/> October <input type="checkbox"/> November <input type="checkbox"/> December	Monthly	<b>1,084</b> Energy production [MWh]	<b>98.8%</b> Contractual Availability	<b>-32.0%</b> Production vs Forecast	<b>0</b> HSE Events
	Year to date	<b>11,740</b> Energy production [MWh] YTD	<b>96.60%</b> Contractual Availability YTD	<b>-34.6%</b> Production vs Forecast YTD	<b>0</b> HSE YTD



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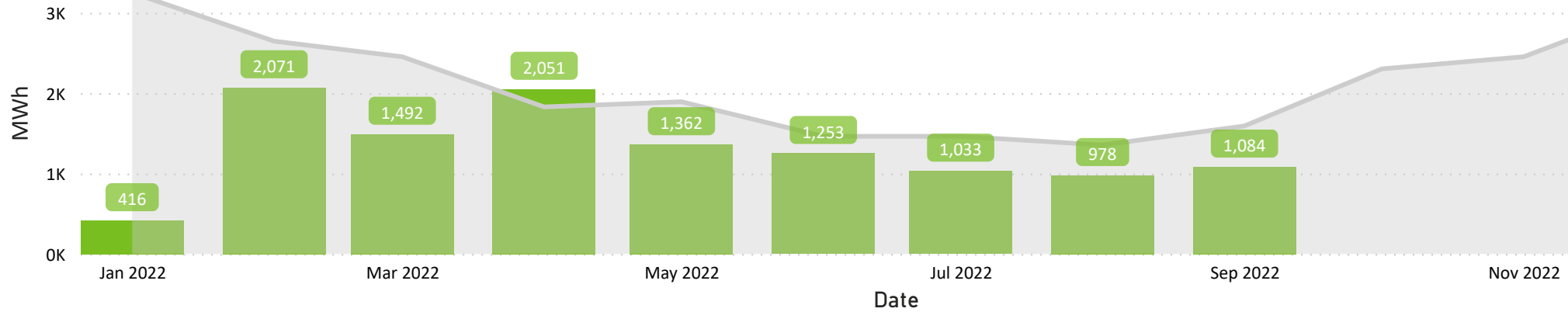
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## Windpark Koningspleij - Production

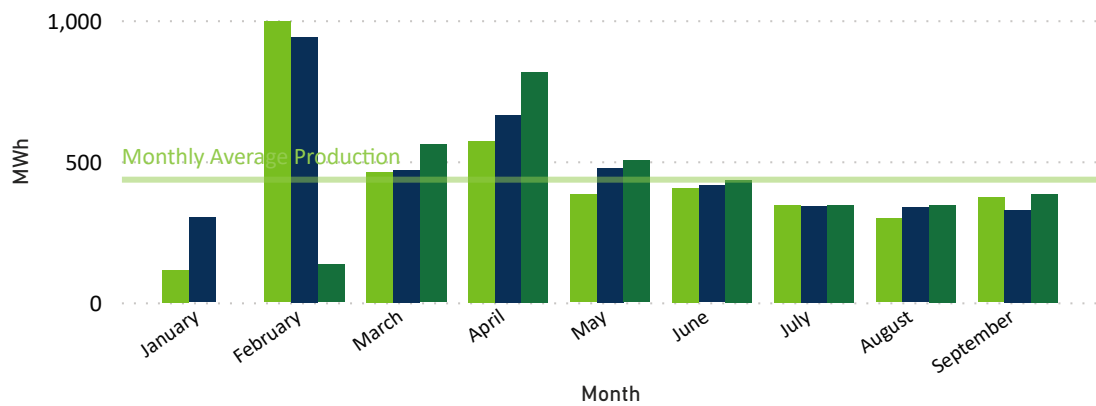
Forecast versus Actual production

● Energy prod. [MWh] ● Forecast P50 [MWh]

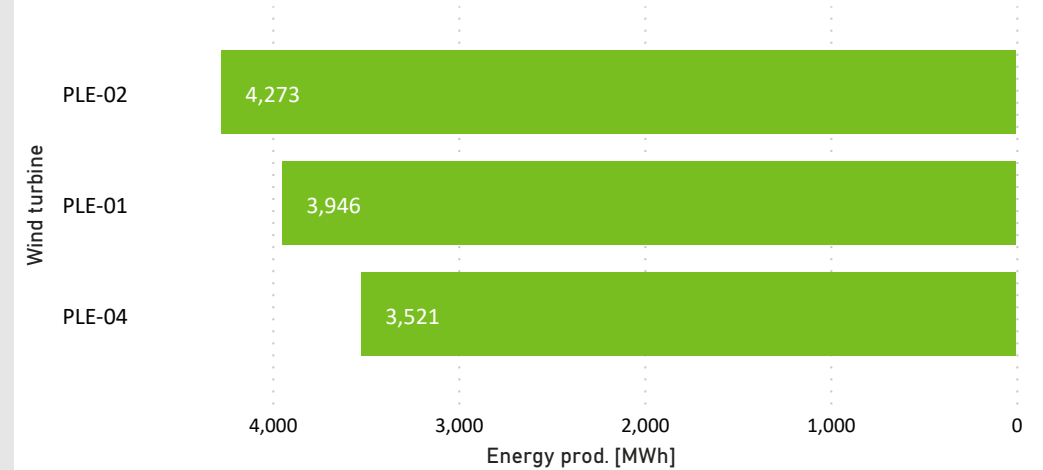


Monthly Production per Wind turbine

Wind turbine ● PLE-01 ● PLE-02 ● PLE-04



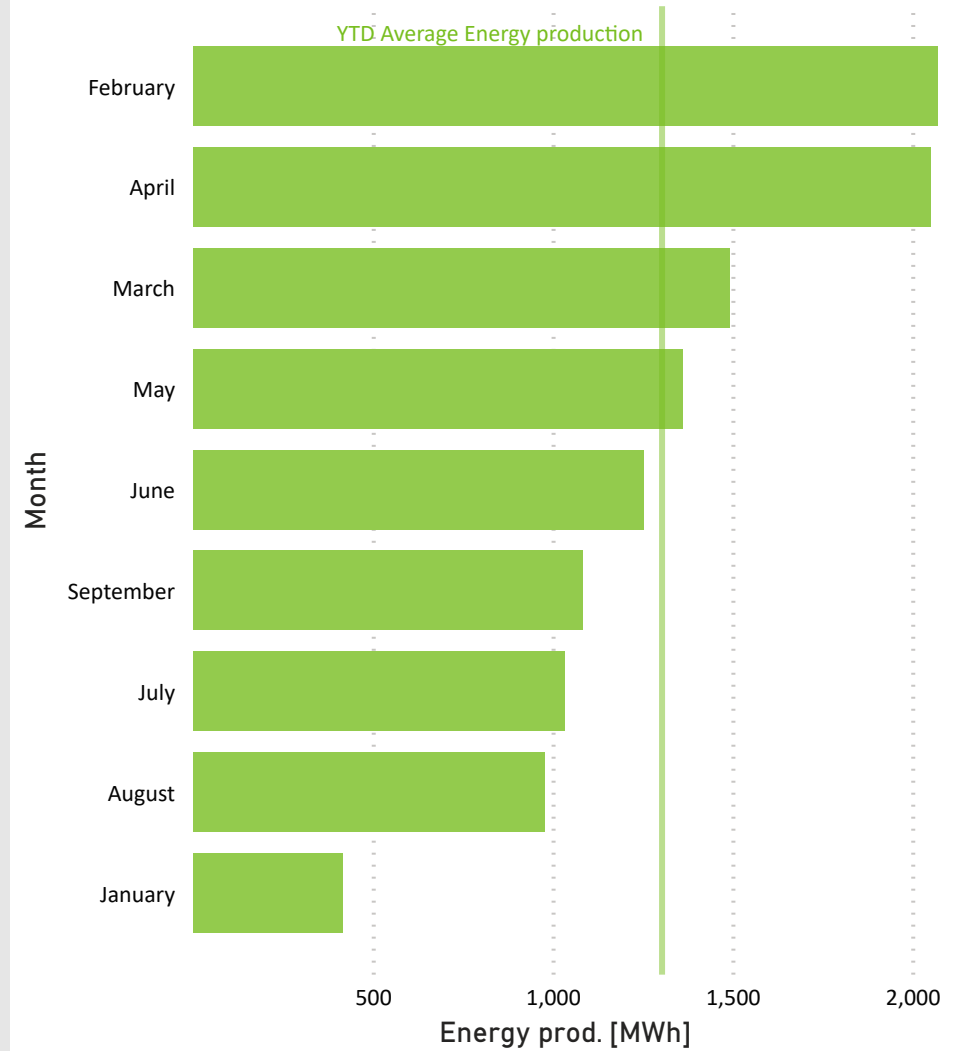
YTD Rank Wind turbine by Energy production [MWh]



Windpark Koningspleij - Production (2)

Month	Energy production [MWh]	Forecast P50 [MWh]	Production vs Forecast YTD
January	416.42	3,250.00	-87.2%
February	2,070.68	2,648.00	-21.8%
March	1,492.14	2,454.00	-39.2%
April	2,051.42	1,830.00	12.1%
May	1,361.91	1,894.00	-28.1%
June	1,252.74	1,464.00	-14.4%
July	1,032.94	1,464.00	-29.4%
August	978.30	1,356.00	-27.9%
September	1,083.50	1,593.00	-32.0%
<b>Total</b>	<b>11,740.03</b>	<b>17,953.00</b>	<b>-34.6%</b>

Rank Energy production [MWh] by Month



## Windpark Koningspleij - Availability

**Contractual availability** is:  $T1 / (T2 - T3 - T4 - T5) \times 100\%$

The contractual availability is calculated according to the EPK Contract, however without any contractual agreed adjustments like, for example, the maintenance factor.

The contractual availability presented below, is based on the down time allocation performed by OutSmart.

**Operational availability** is:  $T_{operationalhours} / T2 \times 100\%$

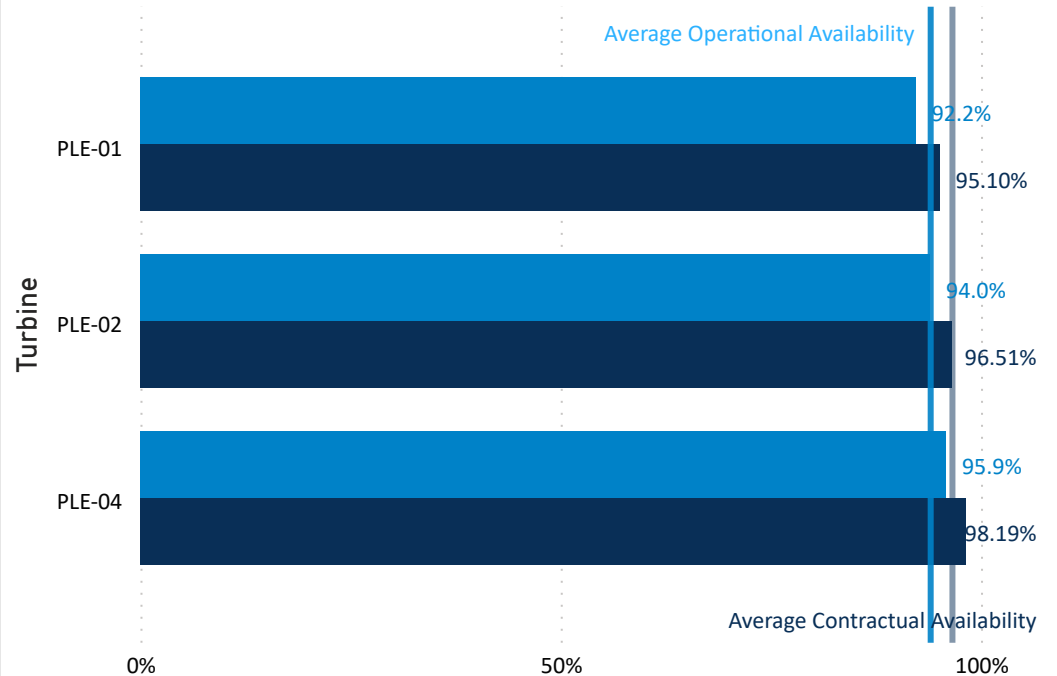
The operational availability includes all downtime except for downtime due to environmental specification such as low wind.

The operational availability is normally equal to or slightly lower than the contractual availability.

Month	Contractual Availability	Operational Availability
April	88.77%	79.93%
May	94.72%	93.99%
June	99.11%	97.76%
July	98.99%	96.94%
August	99.20%	97.72%
September	98.81%	97.72%
<b>Total</b>	<b>96.60%</b>	<b>94.01%</b>

Contractual and Operational Availability YTD by Turbine

● Operational Availability ● Contractual Availability



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## Windpark Koningspleij - Availability (2)

**Annual Technical Availability** for a period of twelve consecutive full calendar months from April 2020 (rolling) is; **Annual technical availability (%) =  $T_{12 \text{ months rolling}} / (T_{2 \text{ 12 months rolling}} - T_{3 \text{ 12 months rolling}} - T_{4 \text{ 12 months rolling}} - T_{5 \text{ 12 months rolling}}) \times 100\%$**

**Maintenance Factor**; Since scheduled maintenance procedures are necessary for a safe and proper WEC operation, a wind energy converter is deemed to be technically available during these periods of time. The maintenance factor for the wind turbine type E-115 EP 3 is 0,61%.

**EPK availability (%) = Annual Technical Availability + Maintenance Factor**

**Calculation of Compensation** in case the warranted availability is not reached: **Closs = (Ag - AEPK) \* AEP \* PPP**  
Where **Ag** is the warranted availability [%]\*, **AEPK** the calculated availability [%], **AEP** the energy yield for the previous operational year plus the compensation for the lack of availability for the previous operation year, and **PPP** the compensation rate.

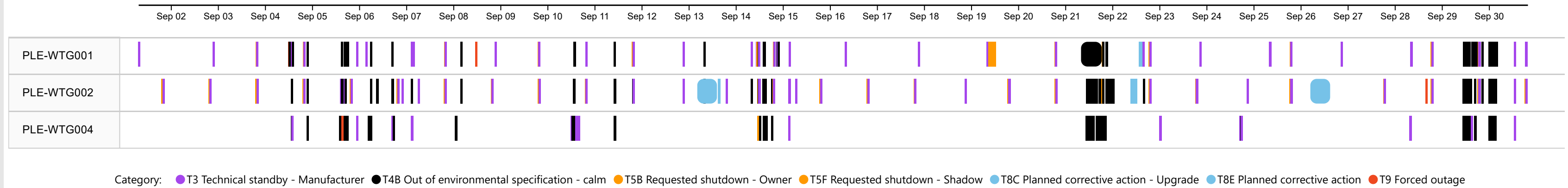
\*As by Particular Conditions EPK Contract No. S-11971-V01 the warranted availability per Wind Farm is 98% while per WEC it is 95% (related to the operational year).

Bazefield ID	Contractual Availability YTD	Warranted Availability	Maintenance Factor	EPK Availability
PLE-WTG001	95.10%	98.00%	0.61%	95.71%
PLE-WTG002	96.51%	98.00%	0.61%	97.12%
PLE-WTG004	98.19%	98.00%	0.61%	98.80%
<b>Total</b>	<b>96.60%</b>	<b>98.00%</b>	<b>0.61%</b>	<b>97.21%</b>

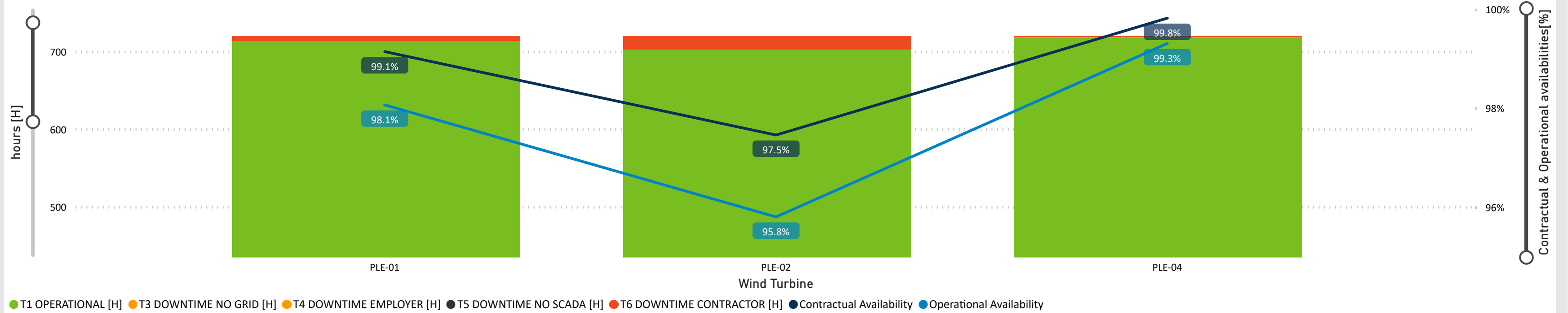


## Windpark Koningspleij - Availability (3)

### Downtime overview (IEC 61400 26 1)



### Downtime type per Wind turbine



Turbine	T1 Operational [H]	Downtime low wind [H]	T2 Total period [H]	T3 Downtime no grid [H]	T4 Downtime employer [H]	T5 Downtime no SCADA [H]	T6 Downtime contractor [H]	Contractual Availability	Operational Availability
PLE-01	713.59	1.11	720.00	0.00	0.48	0.00	5.93	99.14%	98.07%
PLE-02	702.25	1.36	720.00	0.00	0.27	0.00	17.48	97.46%	95.80%
PLE-04	717.98	1.18	720.00	0.00	0.80	0.00	1.22	99.82%	99.31%
<b>Total</b>	<b>2,133.82</b>	<b>3.65</b>	<b>2,160.00</b>	<b>0.00</b>	<b>1.55</b>	<b>0.00</b>	<b>24.63</b>	<b>98.81%</b>	<b>97.72%</b>



## Windpark Koningspleij - Technical Condition

Event List

### Events affecting the wind turbines listed by duration

Events	Duration [H]	Lost Production [kWh]	Occurrences
<input type="checkbox"/> STATUS : Maintenance () (8)	<b>23.27</b>	<b>18,854</b>	<b>6</b>
PLE-02	17.44	16,291	4
PLE-01	5.83	2,563	2
<input type="checkbox"/> STATUS : Shadow shutdown (Active (internal)) (4)	<b>11.40</b>	<b>4,297</b>	<b>40</b>
PLE-02	8.90	3,777	26
PLE-01	2.50	519	14
<input type="checkbox"/> STATUS : Calibration of load control (0)	<b>5.51</b>	<b>1,823</b>	<b>79</b>
PLE-01	2.39	1,061	33
PLE-02	1.89	608	34
PLE-04	1.23	153	12
<input type="checkbox"/> STATUS : Cable twisted (Right (2-3 turns)) (21)	<b>5.13</b>	<b>274</b>	<b>9</b>
PLE-02	1.71	89	3
PLE-04	1.71	20	3
PLE-01	1.70	165	3
<input type="checkbox"/> STATUS : Fault wind measurement (No wind speed 1) (20)	<b>1.14</b>	<b>7</b>	<b>1</b>
PLE-04	1.14	7	1
<input type="checkbox"/> STATUS : Cable twisted (Right (>3 turns)) (21)	<b>0.93</b>	<b>301</b>	<b>1</b>
PLE-01	0.93	301	1
<input type="checkbox"/> STATUS : Ice detection (Abandon nacelle positioning) (14)	<b>0.85</b>	<b>23</b>	<b>4</b>
PLE-04	0.61	15	1
PLE-01	0.17	6	2
PLE-02	0.08	2	1
<input type="checkbox"/> STATUS : Ice detection (SCADA (external)) (14)	<b>0.70</b>	<b>25</b>	<b>4</b>
PLE-01	0.31	15	2
PLE-02	0.19	7	1
PLE-04	0.19	3	1
<input type="checkbox"/> STATUS : Overcurrent inverter (Cross short circuit inverter 13) (64)	<b>0.09</b>	<b>8</b>	<b>3</b>
PLE-01	0.09	8	3
<input type="checkbox"/> STATUS : Inverter bus error (Fastcom Inv. Ctrl. 4 CPU1) (202)	<b>0.04</b>	<b>2</b>	<b>1</b>
PLE-02	0.04	2	1
<b>Total</b>	<b>49.06</b>	<b>25,614</b>	<b>148</b>

### Enercon alarm code YTD overview

#### Alarm with highest Duration

STATUS : Ice detection (Power measurement) (14)

#### Alarm with the highest Occurrences

STATUS : Shadow shutdown (Active (internal)) (4)

#### Alarm with the highest Lost Production

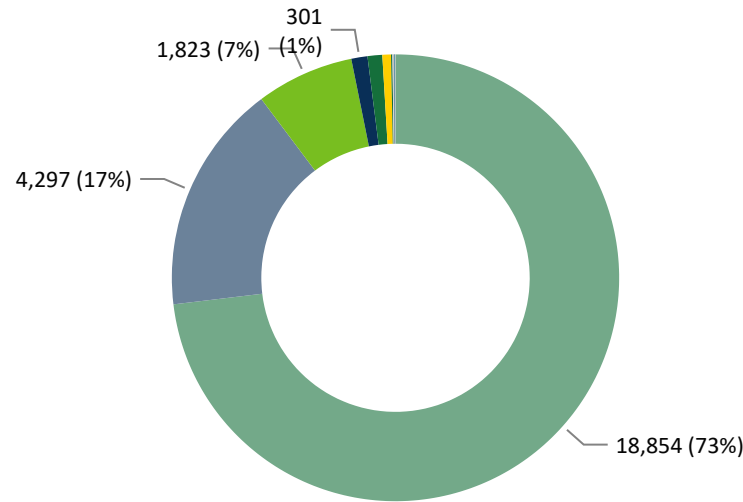
STATUS : Maintenance () (8)



## Windpark Koningspleij - Technical Condition (2)

Event List

### Events affecting the wind turbines listed by lost production



#### Events

- STATUS : Maintenance () (8)
- STATUS : Shadow shutdown (Active (internal)) (4)
- STATUS : Calibration of load control (0)
- STATUS : Cable twisted (Right (>3 turns)) (21)
- STATUS : Cable twisted (Right (2-3 turns)) (21)
- STATUS : Lack of wind (Rotor speed too low) (2)
- STATUS : Ice detection (SCADA (external)) (14)
- STATUS : Ice detection (Abandon nacelle positioning) (1...)
- STATUS : Inverter bus error (Inverter Control 12 CPU1) (...)
- STATUS : Overcurrent inverter (Cross short circuit invert...)

#### Major events

Nothing to be reported.

#### Others events

Nothing to be reported.



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**Windpark Koningspleij- Technical Condition (3)**  
Preventive Maintenance

Preventive maintenance per Wind turbine

Enercon has no planned maintenance to be executed for 2022.  
The maintenance planning is presenting activities to be performed in 2023.

	May 2022	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan 2023	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan 2024	
1160066											Windabhar 1. Hauptwartu											
1160067											Windabhar 1. Hauptwartu											
1160068											Windabhar											



**Windpark Koningspleij - Technical Condition (4)**

Other Visits

**Other visits - Unplanned visits**

Wind Turbine	Date	Full Comment
PLE-02	13/09/2022	WV 9850, corrective visit due to malfunction nacelle lightning.
PLE-01	22/09/2022	WV 9988, corrective vist due to hazard light issues.
PLE-02	22/09/2022	WV 9988, corrective vist due to hazard light issues.
PLE-02	26/09/2022	WV 10020, installed the visibility meter.

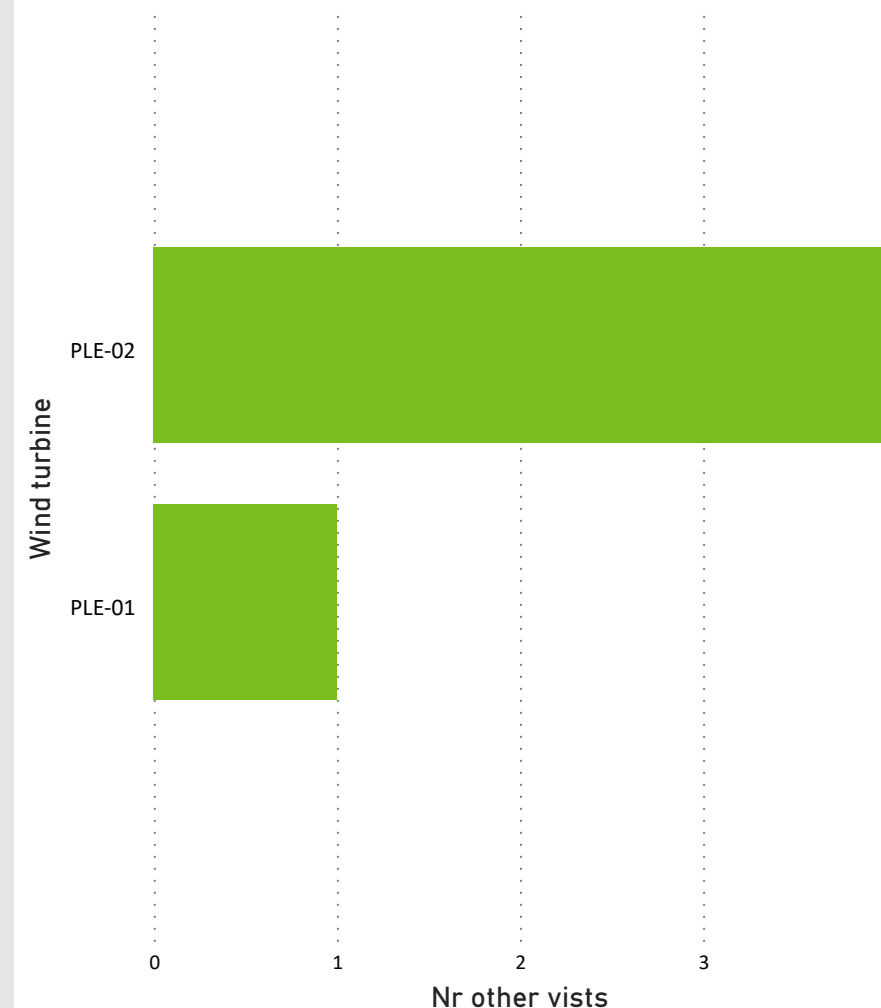
**Other visits (2) - Owner's requested visits**

Wind Turbine	Date	Full Comment
PLE-01	14/09/2022	Performed test of Topwind IPS system.
PLE-02	14/09/2022	Performed test of Topwind IPS system.
PLE-04	14/09/2022	Performed test of Topwind IPS system.
PLE-01	19/09/2022	WV 9932, OutSmart inspection and rotor blocking

**Other visits (3) - Wind turbine was operational**

Wind Turbine	Date	Description
PLE-01	26/09/2022	Enercon has inspected the roof module following the safety warning following found cracks in the support structure of the roof module of two EP3 EP3 turbines on the 15th of July.
PLE-02	26/09/2022	Enercon has inspected the roof module following the safety warning following found cracks in the support structure of the roof module of two EP3 EP3 turbines on the 15th of July.
PLE-04	26/09/2022	Enercon has inspected the roof module following the safety warning following found cracks in the support structure of the roof module of two EP3 EP3 turbines on the 15th of July.

**Rank Wind Turbine by number of other visits**



P1	Windpark Koningspleij - HSE
P2	
P3	<b>5 Health, Safety &amp; Environment</b>
P4	0 new events.
P5	
P6	<b>Incident / accident</b>
P7	No incidents/accidents to be reported.
P8	
P9	<b>Others</b>
P10	Nothing to be reported.
P11	
P12	
P13	
P14	



Windpark Koningspleij - Recommendations for Improvement

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P4

**Recommendations: production**  
No recommendation.

P5

P6

**Recommendations: availability / performance**  
No recommendation.

P7

P8

**Recommendations: health, safety & environment**  
No recommendation.

P9

P10

P11

**Recommendations: technical condition**  
No recommendation.

P12

P13

P14



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## Windpark Koningspleij - Action List

On the 14th of September was performed the test on Topwind IPS system. The result was satisfying.

### Contact Information

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**Windpark Koningspleij - PPA**

**Commissioning Phase**

Month	APX	APX weighted	Production MWh	Discount for Production	Final Production Price	Turnover Production	Consumption MWh	Consumption Premium	Final Consumption Price	Turnover consumption	GOO Quantity	GOO Price	Turnover GOO	Total Turnover
Jan-2022	189.10 €	€ 177.63	411.9030	0.91	€ 161.64	€ 66,581.11	0.032	1.05	€ 186.51	€ 5.97	411.94	€ 5.50	€ 2,265.64	€ 68,840.79
Feb-2022	168.37 €	€ 157.40	2049.2140	0.91	€ 143.23	€ 293,508.29	4.370	1.05	€ 165.27	€ 722.21	2,053.58	€ 5.50	€ 11,294.71	€ 304,080.79
Mar-2022	261.18 €	€ 257.48	1476.7280	0.91	€ 234.31	€ 346,007.17	3.725	1.05	€ 270.35	€ 1,007.07	1,480.45	€ 5.50	€ 8,142.49	€ 353,142.59
<b>Total</b>			<b>3937.8450</b>			<b>€ 2,118,283.75</b>	<b>8.127</b>			<b>€ 5,044.33</b>	<b>3,945.97</b>		<b>€ 65,108.54</b>	<b>€ 2,178,347.96</b>

**Pre-Operational Phase**

Month	Avg. APX Prices	CFSDE Provisional Factor	Improvement Factor	Final Production & Consumption Price	Production MWh	Turnover production	Consumption MWh	Turnover Consumption	GOO Quantity	GOO Price	GOO Turnover	Total Turnover
Apr-2022	195.20	0.785	0.00	153.23	2032.1240	311,388.20	2,233.00	342.17	2,034.36	€ 5.50	€ 11,188.96	322,234.99
May-2022	181.37	0.785	0.00	142.37	1348.7120	192,021.86	4,234.00	602.81	1,352.95	€ 5.50	€ 7,441.20	198,860.25
Jun-2022	210.55	0.785	0.00	165.28	1241.3910	205,181.89	2,668.00	440.98	1,244.06	€ 5.50	€ 6,842.32	211,583.24
Jul-2022	306.60	0.785	0.00	240.68	1022.7250	246,153.80	4,542.00	1,093.19	1,027.27	€ 5.50	€ 5,649.97	250,710.58
Aug-2022	447.06	0.785	0.00	350.94	968.8580	340,010.85	3,624.00	1,271.81	972.48	€ 5.50	€ 5,348.65	344,087.70
Sep-2022	341.88	0.785	0.00	268.38	1072.7940	287,911.21	3,758.00	1,008.55	1,076.55	€ 5.50	€ 5,921.04	292,823.69
<b>Total</b>					<b>7686.6040</b>	<b>10,171,696.44</b>	<b>21,059.00</b>	<b>27,867.41</b>	<b>7,707.66</b>		<b>€ 254,352.88</b>	<b>10,398,181.91</b>