



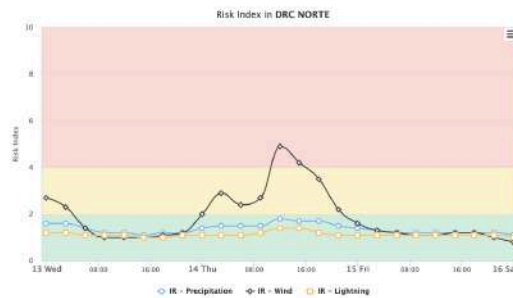
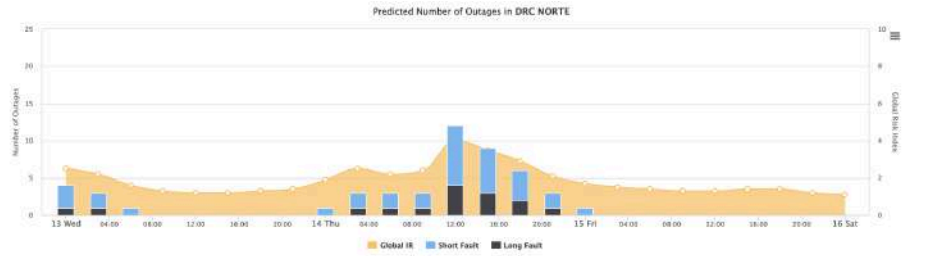
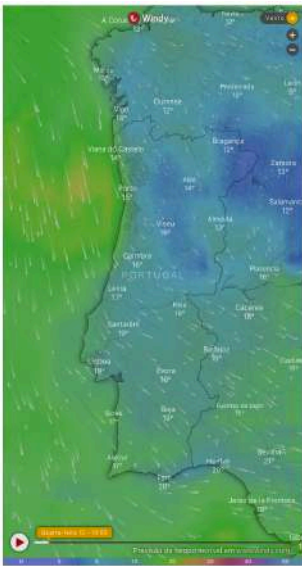
SMARTWATT
INTELLIGENCE

OUTAGE PREDICTION

AI AS A PRODUCT

WHAT?

Outage Forecast is a tool that delivers a risk index of the probability of outage on the electrical grid, identifying the number of faults and location.



Data	Long-duration outages probability				
	Nov 13 (1)	Nov 13 (2)	Nov 14 (1)	Nov 14 (2)	Nov 15 (1)
2019-11-13, 00h	47%	50%	3%	3%	2%
2019-11-13, 03h	52%	52%	0%	3%	2%
2019-11-13, 06h	75%	20%	0%	0%	0%
2019-11-13, 09h	80%	14%	0%	0%	0%
2019-11-13, 12h	87%	13%	0%	0%	0%
2019-11-13, 15h	80%	14%	0%	0%	0%
2019-11-13, 18h	83%	17%	0%	0%	0%
2019-11-14, 00h	80%	20%	0%	0%	1%
2019-11-14, 03h	40%	51%	3%	3%	2%
2019-11-14, 06h	57%	46%	4%	7%	1%
2019-11-14, 09h	45%	20%	0%	3%	1%
2019-11-14, 12h	4%	80%	3%	8%	0%
2019-11-14, 15h	27%	50%	23%	4%	1%
2019-11-14, 18h	39%	52%	6%	7%	0%
2019-11-14, 21h	53%	40%	0%	0%	2%
2019-11-15, 00h	89%	29%	1%	0%	0%
2019-11-15, 03h	80%	20%	0%	0%	0%
2019-11-15, 06h	82%	18%	0%	0%	0%
2019-11-15, 09h	90%	14%	0%	0%	0%
2019-11-15, 12h	84%	16%	0%	0%	0%
2019-11-15, 15h	82%	18%	0%	0%	0%
2019-11-15, 18h	62%	16%	0%	0%	0%
2019-11-15, 21h	80%	14%	0%	0%	0%
2019-11-16, 00h	88%	12%	0%	0%	0%

REAL OUTAGE FORECAST FOR 13-15 OF NOVEMBER, 2019, FOR NORTH OF PORTUGAL.

“ Outage Forecast was one of the first successful applications of Machine Learning techniques to an EDP Distribuição’s real challenge. The deployment of this project help us better understand the impact of weather conditions across all mainland Portuguese HV and MV grid, and by predicting the number of outages help us improving our work force management strategies and operational planning.

ENG. BERNARDO ALMEIDA
EDP PROJECT MANAGER
EDP – Portuguese DSO



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HOW?

Using Artificial Intelligence tools such as Machine and Deep Learning, allowed SMARTWATT to build an algorithm that performs the analysis of the following data sources: **historical weather data, orography of the area, topology of power lines and records of outages**. The grid was split from 100 to 100 meters and connected to weather forecast points.

The algorithm delivers the **risk index probability of electrical fault**, into the client's system or into a web platform, divided in short and long faults, number of clients in fault, reposition time and other relevant insights to better management.

IS IT ACCURATE?

This tool is being used in Portugal for 1 year, with 80 000 km of power lines, and for **85%** of the time the forecast matched with what happened in real time. It is also relevant to mention that for **99%** of the time, when there was an outage, the real events happened in the forecasted level or above.

85%
OF ACCURACY

MAIN BENEFITS

- ✓ Prevent the effects of the extreme weather events of the grid;
- ✓ Emergency equipments allocation;
- ✓ Grid Reliability;
- ✓ Work force allocation.