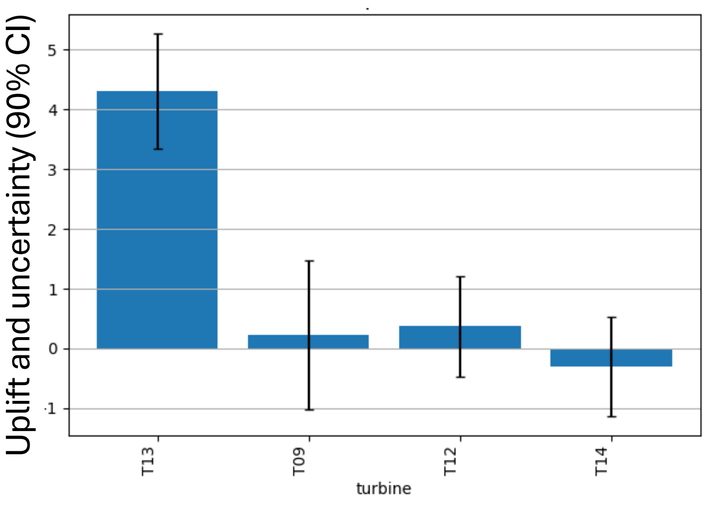
AeroUp + TuneUp = 5% uplift

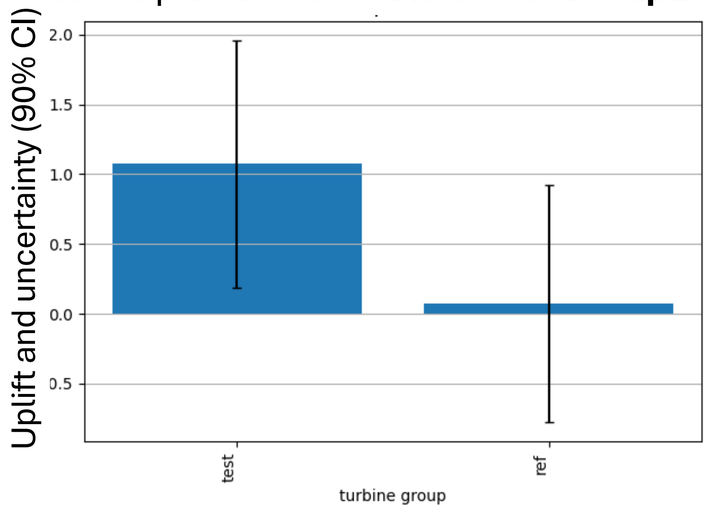
AEP uplift can be measured using only SCADA data.

Open-source dataset and AEP validation for wind turbine upgrades worth 5% AEP

AeroUp trial on T13: **4% uplift**



TuneUp trial on 9 test turbines: **1% uplift**



Intro

RES has developed a new, innovative method to measure the AEP uplift of wind farm enhancements: **wind-up**.

The method is applicable to a variety of upgrades and data options (turbines only, LiDAR, etc.)

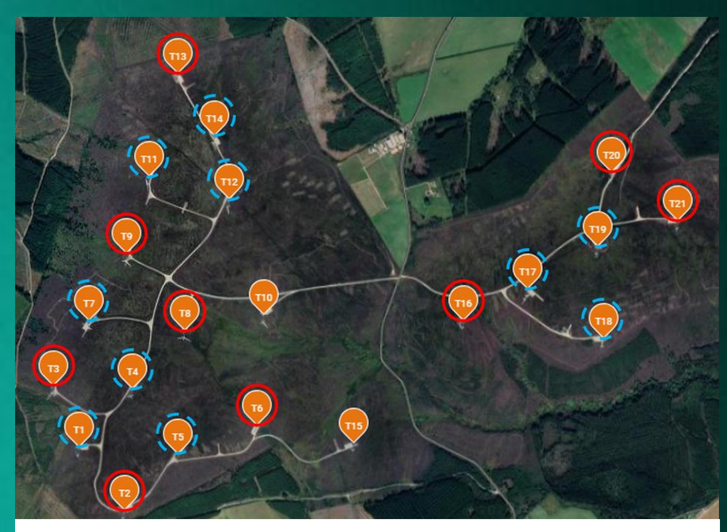
In this case study, **wind-up** is applied to 8 years of open SCADA data for Hill of Towie Wind Farm. Two upgrades occur in the data record (AeroUp in 2021 and TuneUp in 2024).

Methods

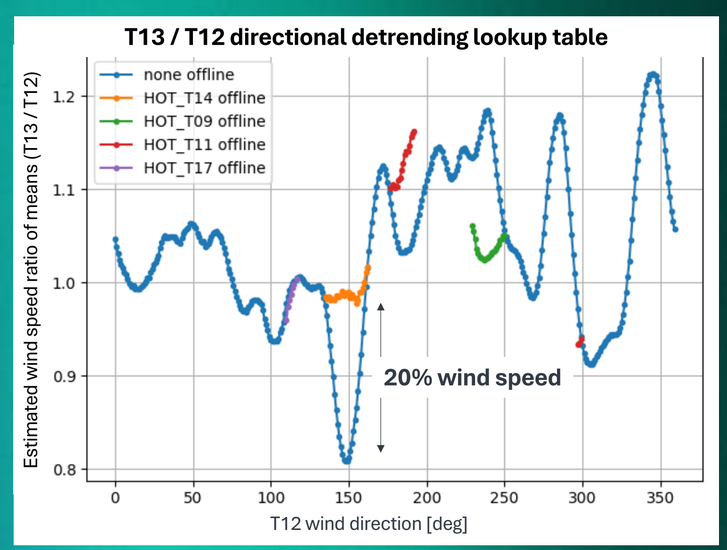
The open Python tool **wind-up** is used to process the SCADA to measure uplift and uncertainty. See the Github repo (QR code) for more detail.

Results

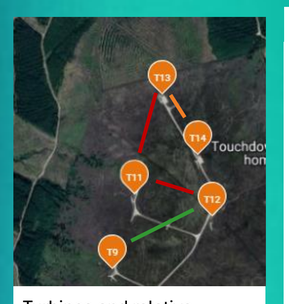
- AeroUp: P50 uplift of 4.3% with a 90% confidence interval of 3.3% to 5.3%.
- TuneUp: P50 uplift of 1.1% with a 90% confidence interval of 0.2% to 2.0%.



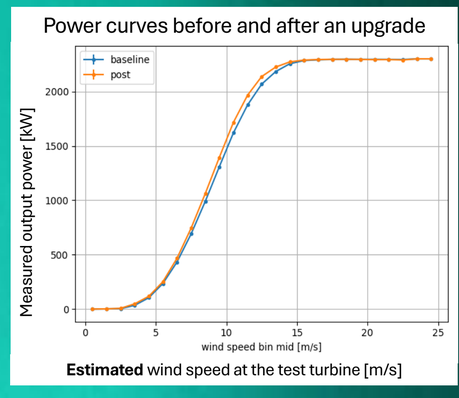
Hill of Towie **test turbines** and **references turbines** used for TuneUp uplift measurement.



Example of directional detrending using the wind-up Python package



Turbines and relative bearings in the directional detrending example



Thank you to TRIG for allowing us to make the Hill of Towie SCADA dataset publicly available!

Contact Info
Alex.Clerc@res-group.com
www.res-group.com/digital

Scan here to learn more

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