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Modelling and load assessment of the NREL15 MW wind turbine and comparison against 2B14

Description

2-B Energy has developed an innovative 6MW turbine for the offshore wind industry. By introducing a step-change in turbine size up to 14 MW and beyond, further cost savings can be obtained in the (electrical) infrastructure cost, installation cost and operation and maintenance cost. While in the past the 3-bladed rotors were ahead of the 2-bladed rotors, the today's difference is much less since issues like visual impact, noise, loads and energy output are compensated for by blade tip speed limits and smart control algorithms. Apart from that, the 2-bladed downwind turbine offers inherent technical advantages (e.g. weight reductions, installation benefits, pre-bend of blades, horizontal parking).

The National Renewable Energy Laboratory (NREL) has recently shared a reference design[1] for a 15 MW 3-bladed wind turbine. Reference wind turbines serve as open benchmarks that are defined with publicly available design parameters to be used as baselines for wind turbine designs.

In this study, we would like to ask you to make a detailed loads comparison to compare our designed 2B14 with the publicly available NREL15 MW reference turbine.

Tasks & Deliverables

- Understand the design philosophy of the NREL15 MW
- Modelling of the NREL15MW using aero-elastic codes (e.g. openfast, bladed)
- Run a (reduced) load set according to certification standards (IEC-61400) for both the 2B14 and the NREL15 MW
- Compare load results based on fatigue and extreme analysis
- Understand which design choices influenced these load differences and report on them

[1] Gaertner, E., Rinker, J., Sethuraman, L., Zahle, F., Anderson, B., Barter, G. E., ... & Viselli, A. (2020). *IEA wind TCP task 37: definition of the IEA 15-megawatt offshore reference wind turbine* (No. NREL/TP-5000-75698). National Renewable Energy Lab.(NREL), Golden, CO (United States).

Duration

Minimum of 3 months (full-time) as an internship. This project can possibly be transformed into a full graduation project in consultation with the University and 2-B Energy.

Requirements

- Self-starter and pro-active problem solver
- Knowledge in programming (E.g. C++, Python, Matlab)
- The candidate must have a good command of English, written and spoken

What Will You Acquire?

- Challenging and innovative work environment with an open culture where new ideas are welcomed and valued. *Independence, Creative thinking, Critical attitude*
- Dynamic working environment with high interaction among colleagues. *Practical skills*
- Working on sustainable product and exciting business plan. *Theoretical knowledge, Reporting, Presentation*
- A highly motivated multinational and diversified team. *Interpersonal, Time management*.

About 2B Energy

2-B Energy has developed an innovative 6MW turbine for the offshore wind industry. 2-B Energy was founded in 2007 and is active in the field of offshore wind energy. The company is well advanced with the design for a new concept for offshore wind power plants. The concept has been developed together with a reputable network of key partners in the industry and the first unit is assembled and installed in the first quarter of 2015 in Eemshaven, Groningen. The turbine has been fully operational ever since.

Interested?

Please write an e-mail to info@2benergy.com with the subject “Internship NREL15 MW” and include a resume as attachment.