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**Hochschule Flensburg Wind Energy Technology Institude**

University of Applied Science Research on wind Energy

**Advance Wind Farm Development, WiSe 2024/25**

Master’s degree in Wind Engineering, Flensburg, Germany

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# Introduction and Motivation

This report presents general information on wind farm planning area. The project was developed as part of the exam “Advance Wind Farm Planning” module within the Wind Energy Engineering Master’s Program at the University of Applied Sciences in Flensburg.

The shapefile already provided into exam, which shows the planned wind farm area, including all exclusion zones, so no need to consider distances to roads or boundaries. The tip height is limited to **200 meters**. Lidar measurements were taken at coordinates **548207 E, 6061864 N (UTM ETRS89 Z32).**

This report presents wind farm layouts for **Vestas V150-4.5MW** and **Enercon E-147 EP5 E2 5000** turbines, considering maximum hub height limit. The layouts follow a minimum spacing of **5 RD** in the main wind direction and **3.5 RD** perpendicular. Two versions are created: baseline layouts without flicker and noise constraints and optimized layouts with these considerations. The goal is to maximize energy output while meeting spatial requirements.

# Methodology

# Wind Farm Development

## Baseline layout without flicker and noise requirements

## Flicker and noise compliant layout

# Optimization

# Results

# Recommendations for Future Research

# Conclusion

# References

# Appendix