

# Linear Wind Power Plant

*M. R. Hansen<sup>1</sup>, and S.S.W. Sørensen<sup>1</sup>*

<sup>1</sup>DTU Electro, Technical University of Denmark  
S081927@student.dtu.dk and s080247@student.dtu.dk

## ABSTRACT

Through time there have been numerous ideas in which we can harvest wind energy. Today the most widespread method is the horizontal-axis wind turbine (HAWT). 50 years ago a patent was made for the first linear wind power plant (LWPP). Since then the LWPP has been subject to many improvements. No ideas have been commercially realized yet, but this project will prove if the concept is technologically possible.

A possible implementation of a LWPP could consist of a 10km long closed track with 180 degree turns at each end. Along the rail several carriages, each carrying a 100m vertical wing, are able to move freely. The distance between the carriages and the maximum speed should be around 100m and 100km/h on the straight parts and less in the turns.

A linear generator/motor is split between the rail and carriage, where the linear stator is integrated in the rail track and each carriage contains a part of the rotor. After each turn the carriage needs to be accelerated to nearly 100km/h and before a turn the carriage needs to be decelerated to around 40km/h. The acceleration/deceleration of each carriage is controlled by adjusting the electrical power input/output of the converters related to the carriage. When the system is fully build the theoretical output is 100MW, which corresponds to around 40-50 average sized onshore HAWTs.

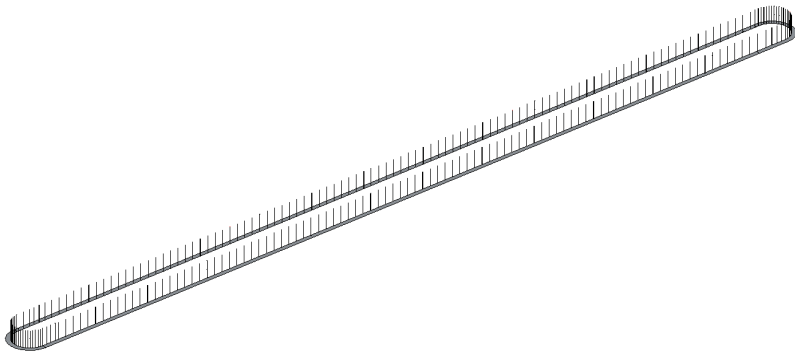


Figure 1 Bird's eye view of the linear wind power plant.  
The vertical lines are the carriages with wings.