

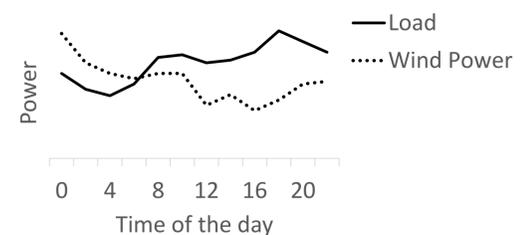
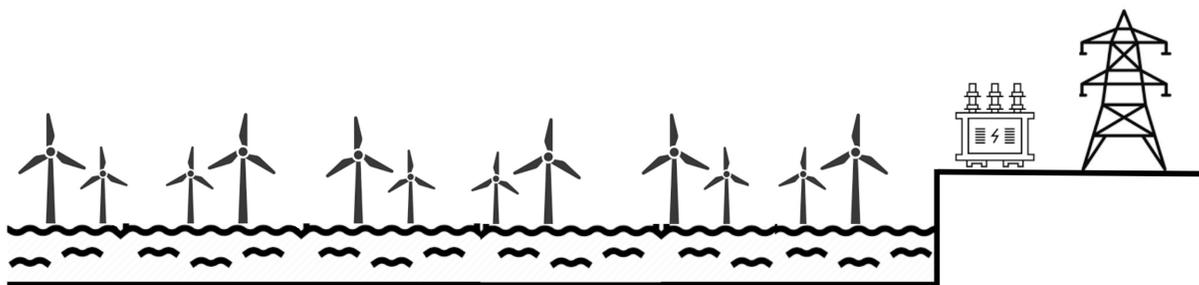
# Advent of Energy farms for reliable power supply

**Viswambher**  
AWEP - Wind Energy  
Supervisors: Simon Watson  
Dominic von Terzi  
Michiel Zaayer  
V.Kambhampati@tudelft.nl



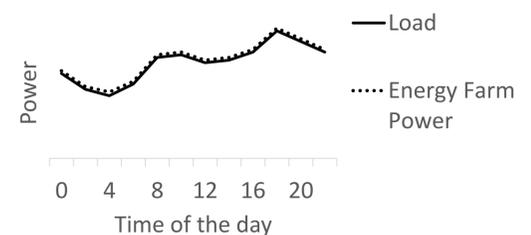
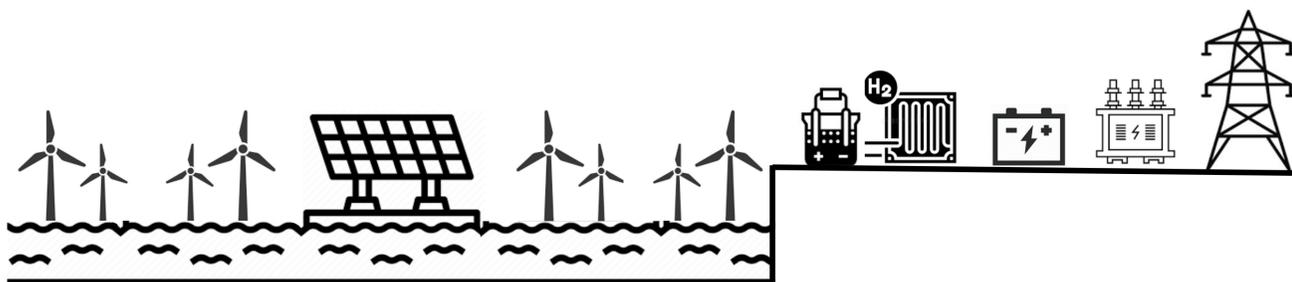
## Conventional Wind Farms

A wind farm is a group of wind turbines in the same location used to produce electricity. It is one of the cleanest forms of energy generation that helps us combat the global warming challenges. However, wind energy is intermittent in nature and can not produce electricity on demand. Below we can see a sample offshore wind farm and a graph of daily electricity demand and wind energy production. Until early in the morning wind energy production is greater than load and falls below later in the day. Keeping the load and generation equal at all times of the day is the major challenge we face in stepping towards a greener future.

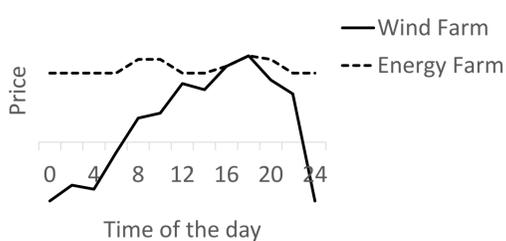


## Crosswinds Hollandse Kust Noord Hybrid Energy Farms

CrossWind, a joint-venture between Shell and Eneco, is developing the Hollandse Kust Noord offshore energy farm project. CrossWind and its partners are exploring multiple innovations designed as shown below to address the intermittency challenge. Through these innovations, an offshore energy farm could be capable of providing more constant electricity regardless of the wind conditions as shown below.



## Market Value of Energy



With the advent of innovative energy farms which include a conglomerate of technologies such as offshore windfarms, floating solar, battery and hydrogen storage technology, not only does the reliability of power supply increase but also the market value of the wind energy increases as shown in the plot

## My PhD research

Develop a Multidisciplinary Design Analysis and Optimisation (MDO) framework to evaluate the options to maximise market value of offshore wind energy.