

# TWIND Summer School Presentation

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Craig White

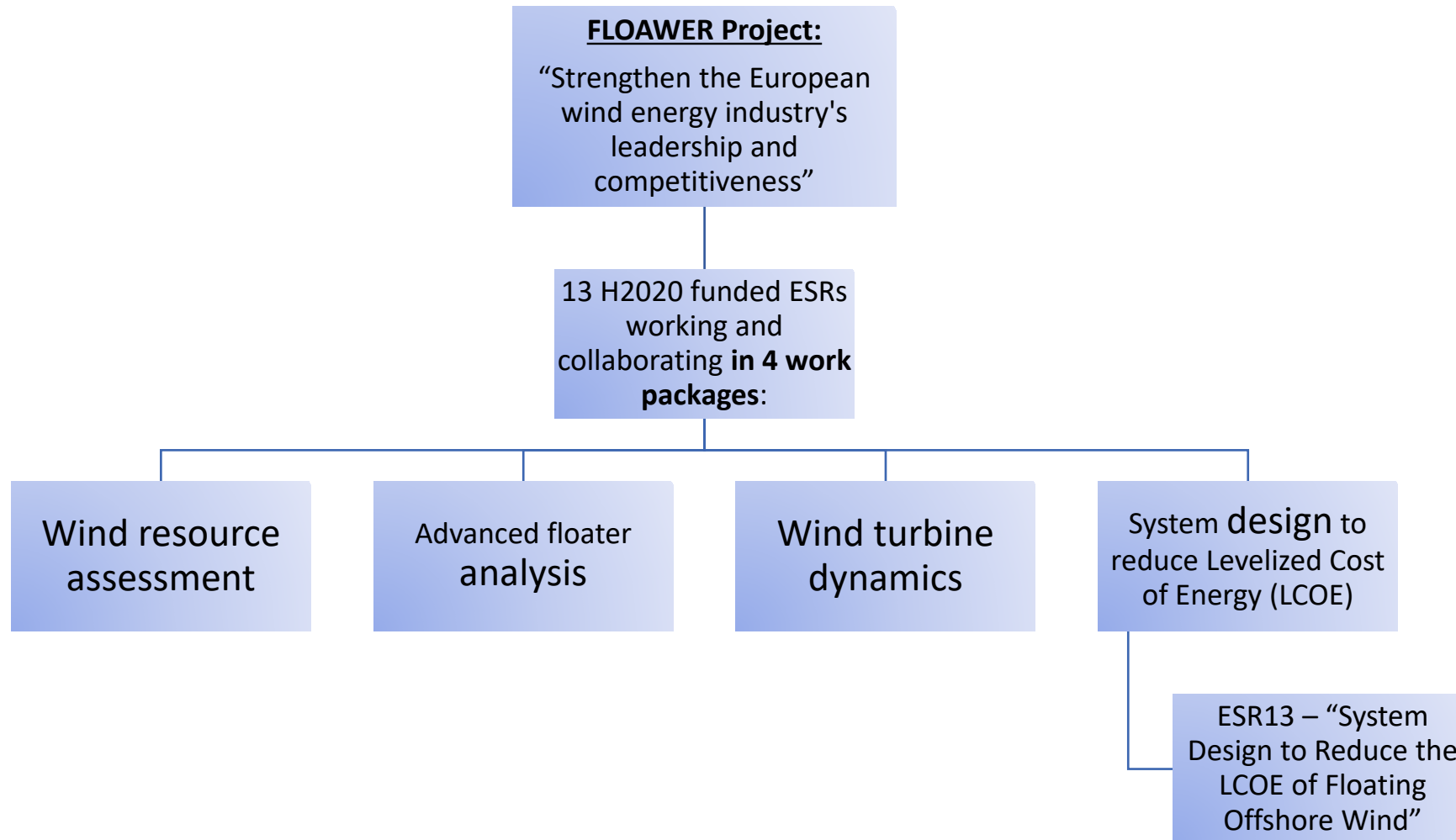


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- Name – Craig White
- Nationality – British
- From – London
- Lived – Salisbury
- Studied - MSc Renewable Energy Systems Technology, Loughborough University, United Kingdom (2016-19):
  - Comprehensive analysis of the mathematical and engineering principles behind all renewable energy generation
- Worked - Swansea University Engineering, Wales, United Kingdom (2018-19):
  - Research position in solar modelling:
  - Programming and database management
  - Computer-aided design of innovative solar buildings, with energy yield assessment.







Goal: Assess FOW projects

Solution:

## Techno-Economic Model

- Inputs:
  - Global wind and site data (COPERNICUS)
  - Cost database data
  - Any TRL level and technology
  - Project economic environment
  - Numerical codes from other FLOWER ESRs
- Processes:
  - Optimisation
  - Automation
  - Production method.
  - FOW installation and O&M tool
- Outputs:
  - LCOE / SLCOE/ NPV / IRR
  - Numerical data for other ESRs / WPs



Goal: Comprehensive cost database

Solution:

## Cost database

- Components
  - All costing scales
  - Material and process costs
  - Material efficiency
  - Logistics and supply chain
- Method:
  - Outreach campaign to OEMs
  - Project collaborations
  - Define boundaries for cost ranges



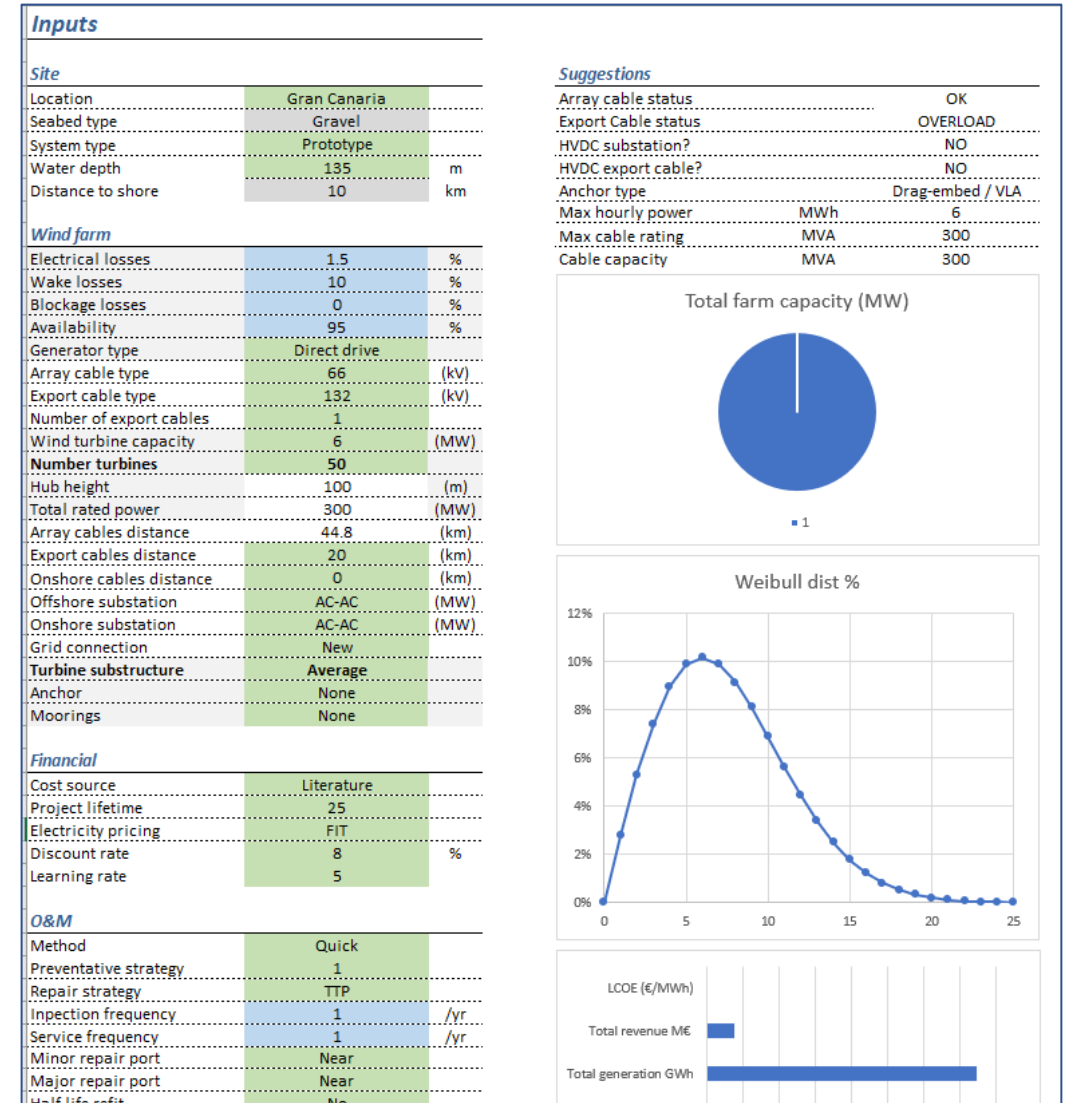
Goal: Deliver of system design to minimize the LCOE

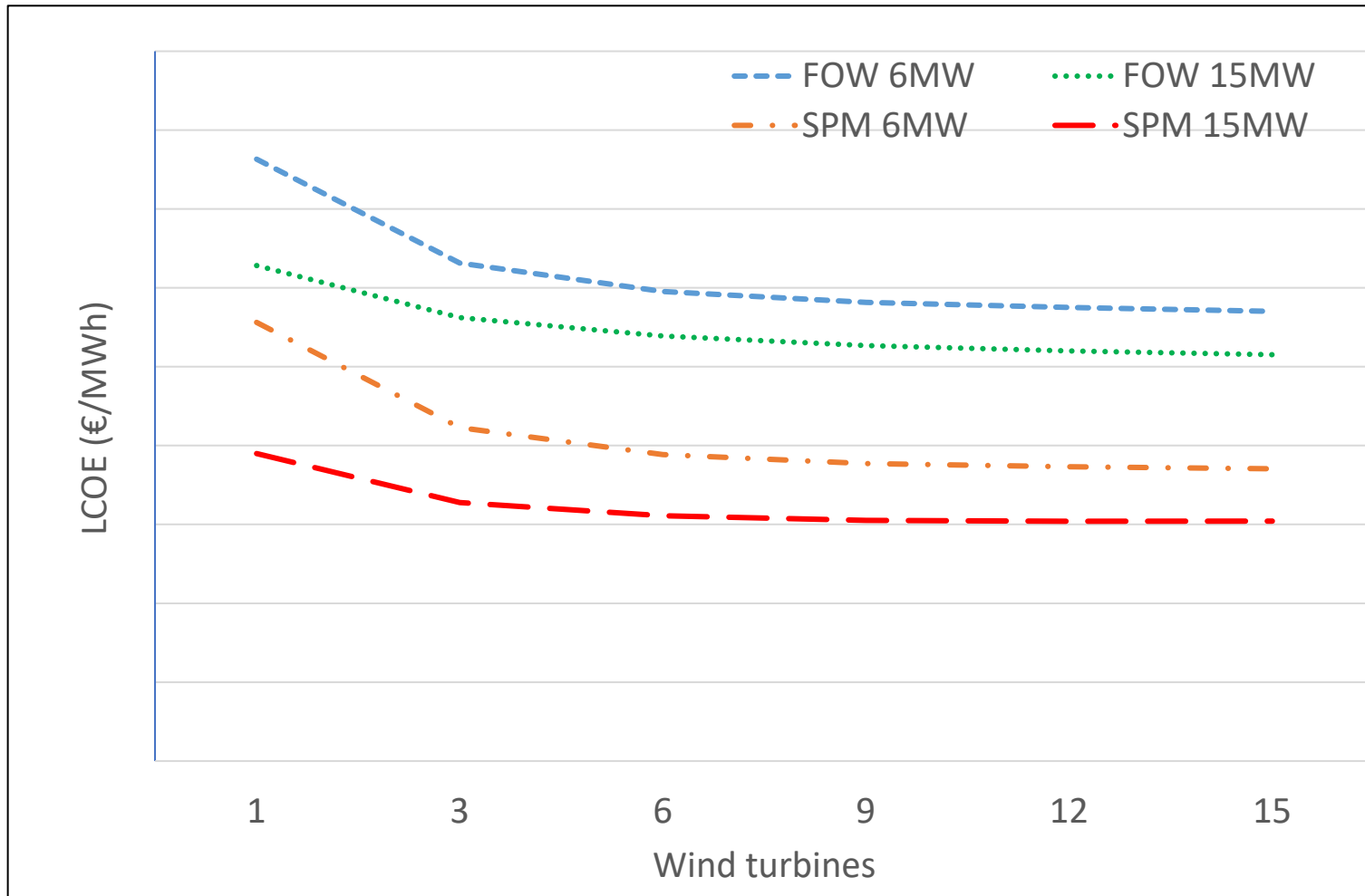
Solution

## System design

- Develop optimised turbine for given site, O&M strategy, TRL
- Through optimisation of sub modules
  - Maximise – generation module
  - Minimise – Cost module

- What I have done so far:
- Development of two TEMs to assess:
  - Hybrid offshore wind-hydrogen project. Highlights: An optimised design found that maximises project value.
  - Prototype floating concept in deployment in Canary Islands. Highlights: Mooring method analysed to establish cost-risk benefit.
- Design of detailed operations and maintenance (O&M) tool for floating devices and farms
- What I am about to do:
  - Build comprehensive cost database
  - Translate developed TEM into Python, align with numerical codes developed in other ESR projects





### Highlights:

- LCoE reduction from 1 – 15 turbines:
  - FOW 6MW 25%
  - SPM 6MW 33%
  - FOW 15MW 18%
  - SPM 15MW 22%
- LCoE reduction from FOW to SPM:
  - 6MW 33%
  - 15MW 41%

Thank you, any questions?



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