



# Should wind turbines get bigger?

SPOILER: IT DEPENDS!



M.K.MEHTA

Flow Physics & Technology

Wind energy

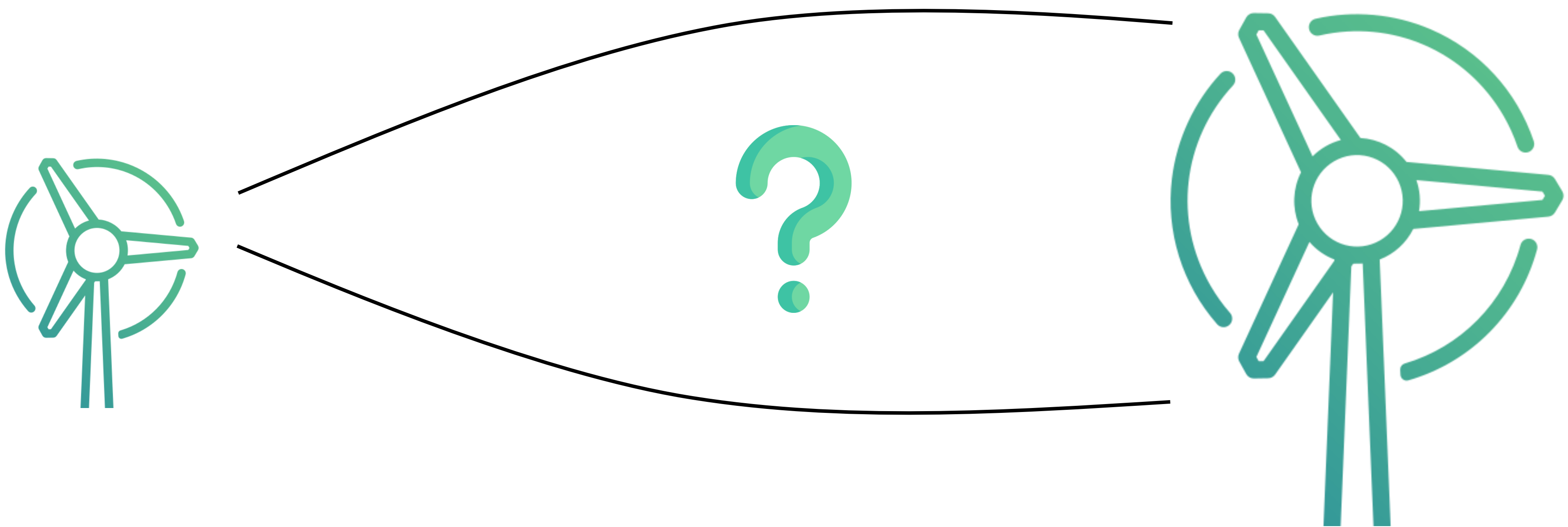
M.K.Mehta@tudelft.nl

## Wind turbine upscaling for offshore wind farms



### Research Objective

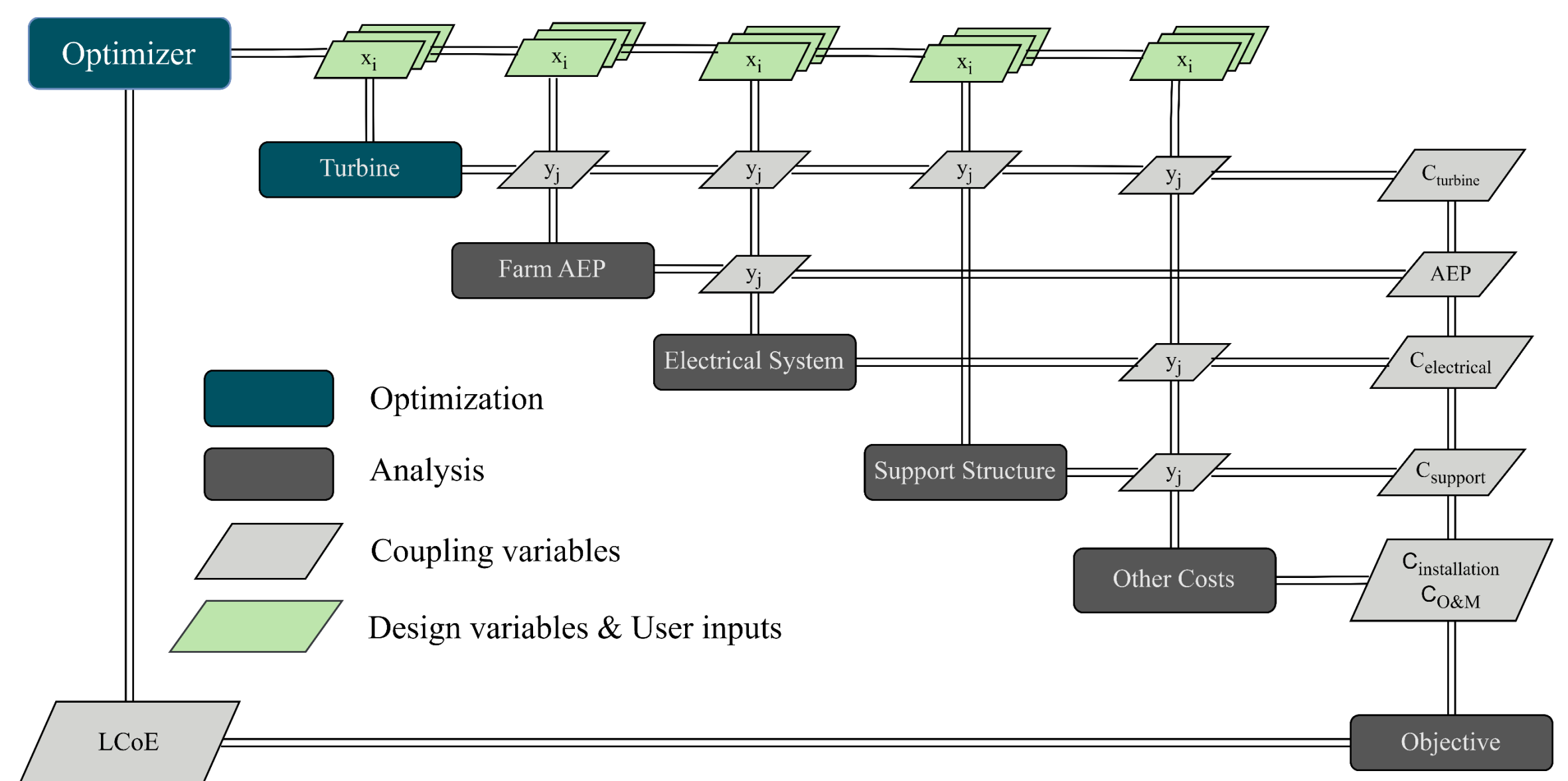
The objective of this study is "**to explore how turbine design impacts various elements of an offshore wind farm, and identify how various uncertainties, design inputs, and problem formulations drive the optimum turbine design.**"



### Design Framework

Tightly coupled Multi-disciplinary Design Analysis & Optimization (MDAO) framework to capture all the interactions in an offshore wind farm.

$$LCoE = \frac{CAPEX + \sum_{n=1}^L \frac{O\&M_n}{(1+r)^n}}{\sum_{n=1}^L \frac{AEP_n}{(1+r)^n}}$$



### Results

Optimum turbine size sensitive to:

- ☐ Objective function
- ☐ Wind farm problem formulation
- ☐ Rotor, O&M model uncertainties
- ☐ Wind speed, Farm power inputs

