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FP7-ENERGY-2011
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SEVENTH FRAMEWORK
PROGRAMME

Challenge

1. Improve profitability / viability of offshore energy generation
2. See 1

In answer to the FP7 Call ENERGY.2011.2.3-2: Development of design tools for Offshore Wind farm clusters

Researched the main hurdles to overcoming this challenge

HOW to reduce costs, improve profitability / viability?

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Objectives

- Increase energy / cost ratio
    - Reduce construction costs
    - Reduce maintenance costs

- Improve ancilliary service provision

- Facilitate transition of research to real life (application)

SEVENTH FRAMEWORK
PROGRAMME

Realisation

- Research areas

- Partners

- Useful outcomes

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Research areas

- Resource/Flow/Wake modelling

- Electrical topography modelling/costing

- Fatigue load modelling

- Intelligent control modelling –
  at design and operational phases

- Measurements –
  Validating models
  Measuring success

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Partners

- 3E

- ECN

- ForWind (Univ. Oldenburg, Hannover &Bremen)

- REpower

- RWE Innogy

- Imperial College London

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Useful outcomes

Now 2 core objectives:

- Design toolbox

- Operational toolbox

Validation required for both

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Design toolbox

- Development & integration of flow models

- Calculate fatigue loads (varying turbine modes)

- Calculate cabling/topography costs & operating costs (maintenance)

- Many cases with simlpe models, few cases with complex models

Operational toolbox

Selects optimum turbine setting at any time given :

- Fixed topography

- Current met. Measurements

- Current turbine states

- Detailed pre-computed simulation results

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Validation

Optimum design hard to validate. Comparison with existing farms where data is available (CAPEX/OPEX)

Optimum operational setting technically not so hard to validate:

- step-wise implementation of research (1 turbine, several, half park, park)

- Comparison to other turbine production

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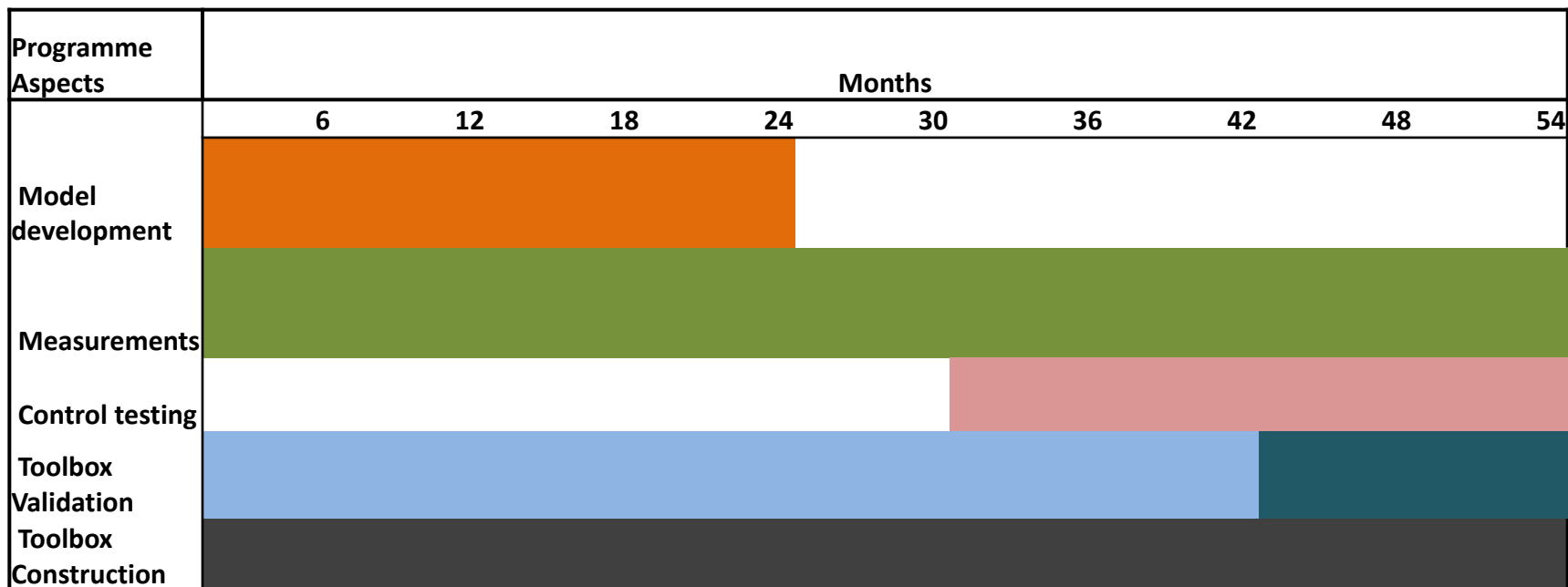www.cluster-design.eu

Innovatation

2 consortia answered same call. ClusterDesign includes:

- Less models

- Consideration of loads

- Intelligent (operational) turbine control

- Open MDAO format to ensure model interchangability

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SEVENTH FRAMEWORK PROGRAMME

Timeline

Programme Aspects	Months								
	6	12	18	24	30	36	42	48	54
Model development									
Measurements									
Control testing									
Toolbox Validation									
Toolbox Construction									

Validation throughout entire process, but intensive toolbox validation in darker period.

Conclusions

Objectives :
- Increase energy / cost ratio
- Improve ancilliary service provision
- Facilitate transition of research to real life (application)

Industry feedback :
- Any additions/comments that could benefit the project outcomes to realise the overall challenge.