

ECOFYS



sustainable energy for everyone



XEMC DARWIND



Benchmarking of innovative O&M propositions

Windkracht 14

Keep on running session

23/01/2014

Eneco - Darwind - Ecofys - Jean Grassin

What is happening in offshore wind O&M?



Vessels / Helicopters

Transfer systems

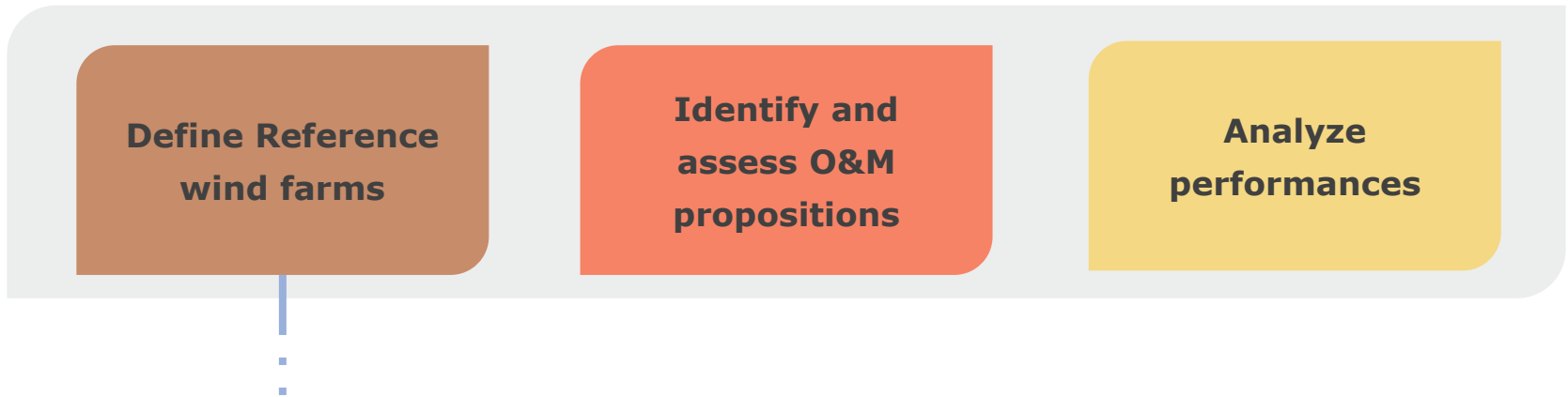
Floating accommodations

Wind turbine improvement

Goal of the study

Provide a quantified overview of the costs, benefits and risk of a range of innovative O&M propositions on a range of benchmark wind farms

Approach



- > 6 reference wind farms
 - 3 sizes: 100MW, 300MW and 900 MW
 - 2 distance to harbour: 30km and 100km

Approach

**Define Reference
wind farms**

**Identify and
assess O&M
propositions**

**Analyze
performances**

. Focus on three harbour based access strategy

1. Standard Crew Transfer Vessel (base case)
2. Larger Crew Transfer Vessel
3. Large Crew Transfer Vessel fitted with small offshore access system



. Focus on three Accommodation vessels based strategy

1. Accommodation vessel (70m) operated with RIB/CTV
2. Accommodation vessel (70m) fitted with large gangway access system
3. Larger accommodation vessel (90m) fitted with large gangway access system



Also: analysis of 3 different wind turbine types

Approach

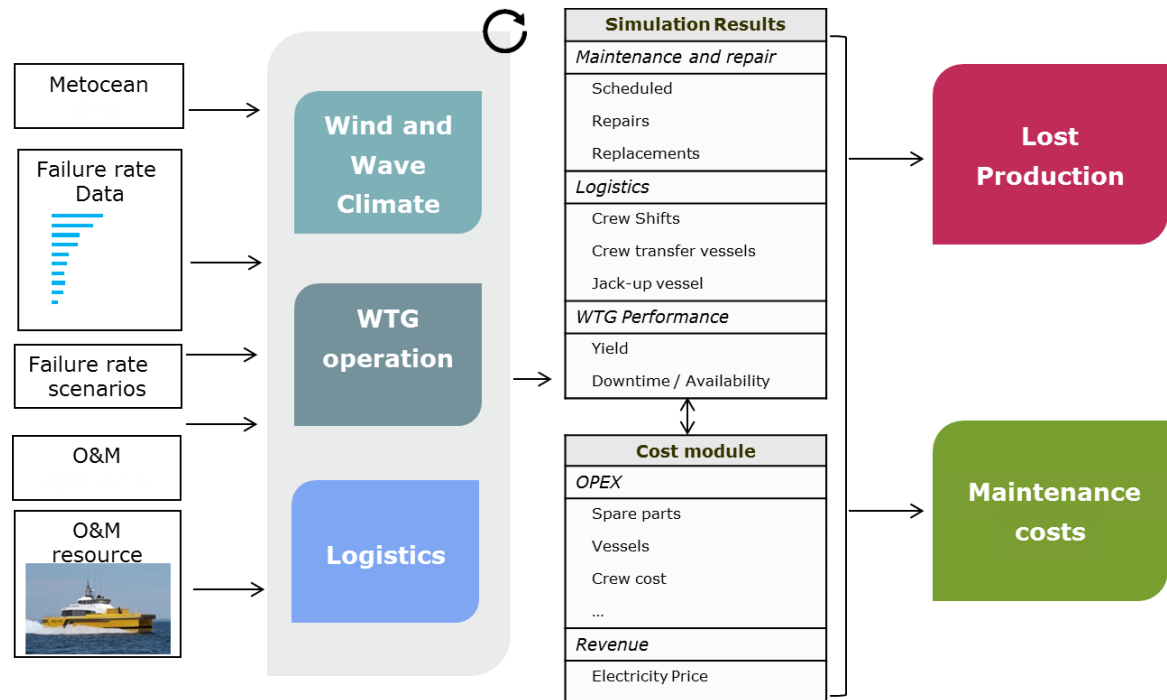
**Define Reference
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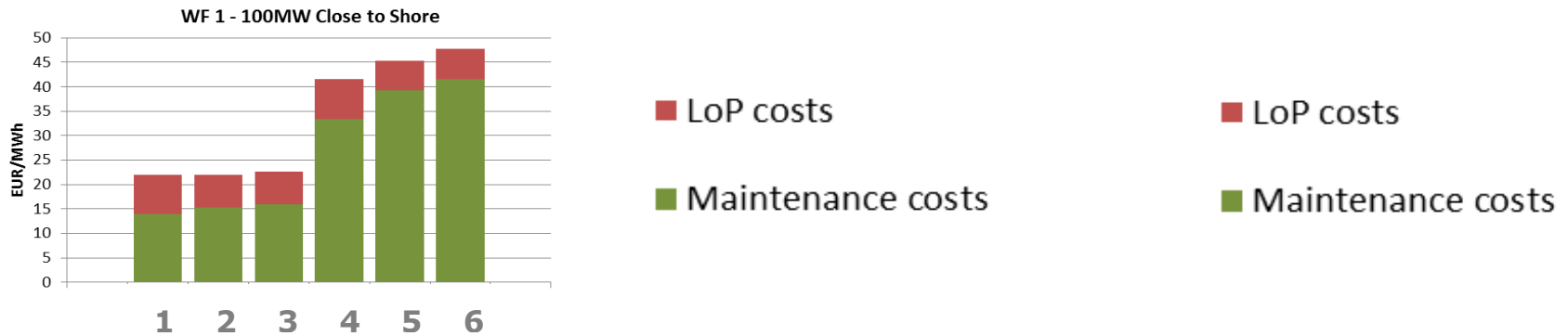
- Fed with actual failure data based on operational offshore wind farms
- Based on Ecofys experience in O&M package management
- Verified on a number of offshore wind farms (PAWP, OWEZ)

ECOFYS O&M MODEL



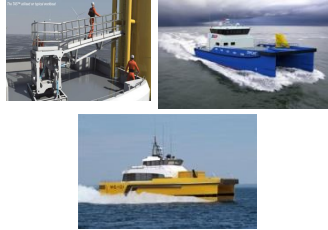
Results

- 1. Crew Transfer Vessel (CTV)
 - 2. Larger CTV
 - 3. Larger CTV with access system
 - 4. Floating accommodation (FA)
 - 5. FA with gangway
 - 6. Larger FA with gangway
- REF: Business as usual for WF1 – cost observed as of today



Conclusion - Discussion

- > What solutions?
- > For what impact on O&M Combined costs?

	100MW	300MW	900MW
Close to Shore	<p>- 0-5%</p> 	<p>-10%</p> 	<p>-15%</p> 
Far from Shore	<p>+ 100%</p> 	<p>+20%</p> 	<p>-15%</p> 

Thanks