Laborelec
RESEARCH & INNOVATION

ADVANTAGES AND SYNERGIES OF ARRAYS IN OFFSHORE ENERGY

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ENGIE

ICOE INTERNATIONAL CONFERENCE ON OCEAN ENERGY
OCEAN ENERGY EUROPE
Donostia / San Sebastián 2022

Laborelec in a nutshell
60 years of expertise and experience

Laborelec
RESEARCH & INNOVATION

ENGIE Laborelec was created in 1962 by major players in the Belgian electricity sector with the aim of pooling the multidisciplinary expertise needed to:

- **Carry out operational research programmes** to meet the challenges posed by technical and technological developments in the energy sector and to secure competitive advantages.
- **Support the operation and maintenance of electricity generation, transmission, distribution, storage and utilization assets**, by providing both technical consultancy and expertise support in the field.

New Energy Sources

- **Solar Lab**
- **Wind, Hydro & Marine Lab**
- *Hydrogen Lab*
- *GeoEnergy Lab*
- **Green Thermal Generation Lab**

Digital & Enabling Technologies

- *Computer Science & AI Lab*
- *Sensors & Nano Lab*
- *Energy System Simulation Lab*
- **Advanced Materials Lab**
- *Robots & Drones Lab*

New Usages

- **Future Collectivities & Home Lab**
- *Future Building & Cities Lab*
- *Future Industry Lab*
- **Energy Storage Lab**
- **Smart Grids and Cyber Security Lab**
- **Green Mobility Lab**
- **CO2-as-a resource Lab**
- **Lighting & Urban solutions Lab**
- *Sociology & Environmental Impact Lab*
- **Water & Chemistry Lab**

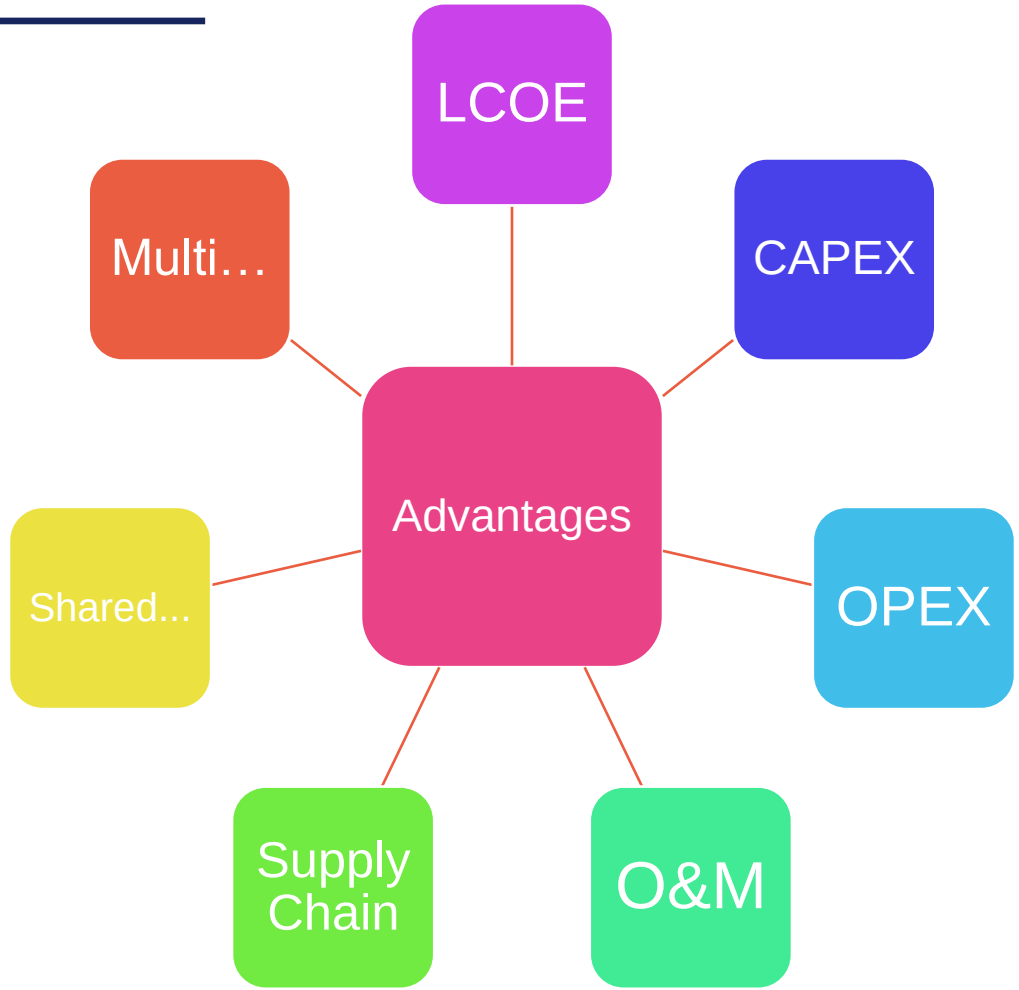
A series of Labs to support innovation and operational research over all dimensions of the electricity value chain.

ENGIE

01

From one to many

From one to many



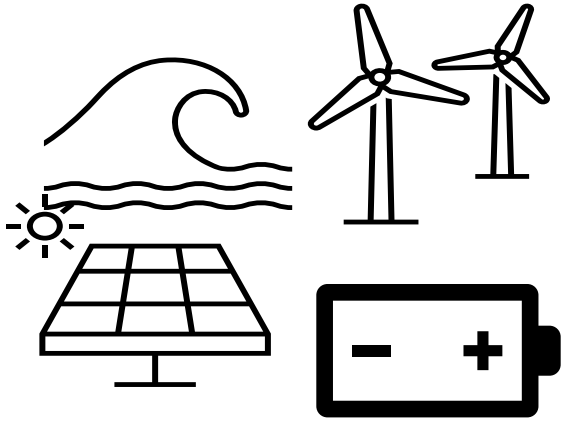
But more concretely…

02

REX Offshore Wind

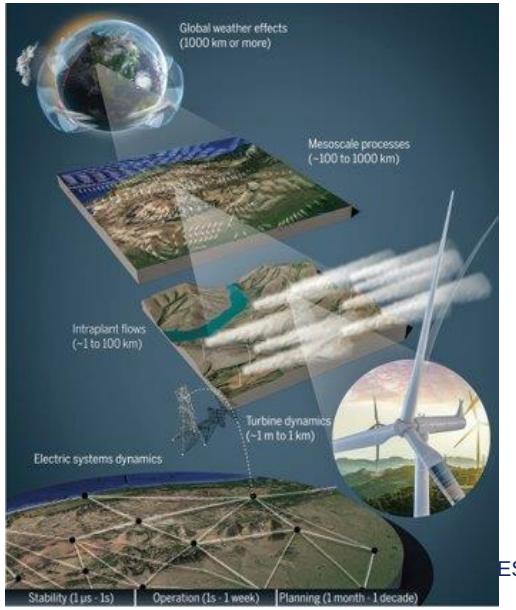
Latest developments in offshore wind arrays

Wind farm Control



Hybridisation

Fleet notion & canibalisation



Mesoscale effects

03

REX Marine Energy

3.1

Selected projects – focus on electrical aspects

REX Marine

- Vlaio - BE-VLAIO-DBC-2019
  2019 - ongoing

- CORPower
  2021

- Horizon Europe LCE-02-2015 – Grant 654438
  2016 - 2018

3.2

FORWARD2030

FORWARD2030

Green Deal LC-GD-2-1-2020 – Grant ID 101037125
2021 - ongoing

FORWARD2030

FORWARD2030

Fast-tracking Offshore Renewable energy With Advanced Research and enabling a pipeline of 2030MW of tidal energy before 2030

In short, FORWARD2030…

- To advance the commercialisation and rollout of tidal stream energy FORWARD2030 has five overall objectives:
  1. Reducing Levelized Cost of Energy (LCOE) of 25 %,
  2. Enhancing environmental and societal acceptance
  3. Enhancing commercial returns and energy system integration (with battery storage and green hydrogen production and other renewables)
  4. Reducing life cycle carbon emissions by 33% from 18 gCO2 eq/kWh to 12gCO2 eq/kWh
  5. Complete the industrial design and develop the manufacturing and supply chain for volume rollout

Facts & Figures

- 7 partners: Universities and companies from 6 countries
- 4-year project, starting Q4 2021.
- Total budget of the project : €27,9M; Total funding of the project: €21,5M

Consortium

ORBITAL MARINE POWER

EMEC THE EUROPEAN MARINE ENERGY CENTRE LTD

SKF

UCC Coláiste na hOllscoile Corcaigh University College Cork, Ireland MaREI Energy · Climate · Marine

THE UNIVERSITY of EDINBURGH

Laborelec RESEARCH & INNOVATION

FORWARD2030

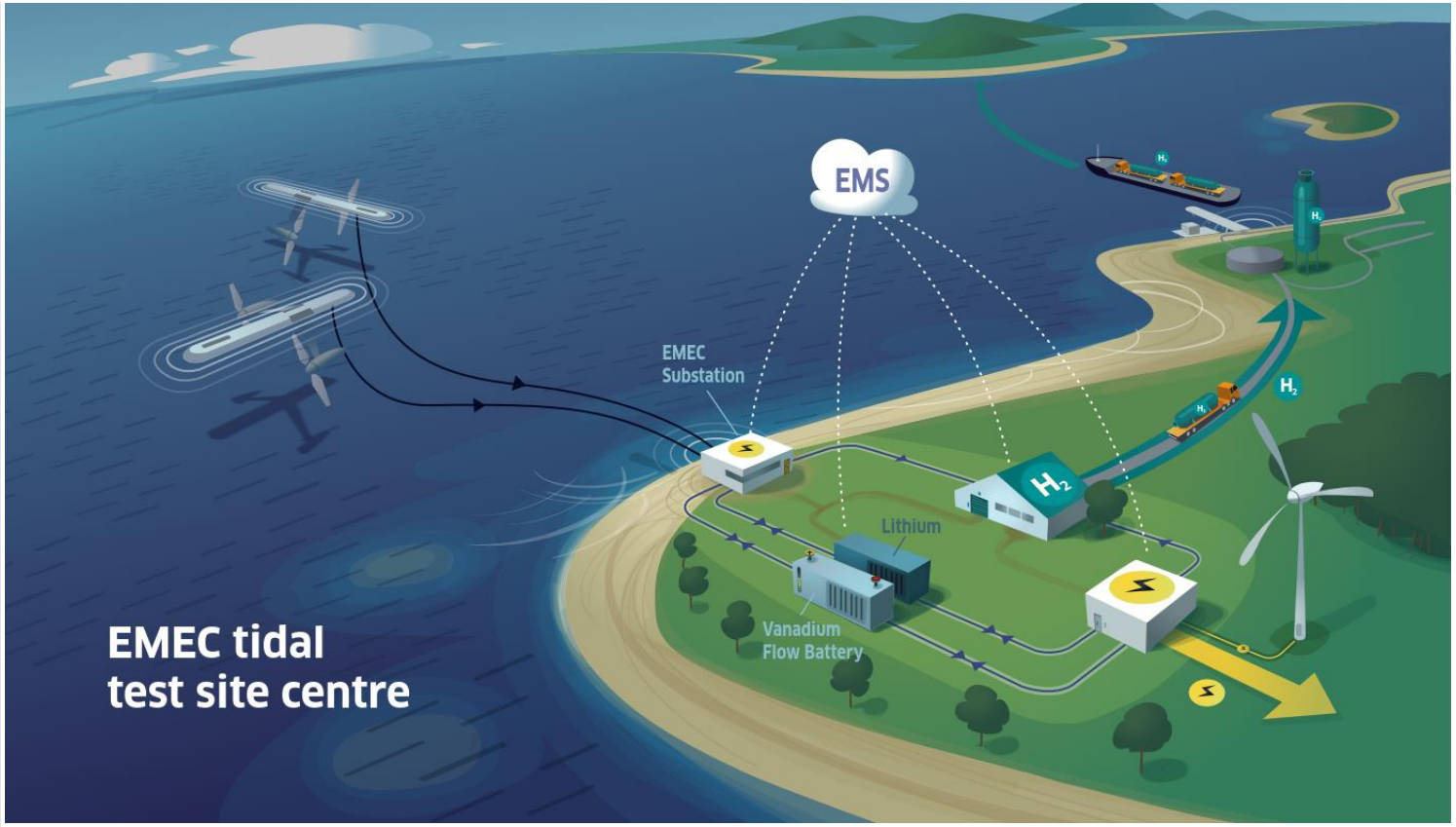
FORWARD2030

Fast-tracking Offshore Renewable energy With Advanced Research and enabling a pipeline of 2030MW of tidal energy before 2030

Laborelec's role

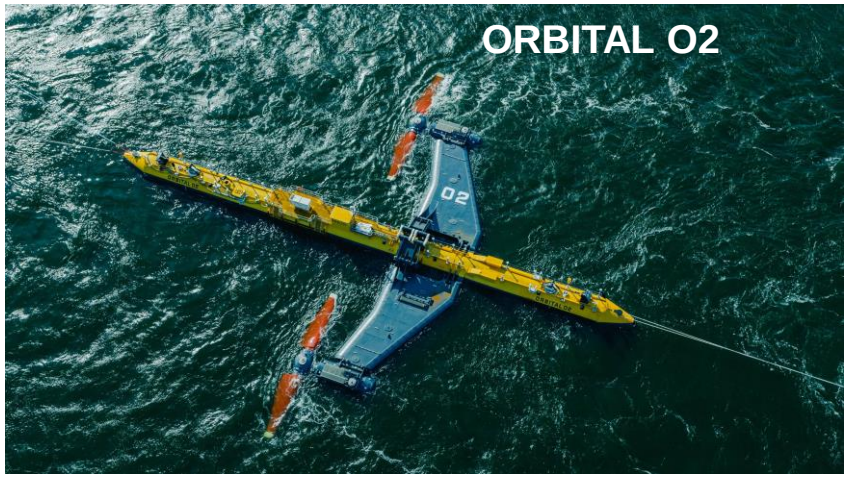
- Grid integration (multi-RES, multi-storage)
- EMS development
- Selection, sizing, purchase, installation and monitoring of an additional storage system

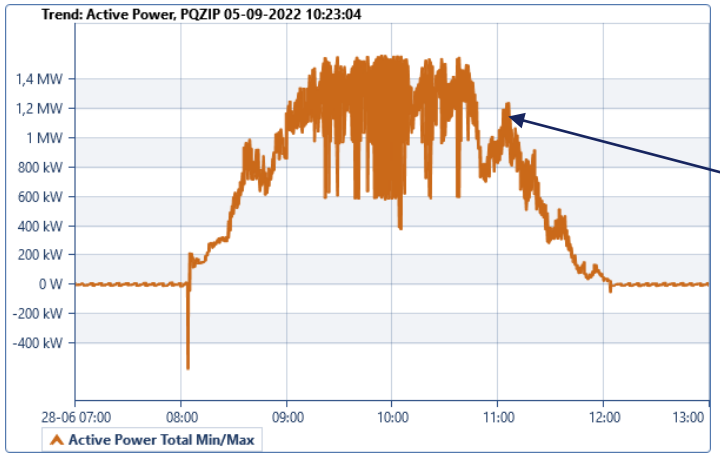
- *Monitoring of the generator and frequency converter*
- *Development of a current signal analysis for tidal energy*
- *Point of view of a Utility and Project Developer : Industrialisation, Scaling, LCOE, etc.*



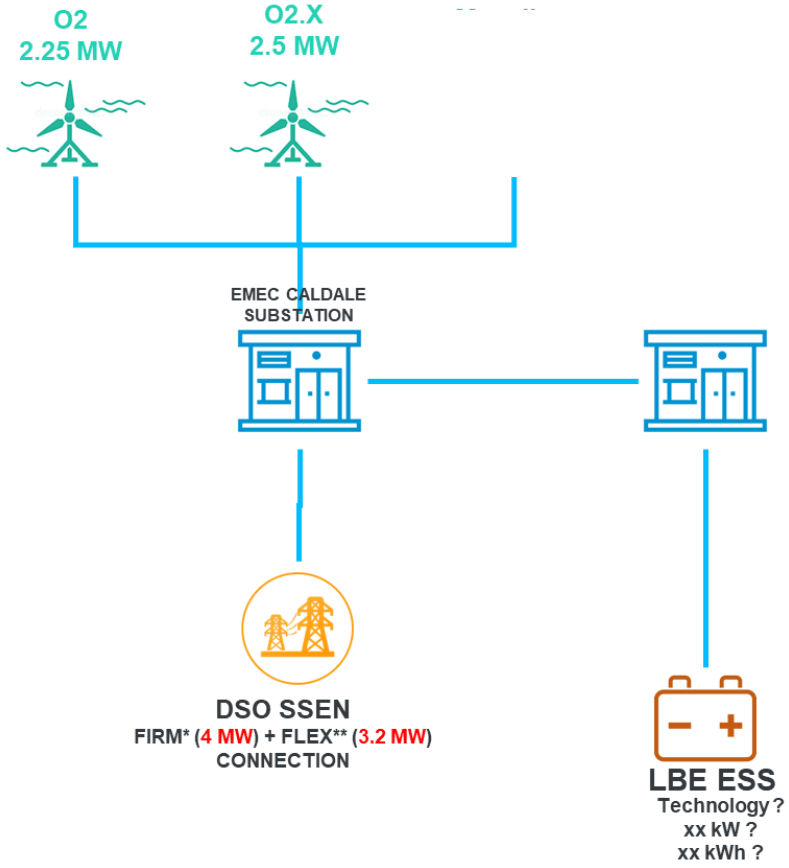
FORWARD2030

Laborelec's scope – focus WP6





High active power fluctuations

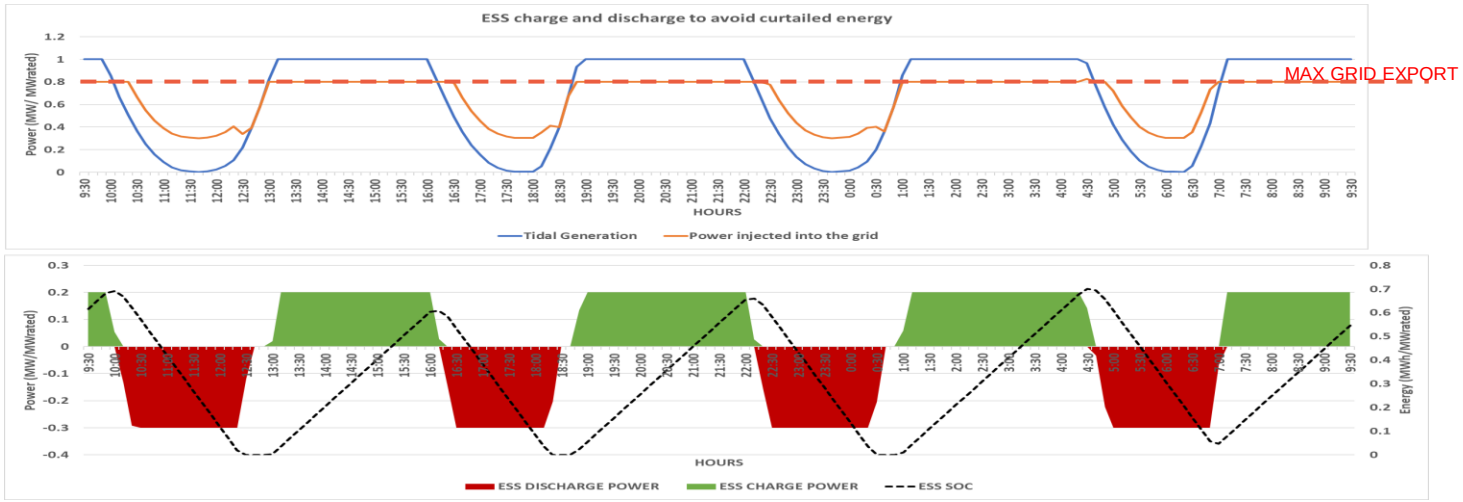


FORWARD2030

Laborelec's scope – focus WP6

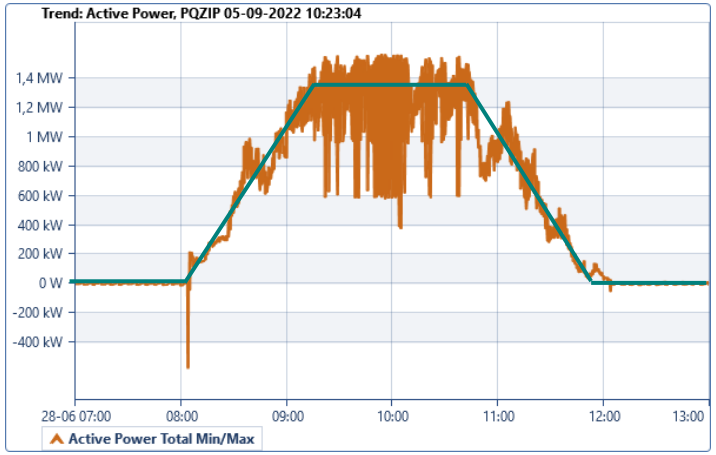
FORWARD2030

USE CASE 1
limit grid connection capacity



ESS (700 kWh, 300 kW) used to limit the grid connection capacity (1MW of tidal turbine for a 800 kW connection) – 24 hours during spring tide

USE CASE 2
shave fast active power fluctuation



04

Key Take Aways

Remember


NEW CAFE
ROCKS!
SUCCESS
What's NEXT?
Talk with "Marketing Developer"
BE HAPPY
PASSION NEVER FAILS!
Coffee Break!
Exchange MONEY
TIME
Thanks for helping me!
"WORK" MORE · TALK · LESS
8.30 11:00
Focus on Concepts!
NEW PROJECT
Operations
HARD WORK BEATS TALENT!
WORRY LESS
GOALS
Goal!
BE HAPPY!
Cheer UP!
TAX
TODAY IS YOURDAY!
DON'T BE LATE
Fight!
Hit Target
OMG!
BE BOLD !!!
PLANT NEW CACTUS
WORK SMART!!
IMAGINE
DONT FORGET TO PAY TAX
DON'T FORGET TO BE YOURSELF!
Do your Best!
WORK HARD PLAY HARDER
Coffee??
WE CAN!!!
GAY PRIDE
POSITIVE THINKING
LOVE WHAT YOU DO!
NEXT TRIP
THIS IS THE DAY!
MARATHON @ 9 AM
DO it!
Hey!
FOLLOW UP
BILL PAYMENT !!!
TAKE A BREAK
CALL PAM @ 6PM
NEW IDEA
To do list
What's NEXT?
DAILY REPORT!
LIVE IT UP
MAKE YOUR MOVE
BUSINESS MEETING
INTERN STUDENTS
Life is short choose HAPPINESS
DONT BE LATE!
Balance
Clients
PASSWORD 1234
DON'T AGET 2 CALL BABE
VDO CONFERENCE W/ ROB!
LOADING 70%
Strong
MAIL SCHEDULE !!!
BETTER THINGS ARE COMING!
HAPPY
YEAH
TRUST
FOCUS
FITNESS TRAINER
NEW
POSITIVITY
TIME
the BEST!
TIME & MONEY

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