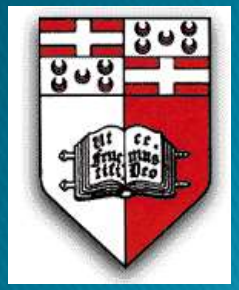
BLUE OCEAN ENERGY® project

Luciano Mule'Stagno

ISE Conference 2013



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- Malta lacks the space to implement (many) large scale renewable energy projects.
- Only real-estate we have abundant supply of is ocean with a depth of >50m
- Suitable for:
- Wave Energy
- Floating Wind turbines
- Floating PV

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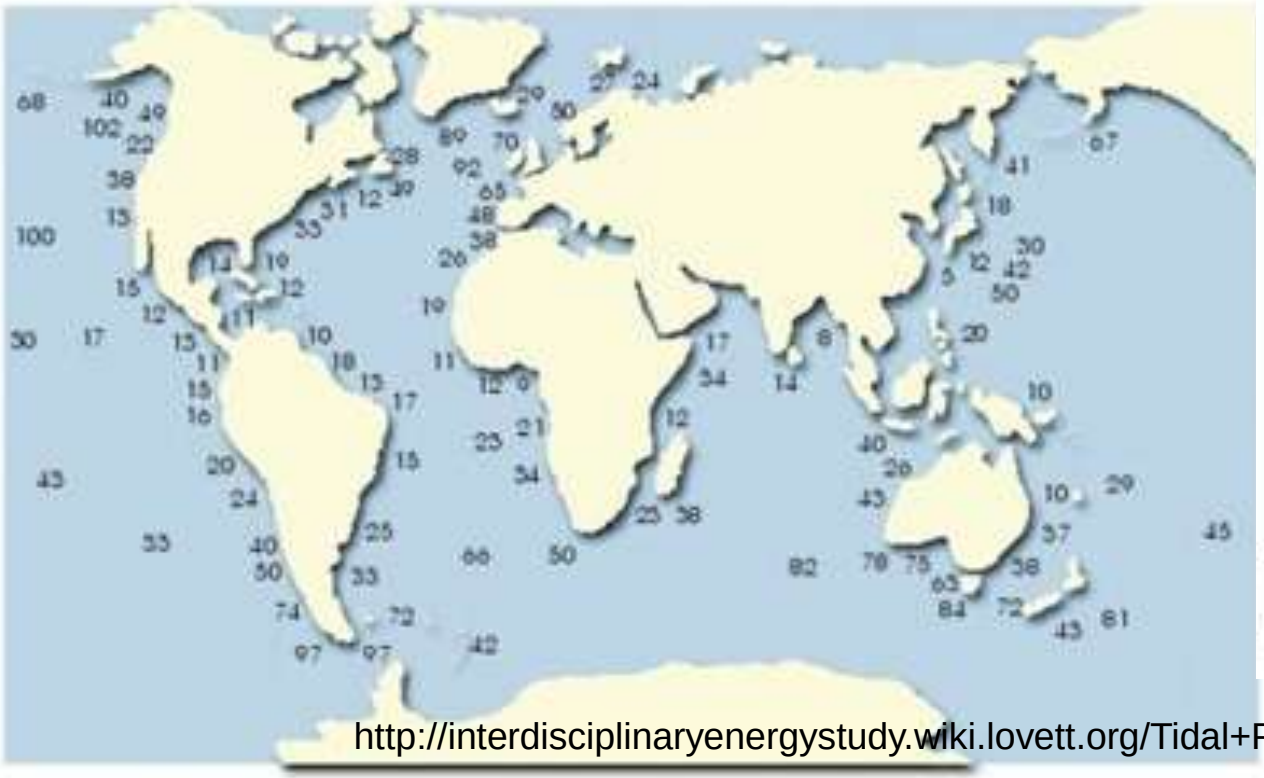
- Just as in the case of wind the resource is not the same everywhere



http://interdisciplinaryenergystudy.wiki.lovett.org/Tidal+Power

Wave Energy

- Malta's Potential

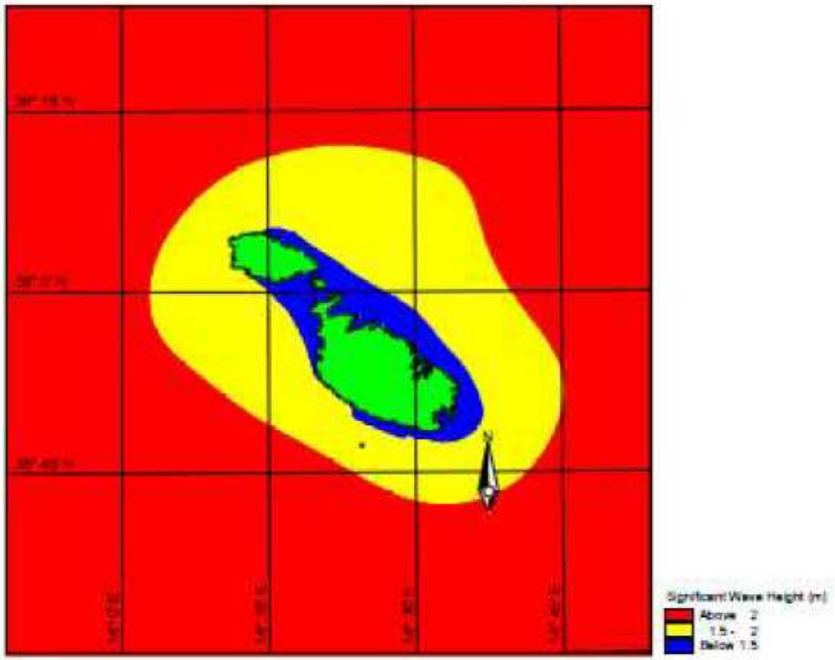
Table 3: Locations of the data collection points [18].

Point A	14.3°E, 35.75°N	North of Malta
Point B	14.7°E, 36°N	East of Malta
Point C	14.3°E, 36.25°N	South of Malta
Point D	13.9°E, 36°N	West of Malta

Table 4: Percent exceedance of significant wave height [18].

Percentage exceedance of offshore significant wave height at Points A-D. Annual period of operation.

Significant Wave Height	Percentage Exceedance			
(m)	Point A	Point B	Point C	Point D
0	100	100	100	100
0.5	68	69	68	70
1	38	38	38	39
1.5	20	21	20	21
2	11	11	11	12
2.5	6	6	6	6
3	3	3	3	3
3.5	1	1	1	2
4	1	1	1	1
4.5	0	0	0	0



Scott Wilson 2003 report for MMA

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- The Dexawave system consisting of two rigid pontoons hinged down the middle with a hydraulic power take-off system placed in between.
- A simple design should result in a low Cost of ownership and robust system.
- Being a floating device it can be operated in deep waters which is suitable for Malta.
- A prototype device was also being tested in Denmark

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- Funded by MCST 2010 R&I Grant

- Partnership between
- DEXAWAVE Energy Malta Ltd.
- UoM Institute for Sustainable Energy
- IOI-Malta Operational Centre, UoM.

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- AIMS of the Project

a. accurately gauge wave energy resource and use it to refine numerical model
b. Determine the suitability of the Dexawave converter and correct sizing for Maltese waters.
c. Assess suitability of location
d. Design a linear generator for the converter.

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- Converter was launched off Marsascala in early summer 2011
- Project in collaboration with The Dept. of Industrial Electric Power Conversion to design a linear generator to replace the current hydraulic system started.

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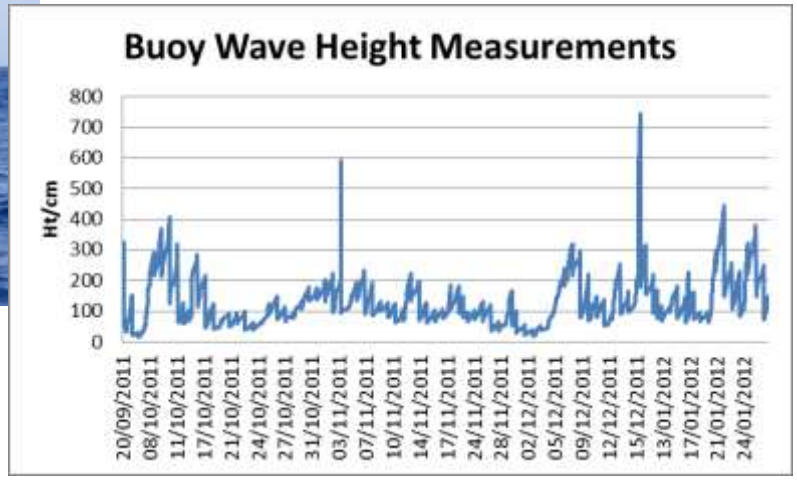
- Buoy was launched 2km off the NW of Gozo in and IOI-MOC has been collecting data since Sept 2011.



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- Various impact assessments were carried out including a study of the seabed in the area identified, and other preliminary investigations with aid from Enemalta and MEPA.
- Discussions with MMA
- Discussions with fishing interests in the area

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- **Results**
- Based on the wave energy resource it was concluded that a point absorber type converter would be more appropriate for Maltese waters.
- A linear generator is being designed for such a converter that would be suited for Maltese conditions

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- **Results**
- The wave resource at location has now been mapped for 18 months giving us much better information and allowing IOI-MOC to refine their model for the whole region
- Suitable area off Zebbug, Gozo has been identified as having an ideal seabed for anchoring and no protected species.
- Area was also cleared in terms of fishing and shipping

Future Work

- Seek funding for a design, testing of a point energy absorber
- Investigate the option to generate pressure (eg. For reverse osmosis plant) rather than generate electricity.