



Image courtesy of Aquamarine Power Ltd

Developing Ocean Energy Technology

TIP Ocean Energy

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Developments in Ocean Energy Technology

Where are we now?

Where do we want to go?

How will we get there?

Where are we now ?

GROWIAN 1980 – 1988

90 Mio DM ~ 75 Mio €

100m tower – 100m rotor diameter

340 ton nacelle

3MW capacity

“ We built GROWIAN to proof that it cannot be done!”

Source: Spiegel 24 1985



Source: <http://www.heiner-doerner-windenergie.de>

Will Ocean Energy develop similar to Wind Energy Industry ?

We are still at an early stage

6MW installed capacity in Europe in 2014!

GROWIAN is still seen as the ignition of wind power in Germany

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Wave & Tidal Energy not a back yard business!!

10 - 50 Mio Euro to get first reasonable full scale prototype in the water

Do we have enough experienced professionals?

Young industry – young professionals

Engineers – Researchers - Scientists

Lack of past experience!

Oil & Gas sector is experiencing the same – offshore engineers retiring

“ We have very few left, who know how to do it!” (NCE2013)

Industry is competing for the same pool of (young) professionals



Image courtesy of EON

We can (need to) do it all!?

Device developers need to fulfill a wide spectrum of roles / duties to get device into the water:

Financing

Technology

O&M

Environmental aspects

Construction

Foundation

Substructure

Rotor/nacelle/reacting body

PTO

Electrical & Monitoring

Grid connection

Small companies compared to task!!

Where do we want to go?

**Linking knowledge
and transferring skill
& expertise across
sectors & disciplines**

- Naval architecture
- O&G Offshore sector
- General power generation
- Smart components and composite materials
- Power control – F-One
- Economy of scale – wind?
- ...



Image
courtesy of
IBERDROLA

Where do we want to go?

**Incorporating
environmental
issues at an early
stage**

- Involve licensing agencies
- Get expert advice from environmental scientists
- Get public involved
- and test your device for these issues



Where do we want to go?

Developing a sectorised industry

- Resource assessment
- PTO
- Substructure
- Foundations
- **strong supplier backbone!**



Image courtesy of Aquamarine Power Ltd

How will we get there?



Tackling the skill shortage!

- Graduate school
- Postgraduate training & education
- Dedicated degrees



Provide access to testing facilities



Develop closer links between research institutions and industry



Providing a longer term vision for ocean energy sector

- Clear funding strategy
- Facilitate development & selection
- Political will to develop this sector