MANAGING LONG TERM AND CAPITAL INTENSIVE PRODUCT DEVELOPMENT THROUGH PARTNERSHIPS

ANDERS KØHLER • MAY 21ST 2016
AGENDA

1. Who are Floating Power Plant A/S and why are we here?
2. Our Market
3. Our Technology
4. What are the companies key challenges for commercialization?
5. Our strategic approach
6. Experiences with developing in strategic partnerships
7. Next steps for FPP
8. Questions
WHO ARE FLOATING POWER PLANT?
WHO ARE FLOATING POWER PLANT A/S

The basics
• A Danish non listed limited company
• Develops the worlds only offshore proven combined wind and wave device
• A pre-revenue company

Funding and capital structure
• Total funding till date ~13 mill €
  – Private equity ~ 9,4 mill €
  – Energy fund ~2,6 mill €
  – Public co-funding ~1 mill €
• 120+ shareholders
WHY ARE WE PRESENTING HERE?

• We have strategically chosen to develop our technology in a “pure” partnership model

• The experiences and lessons learned from this may inspire some of you on how you develop your companies and technology

• To learn and hopefully some of you will challenge our approach and thoughts

• You are welcome to ask question during the presentation
**FIXED FOUNDATION WIND BECOMES NON FINANCIAL FEASIBLE AT OVER 45 METER WATER DEPTH**

Offshore wind installations are moving further away from the shore and into deeper waters, creating a need for floating foundations. Wind parks commissioned for 2016 or later are being pushed to water depths beyond 45 metres.

Water depths beyond 45 metres require new foundation technologies, i.e. floating foundations.

**Source:** 4C Offshore; WTG Partners
In Europe, approximately 80% of the combined resource is located in water depths of greater than 60m.
SUITABLE GEOGRAPHIES FOR FPP’S PLANTS

Note: the numbers on the map express the wave energy potential at the specific site – the higher the number, the greater the potential (kW/m wavefront)

Current focus

Area of interest
OUR TECHNOLOGY
All future commercial devices will facilitate only one wind turbine, whereas P37 was installed with 3 turbines. The turbines are in correct scale and are heavily instrumented to validate MW models and MW load cases.
FLOATING POWER PLANT DEVELOPS THE WORLD’S ONLY OFFSHORE-PROVEN, GRID-CONNECTED WIND AND WAVE POWER PLANT.
**P80 facts**

- 80 meters wide
- up to 2.6 MW wave power
- up to 5 MW Wind
- Minimum water depth 45 m
- 33-(66KV) KV AC joint wind - wave grid connection
LEVELIZED COST OF ENERGY (EUR/KWH)

- Current cost reduction target for offshore wind is **0.137 €/kWh** (100£/MWh) including a 10% capital cost
- FPP can as minimum match that the offshore fixed foundation target

**Power generation costs based on P80**

(in €/kWh)

Note: FPP has based its method of LCOE calculations on the framework applied by The Crown Estate, which is similar to the general offshore wind industry. The method includes cost of capital (WACC) which the Crown Estate fixes at 10% for offshore wind, however FPP applies a WACC of 12%
The wave energy cost curve and wind energy cost curve source is renewable UK.
Cost Power mix conventional: Fraunhofer, ISE
WHAT ARE THE COMPANIES KEY CHALLENGES FOR COMMERCIALIZATION
FPP did not start here ..... **FPP started with the inventor’s idea**

- A combined wind and wave device
- With a highly efficient wave energy system
- That can be maintained and can survive
KEY PARAMETERS FOR SUCCESSFUL COMMERCIALIZATION IF THE OFFSHORE RENEWABLES SECTOR

Costumers (DONG, EON, EDF, etc)
- Offshore renewables are extremely capital intensive
- Offshore renewables are only competitive in large farms
- IRR
- RISK, RISK and RISK
- Power quality

Technology provider
- Cost of energy (LCOE)
- Power quality (predicable, dispatchable, etc.)
- Insurable (farm and revenue)
- Guaranteed and certified
- Financing
- Proven and demonstrated
- Potentially O&M contract
- Preferably placed in our of sight
- Requires several different production facilities for local content

Market framework
- Demand for renewable energy (political sensitive)
- Tariffs
- Local content
- Space (use of space is a key barrier for renewables)
SOME OF THE KEY CHALLENGES OF THE IDEA

• A capital intensive device to reduce the Eur/KWh (LCOE)

• Two power technologies (wave and wind) and in the worst possible environment => RISK

• In a political dependent framework => RISK

• No certification rules => Insurability, financeability, ..... 

• Engineering tools are lacking or not capable ..... Scaled up approach is necessary
KEY CHALLENGES WITH THE SCALED UP APPROACH

- Time from idea to revenue is very, very long with lots of risks
- Small waves (small scales) have little power => no real revenue on the way
- Several valley of deaths on the way - investment capital needed for all steeps
- Several technologies have to be developed / adapted to be successful (Moorings, PTO systems, Control systems, Wave technology, Wind turbine pitch control, Platform stability and survivability, Numerical models, Design tools, Etc.)

This is why this is usually done by large industrials

Try pitching that to a VC
MUST BE DEVELOPED IN SCALED UP APPROACH

- Concept tests
- Design Optimisation
- Numerical modeling & engineering
- Commercial Prototypes & Small Arrays
- Commercial wave-basin and wave-flume tests
- Dry tests
- 4 Scaled P37 offshore tests
- Large scale P80 commercial arrays

Floating Power Plant
OUR STRATEGIC APPROACH AND EXPERIENCES
HOW DO WE DEVELOP THIS?

Several options:

1. Give up and sell the idea
2. Merge with a larger industrial player
3. Internal development and organizational growth
   Competitors within floating wind and wave energy have spent 100 - 150 mill. Euro to get to single unit scaled demonstration
4. Internal development with suppliers/consultants on commercial terms
5. Develop in partnerships

But how do we make the most profit for our shareholders
DEFINITION – STRATEGIC PARTNERSHIPS

Why partnerships
FPP’s technology risk profile and revenue profile meant we did not believe we can do this ourselves, we needed to develop the technology in partnerships to:

- Access knowledge
- Integrate / Use standard solutions
- Learn from other offshore industries
- Reduce capital cost / use
- Access networks and end users
- Build up value chain – fit our business model of co production with preferred partners
- Improve brand and trust in technology and company
HOW ARE WE GOING TO MAKE MONEY ON THIS (BUSINESS MODEL)

FPP’s business model for commercialisation and revenue is based on a classic oil and gas business model. The key elements are:

• FPP shall not manufacture devices (IMPORTANT).
  – They will be manufactured / provided by “preferred suppliers”.
  – The platform is composed of simple defined modules
  – The platform consists primarily of large steel components requiring large manufacturing facilities, which there is an overcapacity of in the world.
  – Will therefore also provide local jobs when parks built

• FPP will
  – Perform the site-specific design/engineering
  – Deal with suppliers
  – Handle the interface coordination and quality assurance
  – Manage the joint assembly in a dry dock / port
  – Offshore Site Development will handled by the developer (utilities as at a normal wind farm)

• Earnings will come from
  - A Design / consultant fee of ~ 8-12% of a platforms investment cost
  - A delivery fee of ~ 5 % of a platforms investment cost
  - A Royalty Fee from power production over 15 years that corresponds to ~ 5 % of a platforms investment cost

Furthermore there is significant potential for three spin-off companies:
• Production of PTO (Power Take Off) modules with Siemens and Fritz Schur Energy
• Operation and maintenance in cooperation with a major offshore service provider
• Condition monitoring of systems with Critical Systems
THERE ARE MANY STRATEGIC TYPES/LEVELS OF PARTNERSHIP

FPP: What is partnership?
- Joint long term commitment
- Both parties investing resources under direct cost level
- Joint market opportunity
- Joint strategy

It is NOT just a social or professional network

The long term goal is to create partnerships that progresses without FPP management

Third degree:
How can we obtain information and power from being positivity evaluated by others, as a result of our firms central position in an industry alliance network?

Second degree:
How can we get timely access to information, secure cooperation and gain power by using the connections among our firm’s alliance partners

First degree:
How can we combine the resources and capabilities of our firm with the resources and capabilities of each of individual partners

Figure from: Network advantages; Henrich Greve, Tim Rowley & Andrew Shiplow
THERE ARE MANY STRATEGIC TYPES/LEVELS OF PARTNERSHIP

Simple generic example

Figure from: Network advantages; Henrich Greve, Tim Rowley & Andrew Shiplow
WHAT CORE COMPETENCIES DO FPP NEED TO SUCCEED

- Capital
  - Private
  - Public

- Value chain

- Sales/Marketing

- Costumers

- Technology Development

- Third party
  - Insurance
  - Certification
  - Political focus
  - Tariffs
DEVELOPING IN PARTNERSHIPS

Sounds very, very easy......

• Would you like to aid in developing this new technology that will provide you with potential revenue in many years, at a significant reduced cost/free

• We need access to your best specialist and network on a long term basis....

• Developing partnerships is a process based on trust and performance
THERE ARE MANY VALUE GIVING ELEMENTS IN PARTNERSHIP

• Payment for services - this is where people usually start
• Sharing/access to real knowledge – both FPP’s but also the other partners
  – New tools and numerical models
  – Real data
  – Market knowledge
• Access to other network via FPP and partners
• Cheap development of components/solutions to a new market segment
• IP
• Brand/PR
• Market penetration and presence
• Shares
• Production / First right of refusals
• Etc.
## A FEW PUBLIC EXAMPLES OF FPP PARTNERS

<table>
<thead>
<tr>
<th>Partner</th>
<th>Expertise</th>
<th>Role</th>
<th>Since</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SIEMENS</strong></td>
<td>Power generation, net-integration, control, data acquisition, ramp up</td>
<td>Development of energy conversion systems incl. PTO module and net integration</td>
<td>2008</td>
</tr>
<tr>
<td>Utilities (confidential)</td>
<td>O&amp;M, safety, cabling, offshore site operations, approvals, EIAs, etc.</td>
<td>Provides key end user information and aids in overall system design, O&amp;M and approvals</td>
<td>2005</td>
</tr>
<tr>
<td>Fritz Schur Energy</td>
<td>Large scale oil hydraulics design, systems integration, control, O&amp;M</td>
<td>Co-development of PTO system securing delivery of grid compatible power</td>
<td>2011</td>
</tr>
<tr>
<td>DHI</td>
<td>Wave force theory, testing, measurements, scaling, design</td>
<td>Consultant on offshore measurement, wave basin and flume tests, scaling etc.</td>
<td>2000</td>
</tr>
<tr>
<td>DTU National Laboratory for Sustainable Energy</td>
<td>Measurements and modeling of wind turbines on floating foundations</td>
<td>Measurements and modeling of wind turbines on floating foundations</td>
<td>2007</td>
</tr>
<tr>
<td>Contech</td>
<td>Advanced control and measurement systems</td>
<td>Platform control, DAQ, PTO development, etc.</td>
<td>2006</td>
</tr>
<tr>
<td></td>
<td>Naval architecture, survivability, engineering, certification, procurement, construction, ramp up</td>
<td>Design of buoy, stability and storm safety systems, etc.</td>
<td>2008</td>
</tr>
</tbody>
</table>

Each partnership is unique - Everybody is looking for something different
FPPS MODEL FOR STRATEGIC PARTNER SELECTION

Are they truly a strategically potential important partner

No

Do not setup partnership

Yes

Strategic fit

Cultural fit

Competence fit
- Specialist skills
- Personal skills

Business model fit (incl. resources)

Potential fruitful partnership

All elements must fit, otherwise you will NOT create partnerships that progresses without FPP management
DEVELOPING PARTNERSHIPS

• Motivation and trust are key
  – Do not over sell
• The are many layers of motivation you must address (see figure)
• It is a continues process
• Remember there are several more things to sell that $
• Trust and openness is not developed in one day
• Each partner and person is different
• Sometimes it takes a pure commercial setup to start up
MOTIVATION (STOP DE-MOTIVATING)

- FPP is working with highly qualified people and if the partnership is setup correctly - people are motivated
  - the challenges is not to de-motivate them
AN ADAPTED ORGANIZATION WITH A WORKING BOARD

• You have to **build a culture and hire people** supporting the partnering strategy
Working with several strategic partners creates a lot of “tasks”

<table>
<thead>
<tr>
<th>In a rush</th>
<th>Important</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>Yes</td>
<td>Do it</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>Do NOT do it</td>
</tr>
<tr>
<td>No</td>
<td></td>
<td>Do it when there is time</td>
</tr>
</tbody>
</table>

*FPPs internal version of Eisenhower's model for prioritization*
KEY LESSONS – SOME OF THEM EARN THE HARD WAY

• The goal is (For FPP)
  – Partners thinking with the project and work -not just when we push
  – Partners developing together without FPP
• You need to continuously control knowledge and internalize it – a lot of your valuable knowledge is in your network.
• Be clear on IP and rights from the beginning
• It is about building a culture – the same as internally
  - Cultural match is everything
• Communication and motivation is essential – at all levels
• It is a continues process
• Continue to evaluate and develop the network (both expand and reduce)
• Make a drawing of your network – you must be in control
• Have one clear development path with a focus on the long term goal, not just the short term ones.
KEY LESSONS – SOME OF THEM EARN THE HARD WAY

• It takes longer and a lot of resources to manage and motive the network/partners
• It both imposes and reduces risk. E.g. key people are outside your control
• Be critical on who actually has value as partner and STOP partnerships that do not work
• Getting the end user onboard is a key driver
• Your business model is a key driver

• Developing in partnerships
  – Brings a lot of knowledge and network
  – It reduces costs and expenditures significantly
  – Adds complexity an uncertainty
  – Takes a lot of time and resources

• This is not the right path for all technologies /companies!
NEXT STEPS FOR FPP
FPP SITES UNDER DEVELOPMENT

- ~150 new wind parks currently planned/consented creates scarce availability of wind sites near shore
- Political support pushes parks further offshore away from public view and shipping lanes

Source: 4C Offshore

*In order to optimise array extension floating wind technologies are required due to water depth
SO WHY ARE WE (OUR SHAREHOLDERS) DOING THIS WAY?

- We have “only “spent 13 mill Euro till date (some competitors have spent over 150 mill Euro)
- We have the best technology in the world for the over 45 meter high wind, high wave market segment
- We can as minimum match LCOE on fixed foundation wind (better IRR)
- We already have the technology partners and end customers on board for fast ramp up
- We would never have been able to this by ourselves
  - Capital
  - Quality of solution
  - Interest and commitment from costumers

- We can, if successful in this last part of the commercialization process, provide our shareholders with a very high multiple on their investment