The Business

Tidal Sails AS, established in 2004, Haugesund, Norway by commercial airline pilot Are Børgesen, whose years of flying experience with combined with sailing, diving and alpine skiing – inspired the idea of sails “catching” tidal currents to produce clean electricity.

“Tidal Sails vision is to become the world´s largest solutions provider within Marine Energy, providing sail based solutions for tidal, river and ocean currents.”

Developments will be prioritized on earnings potential:
Business Case 1: Tidal Sails will sell turnkey systems to utility companies worldwide.
Business Case 2: Tidal Sails will sell electricity via own developments/fields worldwide.

The readily available industrial components and materials, assures a rapid “Roll Out” once the technology is demonstrated full scale.

The Market

Both UK, Canada and many other countries have incorporated aggressive Feed in Tariffs and regulatory infrastructures to accommodate commercial marine energy deployment. (Presently 70+ countries have implemented Feed in Tariffs, and others are in process of establishing national support regimes.)

Market size, -presently untapped, is estimated at 1 trillion USD annually.
This is based on well known tidal turbine technology, which requires stronger currents than Tidal Sails. Thus an even larger market is realistic for Tidal Sails technology platform.

The Challenge

The cost of devices is the major obstacle to widespread commercialization of tidal.
Present tidal energy solutions are way:
– to expensive
– to heavy
– to maintenance intensive
The multitude of solutions already demonstrated fail to deliver on all of these three essential parameters, thus the need to bring to market a far less expensive, robust and light weight solution, which is commercially viable without aggressive governmental subsidies.

The Objectives

Tidal Sails will finance and execute a Full Scale Demonstration in Norway in 2019. Establishing a First Commercial Array in the UK will follow suit in 2020. Preparation of "First Commercial" sites and permits will be undertaken in parallel.

The Solution

Tidal Sails tap kinetic energy from slow moving water, in large rivers, ocean currents and tidal streams to produce electricity at the lowest cost in the market, with minimal environmental impact, by combining ancient principles of ocean sailing with state of the art alpine ropeway technology.

Direct Drive Permanent Magnet Generators assures high efficiency (ca 95%), and the sails assure high energy capturing efficiency from the swept area in the energy stream.

The Product

Tidal Sails fully submerged installation will be installed in the current, with no surface protruding elements, well beneath shipping lanes. The Aluminum sails (wings) "reach" back and forth across a channel, strait or current, effectively generating electricity via pulling ropes, which in turn rotates large direct drive generators.

The new autonomous Self Adjustable & Variable Pitch Sail Control System continuously optimize Angle of Attack (pitch) as the sails travel in between the two stations.

Tidal Sails fourth generation dubbed “BeamReach” yields the same efficiency per swept area as the competitors, but sweep a much larger area, thus facilitating a cost efficient energy capturing at 1/20 of competition cost in slow moving currents.

The slow moving sails, (max speed 6knots) 15 meter underneath the surface, are considered harmless to fish and sea mammals, and do not interfere with shipping lanes.

The Risks

Potential risks occur mainly during three phases, which are a) the design and optimization phase; b) during the installation of the device under the Kvalsund bridge; and c) during the operational and maintenance phase of the device at the site.

Partner Global Maritime AS risk team provides a risk management and mitigation plan for the project. A risk management and mitigation plan at an early stage of the project; monitoring and mitigation of potential risks during the course of the project.

The Progress

Univ. of Hertfordshire-Tank and wind tunnel testing, UK, 2006
First prototypes deployed in Skjoldastraumen, 2007
€3,5m Eurostars project – “Best Norwegian Proposal”, 2008
€1,1m – FP7 EU project, “Tidal Sense”, 2009
CNBC Green Hero + Frost & Sullivan Technology Award, 2010
CNBC and Euronews feature broadcast , 2011
Demonstrator “Balder” 2nd generation: 25 kW in 2 m/s, “EU - Success Story”, 2011
Winner of European Venture Contest – Semifinal Energy, 2012
€1,6m – FP7 EU project “Magnetide”, 2013
IAIR Awards – Sustainability, 2014
Norwegian Coastal Administration-Exclusive Sponsorship Agreement, 2016
Wave Sails AS estbl., 2016
3rd generation "TidalSails" principle patent - worldwide, 2017
NVE- 6MW Tidal Permit extension, 2018
IN 8,9MNOK pre project completed, 2018
EU “Seal of Excellence” -IN grant €50k, 2018
4th generation “BeamReach” patent pending, 2018

The Competition

Only one other sail based solution has been found - Norway's Aqua Energy Solutions – that is comparable to the sail-based technology discovered by Tidal Sails AS a decade ago. The patent which Aqua Energy Solutions based their sail-based technology on was revoked by Norwegian Patent Authorities (PAT 13/022-23).

The Benchmarking is presently at ca €5m per MW and way higher than Tidal Sails expectations. According to Bloomberg, tidal LCOE is at 0,45€/kWh, whereas Tidal Sails is expected at 0,05€/kWh.

However, in slow moving currents (3knots) TS cost is less than 1/20 of competition.

The Financing

Since its formation in 2004 Tidal Sails has accepted investments in cash or "in kind" from contributing staff members, private investors, industrial investors like the world largest ropeway company, and a small local utility company, totaling 65 share owners. Since 2007 several offers from Seed Funding companies have been turned down, as they typically wanted 30%, with an option to acquire additional 30% of the company. Public funding has been granted by Innovation Norway, The Norwegian Research Institute and EU program: Eurostars and FP7. Three large EU projects have facilitated the majority of financial resources since 2009.

The Team

A complementary, highly qualified and experienced resource bank of readily available, enthusiastic professionals has catered to Tidal Sails various needs and requirements.

Tidal Sails has since its foundation managed a sober and tight operation in tune with ambient financial situation, and the founder has coordinated a number of projects evolving iterations of Tidal Sails technology. He is frequently invited to speak at various marine energy conferences.

The Partners

Global Maritime: Moorings & Installation engineering. CDF modeling, calculations.
Setec: Power Take Off system, monitoring, fully integrated control system.
Igrek: Steel structures, bearings and fittings.
Ad Offshore: Diving, subsea preparation, Moorings & Installation
Hydro: Extruded Aluminum - Self Adjustable & Variable Pitch Sail Control
Bridon-Bekaert: Wire ropes, splicing
Akvaplan Niva Environmental, Sea Mammals, Monitoring.

EU FTI proposal describes all aspects of its business, team, partners, awards, patents, market, projects and technology.

• **Norwegian Coastal Administration**-exclusive partnership agreement – Contributing 3 man months free of charge into the project.

• Five international patents, of which all have been expanded globally beyond PCT, plus one patent pending.

The Pitch

The simple fact that Tidal Sails can expose a much(!) larger area into the energy stream at a fraction of the cost and weight of our competitors really says it all! With same efficiency per square area and next to maintenance free direct drive generators no one are remotely close to achieve the exceptional low cost of electricity generated by Tidal Sails technology!

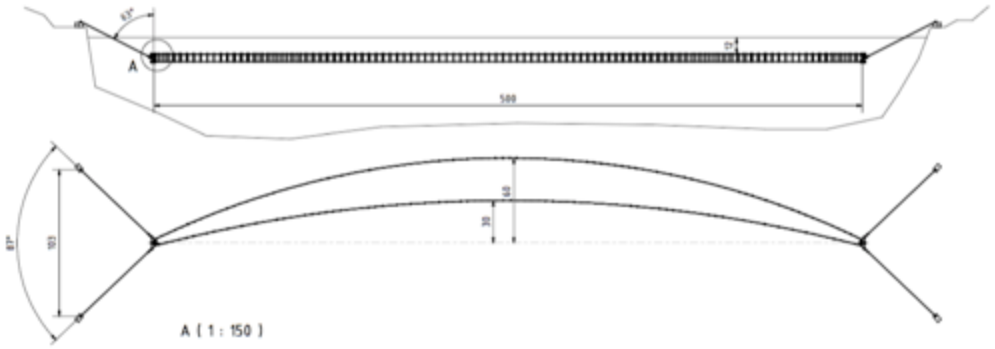
Tidal Sails has developed a paradigm breaking technology platform for the exploitation of slow moving currents, which offers a significant larger energy harvesting area over 'traditional' axial turbine solutions being developed elsewhere.

The use of underwater sails as an energy converter is ground braking, according to EU evaluators.

The Proposal

Invest in revolutionizing ocean energy and enable Tidal Sails to demonstrating its radical new technology platform! Exit via IPO in 2020 with +10 times ROI, or observe share values escalate in the years to come!

Imagine the impact Tidal Sails would inflict upon, -as an example, the 17 000 Indonesian islands, in the midst of a tidal stream belt, where presently diesel generated electricity at 1$/kWh dominate, by supplying 100% predictable clean, renewable, low cost ocean energy!



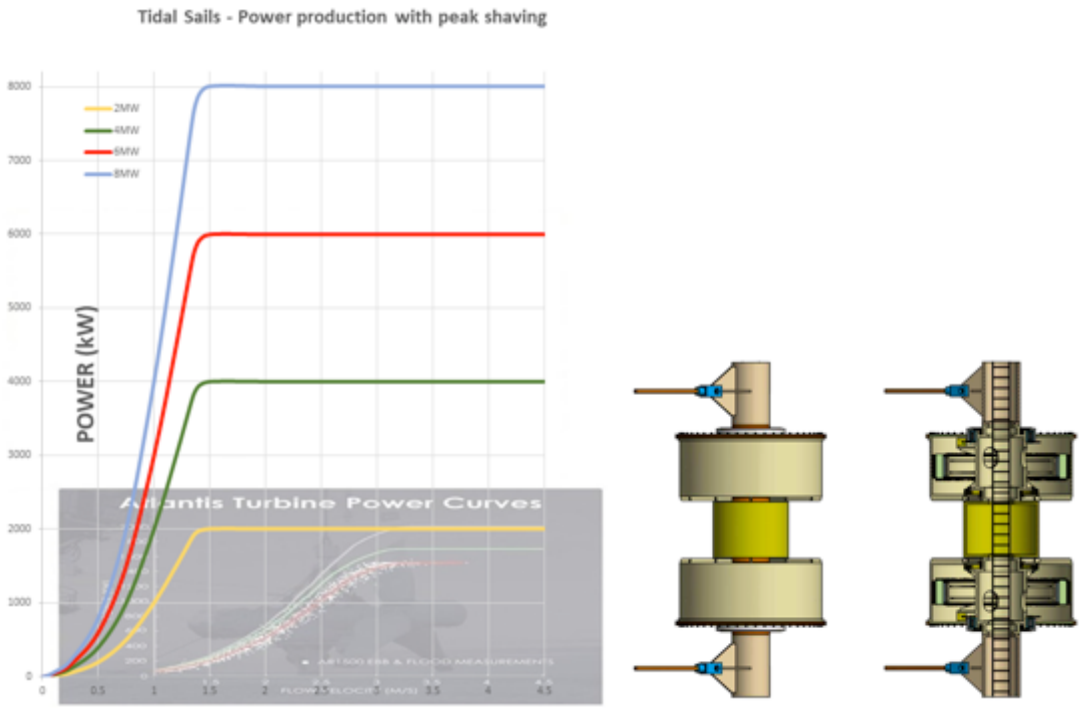
Tidal Sails technology is a creative extension of traditional ski lift systems consisting of wires and turning stations.

As horizontal axis based turbines are the most widespread technology, yet remain unsuccessful commercially, there is reason to believe that the tidal energy market may benefit from entirely new concepts and solutions – which "BeamReach" indeed answers.

The technology is adaptable to most sites as system length, number of sails, distance between sails, height of sails and related auxiliary systems can be adjusted as needed.

500meter wide and 50 meter deep tidal site. Max 4knots current.

Map of the Kvalsund location (6MW Permit)



Atlantis 200kW vs Tidal Sails 8MW in 1,5m/s = 3knots