NESOI
EU ISLANDS FACILITY

Feasibility Ameland
TidalKite Power Plant

FAMTIPP

AMELAND

“The TidalKite system is a highly innovative and disruptive technology that is ideally suited for island environments. Its 3D harnessing approach drastically increases the energy yield potential of a single device.“

This project is supported by the EU Islands Facility NESOI.
NESOI has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement N°864266

NESOI
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FAMTIPP

The European Islands Facility NESOI aims to unlock the potential of EU islands to become the locomotives of European Energy Transition. To do so, NESOI aims to mobilize more than €100 million of investment in sustainable energy projects to give EU islands the opportunity to implement energy technologies and innovative approaches, in a cost-competitive way. NESOI has selected 56 such projects across the European Union and provide them with financial resources and technical support.

Feasibility Ameland TidalKite Power Plant

ABOUT
THE PROJECT

Project Promoter SeaQurrent Holding B.V.

Stakeholders
SeaQurrent Holding B.V.
Amelander Energy Cooperative (AEC)
Municipality of Ameland
The University of Groningen

Country Netherlands | **Sector** Tidal energy | **PROJECT VALUE** 8 M€

DESCRIPTION

Ameland's ambition is to be a frontrunner in the energy transition. To increase the renewable energy share in Ameland, SeaQurrent plans to realise a 1 MW TidalKite kite project in Borndiep near the island. There, a demo project at TRL6 is already ongoing to test a TidalKite system. A logical next step is to expand this.

AIM OF THE PROJECT

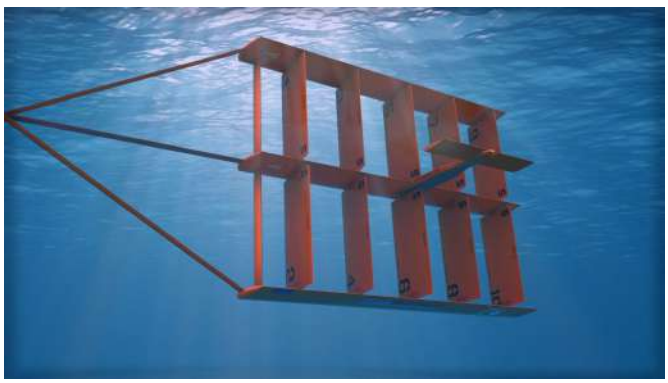
FAMTIPP will contribute to market entry of the TidalKite technology by studying the technical feasibility of a pre-commercial scale installation. The project will ultimately deliver 1 MW, from an array of 2 TidalKite units, in the Borndiep near the island of Ameland (an 8 M€ investment).

FUTURE STEPS

FAMTIPP is looking towards TidalKite replication not only in other islands of the Netherlands but also in Italy, Norway, and Sweden. The project enables significant progress in helping the island to achieve a 100% sustainable, replicable, predictable and affordable energy system.

HOW THE EU ISLANDS FACILITY NESOI
SUPPORTS THE PROJECT

1. **Feasibility analysis of a pre-commercial scale TidalKite project**
2. **Risk and vulnerability assessment and identification of available mitigation strategies**
3. **Identification of measures to reach the defined objectives and key project sizing drivers**
4. **Mapping of the main financial instruments available to finance the identified actions**
5. **Action plan and monitoring system, allocation of responsibilities for its implementation**
6. **Support in participatory processes and drafting of a clean energy transition agenda (CETA)**
7. **Technical support in communication and dissemination of the results**



Example of a TidalKite system
(SeaQurrent®, www.seaqurrent.com)

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***Feasibility Ameland TidalKite Power Plant* - Interview**

INTERVIEW WITH

Maarten Berkhout
Project Director and Co-Founder of SeaQurrent®
Board Member and Treasurer of the Dutch Energy from Water Association

Q: How was the project initially designed? Why choose this specific technology / sector?

A: FAMTIPP is developing a tidal kite to exploit sea flows because we believe this is a very promising technology for a variety of reasons (e.g., lack of intermittency as with wind or solar, improved aesthetic compared to big wind turbines in the middle of the island, etc.). NESOI has helped us to show the potential of tidal kite solutions, which we envisage to become optimised for islands across the globe.

Q: What are the challenges of the project?

A: The first challenge of FAMTIPP is proving the business case to local stakeholders, and to overcome this challenge, we've engaged a local finance boutique as one of the project participants which had a positive result as we were able to show the local benefits. Another challenge is understanding the auditory impact on nature resultant from underwater sound, and enabling mitigation of negative influence on sea life behaviour.

Q: What are your next steps towards clean energy transition?

A: We're working closely with the municipality to become fossil free in 15 years before the Netherlands mainland (i.e., in 2035 rather than 2050) and tidal energy is a big part of that goal which involves the shift to purely local energy for ensuring self reliance and self-sufficiency. The next immediate action planned is for us to secure subsidies and permits that will enable us to realise a facility with a minimum of 1 MW capacity.

Q: Within your views, where could this project be replicated?

A: There's a lot of people interested in replicating FAMTIPP from other islands in the Netherlands as well as in other countries such as France, Ireland and UK. Such replication relies on a variety of technical criteria such as: how land masses restrict or accelerate water flow velocity, the island location and size from an energy consumption perspective, how mainland power connection is structured, the presence of diesel generators to improve economic viability, how cost-efficient the existing energy system is, how sufficient the water speed is, shore and backup power proximity, and finally the costs of installation, maintenance, and grid connection.

THE IMPACT
ON LOCAL COMMUNITY

1 Local Environment Conditions

The environmental impact of the TidalKite is minimal. The flow channels host few permanent sea mammals and thus risk of collision is therefore not significant. Studies by SEAMARCO show that seals detect and avoid slow-moving structures. Mooring substrate increases biodiversity. A better understanding of net sediment transport to estuary mudflats will contribute to mitigate effects of sea level rise.

2 Social Acceptance and Impact

Tidal power is not visible nor audible above water. This contributes to the societal acceptance compared to wind and solar. The communities have lived with the water, from what the sea offers, survived the storms, and have a strong sense of self-reliance. The community support for renewable energy generation in general, and from the sea specifically is very high.

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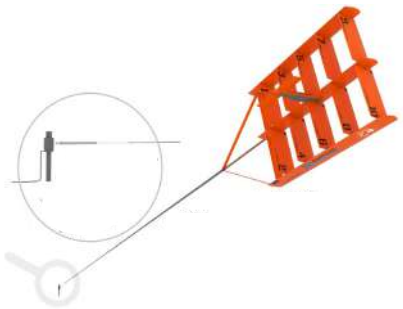
***Feasibility Ameland TidalKite Power Plant* – Technical Data**

FOCUS ON
HARNESSING TIDAL ENERGY

The tide is very predictable and offers daily available sustainable energy. It also has minimal impact on the landscape. Compared with tidal turbines, tidal kites can cover a larger area in more shallow waters. This enables to exploit sites with a lower velocity, as the amount of tidal energy that can be utilised depends on the area covered and velocity of the water.

The Borndiep flow channel is suitable for the production of tidal energy, since there is a strong current and sufficient depth. The channel has served as a test site for TidalKite units, but it is estimated that up to 20 of these units can be installed there to produce renewable energy. In the FAMTIPP project, two TidalKites with a rated power of 500 kWp each will be deployed in the channel of Borndiep at a distance of 200–300 m from the shoreline. The tidal variation in Borndiep reaches 2.5 m at spring tide, causing operational currents up to 1.6 m/s.

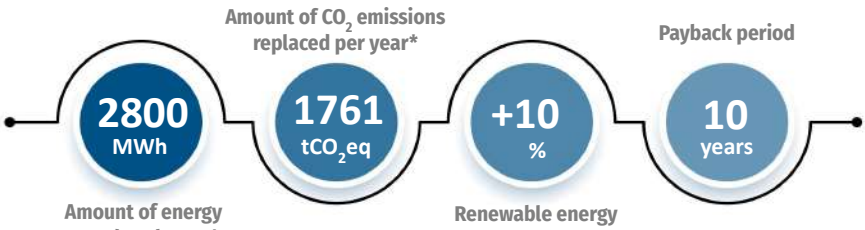


One TidalKite system
(Source: documents sent to NESOI)

The TidalKite system is comprised of a TidalKite that is connected to the power take-off (PTO) system. The PTO is fixed to the seabed and electricity is distributed to shore by an underwater electric export cable. The TidalKite itself is a single rigid device. The kite wings capture the water flow, accelerating the kite through the water. The kite creates a lift force that is transferred to the PTO, which converts that force to clean electricity is generated.

Preparation activities for the grid connection and TidalKite test site in Borndiep near Ameland
(Source: documents sent to NESOI)

KEY NUMBERS
OF THE PROJECT



** based on the number of TidalKites, installed nominal power per turbine and full load hours, and the emissions of the current grid in NL.*

REPLICABILITY
IN OTHER ISLANDS

This project will help to establish a technology for renewable energy production based on the flow of water in both high and low low velocity conditions. If successful, similar projects can be deployed at many locations around European islands and further afield.

R2M SOLUTION
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NESOI has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 864266