Tidal energy by Minesto

Contributor to Faroe Islands' clean energy transition

Faroe Islands: 100% renewable

The Faroe Islands have set a goal of producing their entire electricity need from renewable energy sources by 2030, including transport and heating.

Why tidal energy?

Tidal energy has several advantages which makes it an important complement to established renewables:

- Tidal streams are predict able and so are not dependent on weather conditions.
- Minimal physical and no visual footprint.

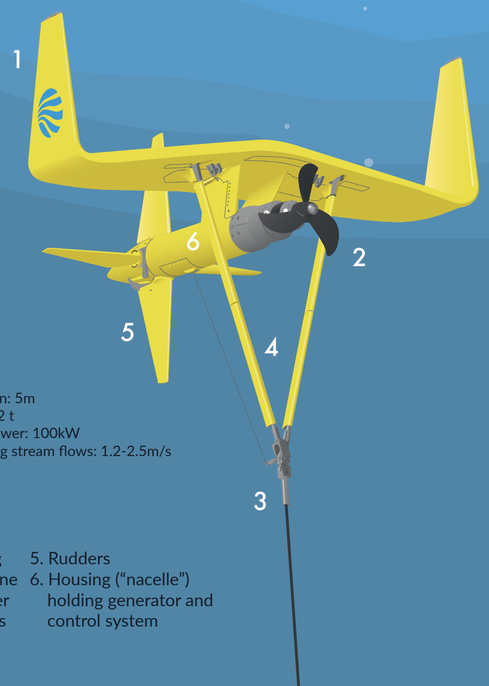
Joint collaboration

In late 2018, Swedish technology developer Minesto and Faroes utility company SEV engaged in a collaboration agreement for two installations of Minesto's DG100 model in Vestmannasund, Faroe Islands. The collaboration is the first phase of a long-term ambition to add further tidal energy capacity by Minesto's Deep Green technology to the Faroe Island's energy mix, which is estimated to approximately 30–70MW installed capacity.

The project is considering various installation locations in Vestmannasund. A typical seabed footprint will be less than 10x5m.

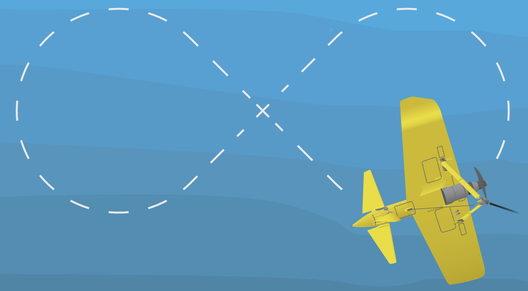
The Deep Green technology – Low flow, low weight, low cost

The DG100 power plant



Wingspan: 5m
Weight: 2 t
Rated power: 100kW
Operating stream flows: 1.2-2.5m/s

1. Wing
2. Turbine
3. Tether
4. Struts
5. Rudders
6. Housing ("nacelle") holding generator and control system



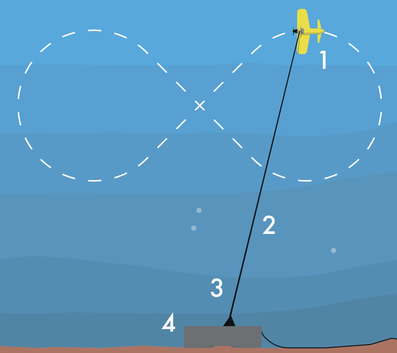
Minesto's marine energy technology, called Deep Green, generates electricity from low-flow tidal streams and ocean currents by a unique and patented principle similar to a stunt kite flying in the wind.

The combination of the tidal flow and the wing creates a hydrodynamic lift force that propels the power plant through the water.

With onboard control system and rudders, the power plant is autonomously steered in a pre-determined figure of eight, pushing the turbine through the water

As the kite flies through the water the turbine rotates generating electrical power in the generator. The power is transmitted to shore via the subsea cable.

The Vestmannasund project setup



The DG100 kite system remains submerged at all times during operations and when in "parking mode".

Trajectory dimensions:
Width 40m
Height 17m

Water depth: approx. 50m

1. Power plant, "kite" that generates electricity
2. Tether (35m) that connects the kite with the bottom joint
3. Bottom joint, the pivoting point for the power plant
4. Foundation, may be a drilled anchor, a gravity-based structure or another solution pending soil and seabed characteristics
5. Umbilical that carries power and data cables for power transmission and data communication
6. Onshore control station and grid connection

INSTALLATION

A seabed foundation will be installed for each DG100 system. Installation of the DG100 systems will be achieved using an appropriate installation vessel equipped with a small crane and winch.

TESTING

Following initial deployment of the DG100 there will be a period of commissioning and testing. During this time all operation will be carried from shore or at remotes sites, there will be no requirements for further marine operations.

OPERATION

During operation the DG100 systems will be automatically controlled by the onboard control systems. Generated electricity is transferred to the Faroese power grid.
In this phase the power plant has two main modes: Park and Run (operation)

Minesto

SEV