

Hydra Tidal Energy Technology AS

Morild Introduction

The oceans around the world contain a massive amount of kinetic energy ready to be utilized for the production of electricity. *Ocean currents* are formed by complex interactions in the ocean such as temperature, osmotic pressure and winds while the Sun and the Moon's gravitational pull on the Earth create *tidal currents* that could produce electricity. Our goal is to harness this energy globally.



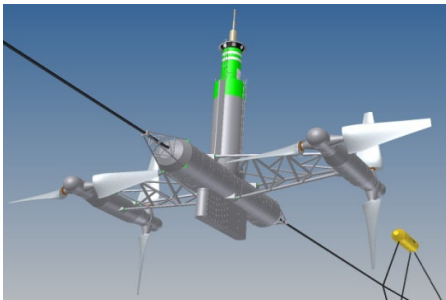
Hydra Tidal was founded in Harstad, North Norway by Mr. Svein D. Henriksen (CEO) - a successful entrepreneur and engineer with over 30 years experience from the ship building industry. Since 2001, the company has been developing a unique floating power plant - *Morild* for harnessing energy from tidal and ocean currents. Hydra Tidal's staff is

composed of four employees with complementary competence. Morild is currently being built as a prototype and is due for deployment at Lofoten Islands in 2010.

Hydra Tidal's owners are Statkraft, Energy Future Invest, Hålogaland Kraft, Hydra Energy, Lofotkraft Holding and Hålogaland Kapital. Some of these are potential pilot customers and strategic partners.

Technology

Morild seen from under



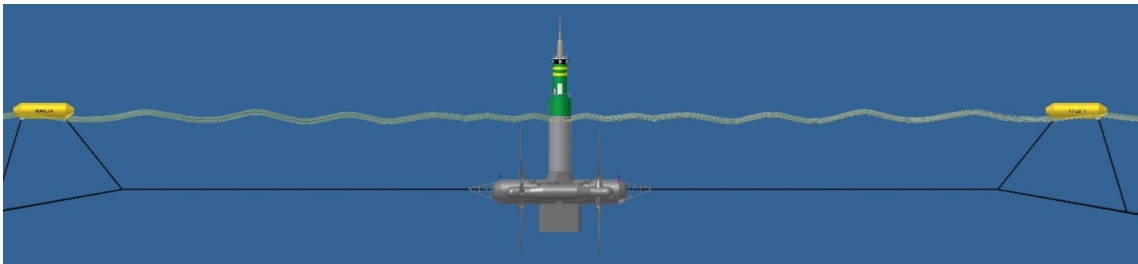
The core technology is a floating power plant which can harness energy from *Low-speed water currents*. Standard components from the ship-building industry are used in order to minimize technological risk. The plant features a patented technology that makes it float while at the same time withstanding high loads. The 4 turbines have a diameter of 23 meters each and contra rotate. The anchoring system has a breaking load of 525 tons (horizontally). Each plant weights

approximately 320 tons (750 tons including water ballast) and can deliver over 5 GWh annually from tidal currents and at least the same from ocean currents. This is enough to support 200-300 Norwegian households with electricity.

Advantages

Morild can deliver green energy from a renewable source; gravity. We call it **planetary power** and it's indeed renewable because the Earth's rotation around the Sun and the Moon's rotation around the Earth are truly perpetual. Morild can be towed by boat (e.g. into dry dock if needed) and may be tested at different locations without costly seabed installation. Because of Morild's patented floating system it can withstand high loads and harsh environmental conditions. In large waves the plant will sit stationary and the floating devices will minimize the influence of water turbulence on construction, a common problem for seabed installed turbines.

Patented floating technology -> only horizontal loads



Morild has **powerful advantages** over other technologies: 1) Morild can produce power at surface position (where the currents are strongest) even at depths > 300 meters, 2) lower installation and maintenance costs because it floats, 3) effective harnessing of energy from ocean currents such as the Gulf Stream, and 4) turbine blades made out of glued wood, which are very durable and environmentally friendly. They can even be recycled in a bio heating plant.

Morild can be mass produced in order to obtain economies of scale and also economy of scope as the "ocean current" version of Morild is launched. Hydra Tidal received concession from the Norwegian Water Resources and Energy Directorate to test the prototype in Gimsøystraumen, Lofoten Islands. No negative enunciations were noted from external parties during the hearing. The plant is barely visible in the surface and does not generate any audible noise for humans.

Building a Prototype in Harstad, North Norway



An interesting aspect of any renewable technology is its Life Cycle Assessment (LCA). Hydra Tidal has done a preliminary LCA, measuring CO2 emissions from production, assembly, transport, maintenance and disposal over Morild's life span. We found CO2 emissions to be 30-40% lower than that of wind power and significantly lower than that of solar (photo voltaic) power.