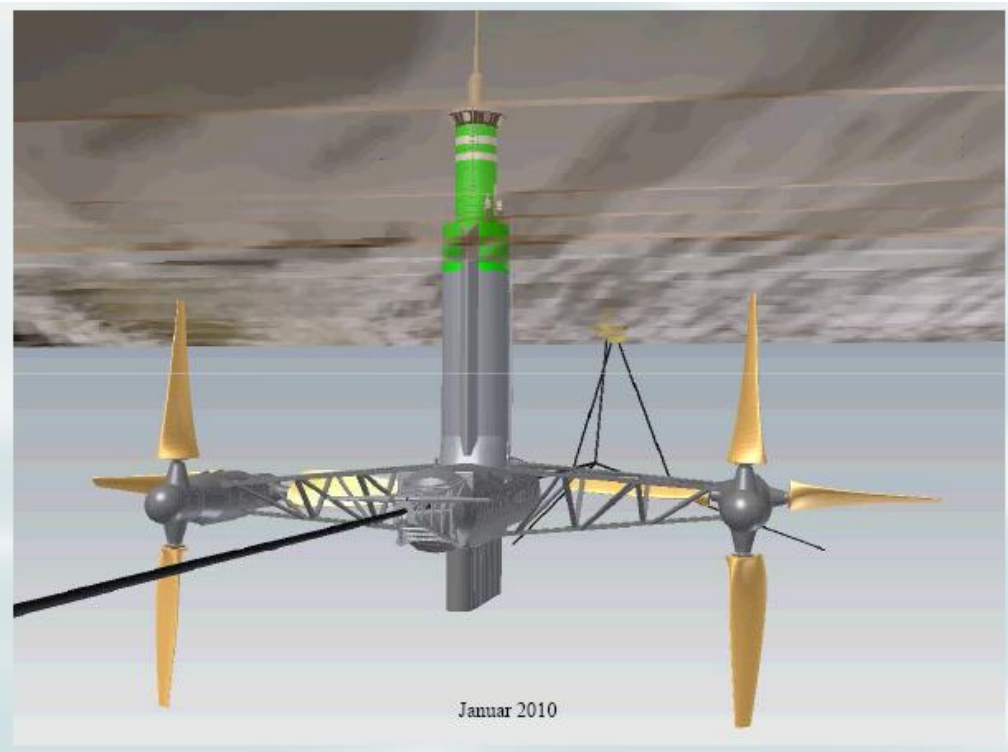


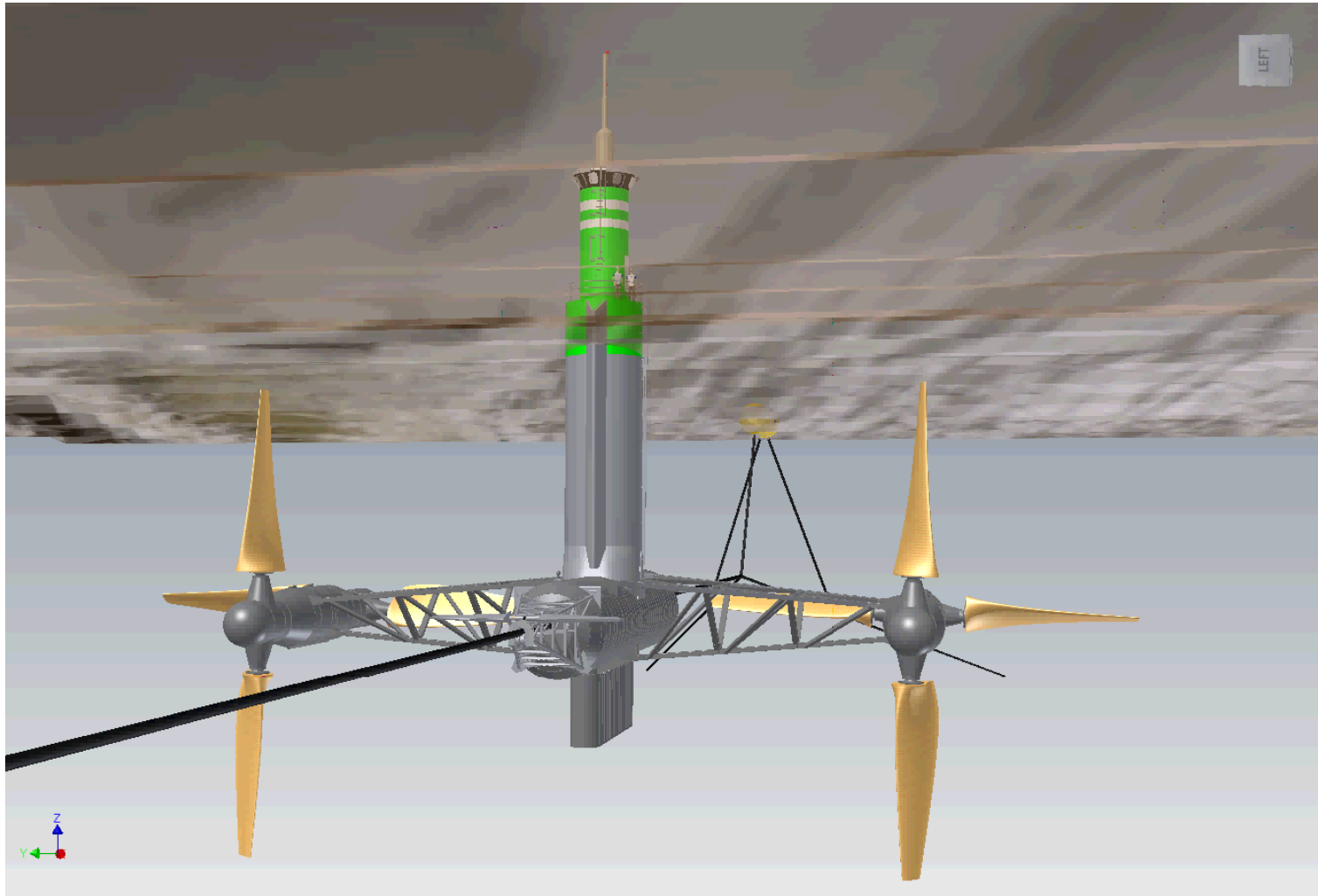
# Tidal power plant

- with wooden turbine blades

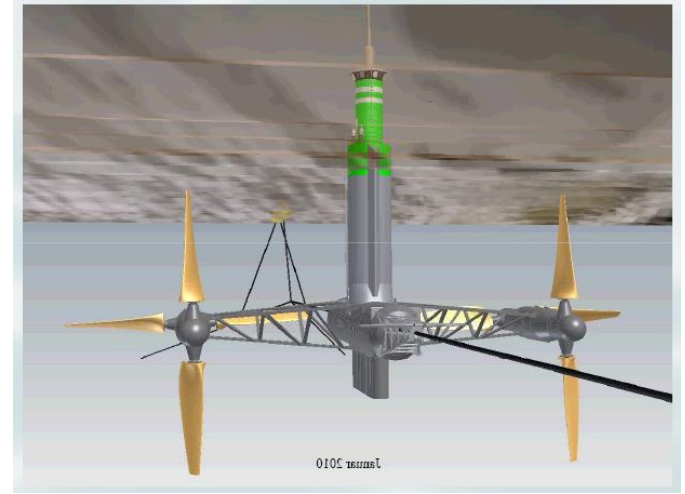


**Moelven Limtre AS**  
**Åge Holmestad**

# Tidal power plant



# Tidal power plant



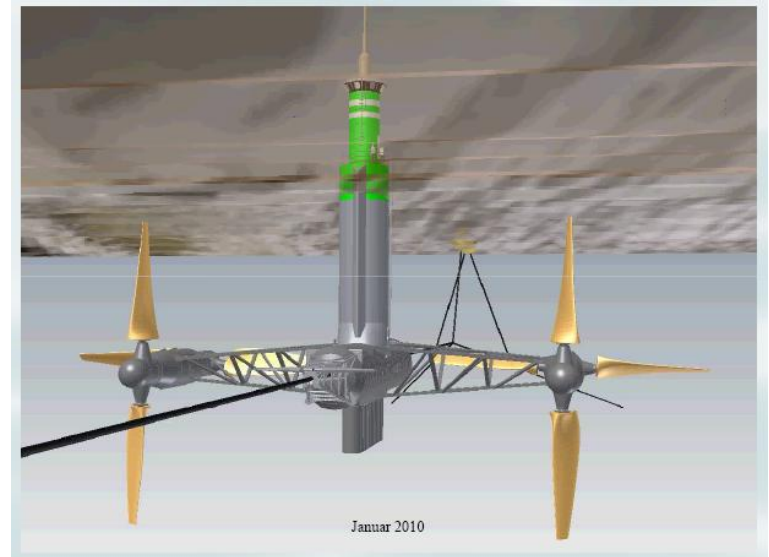
## The foundation and the business basics:

Ocean currents are formed by a complex interaction of temperature, osmotic pressure and winds. The Sun and the Moon's gravitational pull on the Earth creates tidal currents.

The goal is to harness these massive and perpetual sources of energy with our unique floating power plant Morild II, and transform it into electricity.

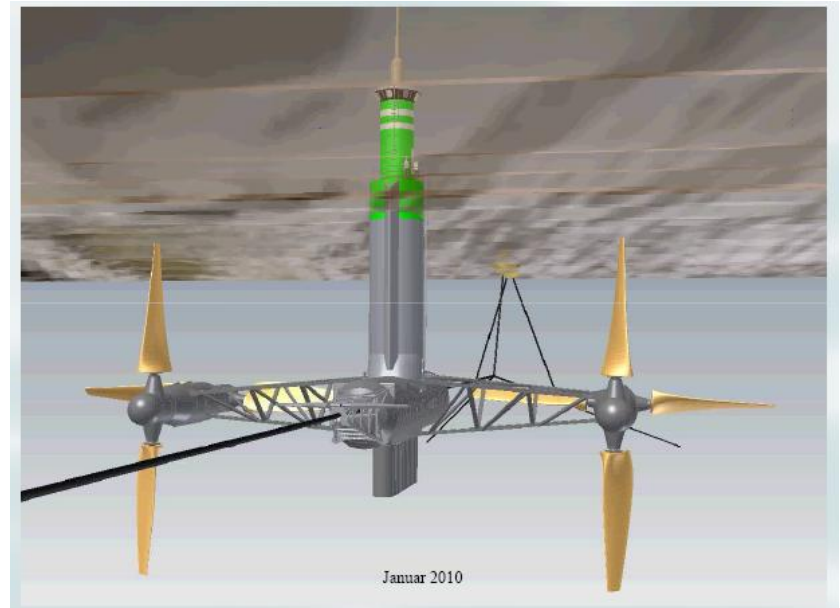
# MORILD II: Tidal power plant

**Since Hydra Tidal was founded in northern Norway in 2001, the design and technology of the MORILD tidal power plant has been re-engineered, developed and fine-tuned to meet any foreseeable challenge from the brutal forces of nature.**

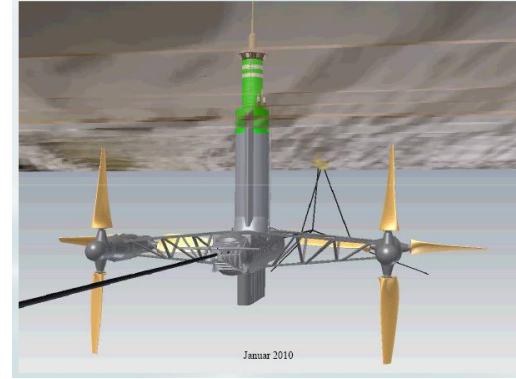


# MORILD II: Tidal power plant

In autumn 2010 the MORILD II tidal power plant, the first of its kind in the world, was successfully launched at sea and towed into location in the Gimsoy stream in Lofoten, Norway. In December 2010 the plant was thoroughly prepared, anchored and submerged into operational position.



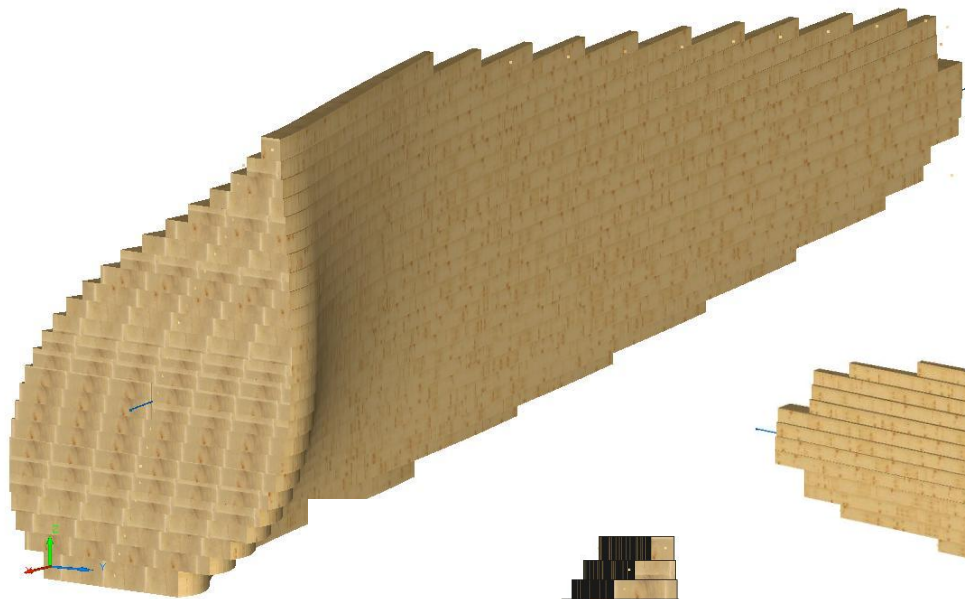
# Tidal power plant



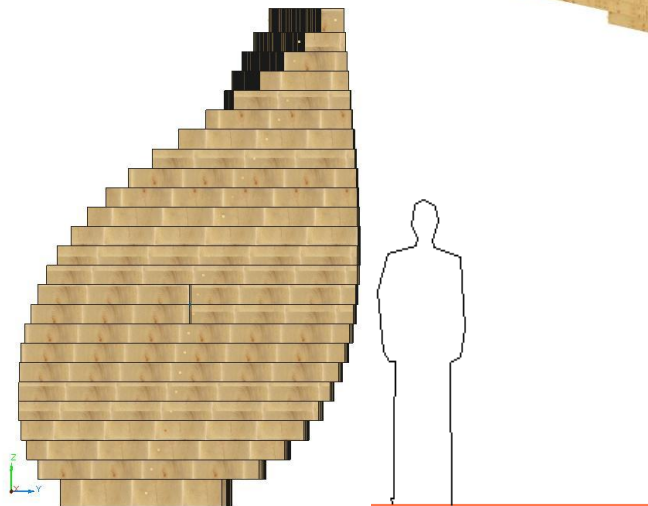
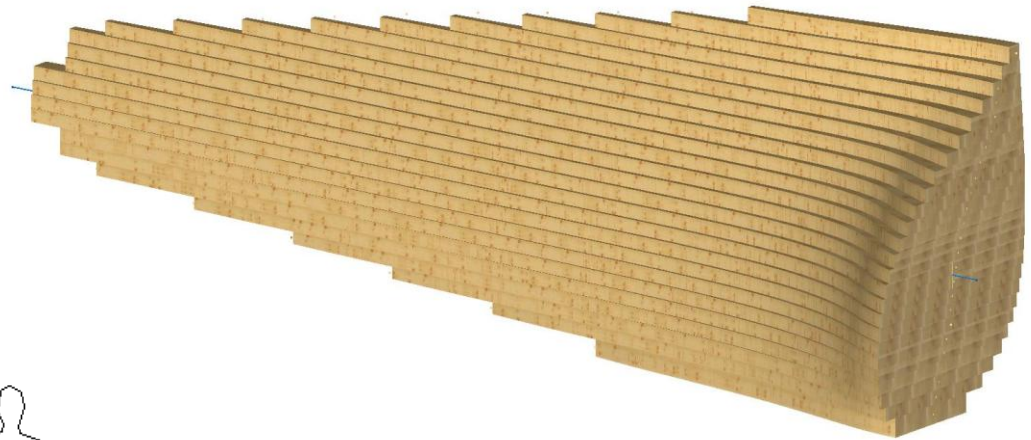
Hydra Tidal's Morild II tidal power plant at-a-glance:

- A unique and patented floating tidal power plant
- Prototype has an installed effect of 1,5 MW
- Annual production 5 GWh (the consumption of 300 households)
- Turbine diameter of 23 meters
- Each turbine pitch-controllable
- 4 turbines with a total of 8 turbine blades
- Unique wooden turbine blades
- The MORILD II can be anchored at different depths, thus it can be positioned in spots with ideal tidal stream conditions

# Turbine blades in laminated timber



Length: 10 m  
Height: 3,0 m  
Width: 1,8 m



# Turbine blades in laminated timber

## Benefits of wood:

- Wood submerged in salt water is a very durable material.
- Wood is an environmentally friendly material (renewable, binds CO<sub>2</sub>), and will therefore help to further enhance the environmental profile of the project.
- The use of wood avoids fatigue, which is a major challenge when using composite, steel or other metals.
- Milling pine gives a smooth surface with little friction.
- Its saturated weight is approximately equal to the weight of water.
- At end-of-life, or if a blade should be permanently damaged, the remaining material can be used for heating the production plant, thus avoiding difficult or costly disposal.

# Production

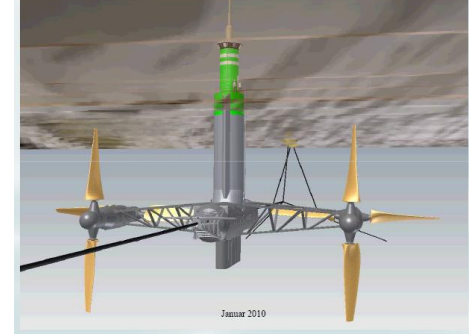


# Tidal power plant

-anchored in Gimsøystraumen



# Tidal power plant - the future



**The pilot tidal power plant will have an annual power output of 5 GWh, which is the equivalent of the annual electricity consumption of about 300 households. The total output potential for tidal power plants along the Norwegian coast is enormous, estimated at 30 TWh. Development of one-third of this translates into a consumption of about 240 000 m<sup>3</sup> of glulam. This amounts to 1% of the potential international market.**

**A test group of six power plants is expected to be built during 2012. If these are successful, production will subsequently increase and could reach up to 200 power plants annually.**

# Tidal power plant



## Consequences for the European Forest Based Sector

- Volume of glulam  
**1 % of the international market**
- Marketing of wood  
**New application for glulam**
- Contributions to clean energy  
**Wood are not only suitable for bioenergy but may be an integral part in other area of renewable energy**

# Tidal power plant

Thank you for your attention !

