

Alternative Concepts in Ocean Renewable Energy PART 2

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www.gero.poli.usp.br

gero
*energia renovável
do oceano* POLI - USP

Tidal Stream

Back and forth...

Conventional

Tidal

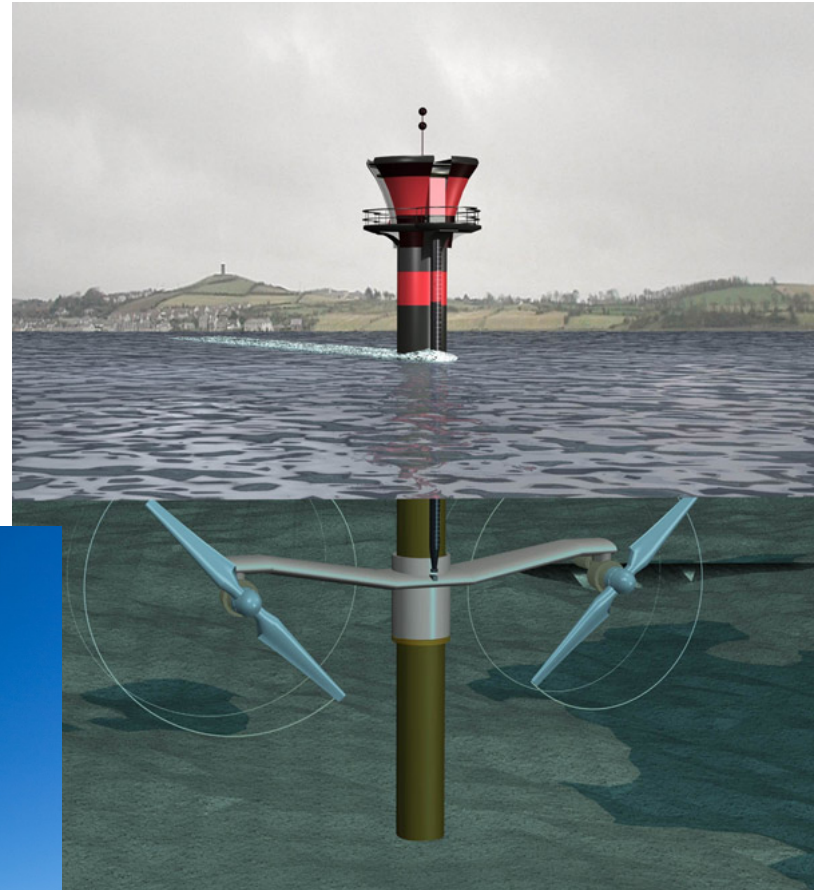


La Rance, France



SeaGen

Marine Current Turbines Ltd. (2008)
www.marineturbines.com



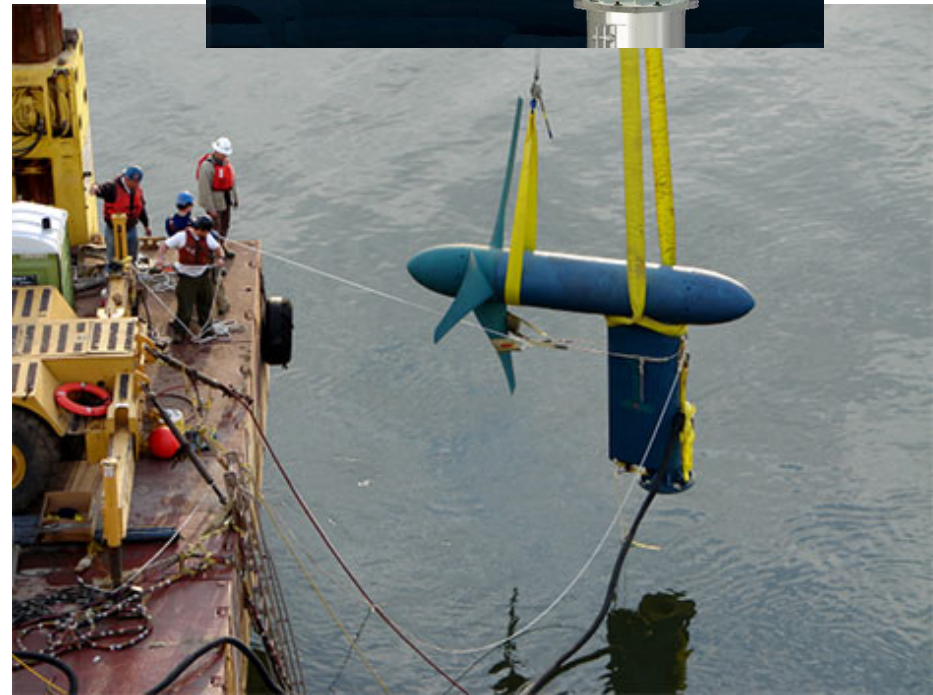
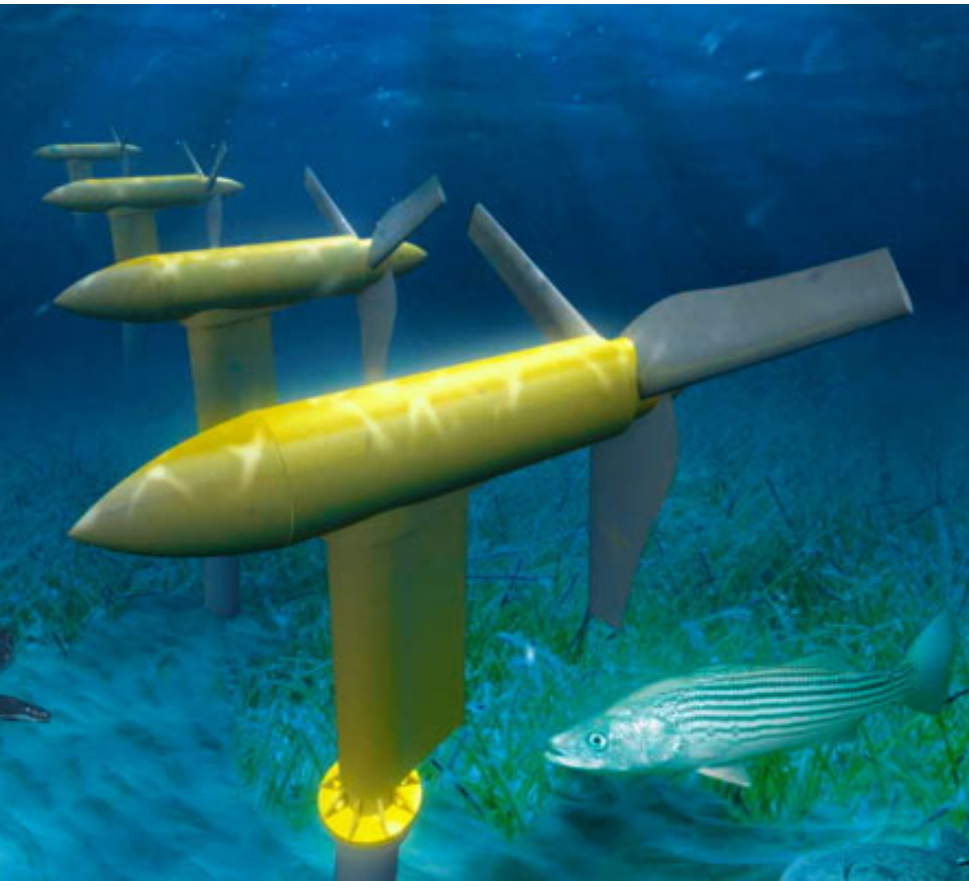
DeltaStream

Tidal Energy Ltd.
www.tidalenergyltd.com



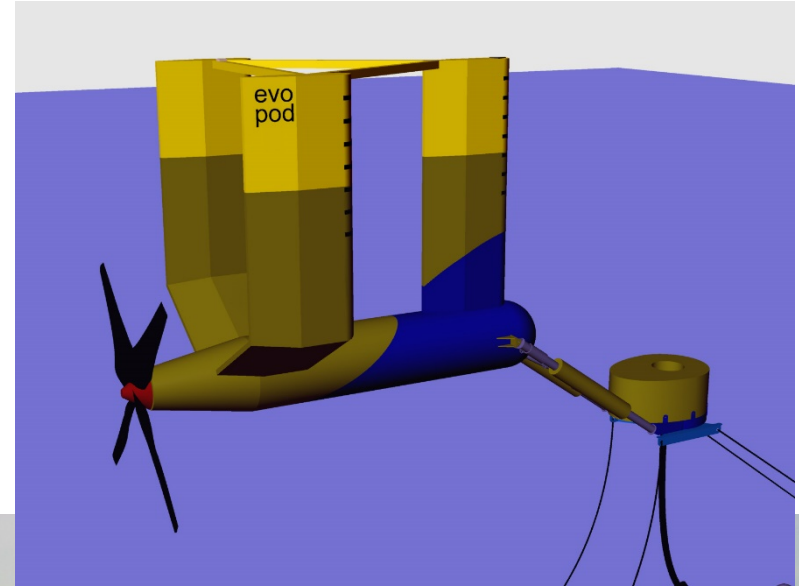
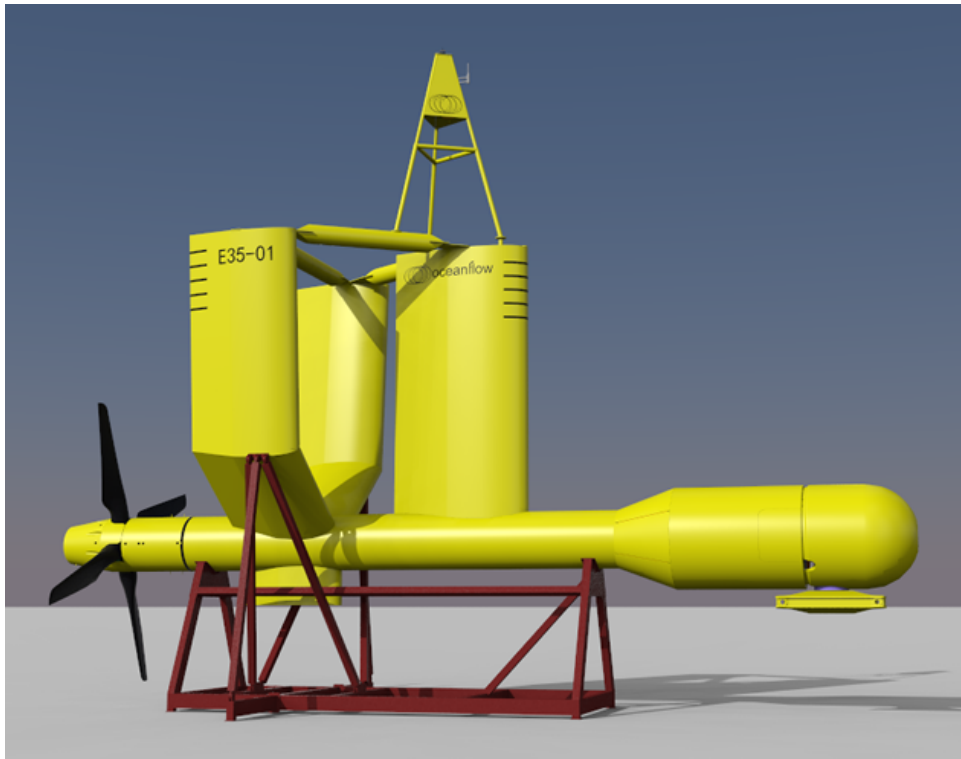
Free Flow Turbine

Verdant Power Ltd. (2008)
www.verdantpower.com



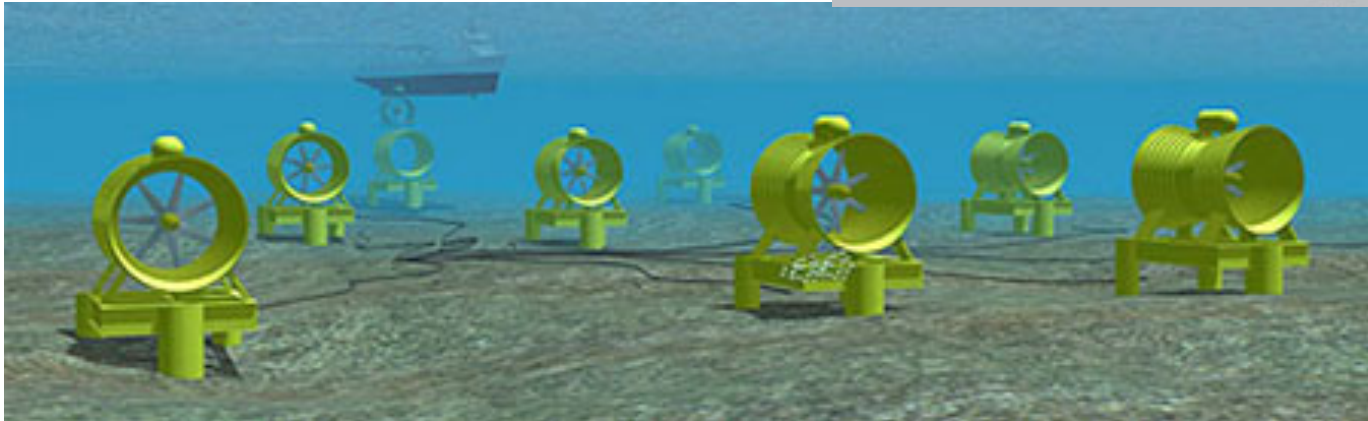
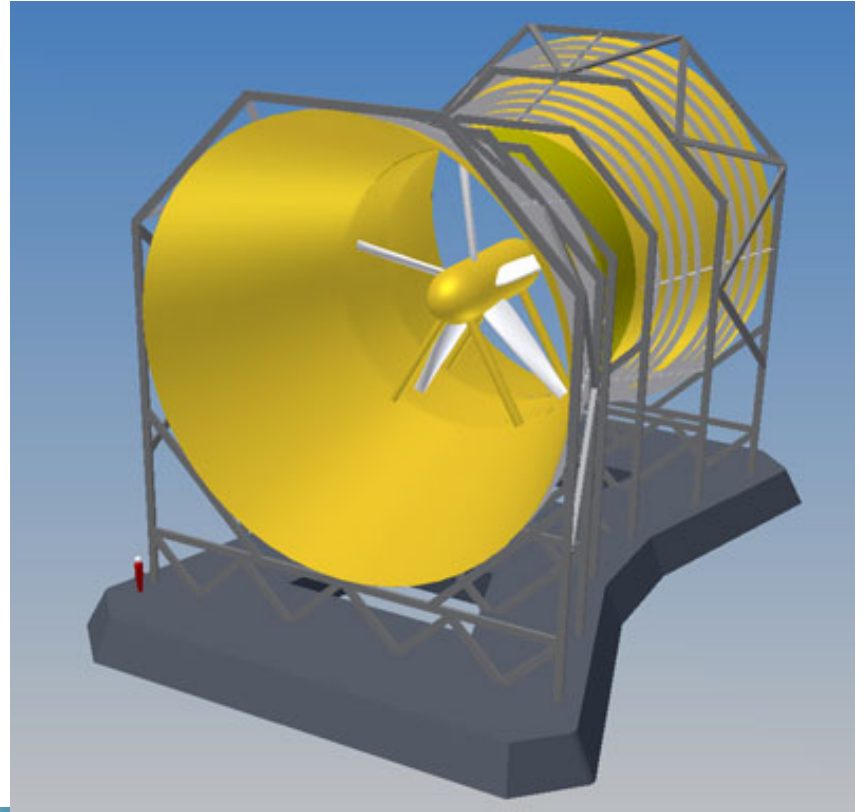
EvoPod

Ocean Flow Energy Ltd. (2008)
www.oceanflowenergy.com



Lunar Energy

Lunar Energy Ltd. (2008)
www.lunarenergy.co.uk

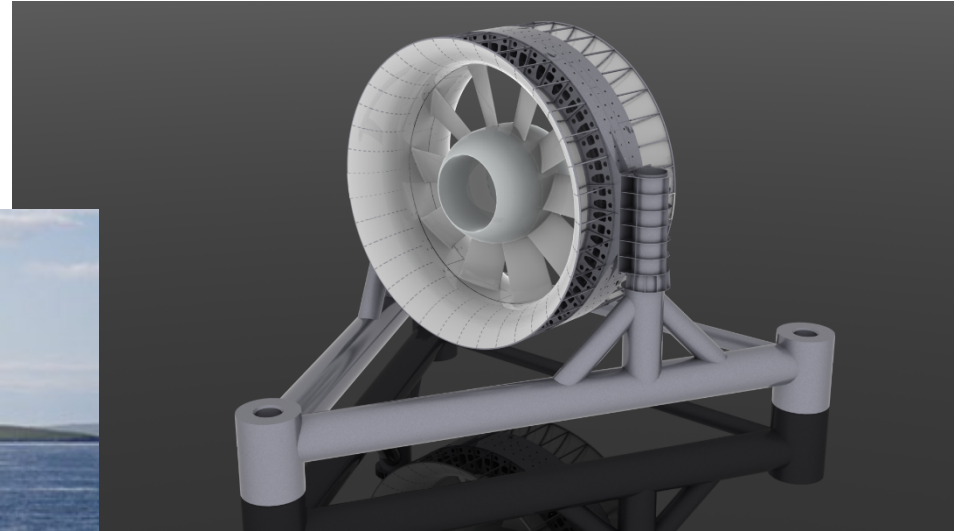


Solon Turbine

Atlantis Resources Corp. Ltd. (2008)
www.atlantisresourcescorporation.com



OpenHydro Turb.



OpenHydro Ltd. (2008)
www.openHydro.com

Alternative concepts

Tidal



Nereus



Atlantis Resources Corp. Ltd. (2008)
www.atlantisresourcescorporation.com

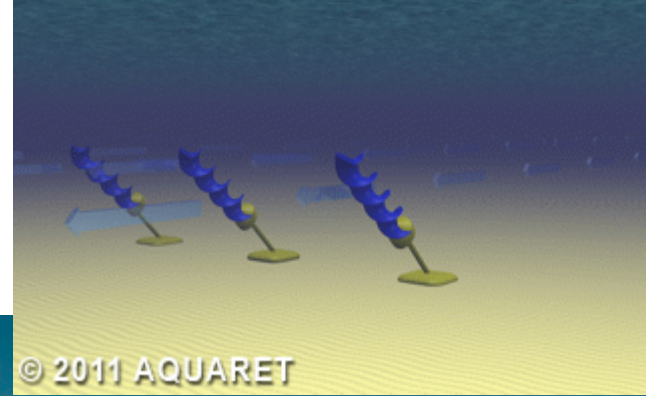
Nereus

Atlantis Resources Corp. Ltd. (2008)
www.atlantisresourcescorporation.com



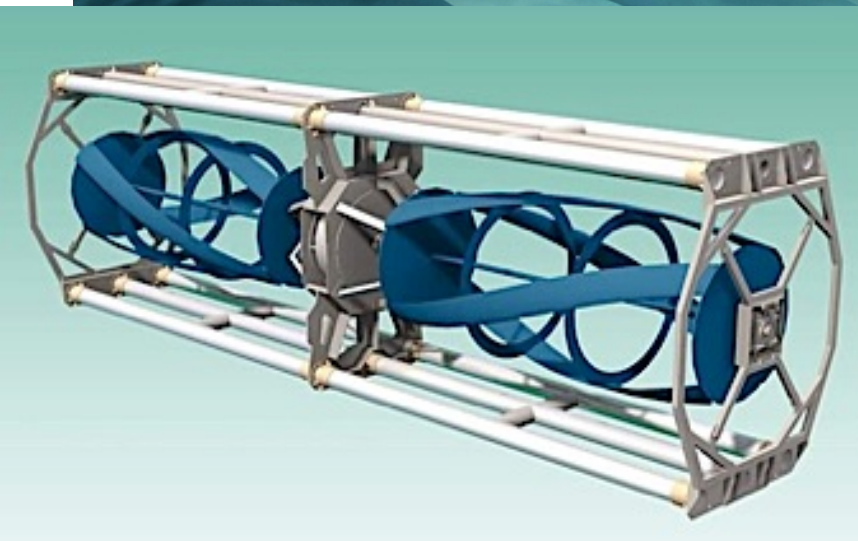
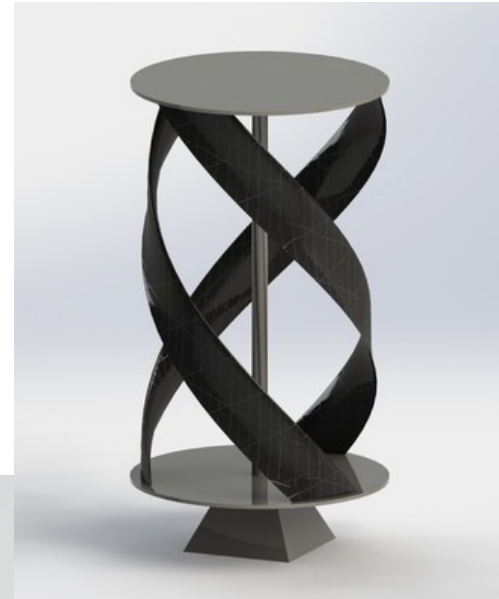
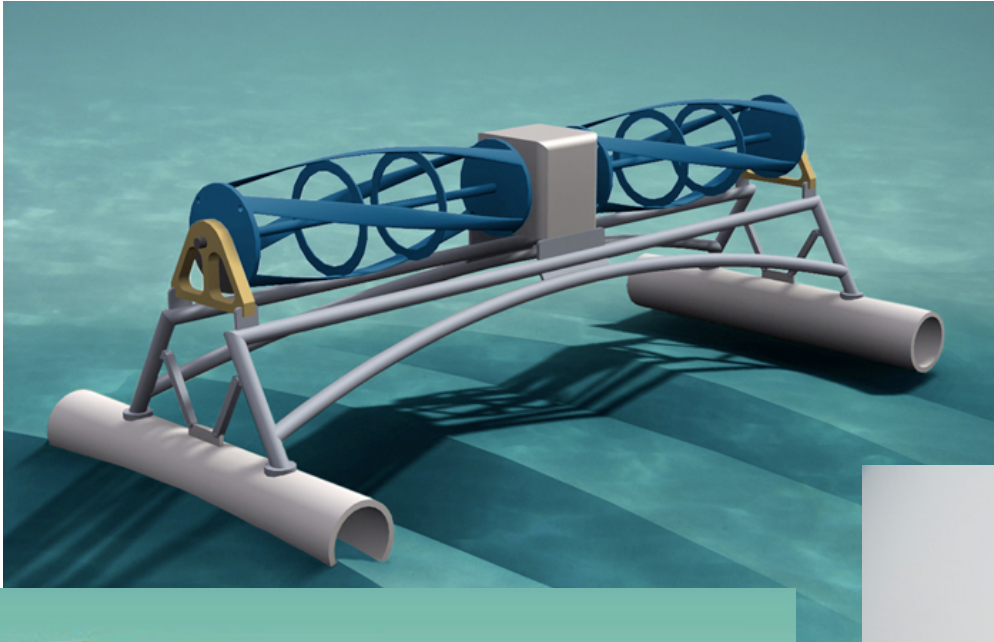
Archimedes Screw

www.emec.org.uk



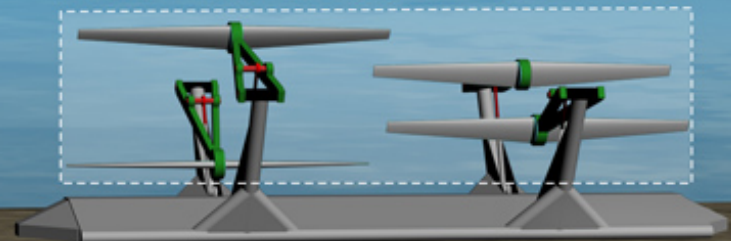
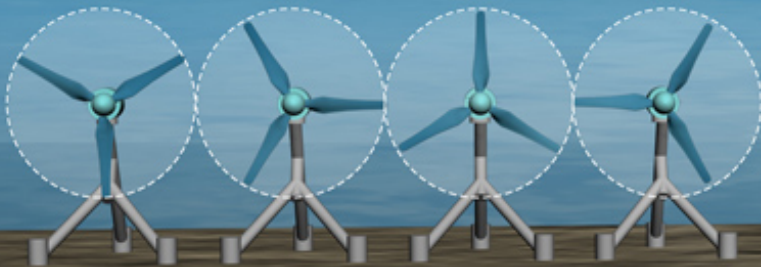
Gorlov Helical Turb.

GCK Technology Ltd. (2008)
www.gcktechnology.com

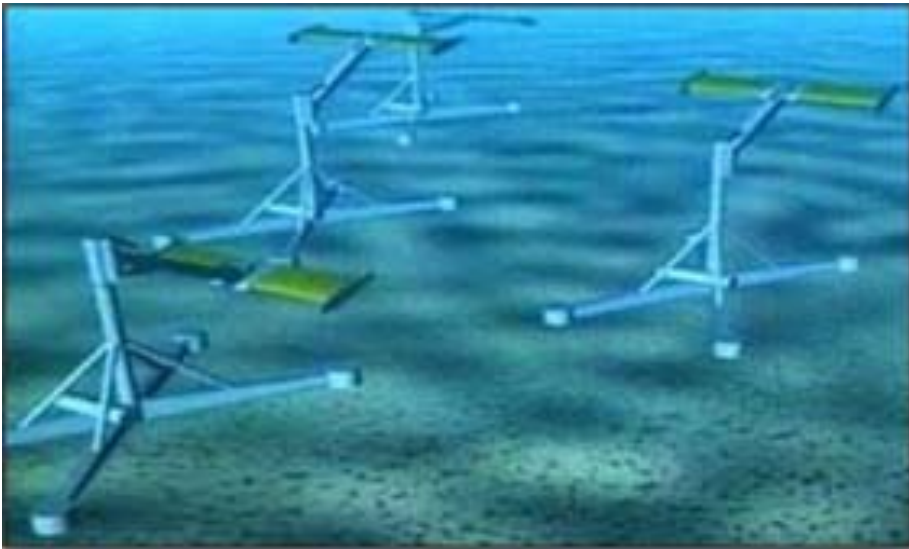


Pulse Generator

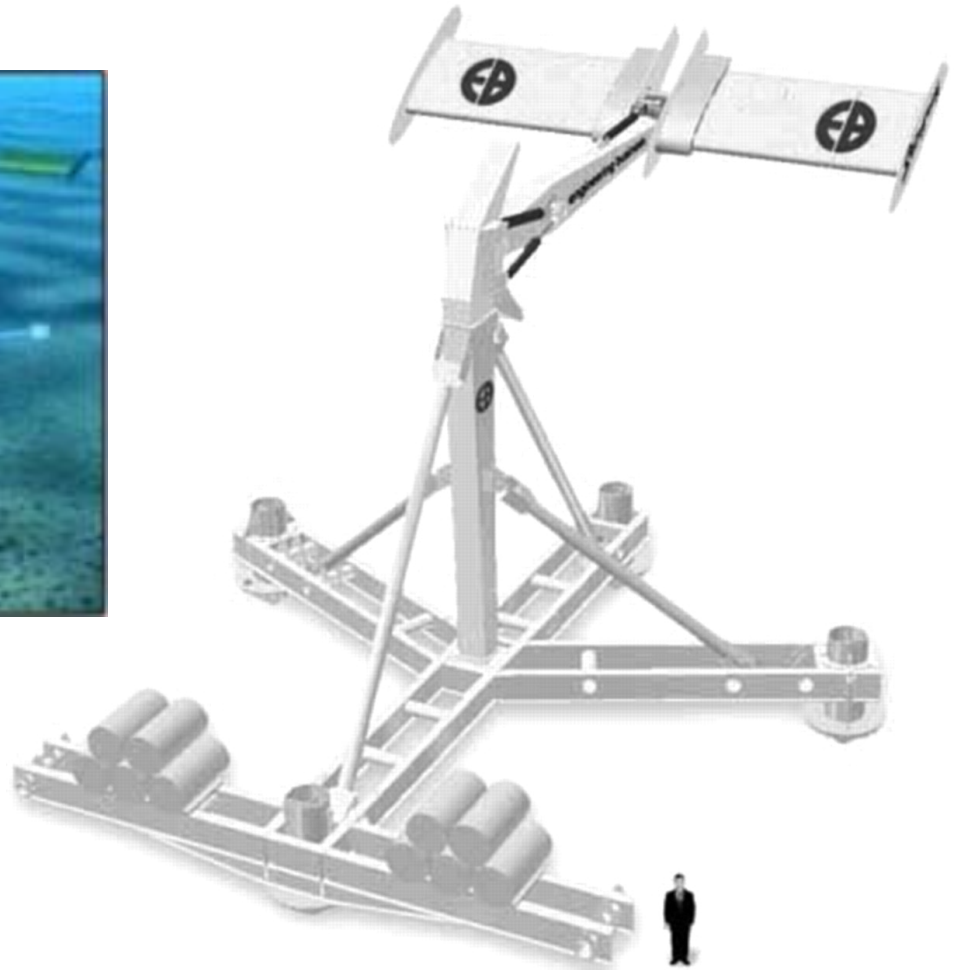
Pulse Generation Ltd. (2008)
www.pulsetidal.com



Stingray Generator

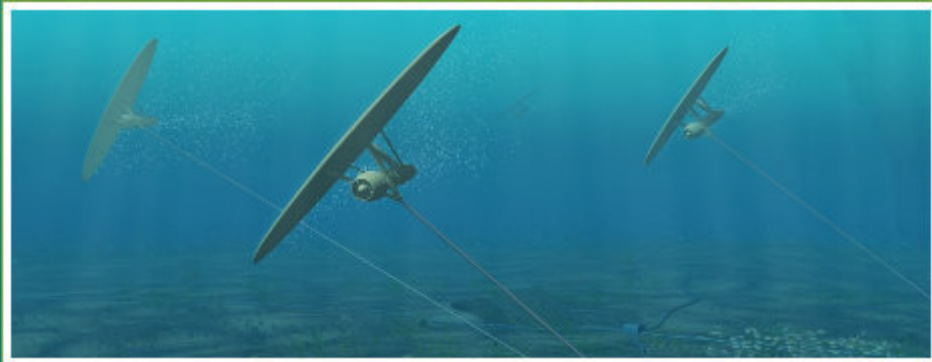


IHC Engineering Business Ltd. (2008)
www.engb.com



Tidal Kite

Minesto
www.minesto.com



Minesto



Minesto
www.minesto.com

Turbine blade design

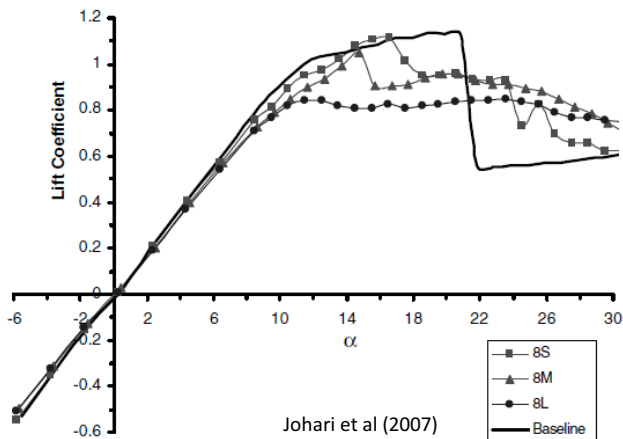
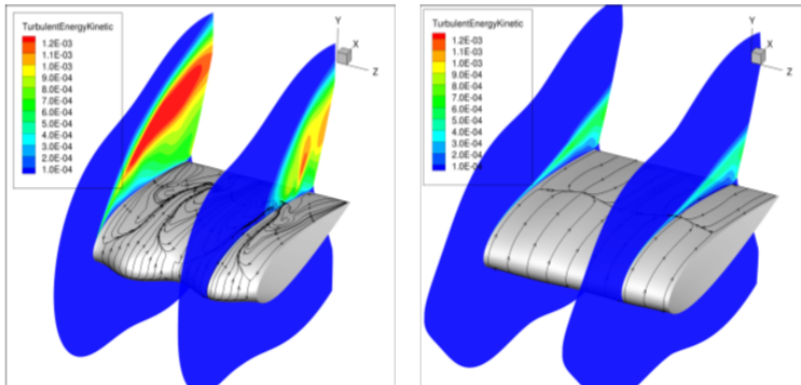
Bio-inspiration



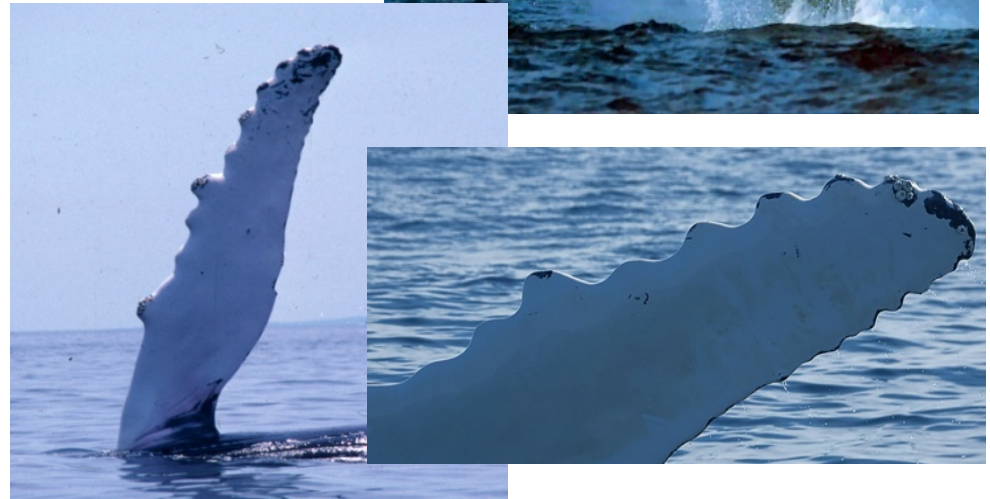
Blade design

- Sinusoidal leading edge
- Biomimetic design

Lohry et al. (2012)

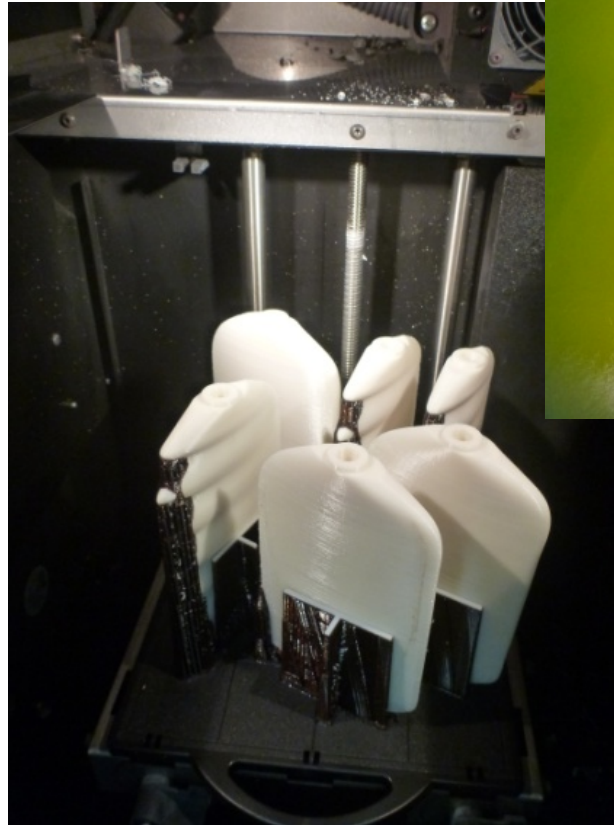
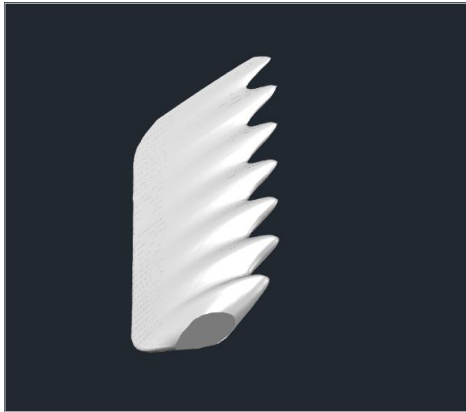
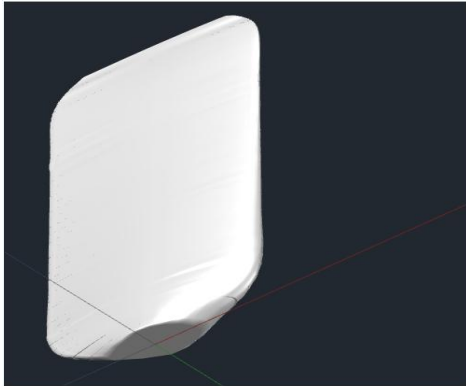


Johari et al (2007)



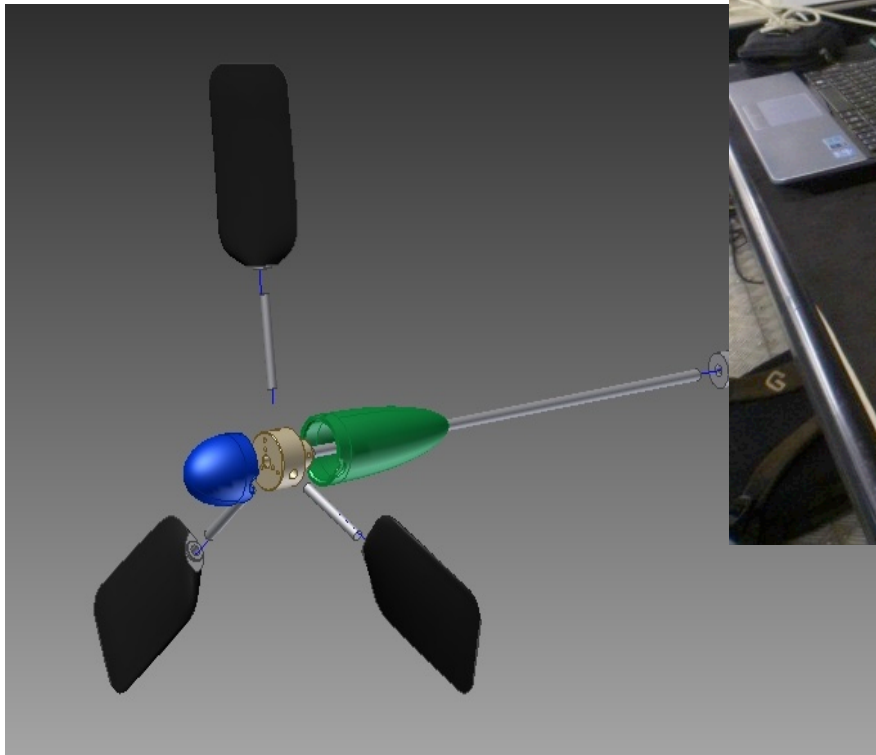
Pierre-Paul Lacas (2013) Sinusoidal Leading Edge on Tidal Blade Turbines, EPUSP.

Blade design



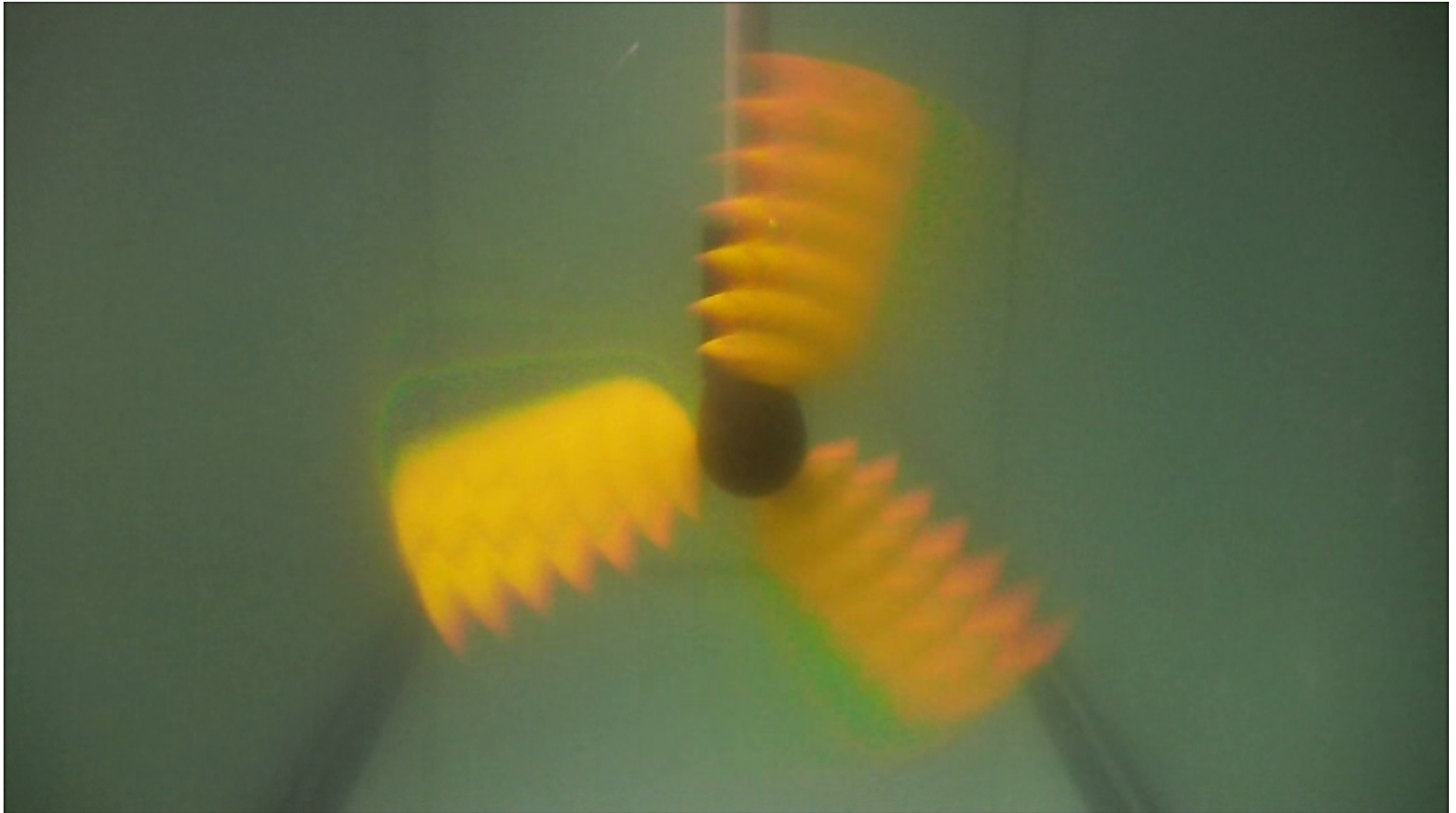
Pierre-Paul Lacas (2013) Sinusoidal Leading Edge on Tidal Blade Turbines, EPUSP.

Blade design



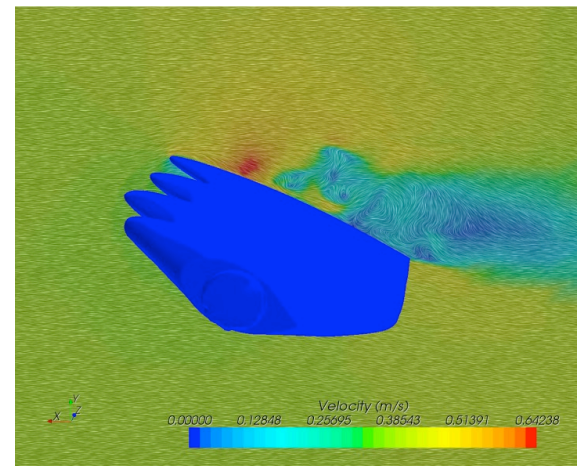
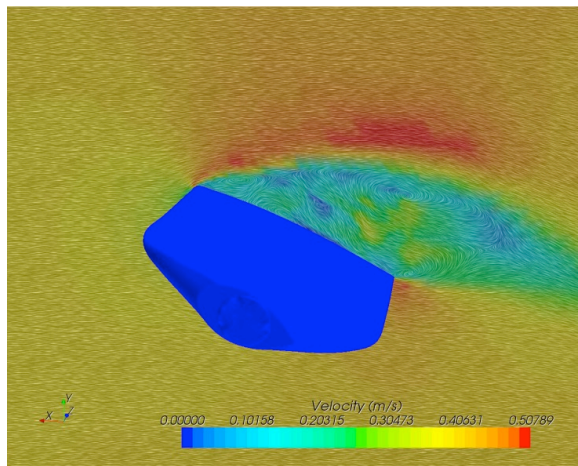
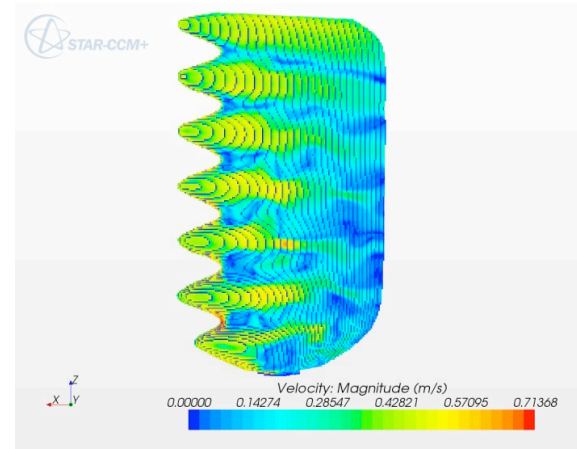
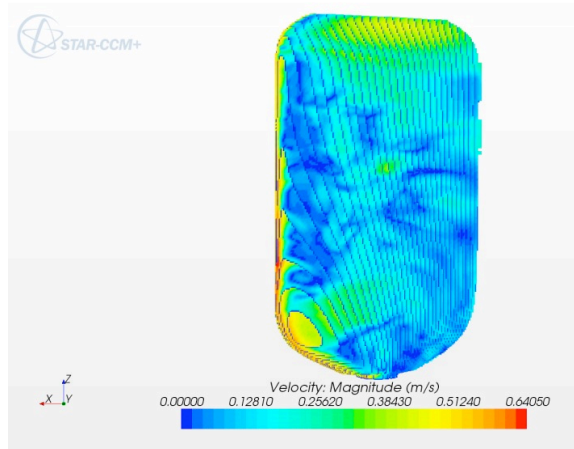
Pierre-Paul Lacas (2013) Sinusoidal Leading Edge on Tidal Blade Turbines, EPUSP.

Blade design



Pierre-Paul Lacas (2013) Sinusoidal Leading Edge on Tidal Blade Turbines, EPUSP.

Blade design

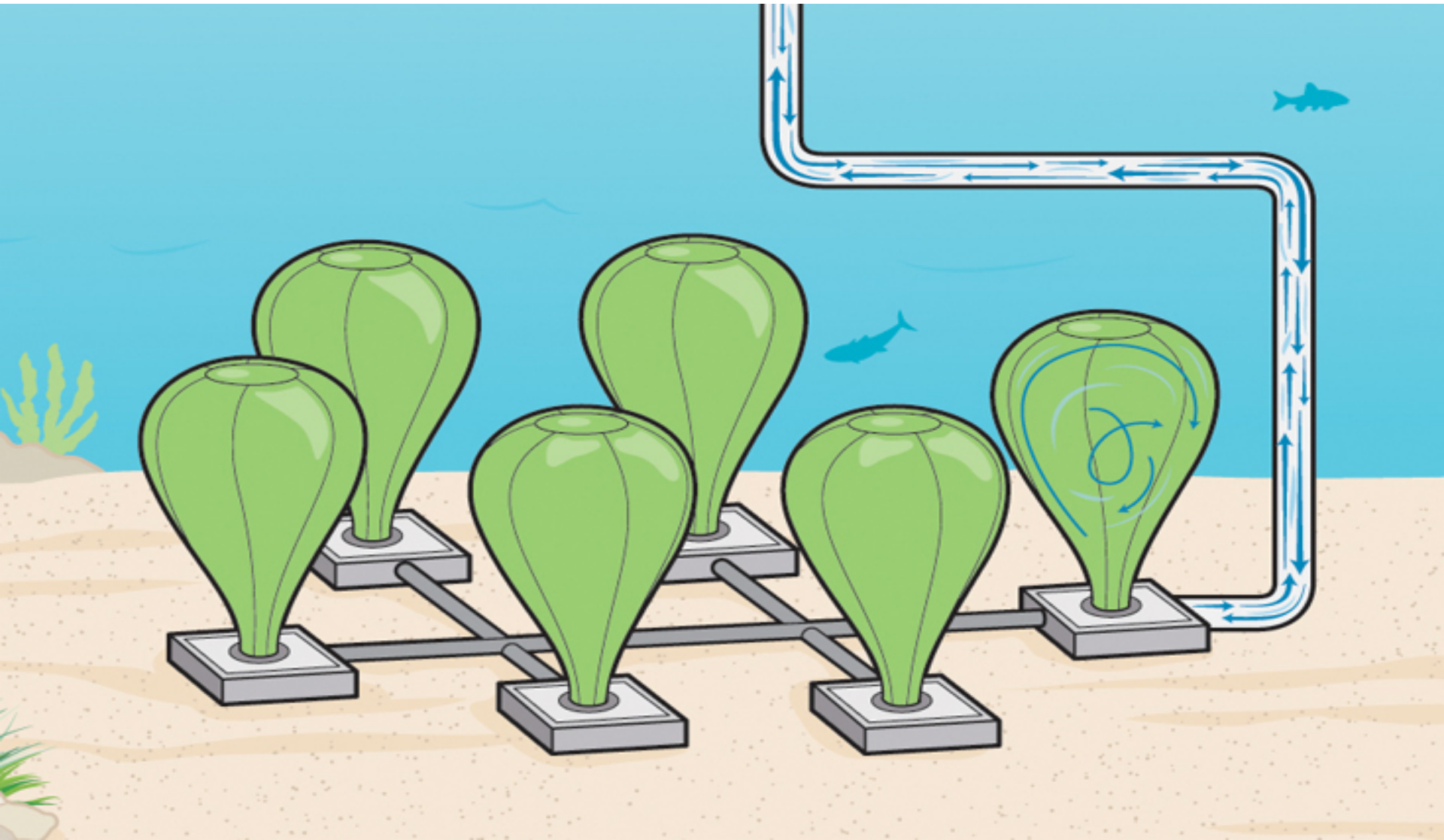


Pierre-Paul Lacas (2013) Sinusoidal Leading Edge on Tidal Blade Turbines, EPUSP.

Energy Storage

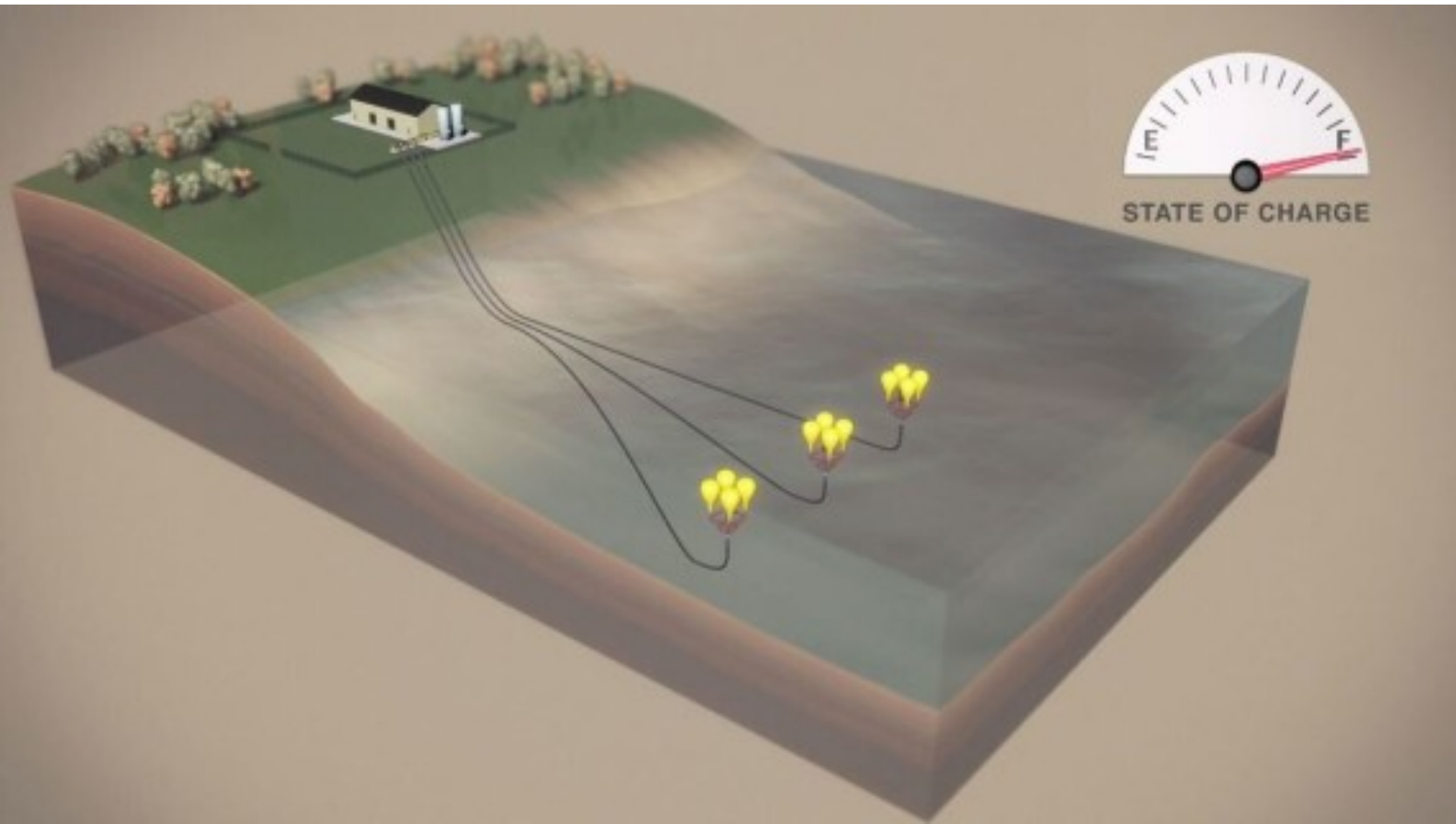
Ocean batteries

Energy storage



Energy storage

Hydrostor
www.hydrostor.ca



Energy storage



Thank you

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