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SHORE PROTECTION THROUGH ALTERNATIVE ENERGY DEVICES

Are there engineering works that jointly protect the shoreline (reduce beach erosion) and serve as alternative sources of electric energy?

wave energy converter devices

Pelamis wave energy converter

Agucadoura, Portugal

Pelamis wave energy converter

Agucadoura, Portugal

Installed: September 2008

Removed: November 2008
due to mechanical problems

3 converters @ 750 kw each

590-ft long, 12-ft diameter per unit

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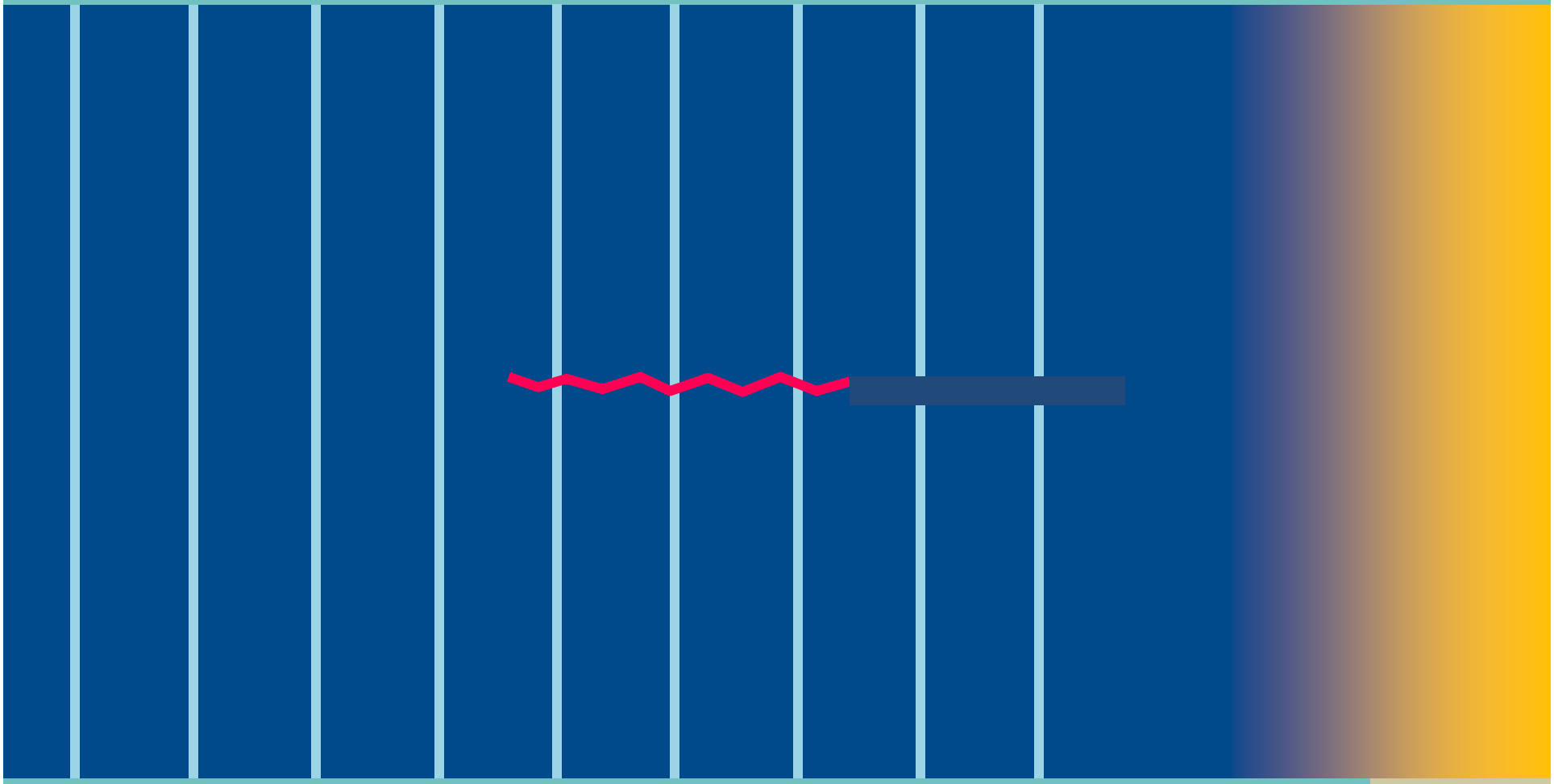
Pelamis “snake-type” wave energy converter



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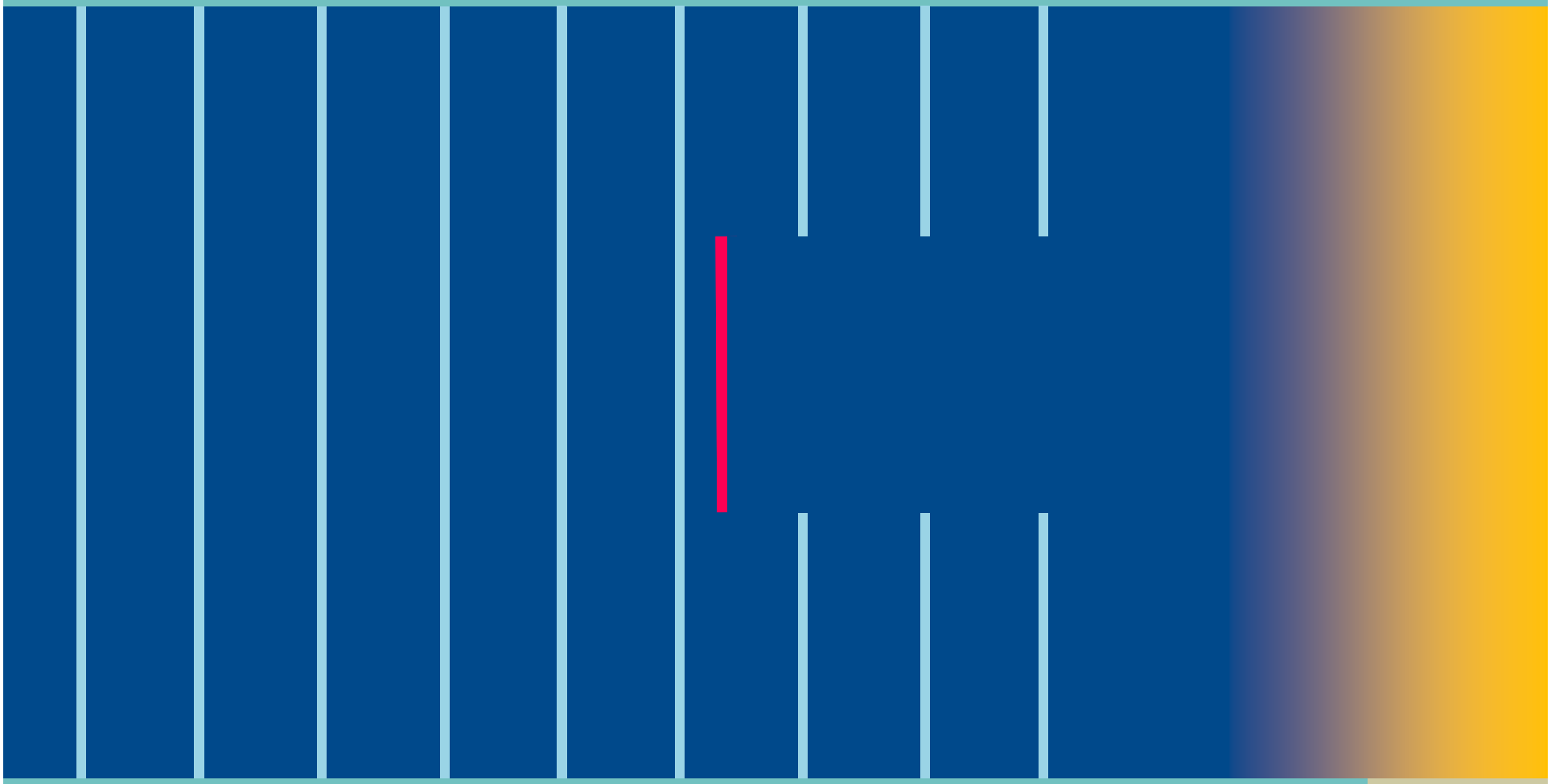
Conventional breakwater for shore protection



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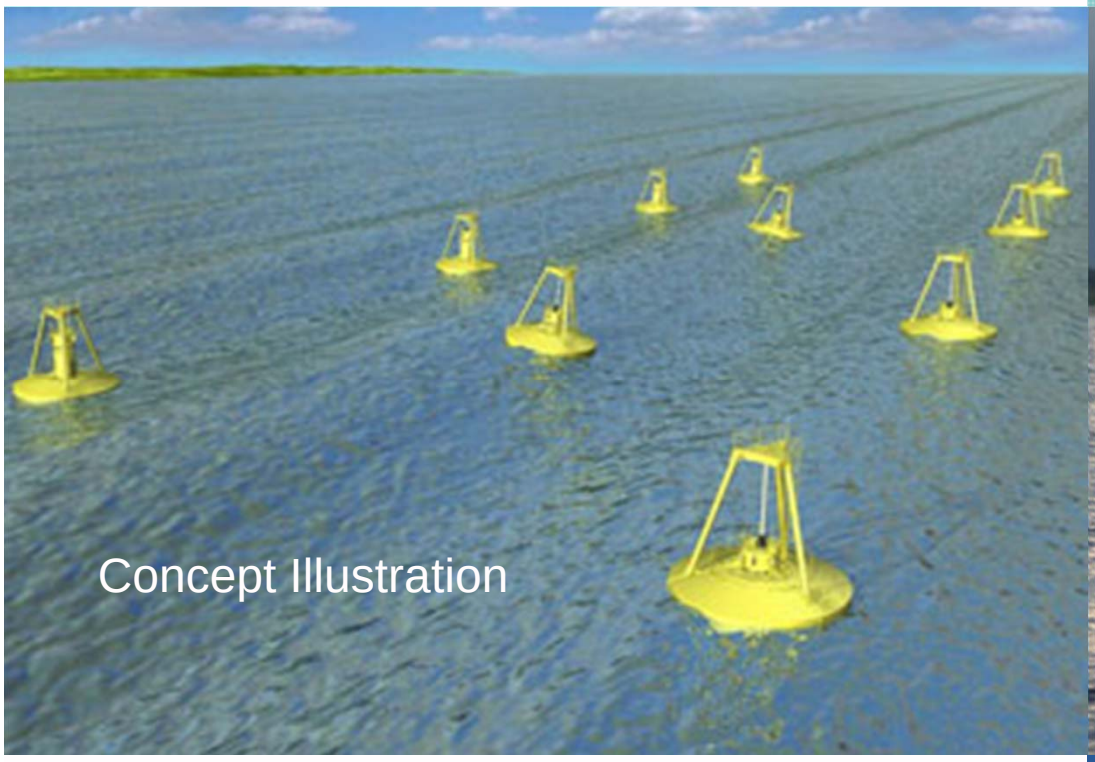
Ocean Power Technologies

PB4ONJ Powerbuoy

Kaneohe Bay, Oahu, Hawai'I

Deployed: 14 December 2009



Concept Illustration

3000-ft offshore, 100-ft water

>183 days operation; grid-connected

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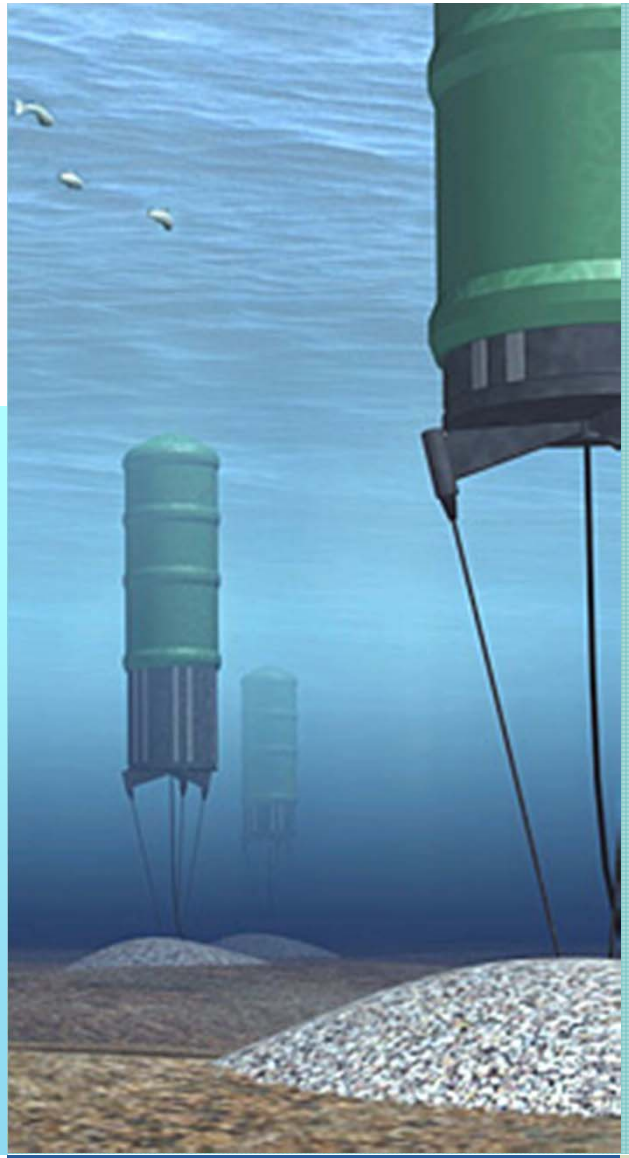
AWS Ocean Energy Ltd.

Archimedes Wave Swing



Concept sketch

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LIMPET

Land Installed Marine Power
Energy Transmitter

Isle of Islay, Scotland

November 2000

500 kW; 3 concrete columns collect water waves in a shoreline recess in 20-ft water depth, and compress air.

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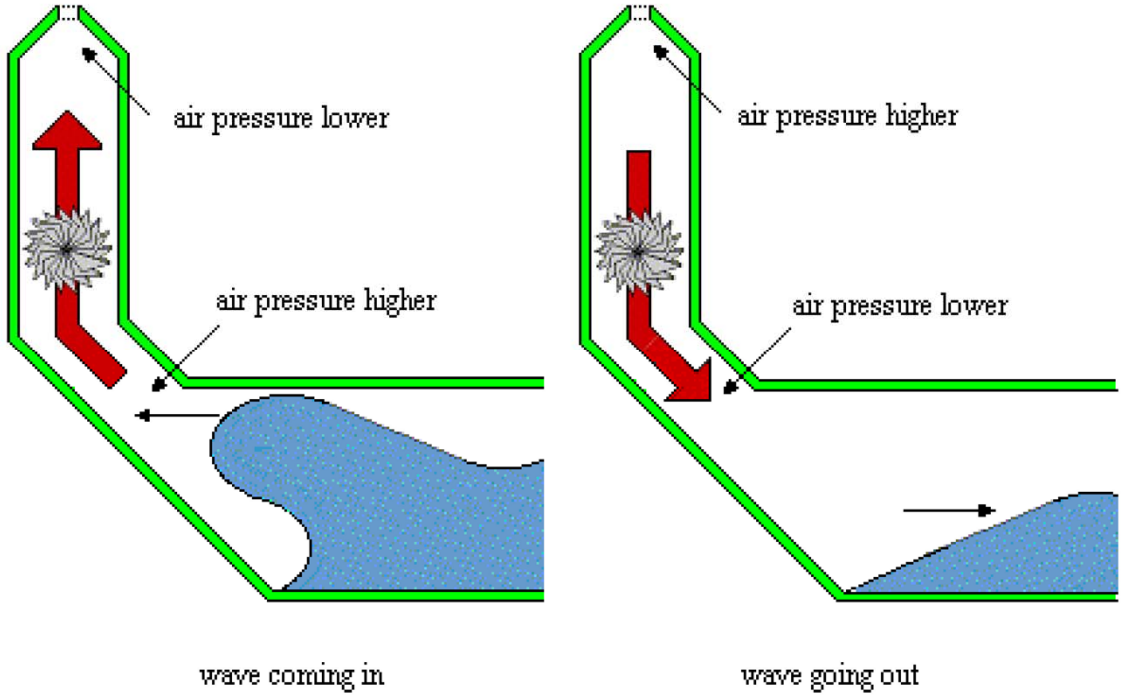
Wave Tower

Kvaerner Brug (and others)

Toftestallen, Norway

1985-91, 1987-1991



350 & 500 kW systems

Both destroyed by storms, c. 1991

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Poseidon Wave Generator

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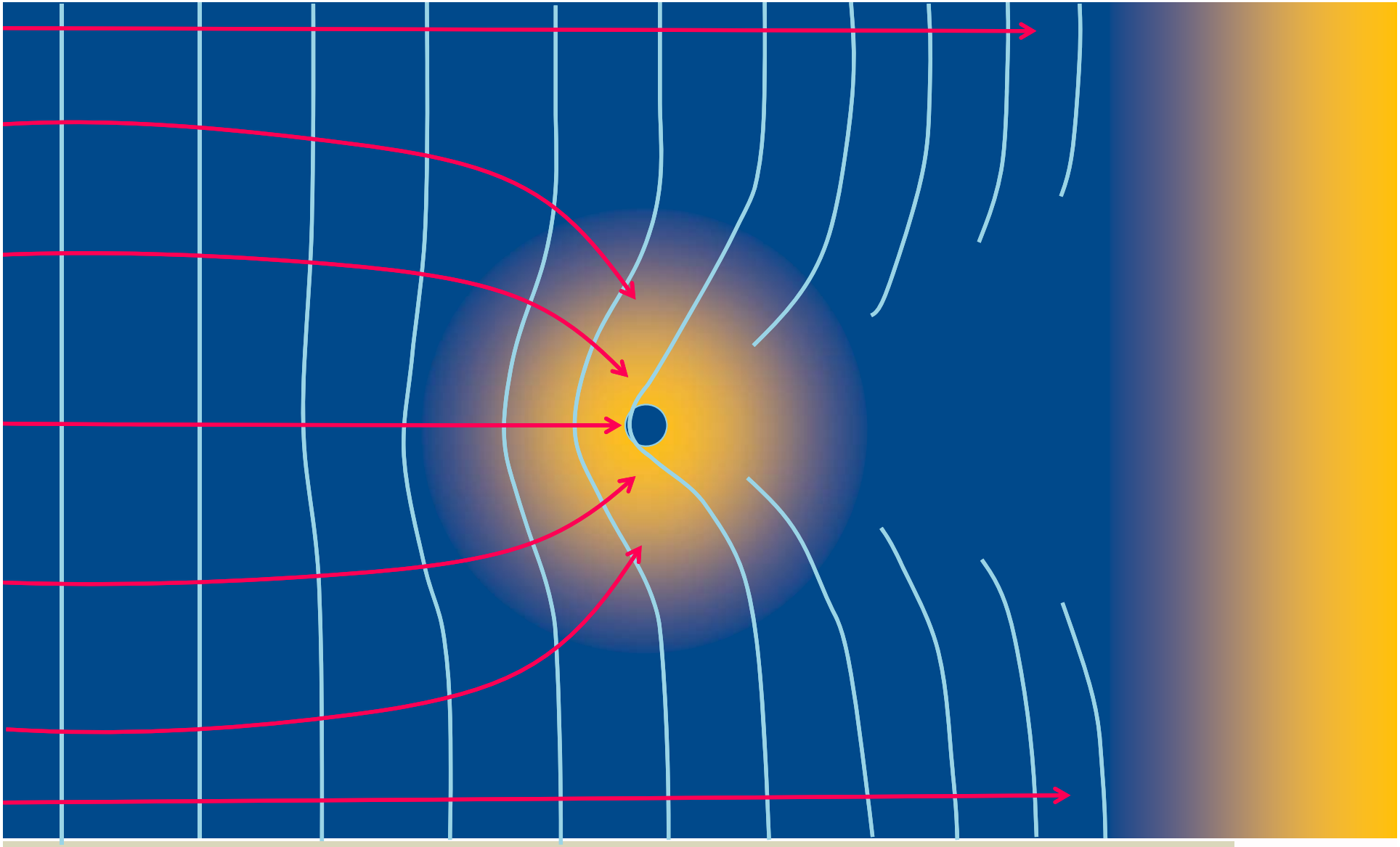

Dam Atoll

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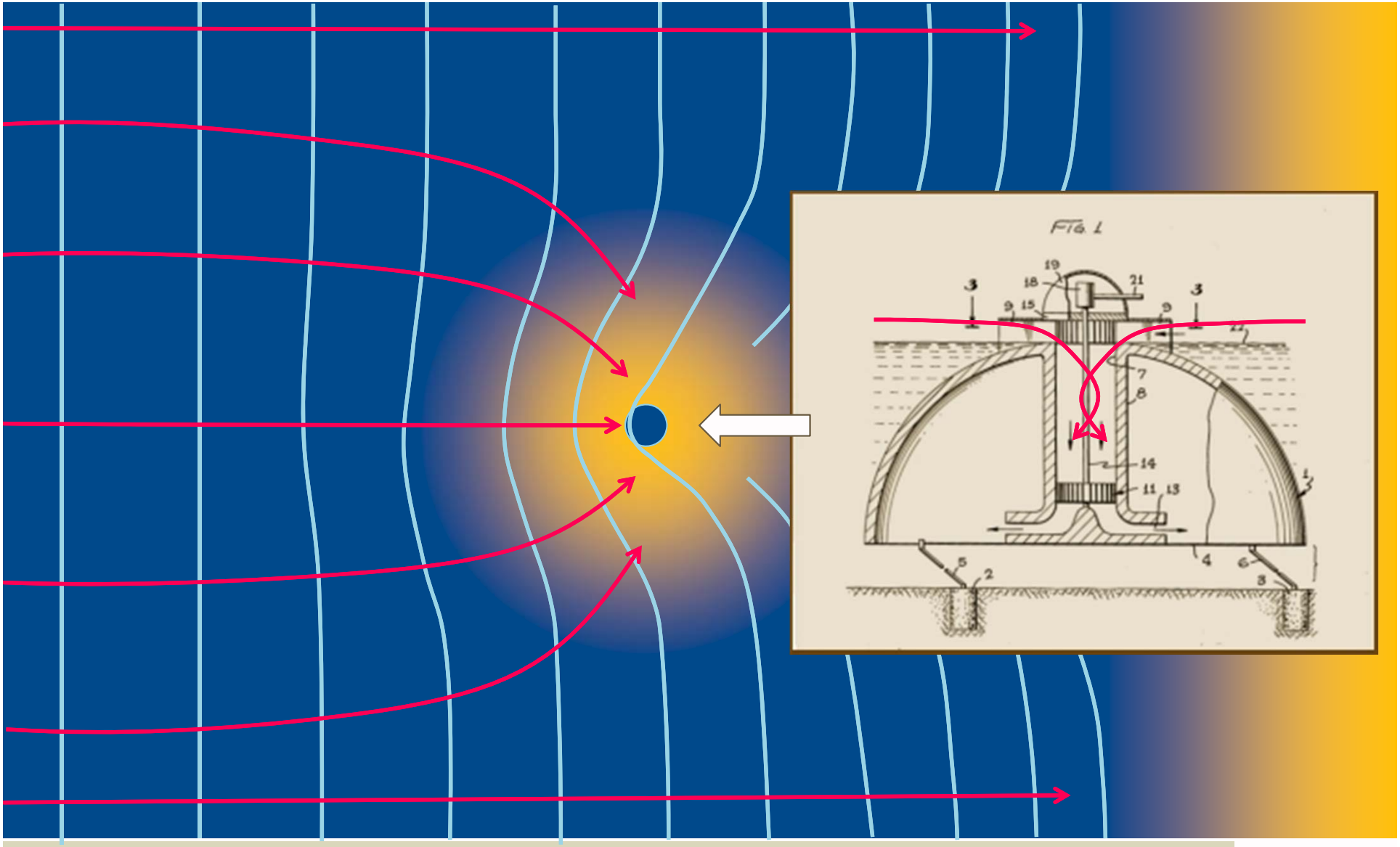

Dam Atoll

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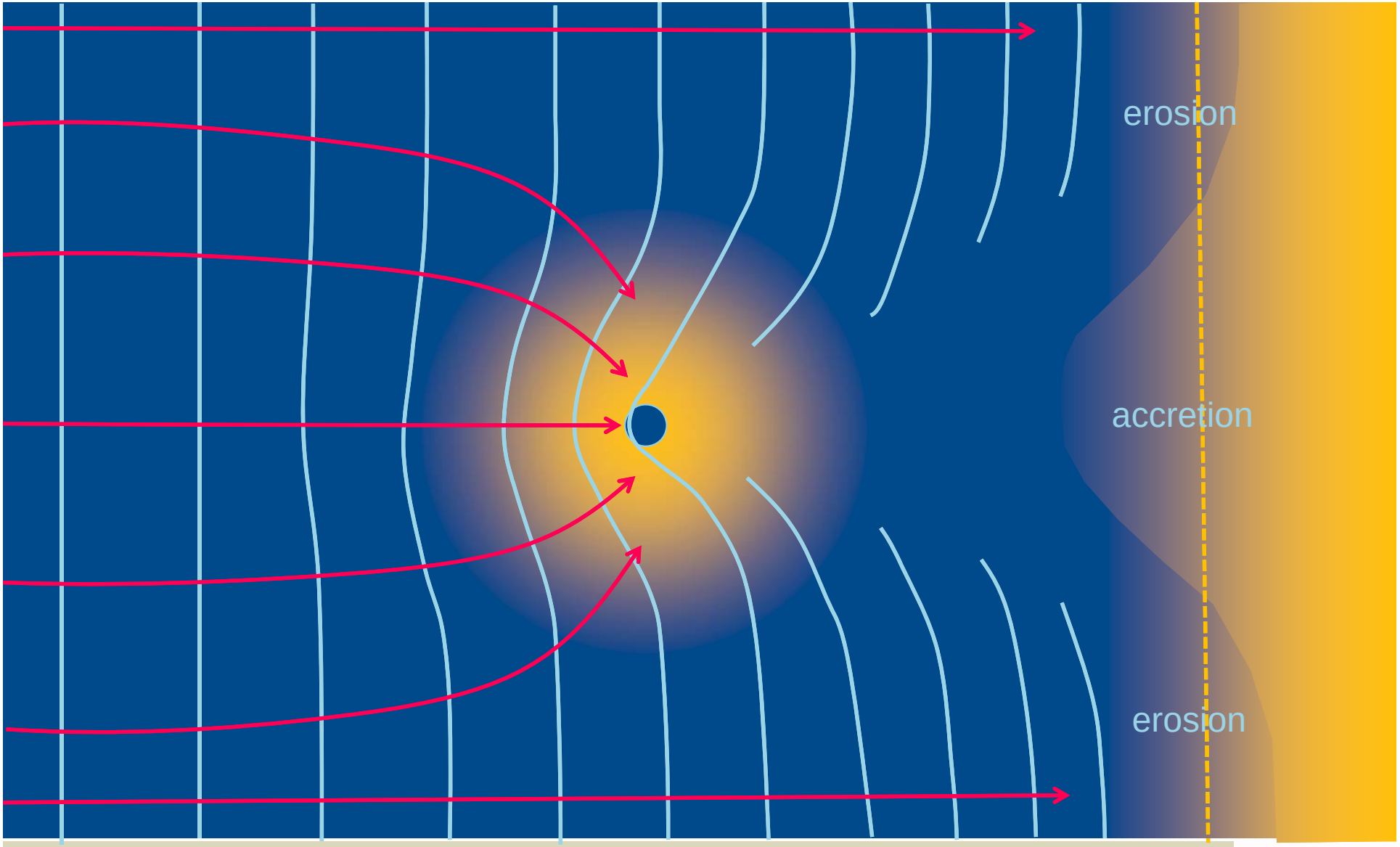

Dam Atoll

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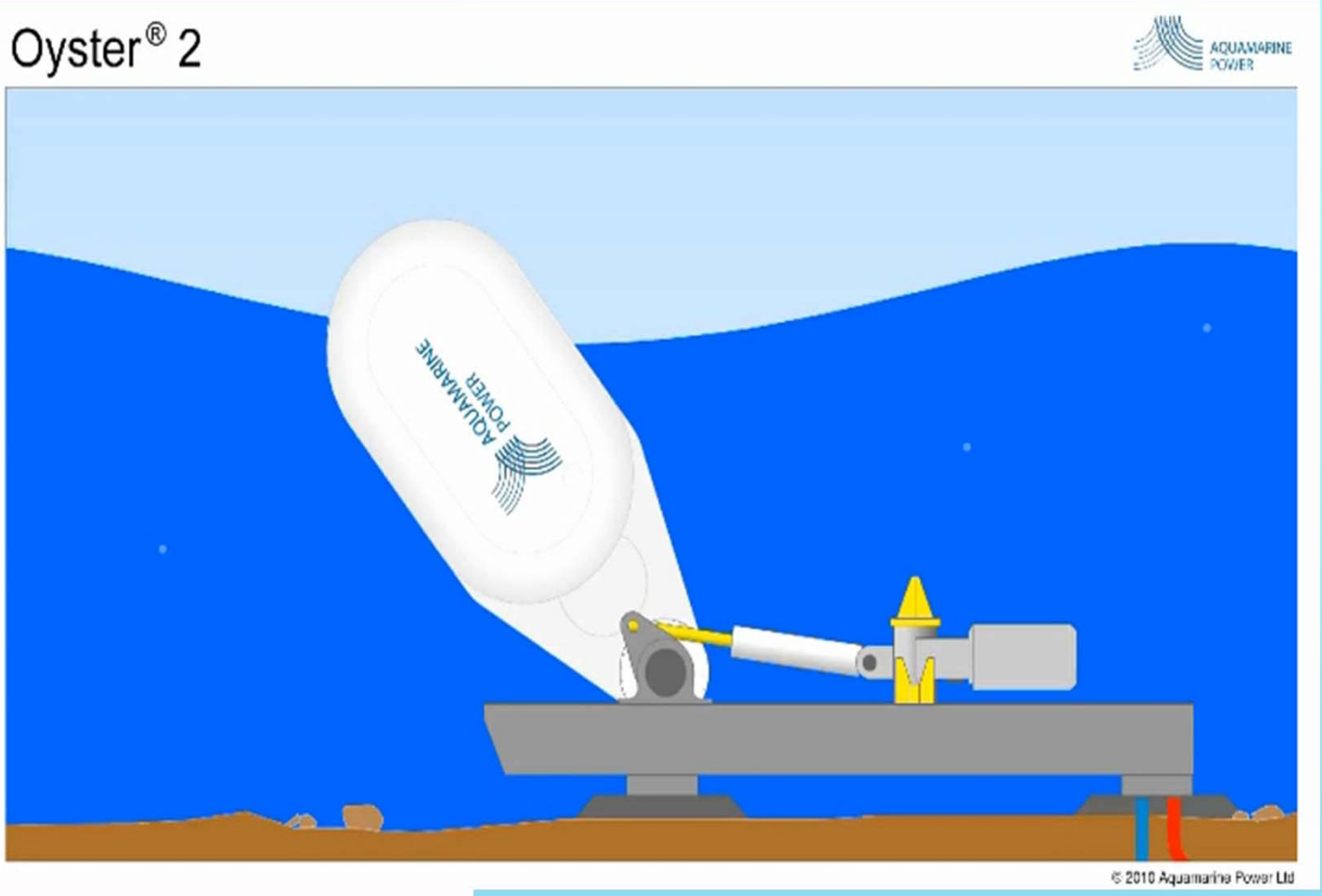
Oyster 1
Wave Power Device

Scotland, U.K.

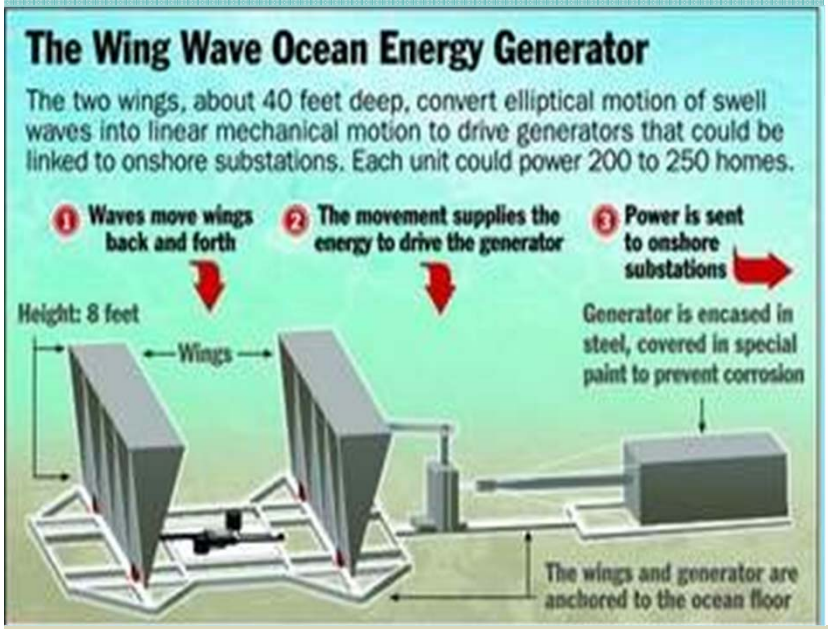


Oyster
Wave Power Device

Scotland, U.K.

Oyster
Wave Power Device

Scotland, U.K.



Wing Wave Ocean Energy Generator

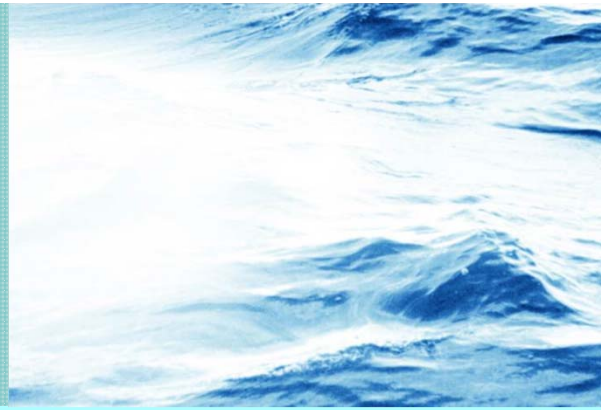
Florida Tech / SebaiCMET

Prototype:
Ft. Pierce Florida

Deployed: November 2010

Destroyed within a few weeks
(the wings were not found upon retrieval)

CONCLUSIONS



Alternative energy devices to create electrical power from ocean waves are not generally suitable for purposes of shore protection, at least upon an open coast.

Wave energy devices typically do not significantly block wave energy from reaching the shore (because of their size, location, orientation, submergence, or conformance with passing waves).

Devices that block wave energy would act as a breakwater and may possibly cause adverse impacts to adjacent shores on an open coast.

To-date, many prototype devices in open water have been damaged by waves and failed.

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