

Control of wave energy converters for the production of potable water from sea waves

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Motivation

- Wave energy is a renewable source of energy
- It is widely available and can be used for the production of electricity and/or potable water
- The work here is focused on the production of potable water through a desalination process called Reverse Osmosis (RO)
- Wave-powered desalination is attractive since both of the primary requirements, seawater and energy, are available at the same location
- Water desalination is greatly important in arid areas

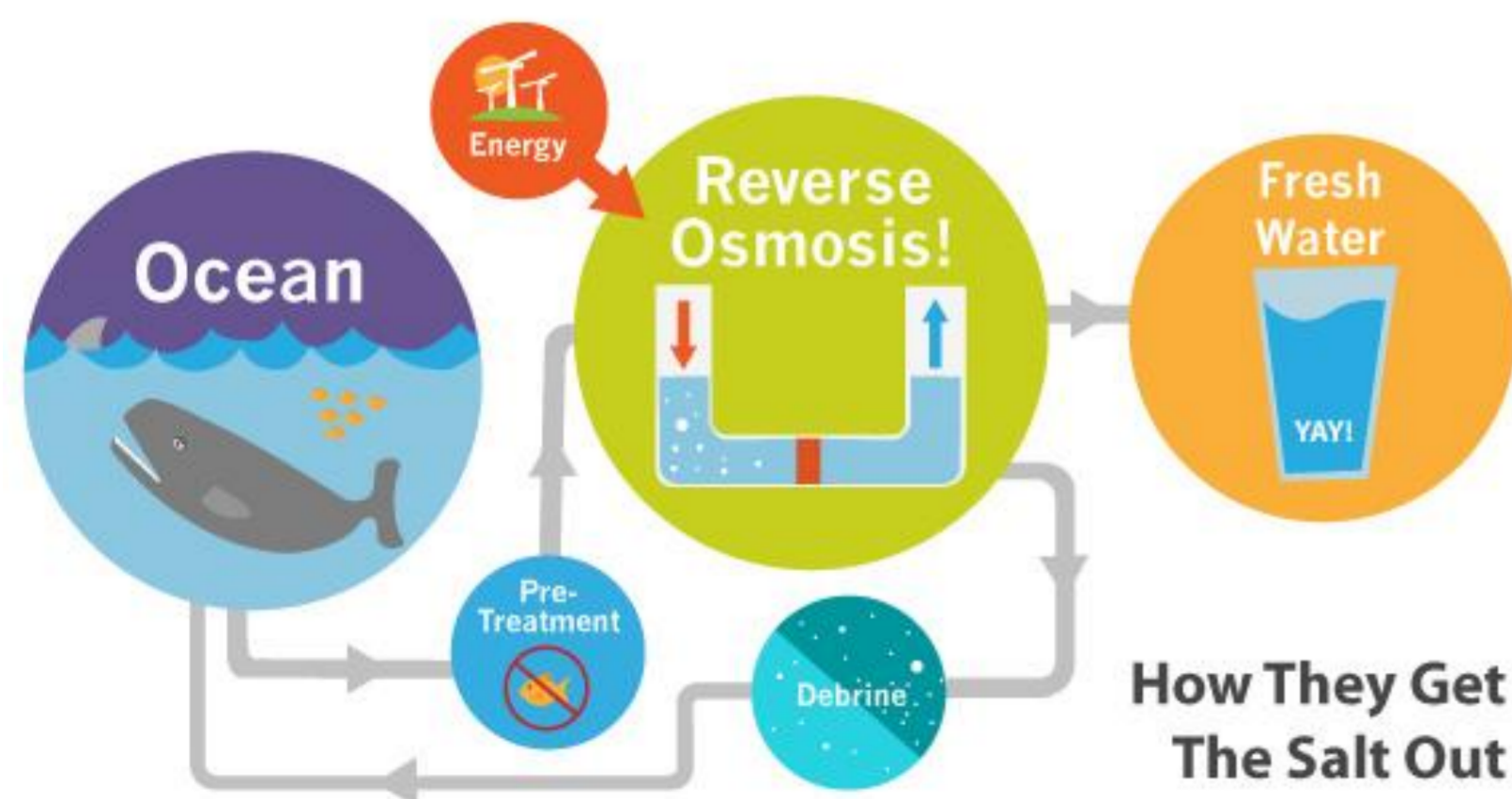


Figure 1: Desalination process

Wave Energy Converters (WECs)

- WECs are devices that convert wave energy into useful forms of energy
- WECs are bulky, expensive devices that need to operate in harsh environmental conditions



Figure 2: Wave Energy Converter

Control of WECs

- Application of control is paramount in order to ensure survivability and efficiency maximisation of WECs
- WEC models are often associated with nonlinearities and/or other constraints that make their control difficult
- Application of stability theory proves the system is stable even if every nonlinearity cannot be eliminated
- Stability guarantees ensure the device will not be destroyed

Conclusions

- Wave energy is a renewable source of energy that can be used for the production of electricity and/or potable water
- WECs are bulky, expensive, prone to failure devices due to the harsh conditions they need to operate in
- Application of WEC control ensures safe operation of WECs, which in turn helps towards commercialisation of wave energy through cost reduction