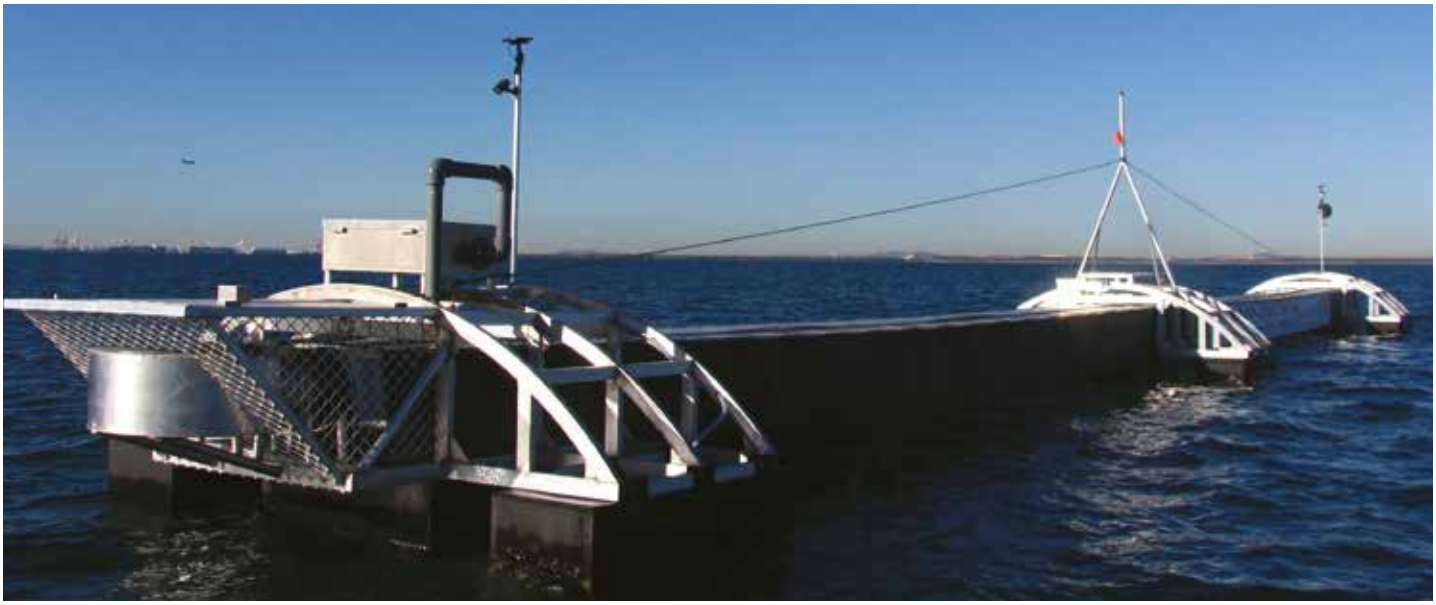
WPE

# Wave Power Engineering



www.wavepowerengineering.com

# Wave Mill is the best ocean wave energy converter


Wave Mill - Prototype

- Converts ocean waves into electricity
- Generating capacity is fully adaptable for customer needs
- Deck is completely open to customer applications
- Can be deployed offshore or close to shore locations

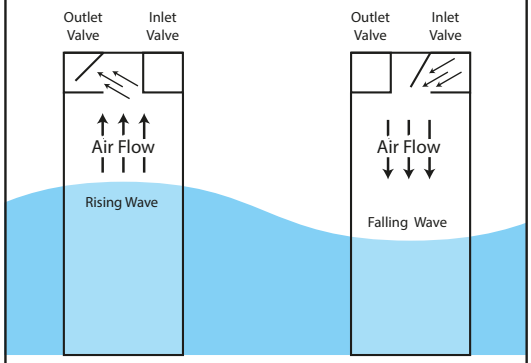

Research & Development


Air Turbines

## How the Wave Mill works

The wave mill is made up of multiple oscillating water columns (OWC's) rigidly connected to each other. Each oscillating water column has an inlet and outlet valve. When the water level inside the OWC rises, air is pushed through an outlet valve. When the water level drops, air is sucked in through an inlet valve. A row of OWC's are connected by inlet and outlet air ducts, these are fed air from the OWC's inlet and outlet valves. At the end of each inlet and outlet duct is an air turbine which generates electricity from the airflow created by the rising an falling motion of a wave.

**Schematic of an Oscillating Water Column**

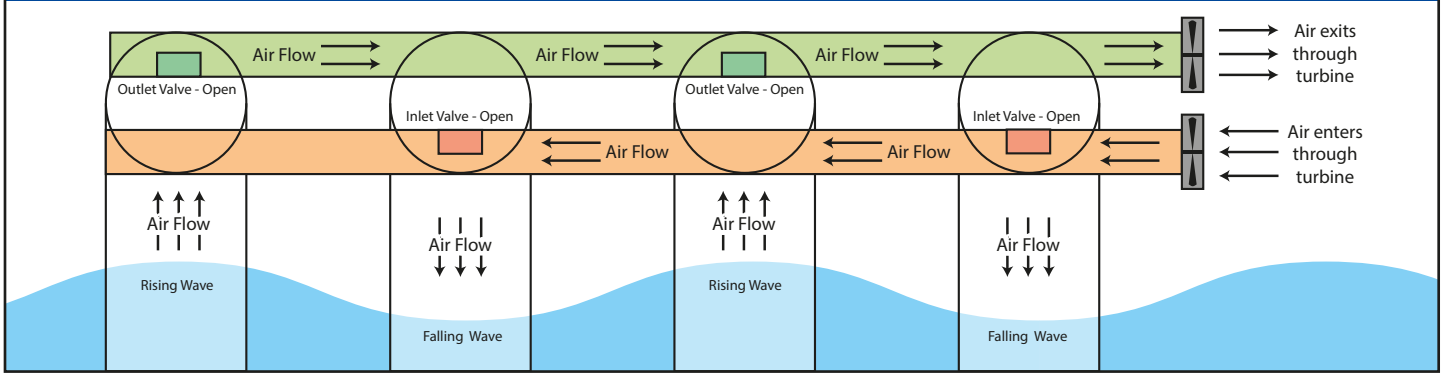



When a wave passes along a line of oscillating water columns there will always be one oscillating water column that is pushing air out and one that is sucking air in. This means there will always be air flow coming from the inlet and outlet ducts to drive the air turbine and generate electricity.

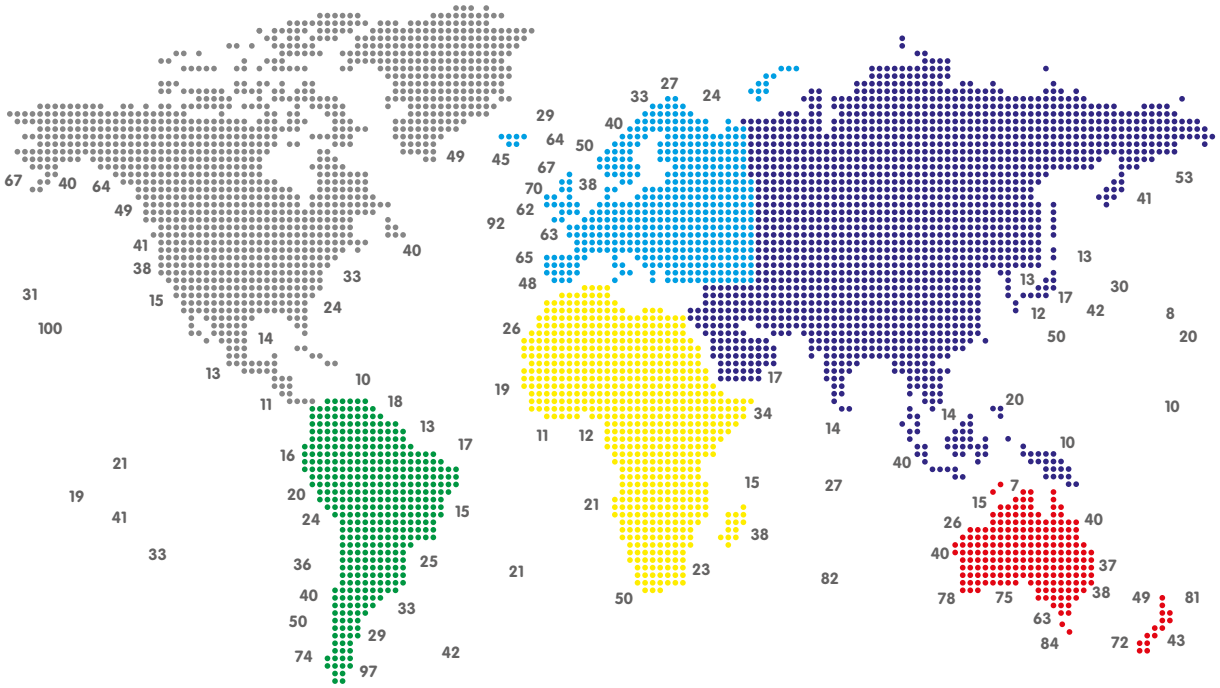
The number of lines of oscillating water columns will define the overall electricity generating capacity.

The length of the air ducts connecting the Oscillating Water Column's will depend on the wave length in the mooring location.

**Floating Wave Power Plant** - Passage of a wave through a line of OWC's



# How much power is in ocean waves




Annual average wave energy flux in kW per metre of wave front

## Advantages of wave energy:

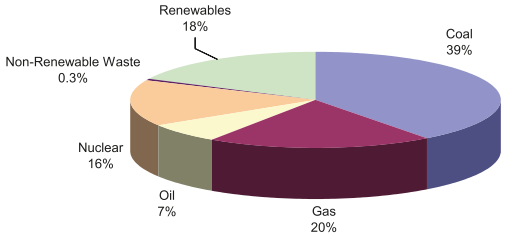
- Unlike solar or wind energy, the ocean delivers wave energy 24/7
- Waves are the most concentrated form of renewable energy derived from the sun
- Waves have a greater energy density than both solar and wind, are more predictable and have greater consistency
- Wave energy provides 15-20 times more available energy per square meter than either wind or solar

## Market Opportunity

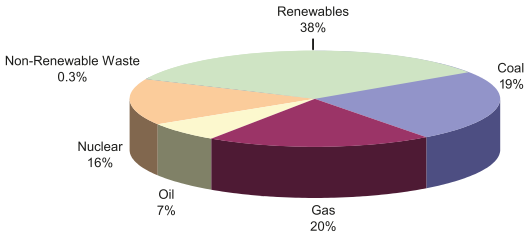
- With a future decline in Coal Power Stations there is a growth opportunity for renewable energy sources to increase their share in the market place.
- Ocean waves deliver 8000 – 80000 TeraWatt hours (TWh) per year. The global potential of wave energy requires a £500bn industry to deliver the full potential.
- The World Energy Council has estimated that approximately 2 TeraWatts (2 million megawatts), about double current world electricity production, could be produced from the oceans via wave power
- Regional theoretical potential of wave energy (TWh/yr)

| | |
|---|---|
| Western and Northern Europe | 2,800 |
| Mediterranean Sea and Atlantic Archipelagos | 1,300 |
| North America and Greenland | 4,000 |
| Central America | 1,500 |
| South America | 4,600 |
| Africa | 3,500 |
| Asia | 6,200 |
| Australia, New Zealand and Pacific Islands | 5,600 |

### Current Energy Production Sources




### Future Energy Production Sources



## Wave Mill customers and applications



• Close to shore communities • Island resorts • Offshore industries • Mariculture
• Offshore support facilities • Marinas • Boatels • Coastal protection

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**WPE Pty Ltd**
Clean Energy Solutions
ABN: 321 166 362 96

+61 438 046 507
info@wavepowerengineering.com
www.wavepowerengineering.com