European Commission

# Offshore Renewable Energy Strategy

## Key Technologies

19 November 2020
#EUGreenDeal

To become climate-neutral by 2050, the EU needs to further develop **reliable and efficient sources of renewable energy**.

Most of our renewable energy is currently produced on land. However, there are also a range of technologies for renewable energy production at sea with considerable potential for further development.

There are **opportunities for offshore renewable energy all across Europe** - from the North Sea and Baltic Sea to the Atlantic Ocean, the Mediterranean Sea and the Black Sea. **And all of Europe will benefit from the sustainable development of offshore energy:**

- It will feed into the European grid;
- It will offer cleaner energy to citizens;
- It will reduce our dependence on energy imports;
- It will support industry across the EU.

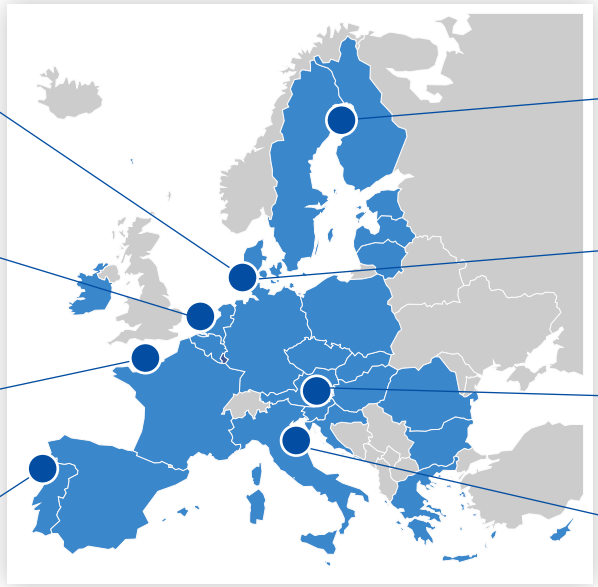
## Examples of projects and production sites

**Offshore bottom-fixed**
**HORNS REV 3**
406.7 MW

**Offshore floating solar PV**
**Oceans of Energy**
17 kW (expected 50kW by end 2020)

**Tidal**
**Hydroquest Ocean**
1000 kW

**Floating Wind**
**WindFloat Atlantic**
25 MW



**Offshore bottom-fixed**
**Kårehamn Offshore Windfarm**
48 MW

**Algae production for biofuels**
**MacroFuels**
Market readiness envisaged for 2030

**Manufacturing sites**
**Power Converters**
**Hubs & Shafts**

**Wave Energy**
**ISWEC**
50 kW

## Technologies supported by the Offshore Renewable Energy Strategy

**The EU offshore renewable energy strategy looks at a broad range of technologies**. Some of them are already well advanced, while others are still on their way to the commercial stage.

Commercially operational

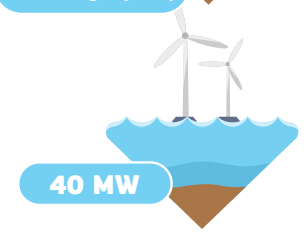
Market Developing

Technology development stage

Early R&D

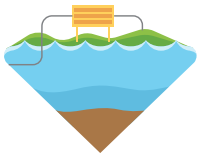

### OFFSHORE WIND (Bottom-fixed)

Offshore wind turbines have a greater output than onshore (as there are no trees, hills and buildings to slow down the wind). **The EU is the world leader in the manufacture** and use of this technology.




### OFFSHORE WIND (Floating)

Floating wind turbines are at an earlier development stage. They show **greater flexibility than bottom-fixed turbines** to adapt to the direction of the wind and the different EU sea basins.



### DIRECT CURRENT TECHNOLOGIES FOR GRID

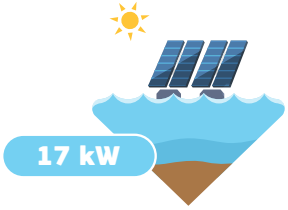
Direct Current technologies for grid, such as High Voltage Direct Current converters and systems, can efficiently convey huge amounts of offshore renewable energy to land, enabling the seamless integration of **high shares of renewables**.


### WAVE ENERGY

This new technology harnesses the power created by waves, based on the motion of floats which ride the waves. Different technologies are being developed with considerable **potential for decarbonising EU islands**.


### TIDAL ENERGY

Tidal energy transforms the movement of tides into electricity – using tidal currents to drive underwater turbines. It is a fully predictable form of renewable energy that **can contribute to a more stable power grid**.




### SOLAR ENERGY (Floating)

Offshore photovoltaic panels have **the potential to make the most of the sun at any moment during daylight hours**. This technology is still at an early stage of development.

### ALGAE FOR BIOFUELS

Algae can be used as a source of biofuels such as biodiesel, biogas and bioethanol. This technology is still in its early development but **shows a promising potential**.



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