

# Ocean Energy

## Key trends and statistics 2021

March 2022



Ocean Energy  
Europe

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# Key findings



## Europe

The ocean energy industry bounces back



### TIDAL STREAM

Installed capacity jumps back to pre-pandemic levels

2021 INSTALLATIONS

**2.2 MW**

capacity added.

A tenfold increase on 2020's capacity additions.

CUMULATIVE INSTALLATIONS

**30.2 MW**

installed in Europe since 2010.

11.5 MW is currently in the water.

Tidal energy hits

**68 GWh**

power production milestone.



### WAVE ENERGY

Deployments on the rise again

2021 INSTALLATIONS

**681 kW**

capacity added.

A threefold increase despite pandemic-related delays.

CUMULATIVE INSTALLATIONS

**12.7 MW**

installed in Europe since 2010.

1.4 MW is currently in the water.



## Rest of World



### TIDAL STREAM

New European turbines installed in



### WAVE ENERGY



Australia deploys its first utility-scale wave device.



## 2021 Milestones

A new step towards industrialisation



### TIDAL STREAM



### WAVE ENERGY

attracted

**€70M**

in private and public investments.

- ▶ Large European OEMs joined the ocean energy market.
- ▶ European developers secure new export projects in Indonesia and the Caribbean.

New support mechanisms for demonstration projects



- ▶ The UK launches new renewable energy auctions with dedicated support for tidal stream.
- ▶ Spain launches offshore renewables roadmap.
- ▶ The USA makes its largest public investment in ocean energy to date.



## 2022 outlook

Steady growth for both tidal and wave around the world



### TIDAL STREAM

EUROPE

OUTSIDE OF EUROPE



**1.4 MW**

of capacity is slated for installation.



**1 MW**

of capacity is slated for installation.



### WAVE ENERGY

EUROPE

OUTSIDE OF EUROPE



**2.8 MW**

of capacity is slated for installation.



**1.1 MW**

of capacity is slated for installation.



## Global total since 2010



### TIDAL STREAM

2021 INSTALLATIONS

**3,120 kW**

CUMULATIVE INSTALLATIONS

**39.6 MW**



### WAVE ENERGY

2021 INSTALLATIONS

**1,385 kW**

CUMULATIVE INSTALLATIONS

**24.7 MW**



## Europe: The ocean energy industry bounces back

Despite lockdowns and worldwide supply chain disruptions, the ocean energy sector hit several significant milestones in 2021 and installations rebounded after a dip in 2020. New devices were deployed along the Atlantic, the North Sea and the Mediterranean, several exciting new projects were announced, while political support and investments also increased.



### TIDAL STREAM: Installed capacity jumps back to pre-pandemic levels

#### Tenfold increase in capacity additions

**Annual installations** – 2.2 MW of new tidal stream capacity was deployed in Europe in 2021, up from 260 kW in 2020. This tenfold increase was expected, as several projects postponed from 2020 went ahead in 2021. The next major capacity increase in tidal stream is now expected around 2025, with a new generation of tidal arrays in the pipeline.

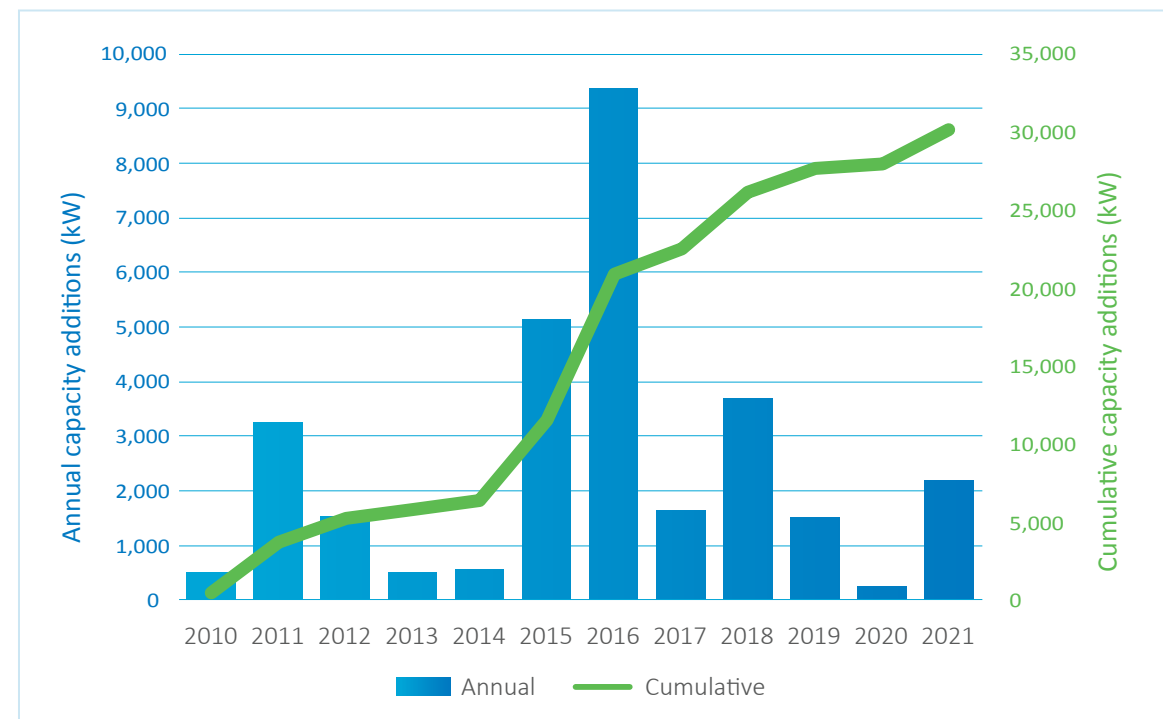


Figure 1: Annual and cumulative tidal stream capacity in Europe

Source: Ocean Energy Europe

**Cumulative installations** – 30.2 MW of tidal stream technology has been deployed in Europe since 2010. Of this, 11.5 MW is currently operating, and 18.7 MW has been decommissioned as projects successfully complete their testing programmes. On top of these new devices, the Magallanes ATIR platform was also re-deployed, bumping up the operating capacity figure for 2021.

#### New designs

Three devices were deployed in Europe in 2021 as part of demonstration projects. These devices are a good example of the various approaches and designs adopted by developers to conquer the tidal market.

- With its O2 machine, Scottish Orbital Marine Power went for a floating horizontal-axis turbine design, with low O&M costs. The company is focussing on high-capacity devices, aimed at the mainstream, utility-scale market.
- The 100 kW prototype installed this year by Swedish developer Minesto is the second iteration of its innovative model. The company is currently targeting island markets and ocean currents with its tidal kites.
- Water2Energy has designed and installed a vertical axis turbine that can extract power from tidal currents around locks, docks and dams. The developer is taking advantage of the Netherlands' specific tidal resource and infrastructure, creating a technology tailored to function in existing coastal structures.

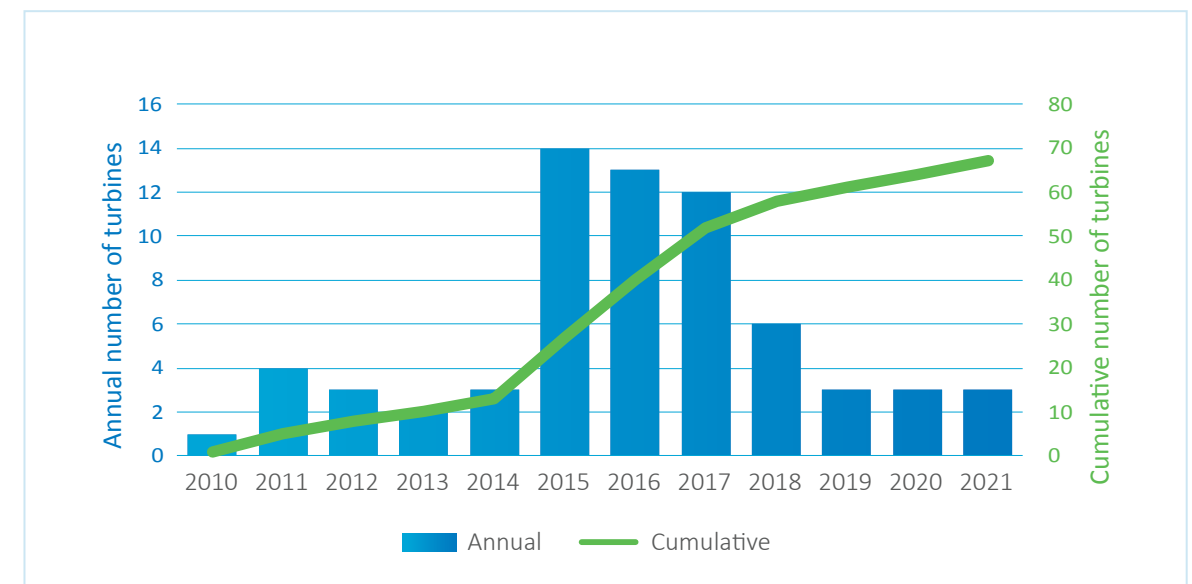


Figure 2: Annual and cumulative tidal turbine installations in Europe

Source: Ocean Energy Europe





## Several new installations around the North Sea

Minesto added another tidal kite to its first commercial project in the Faroe Islands. Supported by the local energy utility, this successful deployment and the extension of Minesto's PPA shows the strong commitment of the Faroe Islands to develop and integrate tidal stream as part of their energy mix.

The O2 installation in Scotland was mainly driven by European funding programmes. Building on its historical leadership and quality infrastructure, Scotland remains the most advanced European hub for testing and demonstration of ocean energy technologies.

Boosted by the emergence of newer developers, the Dutch market is also becoming more active as several tidal developers will be deploying devices in the coming years.

Country	Map ref.	Location	Device developer	Device name	Type	Capacity device (kW)	Number of turbines
<b>FAROE ISLANDS</b>	<b>1</b>	Vestmannaund	Minesto	DG100	Kite	100	1
<b>UK (SCOTLAND)</b>	<b>2</b>	Orkney	Orbital Marine Power	O2	Horizontal Axis	2000	1
<b>THE NETHERLANDS</b>	<b>3</b>	Port of Den Helder	Water2Energy	VAWT	Vertical Axis	100	1
<b>UK (SCOTLAND)</b>	<b>4</b>	Orkney	Magallanes Renovables <sup>1</sup>	ATIR	Horizontal Axis	1500	1



**Figure 3:** European tidal stream deployments in 2021

Source: Ocean Energy Europe

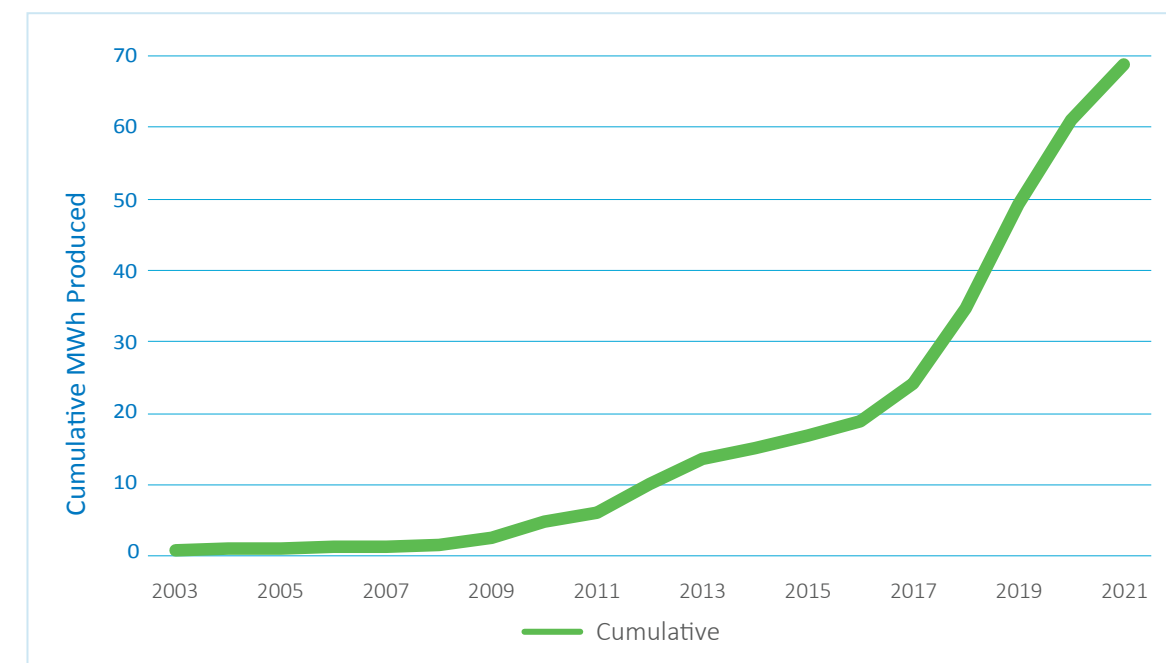
<sup>1</sup>Redeployment of the Magallanes Renovables ATIR platform previously tested at EMEC in 2019 – now rated at 1.5 MW

## Tidal energy hits 68 GWh milestone in 2021

Electricity production from tidal farms and demonstration projects slowed slightly last year. This was mainly due to some extended maintenance work on the first generation of European tidal farms, 5 years after their start of operations.

Led by the 'flagship' Meygen, EnFAIT and Oosterschelde arrays, along with new deployments, the European tidal stream sector exported close to 8 GWh last year – enough to power around 2,000 households.

New generation units - such as Orbital Marine Power's O2 and Minesto's Deep Green kites - were deployed and tested in the second half of 2021 and electricity production from these devices is expected to increase in the coming months.



**Figure 4:** Cumulative MWh produced by tidal stream in Europe

Source: Ofgem Renewables and CHP Register, public releases from developers, information supplied to OEE by developers

## WAVE ENERGY: Deployments on the rise again

### New capacity additions despite pandemic-related delays

**Annual installations** – 681 kW of wave energy was installed in Europe in 2021, with capacity additions tripling compared to 2020. This is an impressive feat, as the global pandemic still severely impacted manufacturing, supply chains and deployment windows.

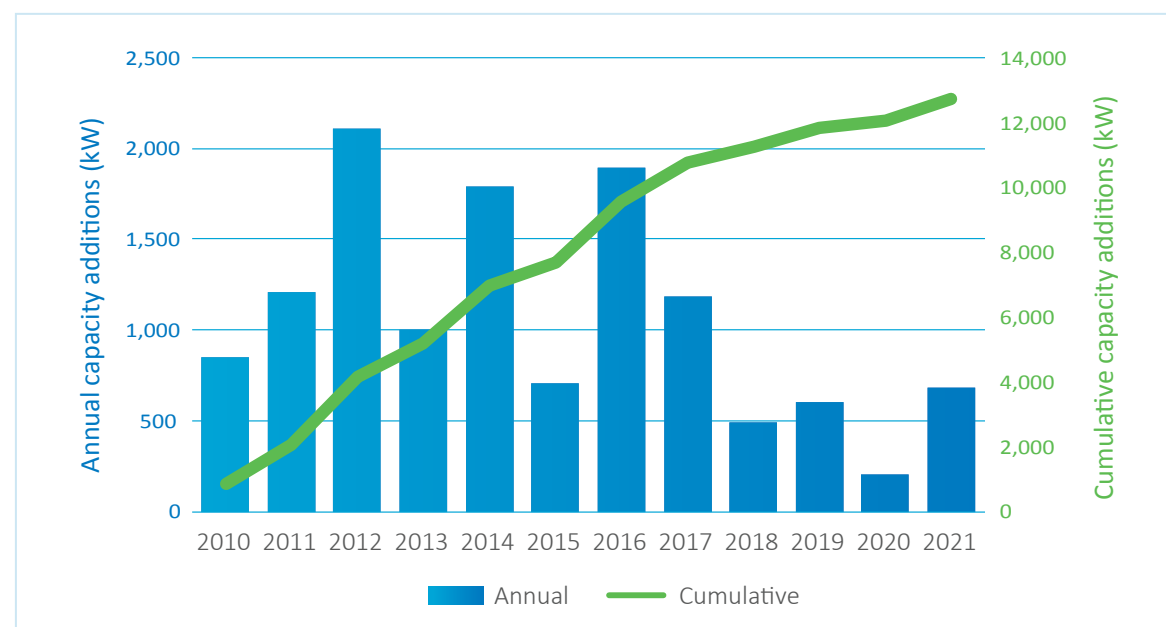


Figure 5: Annual and cumulative wave energy capacity in Europe

Source: Ocean Energy Europe

**Cumulative installations** – 12.7 MW of wave energy has been installed in Europe since 2010. 1.4 MW is currently in the water and 11.3 MW has been decommissioned following the successful completion of testing programmes.

### Europe remains at the epicentre of wave energy deployments

Five devices were deployed in Europe in 2021, including a number of sub-scale devices, signalling a healthy R&D environment.

The 2021 cohort showed once again a diversity of designs – four different types of technologies across five deployments. This is partly due to the wide variety of wave resources targeted by developers, e.g., both strong and mild wave climates, nearshore and offshore etc.

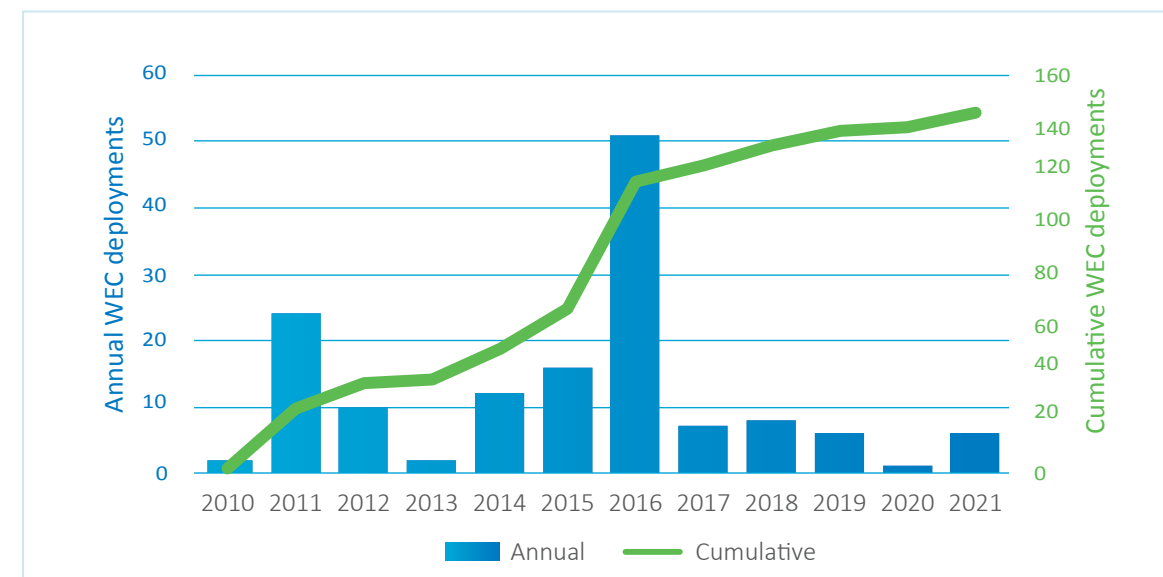


Figure 6: Annual and cumulative wave energy converter (WEC) deployments in Europe

Source: Ocean Energy Europe



Photo: Havkraft

## New deployments in most European sea basins

Scotland, the Netherlands and the Iberian Peninsula are becoming hotspots for wave energy development, with several installations in 2021 and more planned in the coming years. This can mainly be explained by increasing political support in the region, and substantial public funding aimed at progressing the technology.

Support for testing in real-sea conditions drove the majority of deployments this year and should continue doing so until 2025.

Country	Map ref.	Location	Device developer	Device name	Type	Capacity device (kW)	Number of turbines	Scale
NORWAY	1	Haddal	Havkraft	HWEC	Oscillating water column	30	1	01:10
UK (SCOTLAND)	2	Orkney	MOCEAN	Blue X	Attenuator	10	1	01:10
THE NETHERLANDS	3	Port of Den Helder	Slow Mill	Slow Mill	Point absorber	40	1	01:10
CYPRUS	4	Larnaca Bay	SWEL	WLM	Attenuator	1.4	1	?
SPAIN	5	Bay of Biscay	Wello Oy	Penguin 2	Rotating mass	600	1	1



Figure 7: European wave energy deployments in 2021

Source: Ocean Energy Europe



## Global perspective

39.6 MW of tidal stream and 24.7 MW of wave energy have been deployed globally since 2010. The ocean energy industry weathered the Covid-19 storm and deployments are now back on track despite global supply-chain disruptions.

Canada, China and the USA remain the main ocean energy markets outside of Europe in 2021, with stable public support mechanisms. The USA significantly increased grant investments into the sector, reaching US\$200m (€193m) in a single year. Beyond these deployments, significant additions also took place in Australia, Japan and Chile.



## TIDAL STREAM: Canada and Japan lead capacity additions outside Europe

### New European turbines installed in Canada and Japan

European developers continued to drive global tidal energy installations in 2021.

- Three European-led pilot farms are progressing well in Nova Scotia, with new grants and industrial partners announced. Sustainable Marine is the most advanced of the trio, with the first of its 420 kW floating tidal devices deployed in 2021.
- Meanwhile, Scottish tidal energy developer SIMEC Atlantis Energy also made headlines by manufacturing and installing a 500 kW tidal turbine in Japan's Naru Strait.

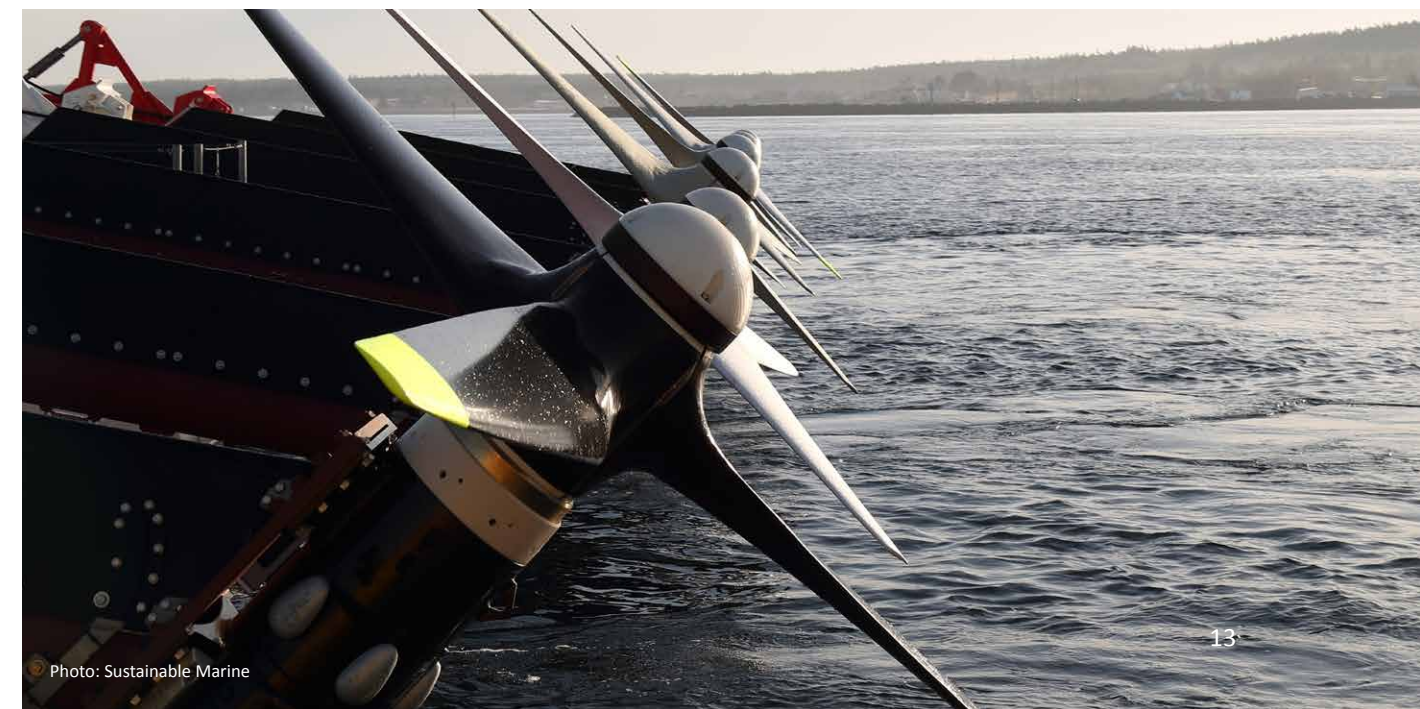


Photo: Sustainable Marine



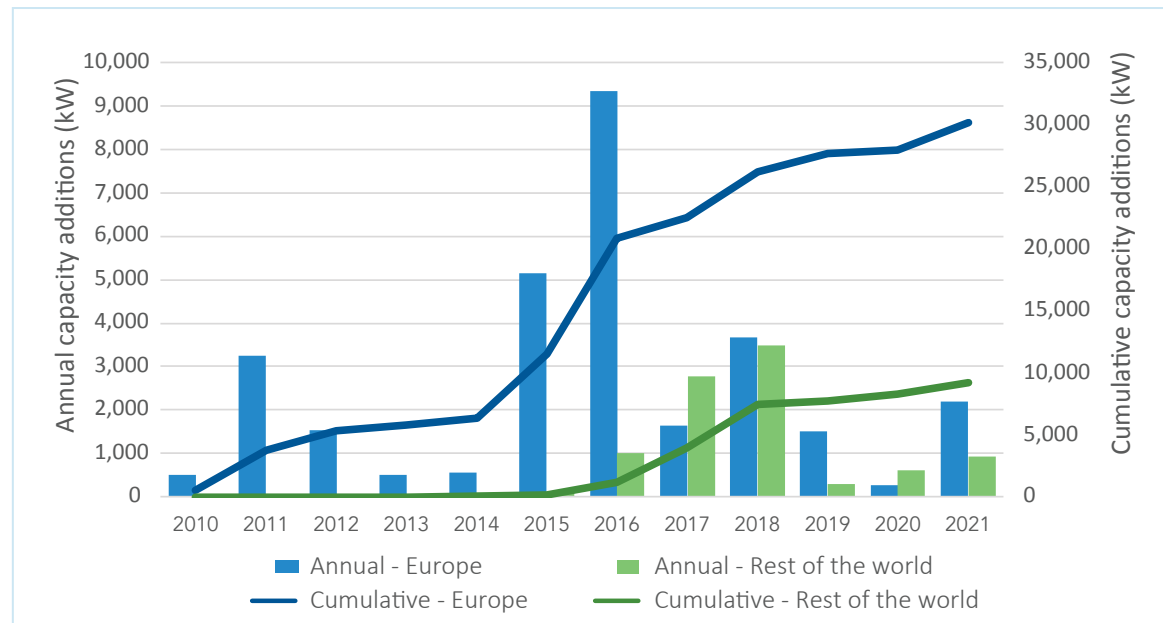


Figure 8: Installed global tidal stream energy capacity

Source: Ocean Energy Europe

Country	Device developer	Device name	Type	Capacity device (kW)	Number of turbines
CANADA	Sustainable Marine	Plat-I	Horizontal axis	420	6
JAPAN	SIMEC Atlantis	AR500	Horizontal axis	500	1

Figure 9: Tidal stream installations outside Europe in 2021

Source: Ocean Energy Europe



Photo: SIMEC Atlantis Energy



## WAVE ENERGY: Several full-scale installations around the globe

Five devices were installed beyond Europe, of which four were full-scale prototypes. Australian Wave Swell Energy deployed a large oscillating water column device, aimed at utility markets, while its Chinese and American counterparts focussed more on niche markets, such as powering offshore observation devices.

International wave energy projects were still severely impacted by the Covid-19 pandemic. Several full-scale deployments were delayed and now are expected in 2022 in China and the USA.

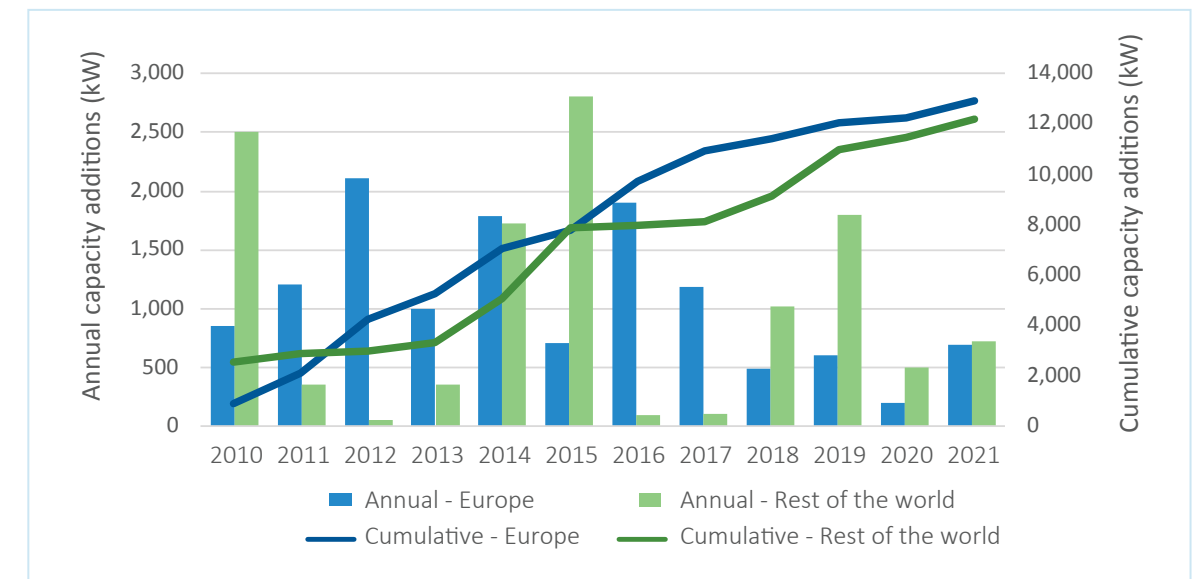


Figure 10: Installed global wave energy capacity

Source: Ocean Energy Europe

Country	Device Developer	Device name	Type	Capacity (kW)	Number of devices
AUSTRALIA	Wave Swell Energy	Uniwave	OWC	200	1
CHILE	OPT	PB3	Point absorber	3	1
CHINA	Hangzhou Huge Wave Energy Technology	Unknown	Point absorber	0.3	1
USA	Calwave	X1	Point absorber	Unknown	1
CHINA	GIEC	Changshan	Attenuator	500	1

Figure 11: Wave energy deployments beyond Europe in 2021

Source: Ocean Energy Europe



# Project spotlight

## ORBITAL MARINE POWER

### Deploying the world's largest tidal turbine

Orbital Marine Power's O2 started generating grid-connected power at the European Marine Energy Centre in Orkney this year. The floating 2 MW turbine is connected to the local onshore electricity network. The O2 is expected to operate in Orkney's fast-flowing waters for the next 15 years, producing enough clean, predictable power to meet the annual electricity demand of around 2,000 UK homes.



Photo: Orbital Marine Power

## MINESTO

### Adding a second tidal kite in the Faroe Islands



Photo: Minesto

Swedish tidal technology developer Minesto achieved a significant milestone this year by deploying a second 100 kW device. This makes the Vestmannaund project the fourth European tidal array currently in operation. Based on the strong performance of this pilot project, Minesto has secured an extension of its PPA in the Faroe Islands and began an industrial partnership with Schneider Electric.

## SIMEC ATLANTIS ENERGY (SAE)

### Entering the Japanese market

In January, Scottish tidal developer SAE installed a 500 kW tidal turbine in the Straits of Naru Island in Japan. Since then, the turbine has passed the Japanese government's pre-use inspection tests and has been recognised as an official power generation facility. As of December 2021, it had generated 247 MWh.



Photo: SIMEC Atlantis Energy

## WELLO OY

### A new generation of full-scale wave energy converter

Wello's second-generation, full-scale wave energy converter has been deployed at the Biscay Marine Energy Platform (BiMEP) in Spain. The 600 kW device will undergo tests and trials in real-world ocean conditions for two years, during which Wello is aiming to achieve full validation of its wave energy conversion technology.



Photo: Wello Oy

## SLOW MILL

### Testing a new wave device in the North Sea



Photo: Slow Mill

Slow Mill commissioned a 40 kW wave energy converter at the Port of Den Helder in 2021. The company designed their device for the moderate wave climate of the North Sea and is now focussing on scaling up the technology. Each full-scale wave energy converter is projected to be rated at 400 kW.

## MOCEAN ENERGY

### First real-sea test for Wave Energy Scotland winner

Scottish wave energy developer Mocean Energy, deployed its 1:10 scale prototype, the Blue X, at EMEC's from June to November. The device completed 154 days at sea, delivering steady outputs of up to 5 kW and peaks of 30 kW, operating in sea states of up to 2.3 metres' maximum wave height. The demonstration of the Blue X has been funded by Wave Energy Scotland and supported by Interreg North-West Europe's Ocean DEMO project.



Photo: Mocean Energy

# 2021 ocean energy highlights

## JANUARY

**SIMEC Atlantis Energy** deploys a 500 kW tidal project in Japan.

Swedish developer **CorPower Ocean** brings in €7.3m for Portuguese wave project.

French developer **Sabella** takes over tidal energy assets from GE Renewable Energy, which in turn becomes an equity partner in the company.

**Wave Swell Energy** deploys 200 kW wave device off Tasmania, Australia.

## FEBRUARY

**CorPower Ocean** secures private investment of €9m, bringing total equity funding of its the flagship HiWave-5 project to over €20m.

**Sustainable Marine** unveils its new 420 kW PLAT-I tidal energy platform, to be tested in Canada.

Danish developer **Wavepiston** closes its crowdfunding campaign, raising over €2.4m.

**Nova Innovation** announces 3 MW project to power whisky distilleries.

## MARCH

**Simply Blue Group** announces plans for a floating wind & wave farm off the Irish coast.

**Minesto** adds another 100 kW tidal kite to Faroe Islands farm and announces partnership with Schneider Electric.

**Havkraft** installs a 30 kW wave-powered breakwater in Norway.

**QED Naval** raises over £1m (€1.2m) from more than 1,200 investors in a crowdfunding campaign.

## APRIL

Scottish **Orbital Marine Power** successfully launches its 2 MW 'O2' tidal turbine.

**OPT** deploys a 3 kW wave device, the PB3 PowerBuoy, for Enel Green Power in Chile.

Spanish developer **Magallanes** redeploys its 1.5 MW 'ATIR' tidal energy platform at EMEC.

Owners give a €4.4m commercialisation boost to **Minesto's** tidal activities.

French-based **Sweetech Energy** secures €5.2m to develop its first full-scale osmotic power prototype.

## MAY

French marine energy company **HydroQuest** unveils plans to develop a 17.5 MW tidal energy farm at the Raz Blanchard site.

Swedish tidal energy developer **Minesto** has secured SEK161.6m (€15.9m) in proceeds for its commercial expansion.

**Corpower Ocean** builds the world's largest wave energy test rig in Sweden.

**Orbital Marine Power** announces plans to deploy 15 MW off the Isle of Wight, UK.

## JUNE

**Eco Wave Power** signs MoU for a 9 MW project in Brazil.

**Seabased** announces plans for a 10 MW pilot farm in France.

## JULY

**Eco Wave Power** gets permit for 1 MW wave project in Portugal, wins a contract with the Israeli Navy and collects US\$9m (€8.1m) in IPO proceeds.

**SIMEC Atlantis' MeyGen** tidal array has exported over 37 GWh of clean power to the UK grid since its deployment.

## AUGUST

**DP Energy** signs a joint development agreement with Japanese utility and shipping company for the first phase of a 9 MW tidal project in Nova Scotia, Canada.

Finnish wave energy company **Wello** deploys its 600 kW Penguin wave energy device at the BiMEP test site in the Basque Country.

Dutch wave energy developer **Slow Mill** installs their 8-metre 40 kW test model.

**Nova Innovation** gets £2m (€2.5m) from the Scottish government for their VOLT (VOLUME Manufacturing and Logistics for Tidal Energy) project.

## SEPTEMBER

Start of the **EU SCORES** project, aiming to build co-located arrays including a wave-wind energy project in Portugal.

## OCTOBER

**CalWave** successfully commissions its wave energy pilot in California.

São Tomé and Príncipe's government announces its plans to deploy **first OTEC power plant**.

## NOVEMBER

**Orbital Marine Power** secures a strategic investment from TechnipFMC, which will also become a shareholder.

**Nova Innovation** receives €2.5m from the EIC, €940k from the UK Gov and €2.4m from crowdfunding, and announces a 7 MW project in Indonesia.

**Seabased** signs the lease for a 40 MW wave energy park in the Bermudas.

UK launches **Contract for Difference** round with dedicated support for tidal **stream**.

## DECEMBER

**SWEL** deploys its wave energy converter for testing in Cyprus.

## New industry and investment milestones in 2021

### Deals struck with large industrial partners to develop ocean energy

#### MINESTO & SCHNEIDER ELECTRIC

Swedish tidal energy developer Minesto and Schneider Electric signed a Memorandum of Understanding to develop and build ocean energy farms based on Minesto's Deep Green tidal kite technology. The collaboration aims at accelerating the commercial roll-out of ocean energy where predictable renewable energy production is necessary.

#### DP ENERGY & CHUBU ELECTRIC POWER COMPANY & KAWASAKI KISEN KAISHA

Irish renewable energy project developer DP Energy entered into a Joint Development Agreement (JDA) with Chubu Electric Power Company (Chubu) and Kawasaki Kisen Kaisha ("K" LINE) to develop the first phase of a 9 MW tidal project in the Bay of Fundy, Nova Scotia.

#### ORBITAL MARINE POWER & TECHNIPFMC

Scottish tidal energy developer Orbital Marine Power secured a strategic investment from TechnipFMC, which will also become a shareholder in the company. The companies have also signed an MoU to jointly collaborate in tidal energy to accelerate the global commercialisation of Orbital's technology and deliver the first commercial scale floating tidal farm.

#### SABELLA & GENERAL ELECTRIC

French tidal energy developer Sabella has taken over the tidal energy assets of GE Renewable Energy, which in turn became an equity partner in the company. The asset take-over agreement covers all tidal energy concepts developed by GE Renewable Energy since 2003, including assets inherited through acquisitions (TGL, Rolls Royce and Alstom), as well as the OCEADE trademark. The technology consists of several tidal turbines, which have produced 1.6 GWh of clean power in the past.

### Investment in ocean energy increases by 50% in 2021

Ocean energy attracted public and private investors alike in 2021: announced investments totalled €70 million<sup>2</sup> in 2021. This 50% increase on 2020 clearly shows the growing appeal of ocean energy for investors as the next big opportunity in renewable energy.

Several tidal and wave energy companies convinced new investors to join them on their journey:

#### MINESTO

Swedish tidal energy pioneer Minesto secured more than **€20M** in proceeds

#### ECO WAVE POWER

Eco Wave Power has closed its underwritten initial public offering (IPO) on Nasdaq, collecting **US\$9.2M (€8.1M)** in gross proceeds

#### SWEETCH ENERGY

French-based osmotic power pioneer Sweetch Energy received **€5.2M** to develop its first full-scale osmotic power prototype

#### CORPOWER

Swedish wave energy developer CorPower secured **€16.3M** for its Portuguese wave project

Portuguese authorities have joined the Swedish Energy Agency, EIT InnoEnergy and private investors to financially support CorPower Ocean's flagship HiWave-5 demonstration project in northern Portugal.

2021 showed yet again the increasing appeal of crowdfunding to raise equity for ocean energy developers. More than 17 successful campaigns have been launched in the past four years. Some highlights from 2021 include:

- Danish company Wavepiston successfully raised over €2.4 million for its wave energy technology and projects.
- Welsh marine energy developer Marine Power Systems (MPS) exceeded its £4 million (€4.8 million) crowdfunding target.

<sup>2</sup> Publicly announced investments (capital raise, crowdfunding, and public investments at national level)





## European developers expand reach with export projects

### NOVA INNOVATION

Nova Innovation announced plans for a 7 MW tidal array in Larantuka Strait, Indonesia. Larantuka Strait lies between the islands of Flores and Adonara and has one of the strongest tidal currents in Indonesia. The array will utilise Nova’s next-generation 100 kW tidal turbines.

### SEABASED

Swedish wave energy company Seabased has signed a lease agreement with the Government of Bermuda for the construction of 40 MW wave energy park. The deployment area is located a few kilometres offshore from Bermuda’s airport on St. George’s Island. As part of the project, Seabased has been working with stakeholders in Bermuda and is finalising an Environmental Impact Report (EIA).

### GLOBAL OTEC

The government of São Tomé and Príncipe has announced partnership with the UK-based Global OTEC Resources for the deployment of the first commercial floating ocean thermal energy conversion (OTEC) platform. The project is a public-private partnership between Global OTEC and SIDS DOCK – the Small Island Developing States (SIDS) Sustainable Energy and Climate Resilience Organisation – a United Nations-recognised association representing small island developing states.



Photo: Nova Innovation



## New support unveiled for demo projects

Beyond industrial achievements, major pieces of legislation supporting the development of ocean energy were adopted around the world.

### Europe: Revenue support and roadmaps

#### UNITED KINGDOM

The British government launched a new Contracts for Difference (CfD) round with £20 million (€24 million) per year dedicated to support tidal stream projects. This represents the biggest investment in tidal power in a generation and could bring 30 to 60 MW online.

#### FRANCE

The French government launched a new mechanism allowing innovative renewable energy project developers to negotiate revenue support on a bilateral basis with the French energy regulator.

#### SPAIN

The Spanish Government launched a new marine renewables roadmap. The document contains a deployment target of 60 MW by 2030 for pre-commercial marine energies such as wave or tidal energy. Spain will also spend at least €200 million by 2023 on the advancement and development of offshore renewable energy technologies.

#### ITALY

In 2021, each European Member State presented its Recovery and Resilience Plan to mitigate the economic impact of the pandemic and invest in the ecological and digital transitions. Italy’s recovery plan includes a budget of €700 million for the development of innovative renewable energy technologies. Wave energy is explicitly mentioned.

### Rest of World: American government boosts funding

#### USA

The USA is slowly positioning itself as the EU’s main competitor in ocean energy, significantly ramping up public investments into the sector. In 2021 alone, the government adopted:

- New appropriations to the U.S. Department of Energy 2021 totalling US\$109 million (€96 million) for the development of ocean energy;
- The 2021 Bipartisan Infrastructure Bill dedicating US\$70.4 million (€62 million) to Marine Energy RD&D; and US\$40 million (€35 million) for the development of National Marine Energy Centers.



## 2022 outlook: Sustained growth ahead

### **TIDAL STREAM: Expanding pilot farms and deploying new prototypes**

#### Europe

Deployments are set to continue at a steady pace in 2022. At least 1.4 MW of capacity is slated for installation. While total installed capacity might be lower than in 2022, more devices should be deployed next year. Following the precedent set by deployments in 2021, most new devices will find a home in British and Dutch waters.

#### International

Outside of Europe, installations in 2021 could add at least 1 MW of tidal energy capacity. Canada will lead deployments with the progress of Nova Scotia's pilot farms, while China is set to install at least one device.

### **WAVE ENERGY: Full-scale devices to dominate**

#### Europe

Up to 2.8 MW of wave energy capacity is lined up for deployment, the bulk of which will come from full-scale devices. Most of these deployments will occur in the UK, Spain and Portugal. Four new full-scale devices - made by Corpower Ocean, Eni SpA, Bombora and Wavepiston - should hit European waters in 2022.

#### International

Outside Europe, installations could add 1.1 MW of wave energy capacity to the global total. Several devices are expected to be deployed: in the USA, Oscilla Power's Triton C and in China, GIEC's second full-scale device.



Photo: Wavepiston



## Want to go into more detail?

Did you know that Ocean Energy Europe members can request information from our 'Kit-in-the-Water' database about projects deployed around the world?

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Contact us now to find out more about this and the many other benefits of OEE membership!

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### About Ocean Energy Europe

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