



FLASC

Renewable Energy Storage

Our vision is to enable an increase in the use of offshore renewable energy

From wind and waves, to currents and tides, the sea can provide us with more clean energy than we need.

We want these resources to become fundamental elements of the energy system, be it to power cities onshore or large-scale industries offshore.

To this end we are building an enabling technology, to tame these bountiful yet sporadic resources, and transform them into a controlled and predictable supply of clean energy.





The problem is that renewable energy supply and consumer demand do not always match

Balancing supply and demand is quickly becoming the biggest obstacle to renewable energy reaching its optimum potential.

Mature technologies, such as wind energy are already being subjected to new supply rules.

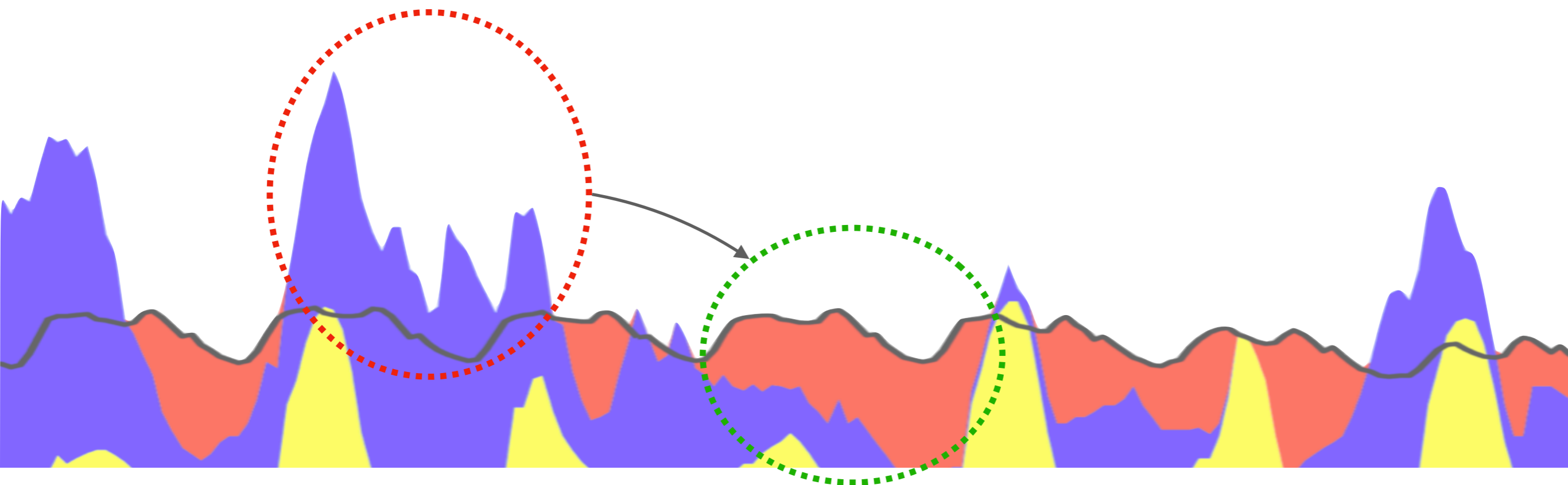
Wind farms will soon start being penalised for deficits between the power they commit, and that they actually deliver. This will compel them to take on balancing responsibilities.

The solution is to shift surplus energy to when it is needed most

A suitable buffer can store energy during periods of excess production and deliver it later to compensate for deficits to meet demand.

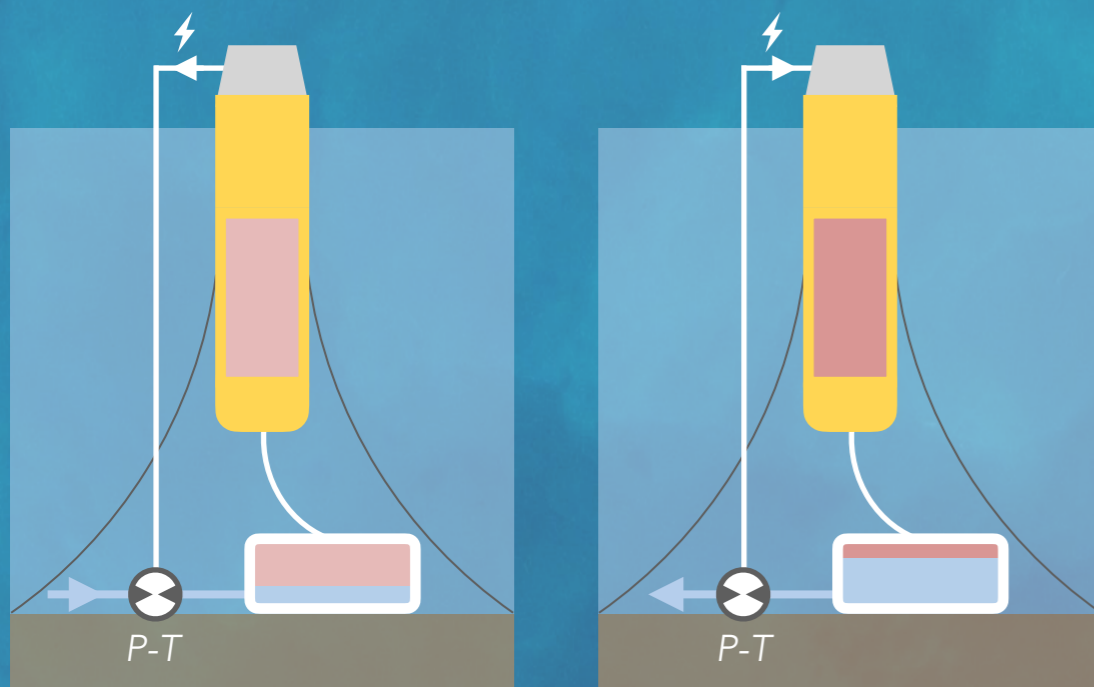
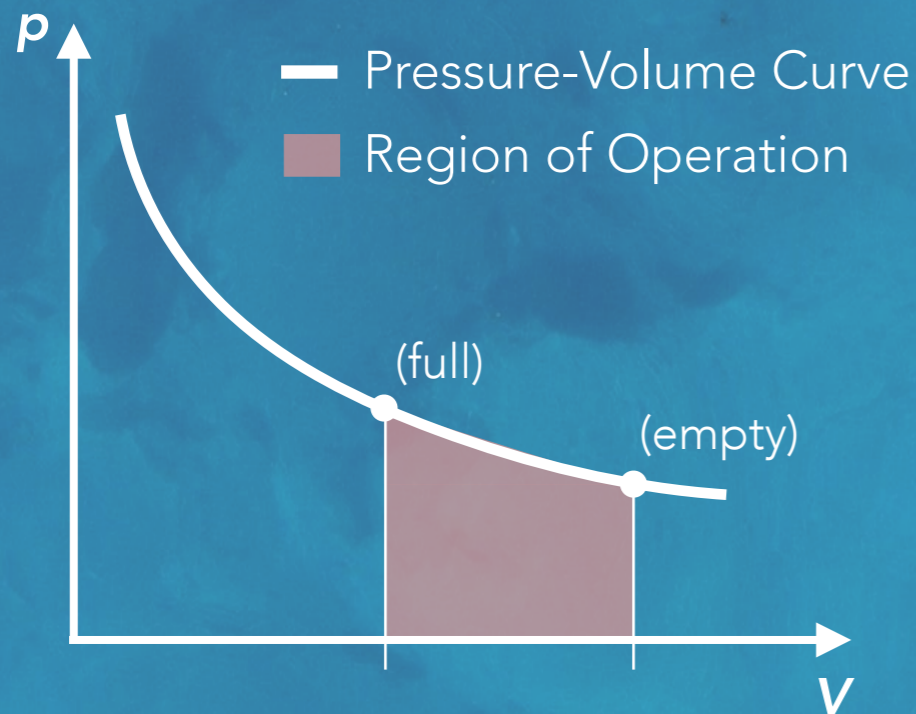
So we can take an intermittent renewable resource and turn into a schedulable source of clean energy. This approach increases the quantity of clean energy that we can use, and also the output quality, therefore improving the net value of renewable energy.

Our target is harnessing the big portion of renewable energy that will come from far offshore.



▲ Generation and demand profiles of a typical European winter week for a hypothetical scenario in which wind and solar can cover 100% demand.





Charging Mode

Discharging Mode

Our product is a better energy storage system

FLASC is an energy storage device that can be integrated directly into a floating offshore platform.

Energy is stored using a hydro-pneumatic liquid piston, driven by a reversible pump-turbine.

Charging Mode: electricity is used to pump water into a closed chamber and compress the air stored inside.

Discharging Mode: air is allowed to expand and push out the pressurised water, which is converted back into electricity using a hydraulic turbine.

Our **unique selling point** is the combination of:

- ▶ reliable technologies,
- ▶ established supply-chains,
- ▶ safe and sustainable materials.

Tailored for offshore

The ocean is our ally: an infinite heatsink that absorbs cycle temperature variations, resulting in a paradigm shift in compression efficiency.

FLASC can be integrated into offshore platforms to add megawatt-hours of electrical energy storage.

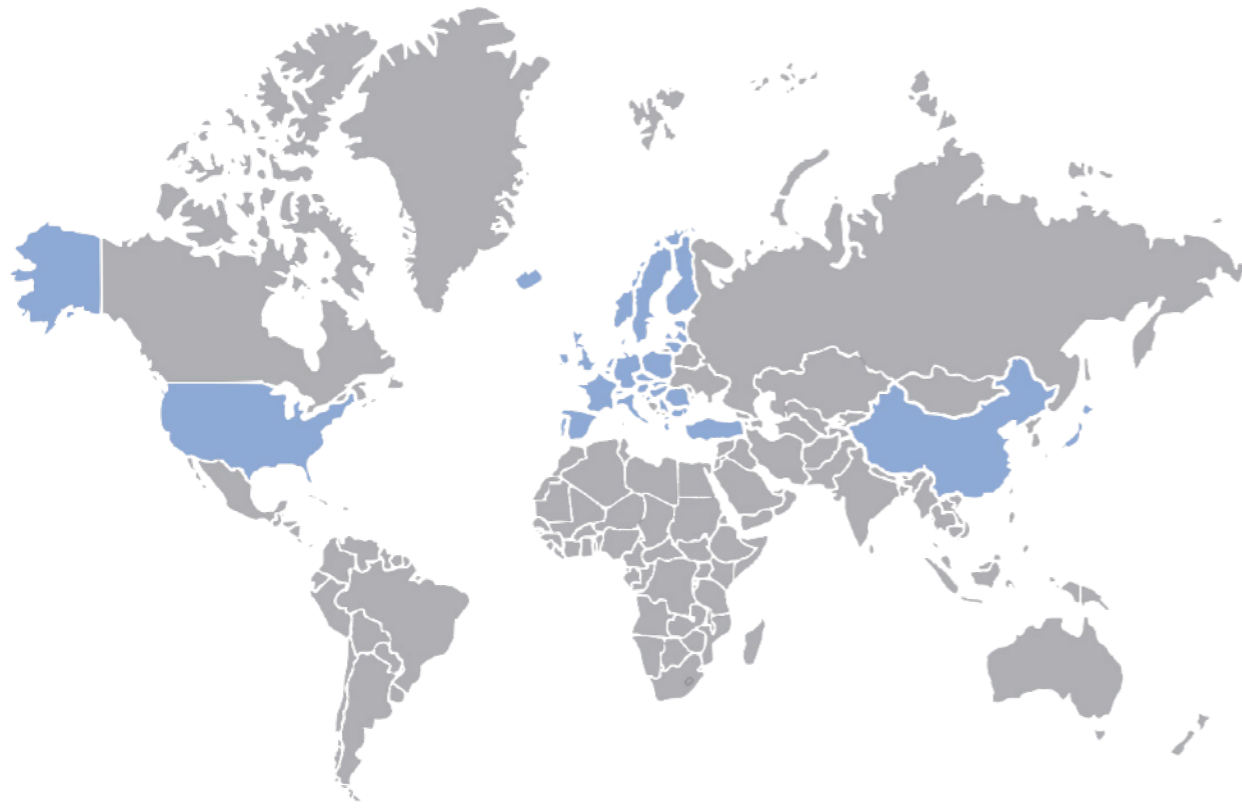
- ▶ Delivering a *fixed* or *ramp-regulated* output,
- ▶ 30-year lifetime with standard maintenance,
- ▶ For *energy shifting*, it offers a better rate-of-return than onshore lithium-ion battery banks.

It is also highly versatile, and can work with:

- ▶ natural gas liquefaction
- ▶ offshore H₂ production
- ▶ carbon capture and storage
- ▶ oil well water-injection
- ▶ offshore desalination
- ▶ electric ship charging



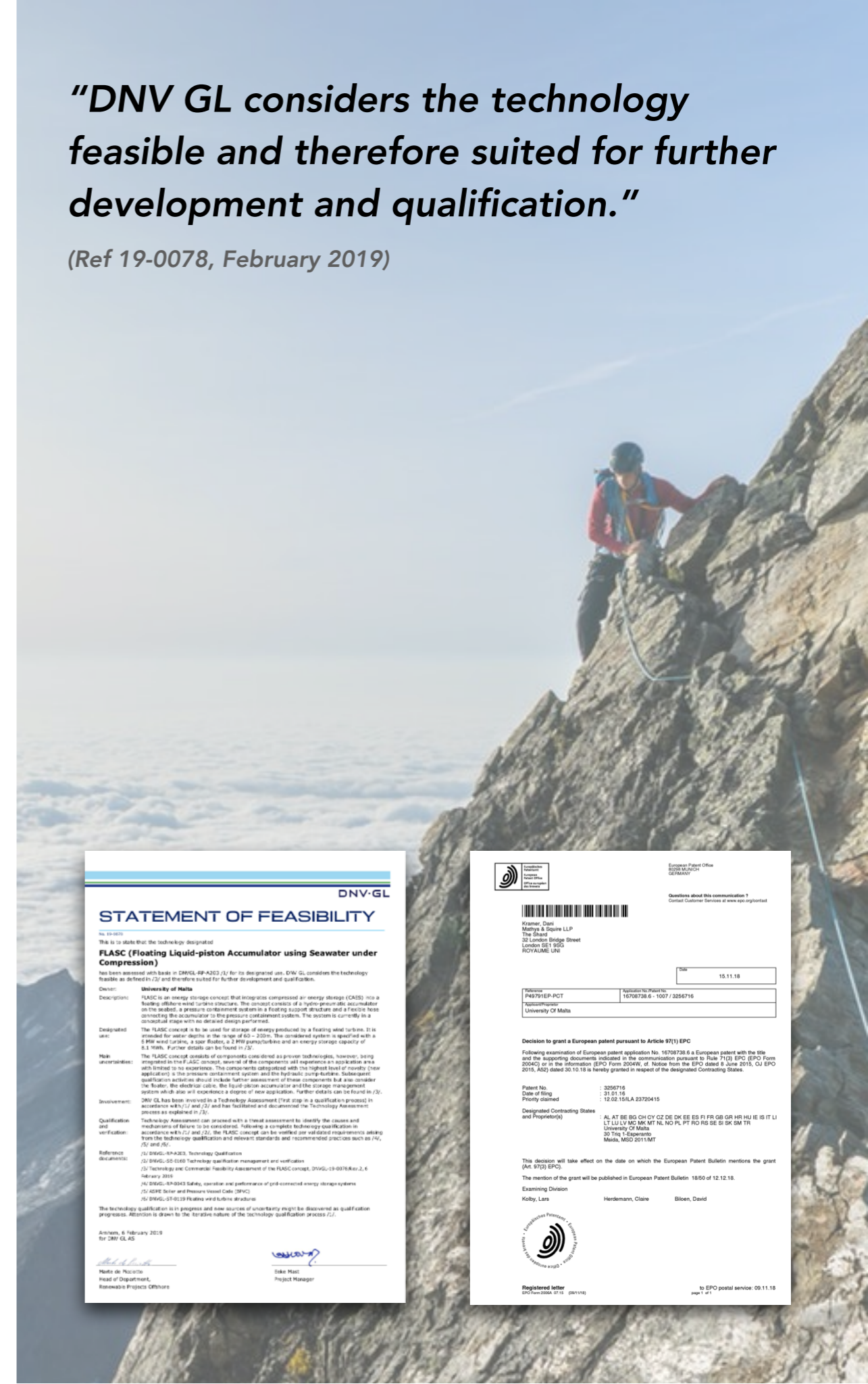
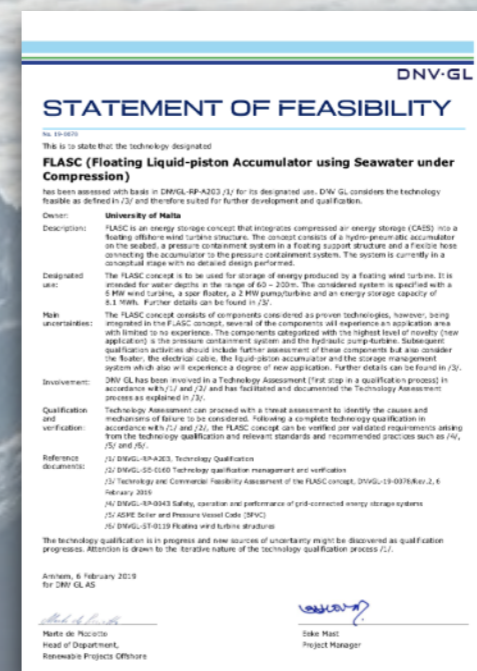
We have the **traction**,
to go the distance



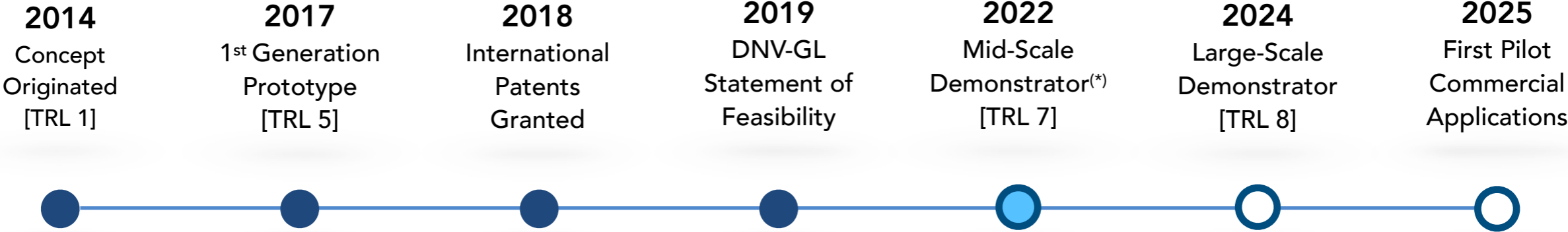
- ▶ Patent Granted: Europe, United States and China.
Patent Pending: Japan.
- ▶ Raised over € 500,000 in funding to-date.
- ▶ In advanced discussions with some of the world's leading offshore engineering companies.
- ★ Panelists at top industry events (*Offshore Energy*, *WindEurope*) with seats on a number of international technical committees (*ASME*, *EAWWE*, *OSSES*, *IOWTC*).
- ★ World Intellectual Property Organisation (WIPO) Inventor Award 2018.

“DNV GL considers the technology feasible and therefore suited for further development and qualification.”

(Ref 19-0078, February 2019)



Our **development timeline** keeps us at the leading edge



(*) Project awarded as part of a multi-purpose offshore platform [H2020 BG-05-2019]: <http://musica-project.eu/>



FLASC 1st Generation Prototype installed in Malta, Q4 2017

Our Team

The founding team combines years of experience in offshore renewables, energy storage, cost analysis and project management. Our advisors include founders and CEOs of global technology and offshore engineering companies.

This internal expertise is compounded by a network of contacts ranging from oil & gas multi-national companies to top international research institutions.



Tonio Sant
Co-Founder

+17 years experience in wind energy, including offshore wind turbines and cost assessment



Daniel Buhagiar
Co-Founder and CEO

+7 years experience in industrial R&D, hydraulics and offshore energy storage



Robert N. Farrugia
Co-Founder

+23 years experience in renewable energy research and wind resource assessment

We're eager to **broaden our horizons**

Currently seeking strategic partners, investors and advisors,
who share our vision for a renewable future.

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FLASC B.V. is a spin-off of the University of Malta, established in The Netherlands
with company registration number: 76566404

The company is part of the Buccaneer Delft energy & offshore accelerator

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