

Magallanes | ATIR 2.0

Decommissioning Programme

EMEC Fall of Warness

August 2025



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1 Executive summary

Magallanes Renovables S.L. is a company that, since its inception in 2007, has focused its activity on the development of a high stability floating platform for obtaining electrical power from tidal currents. Magallanes Tidal Energy – the UK branch of Magallanes Renovables S.L. – aims to deploy and test a platform with a power capacity peaking at 1.7 MW (though nominal power is 1.5MW) at the European Marine Energy Centre (EMEC) Fall of Warress test site, off the island of Eday, Orkney Islands, Scotland.

The present document outlines a decommissioning plan for the platform in question and is submitted for approval in accordance with the requirements of the Energy Act 2004. The platform consists of a full-scale prototype with an overall length of around 53.6 m, an extreme moulded breadth of 7m, approx., and an operational draught of 24m, approx. It is divided into three blocks:

- Upper block: is the visible block of the platform, as part of it is above the waterline. It houses entrance hatches, pumps and emergency systems, and most of electrical equipment and the devices.
- Vertical block or mast: is a hollow space that fixes the lower block to the upper block and through which cables and pipes connect the different equipment of the platform. It also provides access to the lower block for inspection and maintenance.
- Lower block or nacelle: is devoted to the mechanical PTO system comprising the shafts, gear boxes and generators, among others.

The programme that has been proposed for the decommissioning of the device is explained in more detail in subsequent chapters of this document; however, a summary of the procedure is outlined below:

- Vessel mobilisation;
- Lifting of EMEC subsea cable and disconnection from the platform's umbilical cable;
- Laying back of the subsea cable to the seabed;
- Detaching of the platform from the mooring lines and towing from tidal test site;
- Detaching of mooring lines from the mooring structure;
- Removal of mooring structure, if appropriate;
- Post-decommissioning survey.

The site where the platform is intended to be deployed is characterised by its strong tidal streams, whose speed can be higher than 3.5 m/s in spring, in a water depth of 49 m (LAT) approx. Concerning the seabed conditions, surveys undertaken confirm scoured bedrock ridges and platforms with occasional boulders.

Regarding navigation activity, cruise ships are the most common type of vessel in the area, although they usually transit only in the summer period. Fishing vessel traffic and recreational boating are occasional across the test site. Nevertheless, it should be noted that the Fall of Warress test site has been established since 2005 and its boundaries defined on navigation charts. It would therefore be expected that vessels navigating the area should be aware of the test site and the presence of test devices. From the environmental perspective, several assessments of the site have already been carried out. An environmental statement, environmental description, environmental sensitivity table together with environmental appraisal have been conducted in support a site-wide section 36 consent, obtained by EMEC in 2016, for Fall of Warress test site under the Electricity Act 1989.

2 Introduction

The present document outlines a decommissioning programme for an array of floating energy generation platforms, which harnesses the energy of tidal currents and converts it into electrical energy. The platforms are intended to be deployed at the EMEC Fall of Warness test site, off the island of Eday, Orkney. This document is submitted for approval in accordance with the requirements of the Energy Act 2004 and has been prepared in line with the Decommissioning of offshore renewable energy installations under the Energy Act 2004. Guidance notes for industry (DECC 1, 2011).

2.1 Magallanes Renovables S.L.

Magallanes Renovables S.L. is a limited company registered in Spain that started its business activity in 2007 and, since then, has focused its activity on the development of a floating platform for obtaining electrical power from tidal currents. Magallanes Renovables S.L. is supported by its holding company Sagres S.L., as sole shareholder. Magallanes Renovables S.L. is the company who will own and operate the platforms and the items necessary to connect the platforms to the subsea cable owned by EMEC.

3 Background information

3.1 Company Background

Magallanes Tidal Energy is a leading developer of tidal energy technology. We are the UK branch of Magallanes Renovables and have been set up specifically to commercialise the Magallanes technology, leveraging the unparalleled expertise of the UK supply chain to do so. Magallanes Tidal Energy is registered in Scotland, established in 2020.

Founded in 2007 Magallanes Renovables was created with the sole purpose of developing and commercialising a cost-effective tidal technology, overcoming the hurdles that have historically held the sector back. Our philosophy is simplicity and cost-effectiveness, which has led us to develop breakthrough systems, solving the many challenges encountered with innovative and cost-effective solutions.

Our technology is centered around a simple and reliable surface floating platform that leverages existing technology from the mature wind and naval industries, minimising technology risk. Our platforms deliver high output with low installation and maintenance costs.

We are a highly experienced multidisciplinary team with innovation, sustainability and quality as our core values. We have deployed and tested a full-scale platform in the unforgiving environment of the Orkney Islands. Previously we developed and tested 2 scale models to inform the full-scale design.

Key team experience

Our multidisciplinary and highly skilled team has been the main driver of our success, each individual is in charge of one of the working areas for technology development. Important decisions are taken in quorum and teamwork is part of our open working structure.

In addition, Magallanes Renovables has collaborated very closely with skilled partners in different business and technology areas needed to develop a ground-breaking system in tidal energy generation.

Since its inception, the company has been involved in multiple R&D projects focused on developing floating tidal turbines:

- 2007 to 2011 – concept development and evaluation including partial systems tests at small scale – e.g., 1:30 turbine and rotor
- 2011 to 2012 - 1:10 scale model constructed to evaluate and validate the concept. Prototype tested in Bay of Vigo and Scotland with positive results.
- 2013 to 2015 – Design of full-scale platform and systems.
- 2016 to 2017 – Construction of full scale, 1.5MW platform in Spain
- 2018 to 2018 - Sea-trials of full-scale platform around Vigo.
- 2019 - 2024 - Platform installed and grid-connected at EMEC, Scotland in early 2019.
- 2020 – upgrades to key systems on the full scale platform
- 2024 – Decommissioning of prototype platform

The accumulated project experience in areas of structural design, marine operations, control systems, energy production, mooring systems, etc. has allowed us to achieve the goal of having a demonstrated and validated floating platform.

3.2 Technology Background

Magallanes was established to investigate and develop new methods of extracting electrical power from tidal currents.

Magallanes Renovables has had a full scale (1.5MW) prototype at the EMEC facility from early 2019 until mid 2023. We have accumulated thousands of hours of operational experience and demonstrated, proven and verified the performance and advantages of the technology, as well as learned from associated challenges.

Previously we developed and tested 2 scale models to inform this prototype.



Figure 1. Evolution of the Magallanes Tidal Energy Technology

The platform has been on station and generating on most tides, apart from periods of downtime due to maintenance, upgrades, trials of new and improved systems as well as grid outages (including an outage for over 7 months due to damage to the subsea interconnector serving the island of Eday where the EMEC tidal facility is located and an extended leadtime waiting for a replacement dynamic cable).



Figure 2. Launch of the Prototype ATIR platform

Testing and demonstration activities with the full scale prototype over the last 7 years can be summarised as follows:

Activities	Year	Site	Scope	Result
Launch	2017	Vigo	Assembly & launch from quayside	• Assembly in 4 months. • Launched with cranes in Vigo Harbour. • Tow tests (not grid connected) in the bay of Vigo.
Towing Tests	2018	Vigo	Towing Test, including generation	• Towing test 500kW output
Generation	2019 - 2023	FoW (Orkney)	• Generation Test with 1 rotor • 2 rotor, low power • 2 rotor, rated power	• 1 rotor 400kW output • 2 rotors 3 months generation • 2 rotor 1.47MW. • Coeff > 48% peaks
Major maintenance	2022	Leith	Horizontal heeling and major maintenance	• Platform horizontal in dry dock • O&M works
O&M	2019 - 2023	FoW (Orkney)	O&M Works in FoW Cable and mooring options	• O&M works • New cable options • Mooring O&M
Environmental	2019 - 2023	FoW (Orkney)	Environmental tests and resource assessment	• Radar/Sonar • Mammal collision assessment • Birds • ADCP
H&S	2019 - 2023	FoW (Orkney)	Safe operations	• Platform visited more than 200 times • Zero incidents

Table 1. Test campaigns with the full-scale prototype

Generation and operations with the prototype platform over the last 7 years have proven the concept and validated the technology.

Work on the design of the commercial (ATIR 2.0) platform is now complete, and has taken lessons learned from the ATIR 1.0 prototype and working with trusted consultants and supply chain partners. The design has been certified by Bureau Veritas - Design Approval (Design Assessment Statement received in January 2024), with full Type Certification expected mid 2025 following construction and deployment of the commercial demonstrator.

3.3 Project background

The first full scale prototype ATIR device has been deployed and operated at EMECs Fall of Warness tidal test site, which has enabled us to assess its performance in real sea conditions over multiple years. This testing has allowed us to progress the ATIR design towards commercial viability.

This proposed project will see a new platform based on the commercial design of the technology (the ATIR 2.0), deployed for up to 10 years at the EMEC Fall of Warness site (Berth 1), beginning in 2025. It will replace the previous ATIR1.0 prototype that was deployed at the same berth from 2019 until 2023.

The project aims are as follows:

- Verify and validate the commercial version of the technology, including with an independent electrical power performance assessment.
- Gain experience installing and operating the new platform long term.
- Demonstrate the long term operational performance and reliability of the technology in a real, open sea environment.
- Learn and trial appropriate maintenance operations for long term deployments.
- Develop a business and marketing strategy to assist identification of potential customers.
- Develop the supply chain for further, commercial projects.

Data obtained from this period of testing will be crucial for future projects as it provides valuable information regarding long term operations and maintenance as well as validation of the power performance.

Existing funds have come from two separate funding sources: European Grants and the equity investment from the founder of Magallanes Renovables. These sources will secure the continuous development of Magallanes Renovables technology until its commercialisation, as well as the process of securing future projects.

3.4 Device location

The platform is to be deployed at the EMEC Fall of Warness test site, off the island of Eday, Orkney, in the allocated berth (berth1).

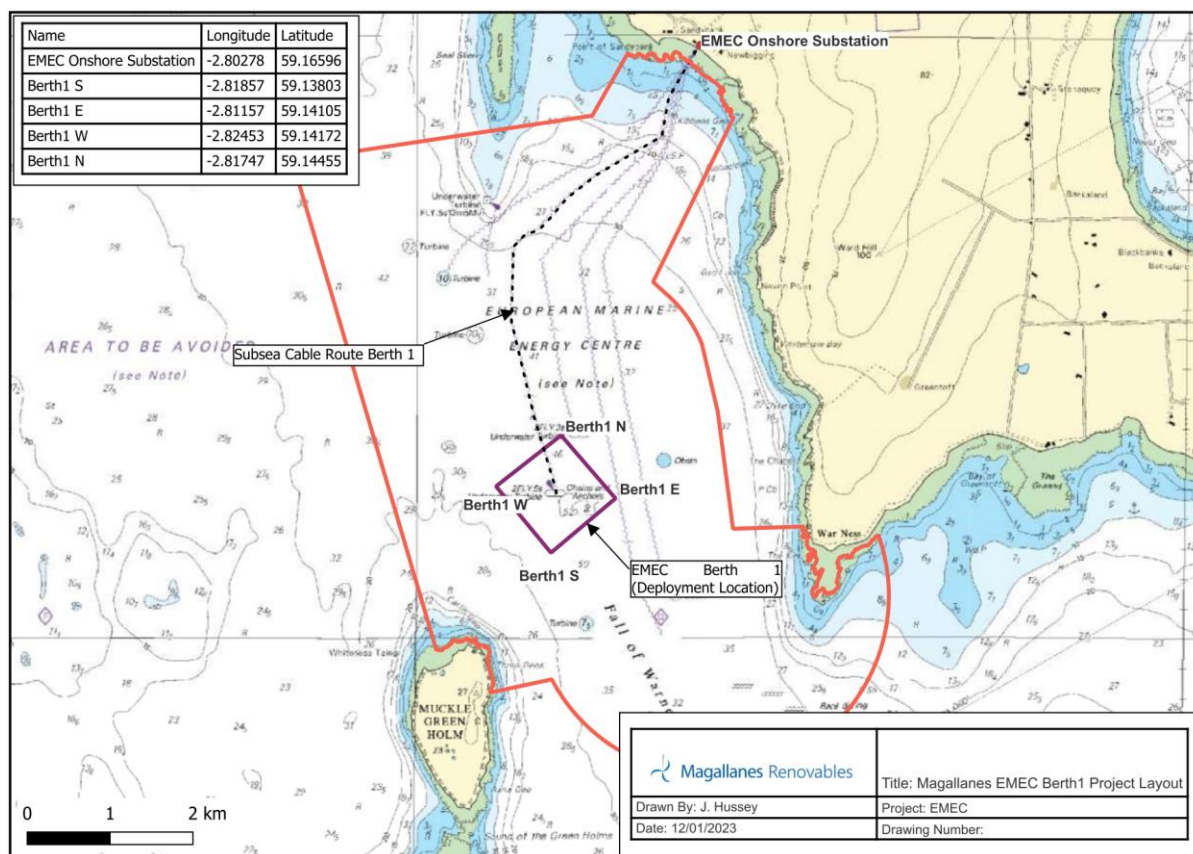


Figure 3. Chart showing the area of EMEC Fall of Warness test site. Magallanes Crown Estate lease outlined with solid purple line. Fall of Warness tidal test site Crown Estate lease shown as red line

The deployment will take place in the vicinity of the berth location and within the boundary coordinates provided in Table 2 and shown in Figure 3 above.

Test berth	Latitude (WGS84)	Longitude (WGS84)
Berth 1	59° 09' 57" N	02° 48' 10" W
Points along platform deployment boundary	59° 08.673'N	02° 49.048'W
	59° 08.463'N	02° 48.693'W
	59° 08.282'N	02° 49.113'W
	59° 08.503'N	02° 49.471'W

Table 2. Location at EMEC's Fall of Warness test site

3.5 Type and status of any other adjacent facilities

During decommissioning, any facilities adjacent to the berth will need to be taken into consideration. As the EMEC test site is available for use by other developers, other installations on the site and EMEC-owned infrastructure, must be considered during decommissioning activities. All operations at EMEC's test site must comply with EMEC's Standard Operating Procedures, Emergency Operating Procedures and Health, Safety and Environment requirements. Before activities begin, there should be a review of other planned work due to be carried out at the site with potential to coincide with the decommissioning works. Site access permits will only be issued if the site is safe for the intended work or may be issued subject to a set of conditions.

The relative proximity of the development to other devices and berths at the site will be considered when updating the decommissioning methodology closer to the time of decommissioning.

3.6 Layout of the facilities to be decommissioned

The full scale floating tidal device to be deployed at EMEC under this proposed project consists of a surface floating platform (upper block), with a nacelle and rotors directly below it (lower block) and a 'mast' (vertical block) connecting the two.

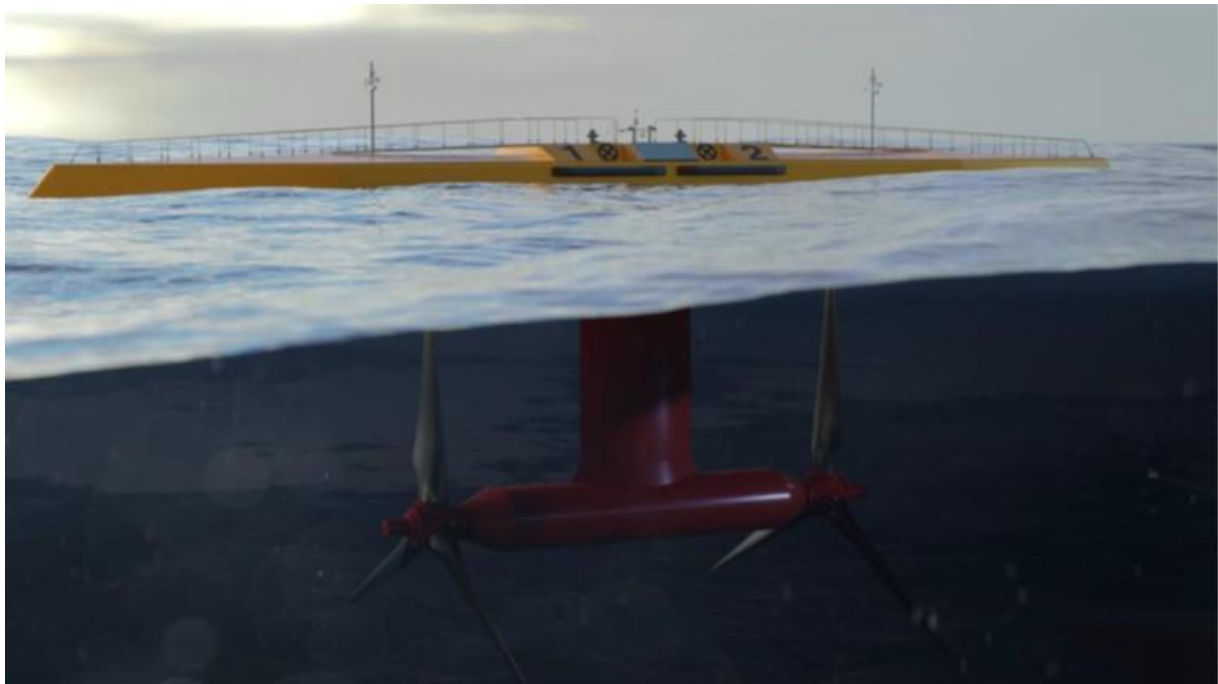


Figure 4. ATIR platform showing 'blocks'

This floating tidal energy converter has a total length of 53.6m, 7m of beam, a minimum draft of 15m without blades and 24m with blades. Its maximum weight with ballast is approximately 600tons.



Figure 5. ATIR from above

It has two counter-rotating horizontal axis turbines in series, one behind the other, so that it counteracts the efforts of one turbine with those of the other to avoid list and yaw. Each rotor consists of 3 blades with a rotor diameter of 21m.

Each rotor is equipped with a generator of 850kW of nominal power, and an associated frequency converter; allowing for a peak power of up to 1.7MW; however, the nominal power is limited to 1.5MW. It's moored to the seabed through four mooring lines, two at each end. The device is able to orient itself to different directions of current in a passive way and to generate energy efficiently on both the ebb and flood currents.

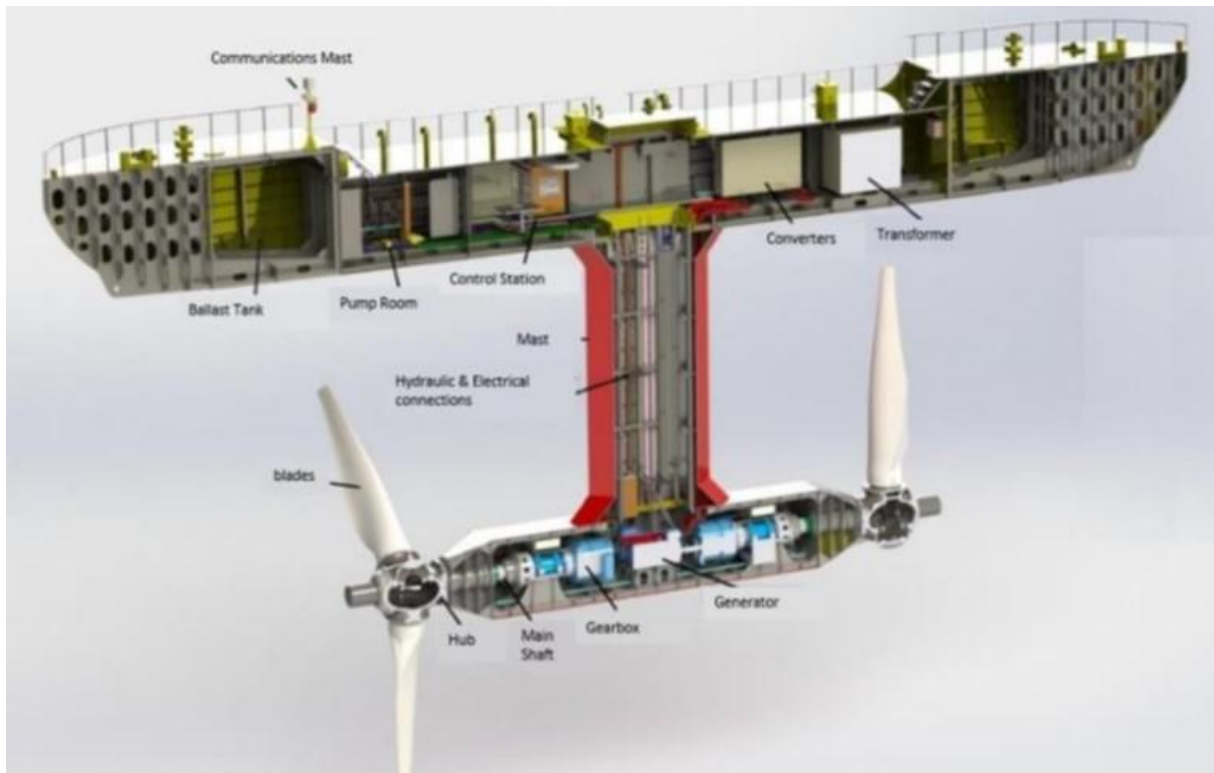


Figure 6. Main components of the ATIR platform

The floating platform (upper block) is the visible part of the device. It has an upper deck, where the entrance hatches are located. It also has 2 inaccessible compartments on both ends of the block, which are part of the variable ballast system. The accessible part of this block is composed of 3 main rooms, the first of them houses pumps and emergency systems, the other 2 have been designed to accommodate transformers, frequency converters, electric panels and other auxiliary electrical or electronic systems.

The mast (vertical block) fixes the nacelle (lower block) to the platform (upper block). It is a hollow space through which the communication and low-voltage cables connect the equipment housed in the nacelle with the parts of the electrical systems within the upper block. Rigid pipes for environmental acceptable lubricant supply and draining, among others, are also installed in the mast. It also allows access to the lower block for inspection and maintenance.

The nacelle (lower block) is significantly smaller than the upper block and is dedicated to the mechanical PTO systems. This block is where the main shafts, gearboxes and generators are located. As the platform is equipped with two counter-rotating rotors, all the components for the PTO system are duplicated (one for each rotor).

The device has electronic power converters onboard the platform that adapts the energy output to the frequency and phase of the network, in addition, it will also have a step-up transformer that will establish the output voltage of the platform at 11kV - the connection voltage).

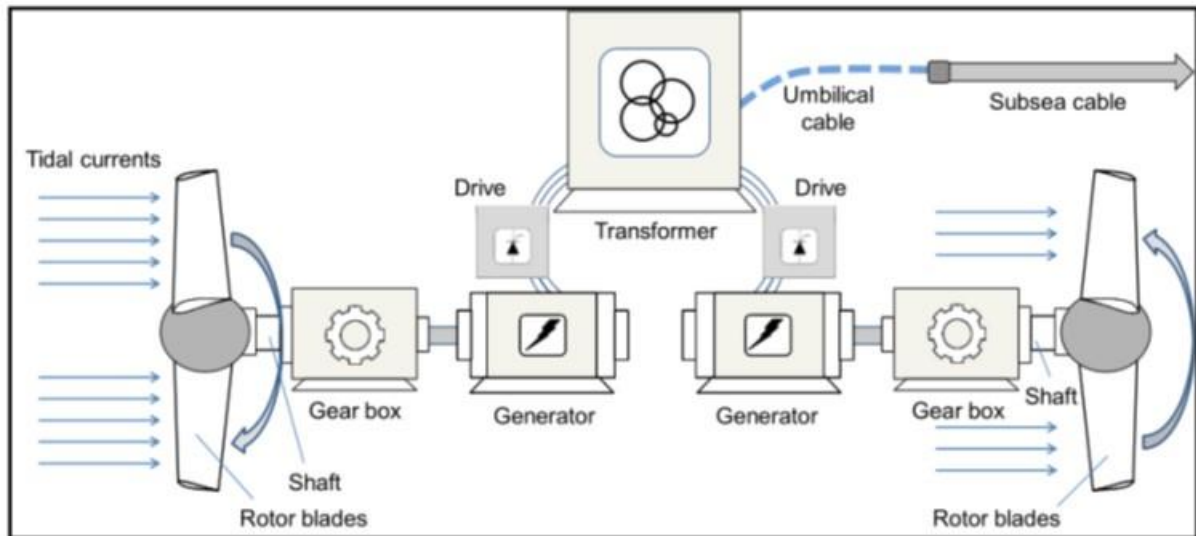


Figure 7. Diagram of electrical power generation from tidal currents

The platform will be connected to the existing EMEC export cable via a dynamic umbilical cable.

3.7 Mooring system

The ATIR 2.0 device will utilise the mooring system which currently exists on site and was used for the previously licensed ATIR device. The mooring system consists of 4 mooring lines, 2 at each end fixed to the platform, the mooring lines are redundantly dimensioned so that even if a line breaks, the other line on that side is capable of holding the platform on station.

The following parameters are currently estimated for the site, based on preliminary engineering analysis and modelling undertaken:

- Hull Attachment - A single padeye at the bow and stern, to which a single shackle is connected and from which two mooring lines are attached.
- The total length of chain per leg (including excursion limiters): approximately 290m of 76mm studlink chain.
- Mooring footprint diameter = approximately 500m (250m radius).

Gravity anchors (as detailed lower down) will be used. A basic scheme of the mooring system to be used is illustrated below in Figure 8. Gravity anchors used will be multiple chain clump weights (up to 12 per leg) with a total capacity (wet weight) varying between 90 and 165Te per leg. Anchor sizes will vary due to the statistically derived environmental loading and the larger environmental forces from the North.

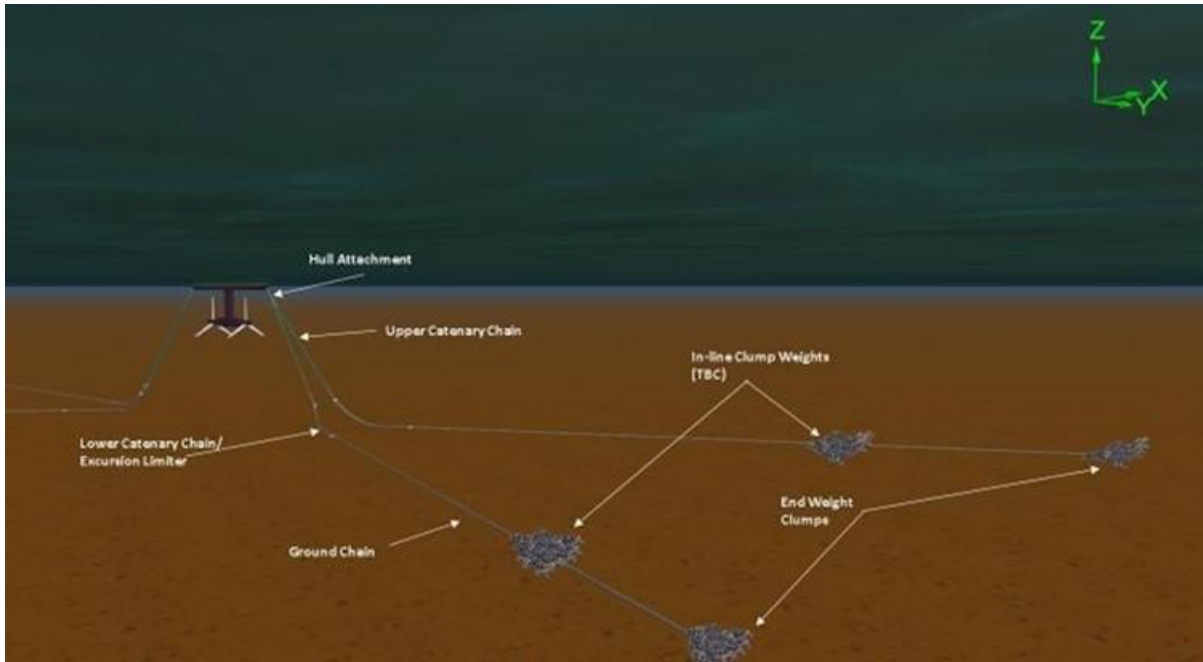


Figure 8. Scheme of mooring system with clump weights

3.8 Site conditions

3.8.1 Prevailing weather

As described in the Environmental Statement undertaken by Aurora for EMEC tidal test facility Fall of Warness, strong winds and gales are very common in Orkney, predominately from the west to the south-east. In the spring and early summer there is a marked increase in the frequency of easterly winds, and in May south-easterly winds are more frequent than winds from any other direction.

3.8.2 Sea water temperatures

Pursuant to sea surface temperatures collected by EMEC from various sources around Orkney and other sources of sea temperature data available from Marine Directorate, satellite, modelled data and The Crown Estate, among others, it can be concluded that temperature ranges from 6.5 °C to 13.5 °C in an annual cycle, with maximum temperatures recorded around August and September and minimum temperatures around February.

3.8.3 Seascape

The Environmental Description developed by EMEC for Fall of Warness tidal test site reveals that the majority of the Orkney Islands are composed of sedimentary rocks of Devonian age (360-410 million years ago). There are older metamorphic rocks and younger dykes in some places. The nature of the rock and the glacial features help to determine the present-day landscape of the coast. Whilst the west coast of Orkney is particularly renowned for cliffs, arches, stacks and geos, the lower lying coastal features likely to be found in the vicinity of Scapa Flow (such as tilted flags, sand dunes and sandy bays) are considered important for recreation and accessibility. The coastlines also contain sites of built and natural heritage interest; prehistoric remains are characteristic features and the cliffs and adjacent heaths are key seabird nesting sites. Older metamorphic rocks and younger dykes are found in a few places. The shores around the southwest coast of Eday follow the typical pattern of habitats and communities associated with exposed to moderately exposed rocky shores.

3.8.4 Currents

The Fall of Warness area is subject to strong tidal streams, with peak spring tide speeds in excess of 3.5 m/s. The significant tide speeds along the year is one of the reasons for Magallanes Renovables' intention of deploying the platforms at Fall of Warness.

3.8.5 Seabed conditions

The swathe bathymetry, geophysical, ROV and dive surveys undertaken by Aquatera (Aquatera 2005) reveal that bedrock is exposed throughout most of the test bay area, with occasional boulders but is swept of any potentially mobile sands or gravels.

3.8.6 Water depths

The chart depth readings decrease steadily from 1 m at the coast to between 34 and 51 m in the main channel where the tidal devices are to be deployed.

3.9 Navigational activity

It is worth mentioning that Fall of Warness test site has been established since 2006 and its selection was made based on the local traffic features. In addition, its boundaries are defined on navigational charts; this allows vessels to plan their passage taking into account the test site. In fact, local vessels in the area, such as inter-island ferries, have good awareness of test site location.

3.9.1 Shipping activity

Transiting vessels on the key NW-SE route (between Westray Firths and Stronsay) tend to already pass to the western side of the test site. Besides, prudent mariners will only navigate via the Fall of Warness in appropriate conditions and cruise ships (the most common type of vessel), which transit the area for sight-seeing opportunities, are unlikely to expose their passengers to very severe sea states if it can be avoided. It is noted that cruise ships are only expected to transit the area during summer months when waves are lower.

The regular inter-island ferries run past the test site to the West and close to the site on the South, however they are well aware of the activity in the area.

3.9.2 Fishing vessel activity

Fishing vessel traffic within the test site is occasional throughout the year and mainly transiting NW-SE between the Westray Firth and Stronsay Firth. Fall of Warness is a transit route for pelagic trawlers enroute to and from fishing grounds, e.g., West of Shetland.

The most common gear type was potter/creeler. Creelers operating off Eday tend to be small craft of typically less than 12 metres in length and draughts below 3 m. Demersal trawlers were the next most common type.

3.9.3 Recreational vessel activity

Fall of Warness test site is located within the general sailing area around Orkney. There are no cruising routes passing through the test site, although there are two light-use cruising routes passing to the east and west as follows:

- Route passing east of Eday, transiting between Kirkwall and islands to the north (e.g., Sanday, Stronsay and Westray) via Eday Sound.

- Route passing west of Muckle Green Holm, transiting between Kirkwall and Westray via the Sound of Faray.

Recreational boating, both under sail and power is highly seasonal and highly diurnal. Nevertheless, due to the strong tides, the Fall of Warness area is not popular with recreational users; in fact, nautical almanacs and sailing directions recommended small recreational vessels avoid the area in general.

3.10 Conservation areas

within the boundaries of Fall of Warness test site, no area is catalogued as Special Area of Conservation (SAC) under the Habitats Directive, or as Special Protection Area (SPA) under the Birds Directive. Nevertheless, there are protected sites in the surroundings, listed in Table 3.

Site Code	Site Name	Designation
8254	Faray and Holm of Faray	SAC
1683	Faray and Holm of Faray	SSSI
8372	Sanday	SAC
10510	Scapa Flow	SPA
1205	Muckle and Little Green Holm	SSSI
10481	North Orkney	SPA

Table 3. Protected areas in the surroundings of Fall of Warness test site

3.10.1 Faray and Holm of Faray SAC and SSSI

This site is approximately 15 km from the Fall of Warness, with grey seal (*Halichoerus grypus*) as a qualifying interest.

3.10.2 Sanday SAC

The site is approximately 4 km from the Fall of Warness. The qualifying interests of the site are the harbour seal (*Phoca vitulina*), intertidal mudflats and sandflats, reefs and subtidal sandbanks.

3.10.3 Scapa Flow SPA

The site is approximately 21km away directly and 25km away by sea from the Fall of Warness. Qualifying species of interests include the great northern diver (*Gavia immer*), red-throated diver (*Gavia stellata*), black-throated diver (*Gavia artica*), Slavonian grebe (*Podiceps auratus*), European shag (*Phalacrocorax aristotelis*), common eider (*Somateria mollissima*), long-tailed duck (*Clangula hyemalis*), red-breasted merganser (*Mergus serrator*).

3.10.4 Muckle and Little Green Holm SSSI

It is immediately adjacent to southern part of the test site, comprising two neighbouring uninhabited islands (Muckle Green Holm and Little Green Holm). The qualifying species of this site is the grey seal (*Halichoerus grypus*).

3.10.5 North Orkney SPA

The site lies adjacent to the south-west of the FoW site. The qualifying interests of the site are red-throated diver (*Gavia stellata*), common eider (*Somateria mollissima*), European shag (*Phalacrocorax aristotelis*), Great northern diver (*Gavia immer*), long-tailed duck (*Clangula hyemalis*), Red-breasted merganser (*Mergus serrator*), Slavonian grebe (*Podiceps auratus*) and velvet scoter (*Melanitta fusca*).

4 Description of items to be decommissioned

The items which are subject of decommissioning are listed below:

- One floating platform, comprising the upper block, vertical block and lower block, in which all equipment and devices are housed.
- The mooring lines, which fix the floating platforms by bow and stern to the seabed.
- The umbilical cables, which connects the power converter housed in the floating platforms to the existing subsea cable connector owned by EMEC.
- The anchoring systems, to which the mooring lines are attached, and which ensures that the position of the floating platforms is maintained.

The floating platform together with the mooring lines is shown in Figure 10 below.

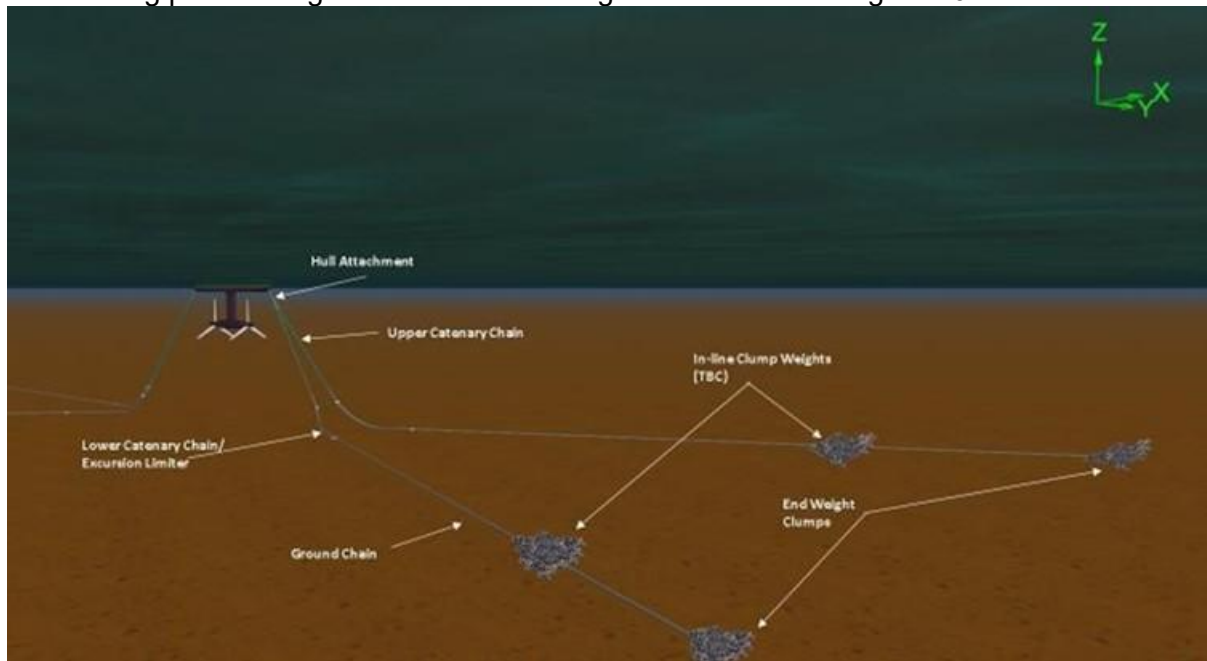


Figure 9. Simulation of floating platform and mooring lines

The floating platform comprises (i) an upper block with compartments allocated to pumps, transformers, converters, switchgears and electrical panels; (ii) a vertical block that fixes the lower block to the upper block; and (iii) a lower block or nacelle devoted to the mechanical system (shafts, ball bearings, gear boxes and generators, among others) which incorporates at either end a hub with three blades assembled, constituting the rotor.

Each blade has a length of up to 9.3m and the hub is around 2.4m across, so the rotor diameter will be a maximum of 21m. The rotor is an open-bladed one and has at least 3m clearance from sea surface.

The mooring lines are mainly made of steel and have a mooring diameter of approximately 500m (250m radius). Attached to the floating platform by bow and stern, the mooring lines ensure that the position of the platform within the berth is maintained.

Concerning the umbilical cable, the electricity generated by the platforms is transmitted first through it and then through EMEC's subsea cables to EMEC's shore-based substation. Umbilical cable is expected to have a length no greater than 400 m.

The anchor point consists of chain clump weights that secure the device to the seabed. The ends of the mooring lines are attached to the anchors and to the floating platform.

Subsea cable is owned by EMEC and, thus, is not going to be decommissioned.

Table 4 summarises the main specifications of the platform

Item	Specification
Scale of the device	Full-scale
Overall length	53.6 m
Extreme moulded breadth	7 m
Operational draught	24 m
Maximum output power	Peak power of 1.7MW (however, nominal power limited to 1.5MW)
Number of rotors	2 – with 3 blades each
Type of rotor	3 bladed horizontal axis, pitch controlled
Rotor diameter	21 m
Rotor depth	15m (to rotor nacelle)
Blade/rotor design	Blades with counter-rotating mechanism

Table 4. Main specifications of the platform

5 Scope of decommissioning scheme

5.1 Introduction

This section aims to describe the proposed measures to be taken for decommissioning the installation. It must be considered that the level of detail provided may be improved upon over time, although it is understood that the programme is detailed enough to demonstrate that the decommissioning has been fully considered and factored into design decisions.

5.2 Proposed method of removal

5.2.1 Cable disconnection

As a first step, the platforms will be disconnected from the EMEC subsea cable. In order to undertake such disconnection, EMEC's subsea cable end will be lifted by a deck crane from the seabed to the deck of one of the vessels, umbilical cables will be then disconnected from

the EMEC cable and, finally, the EMEC cable will be laid back to the seabed in the condition in which it was first taken over.

5.2.2 Floating platform decommissioning

Afterwards, the platforms will be detached from the mooring lines with the help of a multicat workboat and towed by a tug vessel from Fall of Warness test site to Hatson Pier.

5.2.3 Mooring lines decommissioning

If necessary, a dive team will also detach the steel mooring lines from the anchors, so that the mooring lines can be lifted by the crane of one of the vessels participating in the decommissioning of the platforms.

5.2.4 Anchoring system decommissioning

The chain clump anchors used (up to 12, totalling 90-165 Te per leg) will be lifted from the seabed by the contractor's multicat vessels. These clumps will be returned to Hatston quay and lifted onshore by a shore crane for storage.

5.3 Health and safety considerations

The marine contractor is at all levels responsible for ensuring that the offshore and dive operations to achieve the decommissioning scope, are conducted in accordance with the HSEQ Policy and that, as a minimum, the contractors management system is applied on all vessels, sites, and operations where the contractor takes responsibility for employees and subcontractors.

The marine contractor will develop and implement HSEQ Management Plans and or as appropriate HSEQ Bridging Documents as required for the project. By doing so the contractor will ensure operations in accordance with contractual requirements but also ensure that neither Magallanes Renovables nor the contractor HSEQ Standards are compromised whilst undertaking activities.

This section will be updated through method statements when the decommissioning operations have been organised.

5.3.1 Health, Safety and Environment (HSE)

- Risk Assessments will be performed for all tasks detailed in this procedure.
- Risk Assessment Report / Task Risk Assessments should be read prior to carrying out the tasks in order to make sure that hazards, risks and mitigating actions have been identified and understood. As a minimum, Toolbox Talk are to be carried out to convey this.

5.3.2 Quality Control (QC)

- Activities will be monitored in accordance with a Quality Plan and applicable sections of an Inspection & Test Plan.
- The Project Engineer and work site Supervisors are responsible for monitoring the progress of the work and recording pertinent information as dictated in a task plan. Each task should be signed off as the work progresses.
- Where required, the Project Engineer and Worksite Supervisors shall provide Magallanes Renovables with sufficient notification of the activities taking place.

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- On completion of the works, the Project Engineer must collate the completed task plans and the related Task Completion Certificates (where identified for permanent works).
 - Task Completion Certificates form will be filled and gathered offshore by the Project Engineer to be part of the As-Built dossier / Mechanical Completion Certificate.

5.3.3 Worksite changes to approved procedure

In the event of any unplanned operation or required change to the procedure offshore which has not been subject to an onshore HIRA, reference should be made to MOC procedures.

The Shift Supervisor responsibility to ensure that Management of Change is clearly communicated to all on shift personnel. During shift handover, minutes should be taken and documented to identify that all parties have understood and agreed to continue operations after handover of responsibility is completed.

5.4 Proposed waste management solutions

Waste management will be carried out in accordance with all relevant legislation at the time of decommissioning. Furthermore, regard shall be had to the waste hierarchy (reuse, recycle, incinerate, disposal).

5.4.1 Floating platforms

Will be removed from the site and checked in detail in order to know their general condition and in order to analyse how the initial design can be enhanced.

The platforms will be returned to shore and all their components disassembled and managed in accordance with the waste hierarchy abovementioned. In this sense, lubricants, coolants and greases will be disposed of according to the relevant legislation. Blades, which are basically made of composite, if not reused, will be recycled or disposed of as per regulation. Metal components and equipment will be reused and recycled when appropriate.

5.4.2 Mooring lines

Essentially, mooring lines are made of steel and acquire the form of a chain or a cable. Therefore, they will likely be reused or sold to be reused.

5.4.3 Umbilical cable

It is expected that the umbilical cable will be reused; nevertheless, if it is found that the cable is not suitable for a new use, it will be handled in accordance with the relevant legislation on waste management.

5.4.4 Anchoring system

Chain clump anchors will be returned to Hatston quay to be reused.

5.5 Details of any items which may be left in situ

Components which constitute the platform mooring systems at the berth will be dismantled. There are not anticipated to be any components left *in situ* relating to the device anchoring systems.

5.5.1 Predicted degradation, movement and stability of any remains

No items anticipated to be left *in situ*, therefore no degradation or movement of remains is predicted.

6 Environmental Assessment

Regarding environmental considerations, various assessments have already been undertaken of the site and documentation produced.

The test site has been well documented including an in-depth description of the receptors at the site and their sensitivities in the EMEC Tidal Test Facility Fall of Warness Environmental Statement (AURORA 2005), Environmental Description for the EMEC Tidal Test Site Fall of Warness (EMEC 2009) and Fall of Warness Environmental Sensitivity Table (EMEC 2010). Recently an environmental appraisal of the site, EMEC Fall of Warness Test Site Environmental Appraisal (EMEC 2014) has been conducted. The appraisal identifies the potential receptors and sources of risk to the environment, together with mitigation measures for minimising impacts. The environmental appraisal will be submitted in support of the marine licence application.

A project-specific Project Environmental Monitoring Plan has been developed which encompasses the decommissioning phase of the project. Appropriate mitigation measures have been identified as part of the plan and will be reported to the regulator and relevant stakeholders in line with the Reporting Schedules, outlined in the PEMP. During installation and decommissioning of the platforms, there is the possibility of disturbance to marine species due to vessel traffic. For that reason, special effort will be made so that those operational activities will be accomplished in the shortest time possible. In addition, all vessel activities onsite and to and from site will be conducted as far as possible in line with the Scottish Marine Wildlife Watching Code (SMWWC).

The materials used for construction of the platforms and connections have been chosen for their suitability for use at sea, both in terms of durability and their impact on the environment. Except for the diesel oil (deposit quantity of less than 1 ton and only for emergency purposes), the materials are all non-toxic. Environmental acceptable lubricants will be used, and all hydraulic fluids used within the platforms will be certified as suitable for marine environment.

7 Stakeholder consultations

This section will be updated after consultations occur.

8 Costs

The costs for the decommissioning are considered commercially sensitive. As a result, the overall cost estimate of the proposed decommissioning measures is to be provided separately.

9 Financial security

Financial security details are considered commercially sensitive. As a result, those details are provided separately.

10 Schedule

Key project dates are as follows:

- Site surveys: Q2 - Q3 2026
- Installation: Q3 / Q4 2026
- Commissioning Q4 2026
- Operations: 2026 - 2042
- Decommissioning or extension: 2042

Below addresses the most significant decommissioning activities with the anticipated frequency of vessel movements.

Platform decommissioning	
Decommissioning of the platform (including unmooring and subsea cable disconnection)	20-25 day trips (possibly over 2 x neap periods)
Decommissioning of moorings at Fall of Warness	10-20 single day trips

Table 5. Decommissioning timeframes

11 Seabed clearance

During decommissioning operations, it is not expected the generation of any significant debris, since the platforms together with its mooring lines and anchors will be removed completely.

Upon the completion of decommissioning, by means of the appropriate survey, it will be confirmed that the site has been cleared out. Such survey will enable identification and subsequent recovery of any debris (if any) located on the seabed which may have arisen from the company's activities and which may pose a risk to navigation, other users of the sea or the marine environment. Survey will be undertaken in accordance with EMEC procedures and independent, third party will be involved when providing evidence that the site has been cleared.

12 Restoration of the site

Provided that it is only forecasted the deployment of one device and that it is a floating platform attached to the seabed only by means of gravity, it is not expected that there will be significant disturbance to the site during the decommissioning of the platforms. Thus, it is not anticipated it will be necessary to implement a specific site restoration programme.

The removal of the components constituting the platform mooring system would only have influence in a quite limited zone (of several tens of square meters) and would not impact on areas to be conserved.

13 Post-decommissioning monitoring, maintenance and management of the site

Assuming the small potential area of impact on the seabed, the lack of generation of debris forecasted and the complete removal of the platforms together with its mooring lines and anchors anticipated, no post-decommissioning monitoring, maintenance or management of the site is considered to be necessary.

Following the decommissioning of the facilities a seabed survey will be undertaken to confirm that the dismantling has been done correctly. The survey will be carried out as per EMEC procedures and third party will be involved when providing evidence that the site has been cleared.

14 Supporting studies

Supporting studies and documents have been undertaken in connection with Fall of Warness tidal test site. Such documentation is listed below:

- EMEC Tidal Test Facility Fall of Warness Environmental Statement (AURORA 2005).
- Environmental Description for the EMEC Tidal Test Site Fall of Warness (EMEC 2009).
- Fall of Warness Environmental Sensitivity Table (EMEC 2010).
- EMEC Fall of Warness Test Site Environmental Appraisal (EMEC 2014).
- Navigation Risk Assessment of the Proposed Tidal Test Facility at the European Marine Energy Centre (ABBOTT 2005).
- Addendum to Navigation Risk Assessment of the Proposed Tidal Test Facility at the European Marine Energy Centre (ABBOTT 2005).
- Navigation Risk Assessment Update – Fall of Warness (ANATEC 2010).
- Project-specific Navigation Risk Assessment.
- Project-specific Environmental Monitoring Programme

