PROJECT PROPOSAL FORM

Making the Most of Masters aims to improve collaboration between employers and universities by providing opportunities for postgraduate students to undertake work based projects as an alternative to a traditional university dissertation. Projects should address a real need within the host organisation and be beneficial to both host and student.

The Marine Alliance for Science and Technology for Scotland (MASTS), pools the majority of Scotland's marine research capacity. MASTS members provide Masters courses in a range of marine related disciplines and many of their students are keen to undertake applied projects outside of academia.

Notes on Topic Selection

A relevant academic will work with your organisation to refine your proposed topic and ensure it meets both your needs and the academic requirements of the student. Projects should typically be achievable within a 12–16 week timeframe (including writing the final report).

Your proposed project could be:

- A specific project title or topic for the student to deliver;
- A general idea of a business need which requires further development;
- A core research theme to be developed by the student into a bespoke project;
- An intended outcome for the organisation.

The level of detail you provide will determine the extent to which further discussion may be required with the relevant programme director to ensure suitability.

desk-based/data studies that will easily facilitate remote working and remote supervision are welcome, as well as in person and/or experimental based projects where appropriate.

What's Next?

Please send your completed form to the MASTS Programme Coordinator & Deputy Dean of Grad School, Dr Emma Defew (masts@st-andrews.ac.uk) before the deadline.

Following submission of the form, it will be channeled to the leaders of the various Masters programmes that operate within the MASTS community and a representative from the most relevant programme or department will get in touch to discuss the project scope, delivery and the selection of an appropriate student. If more than one student expresses an interest in your project, you will need to ensure discussions take place to enable the most suitable student to be matched with your project. The projects themselves usually won't start until May or June.

MASTS - Making the Most of Masters – Project Proposal Form

Name and address of Organisation: The European Marine Energy Centre Limited The Charles Clouston Building ORIC Back Road Stromness KW16 3AS
Name of the key contact in Organisation: Dernis Mediavilla
Contact e-mail and phone number: Dernis.mediavilla@emec.org.uk +44 (0)1856 852218
Title of proposed project: H2HEAT: Mapping investment pathways for renewable energy integration. An island community case study
Project outline and intended outcomes: **EMEC:** EMEC are a not-for-profit organisation based in Orkney, Scotland. Our work focusses on providing a platform for R&D, where developers can test their innovations for a net zero transition. We enable early-stage developments to prove their concept in a scaled, but real-world environment, enabling them to focus on full-scale commercialisation of their product or service. Originally set up as a test facility for wave and tidal energy generation, we host 4 test sites spread across Orkney for developers to utilise for testing of their energy generation devices. This allows developers to fast-track the technical performance of their device, with the safety of EMEC's processes, consenting and health and safety expertise guiding their development. Due to the grid capacity in Orkney being lower than generation potential, we now look to utilise some of the excess energy generated for R&D projects across the islands. We have facilities for hydrogen (H2) production using renewable energy and welcome innovators to find end-use cases for this, as well as identifying new methods of production, transport and optimisation of H2. **H2HEAT:** H2HEAT is a collaborative project, funded by the European Union. EMEC have a role in the consortium and several deliverables within the overall work plan. H2HEAT is a project to demonstrate the full value chain for green hydrogen for commercial building heating. H2HEAT works in alliance with Canary Health Service (SCS), who wish to develop a full demonstration of Green H2 for heating (and later energy). This will serve as a replicable model to be rolled out across

the SCS hospitals enabling the SCS to fulfil its ambitious "Health Zer0 net Emissions Strategy" delivering deep decarbonisation of its service.

H2HEAT intends to use offshore wind renewable energy to produce H2 using a 1MW electrolyser. The produced H2 will be used as a substitute to conventional fuel by the large end-user hospital CHUIMI with substantial heating requirements. An H2 Combined Heat and Power (CHP) unit will be used to produce heat and energy, used to power a heat pump with no waste. The project will provide full end-to-end infrastructure for H2 transport and use will be planned, installed and commissioned. The project aims to be a pilot demonstration for a replicable business model for wide-scale commercial usage of H2 as a direct heating alternative across Gran Canaria.

As part of the project, EMEC has a number of deliverables. We believe the below to be a great opportunity for a master's student thesis/project to have hands on experience on renewable energy integration opportunities, with the below tasks:

Work Package 5:
This work package is led by EMEC, with support from project partners and wider participation from the alliance partner - SCS, Canary Islands Government and technology providers. The overall objective of the work package is to maximise the exploitation of both green H2 supply chain developed in the project and the individual technologies.

- H2HEAT will work with the alliance partner SCS to roll out its replicable green H2 solution to the other hospitals in the Canary Islands.
- H2HEAT will work with the Canary Islands Government to exploit the broader use of the H2 supply chain for heat both commercial and domestic settings – H2 Valley.
- To assist each technology provider in enhancing their own product offerings arising from the project.

Amongst this Work Package are specific tasks, providing key deliverables to understand the wider impact of the H2HEAT project, to justify its benefits to Gran Canaria and provide a pathway to successful up-scaling once the project is complete.

Below are some key tasks that EMEC are to deliver, which we believe could make a suitable research project for a master's student to carry out:

Deliverable: Mapping the investment community
SCS and the Canary Government has already explored investment options, partners and structures that would help to support the project ambitions of H2HEAT. This deliverable aims to build on this existing research to provide a comprehensive report outlining the existing structure of investment options, planned and expected investments in the H2 sector in the Canary Islands. It is expected the report will:

- Provide in depth review of the regulatory frameworks and government incentives for investment in the Canary Islands, with specific focus on renewable energy.
- Provide case studies of previously completed projects and show an understanding of investment models that facilitated these developments, establishing a best practice guide
- Engage with the local community, academics, industry and financial institutions to establish potential investors in the H2HEAT project.
- Provide recommendations for future investment to avoid facing common barriers to investment that prevent projects from succeeding.

The overall report will cover several key deliverables that EMEC are looking to fulfil, following the below task of the H2HEAT project. Noted below is the expectations should this proposal be successful:

Task: Investment Community Review
It is essential that potential investors for the H2HEAT solution are engaged throughout the project. It is essential we work cooperatively with SCS and the Canary Government to deliver this task. The sub-tasks associated with this are laid out below:

1) Build relations and establish a forum for ongoing communication between H2HEAT and the investment community. This will be led by EMEC and will allow a master's student access to an opportunity to understanding more about the requirements for investment on a multi-national scale. Whilst not being directly involved in the set-up of this task, a master's student will be involved in monitoring outputs from the forum, which will help mould their own work. This task will involve community outreach to establish a set of meetings or online workshops to showcase the H2HEAT project.

2) Map the relevant investment community for the Canary Island H2 economy strategy and comprehensively review the past, planned and expected investments in these sectors. This section will be led by the student, with input from EMEC and other project partners. This sub-task will form the literature review/initial research part of a master's thesis.

3) Investigate innovative financing streams. This will be led by the student, with assistance from EMEC and the wider project team/external partners. The task will inform EMEC of future solutions to investment concerns and provide EMEC with a clear case study to utilise for future work. This could be undertaken in a variety of ways and forms the key part of the research a student would be undertaking. We expect the investigation to be done through a variety of forms, such as desk-based review of investment options, but perhaps also interviews or questionnaire-based research of key identified stakeholders.

4) Investment best practices and barriers. This will be led by the student's research into existing Gran Canaria case studies for renewable energy investment. It would be built into the overall report produced by the student

In addition to the deliverable above, EMEC are responsible for delivering a 2-decade business plan for each technology developer involved in the project, allowing for them to reach large scale commercialisation of their technology. It would be expected that the student could feed into these plans from their investment report, giving them valuable experience in putting the theory into practice.

Any additional comments e.g. details of specific disciplines required, methods to be used, travel involved, where the work would take place (i.e. at the host site or at the University), whether you foresee any Intellectual Property or confidentiality issues (and if so, what form might these take?):

We would expect a student to have a strong interest in marketing or business development and a passion for renewable energy.

This work could be undertaken either on-site at EMEC as part of an industrial placement, but this would need to be discussed and agreed with HR and the candidate.

There would be no confidentiality or intellectual property issues within this work.