

# **TWIND**

## ***Twinning for an Offshore Wind Energy Partnership***

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### ***D2.4 – Senior Staff Exchange Summary***



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## 1 EXECUTIVE SUMMARY

The main objective of the TWIND project is to create a network of excellence that will dynamize a pool of specialist research professionals and trainees to support the emerging offshore wind energy industry in Portugal, a sector with a very strong anticipated growth and no current dedicated training curriculum. This objective is being fulfilled through a set of strategic activities well-structured throughout the project including specific training programmes, short-term scientific meetings, long term staff visits, networking meetings, conference attendance and knowledge transfer events. The aim of these activities is to stimulate research activities that can positively impact the Portuguese economy and society. These research activities are likely to be more impactful and have a greater success if they are developed collaboratively between the TWIND consortium partners and WavEC.

This report entitled '*Senior Staff Exchange Summary*' provides a summary of the senior staff exchanges that took place between the partners during the TWIND project. As with much of the activity in the project, the exchanges were significantly affected by the COVID-19 pandemic. At one point, it did not look likely that the project would achieve its target number of exchanges; as travel restrictions eased in early 2022, the project had only completed one senior staff exchange. As a result, ORE Catapult deliberately delayed the completion of deliverables D2.3 and D2.4 (related to the think-tanks and senior staff exchanges respectively). This allowed the maximum time to schedule the face-to-face activity that is crucial for both deliverables. Subsequently, we were able to have a fourth think-tank on hydrogen in October 2022 and accommodate senior staff exchanges as late as mid-December, only a matter of days before the official end date of the TWIND project. This concerted effort by the consortium partners on a concentrated staff exchange programme in 2022 resulted in a total of 11 senior staff exchanges due to the TWIND project: a fine effort from the consortium given the situation with the COVID-19 pandemic.

A key part of the staff exchange strategy was to maximise the exchanges that were undertaken by WAVEC staff which we felt was in the spirit of a TWINNING style project. Additionally, we saw the TWIND project as an opportunity to provide exchange placements for staff from the other partners. The result was 11 senior exchanges in total. Six were undertaken by WAVEC staff and five were undertaken by ORE Catapult staff. Furthermore, three of the partners were involved in hosting senior staff exchanges, the tally being ORE Catapult (4), Tecnalia (6) and TUDelft (1).

As a result of the delivery of D2.4, the TWIND project completed milestone, MS9 '*Completion of senior staff-exchange programme*'. The target for MS9 was to arrange and complete 10 senior staff exchanges. The project exceeded this target and completed 11 exchanges which covered a large range of topics including techno-economic modelling, roadmap development and grid compliance challenges for the ORE sector.



## 2 INTRODUCTION

This report summarises the senior staff exchanges that took place between the TWIND partners during the project. Section 3 provides individual exchange summaries (labelled 3.1 to 3.10) and commences with an initial summary table that lists the Entity undergoing the staff exchange, the Host organisation, the host Tutor, the entity staff member being Tutored and the Date of the exchange.

For each senior staff exchange, further tables are presented in sections 3.1 to 3.10 that summarise the participation objectives for each staff exchange placement and the highlights from the placement itself. Conclusions resulting from all senior staff exchange activity are provided in Section 4.

Finally, some blog posts have been created for a selection of the senior staff exchanges (one from WaVEC and two from ORE Catapult) - <https://twindproject.eu/blog/>.



### 3 STAFF EXCHANGES

No.	Entity	Host	Tutor	Tutored	Date
3.1	WavEC	OREC	Anthony Gray	Craig White	July 2020-Oct 2021
3.2	WavEC	TECNALIA	Pilar Ruiz	Janete Gonçalves	Jul 2022
3.3	WavEC	TECNALIA	Alberto del Pozo	Luís Amaral	Sept 2022
3.4	WavEC	OREC	Cameron Wilson + Kacper Stefaniak	Paula Bastos	Oct 2022
3.5	WavEC	OREC	John Lang	Janete Gonçalves	Nov 2022
3.6	WavEC	OREC	Ciaran Frost	Craig White	Dec 2022
3.7	OREC	TECNALIA	Iñigo Mendikoa	Will Brindley	July 2022
3.8	OREC	TECNALIA	Imanol Touzon	Daniel Milano	Sept 2022
3.9	OREC	TUDELFT	Simon Watson	Paul McKeever	Oct 2022
3.10	OREC	TECNALIA	Ainhoa Pujana	Anup Nambiar & Mathieu Kervyn	Dec 2022



### 3.1 STAFF EXCHANGE - CRAIG WHITE

Participation objectives
<p>Establish Techno-Economic Modelling baseline knowledge</p> <p>Introduction to Geographic Information Systems (GIS) skills development</p> <p>Awareness of Industrial perspective for floating offshore wind</p>
Highlights
<p>Time spent with Techno-Economic Modelling team at ORE Catapult.</p> <p>Improved awareness of GIS and how to use them.</p> <p>Grounding in industrial stakeholders for floating offshore wind.</p>

### 3.2 STAFF EXCHANGE – JANETE GONCALVES

Participation objectives
Learn about communication activities at TECNALIA
Highlights
<p>TECNALIA explained how the organization works with the several labs. Information, such as brochures are available of each lab.</p> <p>TECNALIA presented the communication and marketing to show the communication plan that is set up each year.</p> <p>One interesting aspect of the communication and marketing plan is the event planning, that WavEC can adapt for the association and the EU funded projects in which we participate and manage the communication WP.</p> <p>TECNALIA and WAVEC can work together on an event on Marine Renewable Energies that will take place in May 2023.</p>

### 3.3 STAFF EXCHANGE – LUIS AMARAL

Participation objectives
Topic of “study”: Electrical components for the offshore wind industry
Highlights
Visit to Tecnalia facilities and conversations about projects Tecnalia are involved. Discussions about offshore wind projects Tecnalia were involved, mainly projects related with electrical infrastructure design and procurement. Cable dimensioning. Discussions on the supply chain for electrical components for the offshore industry. Visit to BiMEP site and BiMEP/Iberdrola onshore substation.





### 3.4 STAFF EXCHANGE – PAULA BASTOS

Participation objectives
<p>Presentation of the Offshore Wind Innovation Hub roadmaps – detailing the process from the initial set-up to the final publication</p> <p>Discussion on potential elements in the roadmaps and scoring criteria</p> <p>Discussion on how a Portuguese roadmap (similar to OWIH) could be set up and the relevant content for it</p> <p>Creating templates for the Portuguese market and populating them for a selected category using OWIH roadmaps and other existing literature</p>
Highlights
<p>OWIH Innovation Roadmaps are tools developed to identify offshore wind sector innovation needs and its main goal is to establish a common set of priorities across industry and communicate these to public bodies. ORE Catapult have been developed in collaboration with industry, supply chain, and academia to present a sector-wide view of priority areas for offshore wind.</p> <p>The roadmaps were divided into 4 breakdown categories, namely “Electrical Infrastructure”, “Turbines”, “Substructures”, and “O&amp;M and Windfarm Lifecycle”.</p> <p>The category “Decarbonising Maritime Operations” is under development to be included in the roadmap.</p> <p>The main steps of roadmap building are: Define the roadmap objectives; Identify the target audience; Create a long list of scores and features that the roadmap could have (timelines, TRLs, goals); Shortlist scores and features; Identify key categories of challenges; Identify technology; Populate the roadmap from existing literature; Challenges and innovation needs; Identify key outcomes; Create templates to present the findings; Present the findings.</p> <p>The flow of processes covers the main actions: Initial strawman; Industry review; Academic review; Moderation group; Release and update every 6 months.</p> <p>The scores categories defined for these models are: Country Benefit; Potential to Reduce LCOE; HSE Impact; Case for Intervention.</p> <p>With the purpose of getting an understanding of how a Portuguese approach might look like, after a brief brainstorming, a draft roadmap was created including the following scoring categories: Priority; National strategic potential; Barriers of implementation.</p> <p>The roadmaps are of relevance in providing a comprehensive overview of the current picture and to indicate the direction the sector might take to tackle industry development, by matching industry challenges with innovative solutions adapted from other parts of the economy, focusing on offshore wind energy cost reduction and maximising economic impact.</p>



### 3.5 STAFF EXCHANGE – JANETE GONCALVES

Participation objectives

Learn about communication activities at ORE CATAPULT

Highlights

ORE CATAPULT showed me one day of work in the communication and marketing department and I had the opportunity to attend the company’s meeting and speak to several colleagues of the communication department.

I have learned a new format of company meetings led by the communication department and learned about several activities that are interesting to be implemented at WavEC: such as podcasts, Instagram, and others.



### 3.6 STAFF EXCHANGE – CRAIG WHITE

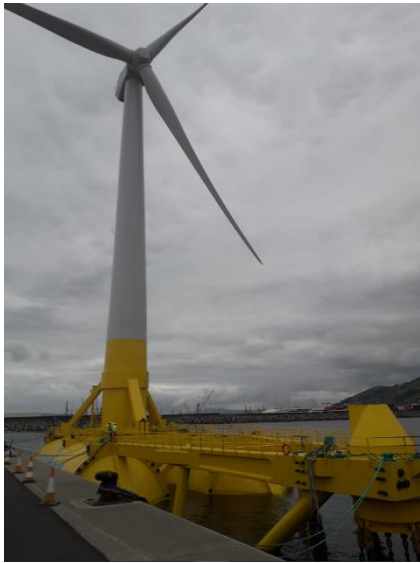
Techno-Economic Modelling knowledge improvement  
Geographic Information Systems (GIS) skills development  
Industrial perspective for floating offshore wind

#### Highlights

Participated in Techno-Economic Modelling sessions.  
Created maps for new floating offshore wind leasing areas in California, overlain with key site characteristics including bathymetry, wind speed and seabed geology.  
Created report on resource requirements for projected floating offshore wind upscaling to commercial level.



### 3.7 STAFF EXCHANGE – WILL BRINDLEY

Participation objectives
Learn about activities at Technalia
Highlights
<p>I visited Technalia in Bilbao, who are ORE Catapult’s counterpart in offshore wind research and development. The exchange successfully laid the groundwork for better sharing of engineering expertise and future project collaboration.</p> <p>The first day of the exchange, I visited Saitech’s DemoSATH floating wind turbine alongside a quay at the Port of Bilbao. After 10-years in the offshore sector, this was my first time seeing a floating turbine up close. It was inspiring to see the innovative design and ask questions to the designers. I was also able to view Technalia’s Harsh Lab floating test site from the shore, whilst speaking to the mooring designers to understand the engineering behind one of the leading offshore test centres.</p> <p>For the remaining week, I worked closely with the Technalia offshore renewable energy team. I was able to learn from their live industry focussed projects, whilst sharing some of my moorings and cables engineering experience.</p>




### 3.8 STAFF EXCHANGE – DANIEL MILANO

Participation objectives
Learn about activities at Tecnalia
Highlights
<p>I visited our partners from Tecnalia’s offshore renewables team between Monday 26th and Friday 30th of September. During the exchange, I was able to see Tecnalia’s offices, workshops and other facilities, get to know the offshore renewables team and meet people from Saitec and Nautilus - floating wind platform developers from the area. The visit was insightful for many reasons; Tecnalia is a research centre with a wide range of technical capabilities and cutting-edge research activities, while Saitec and Tecnalia are key industrial players in offshore wind with years of design experience and an in-depth understanding of the challenges - technical, financial and commercial - that the industry is facing.</p> <p>I was also invited to the BiMEP (Biscay Marine Energy Platform) open sea test site, their control room and substation. The visit was insightful as it allowed me to appreciate the sheer scale of the infrastructure required for a multi-Megawatt power generation system, and because I was able to see Tecnalia’s latest research buoy HarshLab 2.</p> <p>Three potential collaborations have been identified during my visit:</p> <p>Load mapping on structural models: development of a novel methodology to transfer dynamic loads of floating offshore wind turbines into a finite element method (FEM) environment, supporting the structural design of floating substructures;</p> <p>Share operational data of ORE Catapult’s Levenmouth Demonstration Turbine, allowing Tecnalia to recreate it in a scaled physical model, used as a baseline to investigate advanced control strategies;</p> <p>Both Tecnalia and OREC have research buoys (respectively HarshLab 2.0 and the MEECE research buoy) which put us in the unique position of being able to run coordinated comparative analyses in different European waters – e.g. marine growth in different geographical offshore areas. I have introduced the two research teams, who are soon meeting in person at the ICOE-OEE 2022 conference in Donostia.</p>



### 3.9 STAFF EXCHANGE – PAUL MCKEEVER

Participation objectives
Identify opportunities for ORE Catapult and TU Delft to collaborate on DC grids and Energy Systems Integration
Highlights
I visited Simon Watson and other academics at TU Delft in October 2022 to discuss work on electrolysis, isolated grids, weak grids and hydrogen production. Discussions involved Simon Watson, Axelle Viré and Stefan Pfenninger from TU Delft. Discussion was held about possible future collaboration with the EWI and TPM faculties at TU Delft through the work of Michael Smailes and John Nwobu at ORE Catapult. A meeting was also held with Jan Willem Van Vingerden to discuss opportunities to collaborate in wind turbine/wind farm control research off the back of projects such as TotalControl. Discussions are ongoing.



### 3.10 STAFF EXCHANGE – ANUP NAMBIAR & MATHIEU KERVYN

Participation objectives
Learn about activities at Tecnalia
Highlights
<p>As a part of the staff exchange programme under the TWIND project, Mathieu Kervyn and I, from the Grid Compliance team at the Offshore Renewable Energy (ORE) Catapult, visited Tecnalia at its home base in Bilbao between 12<sup>th</sup> and 16<sup>th</sup> December 2022. We were hosted at Tecnalia by Germán Pérez Morán and the Offshore Renewables Group he leads. The main aims of the visit were to:</p> <p>Exchange knowledge and skills;</p> <p>Identify synergies between Tecnalia and ORE Catapult;</p> <p>Identify collaboration areas for future projects.</p> <p>Preparations for the staff exchange programme began about two months prior to the visit with a call with Germán. Mathieu and I had identified research groups at Tecnalia of interest to us before the call. Germán was then kind enough to liaise between us and the research groups we had identified. With his assistance we were able to interact with members of the Offshore Renewables Group, the Power Electronics and System Equipment Group and the Digital Energy Group while we were there. We also got the opportunity to visit the Biscay Marine Energy Platform (BiMEP) wave and floating wind test site on one of the days.</p> <p>The week Mathieu and I were at Tecnalia went very smoothly. We had our own desks to work at and Germán had left the second half of the days free for us to continue discussions from the mornings or to work on our projects. The work culture at Tecnalia was very similar to what we have at the ORE Catapult. The main difference was the “formal” coffee and lunch breaks – when research groups went away to the coffee room or the lunch hall to have coffee/lunch. I found these to be very good opportunities to network beyond those who we had scheduled meetings with, to continue discussions from earlier and welcome breaks from work. One of my three main work-related highlights from the week there was the power electronics and HVDC lab that we got to visit and some of the advanced control and hardware experiments that were shown to us. Tecnalia had a set up for fast prototyping in the lab wherein they could test novel control algorithms in control hardware-in-the-loop systems and then quickly move onto testing those algorithms on a pure hardware test bed in a short period of time.</p>



My second highlight was when one of the researchers at Tecnia we were meeting brought up an old project proposal that Tecnia had worked together with ORE Catapult on. This clearly showed that we just had to revive some of the older relationships that already existed between the two companies.

My third highlight was our boat trip at BiMEP to see Tecnia's HarshLab and their measurement buoys. That trip gave me an appreciation of the energetic sea conditions wave and floating wind devices need to operate in.

From the discussions and meetings we had at Tecnia over the week, possible areas of collaboration like: grid emulation and hardware-in-the-loop testing, modelling of power converters and their grid forming/following control, and digital twins for wind turbine generators and power converters were identified. There were also other topics, slightly outside the scope of our day-to-day work, that were recorded as well. Relevant researchers at ORE Catapult will be introduced to their counterparts at Tecnia in early 2023 to hopefully start/continue collaborations with them.

Mathieu and I spent most evenings after work walking around in Bilbao. Since the exchange was just before Christmas the city was beautifully decorated and the weather was lovely as well. We also went pintxo bar hopping most evenings for dinner, as suggested to us by some of the researchers we met at Tecnia. The week there also improved my, albeit poor, Spanish by a few words/phrases! My visit to the Guggenheim Museum on the last afternoon there was the icing on the cake of the exchange programme.

Participating in the staff exchange program was an enriching and rewarding experience for me. It gave me the opportunity to experience working in and to learn about another research organisation. The measure of success of the exchange programme stems from how we, participants in the exchange programme, continue communicating with and collaborating with those whom we met. I am hopeful that we will make something positive grow from the seeds that were planted during the exchange.





## 4 CONCLUSIONS

The TWIND consortium set out at project outset to organise and execute 10 short-term (1-2 week) exchanges of senior staff between WavEC and partner organisations. Despite the COVID-19 pandemic, the project achieved 11 exchanges (exchange 3.10 was a dual exchange from ORE Catapult to Tecnalia), thereby achieving (and exceeding) Milestone, MS9.

A range of staff were appropriately selected for the following reasons:

- Their exchanges were related to one or more of the eight research themes identified in deliverable, D2.2 including:
  - Numerical Modelling
  - Economic Assessments
  - Floating Wind Turbine Platform Development
  - Mooring Systems and Dynamic Cable Designs and
  - Grid Integration of Renewables (including considerations around hydrogen)
- The placements created or cemented relationships which made the delivery of the short training courses during the Summer School, the 2022 Autumn School and the four Think-Tank events more impactful
- Several WavEC senior staff were given the opportunity to spend time with other TWIND partners (ORE Catapult and Tecnalia) and benefit from the breadth of knowledge and skills at those organisations; some of the exchanges provided direct access and/or tours of laboratories and test and validation facilities
- Several ORE Catapult senior staff spent time at other TWIND partner sites; all placements undertook useful knowledge exchange and advisory discussions around ongoing and future R&D activities

In summary, the senior staff exchanges have provided an opportunity for the TWIND partners to accelerate the development of new (or cement existing) relationships with their respective experts (who are leaders in their field in many cases). With these relationships established, an opportunity to develop the discussions around future R&D activities is strengthened and a longer-term legacy for the TWIND project is possible as we look to form future collaboration and research projects that were seeded as part of the TWIND project activity.

