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When wind power goes to sea: a breath of fresh air for existing occupations

The emergence of the marine renewable energy (MRE) industry has not, strictly speaking, led to the creation of new professions or occupations. However, it is likely to change those for which firms find it difficult to recruit by redistributing their knowledge and skill base and restructuring the training offer. It is also likely to lead to the emergence of new dynamics of occupational development, made essential by work in a marine environment, as the occupation of wind turbine service technician clearly demonstrates.

regional competence nexus
shortage occupations
marine renewable energy
training region
green occupations
wind power

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The marine renewable energy (MRE) industry will have to respond to the policy commitments on France's energy mix made as part of the Grenelle environmental initiative and structure itself in such a way as to become a truly national manufacturing industry. This twofold demand makes the industry a highly strategic one. Moreover, it is perceived as a potential source of openings for young people and of retraining opportunities for older workers affected by restructuring in more traditional industries. Although the emergence of this industry has reactivated the fantasy about the 'new occupations' it could generate, the real interest of this phase of its emergence lies in the opportunities it provides to consider the occupations in question in a new light. This is the message of a study of occupations in the offshore wind energy industry, the most advanced technology in use in the MRE sector (cf. boxes on the study and MREs in France on the following pages).

To adopt a new analytical framework, and in particular to put at some distance the experience of onshore wind energy, is to open up new spaces in which to understand the occupational dynamics now emerging. Furthermore, this shift of perspective will help to shed new light on the organising principles around which the links between training and employment are constructed. Finally, it will enable us to identify the numerous effects (or externalities) that are gradually contributing to the structuring of an industry which, in France, is not yet fully developed.

A number of effects on shortage occupations that may enhance their appeal

Most of the occupations in this sector are associated mainly with the metallurgical, mechanical engineering, shipbuilding and electrical engineering industries (more than 100 occupations covered by the Union des industries métallurgiques et minières [UIMM, the employers' association for the metalworking and mining industries and one of the oldest and most influential in the country]). Many of them have long been regarded as shortage occupations. This applies in particular to occupations in the shipbuilding industry and its subcontractors operating in the same labour market areas. The development of the MRE industry and the efforts being made to think ahead about its labour requirements have reawakened concerns about these occupations and led to a re-examination of the causes of the recruitment difficulties.

These difficulties, which stem from young people's reluctance to embark on technical training programmes, disheartened as they are by the downgraded image of manual occupations, have spurred a re-examination of social attitudes towards these technical occupations. These attitudes are often out of date and no longer truly reflect the current operating conditions or the tools and materials used in high-tech environments such as the MRE industry. Boilermaking and welding are two occupations typical of these disparities between image and reality, which are further reinforced by the very titles of the occupations and the corresponding training programmes. However, this close-up examination of the causes of the shortages goes hand in hand with the risk of an expansion effect. After all, demand for these occupations will increase when the industry is operating at full capacity. The risk then will be that this scarce labour supply will be drawn off into firms that are less attractive or less resilient*. According to the Groupement des industries de construction et activités navales (GICAN, an employers' association for manufacturers in the shipbuilding and maritime sector), the metallurgical and shipbuilding industries are particularly affected. An active policy aimed at transforming the training offer and attracting more young people on to these reformed industrial training programmes is the only way of mitigating this risk. For these occupations, the information campaign firms have already embarked on must be accompanied by a two-pronged plan of action. The first part, already under way, must be aimed at reforming the contents of the relevant vocational training courses. The second has to involve the provision of information and guidance for young people through systems directly linked to the innovative industrial ecosystems now emerging in the regions.

** A resilient company is a company that has the capacity to anticipate and adapt to the uncertainties of the labour market in order to minimise their effects.*

Context of the study and materials used

Céreq was commissioned in 2013 to carry out this study by the Commissariat général au développement durable (General Commission for Sustainable Development, or CGDD) with a view to assisting the Eco-Industries' Strategy Committee (Comité Stratégique de filières Eco-Industrielles or COSEI), established by the Conférence nationale de l'industrie (National Manufacturing Forum, or CNI) and tasked with drawing up policies to develop employment and skills in strategic 'green' industries. Working groups on jobs and skills were set up for each industry, with each group basing its work closely on the 'occupations in the green economy' plan. The fundamental objective was to identify the occupations and new skill requirements that the industries were going to generate and to assess the implications for the initial and continuing training offer.

It draws on 3 sources: a set of documents compiled at the end of the 2000s by occupational federations and associations, the regions, high-tech manufacturing and business centres (the so-called 'technopoles') and job centres; some thirty face-to-face interviews with representatives of companies, training bodies and research centres; and, finally, visits to trade shows (Thetis), attendance at conferences and site visits.

In order to adapt them to the needs of firms in the sector, some occupations will require a radical reorganisation of activities and areas of knowledge (power electronics, mechanical engineering, hydraulics, automation and computing, for the most part) hitherto frequently dispersed among a number of different occupations. These reorganised occupations reflect new approaches to industrial process engineering that require multidisciplinary methods and procedures in which different areas of knowledge, far from being juxtaposed, become very closely intertwined. Mechatronic engineering is the emblematic occupation in this regard. The emergence of the MRE sector is focusing attention on these far from well-known occupations and helping to make them more attractive.

Thus MREs would seem to be capable of producing a lever effect that will help improve the image and status of shortage occupations in manufacturing and enhance their attractiveness, which will be further underscored by an added environmental tinge ('green' jobs) and an attractive maritime setting ('blue' jobs). However, this latter factor should be qualified, since the work environment at sea seems to be even more gruelling than in onshore wind farms. Nevertheless, the sea remains attractive if the location of jobs on the coast is seen as offering a pleasant environment for families, with the maintenance technicians being attached to a port close to the offshore wind farms. Ultimately, this improvement of these occupations' image and status should have a knock-on effect on all the industries, particularly those directly associated with MREs (aeronautics, shipbuilding, electrical and mechanical engineering, metallurgy and plastics technology).

The training offer is being reconfigured

Already, however, the promised development of MREs and forward planning for the ensuing labour market needs are hastening the reform of certain qualifications, such as the vocational baccalaureate in metallurgy and shipbuilding and the BTS in systems maintenance. New qualifications are being created, e.g. the vocational baccalaureate for mechatronics engineers, while others that had disappeared are being revived (CAP in welding). More advanced courses that will confer the status of engineer on successful candidates are creating a large number of MRE options that will be likely to diversify the training offer for engineers, who will have to be able to operate across the entire value chain. Thus the MRE industry would appear to be acting as a lever to drive the reform of qualifications and the harmonisation of reference frameworks.

The slow structuring of this industry and the numerous partnerships between actors in training, research and the industry itself are playing a major role in reconnecting general and specific training programmes. Many training programmes provided by the national education system (BTS in systems maintenance), engineering schools (Ecole Centrale and its ocean engineering course) and the Ministry of Infrastructure (merchant navy officers) offer options and courses that complement training in MRE. These training providers are seeking in this way to avoid excessive specialisation and to keep open a range of options for those completing the programmes. Additionally, a European MRE training quality certification system, based on a panel of existing technological training programmes and ranging from level V to level II, is currently being put in place in certain regions.

New relationships between initial and continuing training are emerging, superimposed on this balance between generalist and specialist training programmes and blurring the traditional boundaries between the two. Specialist courses in MRE frequently take the form of continuing training modules that involve manufacturers and are open to those who already have a master's in engineering. Thus at its newly established West Atlantic Marine Energy Center, the Ecole Centrale in Nantes has designed nine specific modules. Block-release training programmes themselves should be able to evolve along the lines of those in the aeronautics industry; they will take the form of shared apprenticeships in which the young trainees divide their time between their employer, acting as principal, and a partner company (subcontractor, supplier or customer). This will enable them to obtain experience of different manufacturing cultures.

The regions have a crucial role to play in this area. They are, after all, becoming the medium for the creation of closely linked networks involving a wide range of actors in clusters** and so-called 'competitiveness hubs'*** in which several different industries are able to develop strong synergies. Jobs, training and vocational guidance are key issues here. This is the case, for example, with aeronautics, MRE and shipbuilding in the Saint-Nazaire and Nantes regions. These new productive systems are akin to the notion of the 'regional competence nexus', defined as a combination of different forms of proximity, whether spatial, organisational, institutional or technological. Within these configurations, universities, engineering schools, knowledge-producing research centres, firms that experiment and investors and public actors that provide support are all linked together. Training is a constituent part of these collective innovation ecosystems, drawing as it does on a set of pooled resources (technological research and training platforms, research institutes etc.). This is what is demonstrated by the recent establishment in Nantes of the expert ecosystem known as the Jules Verne Manufacturing Valley or the opening in Brest of a 'global sea campus' that is a major centre for MRE. Although they are unable to remedy all the shortages mentioned above, the regions can help to resolve some of them by improving the information on what is required. Thus the tools required for assessing and publicising future demand for the relevant occupations can be produced by combining the prospective management of jobs and skills at industry and regional level. These approaches can be further strengthened by, for example, agreements to develop employment and skills, such as those put in place in Lower Normandy and Brittany, and forward-looking collaborative schemes such as 'Compétences 2020' in the Pays de Loire region, both of which can help to significantly reshape the training offer.

Between land and sea: new occupational dynamics

Although they cannot be described as new, many of the occupations in the MRE industry will be derived from existing occupations that will undergo significant changes in order to fulfil the demand for additional skills directly linked to the maritime context. This applies particularly to engineering occupations (in industrial engineering, for example), as well as to logistics managers, whose profile will include advanced skills in quality, health, safety and environmental management, and to supply chain managers. These additional skills are crucial to production processes that require rigorous compliance

MRE in France

The MRE sector comprises six technologies (in addition to tidal energy). By descending order of maturity they are: fixed wind turbines; hydrokinetic turbines; floating wind turbines; wave energy conversion; ocean thermal energy and osmotic energy. In France, the industry's slow emergence is today based largely on fixed offshore wind turbines. Production of wind turbines will get under way in 2015 in the Alstom factories in Saint-Nazaire and, a little later, in the AREVA plants in Le Havre. The other technologies currently provide only very highly skilled jobs linked to the design and testing of 'demonstrators' (in particular floating offshore wind turbines and hydrokinetic turbines).

A number of forecasts suggest that the volume of direct and indirect jobs created by the offshore wind power industry will be of the order of 10,000 by 2020-2023. However, uncertainties remain, due largely to the highly competitive European and global environment in which most suppliers of components and sub-assemblies operate. By 2030, as the transition to the industrialisation of the other technologies is completed, 30,000 jobs could be created.

Unlike Germany, the UK and the Scandinavian countries, France does not yet have any offshore wind farms. Two calls for tenders were launched in 2011 and 2013 for the installation of wind turbines, firstly in four zones (Fécamp, Courseulles sur mer, Saint-Nazaire and Saint-Brieuc Bay) and then in two further zones (Le Tréport and Yeu-Noirmoutier). Two consortiums are dividing these six zones up between them; a total of 422 wind turbines will be installed in 2020 and 2023 with a total output of 3 gigawatts (half of the target set by the Grenelle environmental initiative).

***The term cluster denotes a network of actors organised, often on a regional basis, around a specific technological sphere and dominant activity. In the case of MRE, examples of clusters include Néopolia in the Pays de Loire region and Bretagne Pôle naval (BPN).*

****Competitiveness hubs are attached to specific business sectors and located in clearly defined areas, in which small and large companies, research centres and training bodies work together to implement a shared strategy.*

with rules, conformity to certification schemes and irreproachable quality. The challenge is to improve understanding of the risks inherent in the marine environment and to better control the operating cost constraints specific to offshore wind farms.

Certain occupations further removed from the traditional world of manufacturing affirm the strongly maritime nature of the industry. By way of illustration, the following can be mentioned: deep-sea divers in the marine civil engineering industry, ROV (remotely operated vehicle) operators, who clear mines from the seabed and maintain submerged structures and cables, dredger operators, winch and crane operators on barges and trencher operators. More broadly, the occupations in the offshore oil and gas and mining sectors are new to the industrial operators in the current MRE consortia, which have little presence in these sectors. Apart from making these atypical and highly specialised occupations more visible, the main effect of the MRE industry here will be to contribute to the structuring of occupational spaces in which working practices have hitherto been more or less unregulated.

However, the most significant occupation in the new dynamics at work is that of wind turbine service engineer. Familiar for over 20 years on shore, it has the advantage of specific training programmes that have gradually been established within a reference framework derived from German certifications (the BZEE*). In the offshore environment, it is the occupation on which most of the issues around the training of professionals and future operators converge. More than 400 new recruits will be required in these occupations by 2020. This recruitment process will have to be completed rapidly, which raises fears about possible labour shortages and the emergence of competition between the offshore and onshore sectors. Furthermore, while these jobs will be long-term ones (wind turbines have a service life of 25 years), the occupation of wind turbine service engineer, with its difficult working conditions, has a high turnover rate, estimated by industry insiders to be almost 25% per year. In reality, however, the main problem is the need for specific offshore skills; they differ significantly from those required on shore, which in turn raises the question of their transferability from onshore to offshore and their modalities. This problem illustrates just how strong the onshore-offshore bivalence is in this occupation. Its emergence and the gradual establishment of training courses pertaining to a wide range of accreditations and certifications (safety and survival at sea, fire on board ship, evacuating a submerged helicopter, etc.) clearly reveal this dual affiliation. It also highlights the crucial influence of the work environment, its rhythms and its interactions in defining an occupation. Although the marine environment creates break points along the whole length of the value chain, in terms of both the design of machines and their installation, it is certainly in the sphere of operation and maintenance that they are most evident. The significance of the marine environment and its high degree of specificity raise the question of whether these service technicians will also be regarded as seafarers, as defined in the agreements drawn up by the Department of Maritime Affairs, which means they will be obliged to hold safety and rescue certificates. Their occupational identity will probably borrow elements from both cultures (wind turbine maintenance and seafaring) and will require the construction of, and provision of support for, an unprecedented process of occupational development. This dual affiliation is reflected in the choices of groups to be trained: are 'technicians to be retained as sailors' or are 'sailors to be retrained as technicians'?

More broadly, what the MRE industry demonstrates – above and beyond the manufacturing activities – is that the influence of the marine work environment should not be underestimated, whether in terms of site preparation, installation, cabling or operation and maintenance. Thus the sea is undoubtedly this industry's centre of gravity and determines to a large extent the organisation and dynamic of its occupations. This is also why it is far from obvious how to organise service technicians' mobility between onshore and offshore wind farms. Recruitment to this occupation must remain open to the possibility of diversification, otherwise there is a risk that it may become another shortage occupation.

Further reading

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**BZEE – Bildungszentrum für Erneuerbare Energien (Renewable Energy Training Centre).*

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