



---

# Overview of wind energy education around the North Sea - VET WIND II

---

Conductors: Eva Hoitzing & Margot Luijken, Noorderpoort College  
In cooperation with Erasmus+

Partners: NOORDERPOORT COLLEGE (NL, APPLICANT) - ENERGY INNOVATION AS (NO) - BZEE ACADEMY GMBH (DE) - TECHCOLLEGE S/I (DK) - SCALDA (NL) - SKILLIANT / SYNTRA WEST (BE) - LETTERKENNY INSTITUTE OF TECHNOLOGY (IE)

01-10-2019

Introduction

The ERASMUS+ project VET WIND II aims at considering and researching possibilities for harmonizing education in (offshore) wind energy. Wind energy is a booming and international business, with growing numbers and growing need for personnel. For education to be able to prepare students to work in this industry, more cooperation is needed. This research report gives a state of affairs of the education and business in all partner countries: The Netherlands, Ireland, Belgium, Germany, Denmark and Norway. For all topics, an overview for each country is given to make an analysis of differences and similarities.

## Partners

The Netherlands - ROC Noorderpoort: Regional education and training centre in the North of the Netherlands, providing a course for wind turbine operators, and also leading partner in the project.

The Netherlands - ROC Scalda: Regional education and training centre in the South of the Netherlands, also providing a course for wind turbine operators.

Germany – BZEE: develops certified industry-relevant training courses for the wind energy.

Denmark –TECH College: Regional technical education and training centre, also offers a course for wind technicians.

Norway - Energy Innovation: GWO and BZEE centre for training, development and operation & maintenance for wind energy

Ireland – Letterkenny Institute for Technology: Regional education and training centre, offering several technical courses, in the past also wind technician course

Belgium – Syntra West/Skilliant: Regional education and training centre, offering several technical courses

## Methodology and main results

This report highlights the main results from the various interviews that were conducted with educational institutes and business partners in the (both on- and offshore) wind energy sector during the period, December 2018 and January 2019. All of the project partners have each interviewed several people to create an overview of the current status of the (on- and offshore) wind industry sector in their respective country. The first section provides an overview of the educational results, in the 2<sup>nd</sup> matrix highlights the outcomes of the business interviews, providing an insight into the industry perspective. The notes at the bottom of each matrix provide information about the variations in the wind energy sector.

For all interviews, the same question format has been used, providing clear and easy to compare information. After conducting the interviews, all information has been processed and summarized into the most important differences and similarities. The report is composed with available information from each partner country, and therefore has unavoidable limitations. The extent of the interviews and the type of company may differ per country. This also means some answer boxes are left empty, as this reflects the current situation or tracking down an answer has not been possible.

## Results overview educational providers in wind energy

	The Netherlands	Belgium	Germany	Denmark	Norway	Ireland
<i>Who are the public educational providers that deliver education for the wind energy sector?</i>	ROC Scalda and ROC Noorderpoort. Both schools are located near sea and have a harbour nearby.	None of the technical schools interviewed offer anything specific for wind energy technician. The technical schools do have topics in their curriculum that fit the wind industry. The different wind energy subjects are spread out over different educational curricula, a student following the current courses will lack parts required to start in the wind industry (example: hydraulic is never combined with electronics).	Germany has a large number of educational providers offering courses for the wind industry due to the maturity (more than 30 years old) and the scale of the industry both in terms of installed capacity (approx. 56 GW end of 2017) and the large number of turbine manufacturers, suppliers and ISPs etc. Some of the larger education providers for wind technicians in Germany are bfw and the Chambers of Trades in Germany (HWK). Some of these are also BZEE certified partners.	TECH College UCRS - Skjern Tekniske Skole Both are public schools	Public providers: Dalane Upper Secondary School, Egersund is the only school-based education provider for wind technicians. There are no private educational providers delivering technical education for wind technicians in Norway.	While there are a number of training organisations in Ireland, they focus mainly on compliance with health & safety standards for the offshore wind energy sector. There is little in the way of formal education delivery in Ireland for the wind energy sector, both in terms of onshore and offshore. Formerly, LYIT delivered a Wind Turbine Technician course during the last 10 years. This course is no longer available. However, Kerry Education & Training

						Board (Kerry ETB) is a national vocational education and training centre and have recently designed and are now implementing a Wind Technician Apprenticeship course for the wind energy sector. While this course is not currently incorporating specific offshore wind considerations, this is an area that Kerry ETB are keen to develop. A traineeship in wind turbine technician is also available.
<i>Who are the private funded educational providers for the wind energy sector?</i>	<ul style="list-style-type: none"> <li>• DRTC</li> <li>• Falck</li> <li>• STC-KNRM</li> <li>• FMTC</li> <li>• QAvD_BwE</li> <li>• Delta Safety Training</li> </ul>	For safety trainings there is Falck that delivers safety training in Oostende and is a privately funded organisation. VDAB gives maritime safety trainings in Zeebrugge and is a publicly funded organisation.	According to the German Offshore Wind Foundation there are currently more than 300 courses throughout Germany that include some knowledge on or about offshore wind. Most of the large international providers are active in Germany.		There are two – three companies providing HSE training for the wind industry	There are a number of Irish private training providers who provide training on GWO training on Rope Access, Blade Repair and Tower Cleaning & Painting along with turbine specific training.
<i>What courses for the wind energy sector are provided by this organisation?</i>	The schools for vocational education offer general technical courses (for example for all round operational technician), with a specialisation in wind. Most often, these courses are on EQF-level 4. The total duration is often 4 years, of which five to six months plus an internship of five months is used for specialisation in wind energy.	Falck gives a safety training for wind turbine technicians as GWO Working at height / Firefighting / First aid / Sea survival / Helicopter training.  VDAB maritime gives STCW and OPITO training and other safety trainings but focused on jobs on ships	At the private funded providers most of the courses are wind-specific (70%), but they also offer courses to security companies and public authorities/military etc.  Many commercial providers offer GWO sea survival courses, however, these courses are focused only on safety and do not train people to be technicians.  Many of the public education providers offer specific service technician wind courses, which last around 6 months. Some of which are based on the BZEE qualification.	Education for wind turbine operator / assembly operator	Dalane Upper Secondary school provide VET for wind technicians. The specific training towards wind is a third year in school program where the background for the students is two years with specific electrical training. After the third year “Energy Operator Wind” (the students are at least 17 - 18 years old when they start the third year) they attend a 1,5 yearlong apprenticeship programme typically attending turbine specific training through the turbine provider / O&M provider. The level of the third year in school training is EQF 4, Vocational Trained Journeyman (when finished with the apprenticeship programme).	The National Apprenticeship delivered by Kerry ETB and supported by a consortium of key industry players is a specific wind turbine course and they are seeking to incorporate offshore wind specific training once they have some experience of delivering the apprenticeship and as the offshore wind economy in Ireland becomes more operational. The <b>traineeship</b> is a level 3 <a href="#">city &amp; guilds qualification</a> . (NQF Level 6 equivalence and Level 5 on EQF). 10 months duration inclusive of an 8 week work experience period. The National <b>Apprenticeship</b> is a NQF Level 6 qualification over a 3 year period, with 60% on the job work experience incorporated.
	<b>The Netherlands</b>	<b>Belgium</b>	<b>Germany</b>	<b>Denmark</b>	<b>Norway</b>	<b>Ireland</b>

<p><i>How are the courses formally qualified (international / national / local / organisational level)?</i></p>	<p>Formally certified by the Ministry of Education, Culture and Science, you will receive a general VET diploma which states that you have completed the elective module in wind energy.</p>	<p>Falck is an international group and provides this training in many places (as in Rotterdam Netherlands) Standards are GWO/Huet/STCW / Opito Bosiet). VDAB uses the maritime standards for their trainings (STCW / Opito)</p>	<p>By a national HWK (Chamber of Trades) qualification. At the national level BG and DGUV certificates. Internationally GWO and BZEE if required.</p>		<p>It is based on national curriculum, but adjusted towards local needs. To strengthen the course towards wind energy, Dalane has implemented the 6 month long German BZEE wind technician technical training course as an integrated part of the local adjusted / specified curriculum.</p>	<p>Traineeship – City &amp; Guilds Apprenticeship – NQF Level 6/EQF Level 5</p>
<p><i>Is the course a part of your National Qualification Framework (or another framework)?</i></p>	<p>It is both at Noorderpoort and Scalda at the moment possible to become a wind technician by following a course (minor) as part of a bigger technical education. W.r.t. contract education the minor Wind technician is also a qualification recognized by the National Qualification Framework.</p>	<p>Not checked.</p>	<p>No. The job title Wind Turbine Technician or Service Technician for Wind Turbines is not officially recognized as an apprenticeship vocation by the German Federal Institute for Vocational Education and Training (BIBB) although there are recognized IHK and HWK (Chambers of Commerce &amp; Industry and Chambers of Trades) further education qualifications.</p>		<p>Yes.</p>	<p>Yes.</p>
<p><i>How are the courses assessed and validated, and who is performing this task?</i></p>	<p>The courses are assessed and validated by the Inspection of Education.</p>	<p>Not checked</p>	<p>It depends whether the courses are public or private. For example, GWO courses, which are commercial and run by private education providers are audited by certification bodies such as Bureau Veritas. Public courses such as those run by the HWK are assessed and validated by themselves. Examinations are assessed by a panel of 3 HWK appointed individuals.</p>	<p>The Ministry of Education together with the local technical committee.</p>	<p>This is done in the same way as other vocational trainings in Norway. The ‘in school’ programme is assessed through a final exam, assessed and validated by the County. As Dalane is a BZEE partner College, there is a specific BZEE exam as well. After the apprenticeship period the students take their final practical one week long Journeyman Exam, assessed and validated by the County.</p>	<p>The Traineeship is assessed by Kerry ETB. The trainee must also complete a number assessments under the supervision of a mentor. Following this, the external City &amp; Guilds authenticator visits to review the on and off the job assessments. The Apprenticeship ‘on the job’ element will be assessed by a qualified mentor (who must take part in a formal mentor training programme provided by Kerry ETB) and the ‘off the job’/studying/training element will be assessed by course instructors. There will also be external verification of these assessments and the overall process will be validated by Quality &amp; Qualifications Ireland (QQI).</p>
	<p><b>The Netherlands</b></p>	<p><b>Belgium</b></p>	<p><b>Germany</b></p>	<p><b>Denmark</b></p>	<p><b>Norway</b></p>	<p><b>Ireland</b></p>

<p><i>Do these courses make a difference between onshore and offshore work?</i></p>	<p>There is no difference in technical training, in Basic Safety training there is a difference in requirements for offshore.</p>	<p>VDAB only has safety trainings for offshore work, Falck only has safety trainings</p>	<p>As a general rule there is no clear division between onshore and offshore training courses at the educational training level (long-term training). After qualifying and gaining experience they venture into the offshore sector and must complete courses such as GWO sea survival, HUET (not wind specific) and helicopter winch training courses etc., which are specific for the offshore sector.</p>	<p>No clear difference in education.</p>	<p>There is no offshore wind in Norway, but it will come.</p>	<p>Onshore only, with a view to adding elements required to meet offshore standards. Kerry ETB as highlighted earlier are keen to keep channels of communication open between LYIT and others in relation to the outcomes of the VET Wind II project and will participate in stakeholder meetings and multiplier events.</p>
<p><i>What are the entry requirements for new candidates and how are candidates selected?</i></p>	<p>For general technical education, students need to have a high school diploma. For wind specific courses, students need to have an (up-to-date) technical background on EQF-level 3/4</p>	<p>Technical schools have an age selection.  VDAB and Falck require a 'attest of good medical health' and minimum age of 18.</p>	<p>An apprenticeship as an electrician/mechanic or similar is usually necessary to complete a further education course to become a service technician for wind turbines. For precision engineers such as watchmakers a pre course of 200 hours which includes electrics and mechanics is also necessary in the case of the HWK. Selection is based on experience i.e. the necessary pre-qualifications.</p>	<p>The candidates has to have completed grade school with at least E (ECTS) in Danish and Math</p>	<p>Two years 'in school' electrical training.</p>	<p>Traineeship –candidates must be electrically or mechanically qualified to Level 6 (apprenticeship level) – Level 5 EQF. And must undertake a climbing test and interview. The Apprenticeship – is aimed at school leavers and they must have completed NQF Level 4 or equivalent (EQF Level 3), must be at least 18 years old and completed a colour vision test. To progress on the process candidates must complete GWO requirements, working at heights and aptitude test. From here, they will be shortlisted and finally selected. Sponsor companies will recruit from the bank of candidates. The company will pay the wages of the apprentice throughout the duration of the 3 year course. There are no fees incurred to the company or the apprentice to the ETB for their contribution to the training.</p>
<p><i>How are apprenticeships organized?</i></p>	<p>Students do a six months apprenticeship as part of their education. Difficult to arrange these places, because who pays for the safety training?</p>	<p>Belgian schools do not offer wind technician courses and therefore no wind technician apprentices.</p>	<p>The German dual training system (2,5-3 yrs) combines theory and training in a real-life work environment. The main characteristic is cooperation</p>	<p>In Denmark, the apprenticeship system is based on working closely together in the tri-partite of government, education and</p>	<p>Students do a 1,5 to 2,5 year internship at a company as part of their education. Placements for apprentices</p>	<p>Courses are waiting for approval to start running. Apprenticeships will be payed and employed by the company. Currently they do a</p>

	Placements are (in small amount) organized by building up contacts with local businesses.		between mainly small and medium sized companies, and publicly funded vocational schools. Companies do not take on a lot of apprentices, but young technicians are at the same time hard to find.	companies. Periods of schoolbased learning are interspersed with workbased learning, which leads to a 50/50 distribution.	are organized by working together with local business.	traineeship. Pros: industry is involved. Cons: industry pays for a student, delays and challenges the process.
	<b>The Netherlands</b>	<b>Belgium</b>	<b>Germany</b>	<b>Denmark</b>	<b>Norway</b>	<b>Ireland</b>
<i>Who are the target groups for these courses?</i>	The target group for education in wind energy are students with an interest in technical work and work in wind energy. For private courses, people with a technical background and the right mindset are very welcome. Because of the high training costs for wind specific courses, applicants will have a thorough check of motivation, capability and background.	Not checked	It is difficult to fill courses as there are few unemployed qualified people in Germany. Most have jobs and see no reason to change to the wind industry, which is not well paid and is a dangerous working environment. However people with an apprenticeship in electrics, mechanics, mechatronics are the most suitable candidates for service technician courses.	Those who have graduated grade school with the right requirements (see above)	Students doing traditional Vocational training in electronics.	School leavers and above as long as they meet the requirements. The potential also exists for employees who wish to upgrade/reskill into the wind energy industry. Kerry ETB have a steering committee made up from key industry stakeholders and there are 14 major companies involved including O&M companies.
<i>Overview of the equipment used for these trainings.</i>	Not all schools in vocational education have all the necessary equipment for training in wind energy themselves. For specific courses as height-training and rescue training, they use facilities by organizations as Falck, to do GWO-training. A tower, a nacelle and a crane are on site at Noorderpoort and Scalda. Guest-trainers from main suppliers are available and main suppliers and technicians are involved in developing course-content and learning outcomes.	None of the organisations have technical equipment as demo equipment from wind turbines  Exception is Falck for their safety training, they have ladders and a boat landing simulation equipment	Differs per site depending on which modules/courses a provider wants to offer. To offer the 6 month BZEE course for service technicians a provider would need a fully equipped training centre including: a training tower for working at heights training including PPE and a ladder wall, a workshop with 2 nacelles (min. 500kW) plus tools, hydraulic and electrical labs, a separate rotor blade inspection and repair workshop etc.	At UCRS there is:  45 fully equipped workstations for electrical assembly  20 fully equipped workstations for hydraulic assembly  20 equipped workstations for pneumatic assembly  5 workstations with universal robots  1 nacelle (Vestas V90)  4 smaller stations of Siemens electrical grid  1 ABB welding robot	The workshop have two 500 KW nacelles, a drive chain, electrical cabinets etc. Dalane cooperate with a private company, Energy Innovation who has HSE equipment for training, in ex. a 30 meter high specialized training tower.	2 x towers Nacelle Demo equipment to simulate faults Health & Safety Equipment IT Equipment

## Results overview business providers in wind energy

Question	The Netherlands	Belgium	Germany	Denmark	Norway	Ireland
<i>Most important discipline for technicians working with Operations &amp; Maintenance</i>	Electronics (with mechanics and mechatronics)	Combination of the following: mechanic, electronic, mechatronic, engineering	Electrical background is preferred, as often trouble shooting is an issue and wind turbines have lots of electrical sensors/parts	(rope access) blade technicians, fibre repair technicians.	Team consists of mechanical, electric, mechatronic, power operator, automation and engineering background.	2/3 electrical and 1/3 mechanical, but especially good all round staff.
<i>Qualification technical entry level when hired (in EQF)</i>	EQF-level 4	Secondary school and/or graduate level	None of the industry partners interviewed knew what EQF was (companies are more interested in specific skills and gained experience)	MVOW Blade Repair, Entry Level / epoxy & isocyanates / IRATA. Craftsmen motivated to repair blades: from no previous background in industry to trained with GWO package and specific training. EQF-level 2 as a starting minimum	Certified electricians or power operators as a minimum	EQF level 5 (NQF level 6 or City & guilds). Or EQF-level 3-4 when trained in-house: follow 2-3 year course at the company.
<i>Qualification Health &amp; Safety entry level</i>	GWO basic Health & Safety Training.	No safety certificate, GWO certification follows later	GWO BST plus HUET as we need people to be ready to work immediately. Most turbines offshore are Siemens or Vestas that both require GWO.	GWO / MVOW SIT / Offshore medical	Technicians are trained according to national standards (FSE) and GWO standards: GWO Height safety, Advanced rescue (most technicians), First Aid, Fire Awareness, Manual Handling, HV qualification, Health certificate. Both need to be yearly refreshed.	GWO basic safety training (several providers, a lot work with Maersk). Specialist companies also: IRATA training for rope access, for technicians to work in blade repair, tower cleaning and painting.
<i>What other important skills are of value?</i>	Discipline, following orders, being stress resistant, working together, problem solving, and knowledge of English language	Maturity / sense of responsibility	Team player, adaptability, ICT skills and knowledge of English language	Skilled in teamwork, self-dependent, knowledge of English language, ICT skills	English language skills, basic ICT and right personality for working in a small team	ICT-skills, fault finding, strong work ethic, health and safety conscious, maturity.
<i>What are the differences in preferable and actual background of technicians?</i>	Technicians with specialization and experience in wind energy are hard to find	Preferably a few years of experience in electric and mechanical maintenance in production company (doesn't need to be wind energy)	Experienced personnel who can start work immediately is preferred, as time is money and projects can happen quickly.	Experienced blade technicians EQF-level 5 with full GWO package and full medical record for off shore work.	Skilled workers, preferably local to the wind park. Health and Safety prequalification not vital (but of course preferred).	Pre-qualified electricians, with mechanical skills. A formal Electrical Wind Turbine Technician Apprenticeship would be the ultimate preferred background.
<i>How easy or difficult is the recruitment process?</i>	There is a shortage of well-trained wind technicians. The combination of right skills, experience and mindset is hard to find. Companies have to look further, when possible also abroad, to find the right technicians.	Difficult. Most personnel comes direct after graduating and has no experience. They do different tests (medical, endurance, etc.) before hiring.	It is difficult to find experienced personnel, especially with an electrical background as there is a shortage of skilled personnel, especially electricians in Germany. Mechanics are hired and then upskilled to electricians in some cases.	A Labour Hire Agreement is the basis for the selection of technicians. With the development of a new blade repair – entry level course, this is more solid recruitment than scanning CV's.	Huge local variations, but in most cases possible to get applicants from local people with relevant background. Because recruitment in wind energy takes more investigation, recruitment companies are used	Shortage on electricians. A one year course to upskill/retrain people to adequate level would benefit the industry. Recruiting by word of mouth works best, to select on insight in industry.

<p><i>What does the training process for technicians without wind energy knowledge/experience consist of?</i></p>	<p>They have to follow (external) courses first. Electrical skills are acquired at a regional training centre. Wind specific technical skills and Health &amp; Safety requirements are (often) acquired at GWO. For new technicians this takes around six weeks. For people who have no technical experience, this takes longer.</p>	<p>Technical training Mechanical training Electric training Basic safety training Fire training First aid and other safety training</p>	<p>Some companies don't employ technicians without the right skills and experience/apprenticeship, because of too high costs. Other will train new technicians in-house, but they are then obligated to stay at the company for 2 years.</p>	<p>A new technician needs to have some technical background and pass at least the MVOW Blade Repair, Entry level course. The training process is as follows: The GWO package including Helicopter Underwater Training and GWO blade training, Medical record approved for the specific region, and Task Specific training ex: Lightning Protection System training, Power edge application etc</p>	<p>New technicians are externally trained in GWO basic H&amp;S and follow technical courses in electrics. Then several months of in-house training, both technical and more specific H&amp;S training.</p>	<p>Technical training is done in-house, Health &amp; Safety by external training. GE also sponsors students during college courses, provides fees, but without obligation to stay at the company (mistake).</p>
<p><b>Question</b></p>	<p><b>The Netherlands</b></p>	<p><b>Belgium</b></p>	<p><b>Germany</b></p>	<p><b>Denmark</b></p>	<p><b>Norway</b></p>	<p><b>Ireland</b></p>
<p><i>Organization of teams of technicians regarding complementary skills</i></p>	<p>Technicians work in couples, 1<sup>st</sup> and 2<sup>nd</sup> mechanic, or teams of three. A senior technician has complementary skills like team leading, advanced rescue skills and enhanced first aid. Junior/new technicians are paired with a senior technician.</p>	<p>Dividing of expertise: 80% focus on electricity 20% focus on mechanical work Each team has complementary skills as well.</p>	<p>Mechanics and electricians normally form a team, however, it depends on the job at hand. In some cases a 3<sup>rd</sup> person who is less experienced is additionally trained.</p>	<p>Experienced technicians are paired with less experienced. IRATA level 3s are paired with IRATA level 1/2s.</p>	<p>Each team has complementary skills, but not always available, due to rotation. Teams consist of one mechanic and one electrician.</p>	<p>Team of 2 or 3, with a supervisor. 1 electrician + 1 electrician's mate (no electrician certificate, but 6 month apprenticeship). Offshore: 3 technicians in a cross-functional team with complementary skills.</p>
<p><i>Is a technician an expert in electronics OR mechanics / mechatronics - or both mechanical/mechatronic AND electronic skills?</i></p>	<p>Emphasis on electronics, but knowledge of both is necessary.</p>	<p>There are more people expert in electricity.</p>	<p>Some companies have at least 1 mechanic and 1 electrician in a team, but it depends on the job. The ratio is unfortunately 70% mechanics and only 30% electricians in many cases. Electricians are sought after.</p>	<p>Their area is primarily fibre repair.</p>	<p>Technicians need to have knowledge of both, or are trained to have knowledge of both. The ratio is 50%. Special tasks are handled by more expert trained electricians.</p>	<p>Electrical background with mechanical skills // specialist company: rope access technician.</p>
<p><i>What kind of specialists/technicians/engineers are hired externally to solve O&amp;M tasks?</i></p>	<p>Technicians with high level engineering degrees, HV knowledge, structural, vessel and IT specialists, external high voltage. These specialists can also be hired internationally.</p>	<p>Currently none, only mandatory TUV or VINCOTTE inspections of equipment, PBM's, lifts</p>	<p>HSE managers who have done risk assessments in advance for example, project managers, commissioners. Other companies have all skills in-house.</p>	<p>Blade repair technicians.</p>	<p>Some problem solving expertise, and Siemens specialist supervisors for replacing main parts of turbines. Operators have a full service contract.</p>	<p>All expertise is in-house or invested in when not readily available. OEMs bring their own specialists for bigger repairs. Rope access technicians on higher level.</p>
<p><i>What is the ratio «Installed capacity in MW» / «Wind Technician» (work force doing regular O&amp;M)?</i></p>	<p>Average: 2 technicians work on a job. When turbines grow from 4 megawatt to 8, you don't need twice as many people, rather 1.5 times. The technique becomes more complicated and complex; you</p>	<p>900MW/70 technicians = 13/1</p>	<p>Depends on the size and age of turbines and their geographical location towards each other. One example: the planned service of a 6MW offshore turbine takes 60 hours and involves 6 technicians so in</p>	<p>Varies from season to season</p>	<p>It differs per company. Some examples are:</p> <ul style="list-style-type: none"> <li>• 20/1</li> <li>• 73,6MW, 5 technicians</li> <li>• As operator: 100/1 to 200/1</li> </ul>	<p>Examples: - 7MW Machines, 174 turbines. 10 people on site at all times for electrical installation. Similar jobs would have 4 technicians on site. 3MW turbine will have 3 rope access technicians.</p>



	have to put experienced people on it.		total 360 hours are needed to service the turbine.			
<i>What is the number of other personnel (engineers etc.) vs. wind technicians?</i>	For an offshore park the ratio was 0.4. For every 6 wind technician there are 2.5 other employees. At the bigger offshore employer the amount of employees is 140. In this group there are 79 employees Operations & Maintenance department, of which 38 are wind technicians.	White collar workers/technicians = 30/70 = 43% A lot of our white-collar workers are technical specialist that sometimes join onsite Theoretical/technical employees = 12/88 = 13%	During routine O&M the teams work autonomously. Staff on service vessel and CTV-staff is present, and sometimes a specialist. There is an overhead of 30 to 40% in the offshore field. This includes site management and back office staff. Onshore on the other hand would have a staff overhead of around 20%	Varies from season to season	Approx. 1/5	The bigger the project, more project management staff comes in.
<b>Question</b>	<b>The Netherlands</b>	<b>Belgium</b>	<b>Germany</b>	<b>Denmark</b>	<b>Norway</b>	<b>Ireland</b>
<i>What is the typical work rotation for wind technicians?</i>	A typical work rotation in the Netherlands is that the amount of days you work is the same amount of days you are off. This differs from 2 weeks on site and 2 weeks off to 4 days on site and 4 days off.	<ul style="list-style-type: none"> <li>• Arrive at service centre: briefing</li> <li>• 'reading' orders through PC</li> <li>• Charging materials and move to location</li> <li>• Coming back and discharging materials</li> <li>• Synchronise PC</li> </ul> Work rotation: not available	14 days on, 14 days off (or 3 weeks). Maximum 12 hour shifts. This is German law.	14/14 days rotations.	Rotation within in the group on site. Some companies: no rotation, normal working hours 37,5 hours per week, plus On Call Duty rotation.	A – 2 weeks on/2 weeks off B – 3 weeks on/1 week off C – 4 weeks on/1 week off The company start employees on rotation C working them towards rotation A. (onshore).
<i>How do businesses feel about international harmonisation of the qualifications?</i>	In the wind business more standardization and harmonisations of training/education to become a qualified wind technician is desired. If the training standard is the same, you could easily switch as trainee, as long as the first onshore internship is more local. It is also of importance that all companies and producers participate, it should then be considered sector-wide.	I consider this to be beneficial. Partnerships are becoming the new standard. There is a lot of employee turnover between companies within the offshore windsector.	This would be a good idea and make companies' jobs easier, especially when dealing with foreign personnel. It would make it so much easier to get an overview of who has which qualifications. GWO is a start but it is only safety training. Other areas where harmonization would be useful are medical certificates an specific English courses for technicians as they work international teams in many cases and the standard of English differs.	This is the way forward. Would make recruitment and usability across sites easier and more flexible. Very effective when local legal requirements are mitigated to the minimum required company standards. Essential to promote transparent frameworks and qualifications towards management and customers.	Interesting (if this is happening in Scandinavia).	Strongly in favour. Brilliant idea, can only be a good thing. Adding blade repair to GWO harmonization would be an improvement.
<i>What could be done according to you to get more/better qualified job candidates?</i>	Create and maintain a partnership between business and schools. Be more present at schools, fairs etcetera where the young and other relevant candidates	Solid knowledge of electricity in general  Experience in troubleshooting	A training course that covers everything needed in one go. All the certificates plus an internship. And even then, you need manufacturer specific training.	Common entry level training across the industry. Global standardization for EHS specific requirements through certified and controlled by	It is more important to get personnel with local ownership and skill, and educate them to be wind technicians.	A foundation course in electrical wind turbine for re-skilling more mature workers. Explore potential for apprenticeships for school-

	participate. Start at secondary schools to attract people towards technology.	Maturity (responsibility – safety...)	Training and education should be more transparent, and experience more officially valued (such as performance-related pay).	global organizations e.g. GWO AVEA etc. Digital solutions that would enable the technician to gain access to technical documentation and upload repair documentation.		leavers, and improve engagement with schools.
--	---	---------------------------------------	---	--	--	---

## Conclusion

The report shows that most businesses and educational providers are willing to harmonize education. It would: “make companies jobs easier”, “make it so much easier to get an overview of who has which qualifications” and “make recruitment and usability across sites much more flexible”. The answers show that an overall harmonization would be difficult to accomplish, but it would be worthwhile to look further into what possible scenarios there are.

Some of the highlights of the report show that:

- There is a difference in background of technicians according to health and safety standards. GWO basic is required in all the countries but technicians in Norway are also trained according to national standards (FSE) and GWO standards: GWO Height safety, Advanced rescue (most technicians), First Aid, Fire Awareness, Manual Handling, HV qualification, Health certificate. Both need to be yearly refreshed.
- The qualification entry for education varies from EQF level 4 to 5. Not all the participants work with or are familiar with the meaning of EQF. The minimum age of new students is 18 years old.
- Equipment for training and education can often be found at external (private) training companies.
- Technical employees with the right skills are scarce in most of the countries. In Norway it seems easier to find local employees.
- It also seems difficult to find placements for apprentices, even though companies are actively seeking employees. This has to do with high training costs and no security of keeping an employee after the investment
- To get better employees there is a diversity in needs. It differs from starting at high school with education about (wind) technician to a common entry level training across the industry.

What is clear is that in each partner country companies are struggling to find enough skilled wind technicians and educational institutes are struggling to find apprenticeship placements. High training costs are a part of this. Possible harmonisation and more cooperation in reaching a common goal would benefit all stakeholders.

### Marks for interviews and reporting

Before harmonizing the education for wind technicians, we need to have a view of what is currently implemented in the different countries. It's important to describe the current situation in education and in business and explore the needs and challenges.

### Assignment 1 - business

We ask you to give an overview of the situation in the industry in your own country.

- a. In each country, partners will interview 3 or 4 companies (manufacturers / service companies / park owners / recruiters). Companies should achieve at least part of their turnover from *offshore* wind. We developed a questionnaire that can be used for the interviews.
- b. As a result we ask you to report about the state of affairs in your country containing:
  - a report of each interview
  - a summary of the interviews with the main results per question

### Assignment 2 – education

Please note that the primary focus of this task is on the question 'How to become a wind turbine technician?'. We ask you to give an overview of the situation in VET in your own country.

- a. In each country partners will interview 3 or 4 training providers. We developed a questionnaire that can be used for the interviews. Maybe additional desk research is necessary to get the image complete.
- b. As a result we ask you to report about the state of affairs in your country containing:
  - a report of each interview
  - a summary of the interviews and desk research with the main results per question

The reports should be ready on 14 January 2019.

As an extra service we developed an summary of the project that can be used to introduce the project to the companies and organizations.

a 3 or 4 interviews with education providers

The interviews will focus on wind energy in general but there has to be an offshore component in it.

To describe the situation in the companies we ask in every country interviews with companies.

It's about education – GWO not

### Questionnaire for business

1. Please give a description of background for technicians working with O&M in your organization regarding:

- a. Discipline (for example: mechanic, electronic, mechatronic, engineering, combinations, specialized trained (offshore) wind technician etc)
- b. Qualification technical entry level when hired (for example: journeyman certificate, EQF-level ..., journeyman certificate with specific training, ....) On EQF:  
[https://ec.europa.eu/ploteus/search/site?f\[0\]=im\\_field\\_entity\\_type%3A97#](https://ec.europa.eu/ploteus/search/site?f[0]=im_field_entity_type%3A97#)
- c. Qualification Health & Safety entry level (in ex. nonspecific, trained in national standards, trained in GWO or other)
- d. Other important skills such as problem solving, working in a team, ICT skills, language, etc.

Please feel free to give further comments to the above questions and add competence profiles.

2. Please give a description of the preferable background for technicians hired to work with O&M in your organization regarding:

- a. Discipline (for example: mechanic, electronic, mechatronic, engineering, combinations, specialized trained (offshore) wind technician etc)
- b. Qualification technical entry level when hired (for example: journeyman certificate, EQF-level ..., journeyman certificate with specific training, ....) On EQF:  
[https://ec.europa.eu/ploteus/search/site?f\[0\]=im\\_field\\_entity\\_type%3A97#](https://ec.europa.eu/ploteus/search/site?f[0]=im_field_entity_type%3A97#)
- c. Qualification Health & Safety entry level (for ex. nonspecific, trained in national standards, trained in GWO or other)
- d. Other important skills such as problem solving, working in a team, ICT skills, language, etc.

Please feel free to give further comments to the above questions and add competence profiles.

3. Could you give a general comment on the recruitment process, and on how easy/difficult it is for your company to recruit personnel with the necessary entry level for working as a wind technician in an offshore wind farm?
4. When recruiting a “new” technician - and this person doesn’t have experience from the wind industry, could you please comment on the training process (in-house or/and external) to become qualified (both regarding technical skills and HSE skills)?
5. Regarding work tasks and organization in teams with personnel with complementary skills - please comment:
  - a. How are the teams of technicians organized when it comes to complementary skills?
  - b. Is the individual technician an expert in electronics OR mechanics / mechatronics - or is the typical technician a wind technician with both mechanical/mechatronic AND electronic skills?
  - c. If divided - what is the ratio mechanical vs. electronics?

6. What kind of specialists/technicians/engineers does your company hire externally to solve O&M tasks for your wind farm?
7. What is the ratio «Installed capacity in MW» / «Wind Technician» (work force doing regular O&M)? For ex.: a 200 MW wind farm with 20 technicians gives a ratio of 10/1.
8. What is the number of other personnel (engineers etc.) vs. wind technicians? For ex.: If there are 5 other full employed staff in the same farm working with 20 technicians, the ratio "other staff" / "wind technicians" will be  $5/20 = 1/4$
9. What is the typical work rotation for wind technicians in your wind farm?
10. How do you feel about international harmonisation of the qualifications?
11. What could be done according to you to get more/better qualified job candidates?

Please feel free to give further comments to the above questions.

### **Questionnaire for educational providers**

Questions for educational providers in each country

1. Who are the educational providers in your country that deliver education for the wind energy sector and explain about each of these educational providers whether they are public or private funded?
2. What courses for the wind energy sector are provided by this organisations?
3. Are these courses:
  - a. general courses
  - b. general courses with a specialisation in wind
  - c. wind specific courses?Please give a description of the duration, level (EQF) and content for each course.  
On EQF: [https://ec.europa.eu/ploteus/search/site?f\[0\]=im\\_field\\_entity\\_type%3A97#](https://ec.europa.eu/ploteus/search/site?f[0]=im_field_entity_type%3A97#)
4. How are the courses formally qualified (international / national / local / organisational level). Is the course a part of your National Qualification Framework (or another framework).
5. How are the course assessed and validated, and who is performing this task?
6. Do this courses make a difference between onshore and offshore work ?
7. What are the entry requirements for new candidates and how are candidates selected?
8. Who are the target groups for these courses?
9. Can you give a short overview of the equipment used for these trainings (do they have a nacelle / tower / demo equipment / other...?)