

## RESKILLS

Assessment of life-cycle skills and training needs in the renewable and energy efficiency sectors: the cases of the wind energy and electric mobility and smart grids.

### **Minutes of the mission to Portugal's wind energy cluster and smart grids laboratory**

On 31st May 2013 took place the first Reskills mission to wind energy and smart grid sites in Portugal. The team visited the ENERCON (wind energy manufacturer) industrial sites and the smart grids laboratory of INESC Porto (Engineering University in Oporto).

The following persons joined the mission:

Ana Claudia Valente, CEPCEP, Universidade Catolica Portuguesa  
Candida Soares, CEPCEP, Universidade Catolica Portuguesa  
Gabriela Prata Dias, Energy Charter Secretariat / CEPCEP- Universidade Catolica Portuguesa  
Irene Correa, C3iT, Universidad de Huelva  
Maria de la O Barroso, C3iT, Universidad de Huelva  
Peter Van den Bossche, MOBI, Vrije Universitet Brussel  
Tomas Ramos, CENSE, Universidade Nova de Lisboa  
Ana Rita Domingos, CENSE, Universidade Nova de Lisboa

### **MORNING SESSION – WIND ENERGY**

The mission started at 9:30 at the Lanheses ENERCON industrial site. At the administrative building was done a general presentation of the wind energy cluster in Portugal, the situation of the wind energy in Portugal, in the world, and ENERCON's presence as technology provider.

ENERCON is one of the major world wind energy technology suppliers (top 10). Its headquarters are based in Germany where it has about 60% of market share. All over the world ENERCON has about 20,000 wind energy converters installed, corresponding to about 29 GW of installed capacity.

In Portugal, ENERCON has also about 60% of the market share, with just above 2,5 GW of installed capacity. It also has four manufacturing plants: rotor blade, concrete tower, mechatronics and generators.

In 2005 the Portuguese Government launched a bid to award new connection rights to wind energy for up to 1200 MW. The awarded criterion was to use wind energy to leverage the creation of a new industry sector through an obligation to provide investment and employment in some of the country's underprivileged locations, to encourage the transfer of technology to Portugal from abroad and to create a new source of export, limiting the need to import wind turbines. The winner also had to support research and development through a EUR 35 million fund dedicated to R&D. The winning tenderer was the industrial cluster composed as main partners of: ENERCON, EDP, ENEL and GENERG. As a total, 29 companies composed the grouping of the winning consortium. This consortium (ENEOP) has taken the commitment to create a state-of-the-art industrial cluster to manufacture all the components of ENERCON's wind turbines.

The industrial project was developed between 2006 and 2008. The facilities manufacture the model E-82 (2 MW) and soon will be also manufacturing model E-92 (2,3 MW). Until now it has already produced about 600 wind energy converters of type E-82.

Given the financial crisis and some delays on investment of the Portuguese wind farms, the ENERCON plants in Portugal started to export in 2011, although it has only been foreseen by 2013. Currently it is exporting about 50% of the production, all by ship mode.

The total foreseen investment according to tender was of about EUR 161 million and the real investment was of EUR 220 million already.

For the whole project there was a commitment with the Portuguese government of 1709 new jobs to be created. Currently there are 1931 jobs associated with this project, from which 1300 correspond to ENERCON wind energy converter manufacturing.

Only in the rotor blades factory, the amount of jobs created was of 600 in 2012 (against 500 foreseen). This particular factory has also a very high percentage of female employment (about 40%), which are women coming from the declining textile industry of the region. The reason is that the incorporation of textile material in the production of the rotor blades is quite relevant, therefore existing labour skills in the region is a good coincidence.

The concrete tower factory has also overcome the target of 110 jobs created, being in 2012 about 150 jobs.

At ENERCON group level, the skills developed in Portugal in the rotor blade and concrete tower factories are already serving the group needs with a strong rate of mobility to elsewhere where the group also develops these activities.

The administration of the company gave relevance to the fact that apart from product manufacturing, the company provides a service and maintenance guarantees for 15 years, which also places quite an effort on labour and skills in the company's available labour force in the coming years.

The organisation of scientific events together with university institutions from the north of Portugal were also mentioned by ENERCON, as several conferences have been organised over the last years on wind forecasting and technical assessment of the impact of wind energy on the electricity grid.

After the meeting, the team visited the facilities of the industrial plant of wind mechatronics and generators. The team then moved to Viana do Castelo to visit ENERCON's wind blade factory and concrete tower manufacturing plants.

The ENERCON site visits were very comprehensive and the team had the opportunity to fully understand the employment and skills implications of the several phases of the wind generator parts manufacturing and assembling. As a general impression, the team was able to understand the high component of hand work against a low usage of automation.

After the technical visits a meeting was held with the Human Resources department where was discussed the past, present and future company policies towards employment, skills and training.

The points shared by the Human Resources team were the following:

1. ENERCON's recruiting policies to all the plants have been accompanying the minimum legally mandatory school level, evolving from 4 to 6 years to 9 to 12 years. The latter in professional areas.
2. Automation is foreseen to be incorporated in the coming future, specifically on rotor blade gluing, automated painting of blades and concrete towers. The management referred to a policy of recycling manpower attached to these tasks to the development other manufacturing jobs.

3. In what regards training, the company implements a standardized policy of compulsory induction training, including corporate culture, health & safety and quality (2 days), then a general production process (2 weeks) and finally on-the-job training (1-3 months).
4. ENERCON also took advantage of the RVCC Portuguese programme (recognition, revalidation and certification of professional competences). It is a process where are recognized the competences of adults gathered during their life, away from the formal educational training centres. The objective is to contribute to the increase of qualification levels and to better opportunities in job finding. ENERCON considers this programme to be a good experience and good opportunity, not only for consolidating and organizing knowledge but also by the opportunity to enhance qualifications in areas like IT and English as a foreign language. About 50 people were certified in 2 years at ENERCON.
5. Looking to the future, ENERCON recognizes the need for further automation, therefore a increased knowledge on IT would be a plus. Moreover, it is expected to increase on-the-job-training sessions, namely focusing on multi-skills and multi-tasking development, also this comes as a consequence of further automation of the production process. Finally, it is also expected the development of soft skills (organizational and behavioral), the latter targeting namely team work, leadership and problem solving.
6. ENERCON envisages that external training would continue and internal training to increase in general terms.
7. Regarding white collar jobs, a minimum of 12 years of schooling is required and in areas of accounting and administration. These would refer to areas of work such as: management, secretarial, human resources, training, IT, facilities and controllers. White collars also follow the same internal training path as blue collar employees, but in a more integrated and complex fashion.
8. As a global picture ENERCON employs 13% university graduated students and 42% with 9 years of schooling. Most of the recruitment is done in the region but in what regards white collars at the management level, the area of recruitment is further enlarged.
9. ENERCON is planning the installation of a training centre to serve the whole group at international level, to be placed in Viana do Castelo. A permanent rolling group of 100 trainees is expected. Nowadays, ENERCON Portugal is already recruiting for exporting to other ENERCON plants in the world, namely with skills of engineering, financial and auditing.
10. The 15 year guarantee on manufacturing support has a big influence on the need to complement and assist in operation and maintenance procedures.

Conclusions of the team to be confirmed during the project:

- Wind energy is a relatively new industry therefore still relying much on manpower rather than automation, at least at the manufacturing of equipments phase. Availability of relatively cheap work force could be also a factor;
- Manpower is relatively easily found as basic instruction is needed (9-12 schooling years);
- Management is like in other industries highly qualified (university degree and above);
- National programmes are welcome by the industry not only to recognize and certify competences but also to provide further knowledge on IT systems and languages;

- Wind power is an industry typically relying on internal training inside the company, possibly for patent reasons, among other. Moreover, there is a general lack of skills and professional profiles in the market which could suit this industry. (This comment is somehow contradicting second bullet point...)
- Guaranteeing assistance, maintenance and operations support during 15 years is also a major factor of continuity of the need of skills during the lifetime of the wind farms;
- Specific centres for training professionals are being thought and state financial programmes could be an important incentive for their development and export of competences to Europe and rest of the world, as wind power is an international industry.

## **AFTERNOON SESSION – SMART GRIDS & ELECTRIC VEHICLES**

In the afternoon, the team visited the Smart Grids laboratory of INESC at the Engineering Faculty of University of Oporto. This laboratory is about 2 years old and serves as R&D platform for simulating and testing the integration of renewables (solar and wind power) in the local grids as well as electricity storage and electric vehicles.

There are currently half a dozen PhD thesis being developed at this site.

Given the specificity of the laboratory, only devoted to R&D, it was not appropriate to use the visit guide as a tool for collecting information. The team gathered the following impressions to be confirmed during the project:

1. This industry is still not yet in a full commercial stage, therefore the importance of R&D developed by highly qualified researches is of utmost importance. The industry still depends on the availability of funds for R&D and demonstration, dedicated to universities and other research centres;
2. Although EU is imposing the roll out of smart meters and energy boxes, there is still a difficulty in sending to the market new products. These products are typically mass market products, virtually to be installed at every electricity consumer. There is a need for uptake from commercial investors of these products. These companies would typically be large at manufacturing capacity as well as consumer reaching;
3. Currently there is still a need of highly qualified skills in engineering, but combining competence simultaneously in IT/telecommunications and electrical engineering, as smart grids combine the two;
4. Storage of electricity is certainly also an area where further research is urgently needed, in order to solve consumers needs and the high penetration of renewables and its inherent intermittency. Skills and competences in this area are also a need.

Mission ended by 17:30.