



Vocational Training in Wind Energy Technologies – The TrainWind Pilot Courses in Bulgaria and UK

“Transfer of Innovative VET System In Wind Energy
Technologies” –TrainWIND

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Project coordinator:

Technical University Varna, Bulgaria

Partners:

Foundation for Training in Renewable Energies, Spain

Embrace Cooperation Ltd., United Kingdom

Syntra West vzw, Belgium

ABC Wind Farm Ltd., Bulgaria

Association of Producers of Ecological Energy, Bulgaria

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Introduction

Based on the TrainWind e-learning platform, the multilingual TrainWind Pilot Course was deployed for remote training of technical staff on wind energy technology. Considering the European dimension and the social innovation, which wind energy technology brings, multilingualism is a major objective. Thus, the content of the TrainWind Pilot Course was made available in four EU languages: Bulgarian, English, Dutch and Spanish.

The present report summarizes the results of the TrainWind Pilot Courses in Bulgaria and UK. The main steps of the organization and the implementation of the TrainWind Pilot courses in Bulgaria and in the UK are summarized in the flowchart shown in Figure 1:

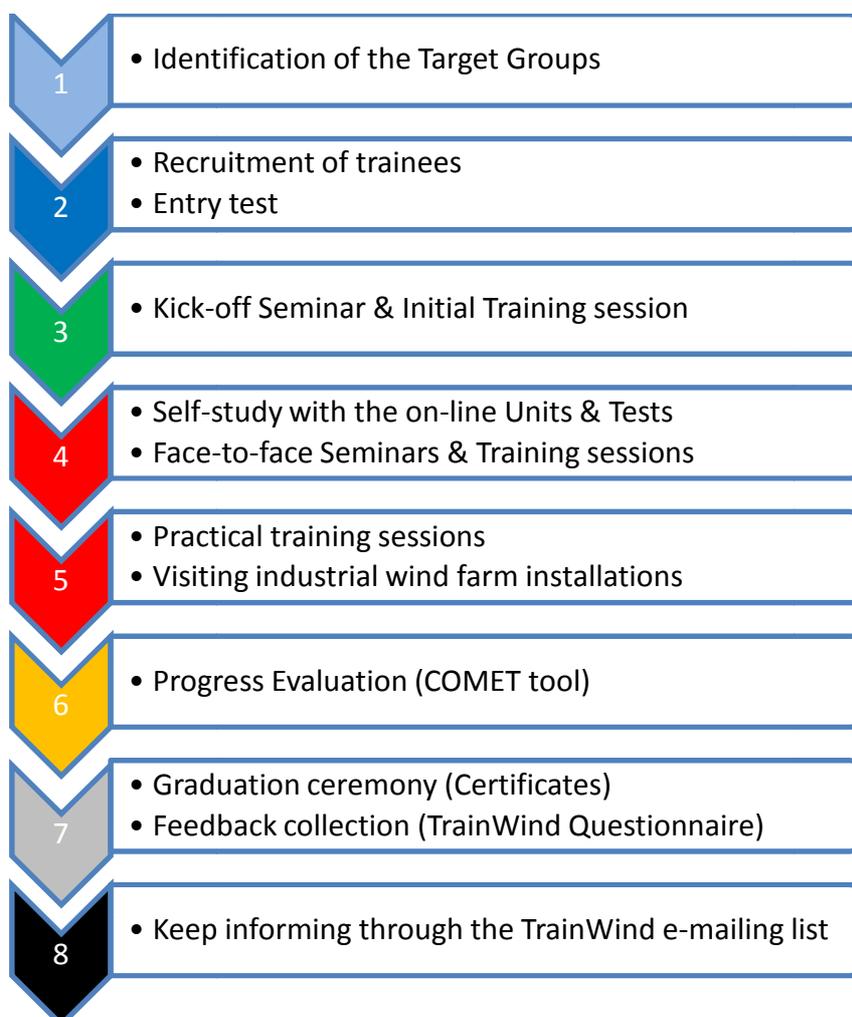


Figure 1. Overall organization and implementation of the TrainWind Pilot Courses

In the following subsections, we detail on the individual steps of the TrainWind courses organization and implementation, and the results of the TrainWind Pilot Courses in Bulgaria and UK.

Identification of Target Groups

The precise identification of target groups would allow individuals who take the TrainWind Pilot Course to qualify for job positions in companies of the wind energy sector, and get involved in the deployment, operation, or the maintenance of wind park installations.

A starting point for the identification of the target groups was the Market Needs Analysis and study of the stakeholder roles in the wind energy sector. Discussion with recruitment officers and managers of companies in the wind energy sector, and more specifically analysis of the hiring strategies, the availability and qualification of technicians available on the labour market, and the fluctuation of workforce employment in the sector were also considered when selecting the target groups. For that purpose, in the course of preparation for the TrainWind Pilot Course, we interviewed:

- a recruitment manager of the ABC Wind Farms OOD, a company that installs, operates and maintains wind park installations on the territory of the Balkan Peninsula,
- managers of companies, members of the Association of Producers of Ecological Energy (APEE) in Bulgaria,
- managers of companies involved in the training of technical staff for the wind energy sectors in Belgium, Spain and the UK.

Analysis of the information, collected during these interviews and discussions, allowed us to shape the profile of target groups and identify potential trainees among

- Technicians from the wind energy sector,
- Technicians from other sectors,
- Technical School / High School Graduates,
- Unemployed young people.

Recruitment of trainees

The recruitment of trainees required a few weeks of preparation as it depended on careful planning of the recruitment campaign. This involved preparation of presentations, which explain the purpose and the benefits of the TrainWind project and the opportunities for acquiring new skills and qualification, which the TrainWind Pilot Course offers.

Initially, members of the TrainWind project gave presentations to managers of companies from the wind energy sector. These presentations aimed at presenting the functionality of the TrainWind e-learning platform and the main features of the TrainWind Pilot Course. Such presentations are considered an important step towards motivating industrial partners to support the implementation of the TrainWind Pilot Course.

Gaining support from the management of a number of industrial entities opens the way for a new round of presentations aiming to motivate employees from the wind energy sector to join the course. During these presentations, we emphasized the benefits of continuous improvement of qualification and the opportunity for combining theoretical knowledge with practical skills.

Another round of presentations and advertisement campaigns aimed at informing undergraduate and graduate students at the Technical University of Varna about the benefits of attending the TrainWind Pilot Course. The information campaign was oriented towards students from the University programmes on “New Energy Sources” and “Power Engineering”. Information about the TrainWind course was posted on the project web site and internet forums. For the above-mentioned target groups, the main motivation points were the opportunity for acquiring knowledge and skills on wind energy technology and of course the TrainWind certificate. When put together, these improve the chances for getting a job in the wind energy sector.

Eventually, 42 trainees were recruited for the Pilot Course in Bulgaria and 14 trainees for the Pilot Course in the UK. The distribution of trainees by category is shown in Table 1.

Tables 1. Distribution of trainees by category

| <i>Category of trainees</i> | <i>Share</i> |
|---|--------------|
| Technical staff working in wind energy parks (partners APEE and ABC), | 60 % |
| Undergraduate and Master Students (TU-Varna), | 20 % |
| Technicians working in the Electricity P&D sector, | 5 % |
| Unemployed and individuals with not-relevant technical background. | 15 % |

During the recruitment campaign, all trainees were encouraged to fill in the Entry Test of the TrainWind Pilot Course. The results of the Entry Test were used for assessing the competence levels of the trainees before the course. Depending on these results, trainees were categorized in one of the following categories: beginners, advanced, very advanced.

For each of these three categories, we set a different curriculum path, where the advanced and the very advanced trainees were allowed access to the Unit Tests of Units 1 and 2 straight from the beginning of the Pilot Course. The successful completion of these tests allowed advanced and very advanced trainees to proceed with the next Unit, without the required mandatory studying all the content of the basic Units. However, all trainees had the chance to go through the entire content of all Units, at any time. The trainees from category beginners were obliged to read the entire Unit contents, before getting access to the Unit Tests.

The Time-schedule of Activities

The initial time-schedule for the TrainWind Pilot Course presented on the figure below, was planned for 10 weeks. The Pilot Course starts with two weeks for the recruitment of trainees, during which the trainees were expected to fill in the Entry Test. Afterwards starts the actual training process, which is expected to last for five weeks, one per each course Unit.

| ID | Task Name | Start | Finish | Duration | 30 Jun 2013 | | | | | 7 Jul 2013 | | | | | 14 Jul 2013 | | | | |
|----|--|------------|------------|----------|-------------|---|---|---|---|------------|---|---|---|----|-------------|----|----|----|----|
| | | | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 1 | Proof-read of the Pilot course materials | 01/07/2013 | 05/07/2013 | 5d | █ | | | | | | | | | | | | | | |
| 2 | Recruitment of trainees | 01/07/2013 | 12/07/2013 | 10d | █ | | | | | | | | | | | | | | |
| 3 | Entry test | 08/07/2013 | 12/07/2013 | 5d | | | | | | █ | | | | | | | | | |
| 4 | Pilot Course, Module #1 | 15/07/2013 | 19/07/2013 | 5d | | | | | | | | | | | █ | | | | |
| 5 | Pilot Course, Module #2 | 22/07/2013 | 26/07/2013 | 5d | | | | | | | | | | | | | | | |
| 6 | Pilot Course, Module #3 | 29/07/2013 | 02/08/2013 | 5d | | | | | | | | | | | | | | | |
| 7 | Pilot Course, Module #4 | 05/08/2013 | 09/08/2013 | 5d | | | | | | | | | | | | | | | |
| 8 | Pilot Course, Module #5 | 12/08/2013 | 16/08/2013 | 5d | | | | | | | | | | | | | | | |
| 9 | Final test | 19/08/2013 | 23/08/2013 | 5d | | | | | | | | | | | | | | | |
| 10 | Train Questionnaire | 26/08/2013 | 30/08/2013 | 5d | | | | | | | | | | | | | | | |

The TrainWind Pilot Course Activities

A brief account of the TrainWind Pilot Course activities is offered in the following subsections. These describe the

Kick-off Seminar & Initial Training session

The main objective of the Kick-off seminar was to explain the procedure, which the trainees are going to follow and to explain the time-schedule for the TrainWind Pilot Course.



Picture from the TrainWind Pilot Course kick-off seminar in London, UK

Self-study with the on-line Units & Tests

As most of the TrainWind Pilot Course trainees work or study full-time, so they were instructed to progress with one Unit per week. The time-schedule was set in the Calendar tool of the TrainWind e-platform, so that trainees can synchronize their progress. Trainees were instructed to study the contents of each Unit and then to fill in the Unit Tests. Besides the final Unit Tests, most Units also included one or more intermediate tests.

Face-to-face Seminars & Training sessions

After the first and the second weeks of the TrainWind Pilot Course, face-to-face training sessions were organized (held on two subsequent Saturdays). These seminars aimed at checking the trainees' progress and querying for problems with the TrainWind e-platform or with the content of the Pilot Course. Question and Answer (Q&A) sessions for helping the trainees who experienced problems were organized. These seminars also gave us the chance to collect feedback from the trainees, which helped for the fine-tuning of the user interface of the TrainWind e-learning platform.

Practical training sessions & Visiting industrial wind farm installations

After the first four weeks of the TrainWind Pilot Course, the trainees were brought to wind farm installations of the ABC Wind Farm Ltd near the town of Kavarna. Trainees had the chance to be acquainted with different types of equipment. A highly qualified technical staff explained specific procedures for checking and maintaining of equipment.

Progress Evaluation (COMET tool)

After completion of all Units and the Unit's Tests, trainees' progress is evaluated via the COMET assessment tool. Analysis of the trainees' progress is estimated based on the results from the Entry Test and the COMET tool.

Graduation ceremony & Feedback collection (TrainWind Questionnaire)

The TrainWind Pilot Course in Bulgaria concluded with a graduation ceremony, where all the 36 trainees, who successfully finished all Units, received the TrainWind Certificate. After the trainees were handed over the Certificates, they were offered to complete the TrainWind Questionnaire. The TrainWind Questionnaire aimed to collect feedback about the acceptability of the TrainWind e-platform user interface, and about the usability of the TrainWind Pilot Course.



Prof. Dr. Vencislav Valchev handed in the TrainWind Certificates after the Pilot Course in Varna, Bulgaria

After the Graduation Ceremony, all trainees, who signed a request, were included in a post-course e-mailing list. This list is aimed to keep informed our alumni about important post-course events and subsequent educational opportunities.

Statistics about the Trainees' Performance

The Pilot Course in Bulgaria was followed by 42 trainees, who come from different occupations:

- In the first group, we have technicians employed by the ABC Wind Farm Ltd, who have practical experience with maintenance of wind energy equipment and sufficient theoretical knowledge about wind technology.
- The second group, involved staff who is employed in companies, which are members of the Association of Producers of Ecological Energy (APEE), who are active in the area of renewable and ecological energy production but are not necessarily involved with wind energy technology.
- The third group includes technicians working in industries not related to renewable energy technology, unemployed young people, and undergraduate and postgraduate students from the Technical University of Varna.

Table 2. Statistics about the TrainWind Pilot Course in Bulgaria

| Indicators | ABC | APEE | Other | Total |
|--|--------|---------|---------|-------|
| Number of Recruited Trainees | 17 | 9 | 16 | 42 |
| Progressing / finished | 15 | 9 | 12 | 36 |
| Drop out rate – not finished by Sept. 30 | 12 % | 0 % | 25 % | 14 % |
| Average time spent on-line | 8:00 h | 35:30 h | 20:45 h | |
| Average number of on-line sessions | 11 | 26 | 30 | |

Thirty six (36) of the 42 trainees enrolled for the Pilot Course in Bulgaria managed to finish the course on time. For the Pilot Course in UK, eleven (11) trainees finished the training out of the 14 enrolled. The dropout rate for the Pilot Course in Bulgaria is 14 %, which is slightly lower compared to the dropout rate for the Pilot course in UK (21%).

Few trainees could not finish the course due to long-term business trip abroad, which changed their priorities. Few other trainees admitted that they underestimated the amount of time needed to invest in the course, and thus were demotivated after going through the first Units.

Analysis of the average time spent for browsing the text of the course Units and the average number of sessions shows significant differences among the different groups of trainees. For instance, the trainees from partner ABC spent on average only 8 hours for browsing the Units and then did the tests. The average time of the individual sessions was in the range between 30 and 60 minutes. The trainees from this group reached the highest success rates on the tests, and six (6) of them showed the ultimate success rate of 100 % correct on all tests of the Units.

On the contrary, the second group of trainees (APEE) spent more than 35 hours browsing the text of the Units, and the average duration of individual sessions was between 60 and 100 minutes. The average time spent by the participants in the Pilot Course in UK was in this range as well – trainees spent more than 30 hours.

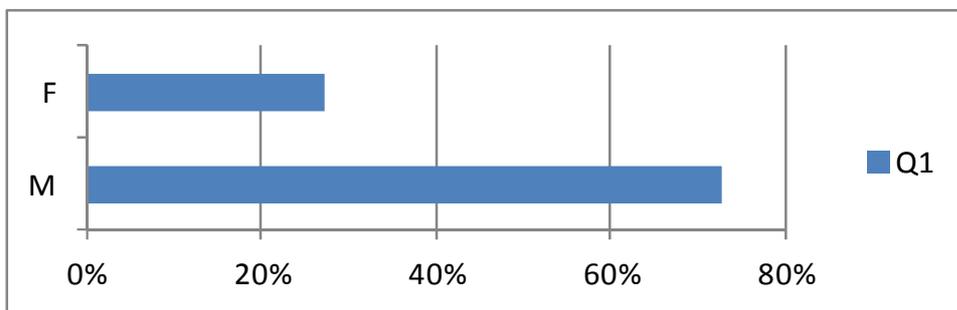
Finally, the third group spent on average approximately 21 hours for browsing the content in short sessions typically from 20 to 60 minutes.

A Summary of Feedback from the Trainees

In the following, we present a summary of the feedback about the TrainWind platform and Pilot Course, which was collected in Bulgaria, Belgium, England and Spain. For that purpose, we developed a Questionnaire with 18 questions, which was filled in by 44 people who had the chance to be acquainted with the TrainWind platform.

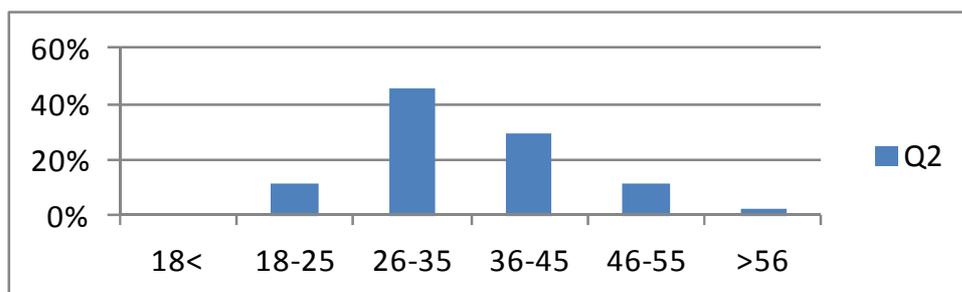
1. Sex

The questionnaire was filled in by 32 men and 12 women, so that 27 % of the responders were women.



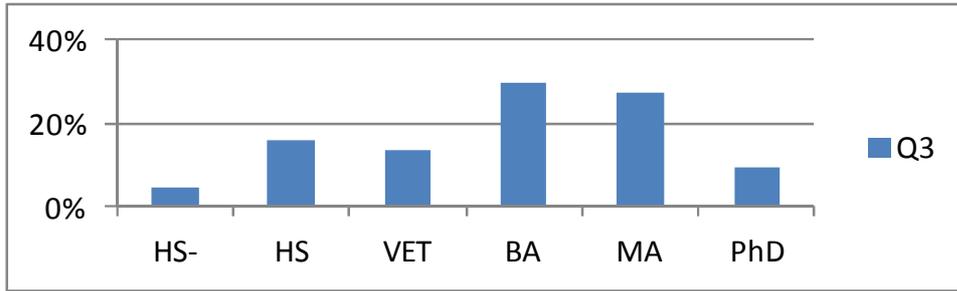
2. Age group

Approximately 56 % of the responders were young people between 18 and 35 years old.



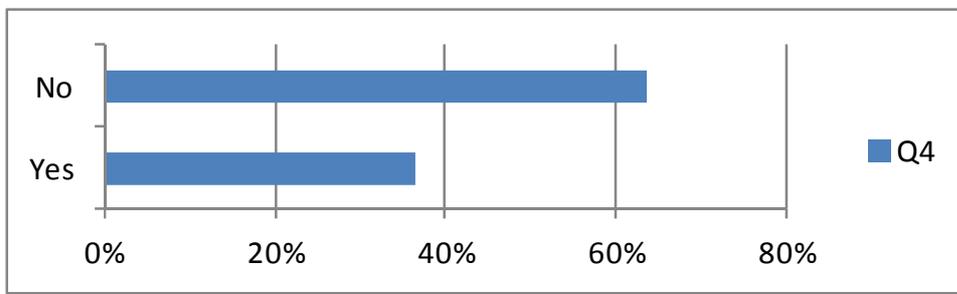
3. Education

There is balance between the responders with high school or VET training (30 %), Bachelor degree (30 %) and Master degree (27 %). On the full range, 5% of the responders did not have high school finished and 9 % had PhD degree.



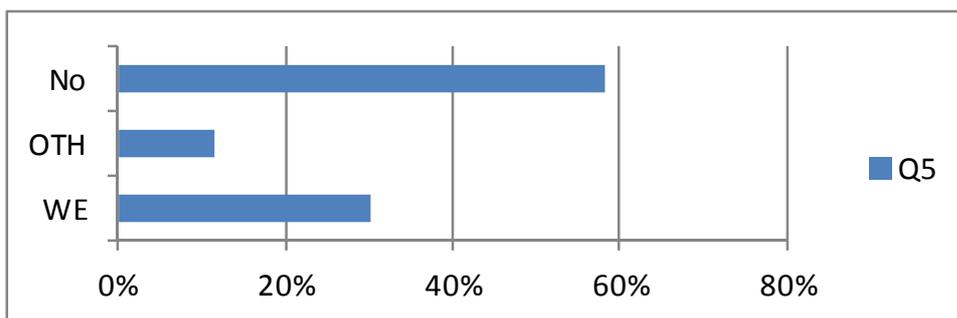
4. Have you taken training on any kind of renewable energy

Approximately two thirds of the responders did not have training on renewable energy technology.



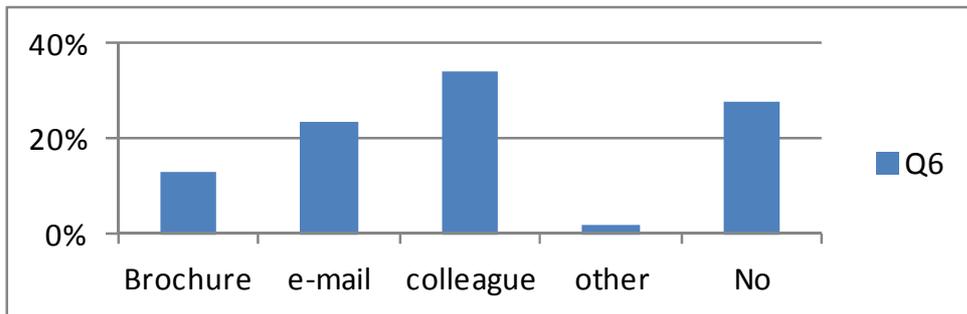
5. Professional experience with renewable energy sources (production /operation/ maintenance)

About 30 % of the responders have previous experience with wind energy technology and 58 % did not have previous experience with renewable energy technology.



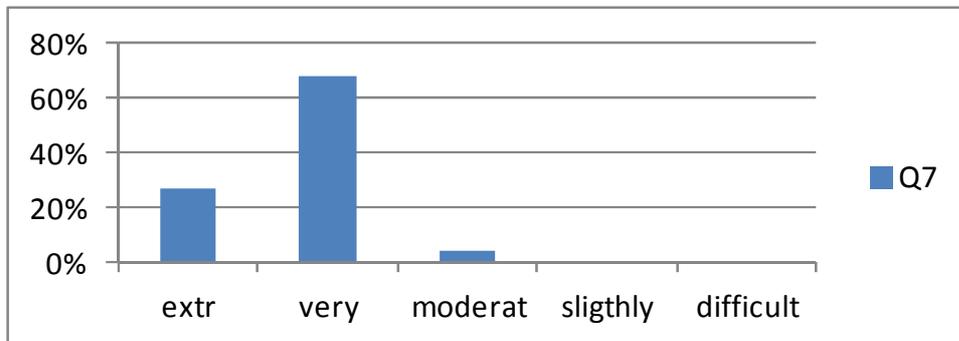
6. Did you hear before about the TrainWind e-learning platform

Approximately 28 % of the responders have not heard of the TrainWind platform and course before they were invited to fill in the questionnaire. The rest have heard previously about TrainWind from a colleague or friend, through e-mail notification, e-newsletter or web page, or through some printed dissemination material about the project (brochures, newsletters, etc).



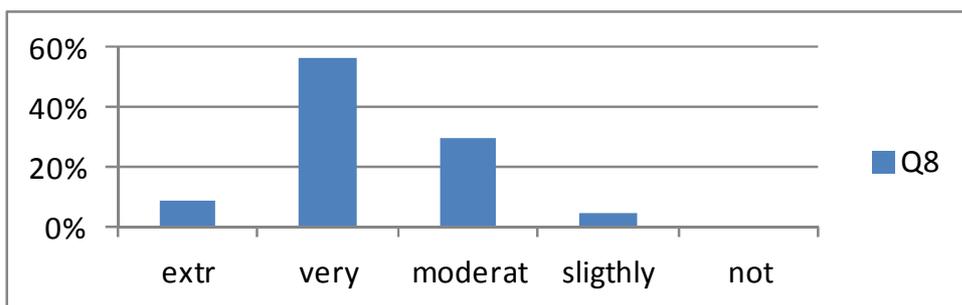
7. How easy is it to login to the TrainWind e-learning platform?

Approximately 95 % of the responders found it out that it is very easy or extremely easy to login in to the TrainWind e-learning platform.



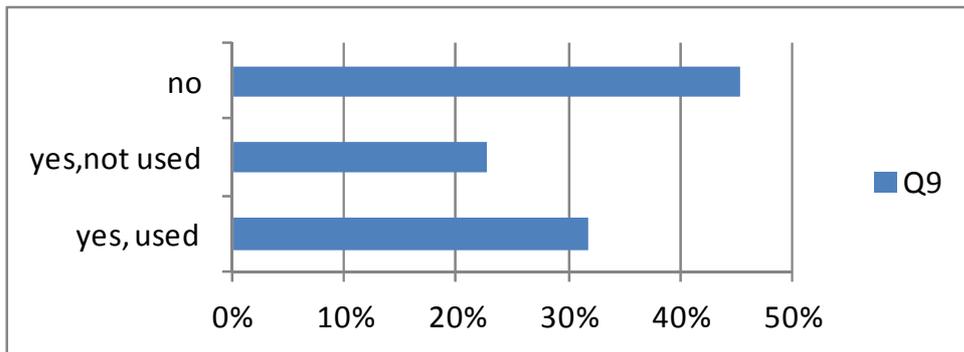
8. How convenient is the interface of the TrainWind e-learning platform?

Approximately two-thirds (68 %) of the responders found out that it is very easy or extremely easy to use the interface of the TrainWind e-learning platform.



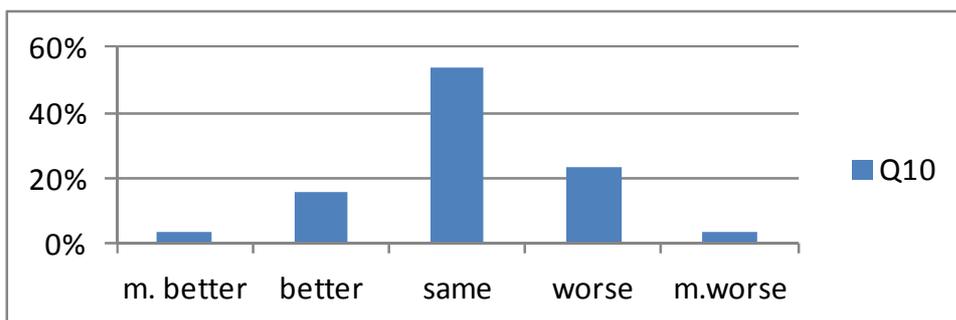
9. Are you aware of any other e-learning platforms for remote training?

Approximately 55 % of the responders have seen another e-learning platform and 32 % have used e-learning platform before.



10. Compared to other e-learning platforms, is the user interface of the TrainWind platform better?

More than 73 % of the responders found out that the TrainWind e-platform user interface is the same or better than other e-platform which they know. However, 23 % of the responders found the TrainWind platform worse and 4 % much worse compared to what they have seen or used.

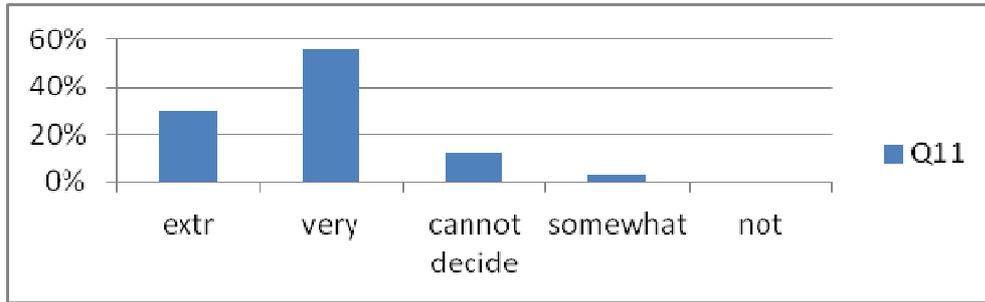


The comments and recommendations collected from the responders were used for improving the user interface of the TrainWind e-platform and the content of the Pilot Course.

11. How useful is the table of contents of the TrainWind modules?

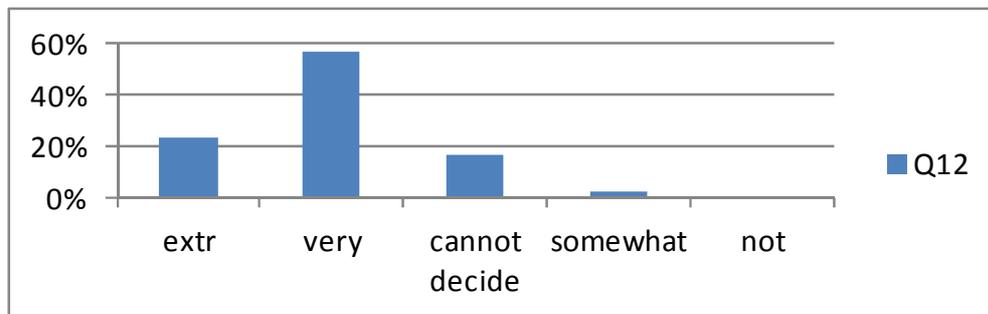
Question 11 and the following three (3) questions are grouped as usability questions, which aim at assessment of the value added.

With respect to question 11, more than 85 % of the responders considered the table of contents informative and descriptive with respect to the actual content of the Units. This question is considered important because the table of contents gives to the trainees the perspective of what follows and facilitates planning and organization of their time and progress plan.



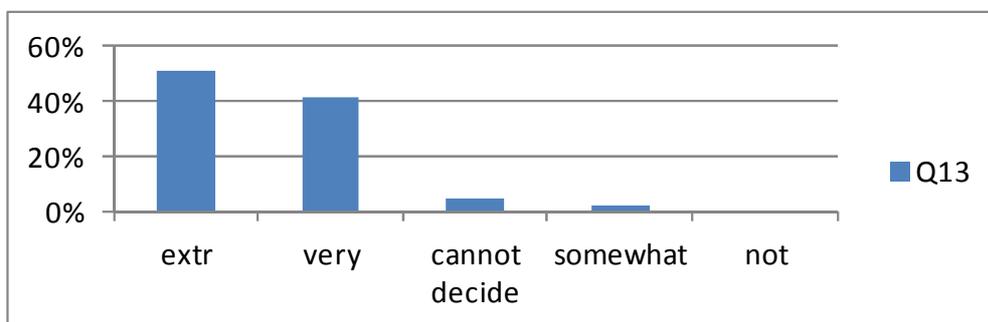
12. Please comment on the added value of the narrative content (text and equations) of the TrainWind course?

More than 80 % of the responders considered the narrative content of the TrainWind course informative and adding value.



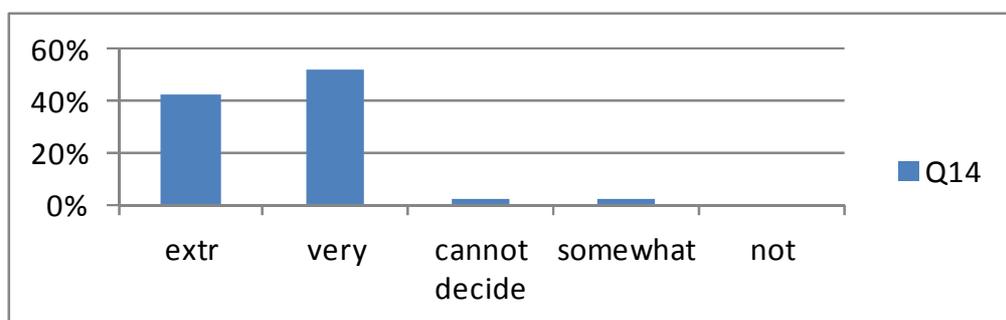
13. Please comment on the added value of the graphical content (figures, pictures, videos) of the TrainWind modules?

Over than 93 % of the responders highly prized as extremely useful or very useful the value added by the graphical content (figures, pictures and videos) and appreciated their illustrative and informative importance.



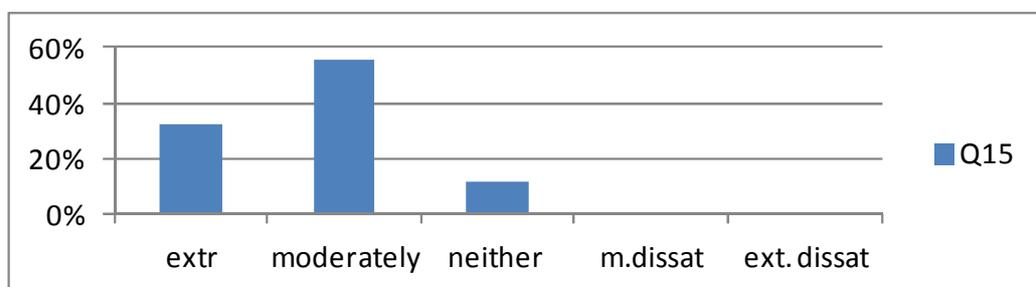
14. Please comment on the added value of the interactive contents (interactive equations, interactive graphics) of the TrainWind modules?

The interactive contents introduced into the TrainWind course Units was highly appreciated and over 95 % of the responders found extremely useful or very useful the interactive equations, interactive graphics, interactive tables, etc).



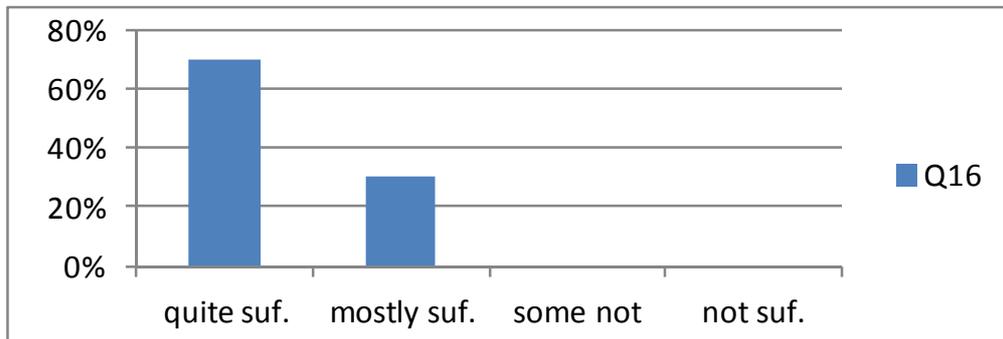
15. Overall, are you satisfied with the overall quality of content of the TrainWind course?

Question 15 and the next 3 questions aim to assess the overall satisfaction and the overall impression about the TrainWind Pilot Course. Approximately 88 % of the responders were positive and were extremely satisfied or moderately satisfied by the TrainWind course.



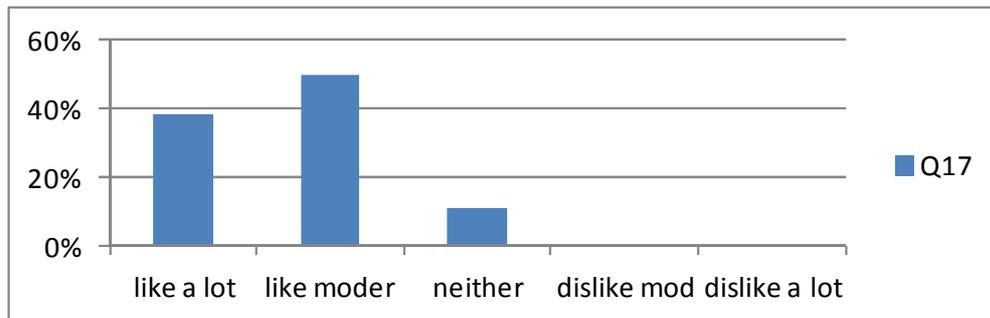
16. Do you find the content of the TrainWind course complete and sufficient for an introductory course?

All responders were positive and found the content of the TrainWind course complete and sufficient -- 70 % of them were extremely satisfied and 30 % were mostly satisfied by the content.



17. Do you like the TrainWind course?

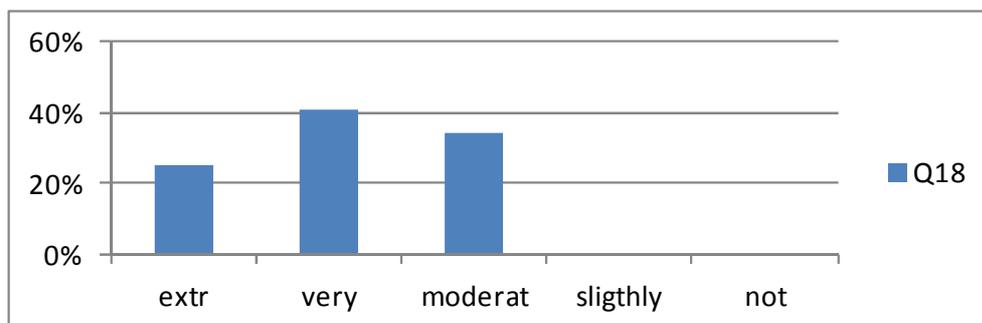
This question aims to evaluate the overall perception of responders about the quality, accessibility, usability, user interface, etc.



In total 89 % of responders expressed that they like the TrainWind course – with 39 % saying “like a lot” and 50 % saying “like moderately”.

18. How likely are you to recommend the TrainWind course to people you know?

All responders found out the TrainWind course useful and expressed attitude and intention to recommend the TrainWind course to other people, with 25 % of the responders saying “extremely likely”, 41 % “very likely” and 34 % “moderately likely”.



The lessons learned during the Pilot Courses

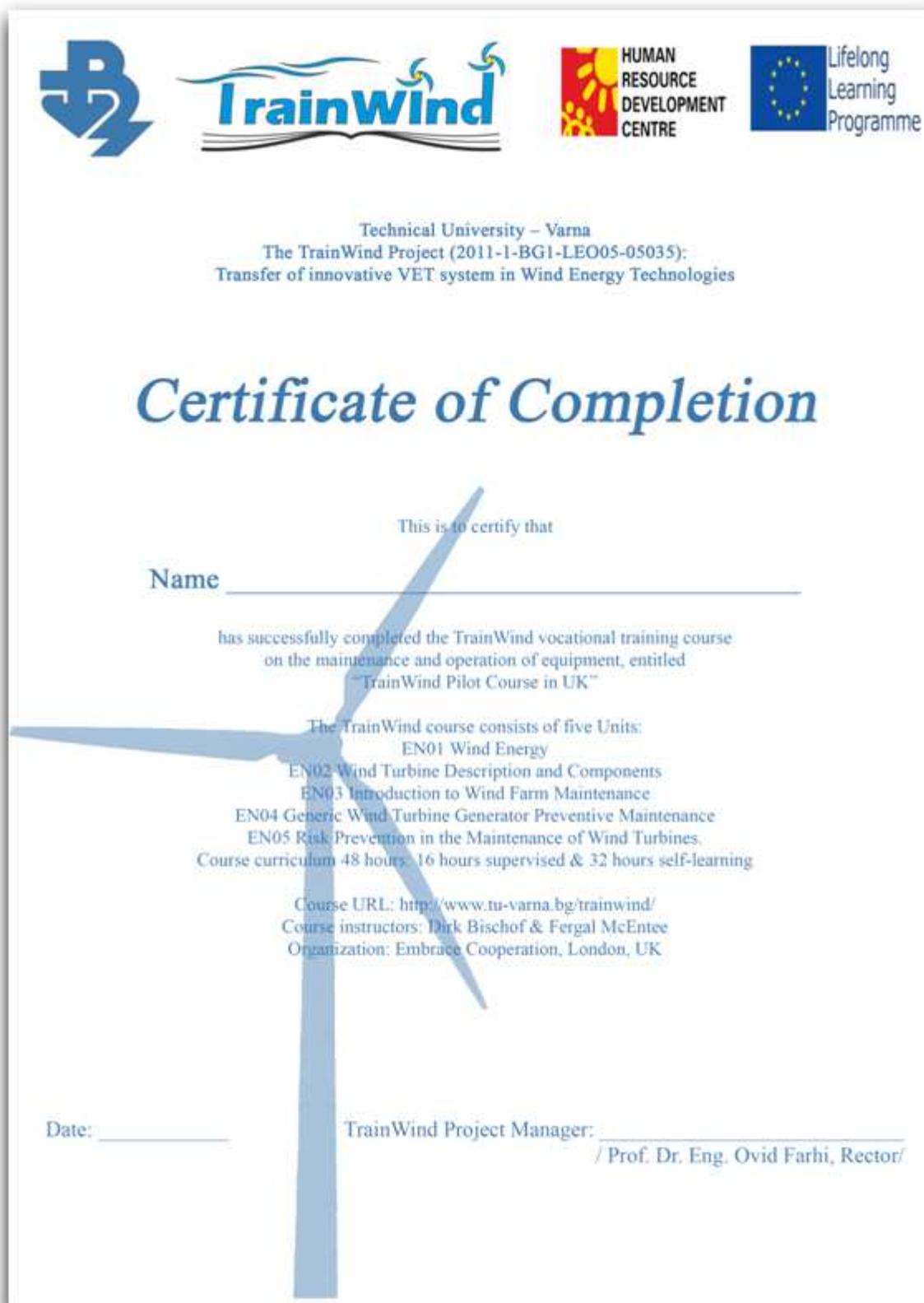
Motivating the trainees to progress steadily through the Units was the biggest problem. This really highlighted the difference of an e-learning platform and a class-based course. We did a number of meetings with some of the trainees who were still interested but experienced technical difficulties with the user interface and went over the functionality of the course in more detail. These meetings were quite rewarding and re-motivated the trainees to progress steadily. During these meetings, trainees were able to explain their concerns, the problems they faced and get some answers and guidelines. The Course developers also received useful feedback about the difficulties that trainees' experience and this helped for identifying the steps for improving the user interface and the Course contents.

In the future, the TrainWind courses could be considered with much longer period, with two-week window for finishing each Unit.

In addition, the Pilot Course could benefit from continuous on-line lecturer/ or IT support available to answer the questions of trainees when they arrive. However, this is not easy to implement as many of the trainees used the evening hours and the weekends to study in the TrainWind course.

Otherwise, in general, the feedback we received about the TrainWind e-platform and the TrainWind Pilot Course was quite positive and all trainees agreed on the statement that it was worthwhile doing it.

Appendix: The TrainWind Certificate



The certificate features a large, light blue wind turbine graphic in the background. At the top, there are four logos: the blue stylized logo, the TrainWind logo, the Human Resource Development Centre logo, and the European Union Lifelong Learning Programme logo. The text is centered and reads:

Technical University – Varna
The TrainWind Project (2011-1-BG1-LEO05-05035);
Transfer of innovative VET system in Wind Energy Technologies

Certificate of Completion

This is to certify that

Name _____

has successfully completed the TrainWind vocational training course
on the maintenance and operation of equipment, entitled
“TrainWind Pilot Course in UK”

The TrainWind course consists of five Units:
EN01 Wind Energy
EN02 Wind Turbine Description and Components
EN03 Introduction to Wind Farm Maintenance
EN04 Generic Wind Turbine Generator Preventive Maintenance
EN05 Risk Prevention in the Maintenance of Wind Turbines.
Course curriculum 48 hours: 16 hours supervised & 32 hours self-learning

Course URL: <http://www.tu-varna.bg/trainwind/>
Course instructors: Dirk Bischof & Fergal McEntee
Organization: Embrace Cooperation, London, UK

Date: _____ TrainWind Project Manager: _____
/ Prof. Dr. Eng. Ovid Farhi, Rector/

Front page of the TrainWind Certificate

The Association of Producers of Ecological Energy in Bulgaria certifies that the TrainWind Pilot Course offers adequate amount of knowledge in the area of wind energy technology.

President of APEE: _____

Mr. Velizar Kiryakov

Back page of the TrainWind Certificate

