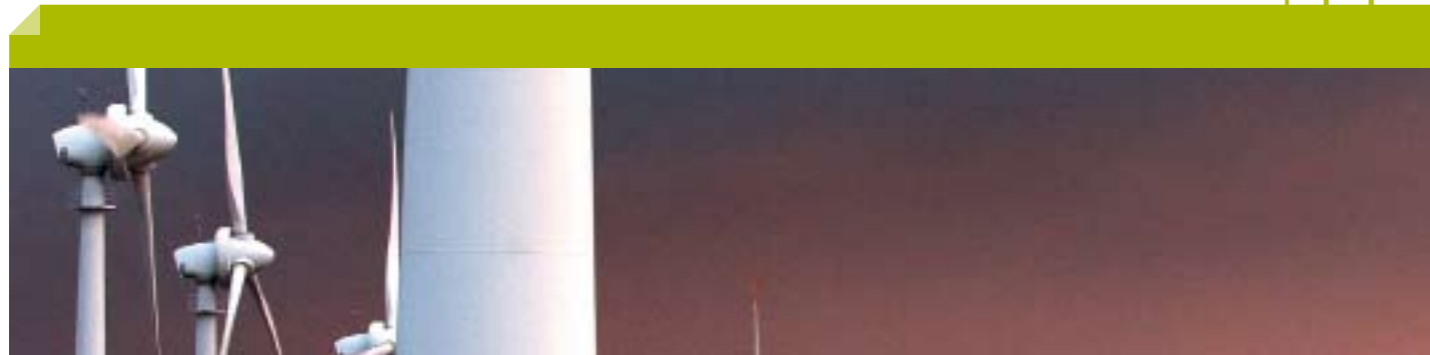




Training and education

- WP1A1
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- Aalborg University
- Energy Research Centre of the Netherlands (ECN)
- Stichting Kenniscentrum Windturbine Materialen en Constructies (WMC)
- Technical University of Delft (TUDelft)
- National Technical University of Athens (NTUA)
- University of Patras
- Institut für Solare Energieversorgungstechnik e.V. (ISET)
- SWE University of Stuttgart

THE CHALLENGE

Further improvement and enlargement of wind turbines implies a deeper understanding of all aspects of the behaviour of the system, including aero-elastic and structural effects, electrical grid connection and power quality issues, load control and partial load performance, as well as the environmental impact (acoustic noise emission, visual impact, impact on birds, etc.). Significant amount of research and development work has already been performed in this field. However, knowledge dissemination to all relevant users of these new insights is critical. Innovation as a means to make the wind energy technology more competitive will only take place efficiently, if SME's and students - as the future developers - have access to new knowledge through education and training.

The present situation concerning training and educational material is very diffuse. Quite a lot of materials are available but dispersed, they are not standardised for educational levels, not easily accessible, and different courses are overlapping to a great extent.

The specific objective of this work package (WP) is to realise a fully integrated approach, involving academic institutions, industry and research institutes, to provide a unique platform to improve educational materials with respect to content and structure, to avoid overlap and to match the educational contents to the users specifications.

A number of modules for international courses in the Wind Energy (WE) field, including their supporting training materials are being developed in order to provide a suitable vehicle for training of researchers and students on the one hand, and of energy consultants and project developers on the other. Results from the research carried out in the other work packages (WP's) of UpWind will be included in the educational materials, developed in this work package.

The target groups of UpWind training courses do already have basic knowledge in wind energy technology. It is not the aim to create basic training courses, but UpWind courses will rather build up on these level 1 courses (see figure below).

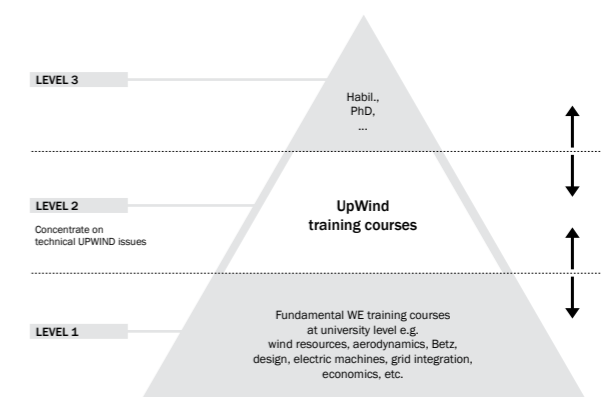


Figure 1: UpWind training is targeted to participants of levels 2 and 3.



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THE RESEARCH ACTIVITIES

The tasks of this WP include:

1. PRODUCING A SURVEY OF THE EXISTING INFRASTRUCTURE OF WIND POWER TECHNOLOGY-RELATED EDUCATION AND TRAINING IN ALL EU MEMBER STATES.

Information about existing WE education programmes was collected. The information was provided by higher education institutions, vocational training centres and other institutes active in the field. A list of these including the persons responsible for these courses was compiled.

Then, the needs of both the training organisations and the students they provide for (questionnaire survey) were examined. Issues that were discussed with the relevant course administrators included course content and duration, target student characteristics, student assessment methods, and recommendations for minimum skill levels.

2. ESTABLISHMENT OF A CONTINUOUSLY UPDATED DATABASE OF EDUCATIONAL/ TRAINING MATERIAL (THE WIND ENERGY INFORMATION AND EDUCATION NETWORK - WEIEN).

The information which is being gathered is processed by means of the hardware and software offered by the ReKnow.Net, (through ISET), a project sponsored by the German government.

The task further includes the development and continuous operation of the tools set at the disposal of WEIEN. It enables a feedback from the end-users of the modular trainings blocks (forum, database). This will allow a better identification of the needs for training as well as getting feedback on specific course elements (open source knowledge composition).

Further training experts and stakeholders who are interested in the training activities are being invited to join the WEIEN Area.

3. THE DEVELOPMENT OF A MODULAR APPROACH TO WIND POWER COURSE MATERIALS.

The common components of the existing curricula surveyed in the frame of task 1 were identified and the most essential ones have been selected to be used for the development of new curricula and training materials. Key issues were the determination of the specific training material which is required for the different groups of key actors (two levels) and the formulation of the course programmes accordingly as well as the decisions made about the specific modules which need to be developed or updated in order to be integrated into existing and new WE courses

4. PRODUCTION OF THE COURSE MATERIALS IN THE FORM OF INDIVIDUAL MODULES COVERING FOCUSED TECHNOLOGICAL TOPICS, INCLUDING RESULTS FROM UPWIND RESEARCH.

UpWind training modules will mainly comprise of scientific findings achieved in the UpWind project, e.g. concepts and solutions which will lead to a new state-of-the-art wind turbine technology. Existing material will be reviewed, revised and updated. In addition, new course materials will be developed for topics that have not already been covered before.

For each of the modules identified in task 3, three sets of coherent supporting material will be produced:

- training modules ready for incorporation into e-learning environments;
- presentations in the form of PowerPoint show files;
- students handouts and lecturers notes, with text for detailed information about each subject.

5. DISSEMINATION OF THE RESULTS OF THIS WP THROUGH PILOT TESTING OF TRAINING MODULES BY THE PROJECT PARTNERS.

The wind power course materials will be made available from the WEIEN e-database. There are a number of ways that will be used to disseminate the results/products of this WP:

- University status partners will use the modules developed in delivering courses to postgraduate students and lecturers from other universities they collaborate with;
- Non-university status partners will use selected modules developed herein to run workshops on the main topics of wind energy technology.

A detailed presentation of the products of this WP will be made available in a workshop that will address PhD candidates with an engineering background.



UpWind
WEBSITE

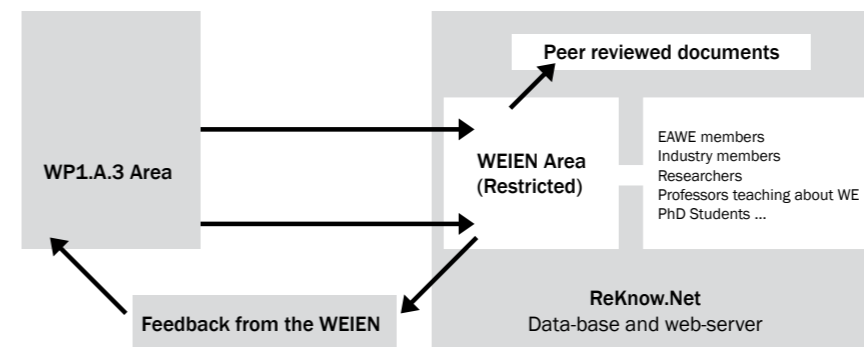


Figure 2: Interaction of the WEIEN (restricted area in ReKnow.Net) with the UpWind website

RESULTS AND EXPECTATIONS

A lot of preliminary material (in the form of guidelines, templates, etc.) was developed in the first stages of this work package. This helped the whole procedure related to the design of the course(s) modules in order to be of real use to this UpWind project WP's target groups.

So, apart from the detailed literature and web-based survey made for Task 1 of WP1A.3, a questionnaire based survey was also carried out, in the frame of which valuable information of WE trainings was collected from 43 respondents that have responded to the enquiry (representing course providers), forming quite an interesting overview.

In order to present in a more systematic way all the raw material on wind courses which has been collected, an on-line database of all relevant courses including all details such as education level, contents, duration, contacts, etc. was created. The title of the data base is: "Database of EU courses in the field of Wind Energy".

As regards the Wind Energy Information and Education Network – WEIEN (e-database),

a restricted area within the ReKnow.net website has been created for the WEIEN members with all relevant functionalities of the ReKnow.Net website, specifically:

- A database for up- and downloading of documents;
- A forum for discussion;
- An "Open Source Knowledge Creation" tool (internal "Wikipedia");
- A peer-review process.

The work on WEIEN is a continuous process.

Also the resource guide of course modules to be developed within the WP has been finalised This includes the most essential of the common components of the existing curricula surveyed, as well as the specific modules that need to be developed or updated in order to be integrated into existing and new WE courses. This way, the detailed curriculum of a course that will lead to a PhD decree was formed (with topics, ways of presentation, required learning units, etc.).

Currently work is in progress for developing the comprehensive set of wind power training modules, single-issue presentations, self-assessment tools, handouts and lecturers notes, which could be applied for individual e-learning purposes

but also as supporting material for existing or new courses.

Pilot applications of the different training modules in parts of courses for faster dissemination purposes will be carried out and workshops will be organised to present new wind power courses.

