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Small Wind Power – challenges and ongoing activities

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According to the EU building guideline and its demand to assure safe, sustainable and resilient urban energy supply, there is an urgent need to make use of the energy resources of cities as efficiently as possible. The wish for private energy autonomy has been one of the major factors why more and more Small Wind Turbines (SWTs), besides photovoltaic, have been mounted on top of a building or next to single- and family houses. In the field of renewable energy, the analysis of the wind flow around buildings together with the site assessment for the small wind turbines are a great challenge.

The main goals of the project smart(D)ER are to provide a detailed and sophisticated knowledge for the application of small wind turbines in urban area, through the whole process of the application: from the license to the site assessment and establishment of the SWT. To accomplish these goals thematic workshops, labor exercises, transfer projects, distance learning and networking events are foreseen. Increasing the enterprises competence in the research, development and innovation in this field, and establishing an innovative knowledge and cooperation among the project partners can be used for future research projects and cooperations.

The project SmallWindPower@Home deals with the evaluation of the impact of obstacles (building with different roof shapes) on the performance of a roof-mounted small wind turbine (SWT), as well as on the local wind flow pattern, under real conditions. In order to reach this aim, two small buildings with two different roof shapes are established in the Energy Research Park „Energieforschungspark Lichtenegg“ in Austria with roof-mounted SWTs on both of them. While previous studies relied on simulations of the flow around scaled building models in wind tunnels, this infrastructure allows monitoring the performance of SWTs directly on the roof of a building under real conditions. The meteorological parameters are measured in three different heights on several masts in order to capture the variations in the wind pattern due to the buildings and the different roof types. Further, numerical simulations of the wind flow are performed with two CFD models and the results are validated against the measurements. Other objectives of the projects are: evaluation of the performance of several roof mounted SWT, environmental analysis in terms of noise, vibrations and safety relevant aspects. Recommendations for site assessment, establishment and maintain of a roof-mounted SWT as well as for training material will be given.

The projects SmallWindPower@Home and smart(D)ER are conducted by the Central Institute for Meteorology and Geodynamics (ZAMG) in cooperation with the FH Technikum Wien (Project Leader), Energy Research Park in Lichtenegg (Company Solvento), Energiewerkstatt Verein and BOKU (University of Natural Resources and Life Sciences, Vienna) together with 18 scientific partners and enterprises, and funded by the FFG (Austrian Research Promotion Agency, www.ffg.at).