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Renewable Energy Projects Catalogue

A guide to successful and innovative projects in the area of renewable energy

6. New innovative solutions, components and tools for the integration of wind energy in urban and peri-urban areas (SWIP)

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CHALLENGES

The SWIP project aims to deal with and overcome the ***main barriers that slow down the massive deployment of small and medium size wind turbines*** (SWT):

- *Cost of technology:* In Europe, the installed cost of a SWT ranges from 2.100 to 7.400 € / kW and the electricity production costs between 0,15 to 0,30 € / kWh.
- *Wind resource assessment:* Accurate prediction of the wind speed is essential to calculate the electricity output, representing the basis for economic performance.
- *Regulation:* Currently, fully competitive wind markets are rather found in developing countries, where off-grid and micro-grid applications prevail. The sector is at the mercy of regulation, as it is completely dependent of it.
- *Social acceptance and safety:* These two topics should be at the core of future developments, as are the issues that may jeopardize the public awareness, and therefore the success of the technology.
- *Aesthetic, noise and vibration:* Tonality is a feature that may increase the adverse impact of a given noise source, as well as vibrations, due to the impact on the location where the device is installed. Aesthetic issues are key enablers for the social acceptance of these systems.
- *Wind market / user friendliness:* Proximity of society to information and communication technologies needs to be exploited and taken as an advantage for the integration of new systems into society and their day-to-day life.

Main features of the project

The new and innovative solutions developed by the project will allow to: reduce the costs of the electric generator of wind turbines, providing two new concepts for energy generation; increase the power coefficient ratio of the blades (and therefore the number of hours that the SWT is working), highly softening or even eliminating the mechanical and acoustic noise they currently produce; reduce the maintenance costs of the SWTs by including two innovative elements (SCADA for preventive maintenance and magnetic gearbox) in the SWTs and improving the integration of the wind turbines in buildings and districts with more aesthetic solutions.

The project will develop *three different prototypes* to be integrated in three different scenarios (new energy efficient building, shore-line and industrial area) with a view to validating the targeted solutions and goals, providing scalable solutions for different applications.

RESULTS

A technology and policy analysis has been performed with a view to establishing the basis for the development of the wind turbines and their features to allow massive deployment within the existing energy grid. A benchmarking of SWT has been developed in order to set the starting point from where the project can provide improvements beyond state of the art. Energy plans in EU cities have been studied in order to define where the SWT can best fit.

The measurement campaign has started in the pilot areas with a view to defining wind characteristics at the demonstration sites.

Developments in the design of the new blades have been done, taking into account aesthetic aspects for integration in urban environments, as well as performance and noise characteristics.

Integration of small wind energy in urban and peri-urban areas

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