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Small wind turbines: the art of disguise

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The use of small wind turbines (SWTs) is growing in appeal thanks to a changing trend in the energy sector, from a centralised system to a distributed one. SWTs can now be connected to the electrical grid from the consumer end and, as the technology progresses, can contribute to the stabilisation of the grid.

But while the green power source is already being adopted in the field, in places like mobile communication base stations, **its wider use is still limited particularly in urban areas**. Communities have very little experience of them – and may need to be convinced when it comes to accepting their addition to the skyline.

The visual impact can be kept to a minimum if the turbines are placed carefully and sensitively. Of course, **the design also has a big part to play**.

For example, a French company, called New Wind, has come up with **a turbine that looks like a tree**. More than nine metres tall, it has plastic leaves which silently move in the breeze. The 'tree' can also capture energy in the lightest of winds, less than eight kilometres per hour – a traditional wind turbine needs a speed of more than four times that.

"Shape, colour and materials used are all aspects of aesthetic acceptability," explains Brian O'Brien, Director of Dublin-based Solearth Architecture. "The specific aesthetics of a turbine model can vary in terms of where people 'place' the turbines on the ugly-to-attractive spectrum. There is also evidence that whether the blades are rotating or not, and how much of the time the turbine is seen to be 'working', that is, producing energy, will affect whether people find them more or less acceptable."

Solearth is collaborating with the European SWIP project, which is coming up with innovative solutions for boosting the **integration of small and medium-sized wind turbines in urban and peri-urban (part urban, part rural) areas**. It's designing three different prototypes, to address the key issues – ranging from costs and efficiency to aesthetics and social acceptance.

by Damon Embling

"Turbines can be best disguised by **architectural integration**. This is an approach where the very design of a building's form is modified to ensure that it and the turbine appear as one cohesive composition, rather than two separate entities, however closely located," comments O'Brien.

"There are also examples of the turbine itself being changed **to match more closely the shapes we are already familiar with in urban environments**. For instance, the SWIP turbine attempts to mimic circular satellite dishes in the UK."

The colour of wind turbines in an urban setting is also a crucial factor in terms of aesthetic acceptability. Experts suggest instead of attempting to just blend the machinery in with the background, more bold statements can also prove to be successful – depending on the environment.

"Dramatic colour schemes are used for turbines to disrupt our expectations and bounce us out of the ugly versus acceptable discussion. **Provoking us, perhaps, to be as open-minded about a new urban energy device** as we would be about any new consumer product we might encounter for the first time," says O'Brien.

"'Backclothing' – the distinction of a turbine from, or harmony with its background - is also an important factor in terms of urban location and installation. Detection is highest in landscapes where the turbine is brighter than its background (positive contrast), rather than darker (negative contrast)."

But some design experts question the overall viability of installing small wind turbines in urban areas. "People love the image of wind turbines, they make people feel good, they demonstrate for a building owner that they're doing something to generate energy and that you care, it's a bit of a badge of honour," comments Tristan Roberts, Chief Strategy Officer at US-based BuildingGreen, a publishing and consultancy company focused on sustainable design.

“But, on the negative side, they can be hazardous to birds, they generate vibration and noise, so **it’s very difficult to attach a wind turbine to a building**. Also, it’s just difficult to have a lot of small wind turbines in a concentrated area. They also require maintenance.

“**Another issue is turbulence**. In an urban environment with buildings, trees, hillsides, other infrastructure, wind near ground level is much more turbulent and is not efficiently used by most small turbines.” Moreover, Roberts highlights **the limited power generation** of small wind turbines as a major stumbling block in helping to reach green energy targets.

These are all issues that the SWIP project claims to address through innovation in design and software. Gosse Hiemstra, from Van der Meer & van Tilburg, in the Netherlands, an independent consultancy firm which is collaborating with the project, told youris.com: “We improve the performance, so there is more electricity production - and we reduce the cost - and this has to do with the design.”