

COMPANY
Agile Wind Power
agilewindpower.com

LOCATION
Zurich, Switzerland

SOFTWARE
Autodesk® Product Design Suite
Autodesk® Inventor®

Wind Energy from Hobby to Series Production

Agile Wind Power develops a new generation of scalable, vertical-axis wind turbines for large output ranges

We use Autodesk® Inventor® for the entire design process of our turbine – from basic design to detailed plans and production drawings for the manufacturers

—Patrick Richter
CEO Agile Wind Power



Rendering of a Vertical Sky wind turbine.

A Swiss start-up reveals how a technological innovation for the sustainable energy market can develop from a hobby in someone's garden. Patrick Richter, CEO of Agile Wind Power, has his father-in-law's painstaking efforts in the garden to thank for the idea behind his company. In 2005 Karl Bahn Müller wanted to delight his grandchildren by building a small pond landscape in his garden. He used a water pump in order to circulate the water. As a qualified machine construction engineer, he developed a wind pump with a vertical-axis and an innovative drive principle in order to generate the required energy. Patrick Richter recognized the potential of the invention for large scale, commercial vertical-axis wind turbines. The idea for the Vertical Sky Concept was born.

To find out whether the idea was actually feasible, Richter and Bahn Müller carried out tests and did calculations. "The vertical wind turbines on the market today are small scale," explains Richter. "But until now we weren't able to scale them. So vertical wind turbines today are only of interest to the self-supply market and are not commercially profitable. But what my father-in-law had developed looked promising." After two or three years the vision of the two hobbyists started to take shape, and an increasing amount

of time too. Then in 2010 Patrick Richter took the plunge and left his job in IT to set up Agile Wind Power and devote himself fully to his Vertical Sky project.

Plenty of advantages over conventional wind turbines

"The requirements of our turbines are generally similar to those of conventional turbines," explains Richter. "Our technology also needs a certain average wind speed and good wind conditions throughout the year. But what distinguishes our vertical-axis and slowly rotating wind turbine is the modular construction, which can be scaled to the multi-megawatt range. Its actively controllable blades also compensate for gusts and so enable optimum use of wind energy." Small and lightweight components minimize transportation and installation costs compared to other large wind turbines. All components of the nacelle can be easily switched, since it is uncoupled from the rotor and is positioned only just above the ground in the tower. This means that it can be easily accessed and reached without the use of a crane. Tests have also revealed that the Vertical Sky Concept is very bird friendly. With the blades weighing between 0.5 to 4 metric tons each, they are considerably lighter

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than those of horizontal wind turbines, which weigh from 12 to over 20 metric tons. Because of this fact and the slow, vertical rotation there is no need for any safety precautions for birds and bats. Above all, the turbine enjoys a high degree of acceptance among local residents because of its low noise levels and integrated appearance. All these advantages come to bear in the choice of location: Agile Wind Power AG hopes to use its turbine to open up locations that are out of the question for other providers on account of logistics, size or ornithological issues.

From vision to reality with software

The path to proof of concept was long. With a team of twelve, Richter spent more than four and a half years working on the technology, building and testing prototypes, and optimizing construction in order to achieve optimum efficiency. The Autodesk® Product Design Suite played an important role from the very beginning. As an Autodesk Cleantech Partner, Agile Wind Power uses the software developer's premium quality design and construction solutions, which were provided to the start-up at a fraction of the actual cost. "We use Autodesk® Inventor® for the entire design process of our turbine – from basic design to detailed plans and production drawings for the manufacturers," explains Richter. "The software is very easy to use. Initial training is short and we can implement exactly what we envisage." Autodesk Inventor supported the Swiss start-up not only with construction. The solution was used for marketing purposes too, as Richter reports: "We used Inventor to produce all our image material, such as renderings. We use these for brochures and booklets and for presentations to investors. We're extremely happy with the results. The software is an enormous help to us in all areas for implementing our vision."

The right size for every location

Patrick Richter's team is currently constructing the first turbine with a medium power rating of 400 kW. This turbine is expected to go into production in spring 2015 and demonstrate that the Vertical Sky Concept is feasible not only on the computer screen or as a prototype. The approval process for a well connected, windy location is already underway. This turbine and one or two other pilots should iron out any teething problems and finally reach production stage in 2017. Richter's stated goal is to enter the market for multi-megawatt turbines. The planned standard product range should then consist of three basic types each with a diameter of 22, 45, and 67 meters and available as a weak, medium, or strong wind variant with a different rotor cell count. The choice of rotor cell count and easy installation of different generator sizes will mean perfect adaptation to the specific characteristics of a location and thus optimize the energy yield. "In the coming months and years we must use the experience from our smaller pilot turbine and optimize the technology if necessary. At the same time we're already working on a turbine for a power rating above two megawatts. Although there's still a lot to do, we hope to be able to implement a pilot for the larger series by 2018, thanks not least of all to the support of Autodesk Inventor."

For more information

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Vertical Sky for decentralized power supply.