

Still much to invent in wind power

Thorkil Munk-Hansen has to plan all life cycles of a wind turbine in advance.

Inventor Thorkil Munk-Hansen is a master when it comes to arranging the many components and systems of a wind turbine in such a way that the turbine will reliably operate for a period of 25 years and can be easily maintained.

The Chief Designer of Siemens Gamesa was honored in the Lifetime Achievements category.



Thorkil Munk-Hansen
Chief Designer Siemens
Gamesa in Vejle, Denmark





Thor kil Munk-Hansen

Inventor of the Year 2017

“We need renewable energy if we want to continue living on this planet. It’s that simple.”

Munk-Hansen is an enthusiastic yachtsman. When he sails his boat past buoys all by himself during regattas, he plays with the wind in the sails to get every possible bit of energy he can from it. “It’s much the same with a wind turbine,” he says. The unit also draws as much power from the wind as possible – throughout its entire lifetime. To do so, all components – from the rotors and generators to the gears, converters and cooling systems – have to work in concert with one another. But that is far from all: The turbine has to be assembled, transported, installed and maintained. All of these factors have to be taken into account when the nacelle is designed.

“When I view the nacelle with my inner eye, I primarily think about how you will be able to gain access to the individual components in the future,” the inventor says. If one of the motors, which turn the nacelle on the tower into the wind, has to be repaired, technicians do not have to remove other parts.

This is critically important for people who have to work in blustery conditions at a height of more than 100 meters.

For this reason, Munk-Hansen has to think ahead. “When we designed the first nacelle with direct-drive, a unit that was much larger than the one with gears, the height of Elbe River tunnel determined the diameter for us,” the inventor says. That was logical because the wind turbine would have to use this tunnel as it traveled to its ultimate destination. Under Munk-Hansen’s design, the nacelle would have just about fit in the 4.2-meter-high tunnel. But not the cooling system that was part of it. The response: “I developed a drop-down heat exchanger for the cooling system.” Ultimately, this solution was not used because the designers of the cooling system came up with an idea that did away with an outside heat exchanger. This was hardly a unique experience, the inventor says. “You might end up not using some things you come up with because the entire system design changes. But that is all a part of the job,” he adds.

The interior of the nacelle being used in the largest direct drive offshore wind turbine made by Siemens Gamesa is surprisingly roomy. The reason? Because the instruments, converters and sensors are sensitive, “we have to pack them really closely together around the tower,” he says. “The rest of the nacelle simply experiences too much vibration. And technicians are happy to have plenty of space for all of the equipment and replacement parts they bring with them.” Such requirements must also be considered by designers.

And more ideas are sure to follow. When it comes to renewable energy, the future has just begun for Munk-Hansen: “We need it if we want to continue living on this planet. It’s that simple.” As a result, he won’t be running out of work any time soon, that’s for sure.



Ever since he was a child, the wind has been his favorite toy. As a result, it is hardly surprising that the Dane based his career on it. After training as a carpenter, **Thorkil Munk-Hansen** (55) studied industrial design and established his own design agency. The passionate sailor then landed his dream job: head designer of a yacht maker. He loved the work, but his relationship with the owners of the company soured after a while. Having reached his mid-40s, Thorkil Munk-Hansen then made a fresh start and became the head designer at Wind Power (which is now called Siemens Gamesa). For nine years now, he has been responsible for the optimal design of direct drive wind turbines. During this period, he has registered 57 inventions that are protected by 116 patents in 41 patent families.

Because wind power is still a relatively new industry, there is still much to invent for wind turbines. “Unlike washing machines, whose design hardly differs from one manufacturer to another, the design of wind turbines differs greatly from company to company,” Munk-Hansen says. A generally accepted standard has not been worked out for wind turbines. Munk-Hansen considers this to be a major challenge. In his search for new and better solutions, he dives deep into the subject matter. “The obvious ideas are rarely the best ones,” he says. “You have to turn things over in your mind a thousand times and completely rethink things.”

When he makes his initial designs, he goes old school, using a pencil and a drawing pad: “Whenever I have an idea, I sketch it out first.”

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