Fact Sheet

B75 Rotor blade

- The B75 rotor blade, which measures 75 meters in length, is the world's largest fiberglass component cast in one piece.
- The latest turbine generation from Siemens has a capacity of six megawatts, and using the B75 blade it has a rotor diameter of 154 meters.

Manufacturing:

- The rotor blade is manufactured from glass fiber-reinforced epoxy resin and balsa wood using the patented integral blade process. It has no seams or glued joints and no adhesive, all of which saves weight.

Turbine rating, rotor area and energy yield:

- Increased turbine rating helps reduce the cost of energy from offshore wind.
- Compared with the Siemens 3.6-120 turbine, which is the current best-seller in the offshore wind market, the Siemens 6.0-154 turbine needs 40% less foundations. Since the foundation cost does not increase proportionally with turbine rating, this leads to significant infrastructure savings.

- The 154-meter rotor sweeps an area of 18,600 square meters – an area the equivalent of two and a half FIFA standard soccer pitches.
- The rotor swept area is essential for the annual energy yield of the turbine. One SWT-6.0-154 wind turbine can generate about 23 million kWh annually at a typical offshore site having 8.5 m/s mean wind speed. This energy yield is sufficient to supply about 5500 German households with electricity

Speed:

- The rotor of the Siemens 6 MW wind turbine is operated at variable speed, 5-10 revolutions per minute. At maximum rotational speed the blade tip moves at 80 meters per second, corresponding to 290 km/h.
- When the 154 meter rotor is operated at a wind speed of 10 meters per second, it captures the energy from 200 metric tons of air every second.

Weight:

- The Siemens B75 blade weighs about 25 tons– this is equivalent to the weight of four bull elephants.
- 25 tons may sound like a lot, but for a structure of this size the B75 is actually very low weight. A main reason for this is the unique, patented Siemens IntegralBlade® manufacturing method where the blade is cast in one piece, without glue joints adding extra weight. If the blade had been made with traditional methods of manufacture, the B75 Quantum rotor blade would have been 10 to 20 percent heavier.
- Carbon fibers are sometimes used in wind turbine blades, and it has often been said that once blades were to get larger than a certain length, carbon fibers would be necessary to keep the weight down. As it is, the Siemens B75 blade is actually lighter than the market average for carbon fiber blades, even though it is manufactures with glass fibers.
- Using carbon fibers, the blade could actually be 10-20% lighter still. However, this weight reduction would come at a price, and so far Siemens has concluded that the most cost-efficient blades are made with glass fibers.

Noise:

- The turbine has a sound power level of 110 decibels at a wind speed of 10 meters per second.

Quotes of Henrik Stiesdal, Chief Technology Officer of the Wind Power Division of Siemens Energy:

“We’ve developed a process in which we can eliminate the use of adhesives or overlapping materials. In our most recent development, the world’s longest rotor blade, we’re using fiberglass and the blade is still lighter than the market leader’s for carbon blades.”

“With carbon fiber the B75 rotor blade could be about another 10 to 20 percent lighter. But this weight reduction would come at a price. That’s why we opted for the cost-efficient rotor blade made of fiberglass.”

“It took a good amount of development work to come up with a process that allowed us to calculate the blade’s stability under all wind conditions, and to thereby optimize the rotor.”

“Twenty-five tons may sound like a lot, but for an object of this size, the B75 is a true lightweight. This is thanks to our patented IntegralBlade process. With this method the rotor blades are manufactured from a single casting.”

“When the 154 meter rotor is operated at a wind speed of 10 meters per second, it captures the energy from 200 metric tons of air every second.”