

Energy generation

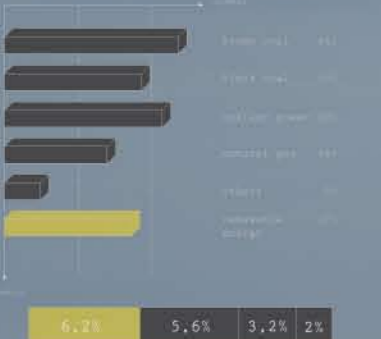
2008 40TWh
 2020 130TWh



18,000 wind power systems in 2008
 1,000 wind power systems in 2020

Power in the field that only allowed are allowed, generation through the use of renewable energies to save more and more important. Furthermore, wind power is one of the greatest energy sources. Wind will reach the top of the energy generation in the future.

Power generation in Germany

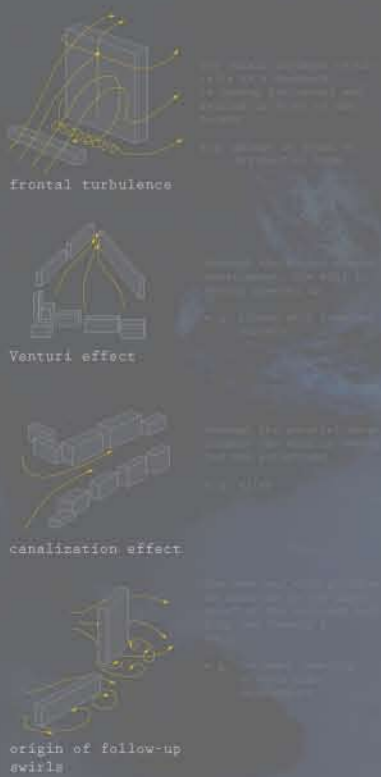


Germany just 2% of the total energy consumption is provided by the use of renewable energies.

Energy consumption



Wind performance



WICON

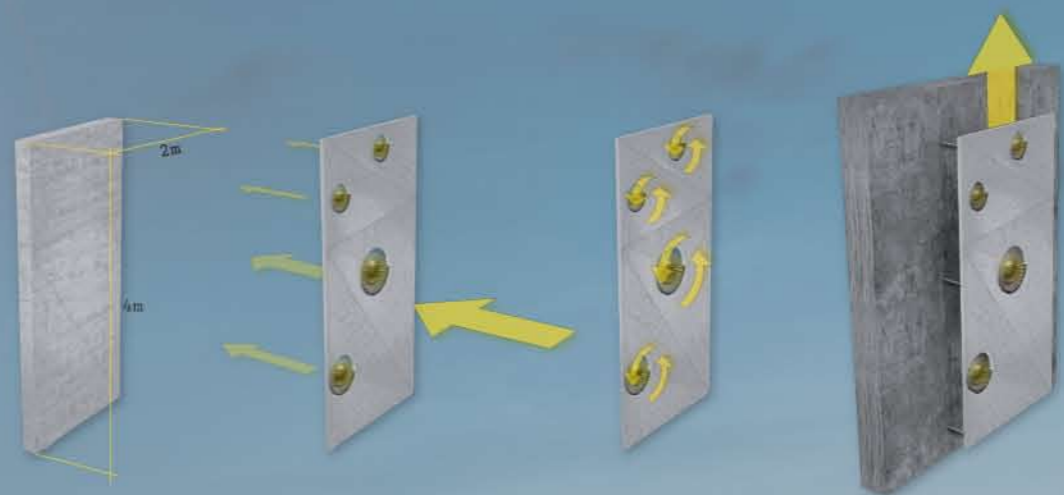
fassade system for the use of wind energy



schematic floorplan



Principle of the facade panel



The created modular facade system routes the squall over the sleek, funnel-shaped concrete surface unbroken into the four vanes. In consequence of the restriction the velocity of wind could increase two-fold. That is why, the quality of concrete, being shapeable, is strongly used by the matrixes, making the facade panels reproducible. In the vanes, small wind turbines transform the wind through nearly noiseless turning into electric energy. Also the generated wind behind the curtain wall is being vertically directed to the top and there, could emit. To guarantee the barrier-free rear behind the curtain wall, thin anchors are provided. However, more important is to keep the facade as light as possible. Therefore, the design includes the use of fibreglass-reinforced concrete (GFR), generating the slight weight and the thickness of the panels by 50 mm.

In general, the following aspects clarify the reasonableness of the concrete use:

- economic efficiency
- durability
- weather resistance
- plasticity
- reusability
- modular



practical wind experiment

As the result of the experimental tests in the wind channel, the following aspects became clear:

- duplication of the wind speed on the frontside of the vents
- most important factors: depth of the funnels & vents size
- proportional increase of the usable wind in relation to the impinging wind (diagram)



plaster model wind experiment



Potential

Quiet wind turbine
 On the one hand, establishing a calmer surrounding is a major fact through the design, but on the other, improving the acoustic situation is also an important point. Therefore „Eco Whisperers“ are included. Instead of the typical three rotorblades, they consist of 30 separate ones, which are connected at their bottoms. The „Eco Whisperer“ has got a new look and with it's use the noise production can also be tremendously reduced. Due to the special construction of the aluminum rotorblades, it is much more easy recognized by birds and bats. Besides, the use of the „Eco Whisperer“ promises a better efficiency of the electric energy production.

Use of the upwind

Another interesting opportunity to generate energy is the use of upwind. Through conical deformations of the whole curtain wall, horizontal wind turbines could be implemented at the highest point. The defussing wind increases its volume as it gets higher and therefore needs more space. Based on that consideration more energy can be produced through the air, which is compressed in the lower levels and emits through the turbines on top. This system could also be implemented in skyscrapers and also generate a natural ventilation.

Piezo effect

Also the „Piezo effect“ could increase capacity. It is based on certain crystals, whose crystal lattice gets a charge shifting by the impact of mechanical energy or pressure. These appear as surface charge and that is the reason why piezoelectric elements are able to produce electric energy from mechanical energy. The effect could be used in form of a textile with piezoelectric crystals on its surface. Every time a squall would hit the facade, electric energy could be produced by them.

matrix concrete model

