

Zero energy brighter future

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Taking sustainability to a new level, German architectural firm Gerber Architekten is planning to build the world's first tower with a zero carbon footprint in Bahrain. How will they do it? Our How-To handyman Benjamin Millington finds out.

The word "sustainability" has become a popular marketing tool in the construction industry of late with many developers adding various energy-saving elements to their projects to earn the green tag.

But as anyone with a background in green design will tell you, using low-wattage light bulbs or even slapping photovoltaic solar panels on the roof are only small steps towards being truly sustainable.

Hoping to set a new bench mark in this regard, Thomas Lucking, of architectural firm Gerber Architekten, said they have designed a tower which will be completely energy self-sufficient.

"We basically achieve this in two steps," he said.

"We first of all designed it to be a highly energy efficient building which requires 60% less energy compared to a regular building of the same size.

"Secondly, we cover the remaining 40% of energy with renewable sources such as sun and wind."

Gerber Architekten plans to build several of these Energy Towers around the world, the first of which will be in Bahrain and is being backed by developer Al Moayad Holding.

A plot of land has already been identified on which they will start a feasibility study next month. If all goes smoothly the tower could start construction in 2013 for completion in 2015.

Inspired by the traditional wind towers of the Middle East, the Energy Tower saves much of its power requirement through a natural ventilation system driven by the wind.

Lucking explains that when wind hits the tower it is naturally pushed to either side and accelerates which creates negative pressure or suction.

Where this occurs, sensor controlled louvers on the outside of the tower will automatically open and the suction will draw out exhaust air from inside the building's double-layered façade.

Thus, a ventilation cycle is created. Fresh cool air is pumped into the building, drawn towards exhaust vents on each floor, enters the double-layered façade and is then sucked out by the external louvers.

"By this method we can save a lot of power by not having continuously running mechanical fans for ventilation," said Lucking.

"We estimate that a regular building of that size would need a total of 30,000MW hours a year and about 9,000MW alone is for the ventilation.

"So we're saving a third of the entire building's consumption."

Cooling

Lucking said another third of a regular tower's energy consumption is used on cooling, namely running air conditioning systems.

Steering away from this energy intensive method, the supply air for the Energy Tower will be naturally pre-cooled through air channels buried in the sea before being further treated by air handling units.

Using chilled water, the units will cool the air down to 18 degrees before it is distributed to every floor through a central atrium and five perimeter atria that run the length of the tower.

Coupled with this, Lucking said they will also chill the ceiling slab by running chilled water through pipes in the ceiling. The cool ceiling will then absorb any radiation or heat generated from lighting, computers and people in the room.

The beauty of the system is that it's designed to be carbon neutral, said Lucking.

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