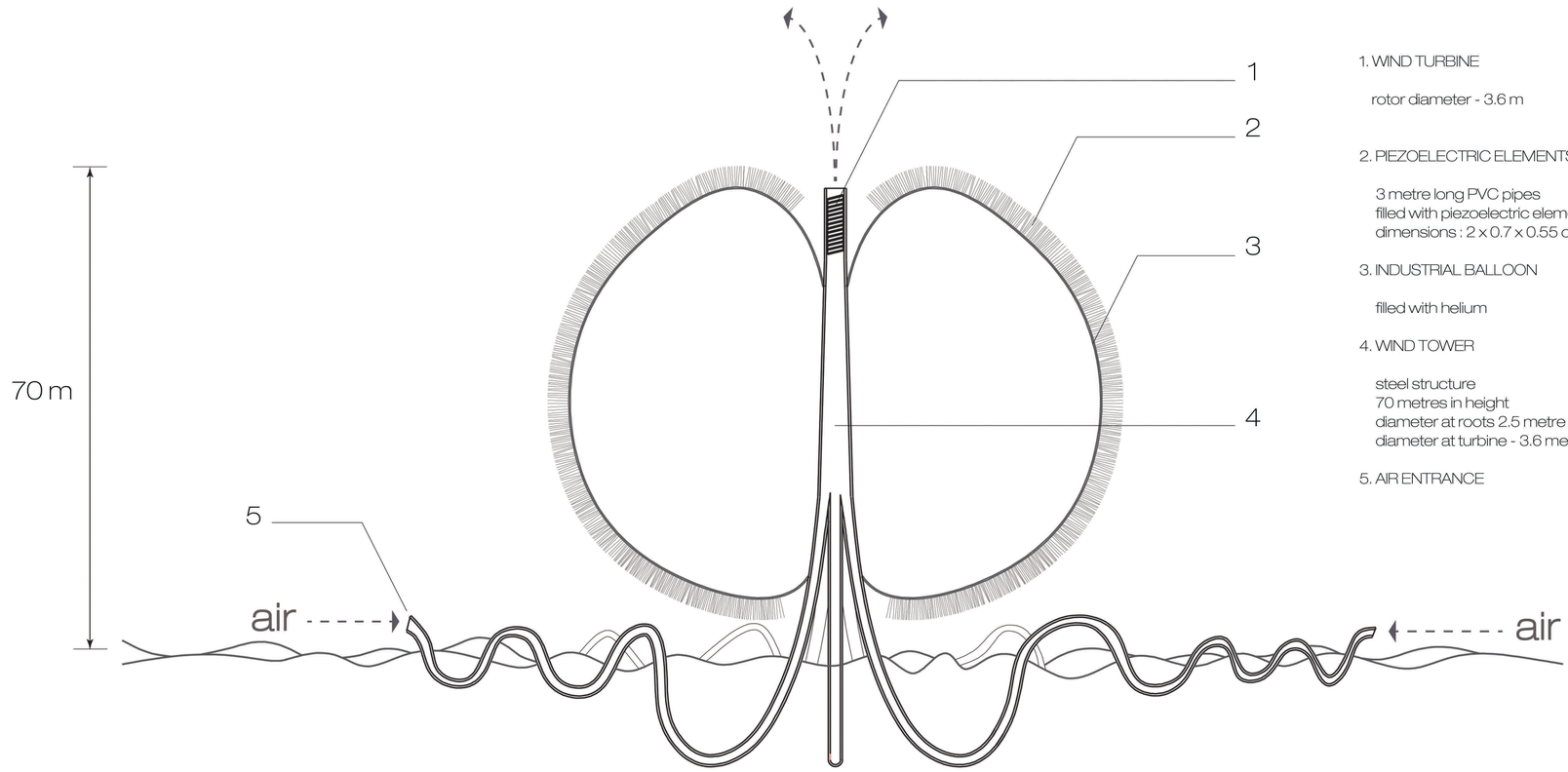
The design is a combination of a two technologies - wind turbine and piezoelectric elements.

Located at the top of the tower is a small scale wind turbine with a capacity of 2.5 KW. The movement of air is encouraged by the stack effect, a difference in air pressure between ground level and 70 m. The air flows from the roots of the steel structure to the crown where the electricity generating turbine is located. Additionally, the steel structure holds two huge industrial balloons. The surface of these is covered with PVC pipes filled with millions piezoelectric components. The movement of air and mechanical stress from the balloon movements will stimulate the piezoelectric elements to produce power. The power produced by these elements will also be used for lighting the structure.

The combined energy production will be 468.8 MWh per annum, enough to power 102 households.

The main aim of the design is to be a visually attractive, energy producing environmentally friendly piece of art. The structure combines two methods of energy production making it a unique design. The first way of producing energy will be through a wind turbine. Wind turbines are in general considered to be one of the most environmentally friendly sources of energy. This is due to the lack of GHG emissions during the conversion of mechanical wind power into electricity. However, the main three environmental issues regarding wind turbines are noise, visual impact and the threat to ecological systems (for ex. The effect on birds and bats). The proposed design deals with these three problems. The installation of the turbine inside the tower will eliminate a huge amount of noise, also it will be hidden so there will be no visual impact and finally it will not affect living creatures.
Moreover, piezoelectric are also very environmentally friendly devices with little impact on the environment. They have the ability to withstand bad weather conditions operating at a range of temperature from 0-70 degrees C and in a humidity of 90%.
It is expected that the whole system will contribute to a total Co2 mitigation of around 4.28 tCo2/year (Wind tower: 1.4 tCo2/year and Piezo: 2.88 tCo2/year), which with time will mitigate the Co2 emitted in the stage of construction.



1. WIND TURBINE

rotor diameter - 3.6 m

2. PIEZOELECTRIC ELEMENTS

3 metre long PVC pipes
filled with piezoelectric elements
dimensions : 2 x 0.7 x 0.55 cm

3. INDUSTRIAL BALLOON

filled with helium

4. WIND TOWER

steel structure
70 metres in height
diameter at roots 2.5 metre
diameter at turbine - 3.6 meteres

5. AIR ENTRANCE