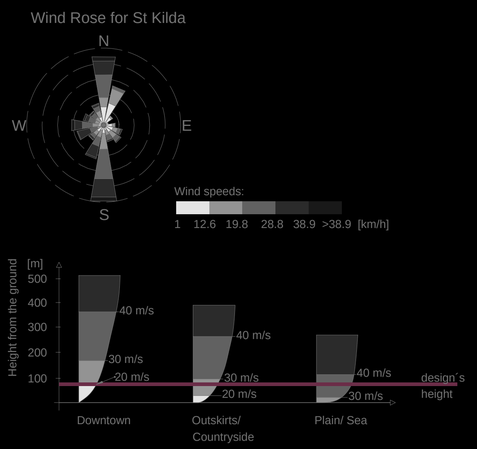
DOWNDRAUGHT EFFECT

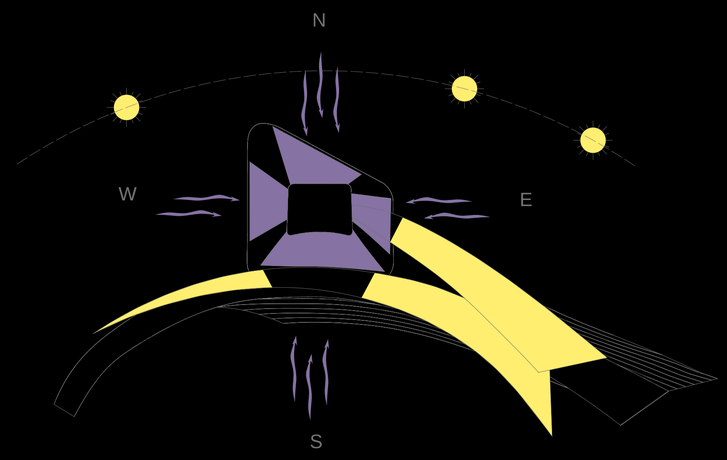
High rise developments are an inevitable part of an urban areas' cityscape. They shape the heart of the city and are often landmarks. However, very often they cause strong, accelerated winds in their proximity and at street level. As cities are building higher buildings, they are becoming increasingly more concerned with this problem as high-rise structures are exposed to higher altitude winds with higher velocity. This phenomenon, which occurs primarily at the base of skyscrapers, is called the downdraught effect and it may be so strong to cause people to fall over and even knock signs off of the buildings. In the downdraught effect the wind hits the building and depending on the shape of the building, is either pushed up, down, or towards the sides.
The effect can be much stronger if the buildings' orientation and elevation faces oncoming winds.

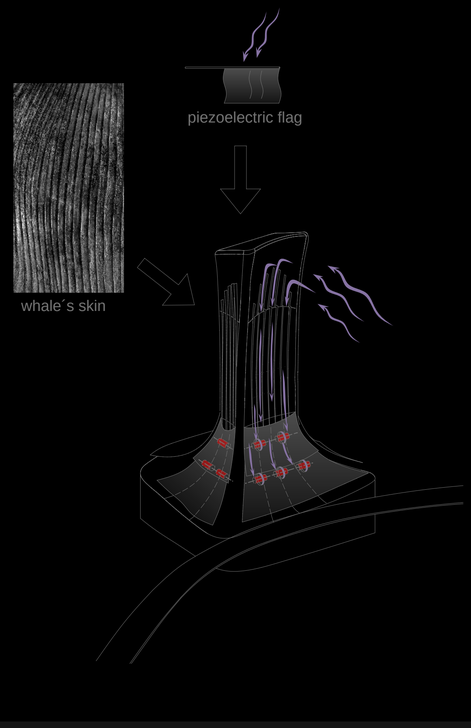
TOWER AND THE ENERGY PRODUCTION

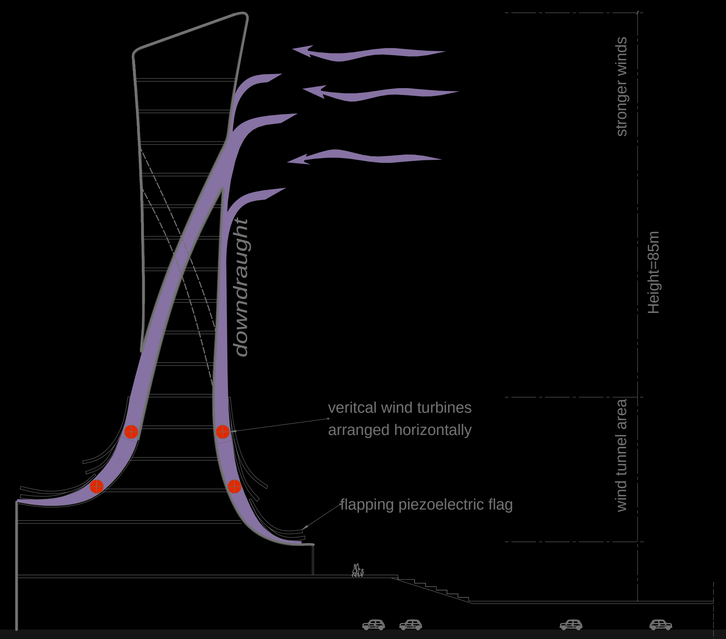
In the environment, wind velocity increases exponentially with height. The tower's design takes advantage of this phenomenon and through its form harnesses stronger winds from higher altitudes and drags them towards the bottom to harvest energy.
The tower is an 85m-high, slender structure, with an orientation set according to the wind rose for St Kilda. The majority of winds in St Kilda come from the north and south, respectively- the northern and southern elevations are wider. The wide elevations face the prevailing winds.

PV modules above the promenade harvest sun energy and protect pedestrians from the sun.









Example of wind profiles showing the relationship between height and wind velocity in different environments

Principle plan:
Orientation of the tower and renewable energies used in the project

Principle sketch:
-Bottom of the tower with energy harvesting machines
-Elevation with structure similar to whale´s skin for more condensed air flow

Principle section:
Wind flows entering the tower are caught by piezoelectric flags and vertical wind turbines