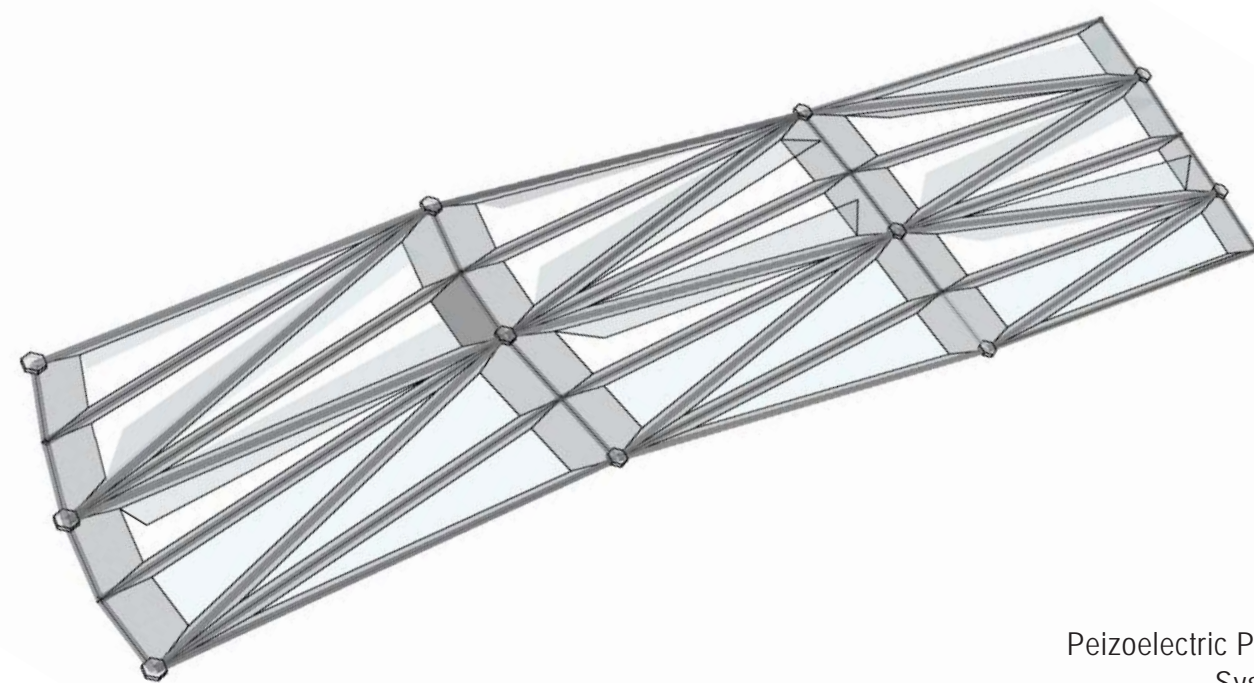
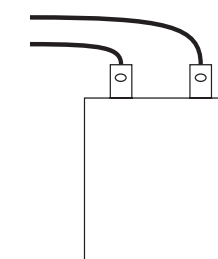
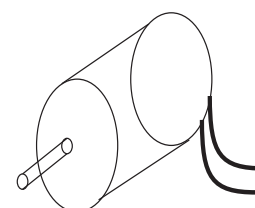
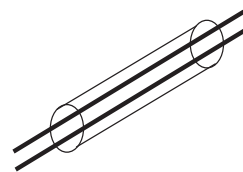


Joint Detail



Piezoelectric Panel System



Energy Conversion Process

**AIRnergy**  
Copenhagen Land Art Generator Initiative 2014

#### TECHNOLOGY

A windy day causes leaves to flutter and road signs to shake. It is these vibrations that resulted in the proposal of a piezoelectric wind energy generating system (inspired by Vibro-Wind Systems). The four structures strategically positioned across the site comprises of a triangulated panel series, each of which houses a kinetic flap/membrane that bends and flutters in response to the prevailing wind. The collection of small vibrating plates are designed to capture wind and generate energy but also to bring an aesthetic element to the site through the wave-like effects created by the moving flaps. These fluctuations not only reveal the shifts in wind movement but also provide a visual map of the panels' collection of wind energy.

The basic science behind each of these movable flaps involves wind-induced vibration due to the non-linear fluid flow and vortices around a flexible structure. The energy harvest device comprises, in one embodiment (each the triangular panel), an oscillating flap, a piezoelectric bender (transducer) and an energy convertor that converts the vibration of the oscillating element into direct current.

The piezoelectric sheet benders are attached to the panel and are connected via a hinge that allows for rotation along the vertical axis. In wind conditions, the rotation of the flap about the bearing joint creates a modal flutter response and hence a vibration that is picked up by the piezoelectric benders connected to an energy convertor (full rectifier bridge) concealed within the joints between each triangular panel. The energy collected from the panels throughout the day is stored in a generator and capacitor, during the night, the energy stored will be able to power the organic LED light panels attached to the joints between the triangle panels. The lights emitted from the panels provide a visual reminder even to viewers at a distance of the real-time energy production on site.