**CONEXUS**

You arrive in sunny Melbourne for the vacation you desperately needed. The weather is gorgeous, and you’ve decided you want to see the sights, so you ask the locals what the attractions are. Of course, they reply Federation Square and the Royal Botanic gardens, but the other name that catches your attention: Conexus. The name seems compelling, so you take the trip.

As you get closer to the area, you can already tell it’s something special. You get dropped off on the Esplanade next to the Palais Theatre. To the North, is St. Kilda, Vibrant and rich with history; on the left, where there used to be a massive grey parking lot, are now colorful ribbons illuminating both sky and ground plane. As you start to follow the glow of the ribbons, it’s impossible not to notice the hexagonal paving pattern appearing as you step or the rolling ribbon that leads you across the pedestrian bridge. You come to find out that the features within this site are serving a dual purpose; beauty and energy. The ribbons not only brighten up the pathway, but they are absorbing the sun’s rays and creating usable energy. The hexagonal pavers you walk on are calculating each step you take to generate valuable energy and lastly, the railings on the bridge harvest wind energy through electrostatic flutter. The whole site is powering itself in artistic fashion.

**Site Plan**

Conexus is a colorful mosaic ribbon that connects the beach, the St. Kilda triangle, and the community. It's varying heights and widths through the entire site allow for fun and exciting ground plane patterns and acts as an undulating, artistic, art installation. The kinetic pavers mimic the artful archetype Conexus established. The pavers are concentrated in areas of high pedestrian traffic to capture the kinetic energy produced. Wind belts are placed along the bridge to capture the wind that flows between Jacka Boulevard and the beach.

**Energy Production**

Instead of using rectangular solar panels and standard triangular wind turbines, the Industria team felt it was pivotal to use technologies that offer unique forms and take on energy production to design a beautiful yet functional site. The design utilizes the combined efforts of three easy-to-install forms of energy production:

**Photovoltaic Thin-Film[[1]](#footnote-1):** Thin-Film technology, first started in the 1970s, has successfully taken over past solar cell technology because of its decrease in environmental impacts. With the right substrate and mounting, this technology can be applied to most rigid surfaces.

Materiality: Recycled Aluminum, Glass, Recycled Plastics
Total Surface Area: 2,100m2
Energy Output per m2: .93 kWh / day
Yearly production: 710,000 kWh / year

**Wind Belts[[2]](#footnote-2):** Designed and manufactured by Humdinger, wind belts line the perimeter of the elevated bridge across Jacka Boulevard. They are spaced .3m on center, have a consistent 1.2m in length, and are oriented to capture the greatest wind amounts. The flutter of the belts oscillates magnets through an electromagnetic field which, in turn, produces energy.

Materiality: Polymer, Composite, Recycled Aluminum
Total Units: 700
Energy Output per unit: 0.2 kWh / day
Yearly Production: 51,000 kWh / year

**Pavegen V3 Kinetic Pavers[[3]](#footnote-3):** Produced by a company of the same name. Generates power from footsteps and allows for foot traffic data gathering.

Materiality: Steel, Recycled Aluminum, Composite
Total Units: 2,316
Energy Output per unit: .12 kWh / days
Yearly Production: 102,000 kWh / year

**Environmental Impact Statement**

By introducing energy production and enhancing what once was a large heat island from an empty parking lot, Conexus has an instant and convincing positive environmental impact on St. Kilda. While recycled aluminum suspends the winding ribbon, the embodied energy of the material and construction development greatly reduces the carbon footprint.

Conexus responds to the state of Victoria’s goal of zero carbon emissions by 2050 by exceeding the REAP’s goal of 100 MWh state wide. Although the photovoltaic thin film forms only a section of Conexus’ energy collection, the ribbon structure avoids a high carbon footprint because of the decreased cost, lighter weight and flexibility. Compared to household crystalline solar panel cells that are 0.15-0.2 mm thick, the PV film can be as thin as 0.001 mm which gives it a lighter weight. Also, opposed to crystalline panels installed on rooftops with a strong mounting system, the PV film can be rolled out and attached to a rooftop or wall of a building allowing for flexibility. The result is not only clean, renewable power, but energy producing art.

1. A Field Guide to Renewable Energy Technologies | Thin Film Polymer Solar Cell | Lagi.org. Accessed April 3, 2016 [↑](#footnote-ref-1)
2. Windbelt - Reinventing Wind Power | Latest Features | Physics.org." Windbelt - Reinventing Wind Power | Latest Features | Physics.org. Accessed May 15, 2016. [↑](#footnote-ref-2)
3. The Pavegen V3 | Products | Pavegen.com. Accessed March 29, 2018. [↑](#footnote-ref-3)