**Hand in Hand**

*Hand in Hand* provides a physical connection between city and nature. This installation invites visitors to experience both of St. Kilda's natural and urban landscapes. The pedestrian bridge connects city and nature, the outstretched fingers symbolize the unity between these two sides and inspires viewers to recognize the natural origins behind St. Kilda's commercial cultural center. *Hand in Hand* was envisioned as the connection between the region’s natural and commercial venues and seeks to command to the public’s attention the importance and beauty of implementing renewable energy into daily use.

The pedestrian bridge connects the primary and secondary boundaries by intersecting Jacka Boulevard. Visitors can easily access the facilities and parking garage on St. Kilda Triangle and the walk through the Catani arch and gardens to reach the nearby shoreline.

The base of the structure is wrapped in hybrid photovoltaic-piezoelectric solar panels and dye-sensitized holographic solar film starts midway on the hand and extends to the fingertips allowing sunlight to pass through on to pedestrians below. The mixture of solar film materials is evocative of patchwork artistry, creating a playful and unique atmosphere for visitors while maintaining views of St Kilda Beach and the Port Phillip Bay horizon.

The holographic thin film solar is ideal to this location as it produces a significant amount of energy during cloudy or rainy conditions. The photovoltaic material is arranged in rows where a layer of holograms separate the visible and infrared wavelengths of sunlight, which are then directed to the corresponding solar energy generator, either photovoltaic or solar thermal. Separation of wavelengths result in heat reduction which extends the longevity of these solar panels. This technology uses far less crystalline silicon than a typical solar panel and is therefore more cost efficient. By employing both photovoltaic and solar thermal energy generation, these panels produce more energy with the same sunlight exposure. Combining these two systems into one also reduces size and maintenance costs.

The base of the bridge is coated in a hexagonal photovoltaic laminated glass that is curved to the shape of two hands reaching out towards each other. The bridge beams and support members were sourced from recycled steel and the hexagonal solar panels and holographic thin film are employed in a manner that is both functional and pleasing to the public eye. The hexagon panels consist of a piezoelectric and a photovoltaic layer which maximizes energy production on both sunny and rainy days. The calculations consider the average per-month solar radiation in Port Phillips, typical sources of system loss including temperature, shading, reflection, irradiance, and mismatch loss, and panel efficiency. Efficiency of the hexagon panels is assumed at 28% and the thin film holographic panels at 18%.

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| --- | --- | --- | --- |
|  | **Hexagon Panels** | **Thin Film** | **System Total** |
| **Square meters** | 3800 | 3500 | 7300 |
| **Total Annual kWh** | 2,836,802 | 1,667,773 | 4,504,576 |

**Environmental Impact Summary:**

The project was designed with the goals set forth in St. Kilda’s Renewable Energy Action plan. *Hand in Hand* generates 4,500,000 kWh of energy per year which is equivalent to 86,400 trees grown for ten years and 8.1 million miles driven by car. These environmental benefits go hand in hand with St. Kilda’s efforts to have 20% of their energy needs produced from renewable sources by 2020. The majority of the energy feeds back into the local grid line while a portion is routed to rechargeable batteries to power night lighting in the immediate vicinity.

*Hand in Hand* connects the primary and secondary boundaries by intersecting Jacka Boulevard. The project footprint is unintrusive to the planned developments surrounding it and complements the existing Catani Gardens and preserves walkways at the site. The materials for this project were selected with sustainability in mind. By connecting the two sites through an easily accessible bridge, *Hand in Hand* will reduce the amount of pedestrian and vehicular traffic along the roadways and support efficient public transport between the two areas. With the planned developments of St. Kilda in the upcoming years, this project aims to lead the region’s transition to a modern energy system by implementing sustainable practices in a major way.