Campus Power Plan: Parking Lot Solar Panels

Standard asphalt parking lots absorb about 90% of incoming solar radiation, re-emitting into the atmosphere as heat, making a small contribution to global warming. Placing solar panels over parking spaces reduces the surface area of asphalt exposed to the sun while generating clean electricity. Parking lot solar power generation (AKA Carport Solar) is an established technology that has been successfully installed at multiple Long Island locations, including a number of train stations and government buildings in Suffolk County.

We believe that installing carport solar at LIU’s C.W. Post campus can significantly reduce the university’s greenhouse gas emissions and generate more than enough power to pay for installation and maintenance in a reasonable time frame. Carport solar turns wasted space into a profitable asset with minimal effects on commuter experience and campus aesthetics.

We have created several models for Carport Solar at LIU; here we present one example. We chose 5 lots (Left) at the rear of the campus to minimize aesthetic concerns.

We calculated the number of panels that could be installed in each lot, the resulting power generation (in kWh per Year) and the dollar value of that electricity based on LIPA’s 18 cents per kWh (Right).

In our model, installing the maximum number of carport solar units in the five proposed locations gives a total capacity of 3,660 kW, expected to produce a total yield of about 4,500,000 kWh per year, or about $820,000 worth of electricity per year. For this simplified model we estimate an installation cost of $4,250,000.

By paying down the principal with 100% of the value of money saved by producing solar energy (rather than buying off the grid), a loan for the full cost of the project (annual payments at 6% interest) could be paid off in less than 7 years. Even if the yield is less than expected, the loan is paid well before the expected lifespan of the solar panels, producing an estimated net value of $7,350,000 to $14,250,000; at least double the capital investment before considering side benefits.

GOAL: 50% Reduction in Greenhouse Gas Emissions by 2035

The table below shows the amount of GHGs emitted under each Scope, measured in metric tons of carbon dioxide equivalent (MtCO2e).

<table>
<thead>
<tr>
<th>Scope</th>
<th>Fiscal Year</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scope 1 - Stationary Combustion</td>
<td>4,366</td>
<td></td>
</tr>
<tr>
<td>Scope 1 - Mobile Combustion</td>
<td>383</td>
<td></td>
</tr>
<tr>
<td>Scope 2 - Purchased Electricity</td>
<td>9,417</td>
<td></td>
</tr>
<tr>
<td>Scope 3 - Commuting</td>
<td>6,676</td>
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<tr>
<td>Scope 3 - Solid Waste</td>
<td>164</td>
<td></td>
</tr>
<tr>
<td>Net Emissions</td>
<td>21,008</td>
<td></td>
</tr>
</tbody>
</table>

The above chart shows how much each category will contribute to reaching our goal of 50% emissions reduction by 2035. Emissions in 2015 totaled 21,008 MtCO2e. Reaching our goal requires bringing that total down to 10,504 MtCO2e.

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