CHS Field Solar Arrays

RDF Advisory Group Presentation July 11, 2017

EP4-34 RDF Grant Contract

Partial project Funding by customers of Xcel Energy through a grant from the Renewable Development Fund
Project Scope

- CHS Field: The “Greenest Ballpark in America”

- 103.5 kW$_{DC}$ Total Photovoltaic Capacity Solar Installation

- 2 Solar Arrays on site (Highlighted Yellow)
  1. Pavilion Array
  2. NE Structured Array
Project Goals

- Energy Production
- Ratepayer Benefit
- Education
- Environmental
Construction

Construction of the Shade Pavilion Array

- **153** SunPower X-Series X21-327-Com 327W Modules
- Oriented at 5°
- 58.3 kW_{DC} PV Capacity
Construction

Construction of the Structured Array

- **144** SunPower X-Series X21-327-Com 327W Modules
- Oriented at 20°
- 44.16 kW$_{\text{DC}}$ PV Capacity

Array Section
Results

• Approximately **12%** of ballpark’s energy use generated from solar arrays
• B3 Compliance
• Highly visible to over 400,000 ballpark visitors per year
• Web-based data available to anyone from anywhere
• Two interactive kiosks on site with production data
• Graphic signage diagrams

Completed pavilion and structured array, interactive kiosk in foreground
Project Benefits

CHS Field (Lowertown Ballpark) Solar Power Production: Year 1

<table>
<thead>
<tr>
<th>Month</th>
<th>Projected Production kWh</th>
<th>Actual Production kWh</th>
<th>Variation kWh</th>
</tr>
</thead>
<tbody>
<tr>
<td>June, 2016</td>
<td>16,307</td>
<td>15,203</td>
<td>(1,104)</td>
</tr>
<tr>
<td>July, 2016</td>
<td>15,769</td>
<td>18,130</td>
<td>2,361</td>
</tr>
<tr>
<td>August, 2016</td>
<td>14,127</td>
<td>13,955</td>
<td>(172)</td>
</tr>
<tr>
<td>September, 2016</td>
<td>10,610</td>
<td>11,491</td>
<td>881</td>
</tr>
<tr>
<td>October, 2016</td>
<td>8,640</td>
<td>8,756</td>
<td>116</td>
</tr>
<tr>
<td>November, 2016</td>
<td>5,980</td>
<td>5,826</td>
<td>(154)</td>
</tr>
<tr>
<td>December, 2016</td>
<td>4,760</td>
<td>1,489</td>
<td>(3,271)</td>
</tr>
<tr>
<td>January, 2017</td>
<td>5,720</td>
<td>2,880</td>
<td>(2,840)</td>
</tr>
<tr>
<td>February, 2017</td>
<td>7,270</td>
<td>7,290</td>
<td>20</td>
</tr>
<tr>
<td>March, 2017</td>
<td>10,410</td>
<td>9,790</td>
<td>(620)</td>
</tr>
<tr>
<td>April, 2017</td>
<td>11,700</td>
<td>10,760</td>
<td>(940)</td>
</tr>
<tr>
<td>May, 2017</td>
<td>15,203</td>
<td>12,999</td>
<td>(2,974)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>126,496</strong></td>
<td><strong>118,569</strong></td>
<td><strong>(7,927)</strong></td>
</tr>
</tbody>
</table>

Energy Production & Ratepayer Benefit

- Since the arrays first became operational in May of 2016 the energy has been used on site.
- The total power produced in the first year was 118,569 kWh
- Provides a hedge against increasing electrical cost and reduces demand and stress on the Xcel Energy grid.
- Through an Interconnection Agreement with Xcel Energy, self-generates power for the ballpark
Project Benefits

Education

The solar project is integrated into the ballpark design and as a showcase to the City and Team’s commitment to sustainability interacting with over 400,000 visitors annually.
Project Benefits

Education

Digital Interaction: Information about the power generated and the environmental benefits are available to the public with internet access.

http://sustainability.chsfield.com/
Project Benefits

Education

Visitors to the site can view the online monitoring data by year, month, or day, visually depicting how daily weather and seasonal changes impact the power production of the solar arrays.

February 7, 2017: Cloudy; late sunrise, early sunset

April 6, 2017: Clear Skies, days getting longer

May 15, 2017: Midafternoon Thunderstorms; Early Sunrise, late sunset
Project Benefits

Environmental

Reduction of the City of Saint Paul’s greenhouse gas emissions

First year Reductions*
Carbon Dioxide, CO₂ – 118,806 lbs
Nitrogen Oxides, NOₓ – 130.5 lbs
Sulfur Dioxide, SO₂ – 154.2 lbs

*Emissions rates used from the 2015 Xcel Energy Corporate Responsibility Report, Upper Midwest Area
Questions?

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