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

SAINT PAUL

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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

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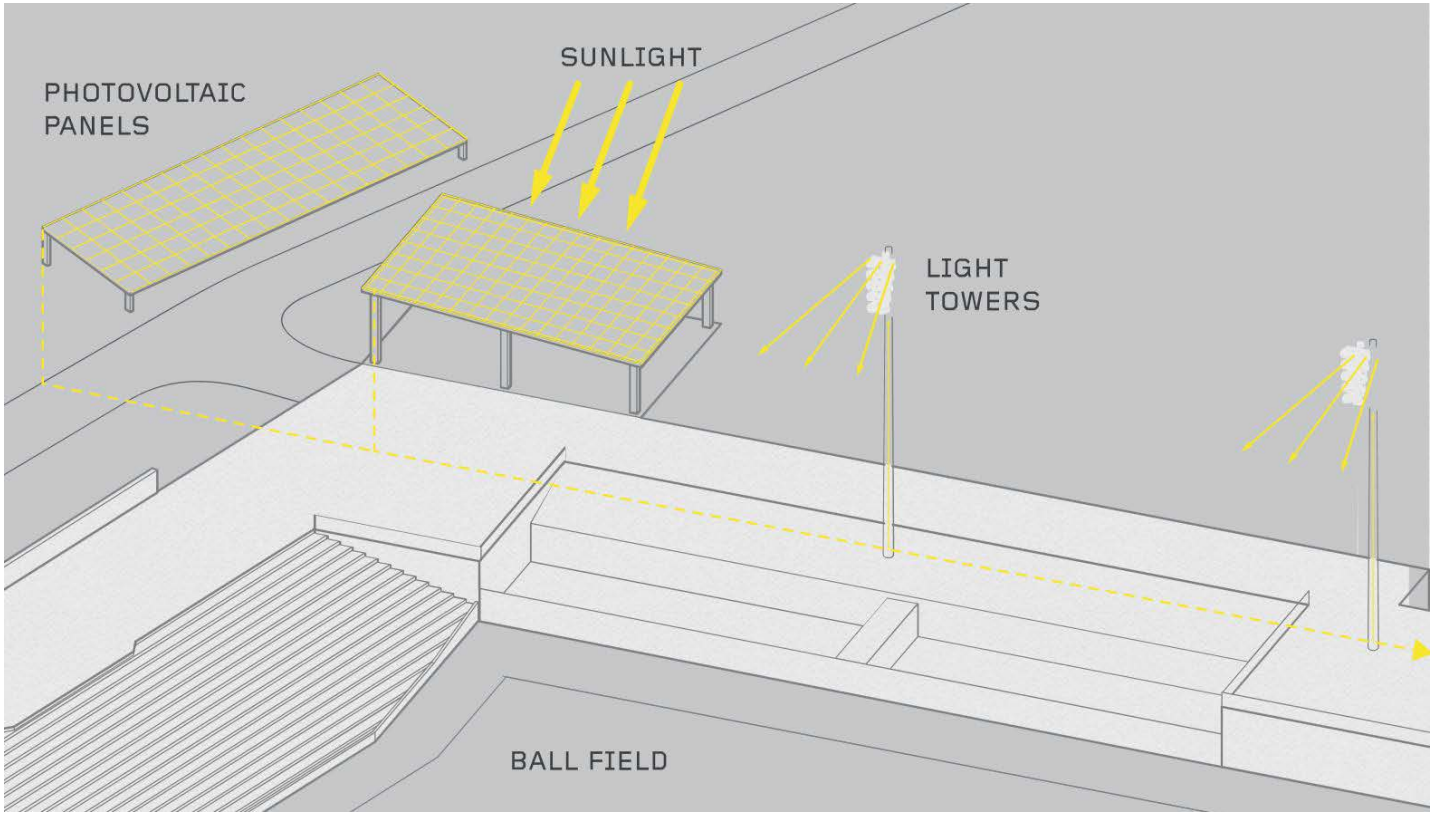
Project Goals

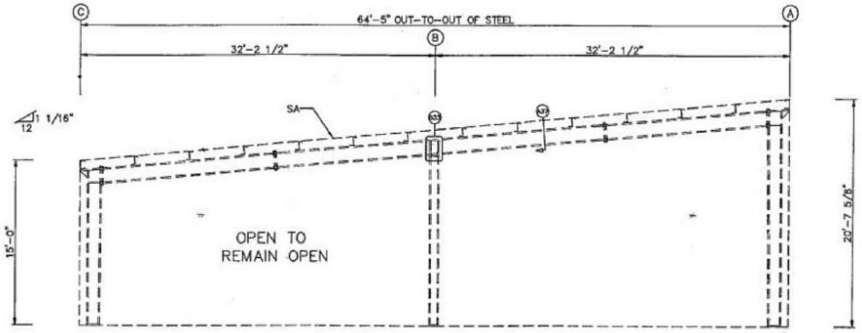


- Energy Production
- Ratepayer Benefit
- Education
- Environmental

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

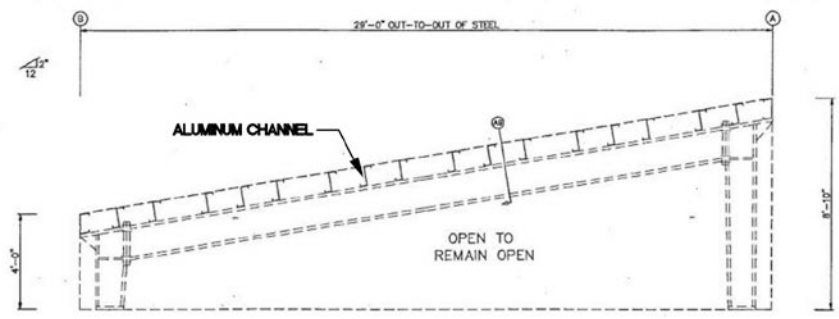


Pavilion Array Section

Construction

Construction of the Structured Array

- **144** SunPower X-Series X21-327-Com 327W Modules
- Oriented at 20°
- 44.16 kW_{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

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

Energy Production & Ratepayer Benefit

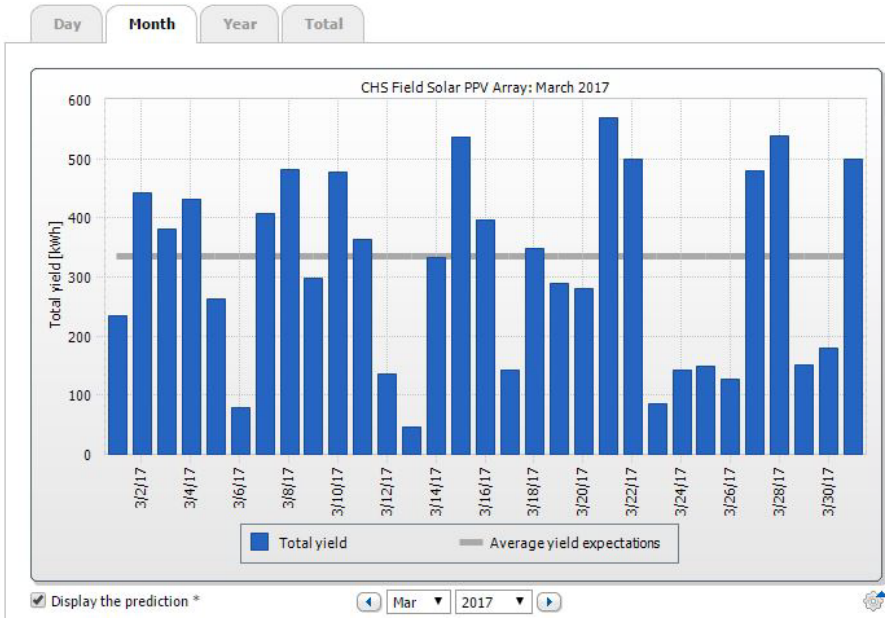
- Since the arrays first became operational in May of 2016 the energy has been used on site.
- The total power produced in the first year was 118,569 kWh
- Provides a hedge against increasing electrical cost and reduces demand and stress on the Xcel Energy grid.
- Through an Interconnection Agreement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

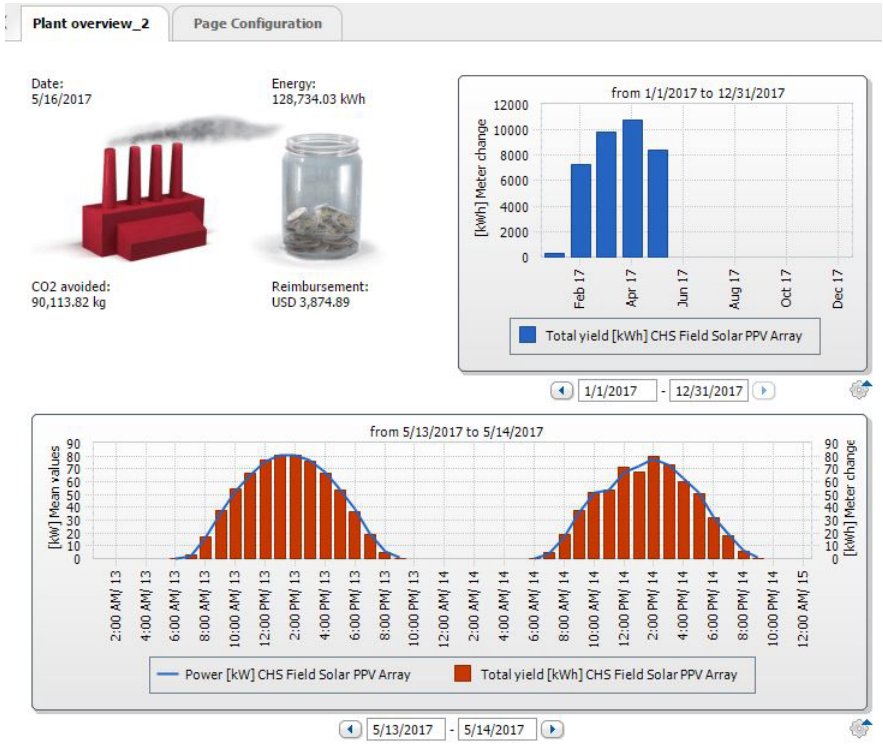
Project Benefits

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/





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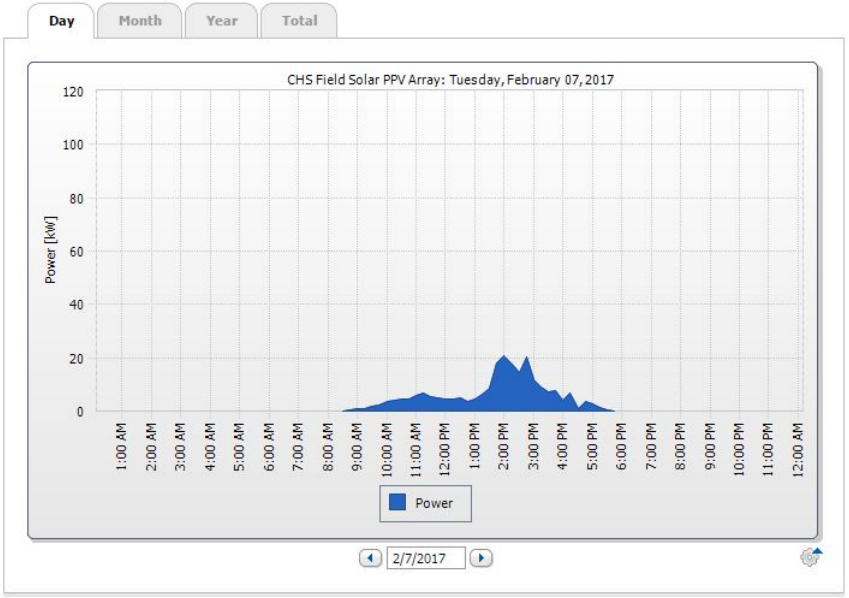
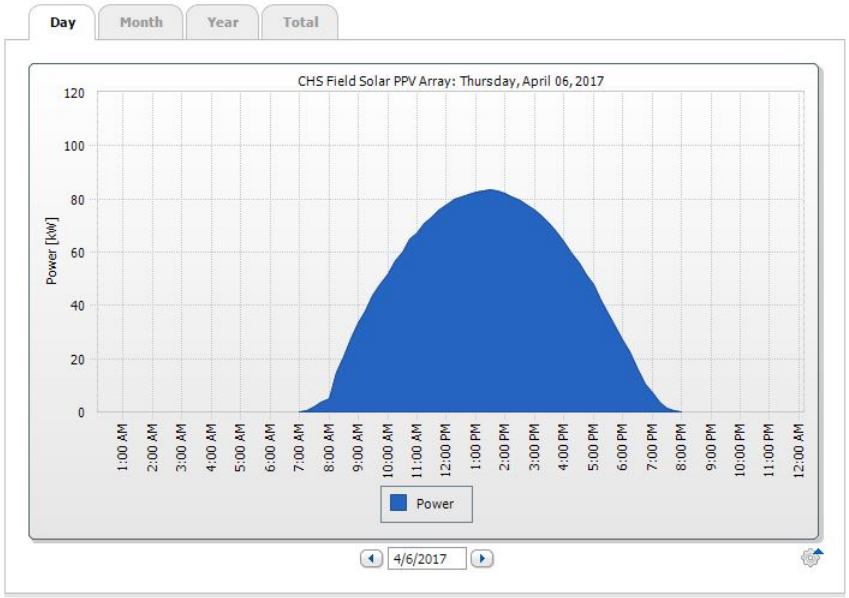
Project Benefits

Education

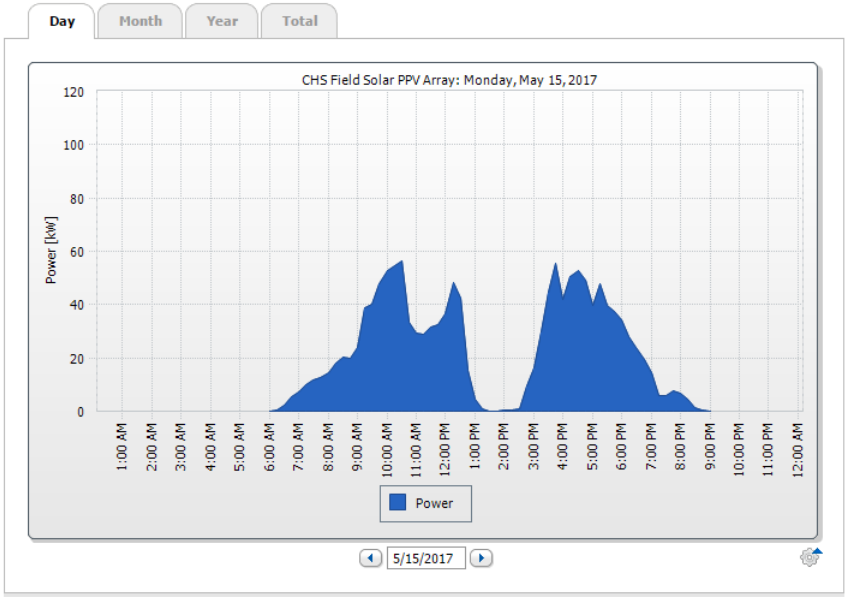
Visitors to the site can view the online monitoring data by year, month, or day, visually depicting how daily weather and seasonal changes impact the power production of the solar arrays.



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, CO_2 – 118,806 lbs

Nitrogen Oxides, NO_x – 130.5 lbs

Sulfur Dioxide, SO_2 – 154.2 lbs

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

Questions?

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