

The background of the slide features a close-up, slightly blurred view of solar panels. A prominent yellow triangular sign with the words 'AT WORK' in black, bold, capital letters is overlaid on the panels. The sign is tilted and appears to be part of a construction or maintenance site. The overall scene is brightly lit, suggesting a sunny day.

Solar Powering Iowa

**Local Jurisdictions Going Solar
with Leases and PPAs
(Emerging Opportunities)**

**Jim Martin-Schramm
Luther College**

Overview

- Luther's Greenhouse Gas Reduction Goals
 - Motivations
 - Commitments
 - Accomplishments
- Luther's Solar Projects
 - 280 kW Leased Array
 - 820 kW Third Party Power Purchase Agreement

Motivations

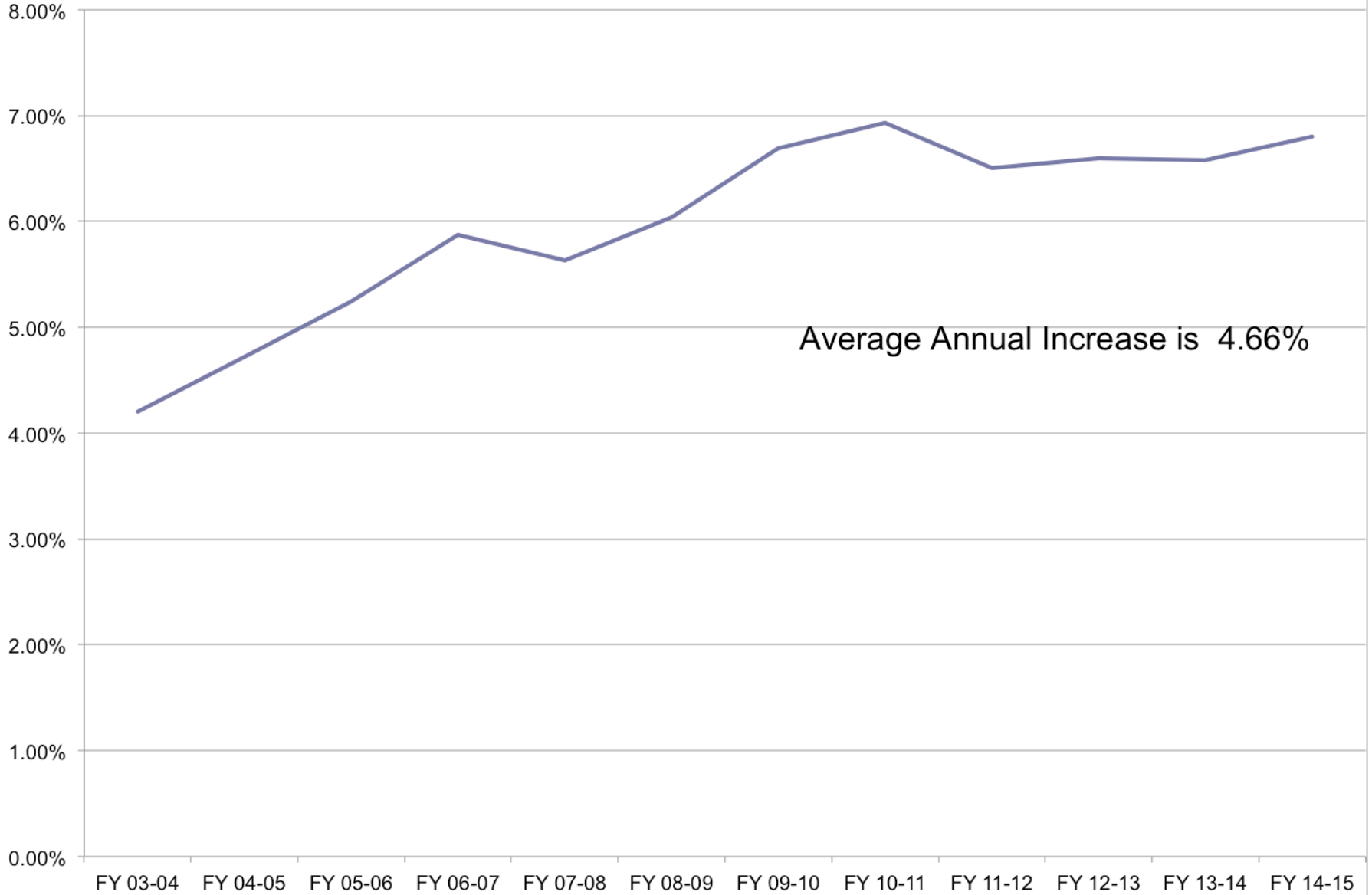
- Economic cost containment
- Environmental stewardship



Transformed by the Journey

LUTHER COLLEGE

kWh Costs Including Demand



Motivation: Environmental Stewardship



SIGNATORY OF

AMERICAN COLLEGE & UNIVERSITY

PRESIDENTS' CLIMATE COMMITMENT

- Luther College became a charter signatory in January 2007.
- Two long-term goals:
 - Make sustainability a part of every student's learning experience
 - Achieve carbon neutrality
- Interim goal: Reduce Luther's greenhouse gas emissions 50%

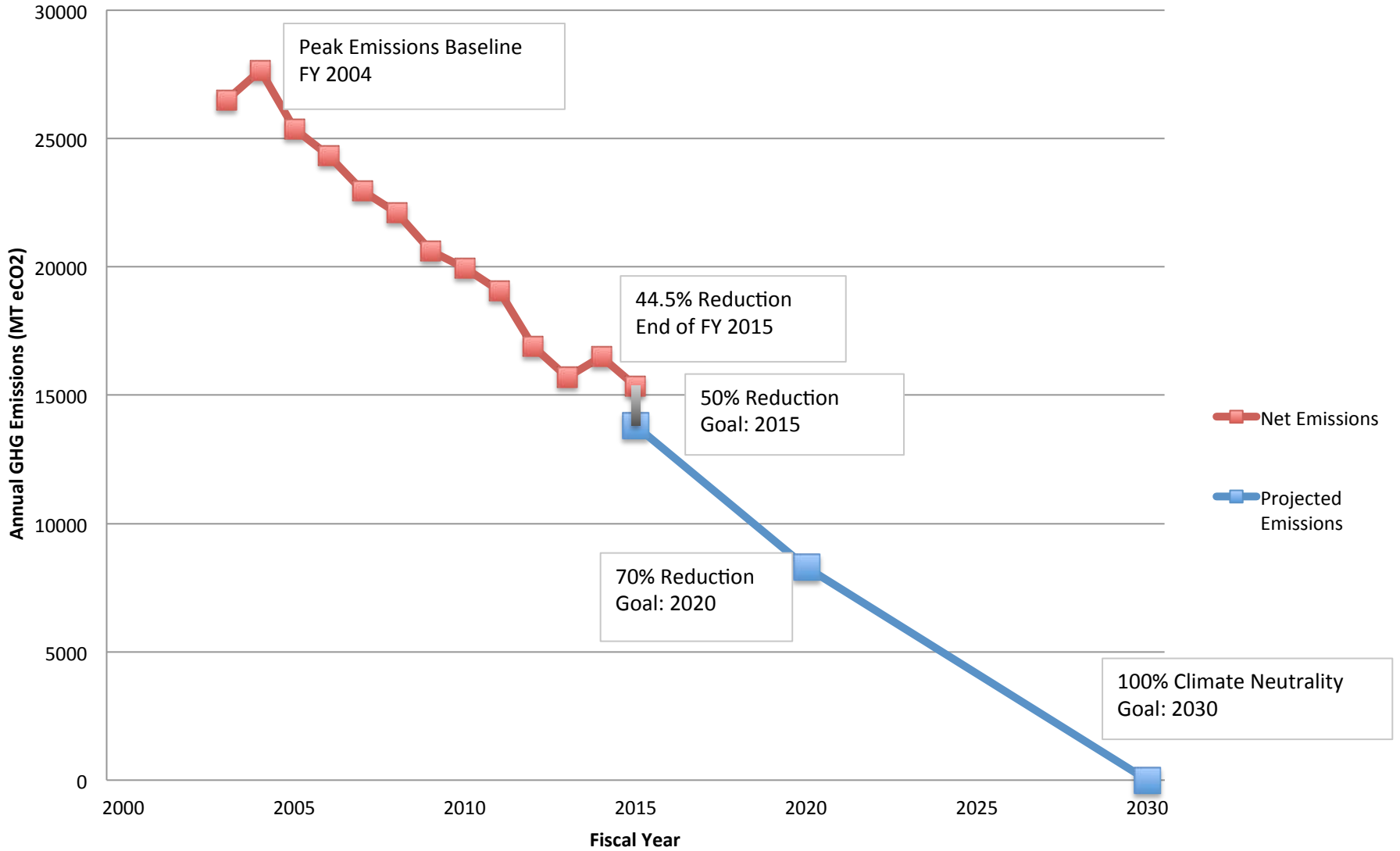
Luther's Climate Action Plan

- Approved by the Board of Regents in May 2012.
- Reduce greenhouse gas emissions from 2003-04 peak:
 - 50% by 2015
 - 70% by 2020
 - 100% by 2030 (net-zero GHG)

Luther College Carbon Footprint (FY 2003-2015)

- Through May 31, 2015, Luther College has reduced its campus carbon footprint 44.2% from its peak in FY 2003-04 via investments in energy efficiency (29.1%) and renewable energy (15.1%).
- Electricity purchases are at a record low, dropping from 17,888,446 kWh in FY 2002-03 to 14,303,052 kWh in FY 2014-15.

Luther College Carbon Footprint



Luther's GHG Reduction Strategies

- **Energy efficiency and conservation**
 - Many efficiency initiatives
 - Energy conservation plan (5% per yr)
 - Sampson-Hoffland Laboratories (LEED Gold)
- **Renewable energy production**
 - Wind turbine
 - Solar arrays
- **Carbon offsets**
 - Renewable Electricity Certificates (RECs) from a single turbine community wind project in St. Ansgar, Iowa

Luther College Carbon Footprint (FY 2003-2015)

Fiscal Year	Total Scope 1	Total Scope 2	Total Scope 3	Biogenic	Total Offsets	Total Emissions	Net Emissions
	MT eCO ₂	MT eCO ₂	MT eCO ₂	MT eCO ₂	MT eCO ₂	MT eCO ₂	MT eCO ₂
2003	6,560.7	15,206.3	4,728.9	-	-	26,495.9	26,495.9
2004	7,536.5	15,120.5	4,989.9	-	-	27,646.9	27,646.9
2005	6,789.8	13,836.3	4,737.1	-	-	25,363.2	25,363.2
2006	6,145.0	12,973.7	5,210.9	-	-	24,329.6	24,329.6
2007	6,151.1	11,101.4	5,707.6	-	-	22,960.1	22,960.1
2008	6,470.0	11,283.2	4,356.1	-	-	22,109.3	22,109.3
2009	6,162.5	11,089.6	4,091.2	7.6	(726.8)	21,343.3	20,616.4
2010	6,581.1	10,745.8	3,497.7	13.2	(865.4)	20,824.6	19,959.3
2011	6,041.7	10,867.0	3,589.1	18.1	(1,433.1)	20,497.8	19,064.7
2012	5,635.2	10,768.5	3,408.8	14.2	(2,902.7)	19,812.5	16,909.9
2013	5,936.7	10,265.6	3,420.1	15.5	(3,920.8)	19,622.3	15,701.6
2014	6,782.5	10,729.1	3,225.9	16.0	(4,238.6)	20,737.6	16,499.0
2015	6,446.7	10,000.9	3,177.2	6.2	(4,180.0)	19,624.8	15,444.8

Geothermal at Baker Village

- Houses 110 senior students.
- An all-electric facility that uses geothermal and solar PV energy for heating and cooling.
- The largest net zero emissions facility in Iowa.



Luther's Solar Projects



Sustainability House (4kW)

- Installed August 2011 by Go Solar, LLC
- 4 kW ground-mounted array
- Sized to provide all electricity for the house
- Donor-funded
- Net-metered



President's House I (5.3kW)

- Installed August 2013 by Novak Electric
- 80% Donor-funded by faculty, staff, and friends of the college
- 20% Utility rebate
- Phase II (10 kW) to be installed in Spring 2016 —all donor funded



Shirley Baker Commons (20kW)

- Installed May 2013 by Novak Electric
- Public demonstration site for marriage of geothermal energy and solar PV
- 40% Donor-funded
- 40% DOE grant funding
- 20% Utility rebate



Baker Village Array (280 kW)

- Installed summer 2012 by Dragonfly Solar
- Leased from Decorah Solar Field, LLC
- 280 kW array
- Annual production equal to Baker Village consumption
- Net metered



Baker Village

Financial Information

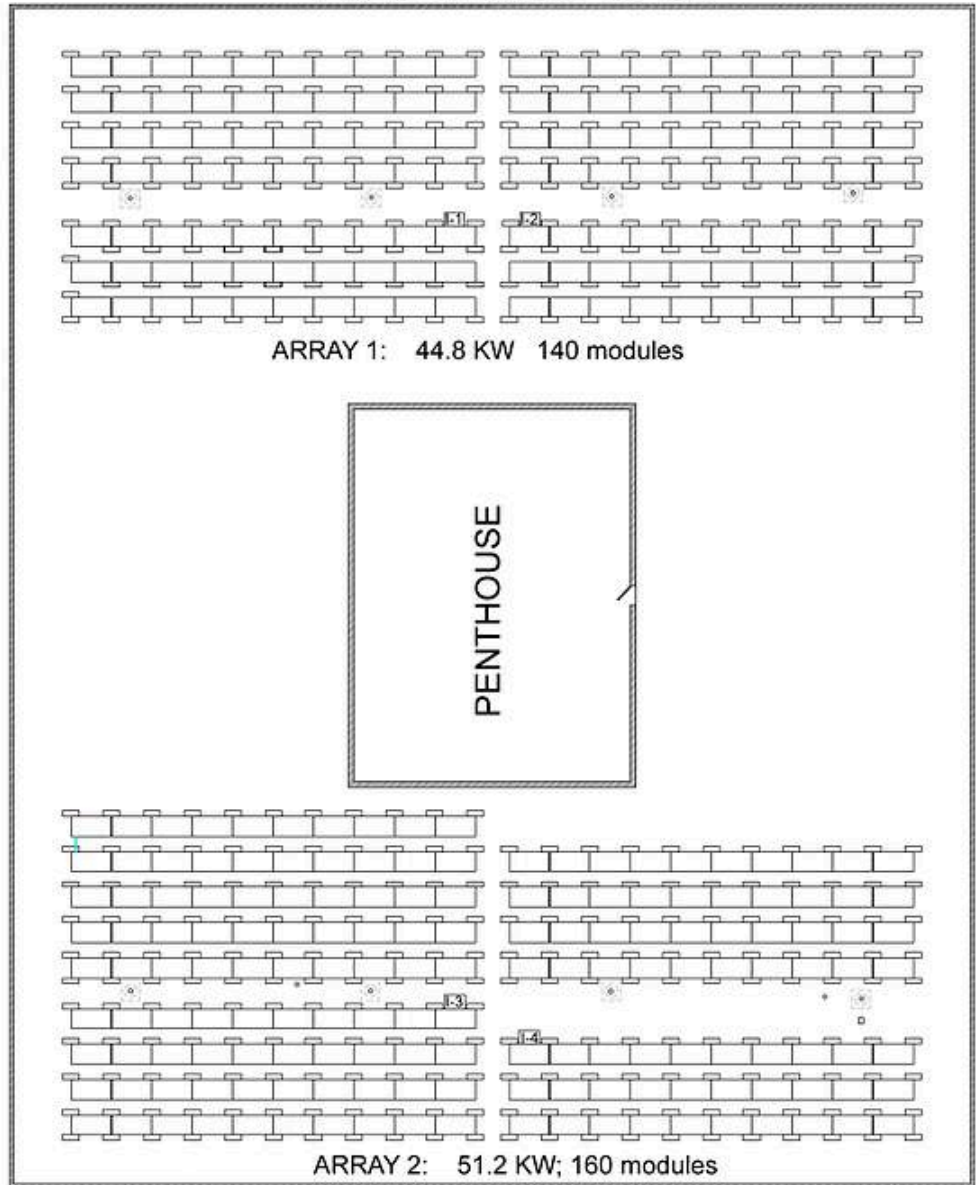
- Total installed cost: \$1.2 million in 2012
- Luther's lease payments are funded by avoided electricity purchases, donations to Luther earmarked for renewable energy, and the sale of solar renewable energy certificates (SRECs) to the Winneshiek Energy District
- After the lease period ends and Luther acquires ownership of the facility after 7 years, Luther will pay less for electricity over the 25-year-rated life of the panels than it would to purchase electricity from the grid to power Baker Village

Main Campus Arrays (820 kW)

- Installed Fall 2015 by Dragonfly Solar
- 96 kW on roof of the library
- 725.7 kW in two ground-mounted arrays near existing 280 kW array
- Projected generation: ~1,118,000 kWh/yr
- Additional carbon footprint reduction of 5-6% will enable Luther to reach its 50% reduction goal

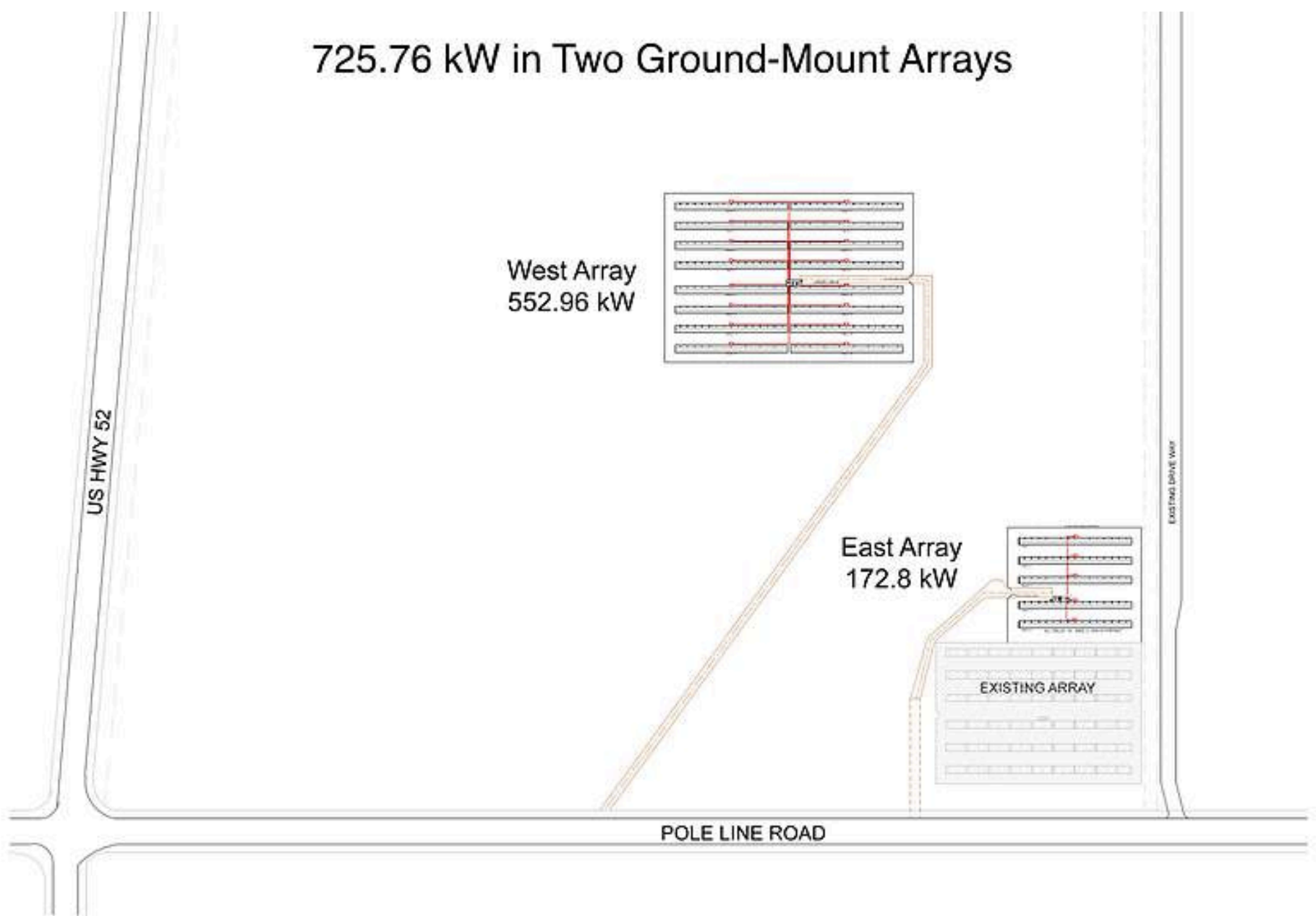
96 kW on Preus Library Roof

PREUS LIBRARY 96 KW





725.76 kW in Two Ground-Mount Arrays





Main Campus Arrays (820 kW)

Financial Information

- \$1,550,000 total installed cost
- Avoided energy cost savings study done by Wind Utility Consulting
- Third Party Power Purchase Agreement with Oneota Solar, LLC
- 25-year term; first ten years fixed price
- Luther intends to purchase the arrays at FMV after 10 years
- 11-year payback for Luther

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