

Proposed Solar Panel Installation on Andersen Hall peaked roof

West and East sides: 100 solar panels total

Estimate Panels will generate 40,000Kwh/year, 50% of electricity use



Proposal for Solar Panels at Fairmount

- Why should we care for the Earth?
- How did we get to this point?
- Why pursue this project now?
- How will this impact the building?
- How will this impact the church's budget?

Why should we care for the Earth?

Our faith urges us to defend and heal creation while working to assure justice for all of creation and the human beings who live in it. This call is rooted in the human vocation of “tilling and keeping” the garden from Genesis 2:15, as well as Christ’s charge to work with and for the most vulnerable (Matthew 25).

Our scripture and tradition call us to care for the natural world so that all may live abundantly (John 10:10). God cares deeply for all of creation and seeks to preserve the diversity of life.

To Till and to Keep



We care for God's Creation



PCUSA's environmental history

- **Confession of 1967** [Environmental Responsibility: one of Five Pillars](#)
- **General Assembly 1990:** [Restoring Creation for Ecology and Justice](#)
- **General Assembly 2006:** [Guide to Going Carbon Neutral](#)
- **PCUSA 2010:** [Launch of Earth Care Congregations](#)
- **PCUSA 2019:** [Matthew 25 and Care of Creation Go Hand-in-Hand](#)

PCUSA Earth Care Congregations



Is Fairmount keeping up or leading the way?

- 1990's: First Fairmount Earth Stewards group started paper recycling, and installed more efficient lighting
- 2008: 2nd and current Earth Stewards group was formed
- 2011: Fairmount became a PCUSA Earth Care Congregation
- 2017: [Fairmount recognized by PCUSA for church energy efficiency efforts](#)
- May 2022: **Fairmount Session approved a motion that our church work towards becoming carbon neutral over time**

Solar at Home

Harren-Lewis family



Ben and Susan



Matt and Gina Kashuk



Solar Neighbors



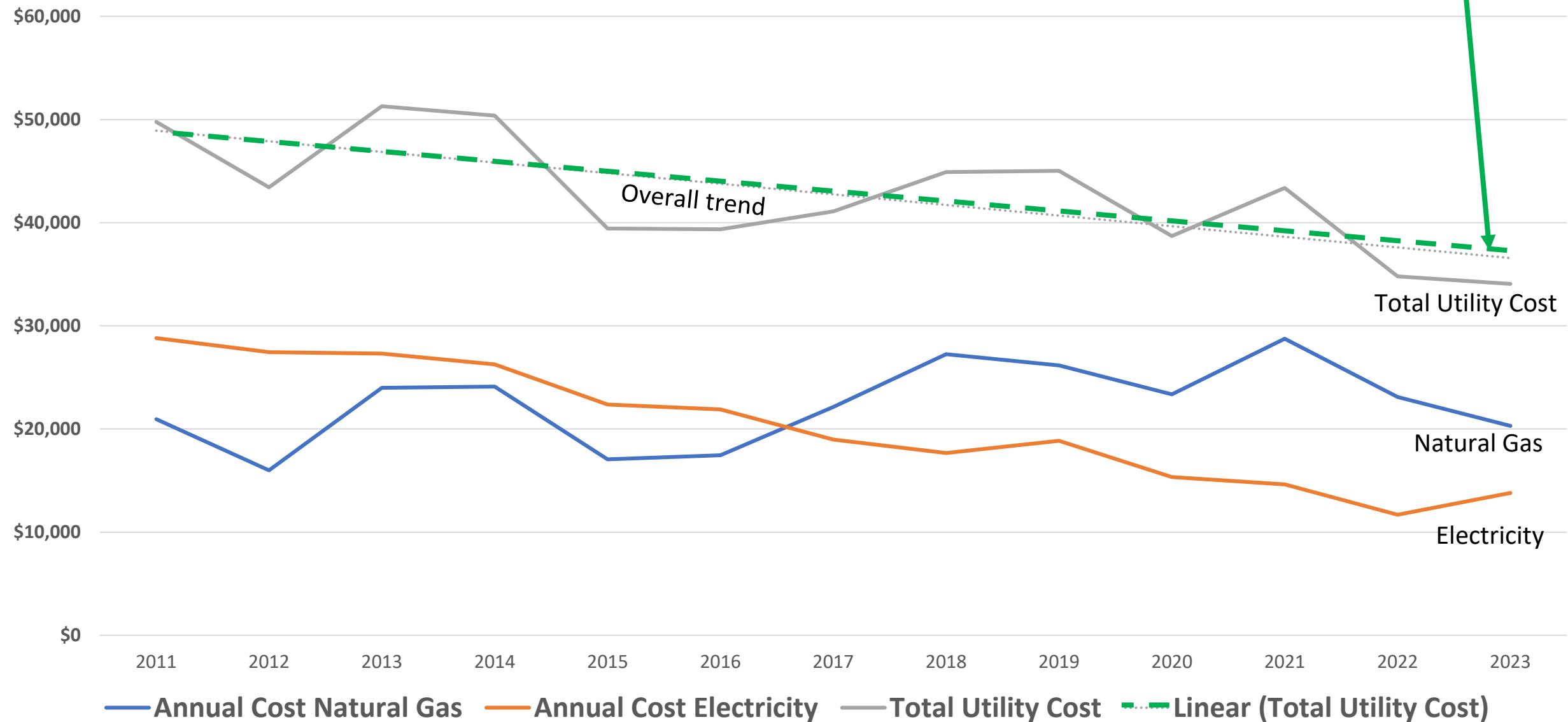
Fairmount Energy: Electricity Use & Cost Down Significantly

2023 Natural Gas Use & Cost Lowest Since 2016

We're also working to reduce Greenhouse Gas Emissions

Year	Annual Natural Gas Usage In Mcf	Annual Cost Of Natural Gas	Annual Electricity in KWH	Annual Electricity Cost	Annual Total Utility Cost	Greenhouse Gas Emissions in Metric Tons
2011	2650.3	\$20,947	181859	\$28,808	\$49,754	
2012	2345.7	\$15,976	187280	\$27,444	\$43,420	
2013	3444.6	\$23,978	175440	\$27,312	\$51,291	282.2
2014	3288.3	\$24,111	149280	\$26,265	\$50,376	278.2
2015	3061.2	\$17,055	111680	\$22,375	\$39,431	230.2
2016	3035.7	\$17,451	121920	\$21,893	\$39,344	230.2
2017	3318	\$22,119	103120	\$18,978	\$41,096	230.5
2018	3178.7	\$27,238	86400	\$17,670	\$44,907	219.8
2019	3689.2	\$26,166	99040	\$18,847	\$45,013	241.4
2020	3268.4	\$23,350	77520	\$15,342	\$38,692	211.4
2021	3381.8	\$28,746	68443	\$14,626	\$43,372	212.0
2022	3390.7	\$23,099	77770	\$11,688	\$34,787	219.9
2023	2303	\$20,282	86071	\$13,783	\$34,066	186.4

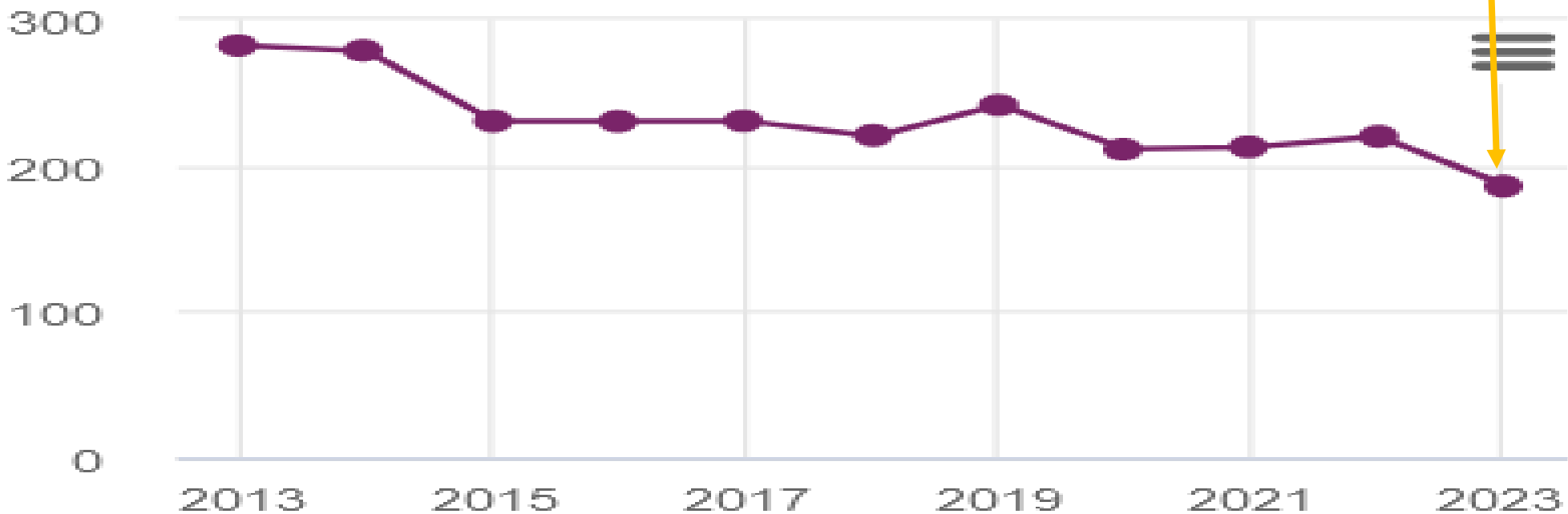
Fairmount Annual Energy Costs: Trending Down



Fairmount Annual Greenhouse Gas Emissions less than 200 tons for the first time in 2023!

Total (Location-Based) GHG Emissions Trend (Metric Tons CO2e)

 [Change Metric](#)



(Chart current as of 01/26/2024
09:26 PM EST)

[Refresh Chart](#)

We've gone after the low hanging fruit – What's next?

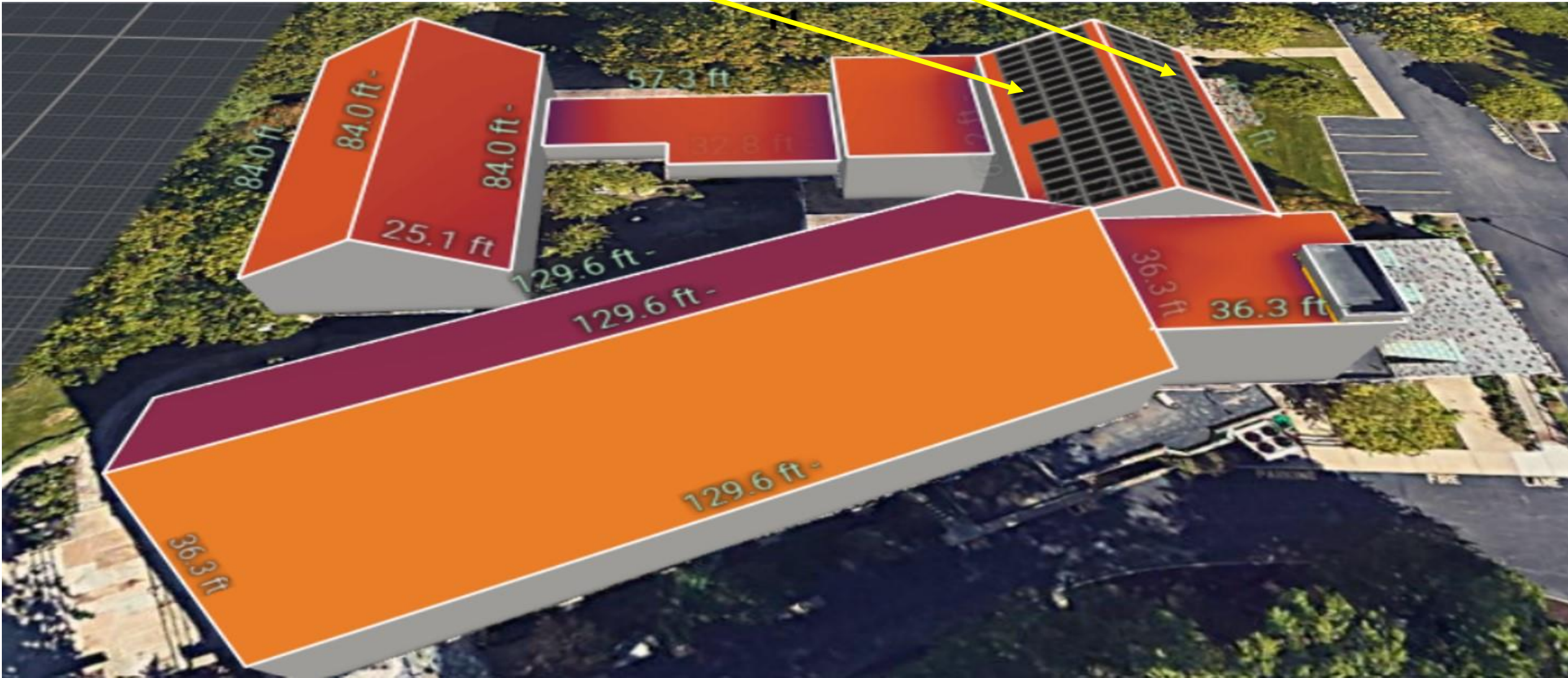
Replace room heating controllers



Install solar panels on the Andersen Hall peaked roof

With Inflation Reduction Act 30% rebates for nonprofit solar installations, 2024 is a unique opportunity for Fairmount to make use of a government rebate, using funds that may not be available in coming years.

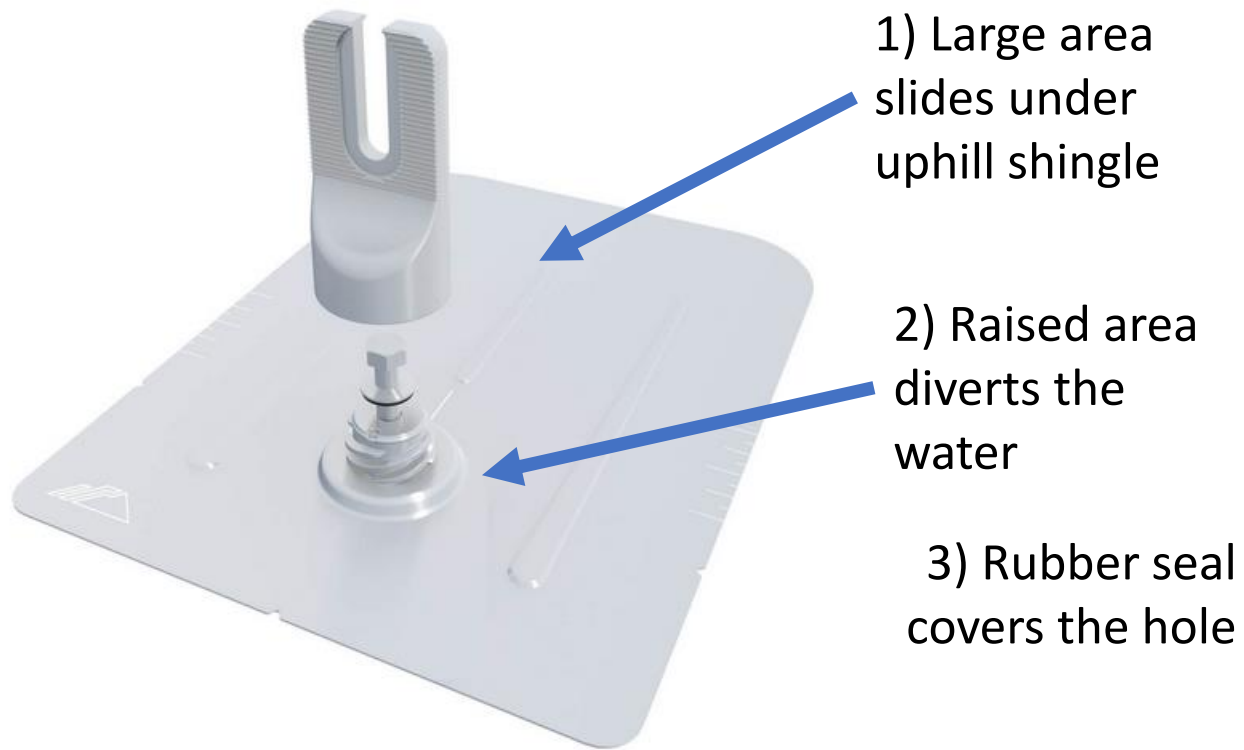
Proposed Solar Panel Installation on Andersen Hall peaked roof
West and East sides: 100 solar panels total
Estimate panels will generate 40,000Kwh/year, 50% of total use



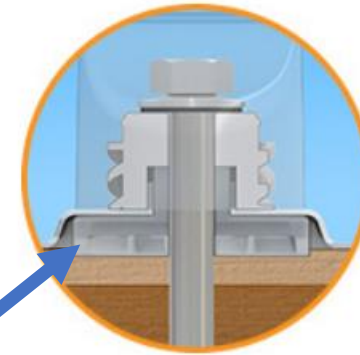
Andersen Hall peaked ceiling and roof support structure: trusses and purlins



Keeping the rain out with 3 layers of protection



THREE-TIER WATER SEALING



An elevated platform diverts water away, while a stack of rugged components raises the seal an entire inch. The seal is then fully-encased by the Cap.

[Solar rack mount flashing](https://www.youtube.com/watch?v=-qN5dwEumCM)

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Project Funding Overview

Investment

- Total project: \$100,000
- Earth Stewards' contribution: \$25,000
- Renewable energy rebate: \$30,000
- Effective Loan: \$45,000

Annual savings

- ~\$5,000 electricity savings
- Solar Renewal Energy Credits (SREC's) Value varies with market; latest price was \$35/Mwh; we would sell about 40 SREC's/year

Annual costs

- ~\$500 insurance

Financing Options

PCUSA Loan

- Payback time: 13 years
- Annual payment: \$4863
- \$18,000 interest charges

Self-funded Endowment Loan

- Payback time: 9 years
- Annual payment: \$5,000 per year to start, increasing as avoided costs increase
- \$0 in interest payments

Fairmount's Future?

Solar panels are a visible witness of Fairmount's taking action to use clean energy and reduce church use related pollution, and in so doing, support Fairmount's on-going vitality.

End of Main Presentation
Reference Slides Follow

Quotes

In order of preference

- **Better Together: \$100,000 for a 40KW solar array – largest array proposed, that makes the most use of available roof space, has a good reputation as a solar installer**
- **Third Sun/Kokosing: \$106,000 for a 32KW solar array**
- **Yellowlite: \$80,000 for a 35KW solar array**

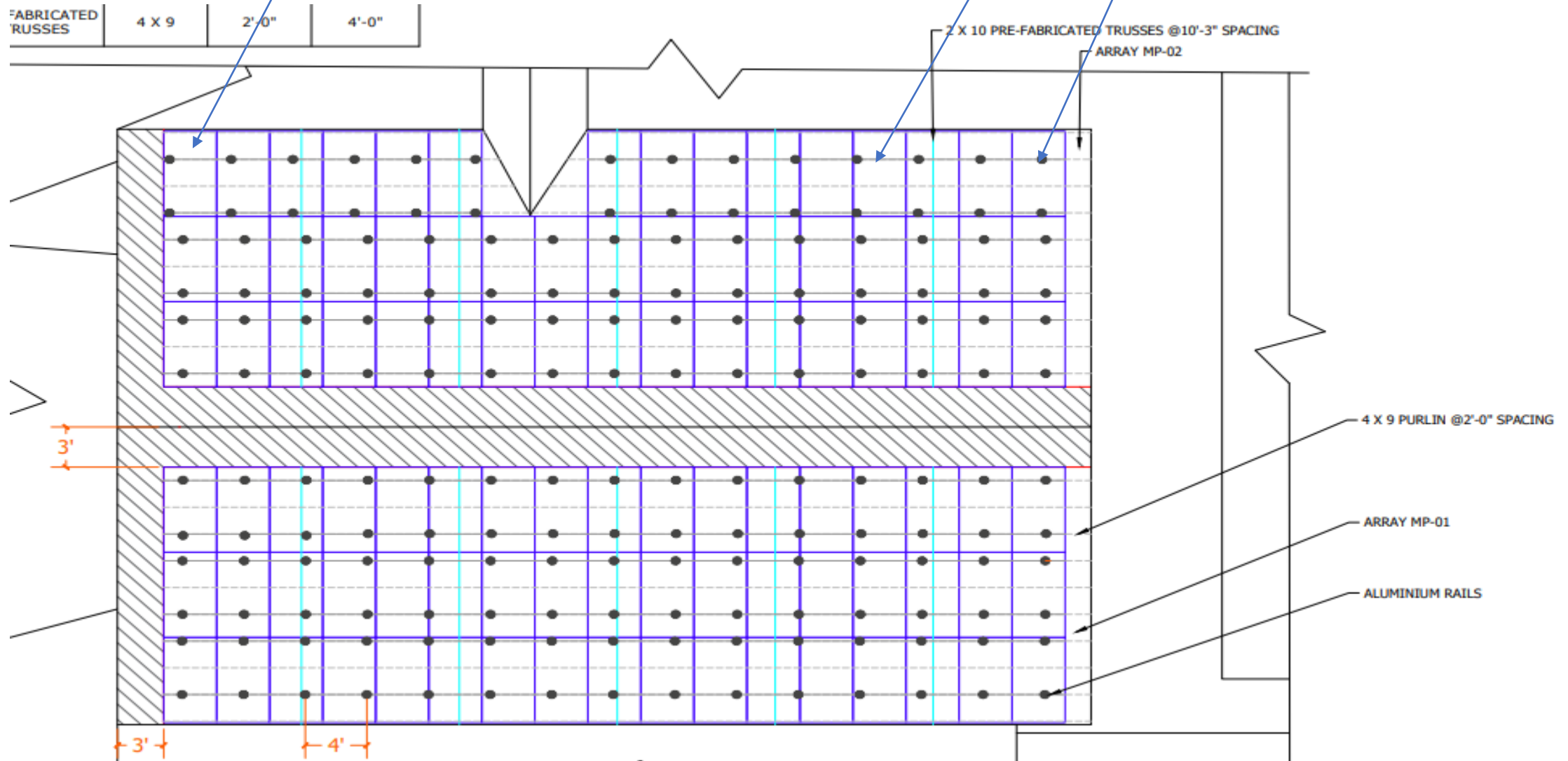
Why Propose to Install Solar Panels Now?

Other churches have followed this playbook to reduce their carbon footprint:

- 1) Conceive and complete a series of projects that reduce energy use over time
 - 2) Maintain and monitor the HVAC systems that you currently have
 - 3) Install renewable energy at your church if you are able
 - 4) Move to reduce natural gas usage with new technology heating/cooling equipment
- With significant reductions of electricity via low hanging fruit projects since 2011, solar panels are ready to go using a well known technology for Fairmount to continue to reduce energy use, costs and carbon emissions.
 - The Inflation Reduction ACT has a 30% renewables rebate for churches and other non-profits, that may not be available in coming years
 - Critical building assessment projects are planned for 2024: roof and electrical room repairs, and a boiler control system. Other carbon reduction projects, such as new boilers and heat pumps, are some years from being ready to go.

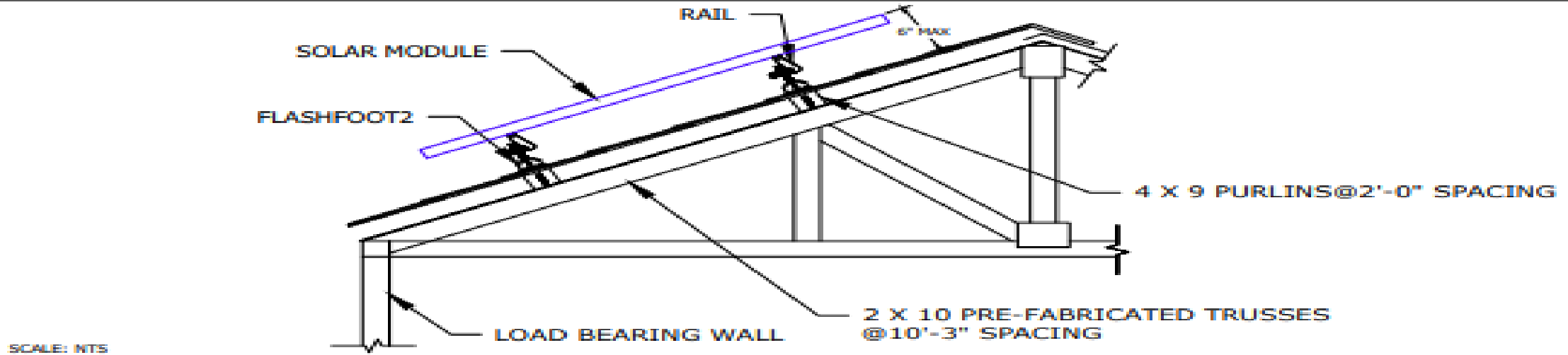
West Aerial view: Panel Rack Rails and Roof Penetrations

3 rows of solar panels per side; 2 mounting rails/row

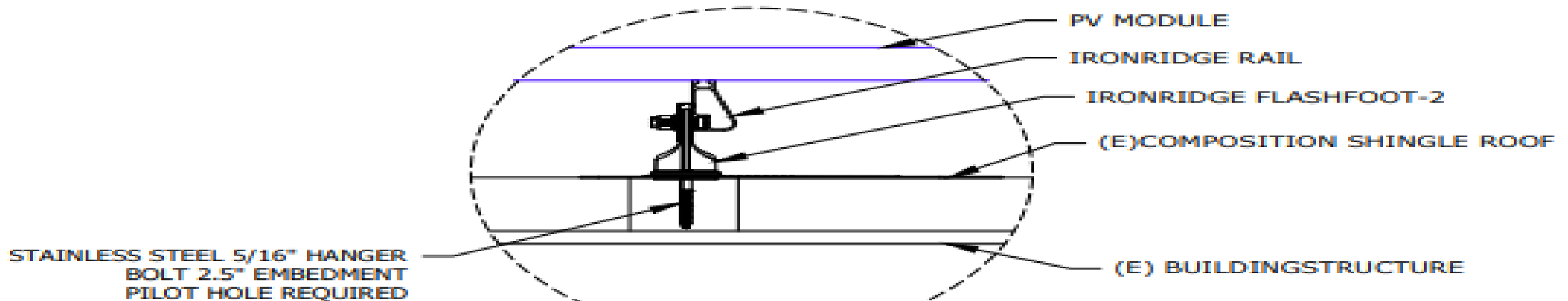


Solar Panel and Rack Mounting Structure Details

ROOF FRAMING DETAILS



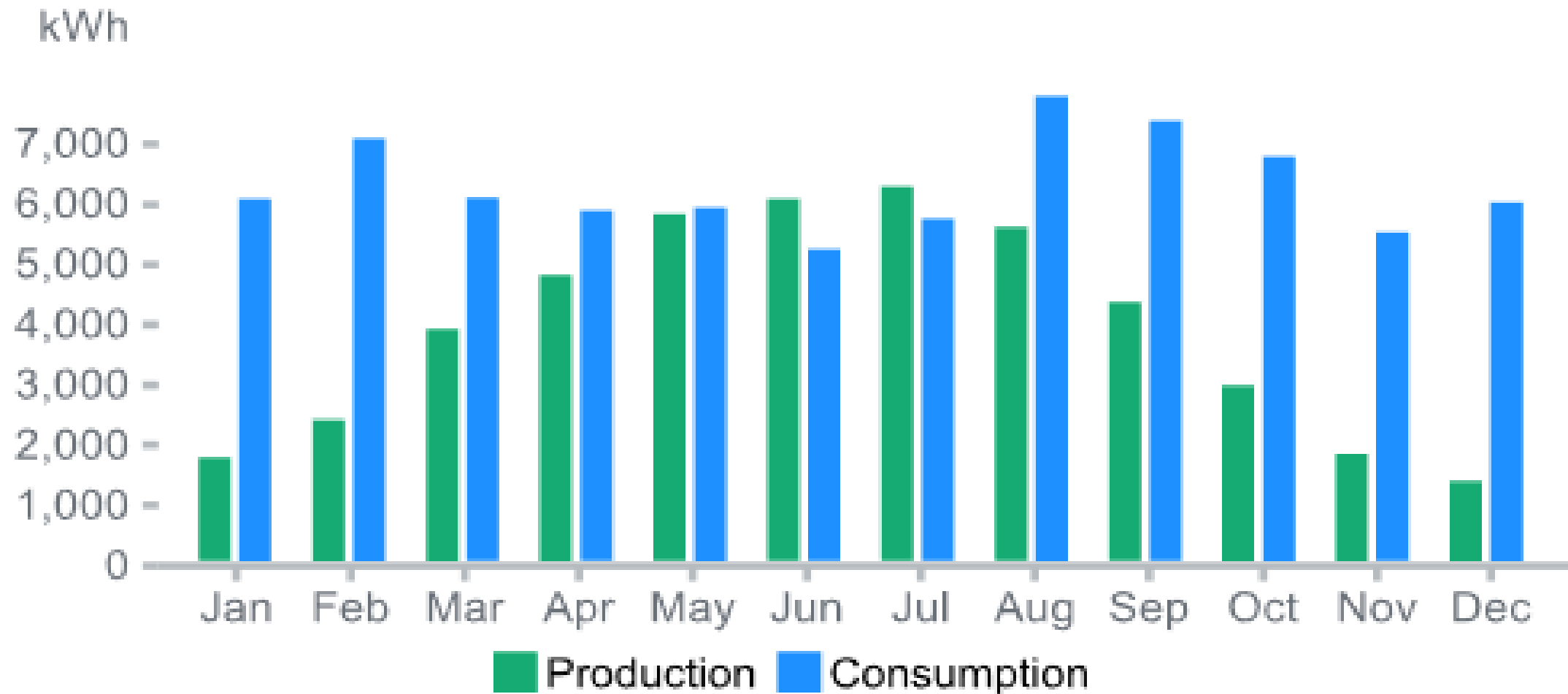
ATTACHMENT DETAILS



Andersen Hall Peaked Roof Condition

- The Andersen Hall peaked asphalt roof was re-roofed in 2013 by Calvetta Brothers, and the roof may last another 20 years before needing to be replaced. Solar panels last about 25 years. Solar panels often extend roof life.
- From engineering studies: as long as attachments occur at the purlins, the structure can provide adequate support and maintain acceptable deflection limits as prescribed by code for solar panels.
- Studies have indicated that the Andersen Hall peaked roof is in good condition; leaks are on flat roof sections, often at or due to drains. Some shale roof sections need repair. None of the flat roof or shale repairs are hindered by solar panels mounted on the Andersen Hall peaked roof.
- Solar contractors say their installations have not had leaks or they are rare. The install crew will use special flashing and sealant to help avoid water leaks into Andersen Hall. Fairmounters will be on-site to monitor the installation, especially when the panel rack is being installed.

Solar generated electricity is seasonal



Checking in with others who have installed solar

- Rev. Lindsay and Tim Harren-Lewis – their system works for them, no leaks
- Gina and Matt Kashuk – their system works for them, no leaks
- Susan Kent and Ben Sperry – their system works for them, no leaks
- West Shore Unitarian – installed on flat roof with weights, works well, no leaks
- Presbyterian Church of Okemos, MI – installed ground mount in 2023
- Westminster Presbyterian Church, MI – panels on peaked roof, no leaks