

An Overview: The Church, Climate Change, and Solar Energy

Climate Change Background

Our planet is warming at a rate that concerns scientists. Tree rings, ocean sediments, coral reefs, and layers of sedimentary rock provide ancient, or paleoclimate, evidence revealing that current warming is occurring roughly ten times faster than the average rate of ice-age-recovery warming. There is scientific consensus that this warming rate has been accelerated by human activities, including burning fossil fuels, deforestation, and anything that releases carbon dioxide and other greenhouse gases into the atmosphere.

Evidence of this rapid change include a global temperature rise of 1.62 degrees Fahrenheit since the late 1800s, decreased mass of ice sheets and northern hemisphere snow cover, increased extreme weather events, and the rise of global sea level by 8 inches in the last century. NASA has predicted dangerous effects due to this rapid change, including increased frequency and danger of hurricanes and heavy rain events, higher temperatures that bring droughts and heat waves, sea level rise, and disruption of agriculture.

However, there are also ways to mitigate the effects of these events. One of the primary ways is to reduce the emission of greenhouse gases, like carbon dioxide, into the atmosphere. This can be accomplished through reducing burning fossil fuels and turning to renewable energy sources such as solar, wind, nuclear, and hydroelectric power.

Rooftop Solar Installation

Solar Panel Background

Having solar panels on the roof shows that Augustana is dedicated to reducing their carbon footprint. There are many options associated with installing solar panels on the roof of Augustana which gives flexibility and allows for Augustana to generate and consume renewable energy while obtaining the maximum financial benefits. The cost of installing solar panels has decreased every year since 2009, a trend that is expected to continue. In comparison, the price of utility electricity is expected to increase. Generally, rooftop solar panels can be divided into two categories: ownership of solar panels or leasing of solar panels.

Ownership

A. Paying the full upfront cost of the solar panels

Advantages	Disadvantages
Generate free electricity for the entire life span of the panel	Paying the full upfront cost of solar panels is often difficult for nonprofits
	Tax incentives are not received. For example, the 30% federal tax credit cannot be received by Augustana.

B. Solar loan: You can receive a loan to pay for the solar panels, and make payments over time.

Advantages	Disadvantages
Augustana will still own the solar panels, but the payment will be spread out.	Interest rates may increase the overall price Augustana will pay for the solar panels
	Tax incentives are not received

Solar lease/ Power Purchase Agreement (PPA): With this option the company you lease the solar panels from will own the solar panels on your roof.

Advantages	Disadvantages
Standard agreements allow you to buy the solar panels at any time if you wish.	It can take a very long time to enter into a PPA.
Recieve all of the energy that is generated from the solar panels	You will pay a monthly fee.
This option could result in cheaper energy, because the solar panel owner will receive tax breaks and financial incentives that will be factored into the monthly payment.	The congregation will not own the solar panels.
Augustana will not be responsible for any repairs or maintenance.	

Community Solar Background:

The Church would subscribe to a solar garden or farm, which would help to power the local utility grid. The Church would then receive credits on its utility bill reflecting its share of generated electricity.

Subscribe to Solar Garden

Advantages	Disadvantages
Community solar options require no installation or maintenance on the part of the member, meaning there are fewer associated expenses and efforts involved. It is a very more accessible option.	Is not as tangible of an investment; given that the physical location of the solar panels would be further removed from the church
It will not affect the aesthetic of the church or cause any spatial inconvenience during installation.	
The larger the solar panel installation, the cheaper the price per kilowatt to produce and use the energy.	Will not have the same long-term monetary benefits as installation because you cannot benefit from incentives and payoffs
Spread awareness about solar throughout the community	Not tied as directly to the church, a step removed through the community solar
Minnesota is one of the few states that offers virtual net metering, which would reduce electric bills	