








#### The Project

Brian is an engineering and construction company executive who decided to participate in the design of his next family home. From the start, he planned for this custom built structure to utilize the latest technologies to increase comfort while also conserving energy.



Brian's family members were excited and inspired to join in the effort to build a sustainable home. Together they chose to incorporate the following:

-  *Full thermal insulation to meet the latest recommended standards.*
-  *Construction materials designed for durability and appearance that also enhance the home's insulation.*
-  *A unique water-based heating system – known as hydronics – built into the foundation and structure to passively control the home's inside temperature.*
-  *The latest in LED lighting technology and room occupancy sensors.*
-  *The most energy efficient appliances.*
-  *The ability to measure and monitor the family's energy usage.*
-  *A solar energy system to offset a significant portion of the projected annual energy demand for this highly efficient home.*

Ultimately the family looks forward to the home becoming a Net Zero building, where the sum of the energy they use will be offset by solar energy generation over time. Welcoming the challenge, Brian has been studying the “ins and outs” of energy used and energy generated in the first full year.

Optimizing the family's energy footprint requires tweaks and adjustments, one of which began in the project's early stages.

## SOLAR PROJECT DETAILS

### The Solar Challenge

Once the home design was finalized, Brian reached out to Exact Solar to discuss options for a suitable solar energy system:

He requested rooftops be avoided for aesthetics and insufficient capacity.

The Exact Solar initial design focused on a stationary or fixed-tilt ground mounted array.

However a first restriction surfaced:

Local zoning ordinances limit to 2,000 square feet the area used for a solar system. The net effect >>> the fixed-axis, ground mounted solar energy capacity was effectively limited to about 35 kW.

The solution needed to increase the energy generating capacity beyond what a 35 kW fixed-tilt system would deliver over a year.

### The Complete Solution



A single-axis tracker design was selected to deliver predictably higher power output and good value. This overcame the permissible area limits by increasing power density (panels per area), and by approaching the output of a 50 kW fixed-tilt system. It was located at the back of the property.

Selection: Sun Action Trackers      PST – 1AX6

About: Sun Action is a U.S. based manufacturer. The system was chosen for its unique design and the company's extensive track record.

Over 1 GW installed across the globe ♦ High power density ♦ Fast assembly for fast installation  
Top industry reputation ♦ Strong customer and product support

**SOLAR PROJECT DETAILS**

**Project Specs and Performance**

The solar energy system was designed to maximize power production from the limited space. After reviewing 12 months of both production data and the home's energy usage patterns, Brian is very happy that the solar energy system produced as predicted. In fact, he plans to further improve the family's energy use habits, modify some of the bigger energy consumers in the home, and solicit for expanded zoning to add more solar!

**Power Production Specifications:**

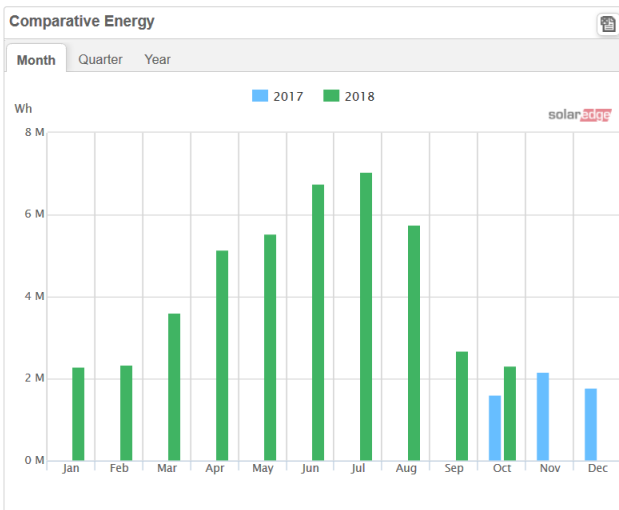
Solar panels and power components were chosen to deliver top performance within the space limitations with demonstrated lifetime reliability.

105 – 330W Solar Panels → LG NeON High Efficiency

105 – Power Optimizers + 3 – Power Inverters



Panel Layout



**Power Production:**

Annual Output (kWh)  
Peak Month Output (kWh)

**Actual**

Annual Output (kWh)	47,679
Peak Month Output (kWh)	7,050

**Environmental Impact:**

Avoided CO2 Emissions (lbs)  
Equivalent Trees Planted

Avoided CO2 Emissions (lbs)	76,774.06
Equivalent Trees Planted	1,934