



# Harnessing the sun to decrease your carbon footprint

Energy self-consumption refers to the practice of generating renewable energy and utilising it directly within the premises where it is produced. This concept has gained significant relevance in 2023, as the world continues to grapple with the challenges of climate change and the need to transition to sustainable energy sources. It allows individuals, households, and businesses to reduce their reliance on traditional energy grids.

In the future, energy self-consumption is expected to witness significant growth and advancements. The increasing affordability and efficiency of renewable energy technologies, such as solar panels and wind turbines, will make it more accessible for

individuals and organisations to generate their own electricity. This will lead to a decentralised energy system, where energy production is distributed across a wide network of self-sufficient units. With the help of energy storage systems, such

as batteries, excess energy can be stored for later use, ensuring a continuous and reliable supply.

Overall, the future of energy self-consumption holds promise for a more

sustainable, resilient, and community-driven energy landscape.

PES had the opportunity to sit down with Brandon Davis of SMA America, a leading global provider of solar inverters and energy management solutions. He is a driven professional, known for his expertise and leadership in the renewable energy industry. As a Territory Sales Manager, he has played a pivotal role in advancing the adoption of solar energy across his designated region. Davis' passion for his work is evident in his ability to educate others to embrace solar energy solutions and reduce their carbon footprint.

**PES: How do you define residential energy self-consumption?**

**Brandon Davis:** When a homeowner has a solar system installed, their utility meter is changed to a bidirectional version. This allows the utility to read the generation from solar and consumption from the grid. When a storage system is coupled with solar, the homeowner has the ability to store the solar energy generated during the day in a battery. Instead of consuming electricity from the grid, the energy comes from their battery.

**PES: What are the primary benefits of residential energy self-consumption?**

**BD:** There are a multitude of benefits for both homeowners and utilities surrounding self-consumption.

For homeowners, adding a storage system allows a level of independence from the electric grid and back-up power in the event of a grid outage. Multiple factors impact how long a system can be disconnected from the power grid. These include the amount of sunlight, additional generation sources available and automatic disconnect of specific electrical loads. In areas like California, where the largest utilities have

adopted NEM 3.0, self-consumption is becoming the new normal. Previously, solar energy was exported and purchased at the same price.

With the transition to NEM 3.0, utilities have slashed the value of these renewable energy exports up to 90%. Exporting to the grid is no longer financially viable and storing that energy during the day to use at night is the most strategic approach. When individuals can produce and store energy for half the cost of what the utility charges, many people will make the decision to become independent energy producers. It literally makes 'cents'.

For utilities, self-consumption can help regulate the grid and reduce demand on an outdated and already strained system. Utilising residential storage systems as a virtual power plant allows a utility to call on home batteries to provide voltage and frequency regulation to stabilise the grid and help avoid blackouts.

When homeowners produce and consume their own energy on site, the need to draw it from the grid is reduced. Over time, this will allow grid operators to remove environmentally problematic sources of electricity generation from the grid.

An issue that has been compounding year after year is what is referred to as the 'duck curve.' It is caused in part by the amount of solar generation that is injected into the grid during the daytime and then falls off at night, when people come home from work and start using electricity in their homes. Homeowners who utilise self-consumption will largely avoid contributing to this issue, as they will be independent from the grid at these times of day.

**PES: How can homeowners optimise their residential energy self-consumption to maximise cost savings?**



Brandon Davis

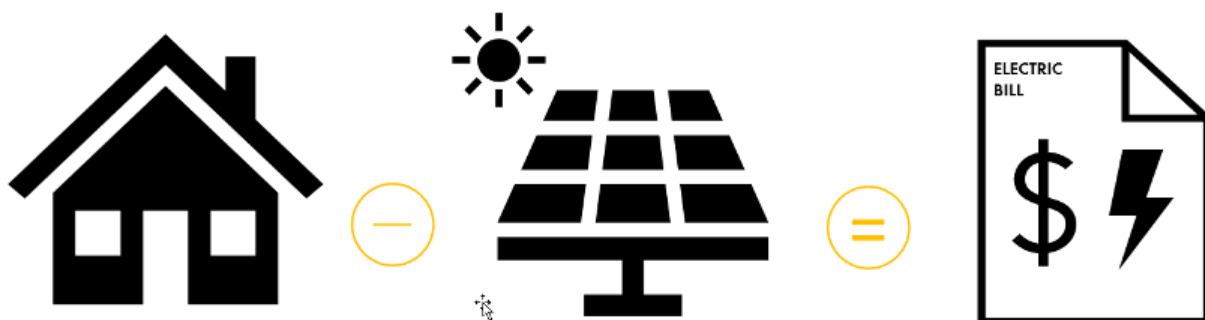
**BD:** Something that is often talked about but not often practiced is reducing energy consumption prior to installing any solar or storage technologies. Simply reducing usage by switching to LED lighting, upgrading HVAC and appliances to more efficient versions and adopting energy saving practices can significantly reduce the cost of the project.

Once a system is installed, the owner can try to shift energy-intensive activities to times of the day when solar generation is highest. Doing laundry during the day and pre-cooling your home before the evening can ensure the maximum amount of energy is available when the solar system is no longer producing power.

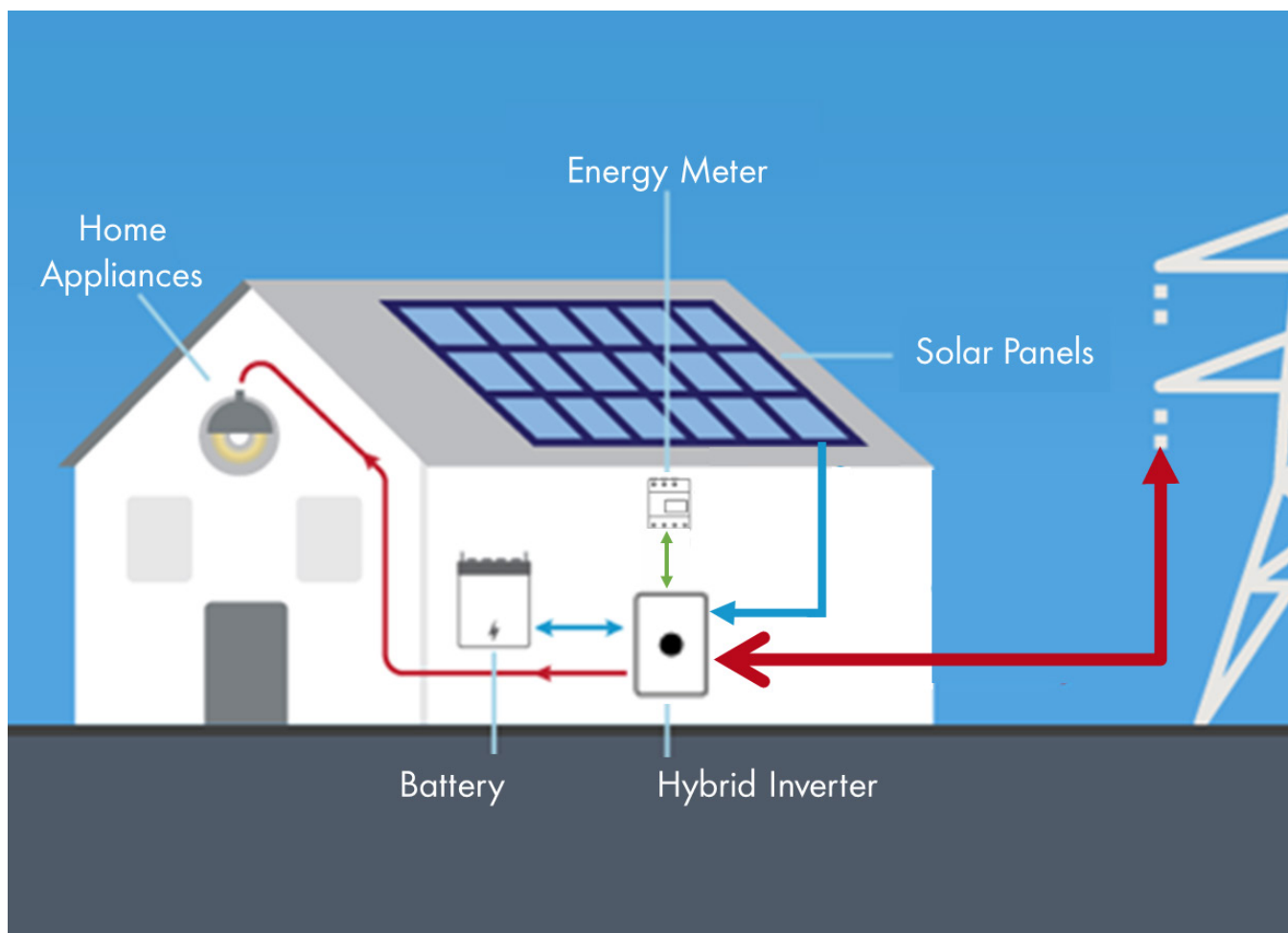
**PES: What are the key technologies and systems that enable efficient residential energy self-consumption?**

**BD:** While solar systems have been around for a while, energy storage is relatively new.

## Full Net Metering Explained



Energy consumed **minus** energy produced **equals** your net electric bill.



Technology like smart electrical panels and load controlling circuits are also making their way into the residential energy space. The combination of these technologies and software to control the flow of energy in a home will continue to improve and create better financial returns for homeowners.

**PES:** Are there any government incentives or programs available to support residential energy self-consumption?

**BD:** The Inflation Reduction Act (IRA) is a harbinger for the continued and sustained growth of the solar and storage industries. The federal tax credit can now be applied to both technologies and will help bring down the cost of systems that support self-consumption. The glidepath put forth in the legislation gives the industry predictable market conditions that allow for further investment in research and development and domestic manufacturing facilities.

In addition to the IRA, many state and local governments have programs as well as utilities. Local solar professionals are well versed in the incentives in their specific region.

**PES:** What are the potential challenges or barriers to implementing residential energy self-consumption in different regions or climates?

**BD:** Today, the industry faces challenges with demand simply outpacing manufacturing capabilities. Supply chain issues over the last several years are just starting to clear up and production is returning to pre-pandemic levels. However, demand continues to grow for these products. Resource constraints such as the demand for lithium for batteries may eventually become a barrier.

**PES:** How does residential energy self-consumption contribute to reducing carbon emissions and promoting sustainability?

**BD:** When a homeowner consumes the energy that is produced from their solar system, they reduce demand on the grid. There are significant energy losses when transmitting electricity through the power lines over long distances. Consuming energy locally means this energy is no longer lost and additionally when energy is exported to the grid, neighbors can use that electricity instead of it having to come from a power plant that may not have as renewable of a source of generation.

**PES:** Are there any emerging trends or innovations in residential energy self-consumption that homeowners should be aware of?

**BD:** This industry is in constant flux. There are new players in this space, coming

up with innovative products and many of the established manufacturers are starting to come out with products to meet this need. I expect it to look very different five years from now.

**PES:** What are the considerations for homeowners regarding energy storage solutions in residential energy self-consumption systems?

**BD:** Homeowners should ask a lot of questions up front, prior to installing a storage solution at home. Most homeowners believe that by having solar they have backup power during a power outage, but that is not always the case. There is also a way to use a battery to save money through self-consumption but it isn't configured for backup power. Make sure you talk to your installer about backup power, if that is important to you.

When the system is set up in an advantageous manner for the homeowner the energy independence benefits include lower bills, increased home value, environmental sustainability and stability against price increases.

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