GE Energy

Residential Solar

a product of
ecomagination℠

imagination at work

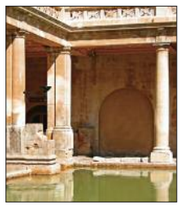
Solar Time Line

(Excerpted from US Department of Energy)

7th Century B.C.
A magnifying glass is used to concentrate the sun's rays on a fuel and light a fire for light, warmth, and cooking.

3rd Century B.C.
Greeks and Romans use mirrors to light torches for religious purposes.

2nd Century B.C.
As early as 212 B.C., the Greek scientist, Archimedes, used the reflective properties of bronze shields to focus sunlight and to set fire to wooden ships from the Roman Empire which were besieging Syracuse.

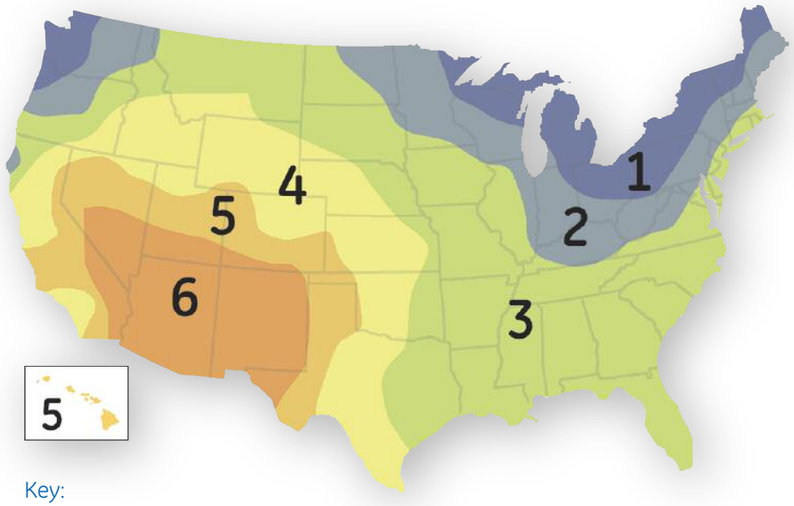


1st to 4th Century A.D.
The famous Roman bathhouses in the first to fourth centuries A.D. had large south-facing windows to let in the sun's warmth.

Harnessing the Power of the Sun

With rising fuel costs, climate change concerns and growing demand for electricity, renewable energy resources such as solar power are becoming an increasingly valuable part of the global energy mix. Around the world, businesses and homeowners are harnessing the power of the earth's most abundant natural resource—sunlight—to provide energy using solar power.

Solar modules generate electricity using an inexhaustible, zero cost, and carbon free fuel—power from the sun's rays. Solar panels reach peak production during the middle of the day, at the time when energy use and electricity costs are typically highest for homeowners. The energy that is produced by solar electric power offsets dependence on other resources, reducing monthly energy bills. In some places, excess generated power can be sold back to utilities, further reducing energy bills.



Key:
Kilowatt-hrs/ft^2/day

6 – 7	3 – 4	0 – 1
5 – 6	2 – 3	
4 – 5	1 – 2	

1 kW (DC) GE Energy Solar System

Zone	Average Monthly kWh (AC) Production Range	Zone	Average Monthly kWh (AC) Production Range
1	80-90	4	115-125
2	90-100	5	125-135
3	105-115	6	135-145

Approximate Required Roof Space [ft^2]	100

Powerful Heritage... Innovative Solutions

Building on a strong power generation heritage spanning more than a century, GE's photovoltaic (PV) solar modules and systems have proven performance and reliability, creating more value for our customers.

GE Energy is one of the world's leading suppliers of power generation and energy delivery technologies—providing a broad array of solutions for traditionally fueled plants as well as those driven by renewable resources such as wind, solar and biogas. GE Energy has the worldwide resources and experience to help customers meet their needs for cleaner, more reliable and efficient energy. Currently, GE Energy operates locally in approximately 120 countries, and has more than a million megawatts (MW) of installed power generation capacity.

GE Energy solar PV products are backed by GE's world class manufacturing processes. GE's solar manufacturing facility is located in Newark, Delaware. GE's Global Renewable Energy business is headquartered in Schenectady, New York, and the European Renewable Energy headquarters is in Salzbergen, Germany. Our Quality Management System, which incorporates our rigorous Six Sigma methodologies, provides our customers with quality assurance backed by the strength of GE.

Energy Learning Center
Niskayuna, NY

Global Research Center
Niskayuna, NY

Global Research Center
Munich, Germany

Renewable Energy Headquarters
Salzbergen, Germany

Global Research Center
Shanghai, China

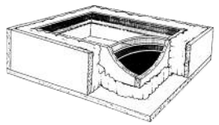
Manufacturing Facility
Newark, DE

Renewable Energy Headquarters
Schenectady, NY

Global Research Center
Bangalore, India

6th Century A.D.
Sunrooms on houses and public buildings were so common that the Justinian Code initiated "sun rights" to ensure individual access to the sun.

1200s A.D.
Ancestors of Pueblo people called Anasazi in North America live in south-facing cliff dwellings that capture the winter sun.



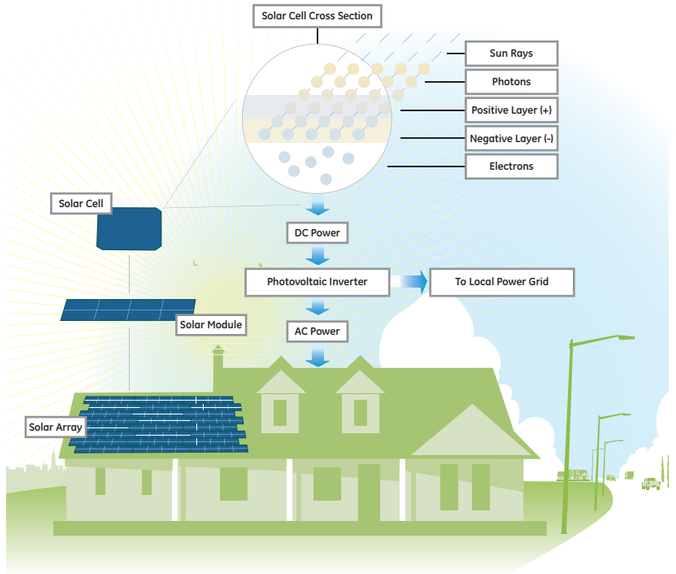
1767
Swiss scientist Horace de Saussure is credited with building the world's first solar collector, later used by Sir John Herschel to cook food during his South African expedition in the 1830s.

1839
French scientist Edmond Becquerel discovers the photovoltaic effect while experimenting with an electrolytic cell made up of two metal electrodes placed in an electricity-conducting solution; the electricity generation increases when exposed to light.

1921
Albert Einstein wins the Nobel Prize for his theories explaining the photoelectric effect.

How Solar Works

Solar panels are a simple addition to most existing and new homes, easily integrating into the design of the structure. Solar panels generate electricity with zero noise and air emissions.



Typical Operational Specifications

Nominal Operating Cell Temperature (NOCT)		45°C * {Conditions: Irradiance = 800 W/m²; ambient temperature = 20°C; wind speed = 1 m/s}
Maximum Tested Load		45 psf (2150 Pa) front and back
Hailstone Impact Resistance		1" @ 50 mph [25.4 mm @ 80.5 kph]
Module Weight	66 W:	18 lb. [8.2 kg]
	200 W:	39 lb. [17.7 kg]
Module Dimensions	66 W:	17.6 x 59.3 x 2.1 in. [446 x 1507 x 52 mm]
	200 W:	38.6 x 58.5 x 1.4 in. [981 x 1485 x 35 mm]

*NOCT is measured under industry-standard open rack conditions.
NOCT for a tile roof mounting is installation-dependent with a typical value of 56°C.

DC power generated by the solar panels flows through a DC disconnect to a DC-AC inverter. The inverter automatically converts the solar power into common household AC power. The AC output from the inverter flows to the home's existing circuit breaker panels, lowering the home's rate of utility power consumption. The system meter provides information related to system performance and the home's power consumption.

GE Solar Technologies

Progressive homeowners are exploring the advantages of meeting part of their electricity needs with solar power, and GE's residential solar technologies can help get them there. Ranging in power output from 66 to 200 watts, GE residential solar products are engineered for maximum performance in any geographic location. Our flexible installation systems are designed to integrate easily into building or ground-mounted structures, and are backed by GE's 20-year warranty and strength in fulfillment.

Our product strategy is focused on results that contribute to our customers' success. Every initiative we pursue bears our uncompromising commitment to quality and innovation, and our reputation for excellence can be seen in everything we do. We believe that renewable energy alternatives such as solar will be an integral part of the world energy mix throughout the 21st century and we are committed to helping our customers design and implement energy solutions for their unique energy needs.

Photovoltaic Modules

GE's standard solar module is a 200W PV module, providing peak power output of 200 watts at 26.3 volts. It is comprised of 54 poly-crystalline silicon cells connected in a series, creating a reliable, sturdy design. The module is extremely durable and has been fitted with a robust, clear anodized aluminum frame with pre-drilled holes for quick installation.

GE also offers a 66W PV module for Roof Integrated (RI) residential applications—the highest powered module for this installation type. Roof Integration, a technology pioneered by GE, seamlessly blends solar modules into a variety of roofing materials.

Solar Electric Systems

GE Energy offers a wide range of complete solar electric power systems. Along with ease of installation and service, our industry leading systems provide a safe and reliable source of renewable power. These pre-packaged systems are designed to supply years of maintenance-free operation. Each system comes complete with modules, power electronics, mounting kits, a power meter to monitor performance, and complete documentation for contractors and homeowners.

Project Execution

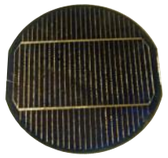
Our global project management and fulfillment expertise offer customers on-time delivery and schedule certainty. Our engineering and supply chain teams are ready to respond to any technical, mechanical or electrical questions that may arise and work with local installers to meet your goals. As one of the world's largest power plant system providers, GE is uniquely positioned to provide customers with full-service project management solutions.

GEPV Modules – Home Installation
Placerville, CA

Roof-integrated Panels
Sacramento, CA

Chadeayne Woods Development
Cornwall, NY

Premier Gardens
Sacramento, CA



1954
Photovoltaic technology is born in the United States when Daryl Chapin, Calvin Fuller, and Gerald Pearson develop the silicon photovoltaic (or PV) cell at Bell Labs—the first solar cell capable of generating enough power from the sun to run everyday electrical equipment.

Mid-1950s
Architect Frank Bridgers designs the world's first commercial office building featuring solar water heating and passive design. The solar system has operated continuously since then.

1970s
Solar technology becomes popular for land-based power applications like remote industrial and telecommunications use, TV, radio and cellular stations.

1991
President George Bush announces that the U.S. Department of Energy's Solar Energy Research Institute has been designated the National Renewable Energy Laboratory.

Last 20 Years
Solar power has been used for urban applications such as roadside emergency telephones, traffic signboards and residential housing.

Brilliance™ Solar Electric Systems

GE Energy's Brilliance™ Solar Electric Systems offer a full range of complete solar power systems designed especially for homes connected to the electric utility grid. Along with ease of installation and service, our industry leading systems provide a safe and reliable source of renewable power. Brilliance Systems are pre-engineered to include all the components necessary for complete installation—solar modules, plug and play wiring, power electronics, patented mounting kits for roof or ground, a performance monitoring power meter, and complete documentation for contractors and homeowners. Before installation, each fully integrated solar electric system is designed and tested for system wide reliability and durability. All Brilliance™ Solar Electric Systems are delivered with industry approved mounting systems for the arrays. Available with or without an Uninterruptible Power Supply (UPS), these pre-packaged systems make solar electric power affordable and simple.

Brilliance™ Solar Electric Systems options:

- Our Standard Brilliance™ Solar Electric System is ideal for both new construction and retrofit applications. This system is compatible with a wide variety of roof types and materials, including asphalt, metal, concrete tile, clay tile, slate, membrane, and tar, and the solar panel arrays can be sized to meet a wide range of power requirements.
- Our Roof Integrated (RI) Brilliance™ Solar Electric System blends seamlessly into the profile of concrete roof tiles. The simplified installation procedure reduces installation costs and enables the solar panel array to be integrated directly into the finished roof.

Ecomagination

GE Energy's solar products are certified under GE's ecomagination program. Ecomagination puts into practice GE's belief that financial and environmental performance can work together to drive company growth, while taking on some of the world's biggest challenges. Through ecomagination, GE is aggressively bringing to market new technologies that will help customers meet pressing environmental challenges.

Launched in 2005, Ecomagination puts into practice GE's belief that financial and environmental performance can work together to solve today's most pressing challenge—producing clean, affordable, renewable energy—and is founded on five firm commitments:

- Doubling investment in Research and Design
- Reducing our greenhouse gas emissions
- Increasing revenue through ecomagination products
- Improving water use
- Keeping the public informed

Homes Inspired by ecomagination

GE has created a whole-home solution that benefits the environment and your wallet. Designed to lower overall household energy consumption, resulting emissions and indoor water consumption, the ecomagination Homebuilder Program combines building science technologies with high-performance products to create new homes inspired by ecomagination.

The program benefits include:

- Advanced building science designed to protect comfort and indoor air quality.
- Innovative, efficient products designed to achieve at least 20 percent savings on energy consumption, indoor water usage and household emissions (CO_2, SO_2 and NO_X), while providing features homebuyers want including an energy monitoring platform, an advanced lighting package, ENERGY STAR®-qualified appliances and an optional solar power system featuring GE's roof-integrated, solar panels, offered in sizes from 1 kW to 10 kW. Once installed, homeowners can track the amount of electricity produced by their system on their Energy Monitoring Dashboard, an interactive wall panel exclusive to homes inspired by ecomagination.
- Significant savings on annual utility bills versus an industry-standard average new home due to energy and water conservation.

For more information about GE's ecomagination Homebuilder Program, please visit ge.com/yourhome.

Shea Homes, Sedona
Ladera Ranch, CA

Shea Homes, Sedona
Ladera Ranch, CA

Shea Homes, Sedona
Ladera Ranch, CA

Trellis Installation
San Diego, CA

Global Research

At GE's Global Research Center, some 3,000 people from nearly every major scientific discipline are working together at the intersection of technology and industry to solve some of the world's toughest problems. The Research Center has been the cornerstone of innovation at GE for over a century. Today, it is one of the world's largest and most diverse labs with facilities in New York, India, China, and Germany.

GE has been a world leader in power generation equipment for more than 100 years, and we have a vested interest in continuing this tradition into the future of the energy market. The key global drivers for the industry are environmental impact and energy independence, so at the Global Research Center we are heavily investing in new "sustainable" technologies that will create the energy systems of the future.

Global Research Center
Niskayuna, NY

Powering the world...responsibly.

To learn more about GE Energy's Solar Products, contact your local GE representative at:

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302-451-7500
866-750-3150

Or visit us online at ge-energy.com/solar

imagination at work

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