VELUX®

Solar water heating

Questions & answers about VELUX solar water heating systems

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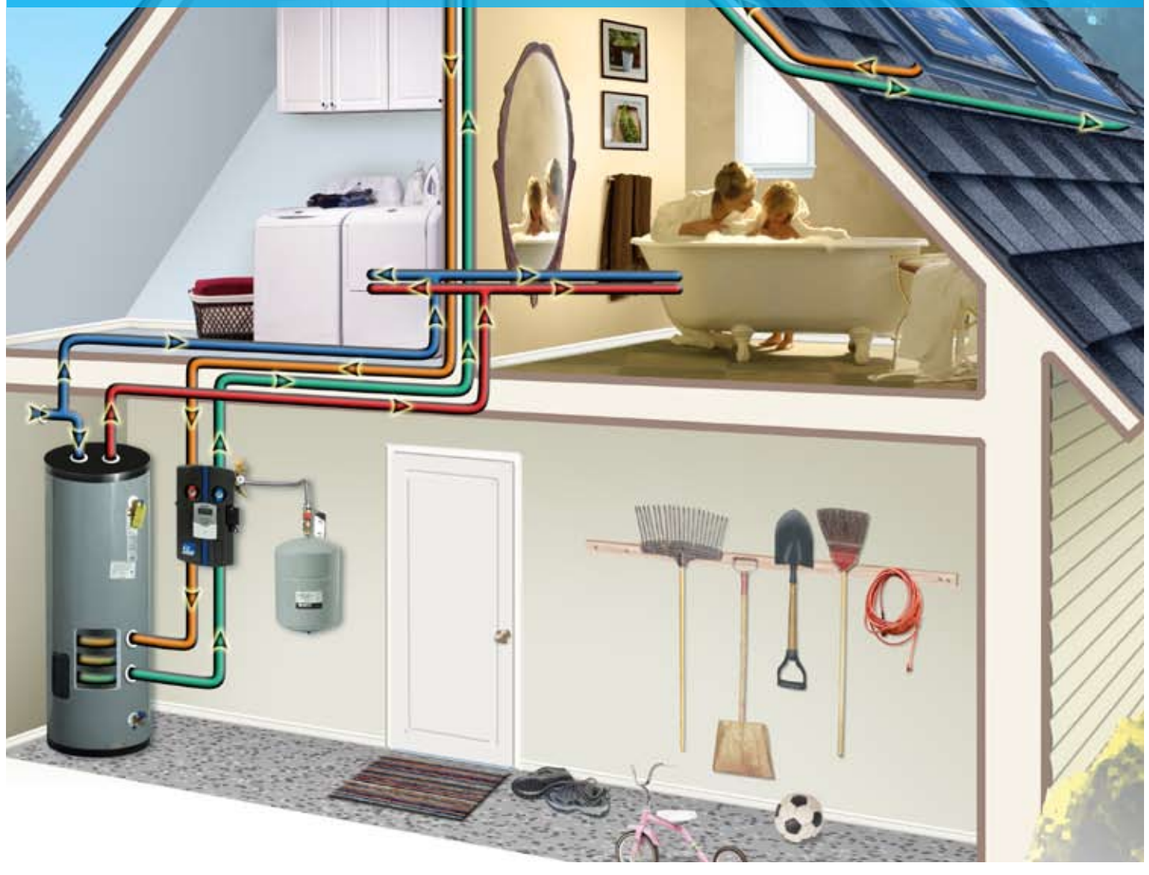
Frequently asked questions



Q What is a VELUX solar water heater?

A A VELUX solar water heater uses the sun's energy as a source of heat to produce hot water for domestic household use. A solar water heater can typically generate from 50% to 80% of the household's annual hot water heating needs. The remaining hot water needs can be supplied by either an electric or gas auxiliary water heater or boiler. Unlike other solar water heating systems, the VELUX solar system includes low profile "roof integrated" solar panels for an aesthetically pleasing look on the roof, just like VELUX skylights. The solar panels and flashing are all that are seen on the roof – there are no exposed pipes or mounting brackets on the roof.

Q Are there different kinds of solar water heaters?

A Yes. Solar water heaters are divided into two kinds of systems: active or passive. Active solar systems rely upon moving mechanical parts in order to transport heat, while passive units simply use the sun to accomplish this action. The bulk of systems installed in the United States are active because they are considered to be more efficient and attractive. All VELUX solar water heaters are active solar systems.

Q How do active solar systems work?

A VELUX solar systems have two major components: VELUX rooftop collectors and a storage tank with built in heat exchanger. A VELUX solar collector is made up of copper tubes and a copper plate that is covered with a highly selective absorber coating; this assembly is enclosed in a well-insulated aluminum frame and covered with low-iron tempered glass glazing. A propylene glycol solution within the copper tubes is heated in the collectors and circulated through a heat exchanger located in the bottom of the solar storage tank. The household water contained within the storage tank is heated by the solution circulated through the heat exchanger.

The propylene glycol solution is gradually heated by the sun's energy which is transferred to the solution in the collectors. Reliable automatic controls operate a circulation pump and provide optimal solar water heater system operation. The VELUX system collectors, pumps and electronic controls have been designed to provide over twenty years of service.

Q How much does a VELUX solar water heater cost?

A The installed system cost will vary, but will typically range from approximately $7,500 to $10,000, and will depend largely upon the following variables:

- Size of the family to be served
- Geographic location within the U.S.
- Type of roof in which the panels are mounted
- Building code requirements
- Roof pitch and site conditions for home
- Distance from solar collectors to solar storage tank

Overall system costs may be considerably less depending upon geography. The federal government currently offers a solar rebate of 30% of the system installed cost up to $2000 and many state and local rebates and incentives may also be available.

Q How much do the homeowners save?

A How much homeowners will save depends upon the size of the system, site conditions (shading, roof pitch, and orientation) and the hot water usage patterns of the family. Typically, savings will be between 50% and 80% compared to a traditional tank type water heating system.

Q How long does it take for a solar water heater to pay for itself?

A In areas that have both federal and state rebates and incentives payback for installation in an existing home payback can vary from three to six years; in other areas payback could be up to 10 years or more. However, if the solar water heater is included in the construction of a new home, the homeowners will save much more on their monthly energy bills than the increase in their house payment – the solar system provides a positive cash flow from the day they move in, effectively giving them an immediate payback.

Q How can homeowners finance a solar water heating system?

A The best way to finance a solar energy system is to include it as part of the home mortgage. In long-term loans of 20 years or more, the monthly solar savings will normally be greater than the portion of the monthly mortgage payments for the solar system. In new construction they will save much more on their monthly energy bills than the increase in the house payment. It provides a positive cash flow from the day they move in.

Q How competitive is solar water heating, cost wise, against conventional water heaters?

A It depends on several factors such as initial system cost, local fuel costs, and local rebates and incentives. Although solar has a higher initial cost than most other water heating systems, it can be very competitive over the long term. The cost of operation is considerably less than traditional tank type water heating systems – typically, you will save between 50% and 80% compared to a traditional tank type water heating system.

Q Will a solar hot water system replace an existing water heater?

A Yes and no. There are two basic sizes of VELUX solar water heaters – a two collector/80 gallon system or a three collector/120 gallon system. The two collector/80 gallon system would typically replace a conventional 40 to 50 gallon residential tank water heater; the three collector/120 gallon system would typically replace a 75 to 80 gallon residential tank water heater. VELUX solar systems can also work with, or in addition to, a conventional tank water heater to provide additional hot water capacity.

Q Will having a VELUX solar water heater affect how much hot water a homeowner will have? Will the homeowners have to change their bathing and cleaning routine?

A Yes and no. They will actually have much more hot water than ever before. Solar water heaters are always installed with an auxiliary heat source, or in addition to your regular electric or gas water heater. That means that even on cloudy days they will still have hot water. To maximize their savings, homeowners should attempt to use the most hot water in the late morning and early afternoon when the solar system is operating at its peak. Also, it helps to spread out the cleaning load (laundry, dishwashing, etc.) over the week. This will reduce the amount of time the auxiliary heat source or regular water heater must operate.

Q Are VELUX solar water heating systems reliable?

A Yes, VELUX solar water heating systems are designed to perform well for more than 20 years. VELUX solar water heaters must be installed by a VELUX authorized solar water heating dealer/installer. Normal maintenance - cleaning collectors, checking pump operation and system pressure, checking pH of propylene glycol solution, and tank flushing - is required. The latter is also recommended for conventional water heating systems, as is periodic replacement of the water heater sacrificial anode rod. Many VELUX dealer/installers will provide yearly maintenance checkups of their solar systems similar to annual air-conditioning system maintenance programs. These can be beneficial in extending the life of the system and ensuring optimum performance.

Q How much space does a solar water heating system take?

A A residential solar water heating system uses two or three solar collectors on the roof. They are approximately 4.5' x 6' each. The storage tank will fit inside a 30 inch pan under an 8 foot ceiling. The collectors are best placed on a south-facing roof. The storage tank is best located near and under the collectors, but can be located up to 60 feet from the collectors.

Q What quality standards exist for solar water heaters?

A To ensure high quality and satisfactory performance of solar water heating systems, the Solar Rating and Certification Corporation (SRCC) certifies and rates the performance of solar energy equipment. SRCC is an independent, non-profit organization headquartered in Washington D.C.

The SRCC certification is similar to the UL certification and EnergyGuide certification that residential appliances undergo for performance and efficiency, respectively. Solar systems that carry the SRCC logo have undergone extensive tests to ensure years of operation for the consumer.

Q How does the orientation and pitch of VELUX solar collectors impact the solar heat gain of a solar water heating system?

A The ideal orientation for the solar collectors is due south. The collectors can be rotated from south, up to 45° east or west with minimal loss in solar heat gain. The optimal pitch for a solar collector is at an angle measured from horizontal equal to the latitude at the installation site. The pitch may vary from 15° to 45° from horizontal with minimal impact on solar gain.

A VELUX solar collector installed at an orientation within 45° of south and at a pitch between 15° to 45° from horizontal should have a solar gain within 90% of optimal for installations within the United States.

Q Can VELUX solar water heating systems be used with radiant floor heating systems?

A No. All VELUX solar water heating systems are intended for use as residential domestic hot water heater systems only. The use of solar water heaters for space heating applications requires the addition of solar collectors and an increase in the amount of hot water storage beyond what is provided.

Q Can VELUX solar water heating systems be used in commercial hot water applications?

A No. The collectors and storage tanks used in VELUX solar water heating systems are sized for use in residential domestic hot water heater systems. Use of a VELUX solar water heater in a commercial application could result in poor performance, and/or damage to the VELUX solar water heating system.

Q Can VELUX solar collectors be installed on a flat roof?

A No. VELUX solar collectors are designed to be installed at a minimum pitch of 15° from horizontal. A pitch below 15° could result in reduced performance and/or damage to the collectors. Please note, however, that if a platform is constructed on a flat roof, that will place the VELUX collector at a pitch greater than or equal to 15°, the installation will meet the design requirements.

VELUX is continually improving and expanding our solar product offering and may modify, or add, products to support space heating and commercial applications in the future. Please contact VELUX for updates and specific details on these and other special applications.

Q Can VELUX solar systems be used in homes that have large garden, or jetted, tubs?

A Yes. However, when sizing a VELUX solar water heating system for use with a large tub, you will have to make sure that you have adequate backup storage volume to meet the volume requirements of the tub (when a tub is filled, approximately 70% of the water used is hot water from the water heater).

When sizing for a large tub, please follow the following steps:

1) *Select the VELUX system that is required for the number of occupants in the home (for a 3-4 person household, select the two collector/80 gallon system; for a 5-6 person household, select the three collector/120 gallon system).*

2) *Determine if the VELUX system selected will meet the volume requirements of the large tub. The VELUX two collector/80 gallon system has approximately 40 gallons of backup storage volume, which by the 70% hot water rule, will support tubs up to about 60 gallons. The VELUX three collector/120 gallon system has approximately 70 gallons of backup storage volume, which by the 70% hot water rule will support tubs up to about 100 gallons.*

3) *If the VELUX system selected does not provide adequate backup volume for the large tub, you must add additional backup storage, in the form of a standard gas or electric water heater installed downstream of the VELUX solar storage tank.*

For example, a 3 to 4 person home with a large 100 gallon jetted tub would be sized as follows:

1) *Select the VELUX two collector/80 gallon system*
2) *100 gallon tub x 0.70 = 70 gallon backup storage volume required (70% rule)*
   - *two collector/80 gallon has 40 gallon backup storage*
   - *system is short 30 gallons of backup storage volume*
3) *To meet the 100 gallon tub hot water requirements, add a 30 to 40 gallon gas or electric traditional water heater downstream of the VELUX system*

While in this example, it may seem that installing the VELUX three collector system will meet the large tub volume requirements, doing so could result in an oversized solar system that may not perform optimally for the number of occupants in the home.

Q How efficient are VELUX solar collectors when compared to competitive models?

A The efficiency of VELUX and competitors solar collectors can be found at the SRCC website. When first comparing our efficiency (68.6%) to competitor's which range from approximately (49% to 78%), it would appear that VELUX collectors are "in the middle of the road".

It should be noted that the SRCC efficiencies are based upon the "gross" area of the collector, which is taken from the outermost point of our mounting flanges. These "frame" materials are wider than other collectors to allow VELUX collectors to be mounted in the roof, resulting in an aesthetically pleasing design. Competitor models are mounted on the roof, with exposed piping and exposed mounting brackets, and do not need mounting flanges and cladding. As such, competitors have a narrow frame around their collectors, which results in higher efficiency based upon the gross area.

When the efficiency of collectors is compared based upon the "net" aperture area (exposed glass area through which the sun enters the collector), VELUX collectors have a more favorable efficiency (80%) compared to the major competitors (70% to 79%). This means that our collectors transfer the sun's energy to our glycol solution better than the competitors.