

SunSource® Home Energy System Frequently Asked Questions

SECTION I – PERFORMANCE AND SPECIFICATIONS

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| 1. | How many panels does it take to power the entire outdoor unit? | <p>Up to 16 solar modules can be installed per outdoor unit. An array of 16 modules on a sunny day could provide enough power that a 3 to 3.5 ton unit would not be drawing any power from the utility. The power required to start-up the compressor and motor (in rush) would always come from the utility power. In our two-stage units (XP/XC21) the full array of 16 modules could offset the majority of the utility power needed to operate even our larger capacity units on low stage.</p> <p>A different way of approaching the question is considering how much power is provided by each solar module to the home annually, whether it's powering the HVAC system, or flowing directly to the home when the HVAC unit cycles-off. When you look at it this way, depending upon which region you are in, fewer than 16 modules can provide the equivalent amount of energy required to run your cooling system for the entire year.</p> |
| 2. | How does this differ from the XPG20? | <p>The updated SunSource® Home Energy System is still an upgrade opportunity available on all SunSource® Solar Ready Dave Lennox <i>Signature</i>® Collection (DLSC) outdoor units, both heat pumps and air conditioners. Homeowners can upgrade to solar at the time of purchase or later date. Now, a fourth-generation microinverter, the Enphase M250, is used with larger and more powerful SolarWorld PV modules and up to 16 solar modules are permitted. The energy generated by the solar modules is used to power the outdoor unit. When the outdoor unit cycles-off, the power is used in the home for appliances or to satisfy other energy needs. If any surplus power is generated, it could feedback to the grid, possibly allowing the homeowner to earn a credit on their utility bills. The system also offers a communications gateway that allows the homeowner to track system operation, energy production and environmental benefits online.</p> <p>The SunSource® XPG20 was a heat-pump unit available in three sizes (3, 4 and 5 ton). It included a secondary DC motor powered by a single DC solar module installed with the system. The XPG20 was only able to use the power generated by the solar module when it was coincident with the HVAC system run-time.</p> |
| 3. | How does the Lennox Solar Subpanel Accessory connect to the outdoor unit? | <p>The new, high-rated Lennox® Solar Subpanel is installed on the Dave Lennox <i>Signature</i>® Collection Solar Ready HVAC unit. A special "trunk cable" is used to connect to each solar-module-mounted microinverter in the system. This cable transitions to conventional AC cable in a junction box. The cable goes down to the Solar Subpanel on the unit (a solar disconnect switch is placed near the HVAC unit) and connects to the pigtails labeled SOLAR.</p> |
| 4. | <p>A Can I retrofit older DLSC units?</p> <p>B XPG20 unit?</p> <p>C Other Lennox or non-Lennox units?</p> | <p>The Lennox® Solar Subpanel will only work on DLSC units labeled Solar Ready. (It will not work on previous XPG20 or older DLSC units.) The unit nameplate lists the maximum current permissible from the solar power system. The new solar sub-panel has been upgraded to handle 15 Amps and DLSC units are also now labeled to accept 15 Amps from the solar system. (The higher power M250 microinverter can be used with the older sub-panel and DLSC Solar Ready equipment as long as the microinverter string is limited to thirteen instead of seventeen. This keeps the amperage below the old sub-panel's 12 Amp rating.)</p> <p>There is no other solution in place to connect solar directly to other Lennox or competitors units. The solar sub-panel and direct connection of solar to DLSC HVAC units are Intertek/ETL listed for this application (older units are not) and both are patent pending.</p> |
| 5. | How does this system compare to a geothermal system? | <p>In general, we think this is a preferable system. Both qualify for generous tax credits and, frequently, utility rebates as well. Both have relatively large up-front costs. A ground-coupled heat pump has the potential to reduce the electrical energy required to run a heat pump. The SunSource® system can actually displace energy that would otherwise have to be purchased from the utility. The SunSource® system is saving you money anytime the sun is shining.</p> |
| 6. | When will it be available? | <p>Starting in March 2013.</p> |
| 7. | What can I be doing now to be prepared to install these when they come out? | <ul style="list-style-type: none"> • Arrange to get solar photovoltaic (PV) training. See the web links page that has been assembled. • Inquire with your local utility about their net metering rules and available renewable energy rebate/incentive programs. • Find out what local code requirements there are for solar PV in your area. • Become familiar with the on-line program PVWatts for estimating the amount of solar energy that can be generated at a site with solar PV modules. • When using PV Watts, the DC rating that should be inputted is 0.280 kW multiplied by the number of panels to be installed. The DC to AC de-rate factor that should be used for the M250 system is 0.861 (per Enphase Energy). |

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| 8. | Is the Solar Subpanel factory installed or a field installed accessory? | The sub-panel is a field installed accessory (catalog number 62E02) making solar an upgrade option for any new solar ready DLSC unit installed. |
| 9. | Will iComfort® recognize any part of the solar installation? | No, upgrading an iComfort® DLSC outdoor unit to a SunSource® Home Energy System will not affect iComfort® in any way. The two options are independent. |
| 10. | What makes the DLSC unit solar ready if the sub-panel is sold as an accessory? | The DLSC units are referred to as solar ready because they have been safety agency (Intertek/ETL) listed to have a secondary solar power connection to them. In addition to this they also have been modified to accept the solar sub-panel accessory and equipped with provisions for the connection of the solar power. |
| 11. | Are there any stipulations with what type of circuit breaker can be used for the HVAC unit? | The HVAC breaker in the main panel must be suitable for back feed (not marked with LINE and LOAD) and cannot be a GFCI or arc fault type breaker. |
| SECTION II – SOLAR MODULE SPECIFICATIONS AND PERFORMANCE | | |
| 12. | What happens when my panels are covered in snow? | When solar modules are covered by snow they do not receive sunlight and will not generate solar power. Our solar modules are installed at the angle of the roof and have a slick glass surface which may allow the snow to slide down. In the event of accumulation, the homeowner will need to brush-off the snow to get solar power. |
| 13. | How does the unit feed power back to the grid? Where is the transfer switch? | <p>Each PV module is connected directly to its own individual micro-inverter. The purpose of the microinverter is to convert the DC power created by the solar module to AC power. Before the microinverter will produce AC power is must first sense that it is connected to utility power. It needs to do this for several reasons:</p> <ul style="list-style-type: none"> A If the utility power is out, then the microinverter must shut down so that it does not push power back out onto the grid when a linesmen could be servicing it. B The utility power must be within certain specifications (established by IEEE) for the microinverters to produce power. See installation instruction for specifications. C The microinverter must analyze the utility power so that the power that it produces will synchronize with the utility power (voltage, frequency.) <p>After the microinverter establishes that the utility power is present and within specification, it generates a matching waveform that will work harmoniously with the utility power (no transfer switch needed). The one difference is that the voltage produced by the microinverter is at a slightly higher voltage potential. This slightly higher voltage potential drives the power produced by the microinverter to the nearest load first and is used preferentially over the utility power. In our case this would be the HVAC unit, if it is running. Otherwise the higher potential will drive the voltage back to the electrical distribution panel to the loads running there. If nothing was on in the house it would drive it back to the utility company spinning the utility meter backwards. An analogy can be made here of a water distribution system with two water sources; one from the normal municipal water source and the other an on-site water source. If the on-site water source, driven by a pump, was at a higher pressure than the municipal water source, then that source would feed the faucets in the home first.</p> |
| 14. | How do the panels hold up to hail? | The solar modules are made using tempered glass and are laminated to a resilient substrate. This makes them rugged and durable. While they are weather and impact resistant, hail that is large enough can damage the solar modules. We recommended the homeowner include these under their homeowners insurance, if possible. (Hail damage is not covered under the terms of warranty) |
| 15. | How heavy are the solar modules? What are the dimensions? | Module weight: 46.7 lbs each. Module Dimensions (L x W x H): 65.94" x 39.41" x 1.22" |
| 16. | What is the DC wattage of the solar modules? What is the voltage and amperage per module? What is the AC wattage of the system? | The DC rating of a module is 280W. Each module is equipped with a micro-inverter that directly converts the DC power to AC. After the standard derates of the system are applied (.861 used in PVWatts), a customer can expect about 241W of AC power production when the solar panel is placed in an optimal location. The output of each micro-inverter is 240 VAC split phase power and each micro-inverter is internally limited to 1.0 Amps output and 250W peak. |
| 17. | How does the efficiency of the modules degrade over time? | Crystalline solar modules (like the ones available with SunSource®) are designed to last a very long time. Due to many various factors, there is a characteristic, slight decline in output over time. The solar module performance warranty guarantees at least 80% of original power performance after 25 years. |
| 18. | What is the conversion efficiency of the microinverters? | The DC to AC conversion efficiency of the microinverter is 96.5%. |
| 19. | How much power can I get on a cloudy day? | <ul style="list-style-type: none"> A Solar modules will still produce power on cloudy or overcast days, but at a reduced level. B The amount of power will depend on the cloud cover, and will vary accordingly. |
| 20. | Are there ever reasons not to wire the solar power system through the HVAC unit? | Yes. If the customer bought a 2009 DLSC unit and now they want to have solar system then, it would make more sense to do a conventional installation of the solar components than to change-out the HVAC unit. Another situation in which wiring the solar power system to the electrical distribution panel might be preferable is if the distribution panel (and electrical service entrance) is closer to the solar modules on the south side of the house than the HVAC unit that is on the north side of the house. |

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| 21. | How do these systems differ from a single inverter system? | <p>There are several important differences:</p> <ul style="list-style-type: none"> A The DC voltages are much lower. This relaxes some important code requirements B Each microinverter uses maximum power point tracking to optimize the output of the solar modules on an individual basis. This gives significant performance enhancement when there are shadows on the modules. C The energy monitoring and diagnostic features provide information on a module by module basis. It is possible to see when a module is under-performing. |
| 22. | How does the system prevent electricity from being put back on a dead grid? Anti-islanding technology? | The microinverters are specially designed to safely operate with the grid. There is an IEEE standard 1547 and a UL standard 1741 that these devices must comply with before they are certified for utility interaction. The Enphase microinverter meets these requirements. |
| 23 | Why is the installation limited to 16 modules per outdoor unit or branch circuit? | The limitation of 16 modules per outdoor unit or branch circuit comes from the design of the microinverters. They are only designed for the maximum current generated by a string of 16. We have designed the new sub-panel and DLSC units to be compatible with the new, higher current rating of the M250 microinverter string. |
| 24 | Is the electricity produced by the microinverters clean enough to power our G71MPP and SLP98V furnaces? | YES! The IEEE requirements governing grid interconnection require that a grid tied microinverter must produce power meeting distortion specifications that are suitable for our furnaces. |
| 25 | Where are the solar modules made? | The SolarWorld PV modules are made in the USA. The company is vertically integrated and manufactures the solar cells as well as assembling the solar modules. SolarWorld's fully-automated production lines and seamless monitoring of production helps ensure consistent quality. The micro-inverter is from Enphase Energy, also a US-based company with manufacturing in US, Canada, and China. |
| 26 | What type of maintenance is required for the solar modules? | The solar modules do not require a great deal of upkeep. Keep the glass surface of the solar module clean and free from debris. Use water and a soft sponge or cloth for cleaning the glass surface. IMPORTANT: Do not use high-pressure sprayers to clean modules. |
| SECTION III – SOLAR MODULE MOUNTING | | |
| 27 | Do I have to put these on the roof? Ground or pole mount? | Lennox provides a selection of four different types of roof-mounting kits. We recommend pole and ground mounting systems from Iron Ridge. |
| 28 | How does it attach to the roof? What types of roof mounting kits do you have? | The solar modules are mounted with a traditional style of rail-based racking. The rails are mounted on roof flashings, which differ by the type of roof. There are three different types of roof mount flashings available, composition shingle, flat tile, and barrel/s tile. The flashings, hardware for the roof penetrations and rails are all included in the roof mounting kits. Mounting parts from S-5! can be used for mounting to metal roofs. |
| 29 | What direction should the solar modules face? What angle should they be mounted at? | Solar modules should be installed south-facing. While there is a preferred angle of tilt, determined by the latitude of the site, the mounting system we have selected uses the pitch of the homeowner's roof. This will minimize the complexity of the installation, while providing homeowners with an elegant, low profile array. There is generally only a slight tradeoff in performance. There is an on-line tool, PVWatts, that can be used to estimate the impact of orientation away from south and tilt other than equal to the latitude. |
| 30 | How far can the panels be from the unit? What gauge wire do I need? | The maximum distance is determined more by the ability to communicate energy performance over power line carrier. There are recommendations about distance in the Enphase manual. A communications booster can be used to extend the performance of the power line carrier (PLC) system. As far as conducting the power, it is recommended to size the wires to keep the voltage drop below 1%. As an example, a 16 solar module system can use #10 wire at 60 feet and #6 wire at 154 feet. A wire size table has been provided in the installation instructions. |
| 31 | What happens if my trees shade the modules? | Any significant shading on an individual solar PV AC module will substantially reduce its output. One of the great features of microinverter technology is that, by using a dedicated microinverter with each solar module, shading on one module does not drag down the others on a string (as it does with traditional string inverters). |
| 32 | Is there a ground mount or flat roof mounting system available in addition to the 4 roof mounting kits? | Flat roof mounting systems are available on special order. Two different types of mounting feet are available for metal roofs. Pole and ground mounting hardware are available from Iron Ridge. |
| 33 | In the event that a microinverter fails, can it be replaced without removing the panel? | No, but with this rail-based mounting system it is easy to lift the individual solar module. |
| 34 | Are there any mounting guidelines for the solar modules with proximity to the edge of the roof? | Yes there are. Consult the SolarWorld Installation Tips manual as well as local codes governing module setbacks |

SECTION IV – COMMUNICATION MODULE AND ONLINE MONITORING

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| 35 | How does the communication module work? | Simply plug the Envoy communications gateway into any outlet in the home (without any surge protector). Data from the microinverter (on the solar module) is communicated over the power wires to the Envoy via a proprietary power line carrier (PLC) system. The Envoy communications gateway is then connected using a standard Ethernet cable to a broadband router, which uploads collected data to a server that will make it available on the online monitoring website. |
| 36 | What happens if I do not have an Internet connection? How do I know that the panels are working? | If there is no Internet access at the installation site, it is still possible to communicate directly using an Ethernet port and a personal computer with web browser. More information is provided on the instructions of the Envoy communications gateway, under Envoy Local Interface. If no communications gateway is used, indicator lights on the microinverters show whether system is working. Amperage and voltage produced by the solar modules can be measured at the connection point in the outdoor HVAC unit. |
| 37 | Is the Envoy communications gateway a required component for the system? | The Envoy is not required for the system to function, but it is highly recommended that one is installed on every system so the homeowner can monitor the benefits that the solar system is providing them. Also, the Envoy communications gateway offers valuable diagnostics for the homeowner and the installer to alert of any service or performance issues. |
| 38 | Is the Enlighten online monitoring service provided with the microinverters or is there an additional cost? | The Enlighten online monitoring service is provided free with the purchase of an Envoy system. |

SECTION V – REBATES AND INCENTIVES

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| 39 | Where can I go to find out more information about rebates? | The Database of State Incentives for Renewables and Efficiency (DSIRESolar) provides a good starting point to understand what is available: http://www.dsireusa.org/solar |
| 40 | Can I get both energy efficiency and renewable energy federal tax credits? Does the tax credit include the outdoor unit? | Most DLSC SunSource® Solar-ready heat pumps and air conditioners qualify for the HVAC tax credit (10% up to \$500). The solar components including the Lennox® Solar Subpanel, and their installation costs, qualify for the solar tax credit (30%, no cap and good through 2016). |

SECTION VI – UTILITY, LICENSING AND CODE REQUIREMENTS

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| 41 | What license do I need to install these? | Generally speaking, there will need to be someone with an electrical license supervising the installation. There are no uniform certification requirements for installing solar photovoltaic systems. A good way to find out what local requirements exist is to speak with your local electric utility to find out what they expect in the way of experience/certifications. |
| 42 | What about my homeowners association (HOA)? | Some states have laws limiting the power of an HOA to restrict installations of solar devices. Even so, HOAs may adopt reasonable rules regarding the placement of a solar device, as long as the installation does not impede its functioning or efficiency. If you belong to an HOA, review your covenants for details. HOA approval is likely a requirement. |
| 43 | Do I need to team up with a solar installer or can I install them myself? | It is important to become familiar with the NEC requirements for solar PV installations. (See Section 690.) A good way to get up to speed is to take a one-week course in solar PV offered by one of several nationally known solar organizations. We have developed a checklist to use in planning an installation. Review it to get a feel for the various aspects of doing an installation. You can become a qualified installer or team up with an experienced solar installer. Either way can work. |
| 44 | Can these meet my local wind code requirements? | The solar modules themselves will not present a limitation. The number of attachment points must be increased in order to meet more stringent wind requirements. |
| 45 | Do I need to a special meter from the utility? What do I need to do with the utility company when installing these systems? | This varies from utility to utility. When you make an application for interconnection with a utility, they will tell you whether the meter at the residence is suitable or not. If not, they will change it out. Some net metering programs require an additional meter to separately measure the output of the solar power system. These meters are often called <i>Renewable Energy Credit (REC)</i> meters. The REC meter may or may not be supplied by the utility. Note that in some states (New Jersey, for example) the Renewable Energy Credits may have considerable value. Different states have different policies on who gets to claim these RECs. In some states, the utility claims them, in others, the homeowner gets them. |
| 46 | Is there a certification program for solar installers? | Yes, North American Board of Certified Energy Practitioners (NABCEP – Certification as a PV installer) is the most well know but it is not the only one. See the web-link reference. http://www.nabcep.org |
| 47 | What safety agency certifications do the components of the SunSource® Home Energy System carry? | <ol style="list-style-type: none"> 1. Lennox Solar Subpanel — ETL/Intertek (US and Canada) Listed Accessory to UL Standard 1995. 2. Enphase Microinverter — CSA (US and Canada) Listed to UL Standard 1741 3. SolarWorld Solar Modules — ETL/Intertek (US and Canada) Listed to UL Standard 1703. 4. SolarWorld Pitched Roof Mounting System - P.E. Certified CA, 2010 Building Code, ASCE 7-05 and 2009 International Building code. |

SECTION VII – SUNSOURCE® TRAINING

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| 48 | Will Lennox provide sales tools and training on solar? | <p>A Sales training will be available via online eLearning, webinars or live sessions</p> <p>B Technical training will be available via online eLearning, webinars or live sessions</p> |
| 49 | Are there sources of information for training and selling solar? | Yes, see the web links page we have assembled. |
| 50 | Does a dealer have to receive training from Lennox to purchase SunSource components? | Yes. Lennox technical and sales training is highly recommended. Those dealers that complete the training will be recognized as a solar ready dealer on the dealer locator on www.lennox.com . |

SECTION VIII – SAVINGS CALCULATIONS

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| 51 | Can I get a calculator that will show the amount of solar energy a homeowner can expect? | A web-based program, PVWatts at www.nrel.gov/rredc/pvwatts/version1.html is the tool used to estimate the availability of solar energy. The program was developed by the National Renewable Energy Laboratory and it is a great tool. See the web links page we have assembled. The value of this energy is calculated if an electric rate is provided along with the other inputs for calculations. Remember that replacing their HVAC unit with a DLSC tier unit will also provide them significant annual savings! It is a package deal. |
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SECTION IX – WARRANTY

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| 52 | <p>Dave Lennox <i>Signature</i>® Collection air conditioners and heat pumps have a 10-year limited warranty. The Lennox® Solar Subpanel accessory is also covered by a 10-year limited warranty.</p> <p>The PV AC module consists of several components, each of which is covered by its own warranty. The frame on the panel and the balance of the system components (roof mounting hardware, etc.) are covered by a 10-year limited warranty. The solar module is covered by a 10-year workmanship warranty and also has a power output guarantee. The power output guarantee states that the output of the module will not degrade over time more than a set percentage of 0.7% per year for 25 years. The micro-inverter has a 25 year limited warranty. The Envoy Communication Gateway has a one (1) year warranty. Warranty for these items are handled by their respective manufactures.</p> | |
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