



Grid-Tie Solar Electricity Quick Reference

Thank you for your interest in solar energy. This information circular will summarize how solar energy works, how it can be practical and offer you an approximate estimate toward costs involved.

What is Solar Energy?

Energy from the sun is called *solar energy*. Solar energy provides light, heat and energy to all living things on Earth. The sun is the most inexhaustible, renewable source of energy known to man. Solar energy is free energy from the sun for life.

Solar thermal energy captures heat from the sun and typically transfers this heat to water (a system which is widely used throughout Europe). Sphere Business Solutions Inc. can provide pool heating and domestic water heating systems that are very practical. However, this circular will provide information on energy systems designed to generate electricity, not heat. If you have an interest in learning more about solar thermal please contact customer care. Email: info@spherebusiness.com or call us at 416.425.8159.

Solar Electric or Photovoltaic (PV)

Solar electric technology converts sunlight into electricity through a photovoltaic (PV) cell, commonly called a solar cell. A photovoltaic module made from a set of PV cells is a non-mechanical device commonly comprised of silicon alloys. Sunlight is composed of photons, or particles of energy. These photons contain various amounts of energy corresponding to the different wavelengths of the solar spectrum. When photons strike a PV panel, they may be reflected, pass through or be absorbed. The absorbed photons provide the energy to generate electricity. When the panel absorbs enough sunlight (energy), electrons are excited and dislodged from the material's atoms creating the flow of electricity.

Connecting to the Grid

PV modules will create Direct Current (DC) electricity. To use in your home, an inverter is needed to convert DC electricity to Alternating Current (AC) electricity. A grid-tie PV system, using a *Utility Interactive Inverter*, means that batteries are not needed to store excess electricity. The utility interactive inverter converts DC electricity into AC electricity and allows the power to be used in your home. Excess electricity generated from your PV modules is sent back into the utility grid, causing your utility meter to spin backwards. At night, your home will draw electricity from the utility grid like a conventional home. You only pay the net difference! This process is called *Net Metering*.

Environmental Benefits of Solar Electric Power

Every kilowatt-hour of electricity produced from your solar system will displace electricity produced from conventional power generation stations using fossil fuels that contribute to CO₂, SO₂, NO_x and smog. In the summer clean renewable solar electricity production reduces suspended particles (Smog). Smog is a significant problem on many hot sunny days when your Sphere Business Solutions Inc. Solar Home produces electricity at its peak level of performance.

Reductions in greenhouse gases and smog are directly proportional to the size of the system. Each kilowatt-hour of electricity produced by coal fired plant results in emissions of 1 kilogram of CO₂, plus SO₂ and NO_x emissions. A Sphere Business Solutions Inc. Solar Home provides you with totally clean electricity unlike the electricity that is produced from conventional energy sources.

Regulatory Status

Energy and electricity is under provincial level jurisdiction. Therefore rules and incentives vary from province to province. Currently these systems need to work with the current local Utility Distribution Company. Ontario has introduced legislation mandating any home or business owner the ability to participate in a Net Metering program if they choose. Ontario has recently introduced financial incentives for local distribution companies to Buy Back excess energy from Solar Power homes and business at a premium 42 cents / kWh. Ontario has also agreed to rebate the 8% Retail Sales Tax (RST or "PST") paid on all system parts of a grid-tie renewable energy system installed on Home or Business prior to 2007. Renewable energy includes, wind and solar power generation.

System Size

Solar is inherently and almost infinitely flexible, so one question to ask is, how much do you want to spend? Sphere Business Solutions Inc. recommends residential solar energy systems should generate less power than is expected to be consumed to avoid attempting to obtain a cheque from the local distribution company. Legislation currently states the utility company will not owe or remit payment to anyone participating in a Net-metering program, in the event the homeowners power generation facility produces more power then is used.

While numbers vary, a typical home and Canadian family using natural gas, forced air heating will consume approximately 8,000-kilowatt hours (Kwh) of electricity *per year*. Ontario Hydro states an average home would require a 2000-watt PV system to effectively power. This varies for each homeowner and family. PV systems are rated in terms of maximum instantaneous power output in kilowatts (kw). To provide you an idea toward equipment cost, a 1000-watt PV system will be approximately \$10,500. *Increasing the power output of your system is less costly!* In the event you decide to purchase a Sphere Business Solutions Inc. Solar Power Generation System, or expand an existing system. Please contact us for more information.

Solar Home Benefits

Take control of your needs
Add Comfort, Security and Value to your home
Reduced Electrical Bills
Protection from Energy rate increases
Save environment by reducing Smog and CO₂
Improve air quality
On-site independent power generation
Connected to grid for continuous power

Energy For Life

Solar technology is very reliable
PV modules have manufacturer's warranties of 20 years
Provide years of automatic operation
Virtually maintenance free
Code compliant, system engineered technology
No moving parts to break down
Seamless integration to home and utility grid

For additional Information:

Please contact us with any inquiry concerning developing your own custom designed Photovoltaic power generation system and answers to any further questions you may have.

Thank you, once again for your interest!

Sphere Business Solutions Inc.

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