

Going Solar: A Guide for Consumers

1. Introduction

Congratulations, on taking the first steps in becoming more energy independent! Using solar energy is one of the most natural ways of powering your home and is a fantastic sustainable lifestyle choice. A solar photovoltaic (PV) system can generate significant benefits for you or your home, helps reduce greenhouse gas emissions, and makes you an active participant in the expanding green energy sector.

This document will help you navigate various solar options and help identify the right solution for you. The Canadian Solar Industries Association (CanSIA) is here to assist you make an informed choice. Whether you're buying a solar system outright or entering a long term agreement with a solar company, we aim to help you understand the basics of solar energy, help you go solar, and identify what questions to ask your solar professionals.

It is important to remember that going solar is a major investment decision, similar in financial scope to buying a car. As with any major investment, you should thoroughly research and evaluate your options before choosing the company that will sell and/or install your solar system. The purpose of this document is to ensure that consumers are informed of the major steps and considerations when buying a solar system. The more informed you are, the more likely you are to be a satisfied customer.

If you have questions concerning the information in this document, we invite you to reach out to us at info@cansia.ca. We will endeavour to answer your questions and get you the information you need. CanSIA will update this document periodically in order to make it as effective as possible for consumers. If there is a piece of information you think would be helpful to include, let us know!

2. How Solar Works

For residential applications, the most common form of solar system is a solar photovoltaic (PV) system. These are systems which convert sunlight into electricity, using the photovoltaic principle and can be used to meet your home's electrical demand. Grid-tie systems enable you to receive credits or payments for energy that you export to the electrical (utility) grid system.

2.1 The Equipment of a Solar PV System

The main components of solar PV systems are:

- **Modules** (aka solar panels) that convert sunlight to electricity;
- **Inverter(s)** that convert(s) the direct current (DC) electricity generated by the panels into alternating current (AC) for use in your home or for export to the grid; and

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- **Racking** that either connects your panels to the roof of a building (rooftop), or, that mounts your panels to the ground (groundmount).

Solar modules are grouped together to form a solar array of connected modules to provide any level of power requirements, from mere watts (W) to kilowatt (kW).

2.2 Solar Electricity Terminology

Below you will find some common terms used in the electrical utility / solar industry. Understanding these terms will help you in your discussions with solar vendors.

- **DC Electric:** term used to categorize electricity with a constant positive polarity, the same as used in a common household battery.
- **AC Electric:** term used to categorize electricity with an alternating polarity, the same used in the transportation of power in the electrical utility grid system.
- **Kilowatt (kW):** used to describe instantaneous usable power, and is a product of multiplying the Voltage and Current component of a system.
- **Kilowatt peak (kWp):** used to describe the instantaneous energy output capability of a solar electric system under ideal solar energy conditions (aka during peak times during the middle of the day).
- **Kilowatt hour (kWh):** describes the amount of power delivered over a period of one hour and is the universal quantity for electrical utility billing.
- **Voltage / Volts (V):** term used to identify the pressure of a system – the greater the pressure the more power can be transported in an electrical wire.
- **Ampere / Amps (A):** term used to identify how much electrical energy is flowing in an electrical conducting wire.
- **Feed in tariff (FIT):** identifies an agreement where the utility company buys all the power generated from your solar electric system at a set price for a set period of years.
- **Net metering:** identifies an agreement where the utility company buys the surplus power which is not consumed in your home.
- **Grid tie:** used to identify when a system is connected to the electrical network, this connection type allows excess power to be taken in return for money/credits from your utility company.
- **Off grid:** identifies independent solar generation and consumption of electricity, associated with remote cabins / properties, typically a seasonal option or requires batteries and/or a generator.
- **Local Distribution Company:** term used for your power / electric utility (hydro) company.

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3. Ownership Options for Your Solar PV System

There are generally three main routes to go solar in Canada; these options are summarized below;

- **Purchase:** Outright ownership of the system from the initial installation. This requires greater initial capital investment and the owner assumes the ongoing operating and maintenance costs.
- **Lease to own:** Allows the home owner to eventually own the system by paying it off over a set period. Typically solar companies allow consumers to buy-out the rest of the cost of the system at any time.
- **Power purchase agreement:** Provides a green power option for the consumer to purchase electricity from the solar system. Typically offered by electrical solar contractors and / or your electrical utility company.

Which option you choose will depend on a number of factors, some are listed below. These certainly are not the only factors when choosing solar power, but they are the main ones:

- How much you can initially afford to spend on your system.
- How much ongoing operation and maintenance work/risk you want to assume.
- How you are compensated for the electricity generated by your solar PV system where you live.

3.1 Purchase

The option to purchase your solar PV system has higher up-front costs, but allows you to own the system and have full access to all revenues that are generated. Ownership of your solar electric system is very much like owning your home and owning your own solar system to power that home, rather than renting utility power indefinitely.

Pursuing this option will require a solar vendor to both sell you the solar PV system (and all necessary equipment) and, usually, to install the system. Once the system has been installed you may be responsible for ongoing operation and maintenance of the system, however, some solar companies will sign an agreement with you to provide those services. This will increase the cost of the system but ensures that your system is being maintained by a qualified professional, keeping it performing optimally and helps to increase its useful life.

This type of ownership option is available in all jurisdictions in Canada (where solar PV systems are sold) regardless of the way that you will be compensated (if at all) for the electricity generated by your system. We will cover the main ways customers are compensated for their generated electricity in Section 4, below.

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3.2 Lease to Own

Some companies offer “no (or low) money down” solar PV systems to customers.

In this type of an arrangement there are either no, or low, up-front costs to the customer in order to install the solar system. Generally, under this type of arrangement, the customer will pay off the cost of the system slowly over time using the revenues from the electricity that is generated. Some solar vendors will also pay you an agreed upon annual sum for as long as you are paying off the cost of the system.

Generally, solar vendors will allow customers to pay off the solar system early in one lump sum payment and take immediate ownership of the equipment, should they wish. Ask your solar vendor if this is an option when you are doing your research.

This type of ownership option is most common in jurisdictions that have long-term contracts for solar, such the [microFIT Program](#) in Ontario. For more information on the Ontario microFIT Program, please see Section 4.1.1. below.

3.3 Power Purchase Agreement

This ownership option is not to be confused with a long-term contract (also called a power purchase agreement) such as the microFIT Contract available in Ontario. This ownership options refers to an agreement between the solar vendor and the customer for the sale and purchase of electricity generated by the solar PV system.

Under this ownership option a vendor installs the solar system on your building (or property), generally at no cost to you. The solar vendor continues to own and operate the solar system throughout the term of your agreement and you purchase the electricity generated by that system rather than buying it from your local electric utility. The “power purchase agreement” is the agreement signed between you and the solar vendor which establishes the terms under which you will buy the electricity generated by the solar system.

Generally, solar vendors will allow customers to pay off the solar system in one lump sum payment and take immediate ownership of the equipment, should they wish. Ask your solar vendor if this is an option when you are doing your research.

This type of ownership option is most common in jurisdictions with net metering programs. We will cover the main ways customers are compensated for their generated electricity (including net metering programs) in Section 4, below.

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4. Compensation for the Electricity you Generate

There are two main ways that individuals and businesses are compensated for the electricity generated by a solar PV system in Canada at this time. More information on each is available below.

4.1 Long-Term Contract

In some Canadian provinces, either the government, an agency, or the local electric utility, will have programs in place that offer long-term fixed price contracts to solar generators. The most widely known of these types of programs in Canada is the microFIT Program in Ontario.

These contracts are generally for a period of 20 years (though this can differ) and have numerous requirements and restrictions built into them including:

- Eligibility on the types of entities that can apply for and hold a contract;
- The price you will be paid for the electricity generated by your solar PV system;
- The length of the term of the contract; and
- Any dispute resolution mechanism between you and the contract counterparty.

These long-term contracts can be quite complicated and customers are advised to read and fully understand them before making the decision to apply for one. It is important to note that these are legally binding agreements and if you are found to be in breach of the provisions, there can be legal ramifications including having your contract terminated.

The main benefit of having a long-term contract is that you know how much you will be paid for the electricity you generate and for what period of time you will be paid. This high level of certainty often helps in acquiring financing for your system in the event you cannot pay for it upfront all at once.

4.1.1 Ontario's microFIT Program

This section includes specific details on Ontario's microFIT Program. Due to the size and scope of the microFIT Program, CanSIA has elected to include a dedicated section within this document for Ontarians who are thinking about applying to the program.

The microFIT Program is a standard offer program managed by the Ontario Independent Electricity System Operator (IESO). This means that the rules and contract for the program are standardized and do not differ from project to project. Some important aspects of the microFIT Program include:

- Individuals interested in applying for a microFIT Contract must do so via an on-line tool. The contracting process and ongoing management of the contract is also all done on-line. There are, however, certain prescribed forms which must be printed out in hardcopy, signed, and then scanned for upload through the on-line tool.

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- The microFIT Contract is a 20 year agreement to purchase all of the electricity generated by your system at a fixed rate. The fixed rate you receive is based on a price schedule that is set by the IESO. This price schedule is generally updated once a year, however, once you have your project built and connected, your price will not change for the life of the contract.
- Even if you are entering into a solar leasing arrangement with your solar provider (i.e. a deal where you pay little or no money upfront for the solar system and pay it off over time), you will still be the applicant to the program and the holder of the contract. This means that you will have the legal obligation to the IESO and any associated liabilities. A third-party solar provider can support you in applying to and navigating the process through to receiving a contract, but the contract will be in your name.
- Only certain types of entities are permitted to apply to the program (ex. Individuals and farmers) and each person may only have one project.
- There are specific timelines for all stages of the application process. If you do not meet these timelines, your application will be rejected and you will need to start the process over again.
- Under a microFIT Contract, you must sell all of the electricity you generate to the local distribution system (i.e. you cannot directly consume the electricity generated by a microFIT project).
- Applicants to the microFIT Program should also enquire as to the possible impacts to their property taxes, income taxes and home insurance as these can all be affected by a microFIT project.

If you have specific questions regarding how to apply, the microFIT Rules or microFIT Contract, we recommend you reach out to the IESO directly through the microFIT website at <http://microfit.powerauthority.on.ca/>.

4.2 Net Metering

Net metering (also known as net billing) is a mechanism for compensating parties for the electricity generated by a solar PV system through two channels:

- The homeowner / generator first consumes the electricity produced by the solar system at their home/building, therefore lowering their electricity bill; and
- The generator exports any excess electricity (if they are generating more electricity than they are using) to the local distribution grid. This exported electricity is generally credited towards the homeowner's electricity bill, giving them credits to apply against future electricity consumption.

It is important to remember that, in most provinces, no cheque is issued under a net metering arrangement. Generally, the only way you are compensated for your electricity generation is based on lowering your electricity bill.

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Some form of net metering regulation is generally available in all jurisdictions in Canada that are connected to a local electric distribution system. There are differences, however, in how different jurisdictions allow for net metering. To get more information about how net metering is done in your particular area you should contact your local electric utility or the electricity regulator in your province/territory.

5. Selecting a Solar Vendor

Installing solar technology is about much more than getting a system at the lowest cost. It is about analyzing your unique needs, coming up with the best overall solution, choosing the right components that are certified and labeled for use in your jurisdiction, installing them correctly, and keeping the system running as expected over its life time. You want to choose a vendor you look forward to working with over the period of design, installation and ongoing delivery of power.

It is also recommended that you choose a solar vendor that is a member of CanSIA. CanSIA members have subscribed to our Code of Ethics as well as to our Solar Business Code of Conduct, recognizing their obligations to the public, the consumer, the industry and related professions and industries.

To view CanSIA's consumer protection resources, including the Code of Ethics and Solar Business Code of Conduct, please click [here](#).

To view CanSIA's member directory, please click [here](#).

Below you will find helpful information on how to select a vendor, what to ask them, and what information they should be providing you.

5.1 Checking References

Start by determining if the prospective vendor has a record of quality work in the solar installation business by asking questions and checking references. Remember, it's not a perfect world and some installs may require additional follow-ups. Ask for history regarding how the vendor solved site based issues in the past.

Obtain independent feedback from past customers wherever possible. You need to be able to count on the company to competently manage your installation from permits to safe solar power delivery. If the vendor's main experience is unrelated to solar, you may want to ask more questions about how their prior skills and experience relate to the solar business.

You can also check with groups like the Better Business Bureau to see if the solar vendor you are thinking of working with is listed on their website, history of complaints against them, and how they have worked to resolve those issues.

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After your consultation, ask yourself if your vendor representative leaves you with the confidence that the company will be around for the long term to deliver on warranty coverage and services that will assure optimum performance of your system. If there is any doubt, ask more questions. Consult multiple vendors and compare your findings.

5.2 Reducing Installation Risk

Determine the installation services that your solar vendor offers in-house. Some providers subcontract these services to reduce labour costs. There are a number of pieces of information that you should be getting from your solar vendor.

- A licensed electrician or plumber may be required to take out a permit and be responsible for all electrical connections on site. If your vendor contracts out work, find out who they use and whether that company or person is experienced with, or certified in, the installation of solar technology.
- To reduce risk and protect all parties, you may decide to give preference to certain vendors based on the degree to which their installers are trained in solar technologies. Anyone working on site must also be insured by the Workplace Safety and Insurance Board.
- Other related solar certification organizations like North American Board of Certified Energy Practitioners (NABCEP) provide optional certification for Canadian contractors choosing to dedicate their efforts to improving solar development and applicable standards.

5.3 Assessing the Cost of the Solar System

It is important to understand what goes into the cost of the solar PV system you are purchasing, and what products and services are included in the cost. There are a number of pieces of information that you should be getting from your solar vendor.

- Ask for a written accounting of the costs and responsibilities covered in the total cost estimate.
- Look for the costs of stamped engineering drawings, building permits, warranty support and maintenance support going forward.
- Will the vendor help you with your an incentive application (where applicable)?
- Will the company order all the required equipment? In other words, does the total cost estimate include a complete “turnkey” installation including all permits, costs and related tasks?
- Who will bear the costs for temporarily removing and reinstalling the system if your roof needs to be renovated?
- Will the installation of a solar system have implications for your home insurance, income taxes or property taxes?

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5.4 Site Selection

One of the most significant factors that will affect how much electricity (kWh) your solar PV system will generate are the conditions of the site on which it is constructed.

- When determining the best location for your installation, a competent solar company will provide detailed performance modelling.
- With the use of appropriate devices and/or analytical skills, the representative can identify obstructions such as structural or natural features that could affect system performance because of shading, both now and in the future.
- Ensure the system will be unshaded for the life of the contract. At this point, it is well worth speaking to neighbours to discuss plans that could affect one another's use of the land (e.g., removal or addition of trees, home renovations etc.).
- The orientation of the planned system is also important. The angle/pitch and compass direction of the roof will impact how much sunlight in your area hits the panels.

5.5 Examine Performance Projections

A number of factors are used to calculate the projected performance for your solar installation. Ensure each quote you obtain documents the following:

- Estimates the total costs of the solar equipment, including regular system maintenance and service.
- Sets out the approximate life of the panels, aligning with the manufacturer's warranty period.
- Indicates the potentially significant costs for replacement parts such as inverters or tracker motors and control systems.
- Accurately assesses the solar irradiation and energy production, considering statistical highs and lows caused by fluctuations in weather.
- Also, consider including monitoring equipment with your system to track its performance and ensure its optimal performance. These types of services generally come with a cost – be sure to ask your solar professional about how much these services will cost.

5.6 Other Considerations

- If you are pursuing a net metering system, the value of the system will be directly linked to how much electricity you consume in your home/building. Remember, a net metered system only saves you money on your electricity bill; there aren't direct payments for your generation like under a long-term contract. Your utility bill will show your electricity usage in kilowatt-hours (kWh) and the amount you pay for that electricity. Are you planning any changes that will affect your electricity use (such as buying an electric vehicle, planning an addition to your home, or

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improving your home's energy efficiency)? Discuss your usage with the solar vendors you interview to get a system sized for your needs.

- Check with your insurance provider and real estate agent to determine if installing a solar system on your home will impact your home insurance or your ability to sell your home.

6. Issues With Your Solar Vendor

CanSIA's members are dedicated to providing quality products and customer service and endeavour to ensure their customers are satisfied. If you are having an issue with a solar vendor that is a CanSIA member, you can utilize the following methods to seek resolution:

- The first step should be to try to seek resolution with your solar vendor.
- Consider exercising your rights under your contract or lease, which may have a dispute resolution section and process built in.
- You can contact private consumer organizations (ex., your local Better Business Bureau) about your issue.
- If you choose a CanSIA member to work with, CanSIA may be able to assist you in resolving your issue. Note that CanSIA member companies are bound by the Code of Ethics and Solar Business Code of Conduct. If you believe a company has violated either of these documents, you may submit a complaint to CanSIA. CanSIA will consider the issue under our Complaint Resolution and Disciplinary Process.
 - CanSIA's Solar Business Code of Conduct and Complaint Resolution and Disciplinary Process are available on our [website](#).
- Complaints may be submitted to consumerprotection@cansia.ca.

7. Additional Resources

- CanSIA Consumer Protection Webpage: <http://www.cansia.ca/consumer-protection.html>
- CanSIA Provincial Policy and Regulatory Resources Webpage: <http://www.cansia.ca/policy-and-regulatory.html>
- Better Business Bureau: www.bbb.org
- Ontario Independent Electricity System Operator: www.ieso.ca
 - Ontario's microFIT Program: microfit.powerauthority.on.ca
 - What you should know before applying to the microFIT Program: <http://microfit.powerauthority.on.ca/what-you-should-know>
 - Using third-party service providers to apply to the microFIT Program: <http://microfit.powerauthority.on.ca/using-third-party-service-providers>

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- FAQs for new potential applicants to the microFIT Program:
<http://microfit.powerauthority.on.ca/faqs/faqs-new-potential-applicants>
- International Energy Agency's Canadian Solar PV Reports: <http://www.iea-pvps.org>

8. Disclaimer

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