



# NOVA SCOTIA SOLAR ROADMAP

UNLOCKING NOVA SCOTIA'S  
SOLAR POTENTIAL

Submitted to: Nova Scotia Department of Energy and Mines

Submitted by: The Canadian Solar Industries Association

January 2020

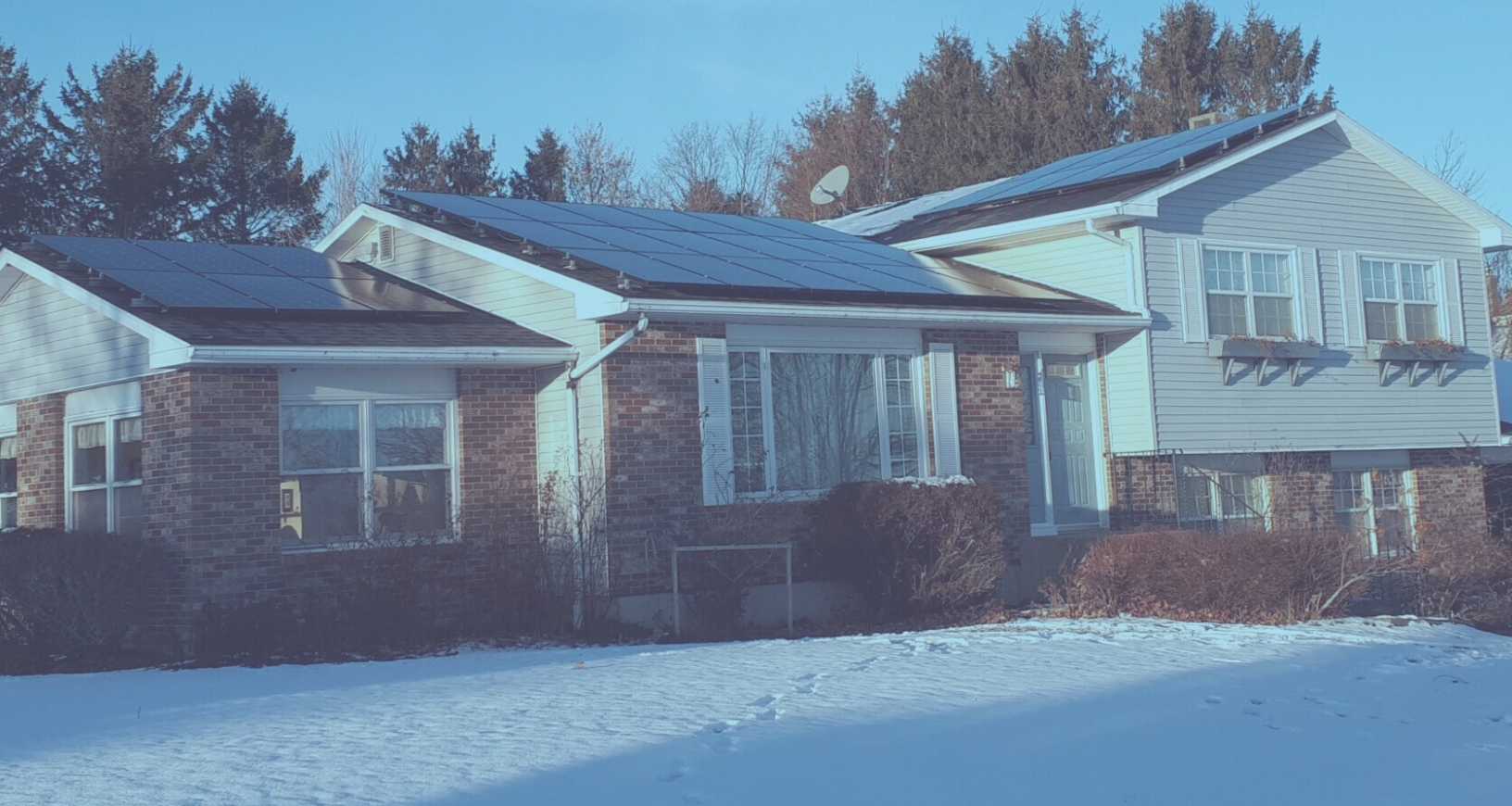


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# Executive Summary

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The following Nova Scotia Solar Roadmap was prepared by the Canadian Solar Industries Association (CanSIA) and submitted to the Nova Scotia Department of Energy and Mines (NS DEM) for review and consideration.

CanSIA is a national trade association that has advocated on behalf of the solar energy industry in Canada since 1992. CanSIA proudly represents manufacturers, installers, developers, builders, owners, engineers, consultants, and other companies and stakeholders who want to see solar energy grow in Canada. On behalf of the membership, CanSIA promotes the unique economic, environmental and technological benefits of solar energy in Canada. CanSIA's role as an industry association is to represent members on current issues while positioning the industry for sustainable growth for years to come.

The purpose of the roadmap is to outline strategies to grow the Nova Scotia solar market over the next 10 years including opportunities, challenges and proposed solutions. The roadmap also provides trends and projections for solar PV deployment on a global, national, and provincial scale. Given the rate at which solar deployment is growing including opportunities for pairing solar with storage, the Roadmap should be viewed as an evolving document that changes and adapts over time.

To achieve increased uptake of solar PV deployment, CanSIA has proposed 13 recommendations for the Province to consider. These are summarized below. While all 13 recommendations are important, CanSIA would argue that the first 4 should take priority in the short term. Many of these will require legislative or regulatory changes in order to become reality. This will require leadership, negotiation and cooperation among the key electricity policy decision makers – the Province (largely through the Department of Energy and Mines), Nova Scotia Power, and the Nova Scotia Utility and Review Board.

CanSIA is willing to take an active role in working with all key stakeholders to advance the 13 recommendations contained within the Roadmap.

# Recommendations to Advance Solar PV Across Nova Scotia

## 1 ELIMINATE NET METERING CAP

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- That the Department of Energy and Mines work with Nova Scotia Power, CanSIA and CaGBC Atlantic to find solutions to the current 100 kW Net Metering Cap.
- One proposed option is to limit annual solar PV production to annual consumption with excess electricity credits expiring on an annual basis.

## 2 INTRODUCE VIRTUAL NET METERING

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- To enable virtual net metering between distribution zones, CanSIA proposes establishing a project size limit based on consultation with the Department of Energy and Mines and NSPI. The total annual solar output from the facility should be less than or equal to the consumption of participating loads. This can be achieved through annual expiry of net metering credits.

## 3 INTRODUCE 3RD PARTY OWNERSHIP WHILE PROMOTING SOLAR AFFORDABILITY/ACCESS

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- That the Province create regulatory changes to enable third-party ownership in the development of utility-scale renewable energy projects.
- That the Province facilitate the development of utility-scale community solar projects that would open up access to solar for all Nova Scotians. These projects could be developed in partnership with NSPI, municipal utilities, third parties or a combination of all three.

## 4 SET IN LEGISLATION A 2030 PROVINCIAL TARGET FOR RENEWABLES

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On October 23, the Nova Scotia Government tabled the Sustainable Development Goals Act which will reduce Nova Scotia's GHG emissions by 53 per cent below 2005 levels by 2030 while moving Nova Scotia to a net zero carbon footprint by 2050. The new legislation does not include renewable energy targets for 2030 which is key to growing the solar industry while continuing to reduce GHG's.

- That the Province set a new 2030 renewable energy target under the Sustainable Development Goals Act of at least 50% from local sources, with a solar set-aside representing at least 5% of total electricity production.







## **5 ESTABLISHING NOVA SCOTIA AS A “SOLAR-FRIENDLY” PROVINCE THROUGH DEVELOPING BEST PRACTICES IN THE AREAS OF SOLAR PERMITTING, INSPECTION AND INTERCONNECTION**

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- That the Province partner with CanSIA to engage a consultant to prepare a report outlining best practices in the areas of municipal permitting, inspections and interconnection with the results communicated to all relevant parties.
- That the Province work with NSPI to ensure the success of their new process to reduce wait times with respect to booking the rough-in inspection and installing the bi-directional meter.
- That the Province work with NSPI to provide training and development for all NSPI staff conducting solar inspections.

## **6 PROVINCIAL OPERATIONS POWERED BY 100% RENEWABLES**

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That the Province commit to powering their own operations with 100% renewable electricity by 2030 and that this be enshrined in the Sustainable Development Goals Act.

## **7 DEVELOP PROVINCE-WIDE RESIDENTIAL PACE PROGRAM**

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That a province-wide PACE program be developed (excluding HRM) with loan amounts up to \$25,000, with a payback period of at least 20 years and no one-to-one debt-savings ratio.

## **8 EXEMPT HST FROM SOLAR PV INSTALLATIONS**

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- That the Province consider exempting the provincial portion of the HST on solar PV installations
- That the Province lobby the Federal Government requesting exemption of the Federal portion of the HST on solar PV installations.

## **9 CONSIDER LARGE BATTERY STORAGE PILOT PROJECTS AT THE UTILITY AND COMMERCIAL-INDUSTRIAL SCALE**

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- That large utility-scale solar projects that include battery storage be explored by utilities, third parties and other key stakeholders.

## **10 BUILD A STRONG SOLAR LABOUR FORCE THROUGH ESTABLISHING TRAINING STANDARDS**

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- That CanSIA and the Province formalize a partnership, including Efficiency Nova Scotia and Solar Nova Scotia, to pilot the development and implementation of a Training Standard for Solar PV Installer based on Electricity Human Resources Canada's National Occupational Standard for Solar PV Installer.

## **11 ESTABLISH A PROVINCE-WIDE CONSUMER PROTECTION PROGRAM**

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- That the Department of Energy and Mines and Efficiency Nova Scotia work with CanSIA to establish a Consumer Protection Program to help regulate the solar industry within the province.

## **12 ENCOURAGE CONSTRUCTION OF SOLAR READY HOMES**

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- That CanSIA partner with The Canadian Home Builders' Association - Nova Scotia, Efficiency Nova Scotia and other key stakeholders to develop a Solar-Ready Homes Strategy

## **13 CONSIDER DEVELOPING A SOLAR SCHOOLS PROGRAM**

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- That the Province partner with Solar Schools Canada to develop a program that would ensure solar panels are installed as part of the construction of all new schools and that curriculum is developed to engage teachers and students in this process.







# Introduction

The following Nova Scotia Solar Roadmap was prepared by the Canadian Solar Industries Association (CanSIA) and submitted to the Nova Scotia Department of Energy and Mines (NS DEM) for review and consideration.

CanSIA is a national trade association that has advocated on behalf of the solar energy industry in Canada since 1992. CanSIA proudly represents manufacturers, installers, developers, builders, owners, engineers, consultants, and other companies and stakeholders who want to see solar energy grow in Canada. On behalf of the membership, CanSIA promotes the unique economic, environmental and technological benefits of solar energy in Canada. CanSIA's role as an industry association is to represent members on current issues while positioning the industry for sustainable growth for years to come.

The purpose of the roadmap is to outline strategies to grow the Nova Scotia solar market over the next 10 years including opportunities, challenges and proposed solutions. The roadmap also provides trends and projections for solar PV deployment on a global, national, and provincial scale. Given the rate at which solar deployment is growing including opportunities for pairing solar with storage, the Roadmap should be viewed as an evolving document that changes and adapts over time.

Developing a Nova Scotia Solar Roadmap is important for the following reasons:

- The Paris Agreement, signed by the majority of countries worldwide in 2015 including Canada, calls for limiting the global average temperature rise in this century to well below 2 degrees Celsius, while pursuing efforts to limit the temperature rise to 1.5 degrees. To achieve this will require significant reductions in GHG's by all signatories. Shifting to clean forms of electricity such as solar is a key way Nova Scotia can assist Canada in meeting this target.
- Nova Scotia's electricity grid is carbon-intensive. Utilizing solar, in addition to wind and other renewable technologies, will play an essential role in transitioning Nova Scotia's grid from "coal to clean".
- The electrification of space and water heating, vehicles and other industrial applications will mean significant increases in electricity usage. The growth of renewable energy generation will need to be even greater to help offset this increased usage while moving toward a clean energy future.
- The solar industry is growing rapidly on a global scale generating green jobs. There is potential to create a significant number of solar jobs from Yarmouth to Cape Breton. Moreover, solar installation training can be provided as an economic development strategy for marginalized communities including First Nations and African Nova Scotians.
- Increased solar deployment will assist the public and private sectors in meeting GHG reduction, renewable energy and climate change targets.
- Solar PV can lower energy costs and GHG emissions in buildings which account for up to 13 percent of Nova Scotia's GHG emissions.
- Solar PV reduces residential energy bills by 50 percent on average. Given that Nova Scotia has one of the highest residential electricity rates in Canada, there is a great opportunity for Nova Scotians to "go solar".
- Solar PV can address energy poverty by enabling participation of low-income households who rent as opposed to own their own home.

# Global and Canadian Growth of Solar PV

Solar PV is one of the fastest growing industries in the world. The International Energy Agency (IEA) reports that solar accounts for almost two-thirds of net new power capacity globally. The IEA also forecasts that by 2050, solar electricity could account for 27% of the world's electricity mix, making it the world's largest source of electricity, ahead of nuclear, fossil fuels, hydro and wind.<sup>1</sup>

In 2017 there was more than 402 GW of installed solar PV around the world – up from just 8 GW in 2007. That's nearly a 5000 percent increase in one decade! The estimated value of solar in 2015 was \$86 billion and is projected to hit \$422 billion by 2022. In 2016, new solar capacity overtook the net growth in coal. In 2019 the United States surpassed over 2 million installations and is expected to surpass 4 million by 2023.<sup>2</sup>

The global renewable energy sector employed 11 million people in 2018; one-third of these jobs (over 3 million) were in the solar PV sector.<sup>3</sup> For every \$1 million invested in fossil fuel infrastructure, an estimated 2.65 full-time jobs are created; the same \$1 million investment in renewable energy creates 7.49 full-time jobs. Given this ratio, there is a strong economic argument to transition from fossil fuels to renewables.<sup>4</sup>

According to the United States Bureau of Labor Statistics, the fastest growing job in the U.S is a solar PV installer. This occupation is expected to grow in the U.S. by 105 percent by 2026.<sup>5</sup> The rapid growth of solar PV in the United States has broad implications for Canada due to our geographic proximity and strong trade relationship. The U.S. is also a leader in low-income solar in terms of job creation for marginalized communities as well as community solar projects that provide solar access to low-income communities. These are important initiatives that Canadian jurisdictions, including Nova Scotia, should adopt.

On a global scale, the costs of solar are falling dramatically. According to the financial advisory firm Lazard, the cost to produce 1 MWh of solar fell an incredible 86 percent between 2009 and 2017. Between 2017 and 2018, the cost of generating energy from utility-scale solar PV dropped approximately 13 percent.<sup>6</sup> The cost of producing one MWh of electricity — a standard way to measure electricity production — is now around \$50 for solar power while coal is more than double that cost at \$102.<sup>7</sup> And the price keeps dropping. As of October 2019, the United States and 8 other countries developed large solar projects coming in at under \$25 (US) per MWh.<sup>8</sup> Within Canada, the Province of Alberta announced in February 2019 three new utility-scale solar electricity facilities totalling 94 MW that will supply the Government of Alberta with 55 percent of their annual electricity needs. The average contract pricing will be 4.8 cents per KWh (3.6 cents US dollars). This is less than the average historical wholesale power pool price paid to natural gas-fired electricity in the province between the years 2008 – 2018.<sup>9</sup>

The Canadian solar market is also growing. In 2018, Canada had 3113 MW of solar PV, a whopping increase of 3013 percent since 2010 (see Figure 1 in Appendix B). Globally, Canada ranks 9th in the world with respect to percentage of total solar PV production at 1 percent.<sup>10</sup> Based on the current economic outlook, Canadian solar generation is expected to almost triple from 3.6 TWh in 2016 to almost 13.0 TWh by 2040.<sup>11</sup>

In August 2019, Greengate Power Corp. announced plans to begin construction of a 400 MW solar farm in southern Alberta, the largest solar project in Canada. The \$500-million project will have 1.5 million solar panels and provide enough electricity to power 100,000 homes. Construction is expected to take place over two years and create several hundred jobs, with about a dozen permanent jobs after the solar farm becomes operational in 2021.<sup>12</sup>

1 Canadian Solar Industries Association, Roadmap 2020: Canada's Future with Solar Electricity, 2015.

2 Wood Mackenzie Power & Renewables and the Solar Energy Industries Association. Visit <https://www.woodmac.com/news/feature/the-united-states-surpasses-2-million-solar-installations/>

3 IRENA, Renewable Energy and Jobs Annual Review 2019, 5.

4 <https://pvbuzz.com/canadians-support-renewable-energy/>

5 [www.CNBC.com](http://www.CNBC.com)

6 <https://www.lazard.com/perspective/levelized-cost-of-energy-and-levelized-cost-of-storage-2018/>

7 <https://www.businessinsider.com/solar-power-cost-decrease-2018-5>.

8 [https://www.greentechmedia.com/articles/read/8-countries-besides-the-us-with-solar-under-25-per-megawatt-hour?utm\\_medium=email&utm\\_source=Daily&utm\\_campaign=GTMDaily](https://www.greentechmedia.com/articles/read/8-countries-besides-the-us-with-solar-under-25-per-megawatt-hour?utm_medium=email&utm_source=Daily&utm_campaign=GTMDaily)

9 <https://www.pv-magazine.com/2019/02/18/bifacial-takes-all-in-alberta-large-scale-pv-auction-final-price-cheaper-than-gas/>

10 <https://www.nrcan.gc.ca/renewable-energy-facts/20069>.

11 National Energy Board: Market Snapshot: Which cities have the highest solar potential in Canada?

12 Amanda Stephenson, Calgary Herald, Canada's largest solar farm gets approval for southern Alberta, August 28, 2019.



# Nova Scotia Context

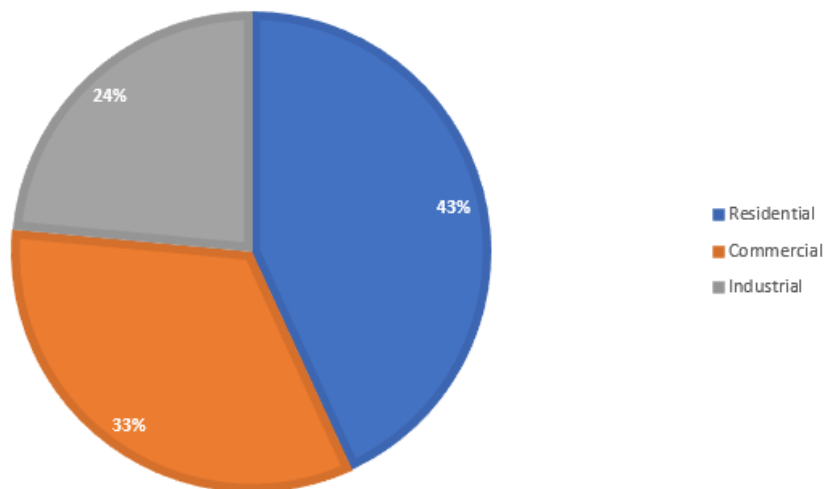
## Electricity Usage and Sources

95 percent of Nova Scotia's electricity is generated and sold by a single vertically integrated privately-owned utility – Nova Scotia Power Incorporated (NSPI). Five smaller municipal utilities buy electricity from NSPI and other sources, generate some of their own and sell directly to their customers. Independent power producers (mainly wind) supply a significant amount of the province's renewable energy. 70 percent of these operations are owned by companies outside of NSPI.

Nova Scotia uses about 11 GWh of electricity annually. Over the next 25 years, projections indicate a need for between 8-13 GWh.<sup>13</sup> While electricity use has the potential to decrease as more Nova Scotia home and building owners undertake energy efficiency upgrades, electricity usage also has the potential to increase due to the uptake of HVAC systems on new and existing homes and buildings. Moreover, Nova Scotia Power projects anywhere from 30,000 to 100,000 electric vehicles on the road by 2030 which will also have a significant impact on electricity usage.<sup>14</sup> Increased solar PV deployment can help offset these projected spikes in electricity usage, particularly if paired with Time of Use rates and battery storage.

Figure 2 below outlines Nova Scotia's electricity use by sector. Residential makes up the largest use at 43 percent followed by commercial at 33 percent and industrial at 24 percent.

FIGURE 2: NS ELECTRICITY USE BY SECTOR



## GHG Emitting Sectors

The largest GHG emitting sectors in Nova Scotia are electricity generation at 42 percent, transportation at 31 percent, and buildings (residential and commercial) at 13 percent.<sup>15</sup> Given that over 50 percent of Nova Scotia's GHG emissions originate from electricity and buildings, solar can play a key role in reducing GHG emissions within these sectors.

Nova Scotia has the highest per-capita GHG emissions associated with residential electricity consumption in Canada and the fourth highest GHG's per unit of electricity generated.<sup>16</sup>

13 Nova Scotia Electricity Review Report, 2015.

14 Electric Vehicles in Nova Scotia Current State and Upcoming Initiative, Nova Scotia Power, 2018.

15 National Energy Board - Market Snapshot: Greenhouse gas emissions associated with residential electricity consumption vary significantly by province and territory, June 2017.

16 National Energy Board, Canada's Renewable Power Landscape: Energy Market Analysis 2017.

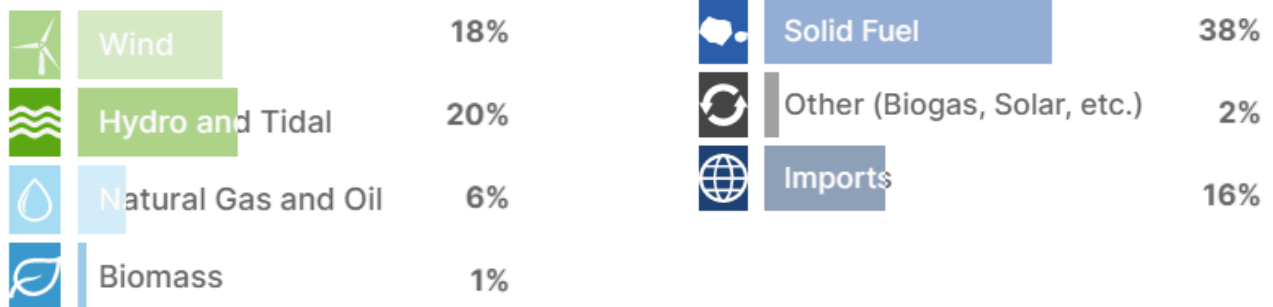
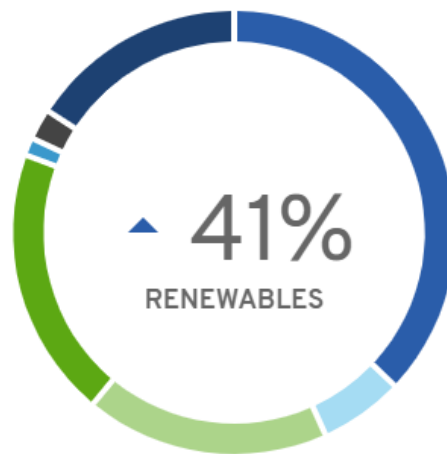
## Electricity Mix

Nova Scotia's current electricity mix is represented by fossil fuels (63%), renewables (30%) and imports (7%).<sup>17</sup> These categories are broken down as follows:

- Renewables: (Wind 18%, Hydro and Tidal (11%), Biomass (1%))
- Fossil Fuels: Coal and Petcoke (52%), Natural Gas and Oil (11%)
- Imports: Represents electricity imported from New Brunswick which could be a combination of hydro and fossil fuels (7%).

By 2020, with the activation of the Maritime Link, it is anticipated that Nova Scotia's renewable energy generation could go as high as 50 percent. The 2020 electricity forecast is outlined in Figure 3 below.

## Nova Scotia 2020 Electricity Source Forecast



Source: Nova Scotia Power <https://www.nspower.ca/clean-energy/todays-energy-stats#forecast>



## Nova Scotia's Solar Potential

Under ideal conditions, a well-sited solar array in Nova Scotia – a south facing roof at 45 degrees – produces about 1100 kWh annually. Figure 4 in Appendix B outlines annual solar production potential by province and territory. While Nova Scotia's solar energy resource is less than that of other jurisdictions, it receives more annual sun hours than Germany, which is a world leader in solar PV. It is important to note that there are other factors that contribute to increased solar PV deployment including electricity rates, incentive programs, net metering, government targets for GHG reduction and renewables, as well as soft costs which include permitting fees, sales tax, interconnection fees, labour, financing, and customer acquisition.

Solar PV has grown substantially in Nova Scotia since the launch of Efficiency Nova Scotia's SolarHomes Program, which was developed with input from CanSIA. Launched in August 2018, the program is targeting up to 2,000 homes with a rebate (as of December 2019) of 60 cents per watt up to \$6000. As of November 2019, over 1400 applications have been received thus far with 1350 approved and 575 processed. Half of these applications are from outside of HRM which indicates strong interest in solar in both urban and rural communities. Thus far, the program has been responsible for generating 8472 kW of solar electricity with a total energy savings for homeowners of over \$1.5 million. Since the launch of the program, there are over 50 installers registered on Efficiency Nova Scotia's solar trade network. There were less than 20 in the province prior to the program's introduction.

In April 2019, CanSIA released a report which projected up to 178 MW of solar by 2030; corresponding to approximately 22,000 residential solar installations and over 1100 jobs.<sup>18</sup> It is important to note that this study only references the residential sector. In August 2019, CanSIA prepared a proposal as a second phase of this research focusing on the solar potential for the commercial, industrial, and institutional (ICI) sectors within all four Atlantic provinces. These sectors represent greater solar potential than the residential market and could account for a significant number of renewable energy jobs in both urban, rural, First Nation and African Nova Scotian communities throughout Atlantic Canada. CanSIA is currently seeking funding opportunities for this proposal.

On August 1, 2019, the Federal Government and the Province of Nova Scotia signed an agreement that will help the federal government reach its goal of using 100 percent clean electricity in all federally-owned facilities by 2025. While Nova Scotia only accounts for 8 percent of the Federal Government's annual electricity demand, that electricity-use accounts for more than 36 percent of their total annual GHG emissions.<sup>19</sup> It is estimated that projects will need to generate about 100,000 MWh of new renewable electricity - enough energy to power about 10,000 homes annually. The province will lead an open, transparent and fair process to build new renewable energy projects. The electricity generated will be purchased by the Government of Canada, at a fair price, to meet its energy needs. While the Federal Government is looking at various renewable energy options, both solar and wind have the potential to play a significant part in this renewable energy mix. In addition to reducing GHG emissions, this initiative will create a significant number of jobs in Cape Breton, an area of high unemployment.

18 CanSIA, Nova Scotia Residential Solar Market Outlook and Labour Force Study, April 2019.

19 Ecology Action Centre, Letter to Federal MP's and NS MLA's, November 1, 2017.



# How Nova Scotia Can Unlock Its Solar Potential

The following represents a series of recommendations for Nova Scotia to unlock its solar potential. Included are existing challenges and a suggested pathway to address these challenges.

## Expand Solar Opportunities Through Policy Changes in the Areas of Sizing, Siting and Retail Options

The ability for Nova Scotia to utilize solar electricity is limited to and by:

- Sizing: 100 kW Net-Metering Cap – impacts industrial, commercial and institutional (ICI) sectors
- Siting: Generation and load must be in same distribution zone
- Retail Options: NSPI's Renewables to Retail Program has had zero take-up due to the tariffs and project duration clauses and absence of solar garden/community solar model

### Sizing - Amend 100kW Net Metering Cap

On December 18, 2015, the Province passed the Electricity Plan Implementation Act which reduced the maximum nameplate capacity for net metering in Nova Scotia from 1,000 kW (1 MW) to 100 kW. The current cap limits the maximum solar production from a single solar facility to less than 150 MWh per year. While the current cap does not impact the residential sector, it has a significant impact on the commercial, industrial and institutional sectors. For example, the IKEA Building in Dartmouth curtails up to 100kW of electricity daily as a result of the current cap.

The cap could impact the Federal Government's ability to install net metered solar in Nova Scotia to contribute towards their commitment to 100 percent use of renewables to power their operations by 2025. Also, it is unclear how the net metering cap would impact proposed community solar garden models which could provide a portion of electricity to a number of residential properties.

Removing or increasing the cap will:

- Create a significant number of green jobs in both urban and rural areas of the province
- Enable net-zero on-site
- Avoid unnecessary curtailment of renewable MWhs
- Support provincial targets for renewables and GHG reductions
- Reduce energy bills of industrial/commercial/institutional customers
- Enable increased energy consumer choice.

While the majority of Canadian provinces have some form of cap in place, Ontario removed their cap while Alberta recently increased their cap to 5 MW allowing the maximum on-site production up to 750 MWh annually.





**RECOMMENDATIONS:**

- That the Department of Energy and Mines work with Nova Scotia Power, CanSIA and CaGBC Atlantic to find solutions to the current 100 kW Net Metering Cap.
- One proposed option is to limit annual solar PV production to annual consumption with excess electricity credits expiring on an annual basis.

## **Siting - Expand Opportunities Through Virtual Net Metering**

NSPI currently allows a limited amount of virtual net metering (VNM) within a single distribution zone – net metered projects connected to the same distribution station feeder.

The advantage of VNM is that it offers customers of all types and sizes a way to lower their electricity bill without any upfront costs or having to install a solar system on their home, building or property. For example, it would enable a family that rents an apartment or a small business owner that doesn't have a suitable roof for solar to “own” or “subscribe” into a solar VNM project located somewhere else on the grid and reap the benefits of a lower electricity bill. VNM customer opportunities are increasingly popular in the United States, which tends to have more private equity driven and transparent electricity markets.<sup>20</sup>

Although VNM is economically viable, current regulations in Nova Scotia prevent expanded VNM solutions from being implemented.

**RECOMMENDATION:**

To enable virtual net metering between distribution zones, CanSIA proposes establishing a project size limit based on consultation with the Department of Energy and Mines and NSPI. The total annual solar output from the facility should be less than or equal to the consumption of participating loads. This can be achieved through annual expiry of net metering credits.

## **Expand Retail Options that Promote Third Party Ownership and Solar Affordability and Access**

NSPI's Renewables to Retail Program has had zero uptake due to the tariffs and project duration clauses. At the same time, Nova Scotia needs to expand its solar outreach and access through developing utility-scale community solar projects.

Within Nova Scotia, only home owners can take advantage of the current solar rebate. And not all homes are suitable for rooftop solar due to roof direction and/or shading. Moreover, not all home owners can afford solar even with an incentive program.

Atlantic Canada has the highest incidence of energy poverty of any region in Canada. Almost 21 percent of households are considered to be energy-poor based on within-the-home energy expenditures. Energy poverty in Atlantic Canada has grown by over 20 percent since 2010.<sup>21</sup>

20 CanSIA. Red Tape Reduction and Regulatory Burdens Reductions Submission, October 25, 2018

21 Fraser Institute, Energy Costs and Canadian Households: How much are we spending? 2016, 14.

The United States has been a world leader in developing community solar/solar garden models which enable both renters and home owners to access solar in an affordable manner as a way to reduce their electricity bills. Colorado and Minnesota are two states in particular that have excelled in this area.

In developing a made-in-Nova Scotia approach to this model would require legislative changes, particularly if enabling third parties to initiate such projects. Legislative changes would not be required if the Province partnered directly with Nova Scotia Power or one of the municipal utilities.

Currently NSPI is in the process of developing a community solar project in Amherst, while the Alternative Resource Energy Authority representing Nova Scotia's municipal utilities, are looking to develop community solar projects in Berwick, Mahone Bay and Antigonish.

#### **RECOMMENDATIONS:**

- That the Province create regulatory changes to enable third-party ownership in the development of utility-scale renewable energy projects
- That the Province facilitate the development of utility-scale community solar projects that would open up access to solar for all Nova Scotians. These projects could be developed in partnership with NSPI, municipal utilities, third parties or a combination of all three.

### **Set in Legislation a 2030 Provincial Target for Renewables**

Having the Province set clear GHG reduction and renewable targets in legislation is important for a variety of reasons:

- Provides stability and guidance to government, utilities and industry to determine if they are on track to meet emission and renewable targets
- Provides employers and investors with market certainty
- Nurtures supply-chains
- Helps build the local economy by serving as a job creation tool for small and medium-sized businesses
- Contributes towards cost-effective solar.

Nova Scotia's Environmental Goals and Sustainable Prosperity Act (EGSPA), introduced in 2007, set 2020 targets for both GHG emissions (10 percent below 1990 levels by 2020) and renewables (40 percent by 2020). The Province should be commended for successfully achieving their GHG reduction target in 2014. Nova Scotia continues to aggressively reduce its GHG's as the province is now at 18 percent below 1990 levels.<sup>22</sup> The 40 percent renewable energy target will be achieved by 2020 as a result of additional hydro power provided by the Maritime Link through Newfoundland and Labrador.

On October 23, 2019, the Nova Scotia Government tabled the Sustainable Development Goals Act to replace EGSPA. The new legislation will:

- Reduce Nova Scotia's GHG emissions by 53 percent below 2005 levels by 2030
- Move Nova Scotia to a net zero carbon footprint by 2050
- Create a Sustainable Communities Challenge Fund to support community projects that fight climate change and grow the economy
- Ensure a new climate change strategy is in place by the end of 2020 to reduce greenhouse gas emissions, expand Nova Scotia's green economy and create jobs.

<sup>22</sup> Nova Scotia's Cap and Trade Program Regulatory Framework, 2019, 4.



The new legislation requires that the Province develop a Climate Change Plan for Clean Growth by December 31, 2020. This plan will outline a strategy of the how the Province will achieve its targets. Consultations will be held to assist the Province in developing this plan.

The new Act does not specify a renewable energy target for 2030. In a letter to the Environment Minister on September 26, 2019, CanSIA recommended that the Province legislate a 2030 renewable energy target of at least 50 percent from local sources, with a solar set-aside representing at least 5 percent of total electricity production. Significant additional locally-sourced renewables could be achieved by 2030 through increased deployment of wind and solar. These renewable energy sources would serve to strengthen the local grid by promoting energy independence with less reliance on electricity from other jurisdictions.

#### **RECOMMENDATION:**

That the Province set a new 2030 renewable target under the Sustainable Development Goals Act of at least 50 percent from local sources, with a solar set-aside representing at least 5 percent of total electricity production.

## **Establish Nova Scotia as a “Solar-Friendly” Province**

Solar-Friendly communities are defined as those jurisdictions that wish to grow the solar market by establishing best practices in the areas of solar permitting, inspection and interconnection. These elements represent some of the non-hardware costs associated with installing solar PV. Often referred to as solar soft costs, they can represent anywhere from 15-25 percent of total system cost.<sup>23</sup> Costs specific to permitting include paperwork, lack of consistency, wait times and lengthy inspections. Extensive research on this subject has been undertaken by the Rocky Mountain Institute based in Colorado. For a copy of their report, [click here](#).

Permitting and inspection processes can add \$2000-\$3000 in costs per residential installation.<sup>24</sup> In Nova Scotia, municipalities are responsible for any building permits associated with a solar installation (largely engineering stamped drawings approving roof structural integrity); Nova Scotia Power has jurisdiction over the inspection and net metering processes.

## **Municipal Permitting Guidelines**

Within Nova Scotia, very few municipalities issue building permits for solar due to lack of exposure and familiarity with the technology. Halifax has a strong solar permitting process in place since the launch of Halifax Solar City. The Municipality of Kings also issues building permits for solar. As more solar installs occur throughout the province, it is important that all 49 municipalities be informed on solar PV technology and best practices relating to solar permitting. Municipalities that do not issue building permits for solar installations could be held liable if property damage were to occur during or after the installation.

The U.S. Department of Energy, through the Solar America Board for Codes and Standards, has led initiatives to develop an expedited permit process outlining a simpler set of rules and requirements for electrical and building permits for solar PV projects.<sup>25</sup> A number of municipalities in the United States have introduced processes to streamline the permitting process including:

- Developing standard systems that meet certain criteria under 10 kW in size that are exempt from the building review process that normally applies to all systems
- Offering solar-specific websites that walk potential customers and new installers through local jurisdictions’ solar permitting process and required documentation

23 Sunrun. The Impact of Local Permitting on the Cost of Solar Power. SunRun. January 2011.

24 Ibid.

25 <http://www.solarabcs.org/>

- Communicating regularly via email to the local solar industry regarding updates and code changes
- Offering a unique solar-specific roof permit
- Providing online permitting systems that have the potential to greatly reduce permit related labor costs<sup>26</sup>
- Imposing a cap or waiving building permit fees on all solar energy systems.

Within Canada, HES PV has prepared best practice guidelines for municipal solar permitting based on simple and complex solar PV installations. Under a simple system installation, no building permit would be required.<sup>27</sup> A number of Canadian municipalities are leading the way in the area of solar permitting best practices including Toronto, Calgary, Vancouver, and Colwood, B.C. For suggested guidelines as prepared by HES PV, see Appendix C.

## Inspection Guidelines

In Nova Scotia, Solar PV inspection rules and regulations fall under the joint authority of the Department of Labour and Advanced Education and NSPI. Under the current model, two inspections are performed; a rough-in and final inspection. While wait times have greatly improved between initial and final inspection, booking the initial rough-in inspection is in some cases still taking up to three weeks.<sup>28</sup> This has resulted in unnecessary delays for both installers and homeowners. Installers and home owners in rural parts of the province have expressed concern with long wait times to install the bi-directional meter following the final inspection—in some cases, up four weeks.<sup>29</sup> This process should take no more than ten business days. Ideally, NSPI should consider installing the bi-directional meter immediately following approval of the final inspection. This would save time and money for the installer, homeowner, and NSPI who would not have to book an additional site visit.<sup>30</sup>

Installers have also expressed concern with inconsistencies among NSPI inspectors in terms of familiarity with PV systems and interpretation of electrical codes and regulations. While many are knowledgeable, the inexperienced inspectors can add cost and time to the installation process.

The Province, in partnership with NSPI, should consider developing model inspection guidelines that would take into consideration:

- Site plan review requirements
- Rough-in inspection requirements
- Inspection window of time (how long it takes from the time NSPI notifies the installer until when the inspection takes place)
- Ongoing NSPI inspector training and development (to ensure all inspectors are working from the same rules, regulations and practices)
- Number of inspections – could consider moving from two inspections to a single inspection.
- Installing the bi-directional meter immediately following approval of final inspection.

### RECOMMENDATIONS:

- That the Province partner with CanSIA to engage a consultant to prepare a report outlining best practices in the areas of municipal permitting, inspections and interconnection with the results communicated to all relevant parties.
- That the Province work with NSPI to ensure the success of their new process to reduce wait times with respect to booking the rough-in inspection and installing the bi-directional meter.
- That the Province work with NSPI to provide training and development for all NSPI staff conducting solar inspections.

26 Rocky Mountain Institute. *Developing Solar Friendly Communities*, 2011, 8.

27 HES PV Ltd. *A Recommendation Guide for Building Permits involving Solar Systems on Residential Buildings*. 2013.

28 Based on discussions with Nova Scotia solar installers, August 2019.

29 Ibid.

30 As of September 2019, NSPI is working on ordering and shipping the bi-directional meters in advance of the final inspection which in some cases would allow the inspector to install the meter immediately following the final inspection. This would only occur if all documentation, including a completed ICA had been received.



## The Province Commit to Powering Their Own Operations with 100% Renewable Electricity by 2030

The Federal Government has committed to powering their operations with 100 percent renewable electricity by 2025. It is recommended that the Province do the same by committing to 100 percent renewable operations by 2030. Doing so would demonstrate to Nova Scotians that the Province is leading by example. It would also be a significant factor in helping the Province achieve its GHG reduction target for 2030.

### **RECOMMENDATION:**

That the Province commit to powering their own operations with 100 percent renewable electricity by 2030 and that this be enshrined in the Sustainable Development Goals Act.

## Develop Province-Wide Residential Solar Financing Program

In Nova Scotia, several municipalities have Property Assessed Clean Energy (PACE) programs that offer homeowners ten-year financing for renewable energy and energy efficiency upgrades. PACE programs are designed to help homeowners pay for their upgrades with the money they save on heating, cooling and electricity costs, by allowing the homeowner to repay a low-cost loan over time either through the property tax bill or a local improvement charge.

The most successful PACE program in Nova Scotia is Halifax Solar City. As the first PACE program in Canada, it won a national award from the Federation of Canadian Municipalities in 2015. Since the launch of Solar City, several other municipalities, including the Town of Bridgewater, Town of Berwick, the District of Shelburne and County of Colchester, have adopted similar programs.

Not all Nova Scotians have access to PACE programs as they are limited to a small number of municipalities. And not all are designed to finance solar PV due to the limited loan amounts (\$10,000-\$15,000), and the 1 to 1 debt-savings ratio in which the cost of clean energy upgrades, program fees, and cost of borrowing must be less than or equal to the estimated energy savings over the financing period.

Private sector financing options for residential solar in Nova Scotia is limited to Credit Union Atlantic, Polaron Solartech (which offers a leasing option) and Skylit which offers homeowners the opportunity to participate in a Community Economic Development Investment Fund (CEDIF).

### **RECOMMENDATION:**

That a province-wide PACE program be developed (excluding HRM) with loan amounts up to \$25,000, with a payback period of at least 20 years and no one-to-one debt-savings ratio. Potential partners include the Province, Efficiency Nova Scotia, Clean Foundation, CanSIA, Solar NS, NS Federation of Municipalities, Association of Municipal Administrators and the Federation of Canadian Municipalities.

## Exempt HST from Solar PV Installations

HST exemptions provide a way to incentivize and thus increase deployment of solar PV installations. This would apply to both individuals and businesses that install solar PV. Because solar will be a key mechanism for the Province to meet future GHG reduction and renewable energy targets, it is in the Province's best interest to develop strategies that increase solar uptake. These exemptions would also assist to maintain solar uptake as the SolarHomes Program winds down over the next few years.

Sales tax incentives typically provide an exemption from the provincial and/or federal sales tax for the purchase of a solar PV system. This type of exemption helps reduce the upfront costs of a solar installation. In Nova Scotia, the Harmonized Sales Tax is 15%; 5% federal portion and 10% provincial portion. The Province could consider eliminating the provincial portion of the HST on the installation of solar PV systems while lobbying the Federal Government to eliminate their portion. Currently Nova Scotians who purchase electricity directly from NSPI are exempt from the provincial portion of the HST. This should also apply to Nova Scotians who self-supply utilizing solar PV.

In the United States, 25 states offer sales tax exemptions for solar energy. Arizona, for example, provides a sales tax exemption for the retail sale of solar energy devices and for the installation of solar energy devices by contractors. Colorado exempts from the state's sales and use tax all sales, storage, and use of components used in the production of alternating current electricity from a renewable energy source. The exemption also includes all sales, storage, and use of components used in solar thermal systems.<sup>31</sup>

#### **RECOMMENDATIONS:**

- That the Province consider exempting the provincial portion of the HST on solar PV installations
- That the Province lobby the Federal Government requesting exemption of the Federal portion of the HST on solar PV installations.

### **Consider Large Battery Storage Pilot Projects at the Utility and Commercial-Industrial Scale**

One of the challenges of solar is that it does not produce during peak demand periods when electricity is most needed by the utility. Solar production in Nova Scotia is highest between the months of April and September with peak production in June, July and August. Solar energy is only produced during daylight hours with optimal production between 10:00 a.m. and 3:00 p.m. NSPI has indicated peak demand occurs in the evening hours during the winter months of December to March.

#### **RECOMMENDATION:**

That large utility-scale solar projects that include battery storage be explored by utilities, third parties, and other key stakeholders.

### **Build a Strong Solar Labour Force Through Establishing Training Standards**

As of December 2019, there were over 50 solar installer companies registered on Efficiency Nova Scotia's Solar Trade Network.

To become an Approved Solar Installer under the SolarHomes program, installers must demonstrate either relevant work experience or proof of completion of a solar installer training course.

Training courses are required to cover, at minimum, electrical fundamentals, solar energy principles, PV modules, inverters, racking, and hands-on installation experience. Installers also require proof of completion of safety training requirements, such as Workplace Hazardous Materials Information System (WHMIS), Occupational Health & Safety (OHS), First Aid and Cardiopulmonary Resuscitation (CPR). This basic solar training is currently being offered within the province through the Nova Scotia Community College.

31 <https://www.seia.org/initiatives/solar-tax-exemptions>.



Primary and secondary research indicates that there are inconsistencies in training for solar PV installations, both at a national and provincial level. Inconsistencies in program delivery, content and rigour can directly impact the safety, efficiency and quality of solar installations in Nova Scotia. Without a benchmark upon which to evaluate training, there are no standards of practice for qualifying trainers; no guidelines for learning objectives; and no consistency in terms of how and what is being taught (i.e. practical vs. lecture-based learning; hands-on vs. online training).

Effective training helps to develop safe and efficient Solar PV Installers. To enhance the consistency and quality of training, a standard for solar PV installer training is beneficial for the following reasons:

- Provides a clear outline of what learners are expected to know and be able to do upon completing a training program
- Prescribes the baseline skills and knowledge that must be taught within a training course and can go as far as recommending training methods/modalities (hands-on vs. theory) and time allotments (hours of lesson) for each skill
- Serves as a benchmark to which existing training programs can be assessed to identify program gap areas
- Can serve as a key foundational document for the development of new training programs.

The National Occupational Standards (NOS) for Solar PV Installer is currently being developed by Electricity Human Resources Canada in partnership with CanSIA.

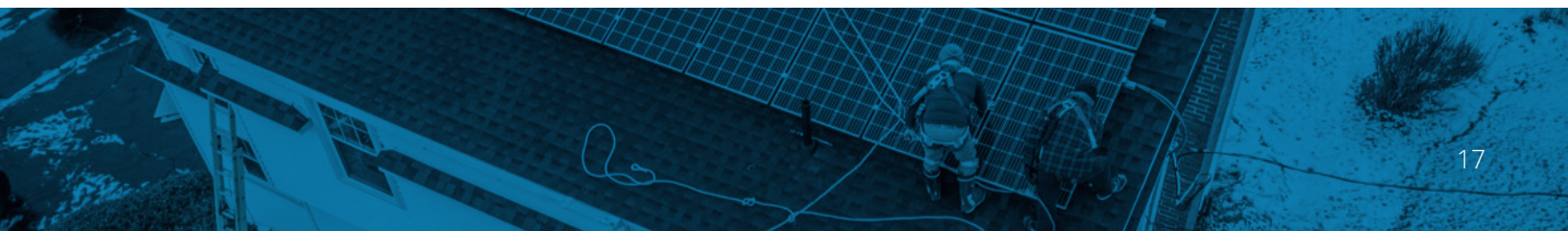
The NOS for PV Installer outlines the Skills and Knowledge requirements to be a competent (i.e., safe, efficient and effective) PV Installer. The NOS have been developed and validated by industry subject matter experts through a rigorous research and consultation process. In addition, an Essential Skills Profile (outlining the foundational literacy requirements) as well as a Physical Demands Assessment (outlining the physical task requirements) will also be developed for the role. The NOS will be available for industry – free of charge – in April/May of 2020. The Essential Skills Profile and Physical Demands Assessment will follow in June 2020.

NOS are not regulatory or prescriptive in nature. Instead, they provide a foundation for the development of important HR documents and resources, such as training curriculum, hiring standards, performance reviews, career pathways and more. As a current snapshot of the skills and knowledge requirements for a specific occupation, NOS help to lend consistency and coherence to HR supports for all occupational stakeholders – inclusive of employers, employees, training providers, unions, governments and job seekers – Canada-wide.

To be effective, the Training Standard should be utilized by an overseeing body to analyze and evaluate existing training programs available to Nova Scotia Solar PV Installers. The results of this analysis could be a Recommended Training Program list, similar to the List of Qualified Installers developed by Efficiency NS. A recommended listing of training providers would help to ‘weed’ out training programs that do not adequately prepare learners for their future work as Solar PV Installers. The Canadian Wind Energy Association (CanWEA) developed a Training Standard for Wind Turbine Technicians in April 2019. To access this document [click here](#).

**RECOMMENDATION:**

That CanSIA and the Province formalize a partnership, including Efficiency Nova Scotia and Solar Nova Scotia, to pilot the development and implementation of a Training Standard for Solar PV Installer based on Electricity Human Resources Canada’s National Occupational Standard for Solar PV Installer.



## Establish a Province-Wide Consumer Protection Program

Currently, there is no consumer protection program affiliated with the SolarHomes Program other than a one-year workmanship warranty. Establishing a consumer protection program protects and serves consumers by ensuring a fair, safe and informed solar marketplace. CanSIA members that are part of Efficiency's Solar Trade Network offer a consumer protection program to their clients as part of CanSIA Membership. This program includes a process to investigate consumer complaints, promote self-regulation of industry practices and enforce consumer protection standards. The program also mandates that all CanSIA members sign a Solar Business Code of Conduct that outlines how CanSIA members shall conduct themselves in their interactions with consumers, what information they need to make available, and best practices for advertising and marketing. For more information on CanSIA's Consumer Protection Program, [click here](#).

It is important that a province-wide consumer protection program be in place not only during the span of the SolarHomes Program but also when no further incentive program is in place.

### **RECOMMENDATION:**

That the Province of Energy and Mines and Efficiency Nova Scotia work with CanSIA to establish a Consumer Protection Program to help regulate the solar industry within the province.

## Encourage Construction of Solar Ready Homes

Very few builders in Nova Scotia offer clients the option of including Solar PV as part of a new home package.<sup>32</sup> This is due to lack of knowledge among homebuilders with respect to solar PV as well as the perception that it will result in excessive costs to both the builder and client. Having new homes in Nova Scotia "solar-ready" only requires a few simple and inexpensive modifications made up front in the design and construction phase. This enables the homeowner a much less expensive option to install a solar PV system at a later point in time should they decide to do so.

Benefits of a solar-ready home include:

- Cost savings to homeowners for the future installation of a solar PV system leading to increased home values
- Allowing builders to offer an environmentally-friendly low-cost upgrade to new homes
- Advantages to manufacturers and installers by encouraging market uptake of solar PV systems.<sup>33</sup>

Key modifications required to make a home solar-ready include:

- Roof Space – ensuring an unobstructed area clear of roof vents, chimneys, etc., proper orientation, roof pitch, azimuth angles, structural loading
- PV Conduit – Run PV Conduit (as specified in electrical code) from attic or roof location to designated wall space for PV electrical hardware.

### **RECOMMENDATION:**

That CanSIA partner with The Canadian Home Builders' Association - Nova Scotia, Efficiency Nova Scotia and other key stakeholders to develop a Solar-Ready Homes Strategy.

<sup>32</sup> Passive Design Solutions based in HRM recently announced pre-packaged passive solar homes for home buyers which includes solar PV.

<sup>33</sup> Natural Resources Canada, Solar Ready Guidelines, 1.



## Consider Developing a Solar Schools Program

In the United States, over 3700 schools have installed solar PV systems generating over 600,000 MWh of electricity with electricity savings over \$78 million and avoiding over 450,000 of CO<sub>2</sub>e emissions annually. In Canada, the Toronto District School Board is installing solar PV on 311 schools while Alberta recently committed \$9 million towards a solar schools program. Locally, Membertou Elementary School in Cape Breton installed a solar PV system of 93 modules at 22kW.

There are many environmental, economic and educational benefits to introducing a solar schools program. These would include:

- Schools can consume electricity directly to reduce their power bill (schools in HRM spend over \$1 million annually on electricity) or sell to the grid for a profit - either scenario results in schools saving money to reinvest in students, teachers and educational resources.
- By shifting to a clean renewable energy source, schools can assist the Province in shifting from coal to clean energy while reducing harmful GHG emissions
- Teachers can use solar panels to enhance curriculum by instructing students in science, technology, engineering, arts, mathematics, energy & environment related subject matter.

The Province should look at developing a program that would ensure solar panels are included on every new school constructed within the province.

Solar Schools Canada, a recently formed non-profit organization based in Halifax, is working with provincial school boards, schools, government, business and community members to develop and fund solar PV systems in public schools across the country. They are currently collaborating with Clean Foundation and the Department of Energy and Mines to develop and deliver a P-6 educational solar program.

### **RECOMMENDATION:**

That the Province partner with Solar Schools Canada to develop a program that would ensure solar panels are installed as part of the construction of all new schools and that curriculum is developed to engage teachers and students in this process.



# Conclusion

Moving Nova Scotia to zero carbon by 2050 as legislated under the Sustainable Development Goals Act cannot be achieved without the proliferation of solar PV in all sectors of the economy. The Paris Agreement as supported by the majority of countries worldwide including Canada, has proposed limiting the global average temperature rise to 1.5 degrees. Shifting to clean forms of electricity such as solar PV is a key way Nova Scotia can assist Canada in meeting this crucial target.

The SolarHomes Program, in conjunction with Enhanced Net Metering and high residential electricity rates, has resulted in a proliferation of residential solar PV deployment across the province. While the total amount of solar PV still represents less than 1 percent of total generation capacity, there is great potential to increase solar PV deployment across the province.

CanSIA's Nova Scotia Residential Solar Market Outlook and Labour Force Study projected up to 178 MW of solar by 2030; corresponding to approximately 22,000 residential solar installations and over 1100 jobs. However, if Nova Scotia's solar deployment is to grow significantly, it must engage the other key sectors – commercial, industrial and institutional.

To achieve increased uptake of solar PV deployment, CanSIA has proposed 13 recommendations for the Province to consider. While all 13 recommendations are important, CanSIA would argue that the first 4 recommendations should take priority. These would include:

- Eliminating 100 kW Net Metering Cap
- Introduce Virtual Net Metering
- Introduce Third-Party Ownership while Promoting Solar Affordability/Access
- Set in Legislation a 2030 Provincial Target for Renewables.

To advance these top four recommendations will require leadership, negotiation and cooperation among the key decision makers with respect to electricity policy – the Province (largely through the Department of Energy and Mines), Nova Scotia Power, and the Nova Scotia Utility and Review Board. Other important stakeholders include Efficiency Nova Scotia, the local solar industry, the commercial and industrial sectors, CaGBC Atlantic and Solar Nova Scotia.

CanSIA has developed a solid working relationship with both the Department of Energy and Mines and Nova Scotia Power and is willing to take an active role in working with the key stakeholders in advancing all of the recommendations contained within the Roadmap.





## Appendix A - Advantages of Solar PV

The following represent the several advantages Solar PV has over other forms of electricity:

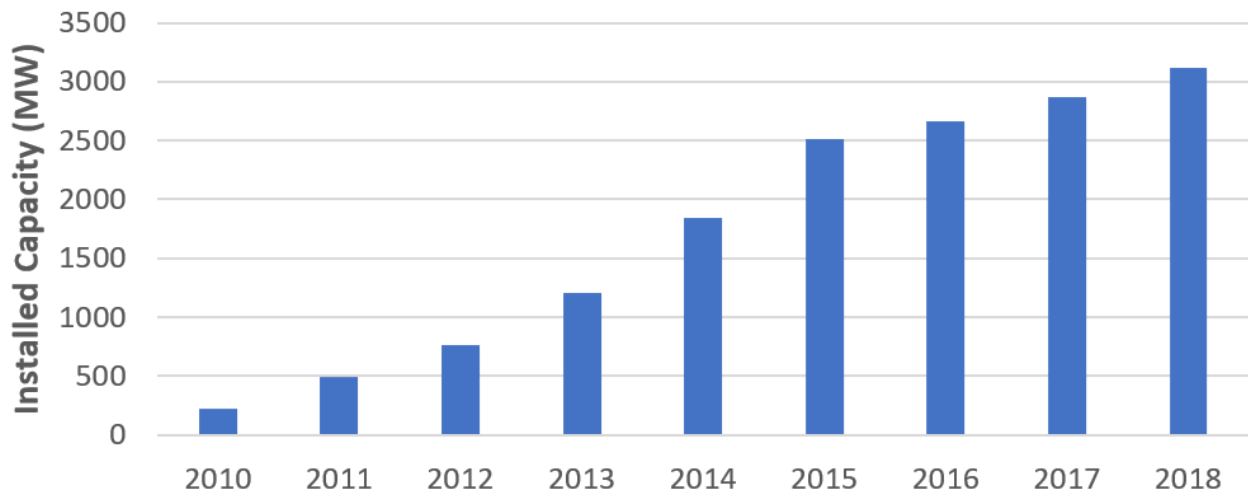
- **Reduces Electricity Bills** – Electricity bills represent a considerable portion of a household budget. Nova Scotia home owners that have elected to go solar have reduced their electricity bills on average by 50 percent. Over the long-term, solar can serve to protect homeowners from increased electricity rates.
- **Addresses Energy Poverty** - Through community solar or solar garden models at the utility-scale level, solar PV represents a tremendous opportunity to address energy poverty among low-income Nova Scotians.
- **Promotes Energy Independence while Strengthening the Local Grid** - While Nova Scotia will achieve a 40 percent renewable target by 2020 through the Maritime link, the province is relying on other jurisdictions for its electricity supply. Promoting renewable energy through solar creates a locally-sourced energy supply controlled and operated within Nova Scotia. More renewables added to the grid will serve to strengthen Nova Scotia's electricity system.
- **Produces Zero Emissions** – Solar PV does not produce any emissions in the production of electricity. That is why the shift to solar and other renewables will enable Nova Scotia to achieve critical GHG reduction targets. Homeowners utilizing solar PV mitigate approximately four tons of carbon emissions annually thus significantly reducing their carbon footprint. It is important to note that the manufacturing and shipping of solar modules and Balance of Systems components does create a carbon footprint. There is also the issue of recycling solar modules at their end-of-use life which is approximately 25 years.
- **Improves Air Quality** – Increased solar deployment reduces GHG's which produces better air quality leading to a healthier environment.
- **Creates Green Local Jobs** - With the launch of the SolarHomes Program in 2018, it is projected that over 1100 residential solar jobs could be created in Nova Scotia by 2030.<sup>34</sup>
- **Flexible in Scale and Location** – Utility-scale solar projects can be less expensive to construct and operate compared to fossil fuels and other types of renewables as they can be located close to transmission facilities. Moreover, additional modules can be added to a system as energy needs increase.
- **Increases Property Value** - Whether a homeowner decides to sell their home, installing solar PV increases home values. Research shows a 3.74 percent increase in home value over other non-solar counterparts.<sup>35</sup>

<sup>34</sup> CanSIA and Dunsky, Nova Scotia Residential Solar Market Outlook and Labour Force Study, 2018.

<sup>35</sup> <https://pvbuzz.com/six-reasons-you-should-go-solar/>

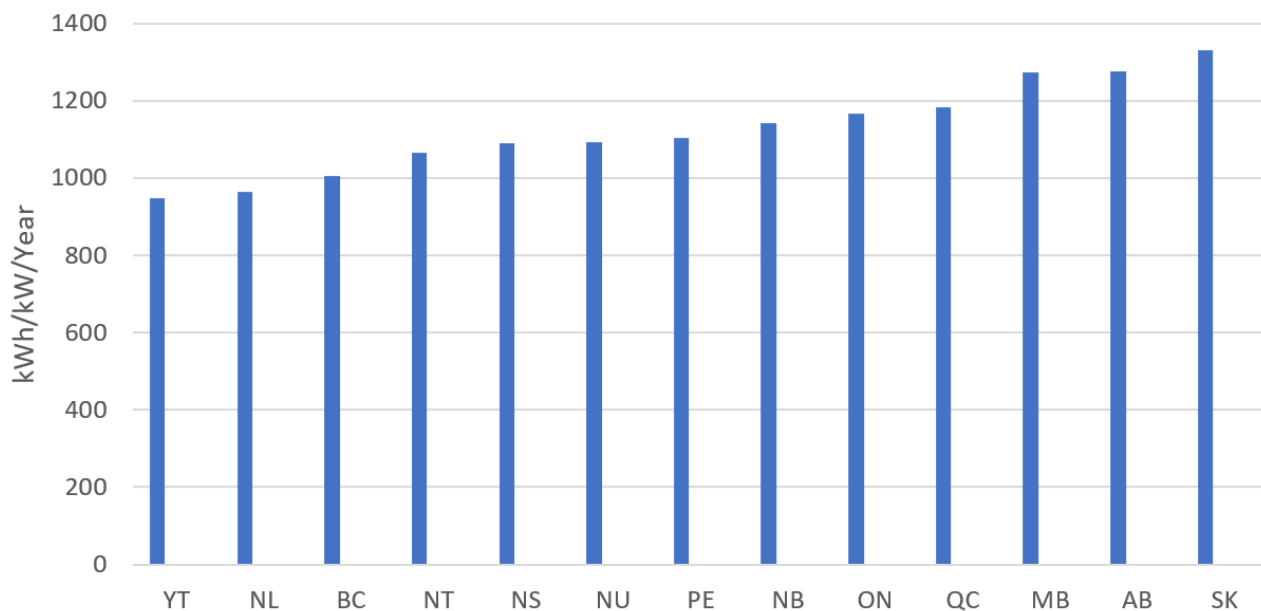
## Appendix B: Canadian Solar Data

**Figure 1: Solar PV Installed Capacity in Canada (MW): 2010-2018**



Source: International Renewable Energy Agency, 2019

**Figure 4: Annual Solar Production Potential by Province and Territory**



Source: <https://energyhub.org/solar-energy-maps-canada/>

# Appendix C – HES PV’s Guidelines Municipal Solar Permitting on Residential Installs

## Complex Vs. Simple Installations

Although many different methods of installing solar PV systems exist, they can generally be classified into two categories: simple and complex. Simple systems apply a minimal distributed load to an existing structure and parallel/flush to the slope on which they are mounted. These systems do not require modification of the base structure to bear the load imparted by the array. Complex projects incorporate many different types of mounting systems all of which rely on a properly designed foundation to support the array. These types of systems may require additional structural components to be added to properly support the load. Listed below are guidelines associated with simple and complex residential solar PV systems.

### Simple Installation

If the residential building meets the following conditions (simple) then the installation of solar should not require a building permit or have a simplified permit process. This applies to sloped roofs and low slope roofs (with rafter or truss construction).

1. The system’s distributed weight is less than 5 lbs/ft<sup>2</sup>, and that the roofing is lightweight material (cedar shakes, asphalt, metal, etc.)
2. The systems connection to the roof results in the system weight being uniformly distributed on the rafters beneath the racking, and each connection point has to bear less than 50 lbs.
3. The solar panels do not tilt or extend more than 18” above the roof.
4. Solar panels are below or flush to the roof ridge (of sloped roofs), and they do not extend beyond the roof edges (eaves).
5. The mounting structure is a product specifically designed to mount solar panels to the roof of interest.
6. There are installation instructions provided by the mount supplier, and they follow good engineering practices.
7. Set back a minimum of 24” from ridges and 18” from eaves and roof edges.

### Complex Installation

If the above conditions are not met, a building permit is required. Below are the criteria where a system should require a building permit for the installation of solar panels.

1. When there is a change to the roof structure, or if the roof needs to be reinforced due to installation of solar, a permit is required. The installation of the panels by itself does not constitute a structural change to the roof.
2. If the mounting system is ballasted on the roof or tilted and the solar panels extend more than 18” above the roof.
3. If the installation is ground, pole or tracker mounted.
4. The installation is impacted by a major obstruction.



