

BC SOLAR AND STORAGE INDUSTRIES ASSOCIATION

Solar Power

BC's Rising Resource



**New Satellite Data
Reveals Energy
For 5 Cents/kWh**

Half the BC Homeowner Rate

5 Facts About BC Solar

1 BC has Canada's Top Solar Power Resource

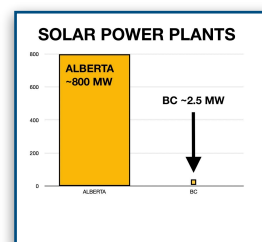
Abundant Source of Low-Cost Electricity Available

BC Shares Canada's top commercial Solar Power resource¹ with Alberta, where approximately 800 MegaWatts (MW's) of low-cost utility-scale Solar Projects are now building. While BC is failing to benefit, Alberta is gaining more than \$1 Billion of clean energy job creating investment.

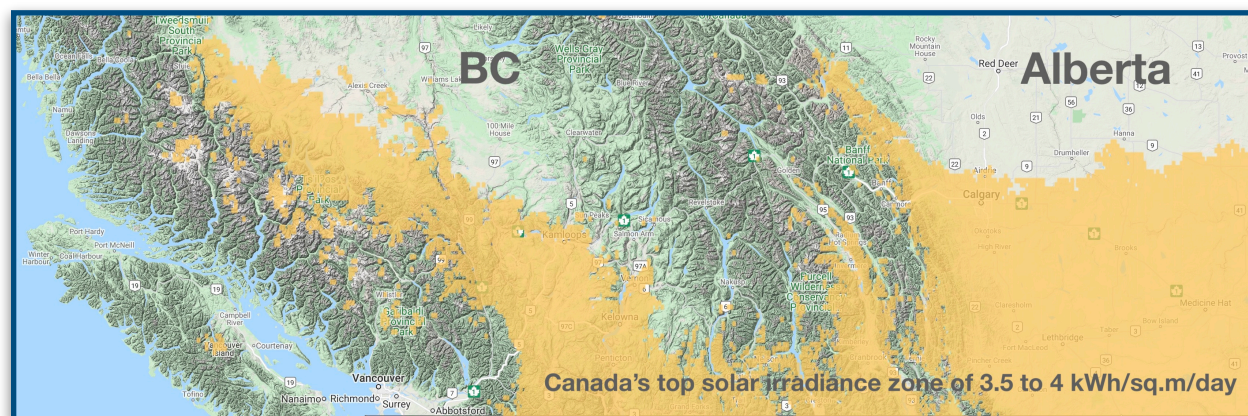
Alberta has 15 low-cost utility-scale Solar Projects announced as built or building — including a 120 MW project adjacent the Edmonton International Airport. Alberta also has some 70 additional *proposed solar projects* in a queue for interconnection². Other regions of southern Canada and 15 northern US states share portions of this same top Solar Power irradiance zone where thousands of MW's of solar projects are building and **commercially viable**.

Large portions of British Columbia are located within this top solar zone, yet only approximately 2.5 MW of utility-scale solar has been interconnected.

Solar is now the fastest growing power sector globally for its low cost and other system benefits³. And the growth of solar is unstoppable. There is now more than 650,000 MW of solar power capacity installed worldwide — a capacity 54x larger than BC Hydro's entire 12,000 MW of generation. Almost half of all new power capacity installed globally in 2019 was Solar Power. In the US alone, utility-scale solar will make up 70% of all new US annual power capacity additions by 2027⁴. In October 2020, the International Energy Agency crowned solar as the “**New King of Global Power**,” forecasting annual solar output by 2040 of up to 4,813 TWh (+4.8 Billion MWh), exceeding gas, coal, wind and all other low carbon options worldwide.⁵



BC may be failing to *understand* and *benefit* from the new “low-cost” and “game change” Solar Power technology despite our province’s abundant and powerful solar resource.



¹ The US Department of Energy agency NREL (National Renewable Energy Laboratory) solar observation data demonstrates that BC shares Canada's long term average top solar power irradiance zone of 3.5 to 4 kWh/sq.m/day (kilowatt hours per square meter per day) in select southern BC regions. The data represents the long term average solar power resource available to solar photovoltaic systems based on 19 years of satellite observation.

² Solar Shines in Canada's Oil Patch, PV Magazine, September 19, 2020. The Alberta Electric System Operator's (AESO) August report lists 72 Alberta utility-scale solar projects as up and coming, 20 of which are rated as in Process State 5 – all but ready for connection in the coming months. <https://www.pv-magazine.com/2020/09/19/the-weekend-read-solar-shines-in-canadas-oil-patch/>

³ Bloomberg New Energy Finance (BNEF), September 1, 2020. Solar Power by far is the world's leading power-generation technology installed in 2019. 45% of capacity added globally was solar with one third of all countries making it their top choice. Given the inexpensive nature of solar technology, BNEF expects the solar market to continue to grow with 140,000 to 178,000 MW of new solar to be built in 2022.

⁴ Global energy consultancy Wood Mackenzie, August 2020.

⁵ <https://www.iea.org/data-and-statistics/charts/change-in-global-electricity-generation-by-source-and-scenario-2000-2040-2>

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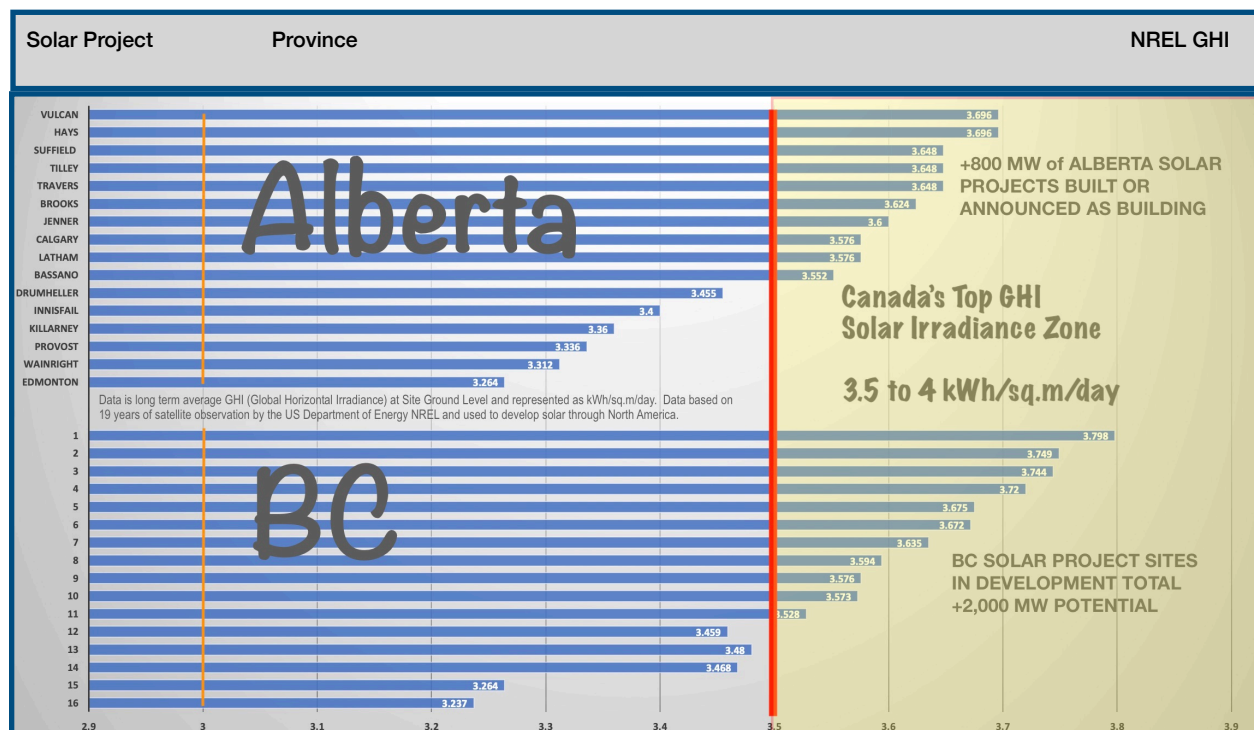
Satellites Reveal BC's Amazing Solar Potential

More Than 1,000 MW of BC Solar Projects Identified

BC Solar developers are currently developing more than 1,000 MW of low-cost proposed ground mount Solar Power Projects in the best solar regions of Southern British Columbia.

The US Department of Energy's National Energy Renewable Laboratory (NREL) now shares satellite solar observation data with Canada - including 19 years of updated BC observation. The new data shows BC Solar project sites have same or better energy values as Alberta and other regions where thousands of megawatts (MW's) of utility-scale solar plants are rapidly building. Other regions endowed with the same commercial solar zone include 15 US States, the UK and most European countries. The NREL data is utilized by energy professionals and is the gold standard for solar site analysis and development throughout North America. Previous Canadian solar maps underestimated the BC solar resource.

BC solar project sites now in development have similar or better Global Horizontal Irradiance (GHI)⁶ electrical generation potential as Alberta solar project sites now operating (or building). The chart below shows irradiance values of the top +800 MW of Alberta Solar Project sites operating (or building) — compared with identified top BC Solar Project sites⁷ now developing. The listed Alberta solar projects have been publicly named. The BC sites are identified by number only for commercially sensitive reasons. The results demonstrate BC utility-scale solar projects in development are as good and better than Alberta's best solar projects.



⁶ Global Horizontal Irradiance (GHI) is the total amount of shortwave radiation received from above by a surface horizontal to the ground. The value is of importance to Solar Photovoltaic (PV) development and includes both Direct Normal Irradiance (DNI), or direct sunbeams, and Diffuse Horizontal Irradiance (DIF), or sunlight diffused by the atmospheric clouds. It also includes ground reflected radiation. The value improves when solar panels are tilted towards the sun.

⁷ BC solar projects in development are identified by number on the attached chart. Their names and locations are available to qualified parties on request.

3

Solar is BC's Lowest Installed Cost Option

Solar Electricity For Little as 5 Cents kilowatt/hour

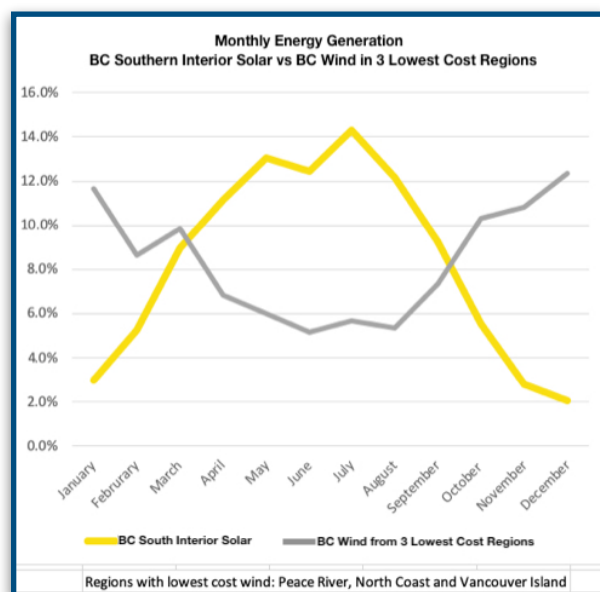
Several BC utility-scale solar projects in development have the same NREL solar zone as three Alberta Solar Projects now building to supply electricity at 4.8 Cents/kWh.⁸ Likewise, the US State of Maine recently announced 482 MW of utility-scale solar projects in the same solar zone. The average Maine price converted to Canadian currency is 4.69 Cents/kWh. Indeed, thousands of MW's of utility-scale solar projects have been announced in 2020 in southern Canada and northern US States as building in this NREL GHI solar zone of 3.5 to 4 kWh/sq.m/day.

The new market-tested solar electricity supply price of **Less Than 5 Cents kWh** in the common solar zone demonstrates that BC solar cost on select sites at utility scale is expected to be below that of other BC generation options. The wholesale price of utility-scale solar at the gate is expected to be less than half the price BC residential customers currently pay for their electricity.

The BCSSA estimates the low range of 2020 wholesale supply prices for BC's top "utility-scale" solar projects in a competitive power call today would be in the range of 5 to 7 Cents/kWh (kilowatt hour) at the gate, depending on project size capacity, location and length of power delivery contract. **Future wholesale BC solar prices for delivery in 2025 or later years are expected to be even lower based on 2020 contract prices for new solar projects building in other regions with identical solar resources.**



The expected BC solar project gate supply price to the BC electrical system compares favourably with the average 2019 BC residential electricity price paid by Vancouver ratepayers of 11.62 cents kWh⁹.



Solar costs have dropped 80% over the past 10 years, and are expected to continue to fall in future. Large utility-scale projects have lower cost than small projects — and a life expectancy of up to 35 years. Solar at utility scale is now recognized by BC Hydro as the lowest installed cost renewables option available to the BC system.¹⁰

In addition to its low-cost, solar at utility scale offers another unique benefit to British Columbia due to the seasonal peaking nature of the BC energy supply. BC solar's *summer generation* peaking profile is complementary to the *winter and spring* peaking profiles of wind and hydro generation. In other words, solar helps fill the energy gap during summer and fall periods of low wind and water.

⁸ Canadian Solar and their partners the Conklin Metis Local 193 in February of 2019 were awarded three solar power contracts for a total of 94 MW from Alberta Ministry of Infrastructure with an average contracted PPA price of 48.05 CAD per MWh. The Hays, Tilley and Jenner solar projects are expected to be operational in 2021 and will provide 55 per cent of the electricity needs of the Alberta government. Canadian Solar is in an 50% equity partnership with the indigenous community Conklin Metis Local 193 on the three projects.

⁹ Comparison of Electricity Prices in Major North American Cities, Hydro Quebec, April 1, 2029.

¹⁰ BC Hydro 2020 Resource Options Plan Draft Update, April 2020, shows lowest installed cost for BC solar at utility-scale is \$1,469/MW. The lowest available installed cost for other BC renewable generation options is higher, with Onshore Wind at \$1,960/MW, Run-of-River Hydro at \$2,000/MW, Geothermal at \$5,700/MW, Biomass at \$5,910/MW, and Small Hydro with Storage at \$7,000/MW.

4

Solar With Storage Eliminates Intermittency

Energy Security To Protect BC Regions and Communities



Utility-scale¹¹ solar projects planned with energy storage batteries are considered the “Holy Grail” of renewable power.

Solar and storage hybrid plants are designed to serve both day and evening electrical loads - even after the sun goes down. The process is known as “**Time Shifting**.” The batteries are charged at the peak of the day by excess solar power. Typical evening discharge durations are 2 to 4 hours, depending on utility needs. Many other auxiliary services can also be provided by solar hybrid plants.



Solar and storage can also provide local **Energy Security** to southern BC regions in event of grid disruptions such as wildfires or earthquakes along the thousands of kilometres of BC transmission lines. During winter solar periods, the solar collocated batteries can recharge from the grid during overnight “low load” hours, and discharge during “high load” hours.

By the end of 2019, according to the US Berkeley Lab¹², there were at least 367,000 MW of solar plants in US interconnection queues. Approximately 102,000 MW (~28%) of this capacity is proposed as hybrid projects, pairing with solar with battery storage.



¹¹ Utility Scale Solar refers to Solar Power Projects constructed as ground mounted projects (not rooftop). As solar is modular, larger projects benefit from reductions in overall cost of component supply, construction and operations. NREL uses the minimum threshold of 100 MW (megawatt) capacity for utility-scale. BC Hydro has used 50 MW. Projects building in Alberta vary between 30 and 400 MW. Smaller projects are expected to have higher cost than large.

¹² <https://emp.lbl.gov/publications/hybrid-power-plants-status-installed>

5 The Future of BC Solar is Brilliant

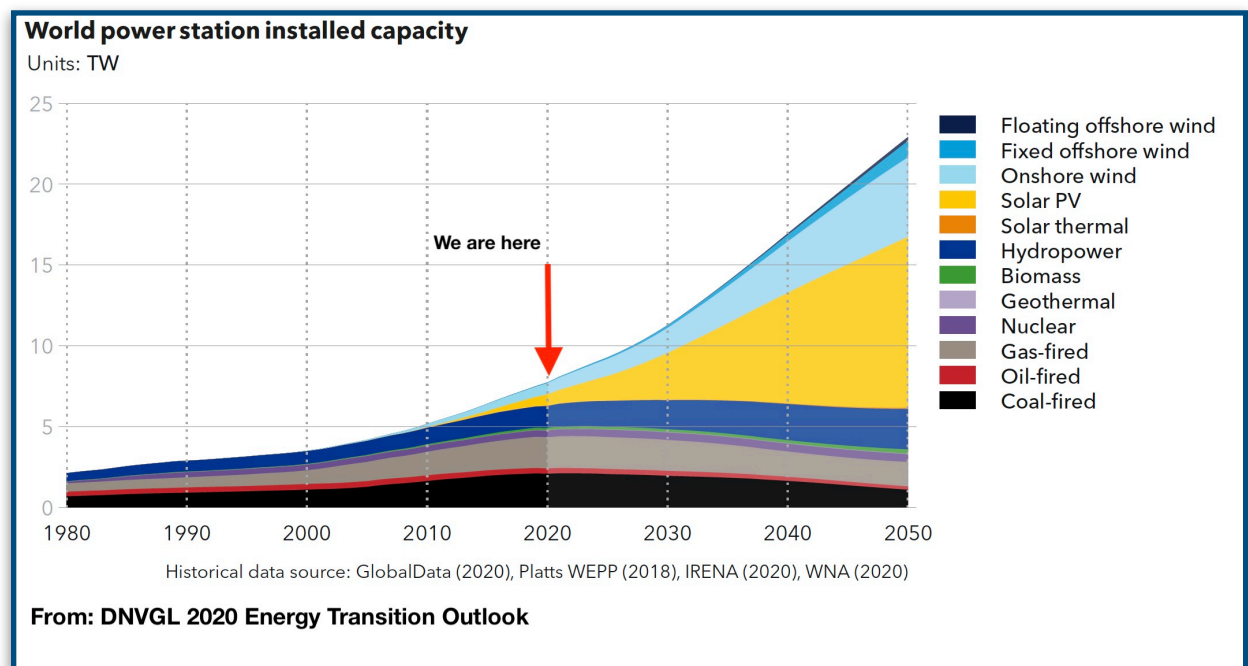
Solar to Become Largest Source of Energy Globally

Solar PV at utility scale is the world's fastest growing power sector. Solar costs continue to fall year-on-year, even as solar technology continues to improve. These beneficial characteristics make the progress of large ground-mount solar projects unstoppable.

Global energy consultancy DNVGL in its 2020 Energy Transition Outlook forecast sees a brilliant future for solar power. According to DNVGL (and many other sector consultancies), Solar PV at utility scale will become the largest energy source among all generation technologies.

Solar has become a keystone technology worldwide as countries and corporations change fuels to meet the challenges of climate change. In the US, for example, the Democratic Party has pledged to invest \$2 Trillion in renewables including solar to achieve a 100% clean energy standard by 2035. China in October 2020 announced plans to enable 30,000 MW of new solar projects. Even traditional oil & gas producers are transitioning with solar, with BP in September 2020 announcing plans to develop 16,000 MW of solar by 2025. The staggering scale of solar investment globally continues to drive down the cost and improve the technology.

Recent BC polling has demonstrated that Solar projects have the highest social acceptance and desirability of all potential BC generation options.¹³ This may be partly due to solar's low visual profile and silent operation. But also that solar can be built in modular blocks allowing passages for wildlife and minimal disturbance to the land. And, unlike some other renewable options, the solar photons which power solar modules under both clear and cloudy skies are available every day - and season of the year.



FOR MORE INFORMATION PLEASE CONTACT:

BC Solar and Storage Association
Web: BCSSIA.ca

¹³ BC Chamber of Commerce Natural Resources Survey 2019-2020 demonstrated 88% of respondents support solar energy investment in BC, the highest approval among all generation options in the survey. The survey also demonstrated 71% of respondents believe BC needs to develop more renewable energy to serve future growth.