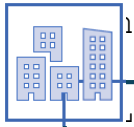
Barrie Solar Mapping Discussion

Purpose: To Provide Barrie Residents a Mapping tool to Visualize Roof Top Solar Potential.

Background:

On March 28, 2022, Barrie City Council approved the **Community Energy & Greenhouse Gas Reduction Plan**. The plan includes actions and strategies for improving energy efficiency and reducing community wide ...house Gas (GHG) emissions.

The outlines four "**Big Moves**" – Buildings, Transportation, Circular Economy, Natural Environment ...and Use.



Big Move: Buildings

Goal: Near zero emissions in new and existing buildings

Strategies:

- **Deep energy efficiency retrofit program**
- Green development standard
- Energy management and benchmarking
- **Solar generation**
- District energy (pre-feasibility study)
- Larger renewables (pre-feasibility study)

Strategy 4: Solar Generation

Description: Develop and implement a rooftop and ground-mounted solar program across all sectors.

The solar photovoltaic (PV) program will be implemented across the community and will include both rooftop and ground-mounted installations. The business case and program design for the Deep Energy Efficiency Retrofit Program will include a solar generation strategy for rooftop PV, though the deployment of the two programs will be separate. The Green Development Standard will include consideration for building rooftop design that can accommodate solar generation.

Target Participation:

Eligible Residential Rooftops have 5% coverage of Solar Panels by 2030 and 15% by 2050

Immediate Actions: Solar Generation

- Communicate and **provide tools/resources to educate the public and businesses on the benefits of solar generation** and access supports/funding.
- Advocate for energy rebates and efficiency/affordability programs at all government levels.

Potential Tool / Resource: a number of Canadian cities provide their Residents with an interactive mapping tool to visualize roof top solar potential, costs and savings. Barrie could provide the same type of tool.

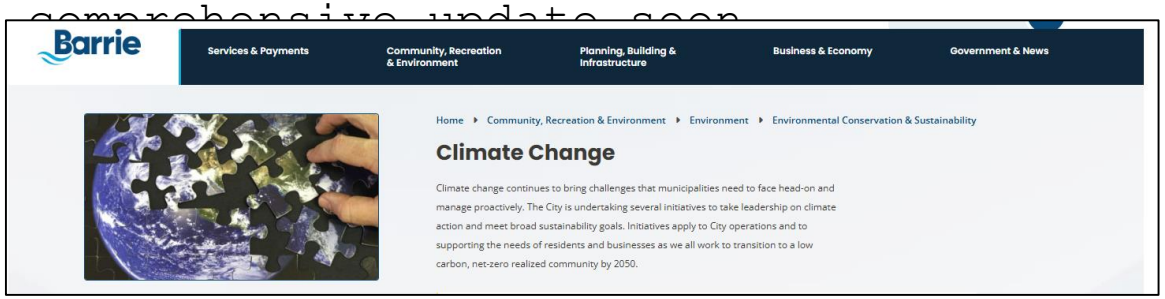
Barrie Solar Mapping Discussion – Why Now?

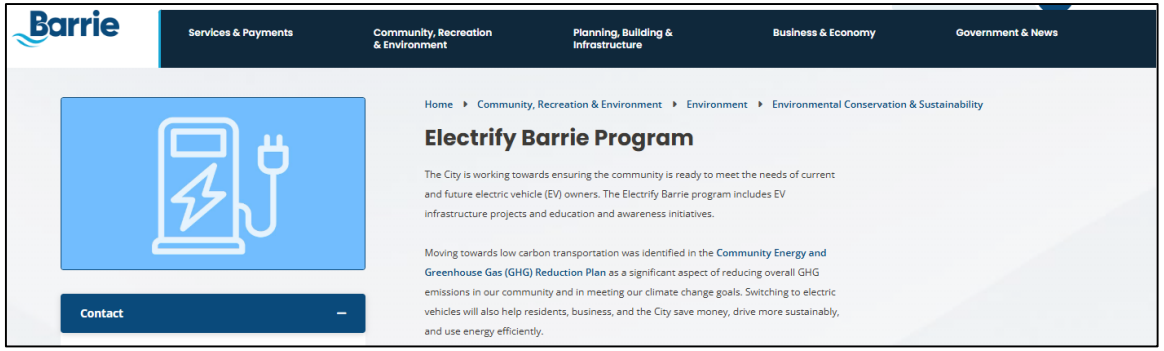
Reason 1

Enbridge Gas and Save on Energy, with support from the Ontario Government, have partnered to launch the new Home Renovation Savings™ program to help Ontarians improve home energy efficiency and comfort. Residents can get up to $5,000 for solar panels, plus the option to bundle with battery storage for an additional rebate, up to $5,000.

Reason 2

The web pages for Electrify Barrie and Climate Change are scheduled for a comprehensive update soon.



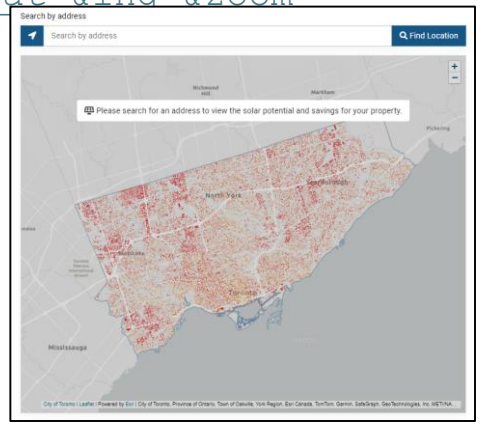


Now is an opportune time to "*provide tools/resources to educate the public and businesses on the benefits of solar generation*" and actively encourage Solar PV adoption.

Barrie Solar Mapping Discussion – Options (Inhouse GIS Development)

Example: Toronto – https://www.toronto.ca/services-payments/water-environment/net-zero-homes-buildings/solar-to/solarto-map/#location=&lat=&lng=&zoom=

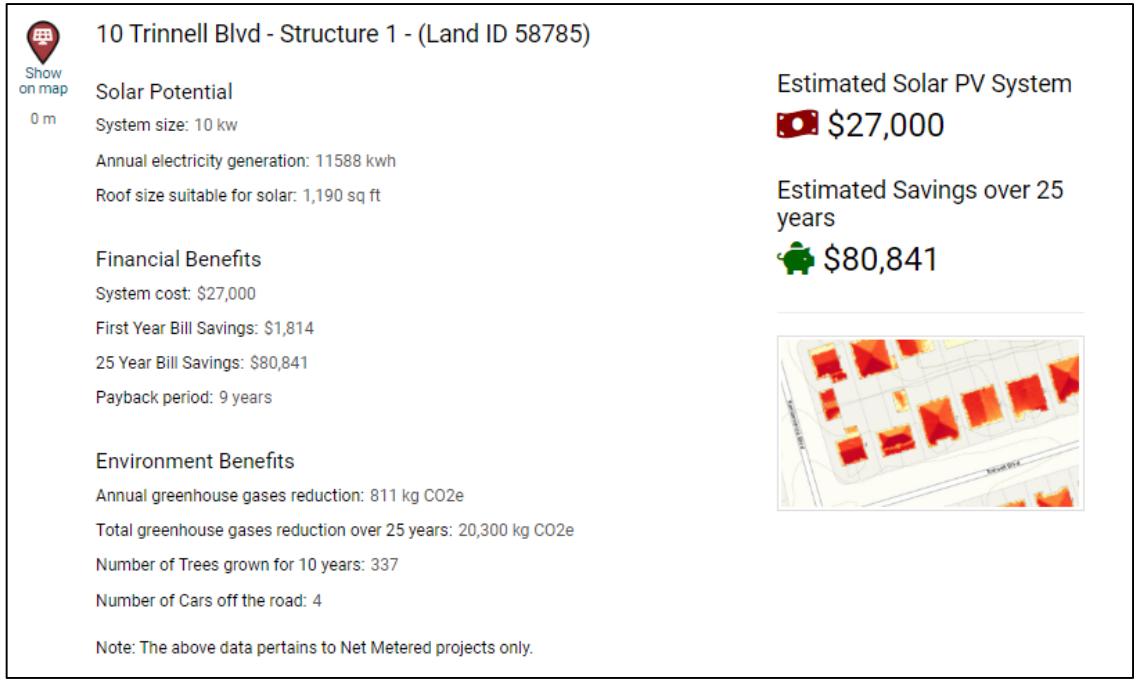
Toronto has developed their Solar TO Map through a Geographic Information Systems (GIS) analysis of Light Detection and Ranging (LiDAR) data. LiDAR technology captures high accuracy elevation data. The software takes into account geographical latitude, as well as the sun's daily position throughout the year.to provide Residents access to an interactive map visualizing rooftop solar potential



Residents simply type in their address or zoom in to select their home

Note Barrie could develop their own Map and share it through the Discover Barrie Portal (https://discover.barrie.ca/pages/apps)

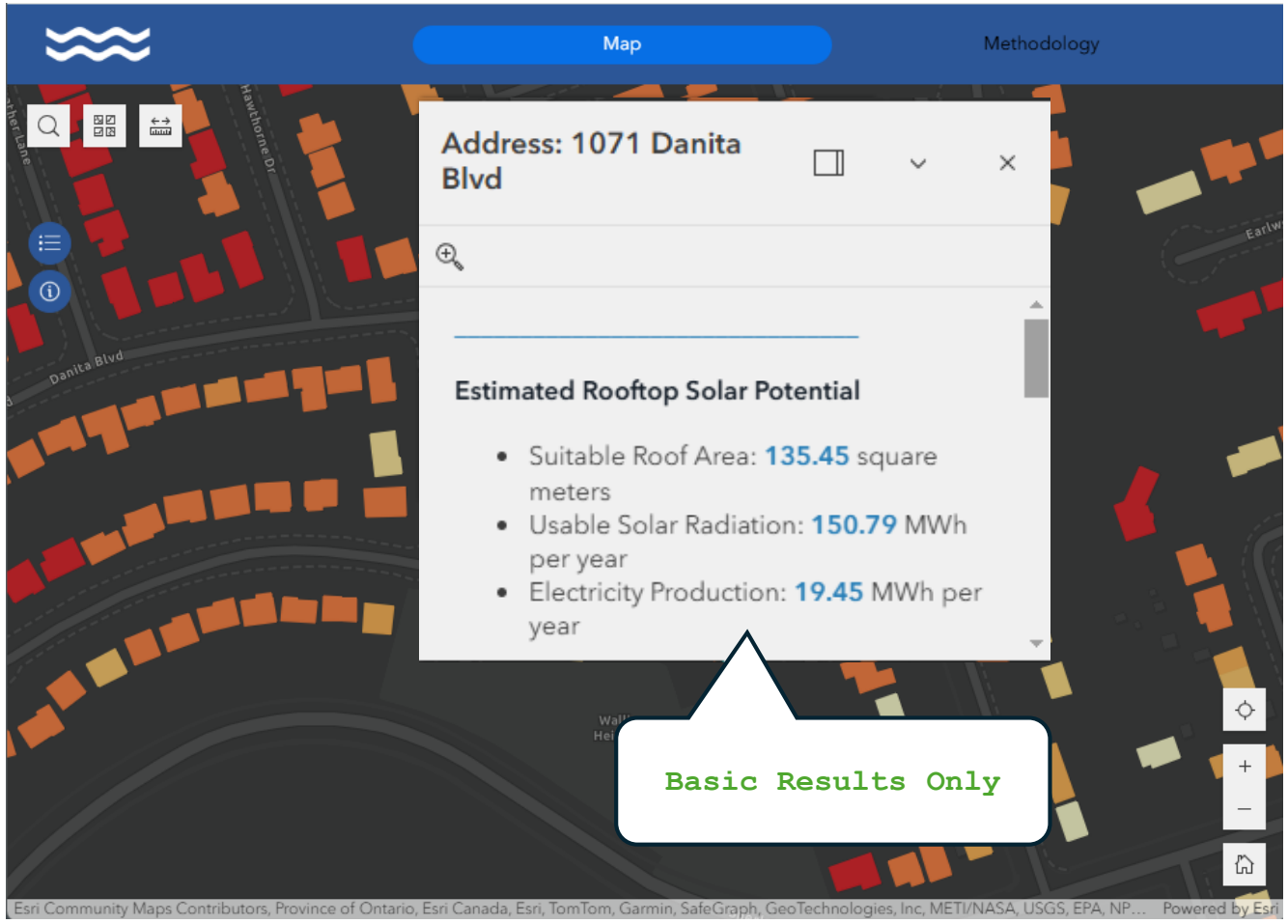
Results:



Barrie Solar Mapping Discussion – Options (Inhouse GIS Development)

Example: Peterborough – https://experience.arcgis.com/experience/fcb650607a9148a688e23f8b7ff38d65/page/Map

An interactive solar panel map that identifies the solar potential of buildings in Peterborough was developed in partnership with Fleming College. Installing solar technologies like solar photovoltaic (PV) to generate electricity or solar thermal to heat water are excellent solutions to help lower your carbon footprint and actively tackle climate change. Solar PV can also support property owners with decreased monthly electricity bills during peak time-of-use periods.



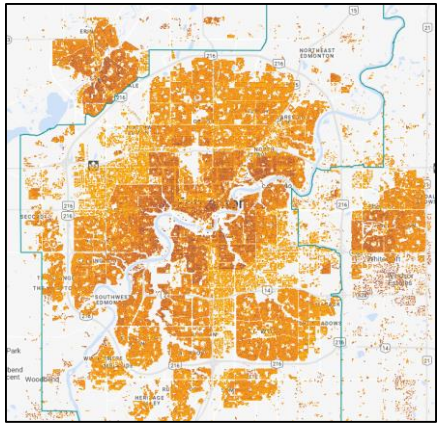
How to use the solar panel eligibility map:

1. Select and click your building from the map
2. A pop-up window will appear that lists:
    1. Suitable rooftop area in square meters for installing solar technologies on your building
    2. Usable annual solar radiation in Megawatt-hour (MWh) for the rooftop
    3. Estimated solar electricity produced (MWh) and avoided greenhouse gases associated with grid electricity in kilograms
    4. Potential range of annual electricity cost savings from not purchasing grid

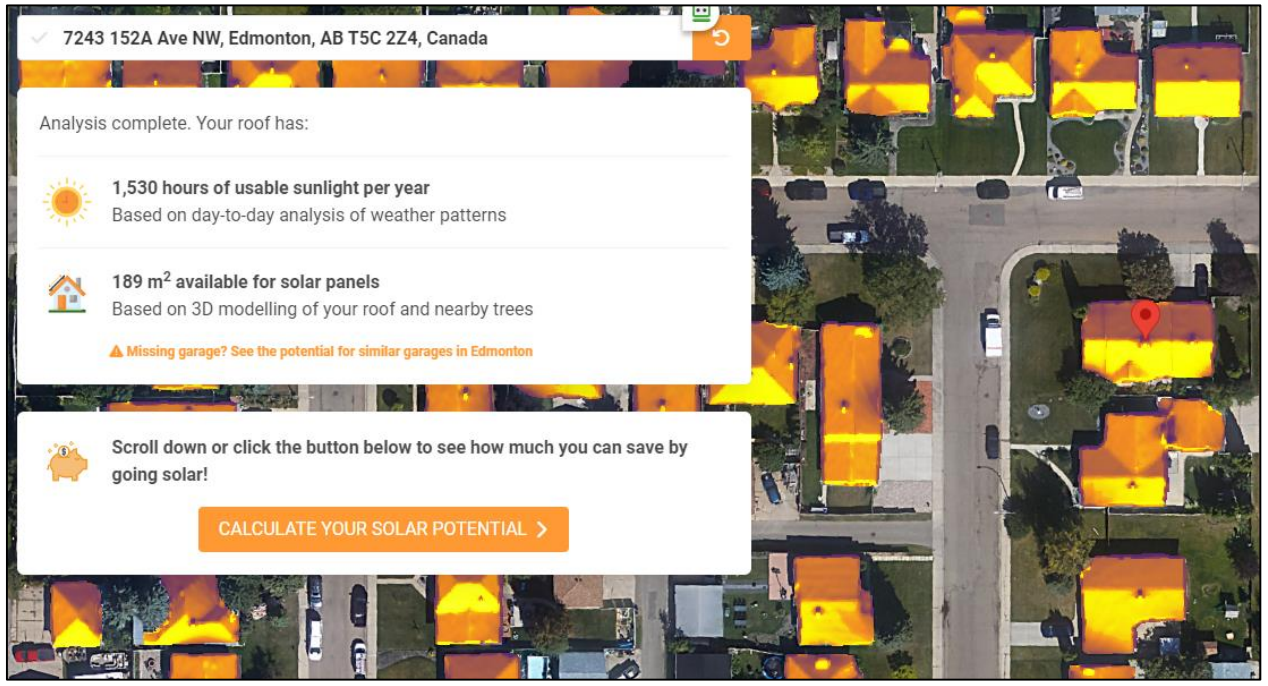
Barrie Solar Mapping Discussion – Options (3rd Party Apps)

Example: Edmonton – 3rd Party Solution (https://solar.myheat.ca/edmonton/)

The City of Edmonton has partnered with MyHEAT to provide Residents access to an interactive map visualizing rooftop solar potential. Residents simply type in their address or zoom in to select their home.

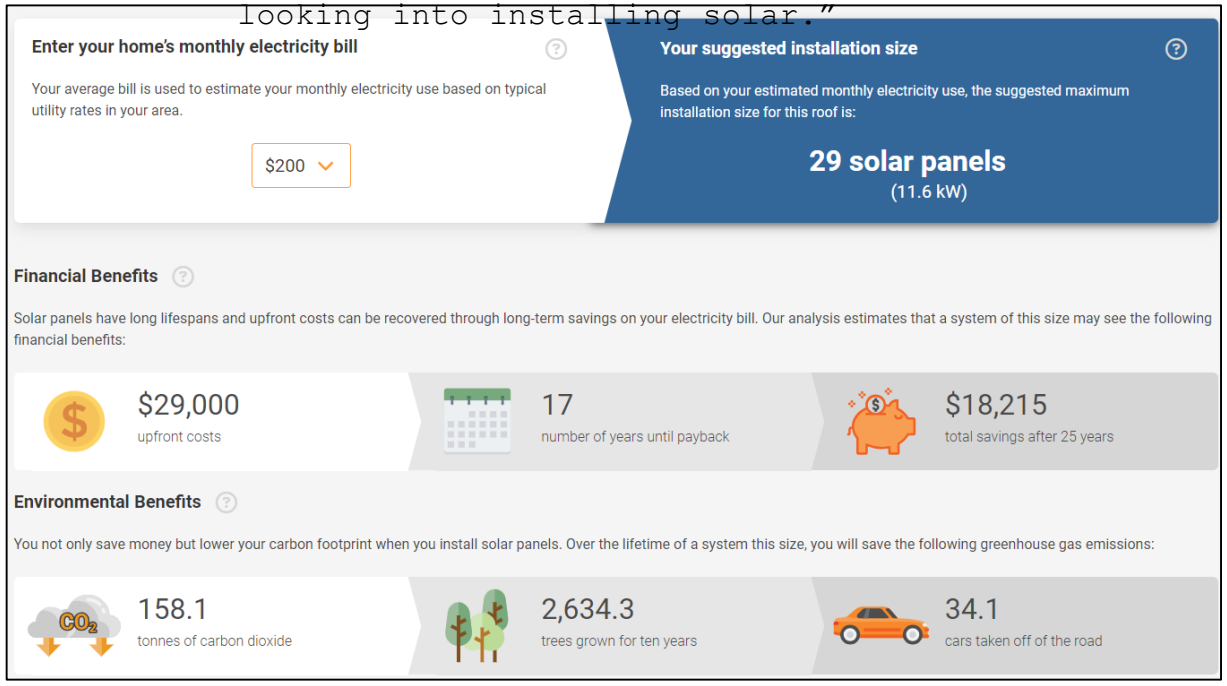


Results:



When asked "What do you like or dislike about Edmonton's Solar Potential Map? Do you have any feedback on the tool and its functionality?", residents of Edmonton shared these responses:

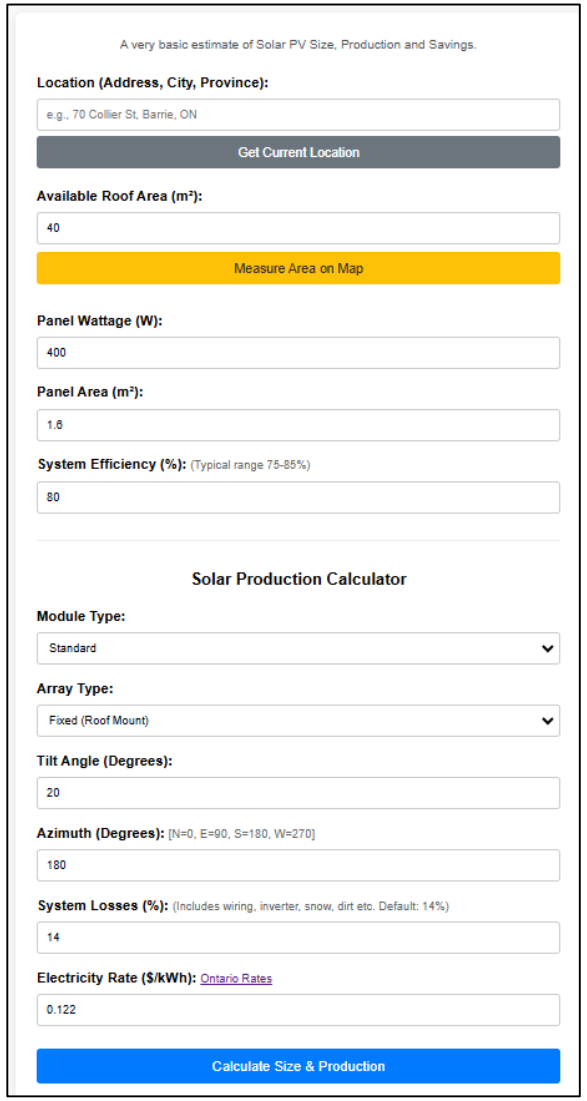
"It helps sell the idea that a northern community still has great solar potential."
"The roof of my house is entirely shaded by American Elms but the map alerted me to the potential of my garage, where I installed 24 panels"
"It was the key in my decision to have solar panels installed on my house."
"It was the first thing we did when we started looking into installing solar."



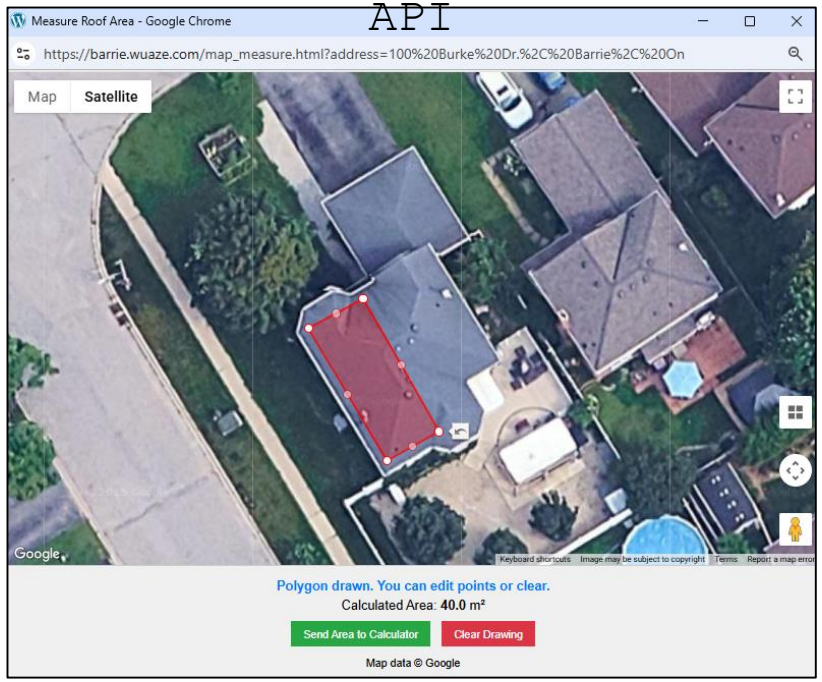
Barrie Solar Mapping Discussion – Options (Inhouse HTML & JavaScript Tool)

Create a simple tool with HTML & JavaScript with basic user input (Example: https://barrie.wuaze.com/Solar-PV-Calc/)

Simple form with set Default

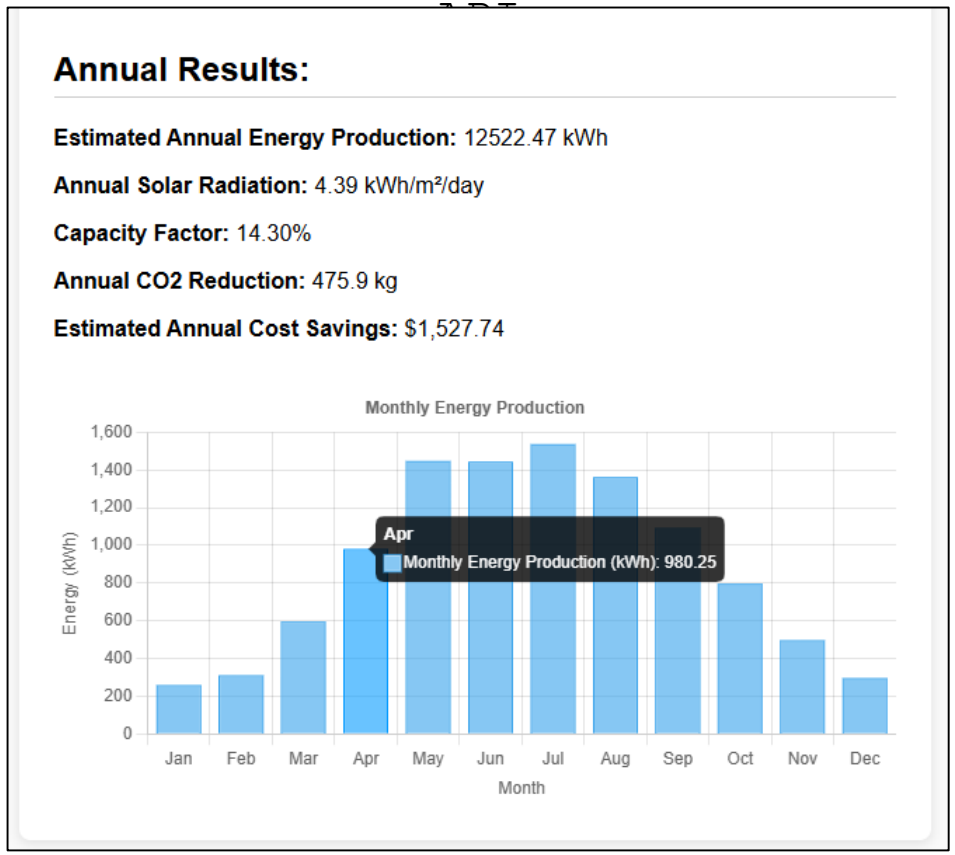


Utilizing the Google Maps API



Google Maps integration allows users to calculate the Roof Area by zooming on your building and selecting the appropriate section.

Utilizing the NREL's PVWatts® API



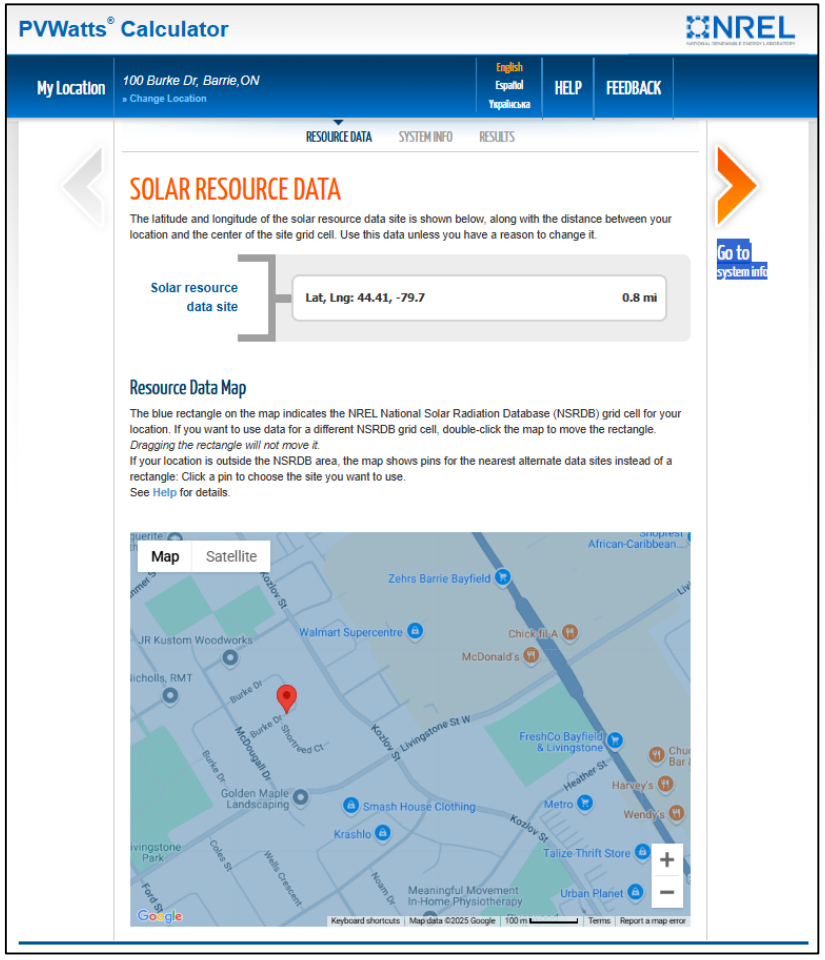
Fairly simple interface
requires confirmation of base assumptions during development.

Barrie Solar Mapping Discussion – Options (Link to PVWatts)

Links to other solutions, information, tools

NREL's PVWatts® is a web application developed by the US National Renewable Energy Laboratory (NREL)

Step 1



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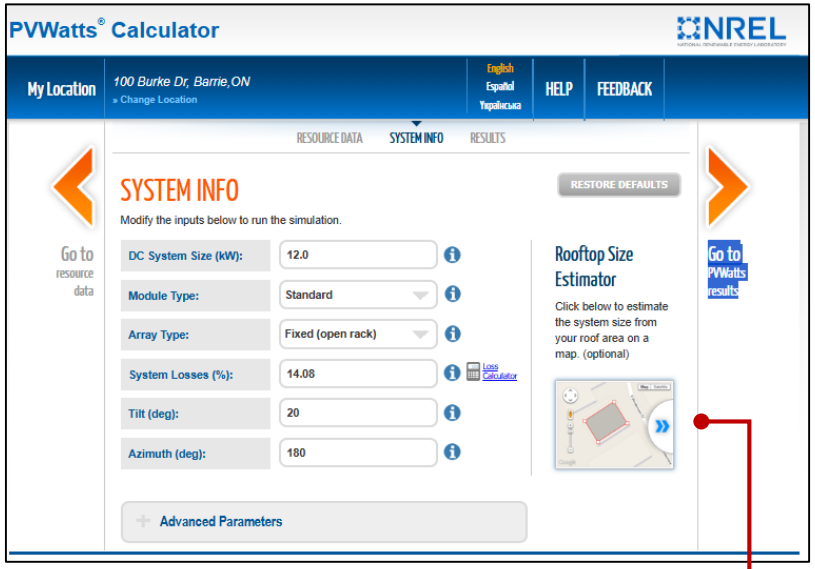
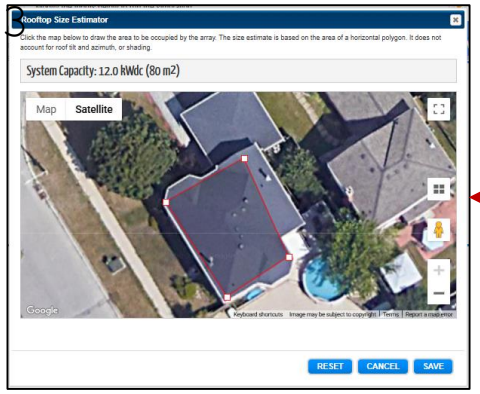
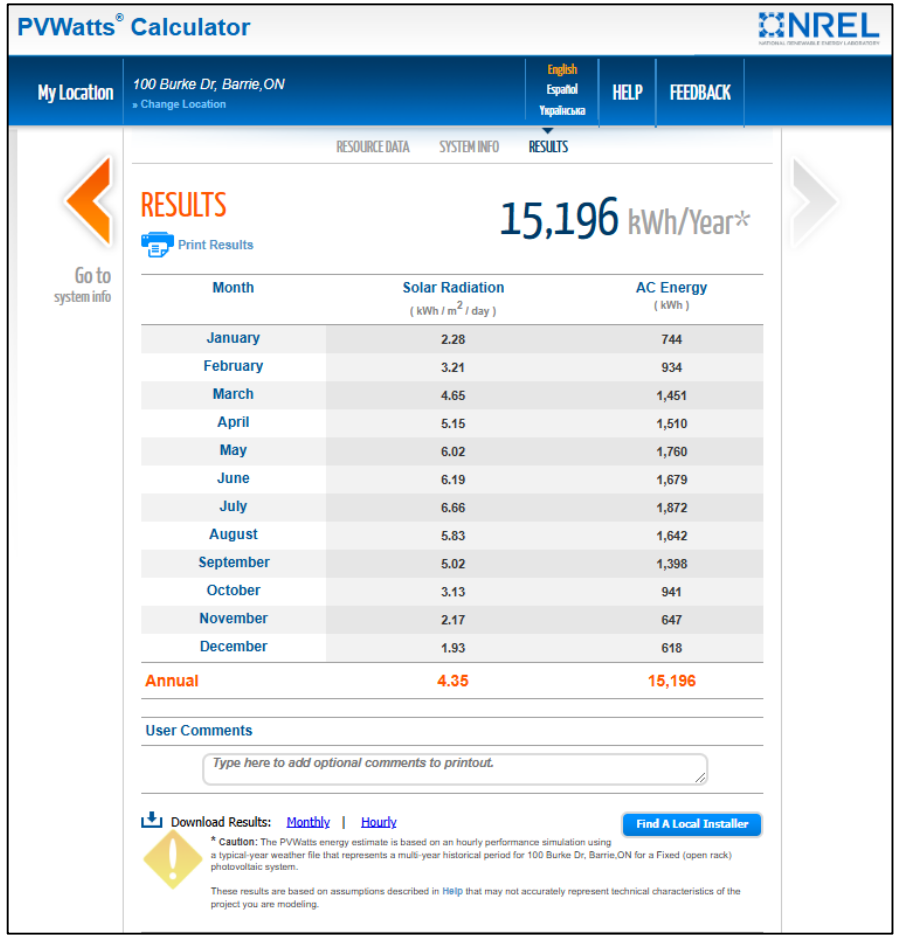


Step 3



Step 4

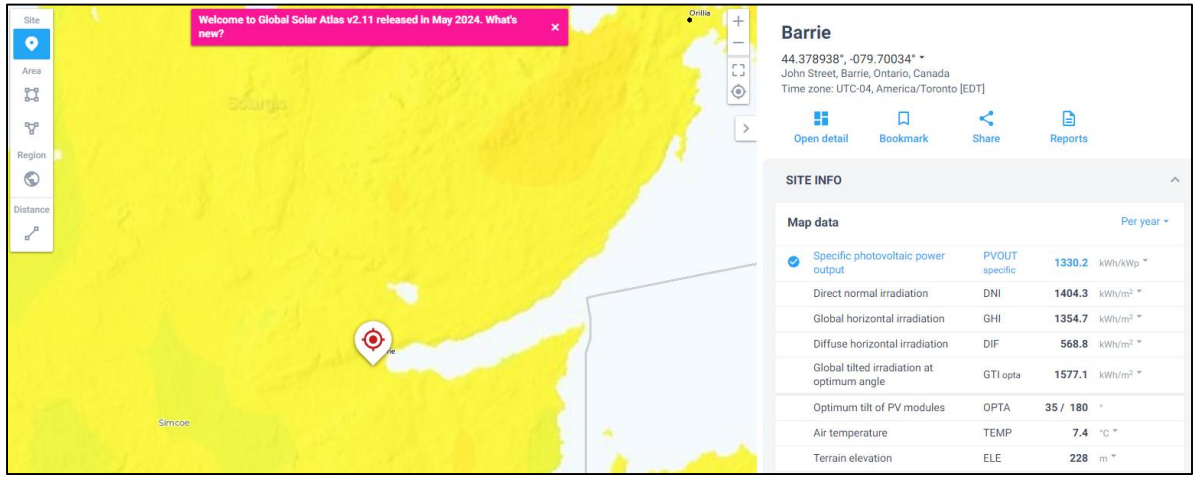


Fairly simple interface but lacks integrated financial (investment / payback) or

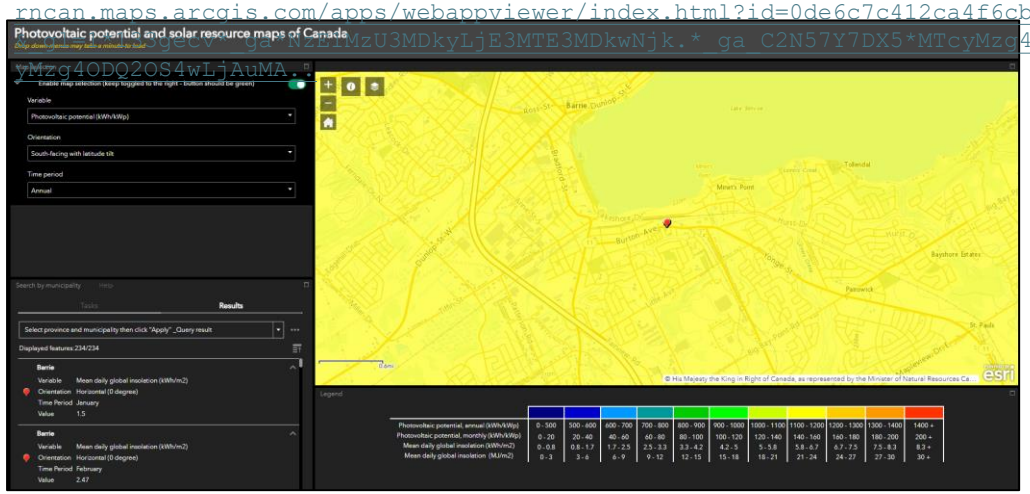
Barrie Solar Mapping Discussion – Options (Links to other Government Tools)

Links to other solutions, information, tools

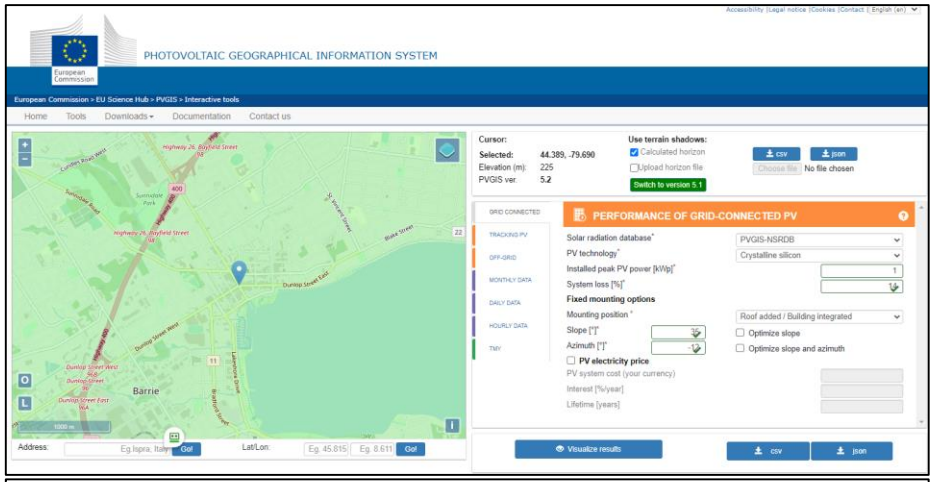
Global Solar Atlas
(https://globalsolaratlas.info/map?c=44.402882,-79.694824,11&s=44.378938,-79.70034&m=site).

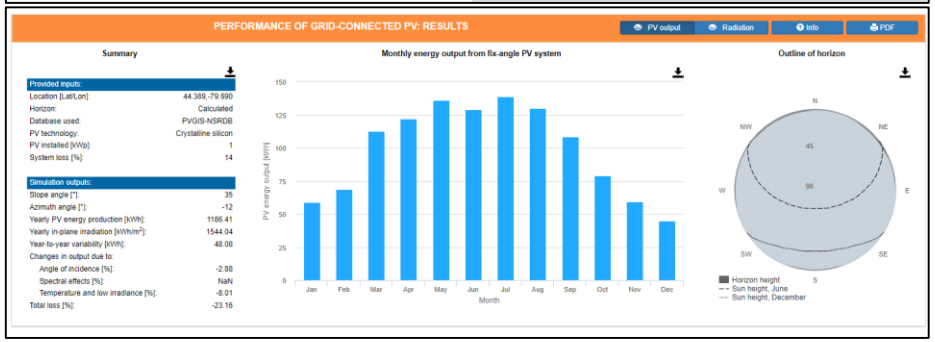


Photovoltaic potential and solar resource maps of Canada
(https://nrcan-rncan.maps.arcgis.com/apps/webappviewer/index.html?id=0de6c7c412ca4f6cbd399efedafa4af4).



Photovoltaic Geographical Information System (PVGIS)
(https://re.jrc.ec.europa.eu/pvg_tools/en/).
Starts in Europe but you can type in Barrie, Canada as the





Generally, these tools are geared towards more knowledgeable clientele which may be somewhat overwhelming for the novice Resident.

Barrie Solar Mapping Discussion – Sample Decision Matrix

Solution	Appropriate Report Details		User Interface (Ease of Use)		Solution Delivery Speed		Cost Effectiveness		Score
Inhouse GIS Development	**H**	-Usable sunlight -Panel Quantity -Financial (investment / payback) benefits -Environmental benefits	**H**	Click on Map or Enter Address	**L**	Estimate: 6 – 12 months to develop after approval.	**L**	Estimated Development Cost: $50k - $200k Ongoing Costs: ?	**8**
3rd Party Apps (MyHeat Solar Map)	**H**	-Usable sunlight -Panel Quantity -Financial (investment / payback) benefits -Environmental benefits	**H**	Click on Map or Enter Address	**H**	4-6 weeks after approval	**M**	3-year term: $25,000/year plus applicable tax billed annually	**11**
Barrie Inhouse HTML & JavaScript Tool	**H**	Can-Usable sunlight -Panel Quantity -Financial (investment / payback) benefits -Environmental benefits	**H**	Enter Address and available space	**H**	< 2 weeks to verify & modify sample code	**H**	< $1000	**12**
Link to PVWatts	**L**	-Monthly DC/AC production based on system size -Daily Irradiance -No financial (investment / payback) or environmental benefits	**M**	Several steps – enter address, array size or area, etc…	**H**	1- 7 days	**H**	$0 - $100: Just add description & link to City Website	**9**
Links to other		-Monthly DC/AC production based on system size		Several steps requiring				$0 - $100: Just add	

H=3, M=2, L=1

Questions and Discussion