

Solar Schools for British Columbia

A collection of
lessons to assist
teachers and students
with their exploration
of solar energy



Acknowledgements

Author

Marnie Olson Engaging Minds Consulting

Contributing Authors

Deb Calderon Calderon Consulting
 Susanna Solecki Teacher, WildBC Facilitator
 Johan Stroman GreenLearning BC
 Keri Laughlin

Editors

Tammy Keetch Education Consultant
 Susanna Solecki Teacher, WildBC Facilitator
 Kerrie Mortin Coordinator, WildBC
 Peter Ballin WildBC Facilitator

Graphic Design

Kristine Webber + Alison Garrad
 Earthwise|Design

Publishers

SolarBC
 WildBC

Other Contributors

Students

Helen Hunter-Perkins former Oak Bay
 Secondary student

Teachers and School District Administrators

Terry Argotow Como Lake Middle
 School, SD#43
 Darlene Braeder SD #39
 Deb Calderon Calderon Consulting
 David Derpak SD #39
 Joanne Dueck Tremblay Elementary,
 SD #59
 Danyell Dutka McLeod Elementary, SD #59
 Beno Fodor South Peace Secondary,
 SD #59
 Lindsey Foell Charles Tupper
 Secondary, SD#39

Laura Lyn Helton Colquitz Middle
 School, SD#61

Jennifer Hong Admirals Seymour
 Elementary, SD#39

Terry Howe King George Secondary,
 SD #39

Vicky Hughes King George Secondary,
 SD #39

Vicki McCarthy SD #39

Timothy George Mcgeer SD #39

Kevin Millsop Sustainability Coordinator,
 Vancouver School Board

Robert Mouro SD #39

Kelly Nordin WildBC Facilitator

Ellen Perkins SD# 61

Tristesse Seeliger Eric Hamber, SD #39

Robert Schindel SD #39

Shannon Sorochan King George
 Secondary, SD #39

Maria Teresa Taddei SD #39

Community Partners

Darla Simpson Destination Conservation
 Johan Stroman GreenLearning BC

Engineers & Scientists

Rob Barry Island Energy

Simon Boone Generation Solar

Dave Egles HES Home Energy Solutions

Susan Huber Swiss Solar Tech Ltd.

Morgan MacDonald, Patrick Spearing
 Thermomax

John Stonier Day4Energy

Sponsor

Nitya Harris Executive Director, SolarBC

Julia Roberts Assistant to Executive
 Director, SolarBC



On the Map

SolarBC projects

What will happen

Students examine how their community is currently using solar energy by identifying and analyzing site-specific examples.

Students will

- Look at the number of registered solar installations currently in BC;
- Make inferences about where solar thermal systems are currently installed;
- Interpret an interactive map and analyze trends;
- Synthesize information to select an installation for research.

Total Time	Establish what students know	Activity	Debrief what students learned
1 - 2 hours + homework	10 - 15 minutes	30 - 45 minutes + homework	20 - 30 minutes

In Advance

What you need to know

You may wish to provide additional time for students to explore the interactive map beyond the steps outlined in this lesson and report back on what they discover.

What might surprise you

- In some countries governments and other organizations help people switch to solar energy. For example, Germany, Spain and many other European countries pay generous amounts for solar-generated electricity and give low-interest loans for its production. As a result of such incentives, Germany experienced a demand for solar PV that increased by 57% per year between 2000 and 2006. Source: spie.org

What you need

- Colour copy of the current map of solar roof projects in BC or access to the online interactive map found on the SolarBC website at www.solarbc.ca

Establish what students know

1. As a class, identify any solar rooftops that students may be aware of in their neighbourhood or community.
2. Ask students to individually and silently guess how many solar installations they think there are in British Columbia and record that number.
3. Put students into groups and reveal the map showing the installations in BC. Ask students to reveal their guesses to their group and to comment on how they compare to the map. Have the groups discuss any surprises from the information.
4. Work with the class to identify the different types of installs shown on the map. Then have the groups discuss and record reasons why some types of buildings or communities might have solar installs while others don't.
5. Gather information from each group and record it so everyone can see the list and refer to it later.



Main Activity

What you do

Part A

1. Distribute a map of solar installations in BC for students to review or have students view interactive map online at <http://www.solarbc.ca/view-installations-across-bc>. If you are giving students a hard copy, give them one showing the overall installs for the province as well as one for your community, if necessary. In some of the more heavily populated areas the installs overlap significantly and are hard to read without zooming in.
2. Have students identify all the solar installations in their community and suggest reasons why there have been done.
3. Ask students to analyze the information, using the legend to identify any trends related to location and type of organization (i.e. residential, government or school). Do some areas of the province have more installs than others? Why would this be?
4. Have students work in pairs and imagine they are going to consult someone from an existing installation. Have them identify which installation would they target for an interview and why. Have them write five questions to ask a representative from the installation they selected.

Debrief what students learned

- What was the most interesting discovery about installations you made?
- What was the most surprising thing about installations in British Columbia?
- What do you think is the greatest barrier to installing solar energy systems in BC?
- What do you think will encourage people to install solar energy systems? Do you think people are influenced by what others in their community are doing?

Assessment

- Can students explain the types of buildings that have solar installations in BC.
- Can they accurately describe the trends in British Columbia for solar installations?
- How well did students identify what they would ask an installer?

Extensions

- **Cataloguing Cases.** If you were to set up a series of case studies for people to learn more about solar installations, what information do you think each case study should include? What information do you think people would be most curious about? What information would you include and how would you organize it?
- **Beyond BC.** Have students research what schools in other countries are doing with solar energy systems. How do the solar installs benefit the schools? How is it helpful for our schools to learn what schools in other parts of the world are doing? What are some of the most interesting or surprising things you discover.

Check out

- A current list of schools and a description of the program:
<http://www.solarbc.ca/install/schools>
- **Fort Nelson Secondary School** <http://www.solarforschools.ca/Schools.aspx>
Fort Nelson, British Columbia, Canada
System Size: 10kW

The 10kW solar energy system consists of 98 solar panels, each generating 102 peak Watts, connected together through 4 power inverters. The system was installed using special non-penetrating roof mounts, ensuring the integrity of the school's roof remains intact. It took approximately seven days for a five-person installation team to complete the installation and connect the solar energy system to the school's grid power supply.

System Performance - 10,000 kW hours of electricity per year.

- **Clarence Fulton Secondary School** <http://www.solarforschools.ca/Schools.aspx>
Vernon, British Columbia, Canada
System Size: 10kW

The 10kW solar energy system consists of 98 solar panels, each generating 102 peak Watts, connected together through 4 power inverters. The system was installed using special non-penetrating roof mounts, ensuring the integrity of the school's roof remains intact. It took approximately four days for a four-person installation team to complete the installation and connect the solar energy system to the school's grid power supply.

System Performance - 10,000 kW hours of electricity per year.

BC Solar Communities

- <http://www.solarbc.ca/solar-communities>

Beyond BC

- **Illinois Solar Energy Association**
http://www.illinoissolar.org/solar_tour
- **2009 Solar Tour 44-page guidebook**
<http://tour.illinoissolar.org/images/stories/tour/SolarTourGuidebook.pdf>
10 solar photovoltaic array installations on high schools with monitoring equipment to allow students and others to keep track of energy output and weather information on Madison Gas and Electric's Web site. In addition, several solar systems in the community are also featured.
<http://www.mge.com/environment/green/solar/schools.htm>
- **School Power...NaturallySM** is an innovative program from the New York State Energy Research and Development Authority (NYSERDA) Power Naturally.org
 - A.A.Kingston Middle School, Potsdam
<http://www.powernaturally.org/Programs/SchoolPowerNaturally/Success/Potsdam%20CS.pdf>
 - Bethlehem Central Middle School
<http://www.powernaturally.org/Programs/SchoolPowerNaturally/Success/Bethlehem%20CSD.pdf>

- Canton Central School
<http://www.powernaturally.org/Programs/SchoolPowerNaturally/Success/Canton%20CSD.pdf>
 - Darrow School, New Lebanon
<http://www.powernaturally.org/Programs/SchoolPowerNaturally/Success/Potsdam%20CS.pdf>
 - Jamesville-DeWitt Middle School
<http://www.powernaturally.org/Programs/SchoolPowerNaturally/Success/Jamesville-DeWitt%20CS.pdf>
 - Shaker High School
[http://www.powernaturally.org/Programs/SchoolPowerNaturally/Success/North%20Colonie%20\(Shaker%20High\).pdf](http://www.powernaturally.org/Programs/SchoolPowerNaturally/Success/North%20Colonie%20(Shaker%20High).pdf)
- **National Solar Schools Program, Australia.** www.climatechange.gov.au.
This program offers eligible primary and secondary schools grants to install solar and other renewable power systems, solar hot water systems, rainwater tanks and a range of energy efficiency measures.

