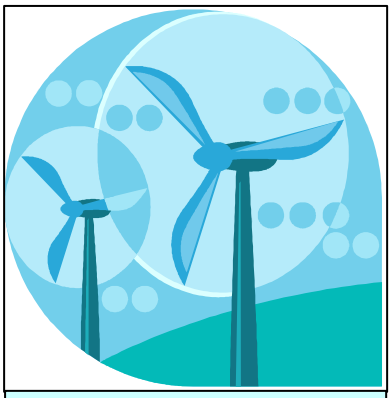
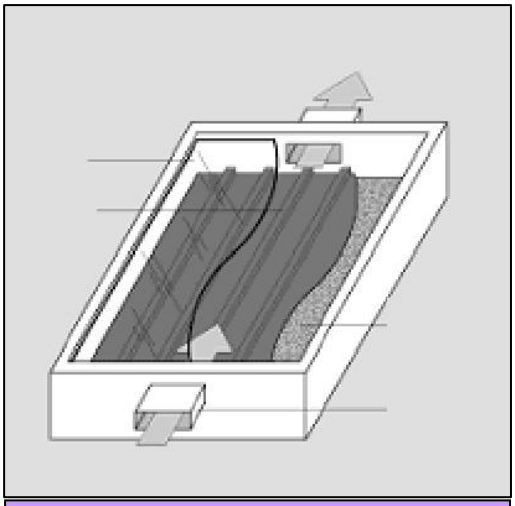
Renewable Energy Permit Regulations

March 21st, 2011

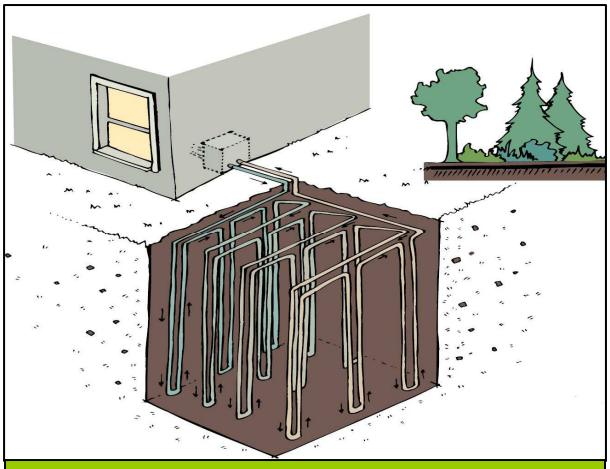


SMALL WIND TURBINE

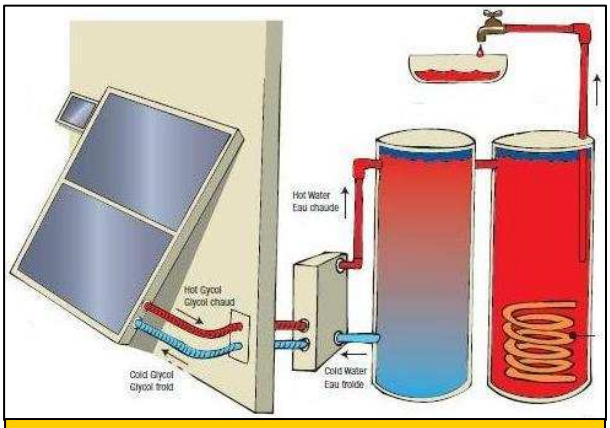
SOLAR PHOTOVOLTAIC PANEL



SOLAR HOT AIR COLLECTOR



GEOTHERMAL HEAT PUMP



SOLAR HOT WATER COLLECTOR

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Introduction

Use this guide to familiarize yourself with regulations for renewable energy technologies such as geothermal ground source heat pumps, solar hot air collectors, solar hot water collectors, solar photovoltaic panels, and wind turbines. Keep in mind that regulations may change, and the following information is presented here to raise awareness about renewable energy regulations, and not to be a definitive guide.

Geothermal Ground Source Heat Pumps

ELECTRICAL SAFETY

- LICENSED INSTALLERS
  - Installer must be licensed electrical contractor or be employed by one.
  - Installer must be licensed electrician or certified technician from NBCC.
  - Ask to see proof of your installer's qualifications.

- WIRING PERMITS
  - Wiring permit required for installing 10 or more outlets; or more than 5 kW.
  - Wiring permit costs from $85-$100 for at least three inspections.
  - When an installation is done at the same time as a new house construction, and the geothermal electrical is done by the electrical contractor doing the main electrical installation of the house, it will go on the same permit at no extra cost.

- INSPECTIONS
  - To ensure your system was installed safely, get an inspection from GNB Technical Services.
  - Electrical inspections cost $100 for one inspection.
  - Unsafe installations, that fail to comply with the electrical code, may be ordered by the provincial inspector to be disconnected immediately, depending on the gravity of the non-compliance.
  - Unsafe installations may be subject to a Provincial Order, which can be issued either to the licenced electrical contractor, to repair an unsafe installation, or to the owner of an installation, when it was not completed by a licenced electrical contractor.
  - Any connection to potable water systems requires that electrical inspectors notify the Chief Plumbing Inspector.

PLUMBING SAFETY

- LICENSED INSTALLERS
  - Installer must be licensed plumbing contractor or be employed by one.
  - Installer must be licensed plumber.
  - Ask to see proof of your installer's qualifications.

LOCATION

- PROTECTED WELLFIELD
  - Ask the Department of Environment if your installation will be located in a wellfield.
  - Search the environmental department's website for a list of designated wellfield areas.

- The **Wellfield Protected Area Designation Order** states no person shall use a ground source heat pump in any zone (A,B,C) of a designated wellfield protected area. Maps of the protected areas are available online.[1]

- PROTECTED WATERSHED
  - Ask the Department of Environment if your installation will be located in a wellfield.
  - Search the environmental department's website for a list of designated wellfield areas.
  - The **Watershed Protected Area Designation Order** currently does not mention ground source heat pumps. However, watershed specialist at the Department of Environment recommends applying for an exemption from the order by filling out an application on the government website. Maps of the protected areas are available online.[2]
  - Ask your local village or municipality about by-laws. Examples of towns with by-laws include:
    - Shediac; no open or closed loop geothermal installations are allowed
    - Petitcodiac By-Law #37
    - Sussex

OTHER

- STANDARDS
  - According to installers, the main geothermal installation standard is CSA 448.
  - CSA 448 states to consult the local regulations.

- LOOP CONFIGURATION
  - Open loop systems are considered to be water wells, and can only be drilled by licenced well drillers.
  - Licenced well drillers carry a laminated well driller's licence.
  - Closed loop systems currently do not require licenced well drillers.

Solar Hot Air Collectors

ELECTRICAL SAFETY

- LICENSED INSTALLERS
  - Installer must be licensed electrical contractor or be employed by one.
  - Installer must be licensed electrician or certified technician from NBCC.
  - Ask to see proof of your installer's qualifications.

- WIRING PERMITS
  - Wiring permit required for all wind and solar photovoltaic installations.
  - Wiring permit required for installing 10 or more outlets; or more than 5 kW.
  - Wiring permit costs from $85 to $100 for at least three inspections.
  - When an installation is done at the same time as a new house construction, and the solar hot air electrical is done by the electrical contractor doing the main electrical installation of the house, it will go on the same permit at no extra cost.
  - Solar hot air heaters may have fans, motors, blowers, and sensors to efficiently move heat from the collector to living space. Custom wiring of the sensors is an example of a project that would require

[1] Available at http://www.gnb.ca/0009/0371/0001/0003.html
[2] Available at http://www.gnb.ca/0009/0371/0004/0003.html

a wiring permit. However, solar hot air collector installations do not always require a wiring permit**.** For example, if there are no electrical components (i.e. passive), no wiring permit is required. Another example is a solar air collector that can simply plug into an existing electrical outlet for electricity to run fans and blowers, where the equipment is certified in accordance with NB Electrical Bulletin 165-3-8.

- INSPECTIONS
  - To ensure your system was installed safely, get an inspection from GNB Technical Services.
  - Electrical inspections cost $100 for one inspection.
  - Unsafe installations, that fail to comply with the electrical code, may be ordered by the provincial inspector to be disconnected immediately, depending on the gravity of the non-compliance.
  - Unsafe installations may be subject to a Provincial Order, which can be issued either to the licenced electrical contractor, to repair an unsafe installation, or to the owner of an installation, when it was not completed by a licenced electrical contractor.

Solar Photovoltaic Panels

ELECTRICAL SAFETY

- LICENSED INSTALLERS
  - Installer must be licensed electrical contractor or be employed by one.
  - Installer must be licensed electrician or certified technician from NBCC.
  - Ask to see proof of your installer's qualifications.

- WIRING PERMITS
  - **All photovoltaic installations require a wiring permit;** *please see Appendix A for information required to obtain an electrical permit for a photovoltaic system.*
  - Wiring permit required for all wind and solar photovoltaic installations.
  - Wiring permit required for installing 10 or more outlets; or more than 5 kW.
  - Wiring permit costs from $85 to $100 for at least three inspections.
  - When an installation is done at the same time as a new house construction, and the solar photovoltaic electrical is done by the electrical contractor doing the main electrical installation of the house, it will go on the same permit at no extra cost.

- INSPECTIONS
  - To ensure your system was installed safely, get an inspection from GNB Technical Services.
  - Electrical inspections cost $100 for one inspection.
  - Unsafe installations, that fail to comply with the electrical code, may be ordered by the provincial inspector to be disconnected immediately, depending on the gravity of the non-compliance.
  - Unsafe installations may be subject to a Provincial Order, which can be issued either to the licenced electrical contractor, to repair an unsafe installation, or to the owner of an installation, when it was not completed by a licenced electrical contractor.

- GRID-TIE INSTALLATIONS
  - Where the installations are intended to be Grid Tie Connected with Utility, the owner must also contact Ann Leggat at (506) 778-2096 or aleggatt@nbpower.com

PRODUCT SAFETY

- CERTIFIED PRODUCTS
  - Solar electricity products such as inverters, solar panels, disconnects, etc., must be in compliance with the **Electrical Bulletin 165-3-8**. In accordance with the regulation, all equipment shall bear a certification mark as evidence of having conformed to the appropriate CSA standards established under the provisions of the Canadian Electrical Code.

Solar Hot Water Collectors

ELECTRICAL SAFETY

- LICENSED INSTALLERS
  - Installer must be licensed electrical contractor or be employed by one.
  - Installer must be licensed electrician or certified technician from NBCC.
  - Ask to see proof of your installer's qualifications.

- WIRING PERMITS
  - Wiring permit required for all wind and solar photovoltaic installations.
  - Wiring permit required for installing 10 or more outlets; or more than 5 kW.
  - Wiring permit costs from $85 to $100 for at least three inspections.
  - When an installation is done at the same time as a new house construction, and the geothermal electrical is done by the electrical contractor doing the main electrical installation of the house, it will go on the same permit at no extra cost.

- INSPECTIONS
  - To ensure your system was installed safely, get an inspection from GNB Technical Services.
  - Electrical inspections cost $100 for one inspection.
  - Unsafe installations, that fail to comply with the electrical code, may be ordered by the provincial inspector to be disconnected immediately, depending on the gravity of the non-compliance.
  - Unsafe installations may be subject to a Provincial Order, which can be issued either to the licenced electrical contractor, to repair an unsafe installation, or to the owner of an installation, when it was not completed by a licenced electrical contractor.
  - Any connection to potable water systems requires that the electrical inspector notify the Chief Plumbing Inspector.

PLUMBING SAFETY

- LICENSED INSTALLERS
  - Installer must be licensed plumbing contractor or be employed by one.
  - Installer must be licensed plumber.
  - Ask to see proof of your installer's qualifications.

- SAFETY ISSUES
  - **Connections to Potable Water Systems;** back-flow prevention valves prevent heat transfer fluid from being drawn into the public water supply.
  - **System Pressure;** Solar domestic hot water installers must also be mindful about creating closed systems. Heating cold water results in thermal expansion so in some cases a *thermal expansion tank* is required and on hot water storage tanks for domestic use, a temperature and *pressure relief valve* is required.

- **Water Temperatures;** Reduce the risk of legionella colonization by maintaining proper temperature in the hot water storage tank. An electric element can be used to supplement heat from the sun in order to maintain a constant temperature (i.e. usually between 140 and 160 F). At the same time, the hot water drawn from this tank for domestic use must be tempered to 49 C (120 F) if it is used in applications like showers and bathtubs.

Small Wind Turbines

ELECTRICAL SAFETY

- LICENSED INSTALLERS
  - Installer must be licensed electrical contractor or be employed by one.
  - Installer must be licensed electrician or certified technician from NBCC.
  - Ask to see proof of your installer's qualifications.

- WIRING PERMITS
  - **All wind installations require a wiring permit;** *please see Appendix B for information required to obtain an electrical permit for a wind system.*
  - Wiring permit required for all wind and solar photovoltaic installations.
  - Wiring permit required for installing 10 or more outlets; or more than 5 kW.
  - Wiring permit costs from $85 to $100 for at least three inspections.
  - When an installation is done at the same time as a new house construction, and the wind electrical is done by the electrical contractor doing the main electrical installation of the house, it will go on the same permit at no extra cost.

- INSPECTIONS
  - Get an inspection if unsure about the safety of your system, and your installer's qualifications.
  - Electrical inspections cost $100 for one inspection.
  - Unsafe installations, that fail to comply with the electrical code, may be ordered by the provincial inspector to be disconnected immediately, depending on the gravity of the non-compliance.
  - Unsafe installations may be subject to a Provincial Order, which can be issued either to the licenced electrical contractor, to repair an unsafe installation, or to the owner of an installation, when it was not completed by a licenced electrical contractor.

PRODUCT SAFETY

- CERTIFIED PRODUCTS
  - If your intention is to sell a product related to wind power (i.e. turbine, inverters, disconnect, etc.), they shall be in compliance with the **NB Electrical Bulletin 165-3-8**, meaning that all equipment shall bear a certification mark as evidence of having conformed to the appropriate CSA standards established under the provisions of the Canadian Electrical Code. However, it may be that there is no standard for wind turbines, and they shall therefore undergo a field evaluation by an acceptable inspection body, as per **New Brunswick Regulation 84-165 Section 3**, and shall bear a certification label.

QUESTIONS & ANSWERS

Q: If a solar electric installation is done by an electrical contractor licensed within NB and under a Wiring Permit, does the installation need to be further inspected or approved by someone else of higher authority?

A: ***Yes, at this time our Department (NB Public Safety Technical Inspection Services) wants all renewable Energy that involves electrical to be inspected at 100%, If during my inspection I think the Plumbing Department should be advised, I have to made them aware and they will decide if it fall under the Plumbing Regulation.*** **(Mr. Robert Branch)**

Q: So what you are saying is that even though the PV system may have been installed by a licensed contractor with the proper wiring permit it still takes an inspector such as yourself to do a final approval of the system – correct?

A: ***Yes, this is correct because the Chief Electrical Inspector want 100% inspection on those installations. If your intention is to sell a product related to solar electricity (i.e. inverters, solar panels, disconnect, etc.), they shall be in compliance with the Electrical Bulletin 165-3-8, meaning that all equipment shall bear a certification mark as evidence of having conformed to the appropriate CSA standards established under the provisions of the Canadian Electrical Code.*** **(Mr. Robert Branch)**

Q: For solar hot air units, do these need to be inspected?

A: ***My expertise is electrical equipment only, and yes the electrical part falls under our Regulation, but I will verify with our department.*** **(Mr. Robert Branch)**

Q: Is there an inspection body for ground source heat pumps?

A: ***Again, the electrical will be our jurisdiction. I suggest that if water is involved, contact the Chief Plumbing Inspector. Bill Fallow. P.Eng he can be reach at 453-8626.*** **(Mr. Robert Branch)**

Q: Is there more information that we can give to RE users about inspections and qualifications, beyond what you provided us as a print out? Such as a website or other forms?

A: ***I am planning to work on some things that we will install on our Web Site, at this time is what I gave you at the meeting, maybe the Plumbing Chief has some info.*** **(Mr. Robert Branch)**

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A P P E N D I X A

Information required to obtain an electrical permit for a photovoltaic system:

1. Permit – Building Permit of waiver
2. All electrical equipments shall be approved
3. All electrical equipment and underground conductors shall be kept a minimum of 3 meters from inside pool wall.
4. A one-line diagram
5. Show all wiring methods
6. Show all conductor size and length
7. Show all grounding type, size, and length
8. Show all bonding size and length
9. Specify inverter (utility interactive or stand alone, and size)
10. Voltage drop calculation as per the Canadian Electrical Code or cable manufacturers
11. Inverter information
    a. Inverter specifications
    b. Inverter model numbers
    c. Is inverter approved as utility interactive inverter
    d. Maximum continuous output at 25 C
    e. Input voltage range of inverter
    f. Utility interactive systems required circuit breakers rated for reverse power application
12. PV Module Information
    a. PV module specifications
    b. Module approval
    c. Open-circuit voltage (VoC) from listing label
    d. Maximum permissible system voltage from listing label
    e. Short-circuit current (lsc) from listing label
    f. Maximum series fuse rating from listing label
    g. Maximum power at standard test conditions (STC) (PMax)
    h. Voltage at PMax from listing label
    i. Current at PMax from listing label
13. PV Array Information
    a. Number of modules in series
    b. Number of parallel source circuits
    c. Total number of modules
    d. Operating voltage
       (number of modules in series x module voltage at PMax)
    e. Operating current
       (Number of parallel source circuits x model current at PMax)
    f. Maximum system voltage
    g. Short-circuit current
14. Batteries
    a. Configuration
    b. Location
    c. Enclosure type
    d. Overcurrent Protection (fuses, breakers)
    e. Ventilation

A P P E N D I X B

Information required to obtain an electrical permit for a wind energy system:

1. Permit – Building Permit of waiver
2. All electrical equipments shall be approved
3. All electrical equipment and underground conductors shall be kept a minimum of 3 meters from inside pool wall.
4. A one-line diagram
5. Show all wiring methods
6. Show all conductor size and length
7. Show all grounding type, size, and length
8. Show all bonding size and length
9. Specify inverter (utility interactive or stand alone, and size)
10. Voltage drop calculation as per the Canadian Electrical Code or cable manufacturers
11. Inverter information
    a. Inverter specifications
    b. Inverter model numbers
    c. Is inverter approved as utility interactive inverter
    d. Maximum continuous output at 25 C
    e. Input voltage range of inverter
    f. Utility interactive systems required circuit breakers rated for reverse power application
12. Nacelle (Wind turbine) and tower information
    a. Amperes
    b. Voltage
    c. Cycles
    d. Kilowatts
    e. Tower Height
    f. Certification that will certify the wind turbine
13. Batteries
    a. Configuration
    b. Location
    c. Enclosure type
    d. Overcurrent Protection (fuses, breakers)
    e. Ventilation

A P P E N D I X C

GEOTHERMAL

Important Regulations:

- NB Electrical Bulletin 165-3-8 [3] (Product compliance)
- NB Regulation 84-165 [4] (Licensed contractor & wiring permit)
- NB Plumbing Regulation 84-187 [5]
- Wellfield Protected Area Designation Order [6] (Water protection)
- Watershed Protected Area Designation Order [7] (Water protection)

SOLAR HOT AIR

Important Regulations:

- NB Electrical Bulletin 165-3-8 (Product compliance)

SOLAR PHOTOVOLTAIC

Important Regulations:

- NB Electrical Bulletin 165-3-8 (Product compliance)
- NB Regulation 84-165 (Licensed contractor & wiring permit)

WIND

Important regulations:

- NB Electrical Bulletin 165-3-8 (Product compliance)
- NB Regulation 84-165 (Licensed contractor & wiring permit)

SOLAR HOT WATER

Important Regulations:

- NB Regulation 84-165 (Licensed contractor & wiring permit)
- NB Plumbing Regulation 84-187

LICENCES (from NB Plumbing Regulation 84-187)

4 (1) No person shall install, extend, alter, renew or repair a plumbing system, other than a plumbing system in a farm building, or make a sewer connection or disconnection in any building, other than a farm building, unless the person;

(a) holds a valid plumber's licence granted or renewed under this Regulation,

(b) is an apprentice working under the direct supervision of a qualified plumber, or

(c) is the holder of a permit issued under section 18 of the Apprenticeship and Occupational Certification Act and works under the direct supervision of a qualified plumber.

4 (2) No person shall contract to install, extend, alter, renew or repair a plumbing system or make a sewer connection or disconnection in any building unless he holds a valid plumbing contractor's licence granted or renewed under this Regulation.

[3] Available at http://www.gnb.ca/0276/safety/english/Bulletins/electrical/165-3-8-e.pdf
[4] Available at http://www.canlii.org/en/nb/laws/regu/nb-reg-84-165/latest/nb-reg-84-165.html
[5] Available at http://www.canlii.org/en/nb/laws/regu/nb-reg-84-187/latest/nb-reg-84-187.html
[6] Available at http://www.gnb.ca/0062/PDF-regs/2000-47.pdf
[7] Available at http://www.canlii.org/en/nb/laws/regu/nb-reg-2001-83/latest/nb-reg-2001-83.html