

# Renewable Energy

Where can we get clean energy?

## Solar Water Heating

### How it works

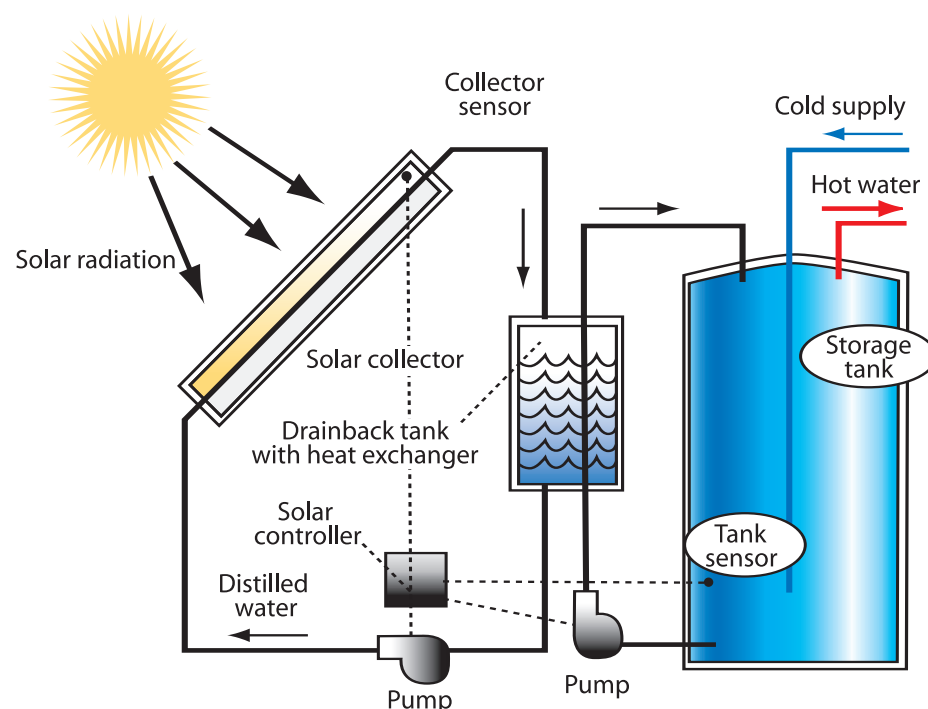
- Put solar panels in a place where they get lots of sunlight
- The sun heats water that flows through tubes in the solar panels
- The heated water goes to your hot water tank - for showers, baths, and washing dishes

### Benefits

- Use less polluting energy to make hot water
- Pay less to make hot water
- Produce no greenhouse gas emissions from solar panels
- Easily maintain the solar panels

### Limits

- Days with no sunlight produce no hot water
- High cost to buy, but pays off after a few years
- Solar panels won't make all the hot water a building needs in the north



Solar Water Heating on the Elders' building in Whati.



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## Solar Air Heating

### How it works

- Put a solar wall - a dark metal wall with small holes in it- on the sunny side of a building
- The wall heats the air, as the air enters the building

### Benefits

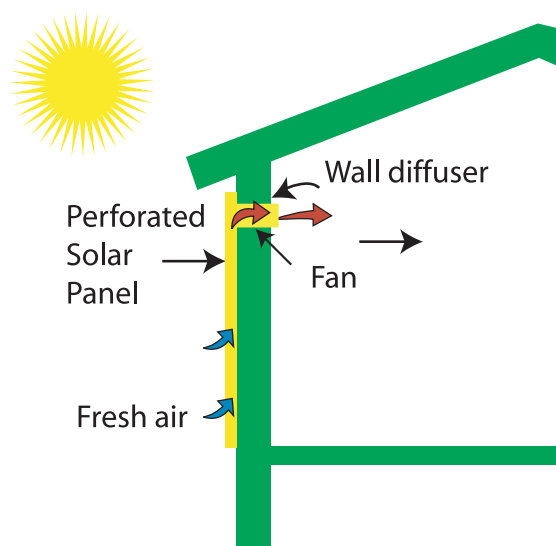
- Use less polluting energy to heat the building
- Pay little to operate a solar wall
- Produce no greenhouse gas emissions from a solar wall
- Easily maintain a solar wall

### Limits

- Days with no sunlight produce no warm air
- High cost to buy, but pays off after a few years
- A solar wall won't provide all the heat a building needs



Solar Wall installed on the recreation building in Fort Smith.



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## Solar Electricity

### How it works

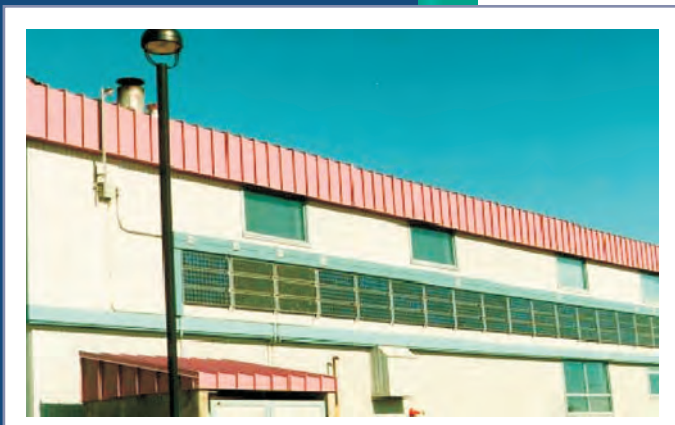
- Put solar panels in a place where they get lots of sunlight.
- Solar panels change sunlight into electricity – at any temperature
- Also called photovoltaics or PV

### Benefits

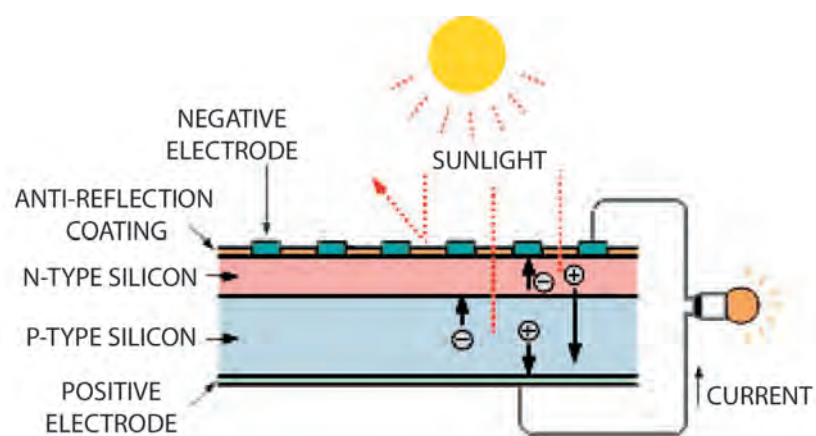
- Use less polluting energy to make electricity
- Pay little to operate PV panels
- Produce no greenhouse gas emissions from PV panels
- Easily maintain PV panels

### Limits

- Days with no sunlight produce no electricity
- High cost to buy, but pays off after a few years
- PV won't make all the electricity that a building needs



Solar PV panels have been making electricity for the Nunavut Arctic College since 1995.



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## Passive Solar Heating

### How it works

- Build homes and other buildings facing south, to catch the most sunlight
- Sunlight enters the building through windows and heats the air, without any technology

### Benefits

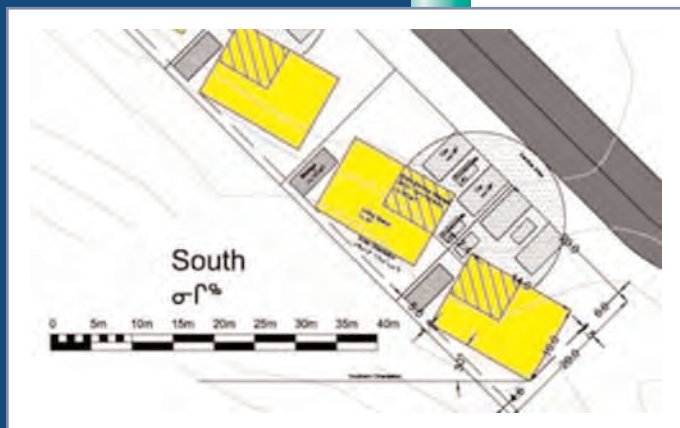
- Use less polluting energy to heat your house and for lights
- Pay nothing for passive solar heating
- Produce no greenhouse gas emissions with passive solar heating

### Limits

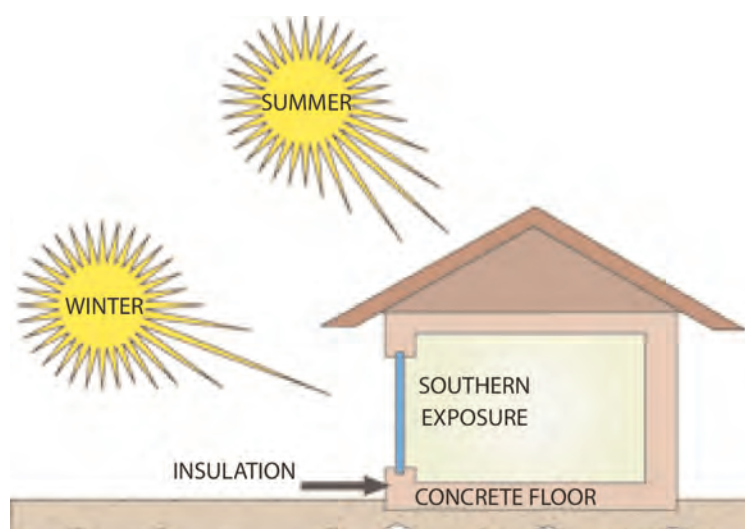
- High cost to buy, but pays off after a few years
- Windows provide much less insulation than walls – even good windows



Energy Efficient Houses (all facing south) in Peanawayuk, Northern Ontario



New houses (yellow) in this Iqaluit subdivision must all face South to so they can use passive solar heating.



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# Renewable Energy

Where can we get clean energy?

## Run of River Hydro

### How it works

Use moving water or a waterfall to make electricity, without a dam or flooding

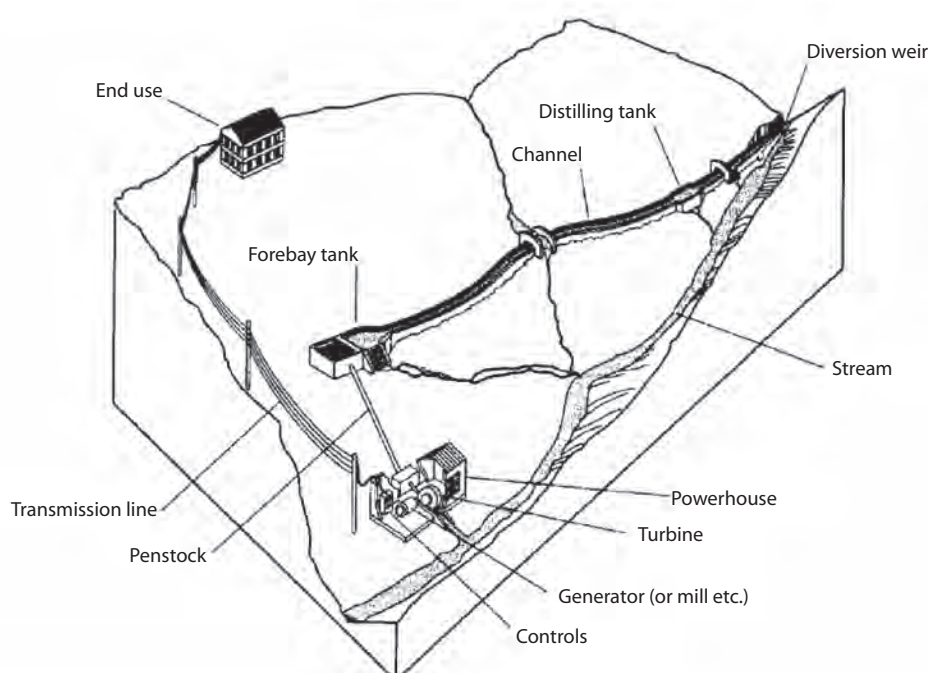
- Water gathers in a pipe at the top of a waterfall
- The water gathers energy as it goes down the pipe to a turbine
- The turbine turns a generator, which makes electricity

### Benefits

- Use less polluting energy to provide electricity
- Works very well if you have a good site
- Produce no greenhouse gas emissions from run-of-river hydro system

### Limits

- The community needs a good location close by, and lots of time and effort to build a run-of-river hydro system
- The community needs to watch and maintain the system
- High cost to buy, but pays off after a few years
- The community might not get all the electricity they need from a run-of-river hydro system



Whati is planning a run-of-river hydro plant to make electricity for the community.



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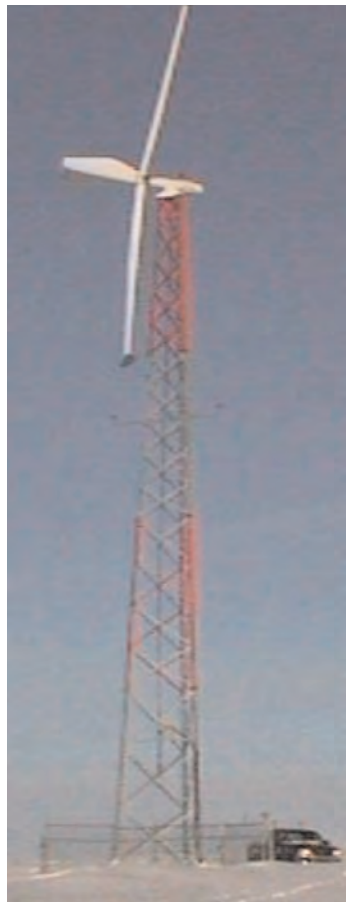
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# Renewable Energy

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## Wind Turbines



Wind  
Turbine in  
Rankin Inlet.

### How it works

- Use a wind turbine to make electricity from the wind
- The wind turns the blades
- The blades turn a generator, which makes electricity

### Benefits

- Use less polluting energy
- Pay little to operate the wind turbines
- Produce no greenhouse gas emissions from wind turbines

### Limits

- High cost to buy, but pays off after a few years
- A community probably won't get all the electricity they need from wind turbines



One turbine is not enough! A group of Wind Turbines can provide electricity for an entire community, as they do here in Ramea, Newfoundland. A group of wind turbines is called a Wind Farm.



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# Renewable Energy

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## Efficient Wood Heating



### How It Works

- Use a wood stove that burns wood longer, cleaner, and more completely

### Benefits

- Use less polluting energy to heat your home
- Use less wood to heat your home
- Produce less smoke
- Produce less greenhouse gas emissions

### Limits

- People need to harvest wood or buy wood or pellets – may not be available everywhere
- To harvest wood forever, we need to manage forests so we always have trees to cut for fuel
- High cost to buy, but pays off after a few years

High efficiency wood stoves use less wood and make less smoke.



Wood pellet stoves are very efficient and only need to be filled once a day.



Wood pellets are made from sawdust and you can buy them in bags.



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## Cogeneration

### How it works

- Use the heat a generator produces to help heat a building, rather than wasting it
- A community installs a system to capture heat from a generator and pipe it to another building

### Benefits

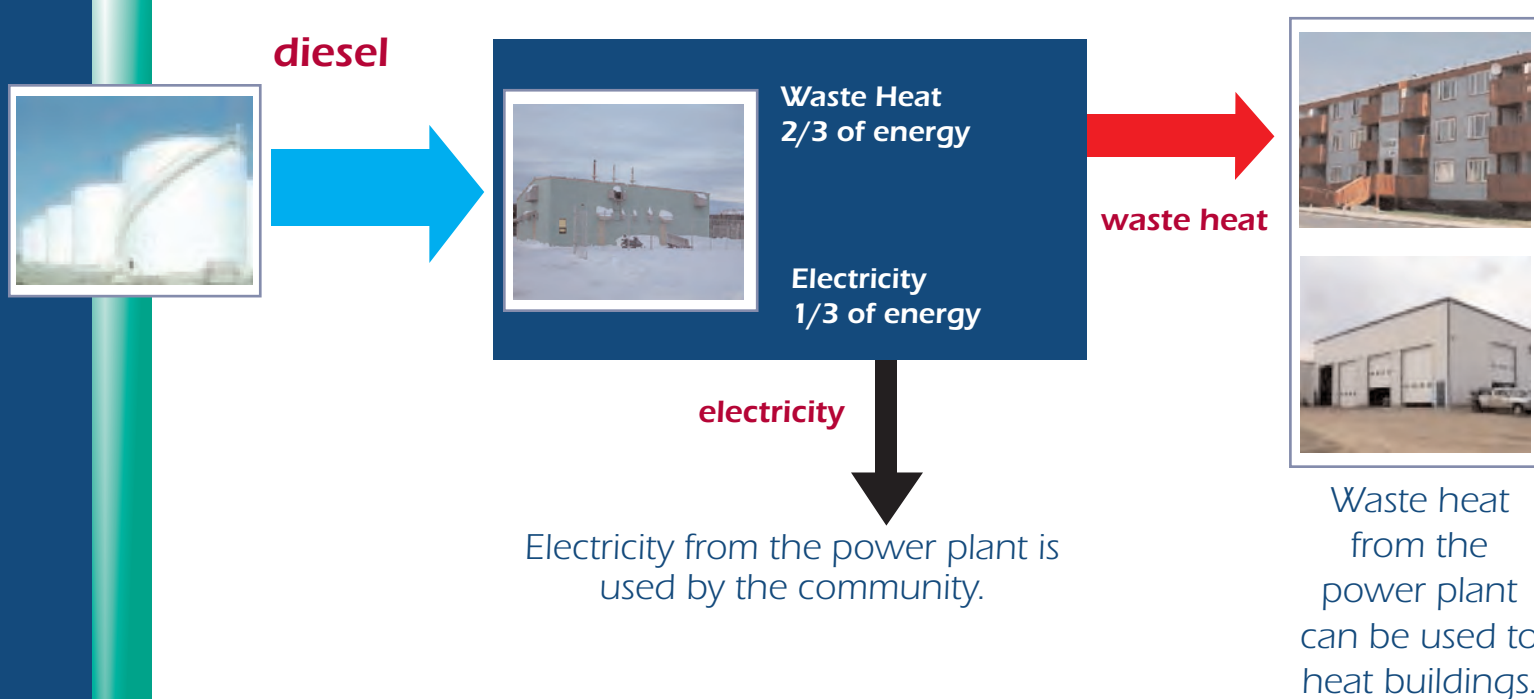
- Use less polluting energy to provide heat
- Save money and don't waste heat energy
- Produce less greenhouse gas emissions

### Limitations

- Hard to convert some existing engines to cogeneration
- High cost to buy, but pays off after a few years



The Snowshoe Inn in Fort Providence has used Cogeneration for over 20 years.



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