

*Burning wood for warmth was the first way humans harnessed energy. Although it is an extremely old practice, new technology allows us to use it more efficiently.*

## Wood Heating Beats Burning Fossil Fuels

### It's All About Carbon

- Plants absorb carbon to fuel their growth
- Carbon is naturally released when the plants are:
  - consumed by animals or humans,
  - when they decompose and
  - when they are burned during natural forest fires.
- Although this is a complicated process, carbon levels in the atmosphere are typically steady for long periods of time.

### But There is a Problem

- A great deal of decomposing organic matter has been trapped underground over millions of years.
- The combination of heat, time and pressure turned this into fossil fuels such as oil, natural gas and coal.
- These fossil fuels are extracted from deep underground and burned to propel our vehicles, heat our homes and to generate electricity,
- This adds a great deal of carbon to the atmosphere that had previously been safely stored underground.

- *The additional carbon is leading to climate change.*

- Fossil fuels take millions of years to form, so it is referred to as a non-renewable energy source.

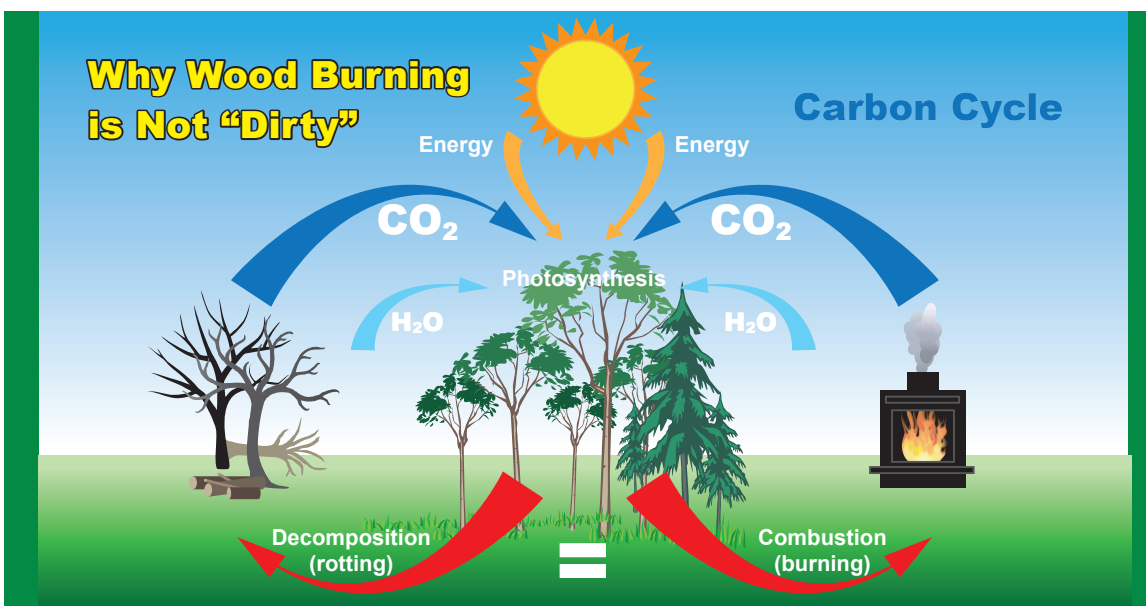
### A Better Way

- By burning wood for heat instead of fossil fuels, we are just recycling carbon that is already in the natural environment.
- Forest fires are a natural part of nature, in fact some plants rely on them to reproduce and thrive.
- Using wood fuel is considered renewable energy as new trees grow within a reasonable time. By using sustainable forestry practices, we ensure we do not run out.
- When trees grow, they absorb carbon dioxide and emit oxygen. This stored carbon dioxide is then released when the trees are burned to generate energy. The carbon dioxide is absorbed again as the forest regrows.
- While plants are growing, they capture nearly the same amount of CO<sub>2</sub> through photosynthesis as they release when combusted
- This makes wood fuels "carbon-neutral".
- In sustainable forest management, no new carbon dioxide is produced.
- For every ton of coal that is replaced by wood pellets, there is a 1.7 ton reduction in carbon dioxide emissions. (*Bioenergy, 2020*)

*As they grow, trees absorb the same amount of carbon dioxide as they give off when they are burned.*

*This makes wood fuels "clean" or "carbon-neutral".*

*No new carbon dioxide is produced.*



## Wood Burning Technologies

### Residential

There are many types of wood burners available, including:

- catalytic wood stoves
- pellet stoves
- high efficiency wood stoves
- traditional fireplaces

It is important to ensure you have the most efficient wood stove possible. For example, a catalytic stove can be almost 10% more efficient than a traditional wood burning stove.

Even improving how you manage the burn can do a great deal to increase efficiency;

- controlling the amount of air that is injected
- maintaining a high burn temperature
- reducing waste heat lost to chimneys
- reburning smoke
- using only dry or seasoned wood

This results in;

- emitting less carbon.
- more useful heat for home owners.
- using less fuel.
- reduced amounts of airborne particulates.

### Industrial

- Large scale wood heating typically involves wood boilers that use either cord wood or wood chips as fuel and average approximately 63% efficiency.
- Wood boilers are sometimes placed outside due to their large size and are capable of providing both space heating and hot water production.
- Pulp and paper mills often utilize waste products to produce their own power.



Greenplanet Energy Analytics

Wood cleared during construction of the Fort Chipewyan solar farm has been used to support the local wood heating business.

## Types of Fuel

- Cord Wood: Cut and/or split log, preferably dried with a uniform length
- Used Wood: post consumer wood waste, such as construction and demolition wood, pallets and wood packaging.
- Wood byproducts: sawdust, wood chips and shavings
- Wood Pellets: made from compressed sawdust and other wood waste, these regular shaped cylindrical pellets can be up to 40 mm in length and can easily be used in automatic feeders.
- Wood briquettes: made of dry, untreated wood chips that are compressed with high pressure without any binder.

## Benefits of Wood Heating in your Home

- You can save a significant amount of money every year.
- Burning wood provides a powerful heating ability.
- It can keep your home warm when there is no electricity.
- It reduces your family's environmental footprint.
- You can enjoy the smell of burning wood and the look of a warm fire.
- Boiler systems also offer the dual benefits of being able to provide both space heating and hot water demand.
- Wood fuel can often be sourced locally, or even by home owners themselves (something fossil fuels cannot offer).

## For More Information

Renewable Energy 101: How Does Biomass Energy Work?

[https://www.youtube.com/watch?v=nV117JLn\\_u0](https://www.youtube.com/watch?v=nV117JLn_u0)

How does Biomass work?

<https://www.youtube.com/watch?v=jln6yi7LF0>

Wood For Fuel – Renewable Energy

<https://www.youtube.com/watch?v=Si6n5Hj6avQ>

Environmental Protection Agency – FAQ's

<https://www.epa.gov/burnwise/frequent-questions-about-wood-burning-appliances>

NR Can – Solid Biomass Fuels

[https://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/NRCAN\\_BB\\_no1\\_e\\_accessible.pdf](https://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/NRCAN_BB_no1_e_accessible.pdf)

Penn State – Does it Pay Off?

<https://extension.psu.edu/wood-heat-for-your-home-does-it-pay-off>

Calculating Pellet Stove Savings

<https://www.pelletheat.org/compare-fuel-costs>

Choosing the Right Wood Stove or Fireplace

<https://www.ecohome.net/guides/2218/choosing-the-right-wood-stove-or-fireplace/>

Rocket Stove – DIY Heating

<http://www.greenenergyfutures.ca/episode/47-rocket-stoves>

Big Biomass

<http://www.greenenergyfutures.ca/episode/big-biomass>

Wood Burning and the Carbon Footprint - Sweepy Stories

<https://www.ctsweep.com/blog/top-sweep-stories/wood-burning-and-the-carbon-footprint/>