

How does biomass energy work?

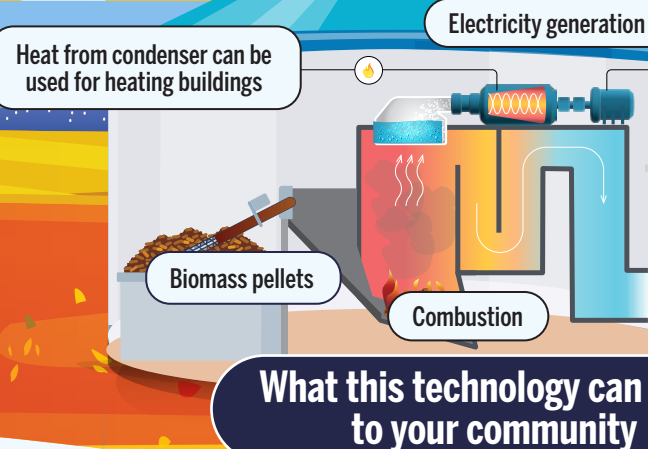
- Forest biomass, such as, sawdust and shavings from sawmills, small diameter trees from forest thinning, is turned into solid biofuels (cordwood, wood briquettes, wood chips and wood pellets) or liquid biofuels (biodiesel, ethanol and bio-oil).
- The biofuels are burned in furnaces or boilers. The resulting energy heats up air or water, which is then sent through ducts or piping to heat homes and buildings.
- Energy from biomass can also be used to produce steam, which can be transformed by a turbine and generator into electricity to power a community.

Industries like forestry leave behind “biomass”, such as wood shavings, sawdust, and small, unsellable trees as a by-product of their harvesting and processing operations. These by-products can be turned into solid or liquid biofuels that can heat and power homes and buildings. For Northern and remote communities, this clean, sustainable energy source can help reduce greenhouse gas emissions while supporting the local forestry industry.

Cost of Biomass electricity^{1,2}: \$\$\$\$

Biomass energy

Transforming heat and power in Northern and remote communities



What this technology can bring to your community

- Locally sourced biofuels are often cheaper and provide more stable pricing than diesel fuel — and each dollar spent goes back to your community or local forestry industry.
- Biomass can be used to heat individual homes or clusters of buildings or entire communities (district heating).
- About 1 GJ of heat can be produced from 65 kg of wood pellets, offsetting 34 kg of diesel fuel.
- Generating energy from biomass is a great way to extract the most value from the sawmills or lumber mills in your community, while also supporting local jobs.
- Buildings that have high heat demand, such as schools or health-care facilities, are ideal candidates for biomass energy systems.
- Biomass collected during wildfire reduction programs can be used to produce energy.

Key considerations when implementing this technology

- The initial costs to build a biomass facility and train people, on how to operate and maintain the system can be quite high.
- The success of any biomass energy project depends on access to affordable, reliable, and sustainable local biomass resources.
- If sourcing biomass from somewhere else, keep in mind the fuel supply chain infrastructure and associated transportation and storage costs.
- Maintaining consistency in biofuels quality (i.e., low moisture content, uniform size distribution) leads to more efficient combustion and release of fewer harmful air pollutants.
- Working closely with utilities is key to ensuring the biomass system integrates with your existing energy infrastructure.

The bottom line Biomass provides Northern and remote communities with a reliable, locally sourced, and cost-effective energy resource that promotes the local forest industry while helping to reduce their use of fossil fuels like diesel.

Want to learn more?

For more information, please send us an email:
oordremoteenergy-energieadistancebrde@nrcan-rncan.gc.ca

¹ The levelized cost of electricity (LCOE) measures the lifetime costs of running an energy source divided by how much energy it produces over that span (typically in megawatt-hours).

² Estimated range of LCOE of biomass in Canada (\$60–\$280/MWh) according to the Canadian Energy Regulator. (2022). Canada's Adoption of Renewable Power Sources – Energy Market Analysis. <https://www.cer-rec.gc.ca/en/data-analysis/energy-commodities/electricity/report/archive/2017-canadian-adoption-renewable-power/canadas-adoption-renewable-power-sources-energy-market-analysis-costs-trade-offs.html>. Additional costs may apply depending on location. This figure excludes costs related to heat.



Natural Resources
Canada

Ressources naturelles
Canada

CanmetENERGY
Leadership in ecoInnovation

Canada