

Bioheat Week 2024

THE ROLE OF BIOHEAT IN ELECTRIFICATION



WOOD PELLET
ASSOCIATION OF CANADA



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MEETING THE DEMAND OF ELECTRIFICATION

- Clean electricity will power Canada's net zero transition.
- Will impact how every household and business uses energy.
- All levels of government need to leverage policy –in a coordinated way.
- Getting it right (or wrong) will have huge implications far beyond electricity sector.

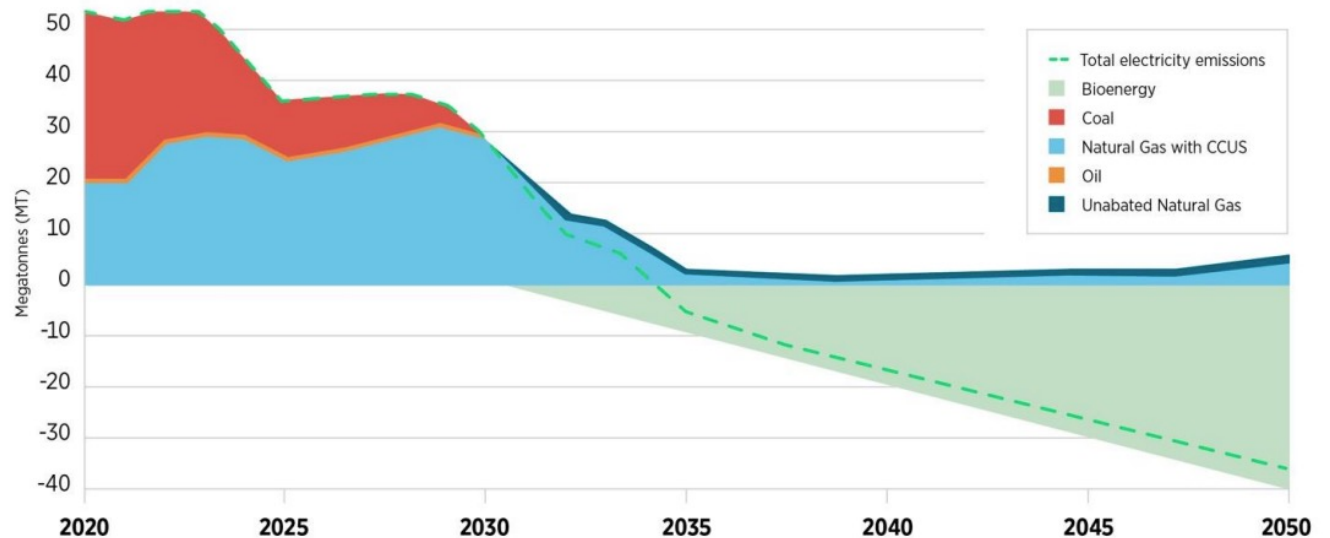
“We have a date with destiny. We need to build, build, build ... we’re way behind where we need to be and we don’t have a lot of time remaining.”

*~ Edward Greenspon,
president, Public Policy
Forum*

ELECTRIFYING OUR FUTURE

To reduce reliance on fossil fuels & shift to emissions-free, Canada needs 2X or 3X amount of power we make now.

FIGURE 1 GHG emissions from electricity generation, by fuel, from CER's Global Net Zero Scenario



Source: Public Policy Forum, *Project of the Century: A Blueprint for Growing Canada's Clean Energy Supply - And Fast*. July 2023

An aerial photograph of a city, likely Copenhagen, showing a dense urban landscape with red-tiled roofs and a prominent church spire. The sky is overcast with dramatic, dark clouds. The text 'GLOBAL UPTAKE OF ELECTRICITY THROUGH BIOHEAT' is overlaid in large, white, sans-serif capital letters across the center of the image. A solid green vertical bar is on the left side of the image.

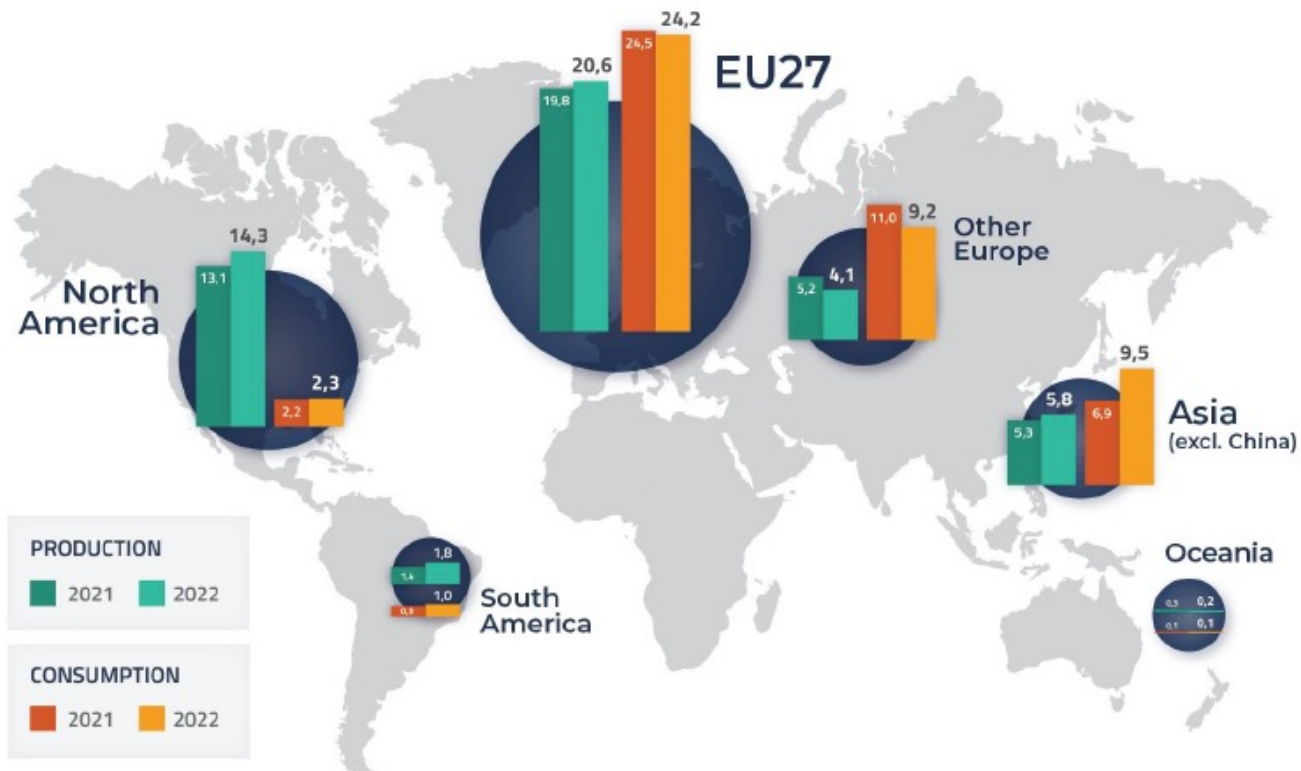
GLOBAL UPTAKE OF ELECTRICITY THROUGH BIOHEAT

CANADIAN PELLETS HAVE GLOBAL RESPECT

- Biomass: ~3/4 of the world's renewable energy.
- Bioenergy accounts for:
 - ~10% of total final energy consumption.
 - 2% of global electricity generation.
- Almost 60% of all renewable energy in US and EU is bioenergy.
- Over 90% of Canada's wood pellet production is exported, due to little local demand and lagging public policy.



GLOBAL UPTAKE OF PELLETS FOR BIOHEAT



BIOHEAT IS MAINSTREAM IN EUROPE

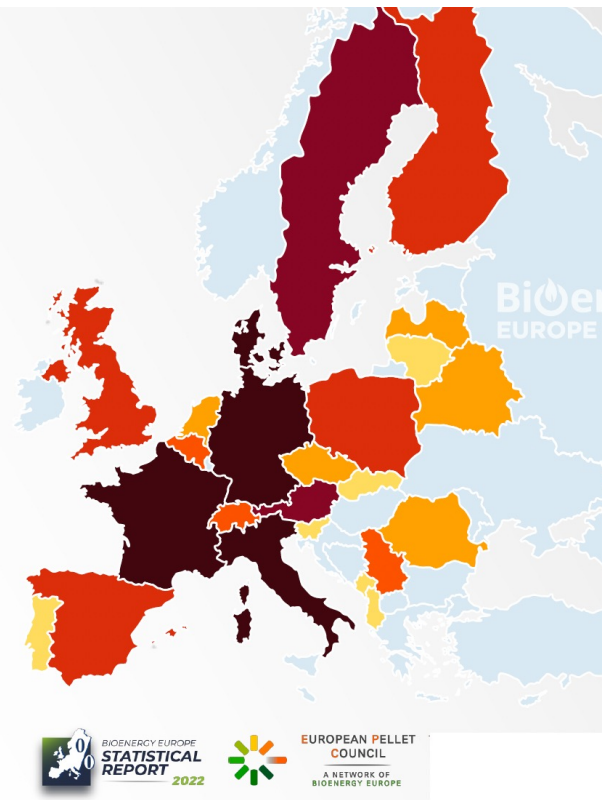
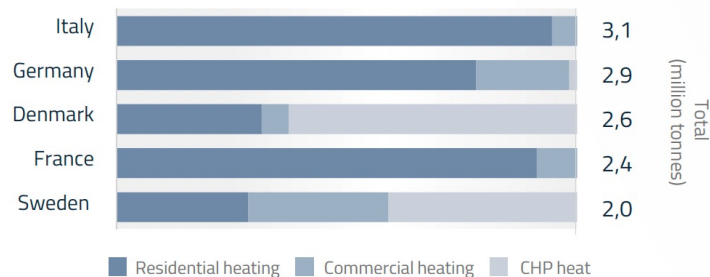
European Wood Pellet Consumption for Heat

(in 2021, tonnes, %) Source: EPC Survey 2022

Actual Consumption (tonnes/year)



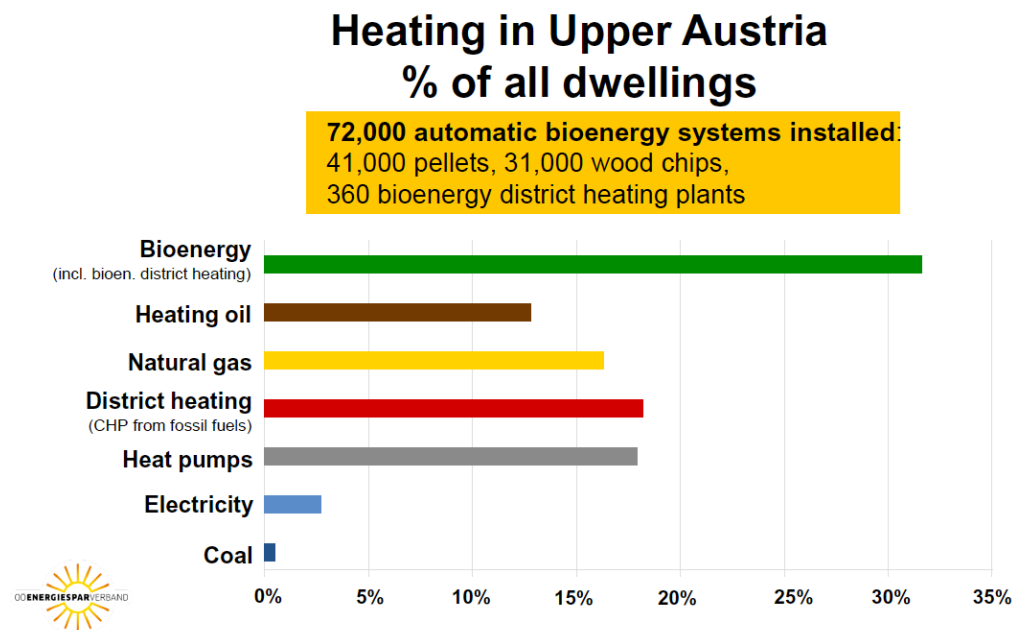
Consumption in top 5 European countries in 2021



48% of global wood pellet consumption is from residential & commercial buildings.

UPPER AUSTRIA: SUCCESS STORY

- 34% of space heating from biomass
- Twice as popular as heat pumps
- Growth driven by effective public policy focussed on:
 - incentives (carrots),
 - regulations (sticks) and
 - promotions (tambourines)





ROLE OF BIOHEAT IN CANADA'S ENERGY FUTURE

ELECTRICITY IS A PRECIOUS RESOURCE

- Electricity is precious—using it for heating and domestic hot water is not efficient (energy intensive).
- Bioheat (both pellets and chips) is a viable option.
- Hydro insufficient for peak and future loads:
 - BC: 20% of hydropower imported in Q1 2024.
 - Quebec and Ontario: swap energy demand peak.



“The challenges we face can be described as a trilemma—needing to maintain affordability while pursuing fewer emissions and increasing our energy independence and resilience at the same time.”

~ Barry Penner, Chair of Energy Futures Institute

RELIABLE AND STABLE SUPPLIER

WOOD PELLETS

Capacity / production in Canada over past decade (tonnes)



BIOMASS: BACKYARD SOLUTION FOR CANADA

Wildfires

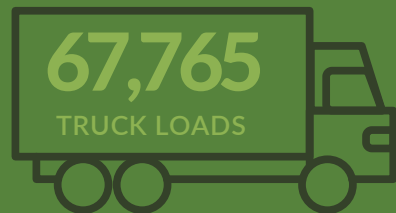
- ~ 2.5 million ha of forest burned each year in Canada.
- 2023 wildfire season:
 - 18.4 million ha (6,000 wildfires).
 - 23% of global wildfire emissions.

Biomass solutions:

- Convert excess forest floor debris from harvested areas.
- Utilize fire-affected timber.

Carbon: 2030 price ~\$170/t CO₂, putting the asset value of the above-ground biomass in Canada's forests at \$7.5 trillion.

SUPPORTING COMMUNITIES & FORESTS

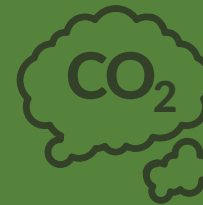


Estimated loads of wood fibre is being utilized instead of piled and burned slash piles.



229,382
CARS OFF THE ROAD

Avoided greenhouse gas emissions from these projects is equivalent to taking 200,000 cars off the road.



1,060,168
AVOIDED EMISSIONS

As a result of these projects, over one million tonnes of CO₂e, will be avoided, helping take action on climate change.

- FESBC supports projects across BC to utilize harvest residuals and reduce slash burning.
- The wood pellet sector has critical role to play converting excess fibre into wood pellets.
- What was once considered waste is opening new doors into the bioeconomy, providing renewable energy around the world and making our communities safer.

2023-2025 Fibre Utilization & Wildfire Risk Reduction Programs (as of Dec. 2023) Source: Forest Enhancement Society of BC



Forest Enhancement
Society of BC

ALTERNATIVE FOR REMOTE COMMUNITIES

- Remote communities still use diesel-fired generation:
 - Newfoundland/Labrador.
 - North.
 - Across Canada.
- Biomass plays an important role in
 - Local climate goal targets.
 - Better economic opportunities & jobs for residence.



*Photo Credit: Newfoundland Labrador Hydro
Charlottetown, Labrador*

ENERGY WE CAN FEEL GOOD ABOUT



GOOD FOR FORESTS

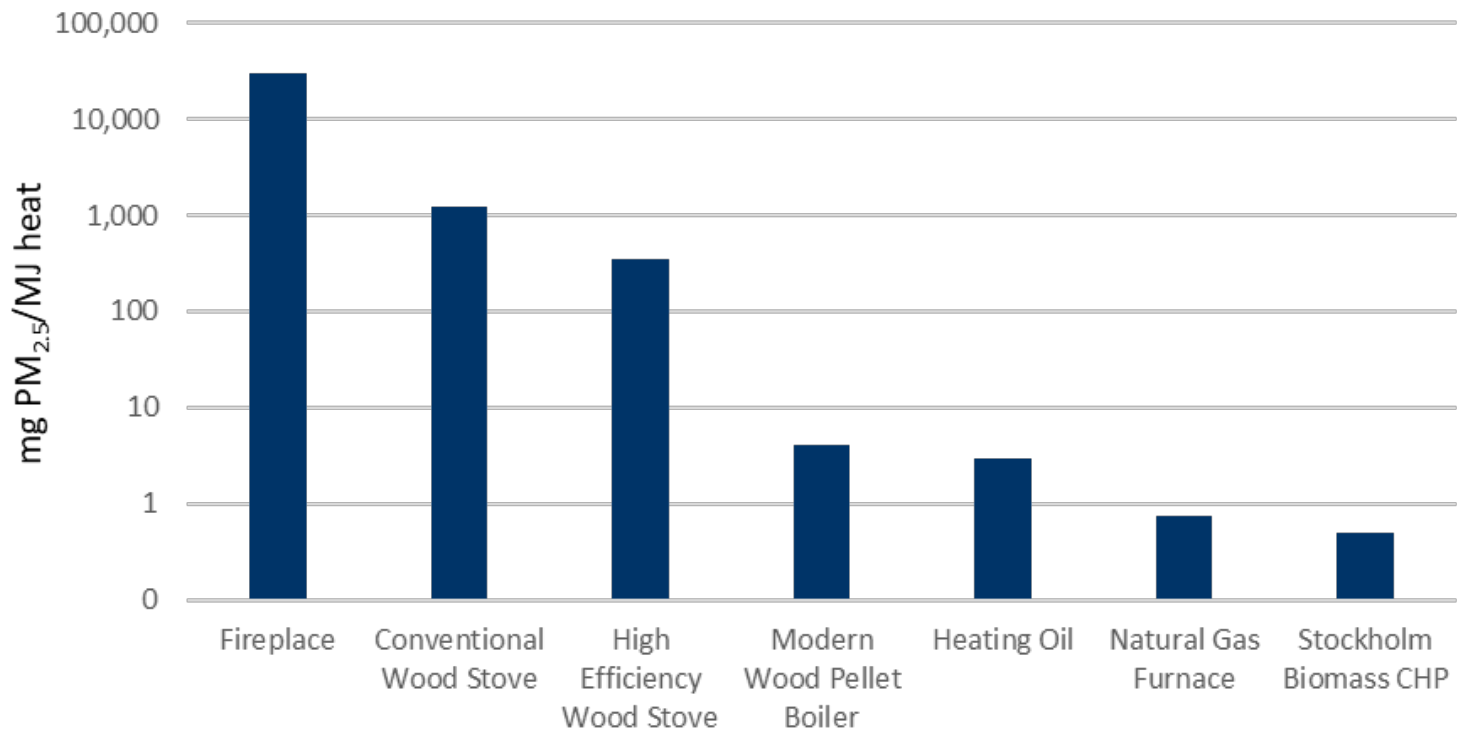
Example: Sweden

- ~37% energy supply from biomass.
- Since 1990
 - 2X bioenergy consumption AND
 - 40% increase in standing timber volume =
 - 70% reduction in GHG emissions

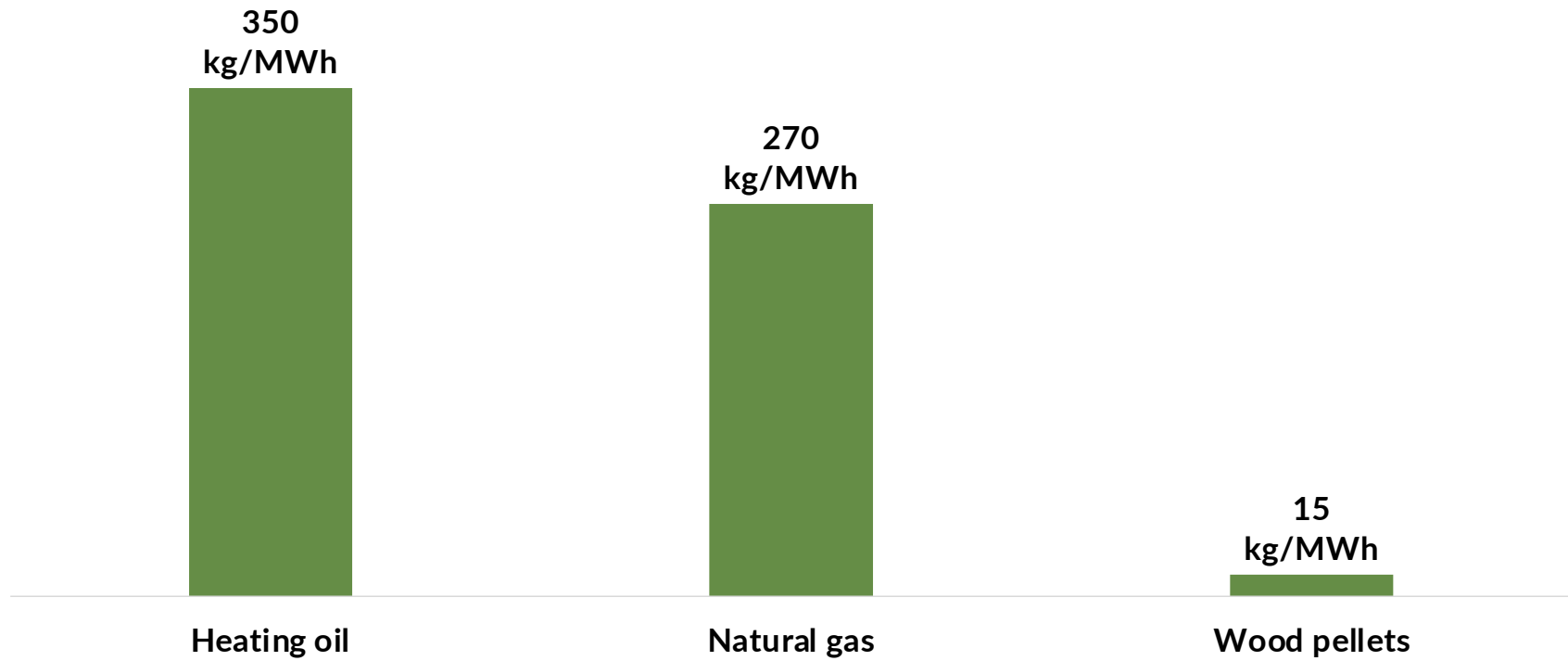


*Science shows
increased demand
for bioheat,
contributes to
better-managed
forests.*

FINE PARTICULATE EMISSIONS



GHG EMISSIONS

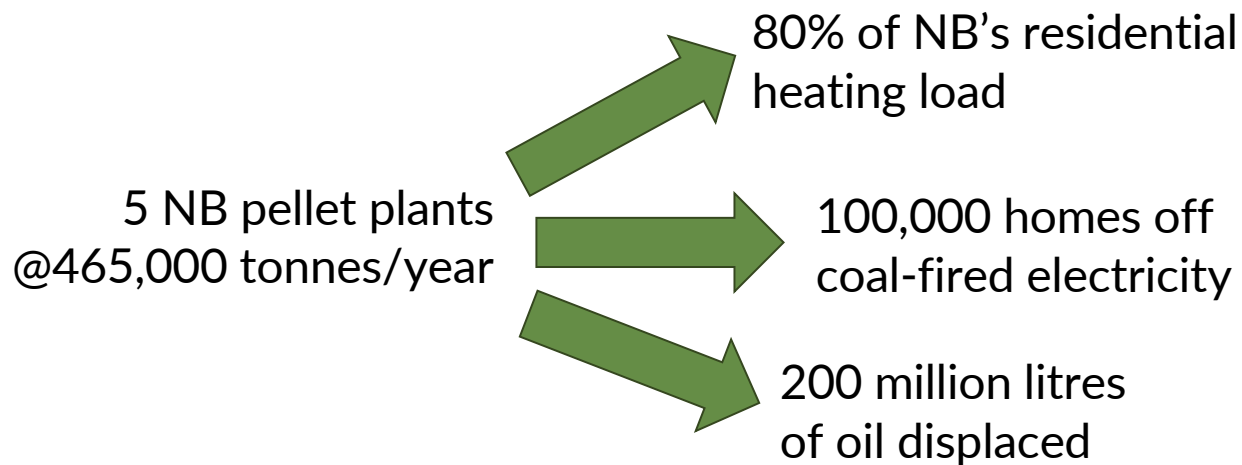


Source: Life Cycle Associates, 2021



LEADING THE WAY

THE CASE FOR NEW BRUNSWICK

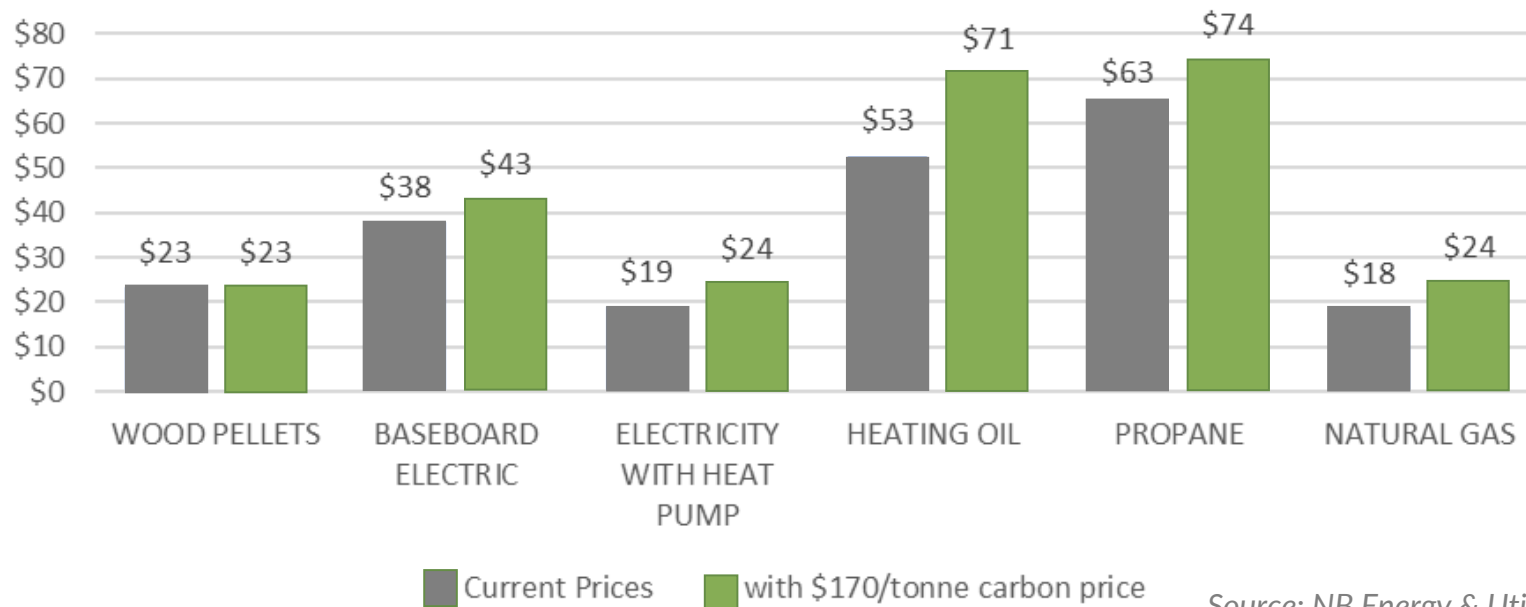


\$300/tonne
bulk wood pellets =
\$6.75/or \$0.067kWh
electricity

40% less than NB's
current residential
electricity price

HEATING OPERATING COST FOR END USER

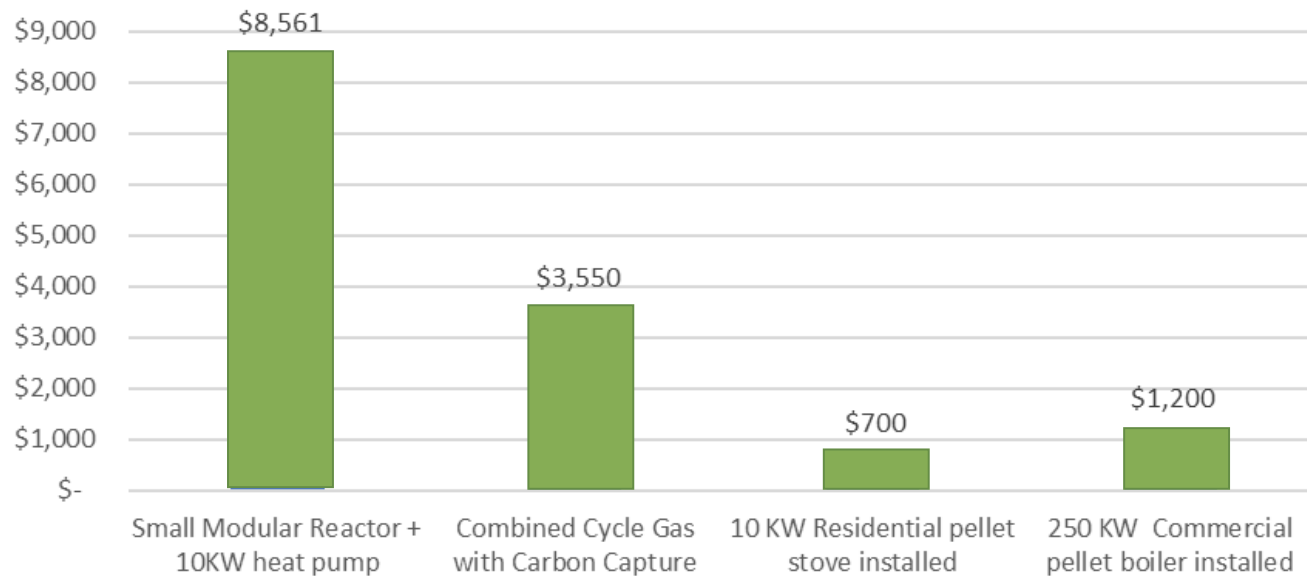
Heating cost including carbon price impact
Cost per GJ



Source: NB Energy & Utilities Board

HEATING OPERATING COST FOR END USER

Capital cost of new heating capacity including electrical generation (\$/KW)



Source: NB Energy & Utilities Board

UNIVERSITÉ DE MONCTON, SHIPPAGAN CAMPUS

- 3 oil boilers replaced with 1 pellet boiler system
- 156,000 ft² heated
- 550 tonnes of pellets/year
- 6-7 years payback
- 120,000 litres less heating oil (over 2 yrs)
- \$137,000 heating oil savings (over 2 yrs)
- 85% GHG emission reduction



INDUSTRIAL PROCESS HEAT

- Industrial heat is 44% of energy demand in Canada.
- Large % use steam—can't use heat pumps. Electricity very high cost.
- Demand stable with high-capacity factor.
- Biomass proven low-carbon option—deployable, low-risk & affordable.
- Atlantic Canada: pulp, potatoes, tires, lime, cement, gypsum board, forest products, refining.

Companies with biomass heat plants:



SOLUTIONS IN CANADA'S NORTH

- Northwest Territories 2030 Energy Strategy:
 - 25% reduction in GHG emissions from electricity generation in diesel-powered communities.
 - 40% share increase of space heating using renewable energy.
- 33% of territorial government buildings in Yellowknife are heated with wood pellets.



ONTARIO POWER GENERATION - ATIKOKAN

- Largest 100% biomass-fueled plant in North America.
- 100% fuel from local Ontario producers.
- 205 MW in-service generating capacity (2023)
- 75% less nitrogen oxide emissions.
- Near-zero sulphur dioxide.



*Atikokan Generating Station
Photo: Ontario Power Generation*

GOVERNMENT INITIATIVES

The Low Carbon Economy Challenge
Supporting innovative ideas that grow the economy and take action on climate change

saveenergyNB
Privately delivered by NB Power

For Home For Business For Community Energy-Saving Ideas Get Started

Canada

Sustainability of Biomass Utilisation
Issue analysis by the Prince Edward Island Forestry Commission

Canada Greener Homes Initiative

Canada

More Comfort. More Savings.

How can we help? SEARCH

For Your Home
Making your home more energy efficient is easier than ever. Get comfort and savings with our efficiency incentives.

Learn More

For Your Business
Energy efficiency upgrades create long-term savings for your business. Let us help with incentives and rebates.

Learn More

Clean Energy for Rural and Remote Communities Program

2023
Fall Economic Statement

Canada

Ontario

Forest Biomass Action Plan
March 2022



THE PATH FORWARD IN CANADA

SOLUTIONS FOR CHANGE



1. Develop a thermal energy (heat) strategy that includes bioheat.
2. Provide financial support for installations.
3. Accelerate bioheat public procurement.
4. Fund fuel switching feasibility studies for switching from fossil fuels to electricity.
5. Fund district energy feasibility studies for municipalities.

