Bioheat 101: Background, Context, Value Proposition

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Bioheat Opportunities for Remote and Rural Communities Workshop

Biomass North Development Centre

Mandate: Support the development of a robust and sustainable bioeconomy in Ontario

Services

Bioeconomy Development

Market & Technical Research

Seminars & Workshops

Tours & Trade Missions

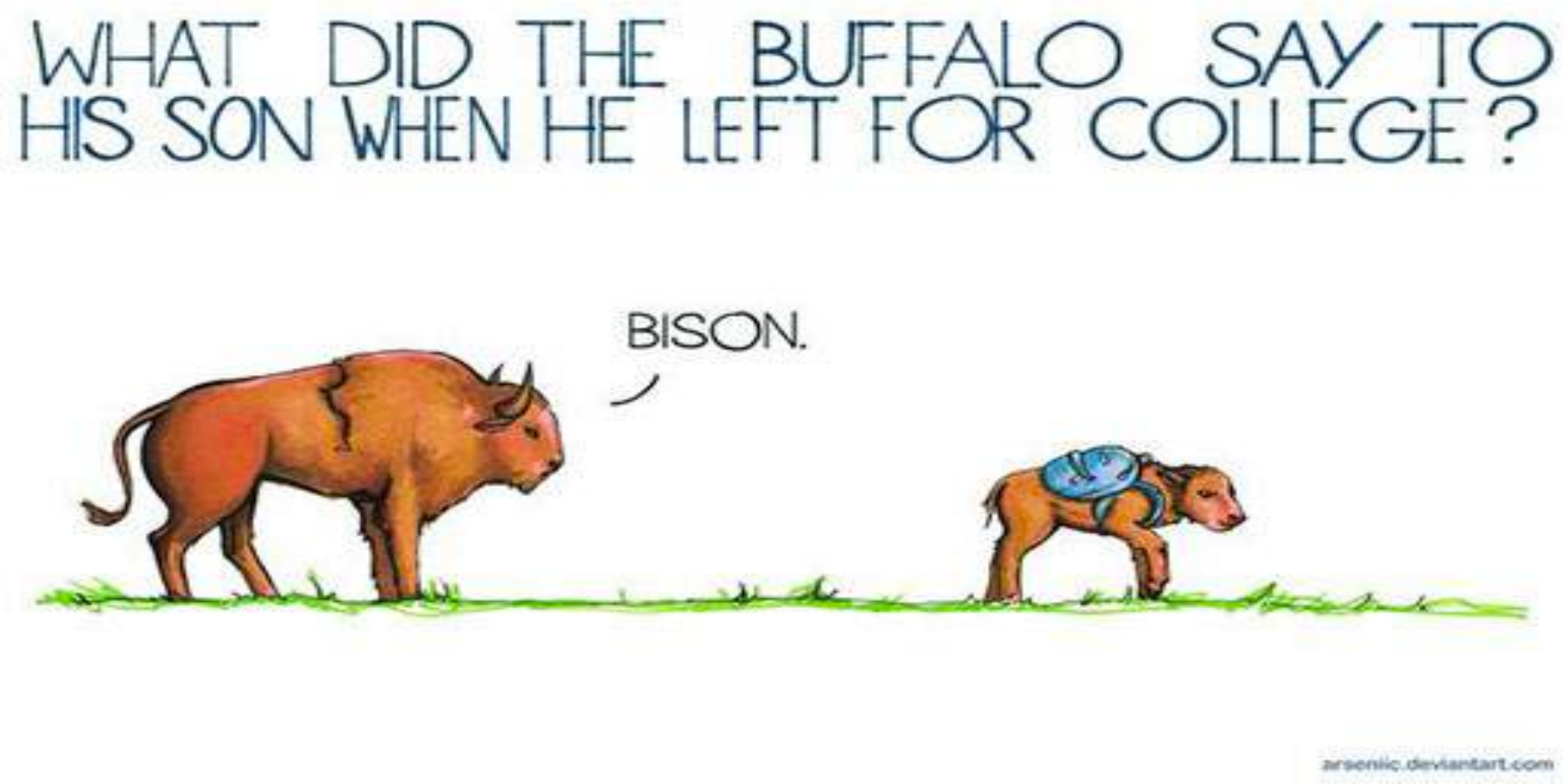
Today

- Background: what is bioheat?
- Context: how is bioheat...

  when is bioheat...

  where is bioheat...
- Value Proposition: why is bioheat...

BUT FIRST - Back to School



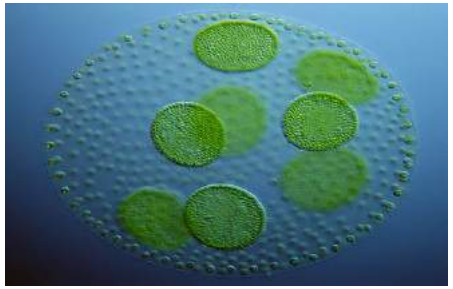
Biomass

Biological material derived from living or recently living organisms

Organic matter renewable over time (human lifespan)

Forestry Crops & Residues

Agri Crops & Residues



Algae

Industrial Wastes

Municipal Solid Waste

Sewage

Animal Residues

Bioeconony

An economy founded on **biomass** instead of fossil fuels

…

where the basic building blocks for

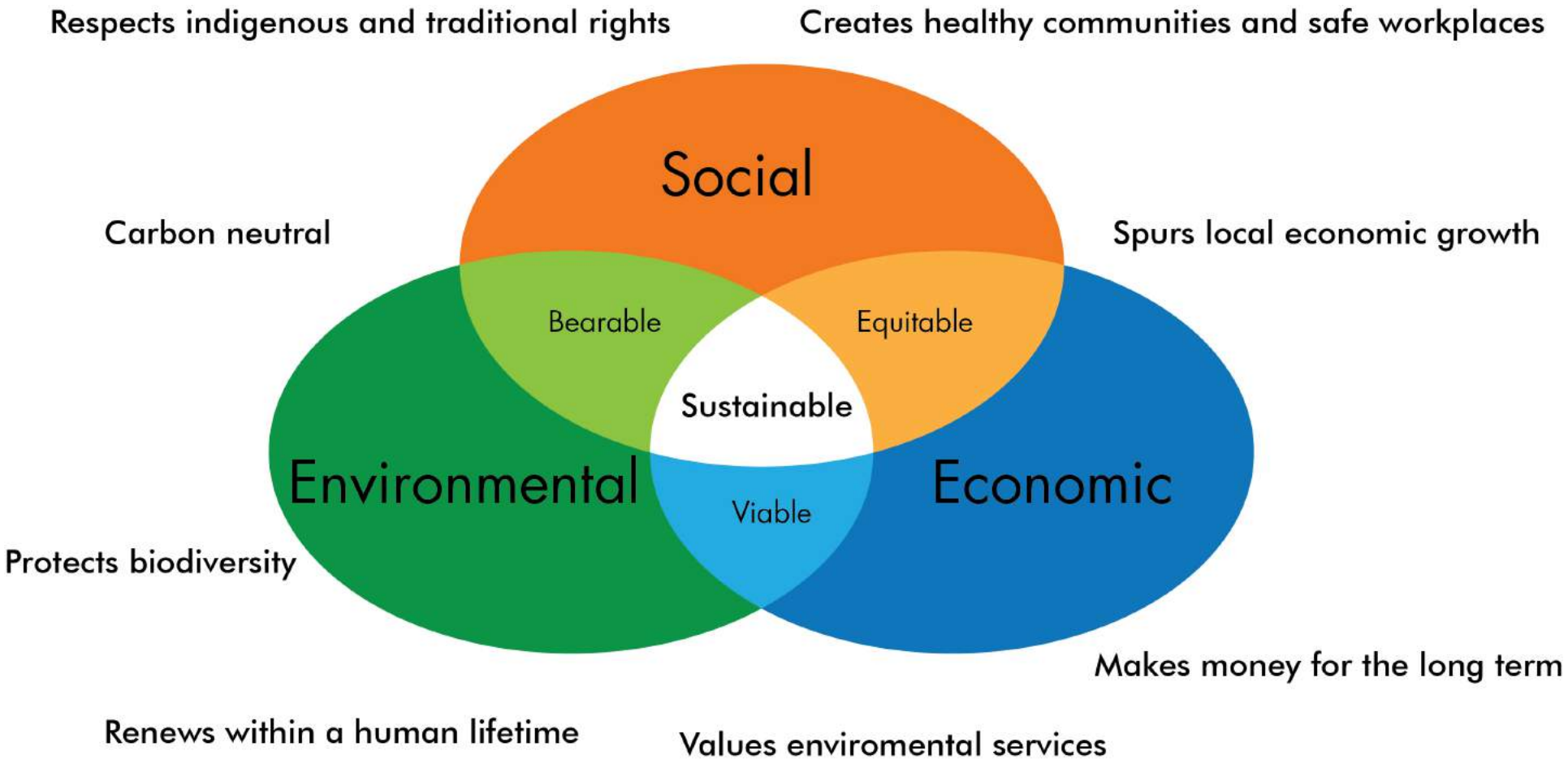
materials, chemicals and energy

are derived from **renewable biological resources**,

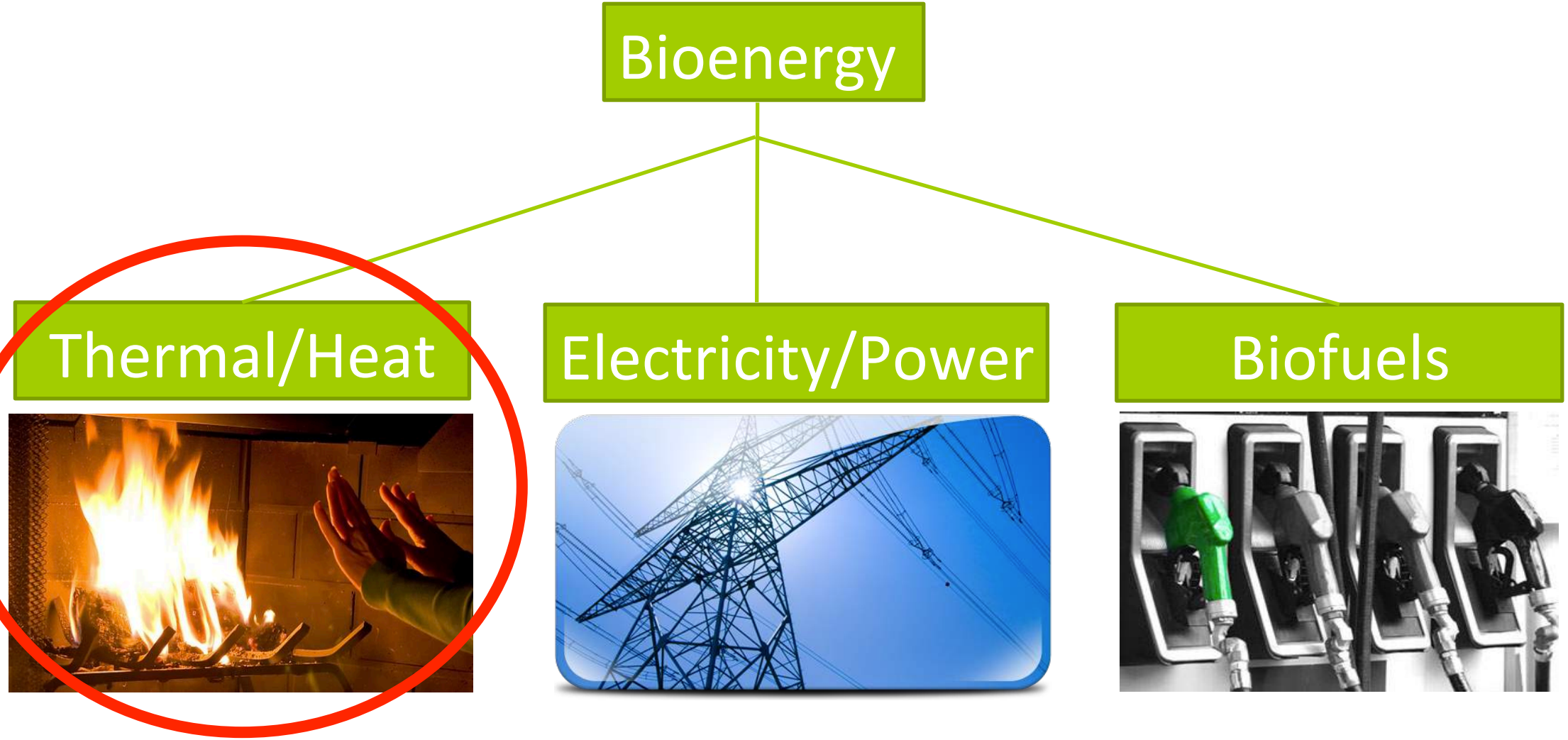
such as plant and animal sources

McCormick, Kes and Kautto, Niina, The Bioeconomy in Europe: An Overview, Journal of Sustainability, 2013

What is a Sustainable Bioeconomy?



Bioenergy



Bioheat = Thermal Energy

- Common bioheat applications:
  - Space heating
  - Water heating
  - Commercial or industrial process heat
- Biomass comes from a variety of feedstocks
  - Forest, agri-crops, municipal solid waste, etc.
- Many conversion mechanisms and technologies

Evolution of Bioheat

160,000 BC

2016

Bioheat Applications: Residential Scale

- For households
  - Wood stove, furnace or boiler
  - Pellet stove, furnace or boiler

Pellet stove
2-20 kWh

Pellet boiler
25-40 kWh

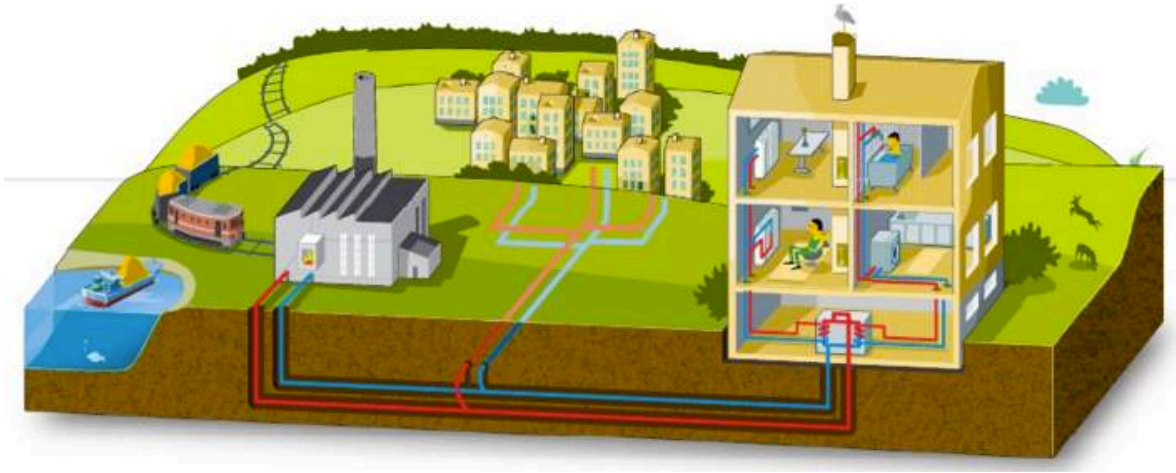
Pellet furnace
25-45 kWh

Bioheat Applications: Commercial Scale

- For government buildings, band offices, office buildings, arenas, schools, hospitals, greenhouses, stores, etc.
  - Biomass boilers

Bioheat Applications: Community Scale

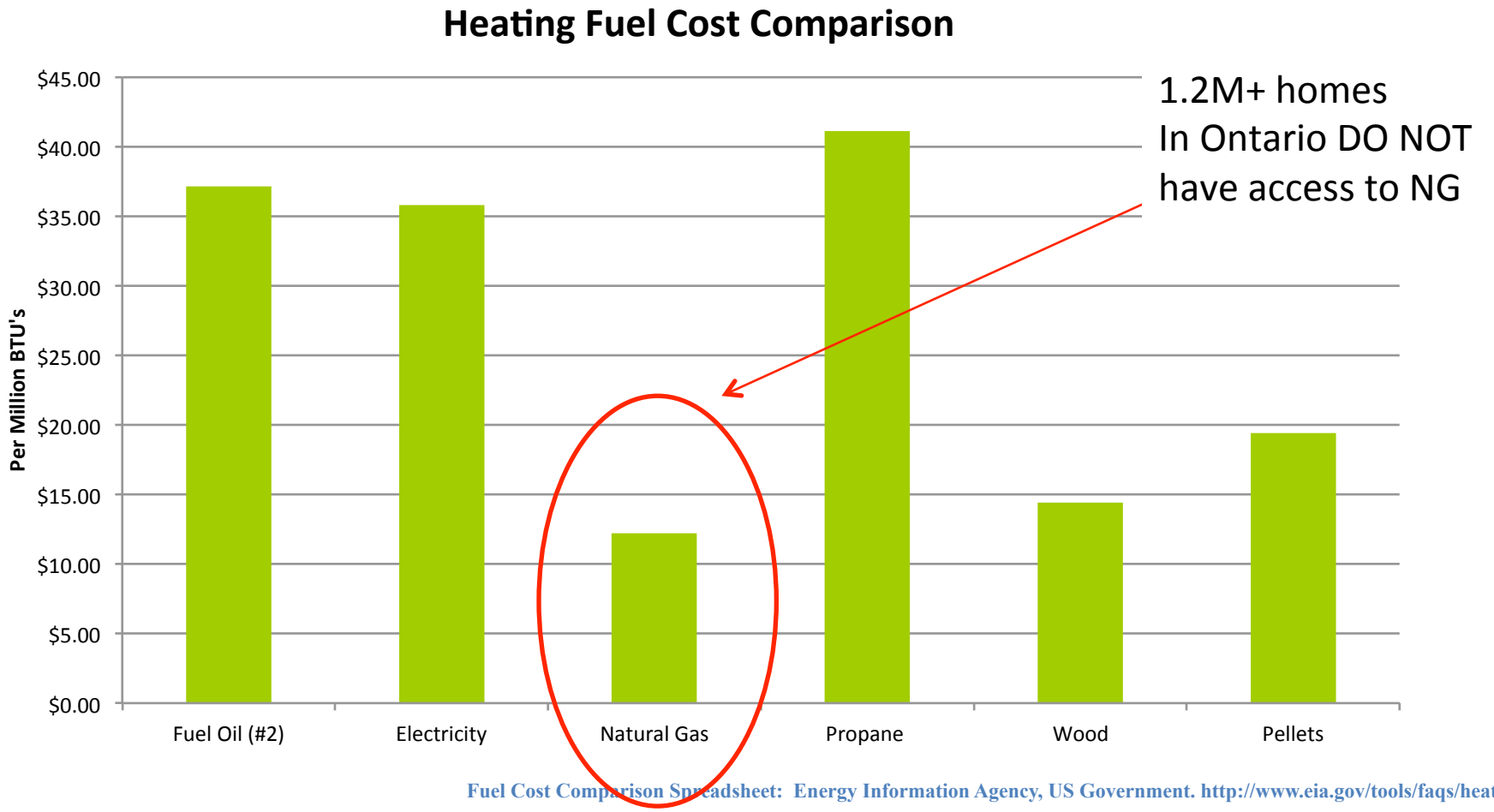
- For household dwellings + government buildings + band offices + office buildings + arenas + schools + hospitals + greenhouses + stores + …
  - District heating



Why Bioheat in Remote Communities?

- NEED for affordable and renewable heating
- NEED to address thermal energy – not just electricity
- Economic recovery opportunities
- Bioheat creates jobs
- Benefits flow locally
- Reduce GHGs

Wood Energy = Cheaper Energy



Fuel Cost Comparison Spreadsheet: Energy Information Agency, US Government. http://www.eia.gov/tools/faqs/heatcalc.xls

Heat Need > Electricity Need

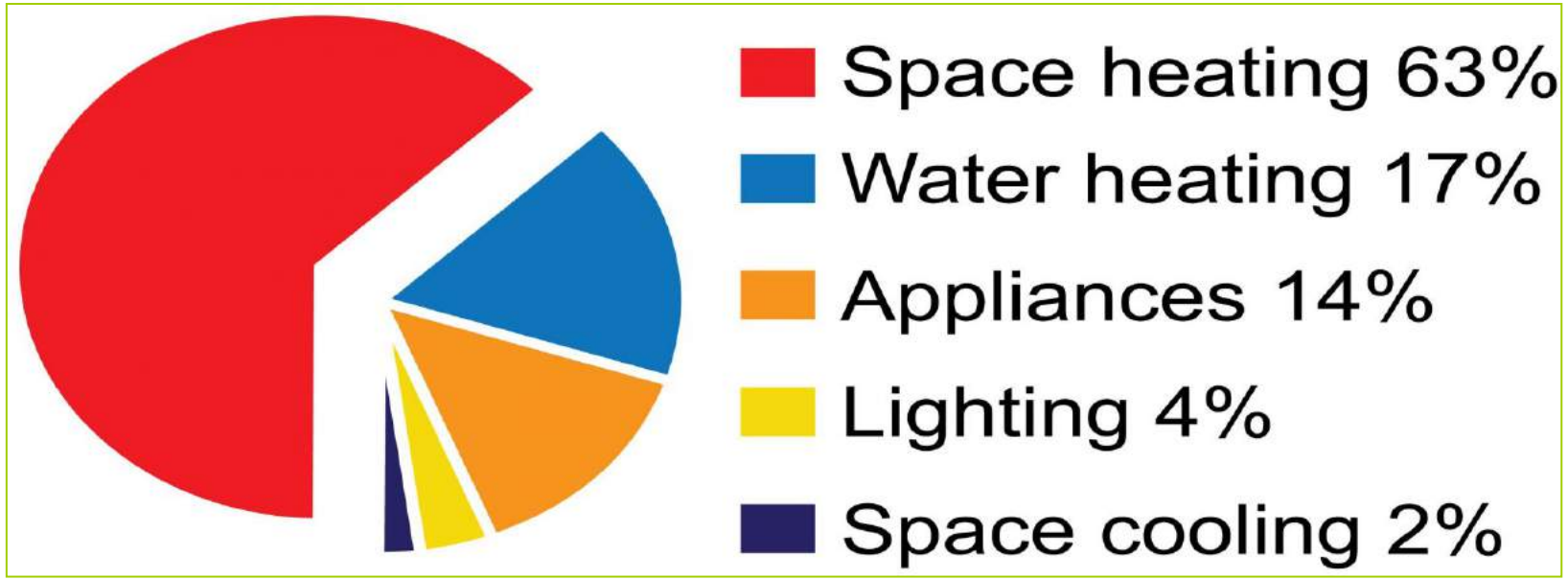


Figure - Residential Energy Use in Canada by activity, 2010 Source: Energy Efficiency Trends in Canada 1990-2010, Natural Resources Canada. http://www.nrcan.gc.ca/energy/products/categories/heating/13740

Bioenergy Creates Jobs

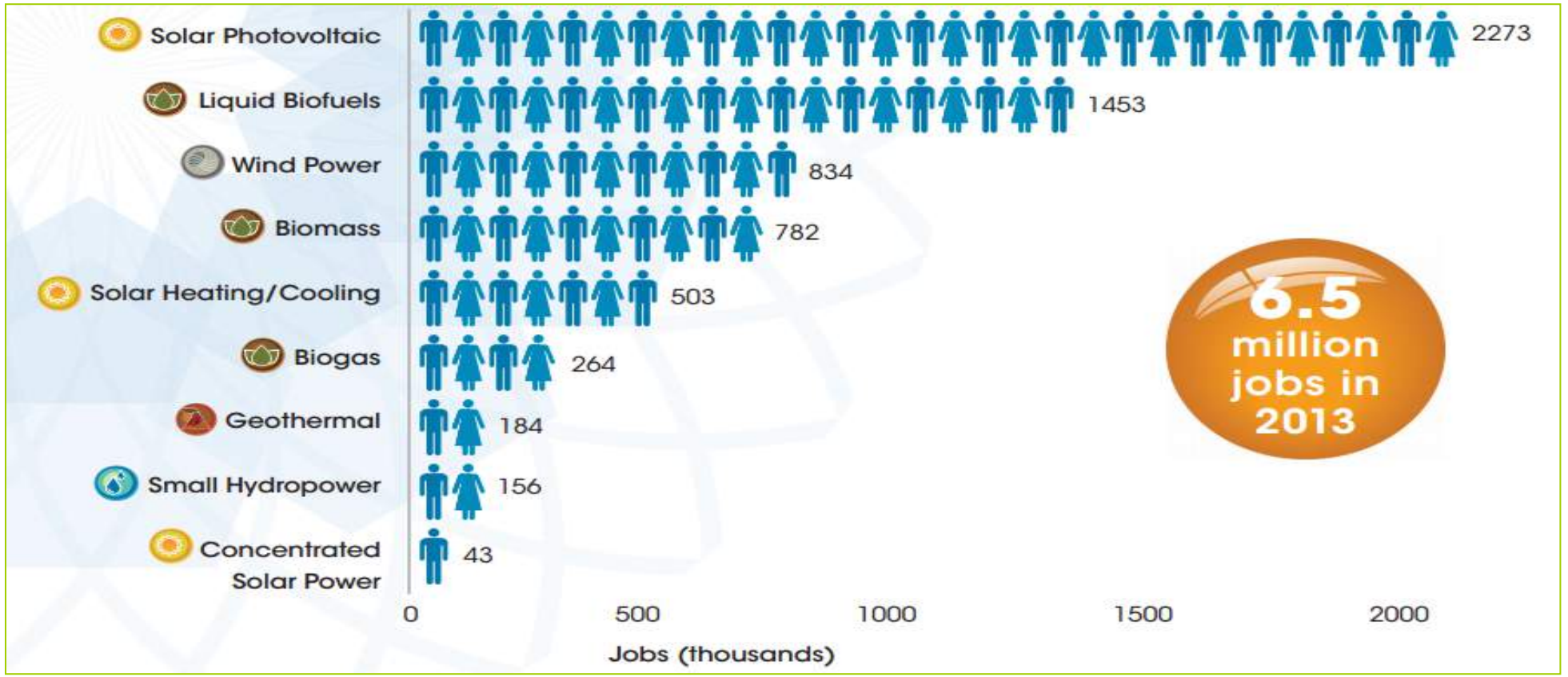


Figure - Renewable Energy Employment by Technology Source: IRENA Renewable Energy and Jobs Report, 2014 http://www.irena.org/publications/rejobs-annual-review-2014.pdf

Economic Recovery of Key Sector

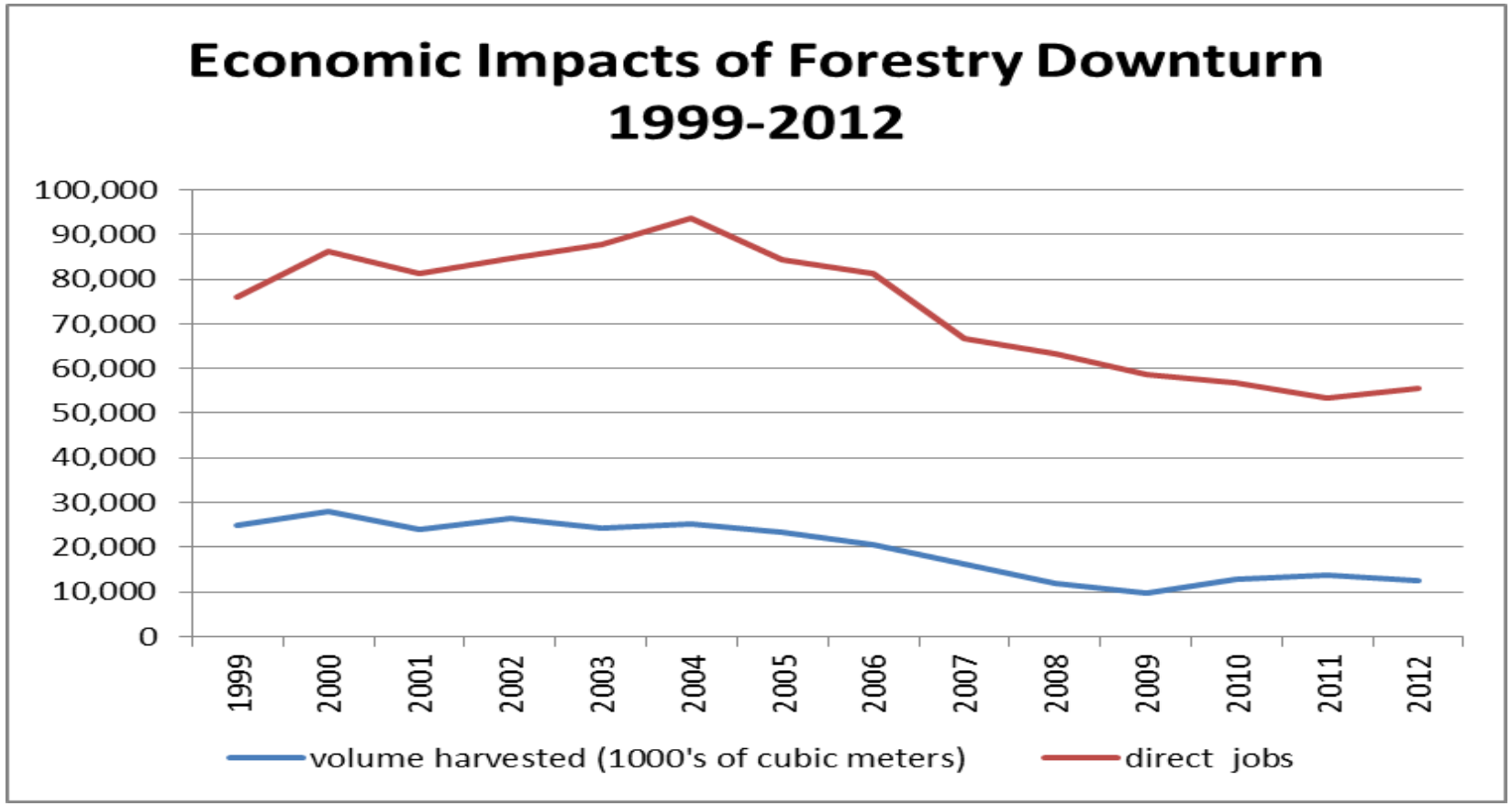
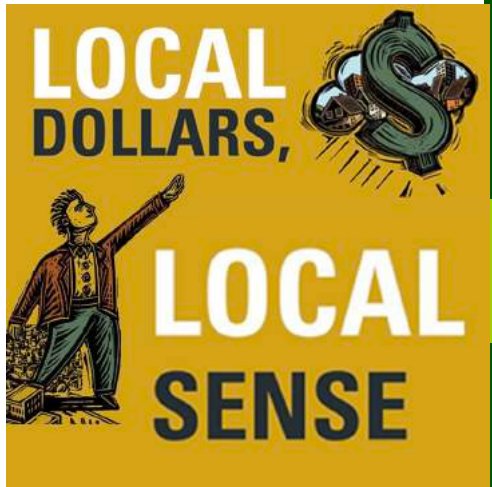


Figure - Economic Impacts of Forestry Downturn 1999-2012
Source: Natural Resources Canada Statistical Data,
https://cfs.nrcan.gc.ca/statsprofile/employment/on

Benefits Flow Locally



Reduce GHGs

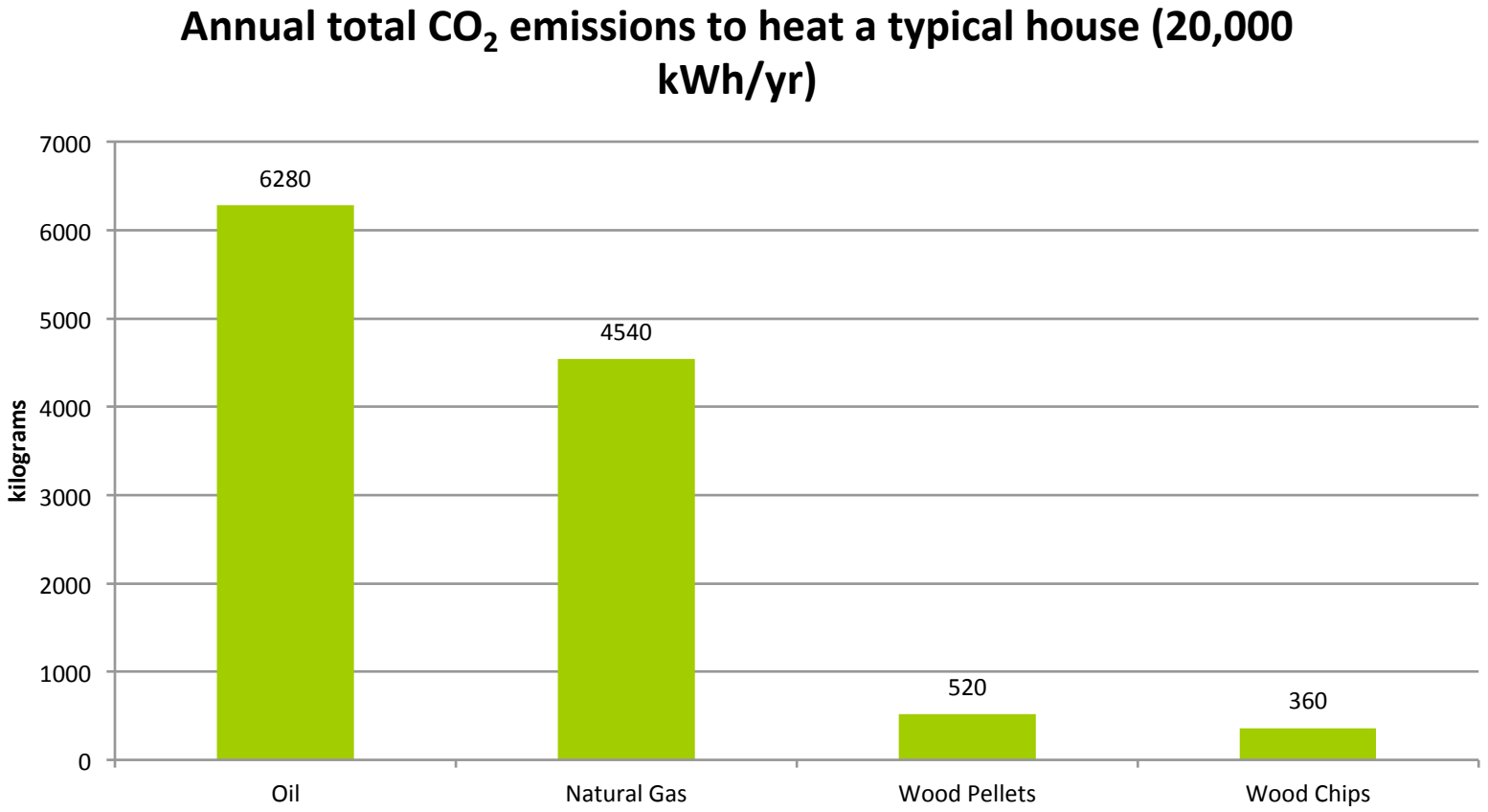


Figure - GHG Emissions from different heating fuel types Source: Biomass Energy Centre http://www.biomassenergycentre.org.uk/portal/page?_pageid=75,163182&_dad=portal&_schema=PORTAL

Why Else?

- Preserve traditional knowledge
- Reverse youth out-migration
- Invest in social and physical infrastructure
- Bioheat = scalable and efficient
- Reduce dependence on outside money
- Future market opportunities – biochemicals, biocomposites
- … … …

… so what's the hold up?

Which brings us to today

- Bioheat opportunities come from:
  - Community engagement
  - Community energy planning
  - Understanding bioheat applications and options
  - Understanding supply chain elements
  - Knowledge of policy and regulations
  - Learning from other people's experiences

Join our Sector Association!

Public Members

- First Nations
- Municipalities
- EDCs
- Academia
- Industry associations

SME Members

- Consultants/Engineers
- Forest license holders
- Bioenergy/bioproduct producers
- Equipment providers
- Forest harvesters

Large Enterprise

- Forest resource processing facilities
- Large industrial and commercial
- Manufacturing facilities

	Allies	Public Members*		Small-to-Medium Enterprise Members*		Large Enterprise Members*	
		Standard	*Premium*	*Standard*	*Premium*	*Standard*	*Premium*
Annual Rate	Free	$300	$500	$600	$800	$1000	$1300

*Refer to our website for details

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