



IDEATHON CHALLENGE

Utilizing NL's organic waste
to create clean energy
opportunities

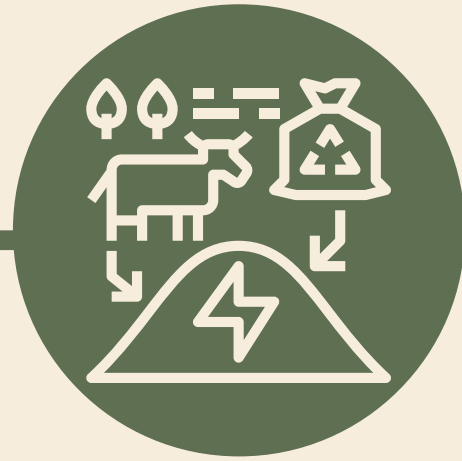
TERMINOLOGY



Organic Waste

Biodegradable waste of plant or animal origin that can decompose in nature.

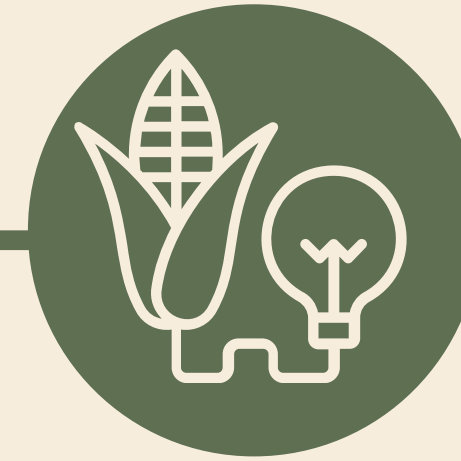
Organic waste contains valuable nutrients from which value can be extracted.



Biomass

Dead plant and animal material suitable for using as fuel.

Living biomass takes in carbon as it grows and releases this carbon when used for energy, resulting in a carbon-neutral cycle that does not increase net GHGs.



Bioenergy

Energy produced from renewable, biological sources such as biomass. Also known as biofuel

THE ISSUE

Organic waste represents as much as 30% of the waste generated in Newfoundland and Labrador (NL).

1

Waste management, exclusive of associated transportation, is responsible for 7% of NL's greenhouse gas (GHG) emissions.

2

Many of the emissions associated with waste management are caused by the decomposition of organic waste that is landfilled.

3

The primary gas produced is methane which is a GHG that is 21 times more powerful than carbon dioxide.

4

Generally, producers of organic waste are not required to separate from other waste streams, and landfill operators are not required to find special solutions.

THE OPPORTUNITY

Organic waste is a resource that can be used to produce energy in the form of electricity, heat, and/or fuels. The production and use of biomass energy presents a GHG reduction opportunity for NL whereas its organic matter is otherwise landfilled.



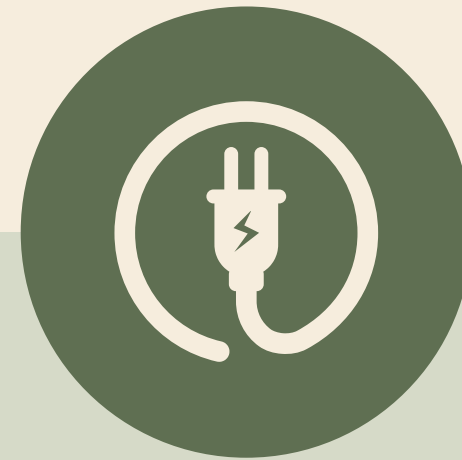
WHY NOW?



Policy and market forces – within NL and abroad – are creating new demands for lower-carbon products and creating new domestic and export opportunities for biomass energy.



Biomass energy technologies have advanced and are maturing. New incentives (such as investment tax credits) have been put into place to support biomass energy projects.

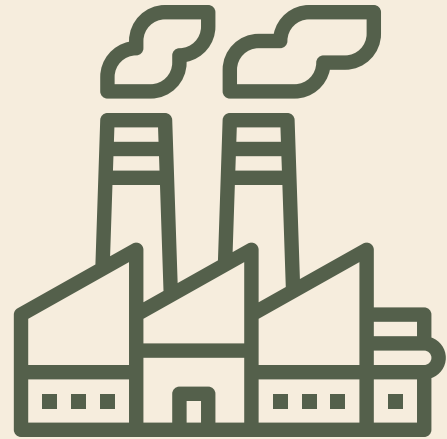


Electricity demand in NL is expected to exceed supply in less than 10 years, creating demand for new sources of electricity.



Large clean fuels projects are online and producing product or are making their way through environmental assessment and/or permitting processes, resulting in new synergies and potentially even customers.

WASTE STREAMS



Industrial

Forestry
Fishery
Agriculture
Mining
Energy
Construction



Residential

Homes
Apartment Buildings
Neighbourhoods



Commercial

Retail Stores
Hotels
Restaurants
Commercial Office
Space



Institutional

Hospitals
Universities
Prisons
Government
Laboratories

SOURCES OF ORGANIC WASTE



Agriculture

Spent crops and crop residues. Livestock waste such as manure, offal, and mortalities. Agricultural waste in NL is not well documented or understood.



Forestry

Sawmill residues like bark, shavings, sawdust, and trim blocks. Sludge is generated from the wastewater treatments of the pulp and paper industry.



Wastewater

700+ wastewater outfalls registered in NL. Most are not treated, leading into the ocean or rivers. Most treated outfalls are done with simple septic tanks. Solid organic waste materials separated from water during treatment processes called sludge possible biomass input.



Landfill Gas

Large source of methane emissions. Instead of allowing escape into atmosphere, collect and use as energy. Newfoundland has 2 primary landfills with ~40 smaller landfills. Labrador has small landfills in some regions, with localized landfills in remote areas.

SOURCES OF ORGANIC WASTE



Household/ Commercial Organics

~155,000 MT of organics waste is generated annually in NL with only a small fraction (2.5%) diverted, representing approximately 30% of all waste. For the most part, household / commercial organics are a waste stream for which there is no definitive plan in place to address.



Construction and Demolition Lumber

Potential for lumber to be used in the same ways as other forestry residues, however it is generally more complex because of contamination. Lumber is likely to be mixed in with (or connected to) other different wastes. It may have been treated or glued (chemicals harmful when used in biomass to energy processes).



Fishery/ Aquaculture

In 2022: 89 fish processing plants in NL, each with organic waste streams. Volumes not well known. Cod liver, heads, frames, and more currently discarded in the ocean. Most organic aquaculture waste utilized locally in pet food/meal production. Projected industry growth won't allow to producers to manage volume.



HURDLES

NL's population and industrial activities are dispersed across a vast geography.

The volume of any single source of organic waste in NL is relatively small. This remains true when all organic waste is considered collectively.

The aggregation of relatively small amounts of organic waste will result in significant transportation costs. Low volumes of inputs into biomass energy processes with transportation requirements for aggregation will negatively impact the cost of the outputs. This may limit the potential end uses for the final product(s).

Lack documentation or understanding of some sources of organic waste. (i.e. agriculture)

Outdated government policies surrounding waste management

TYPES OF SOLUTIONS



Technical

Create a new product or technology;
processes



Business

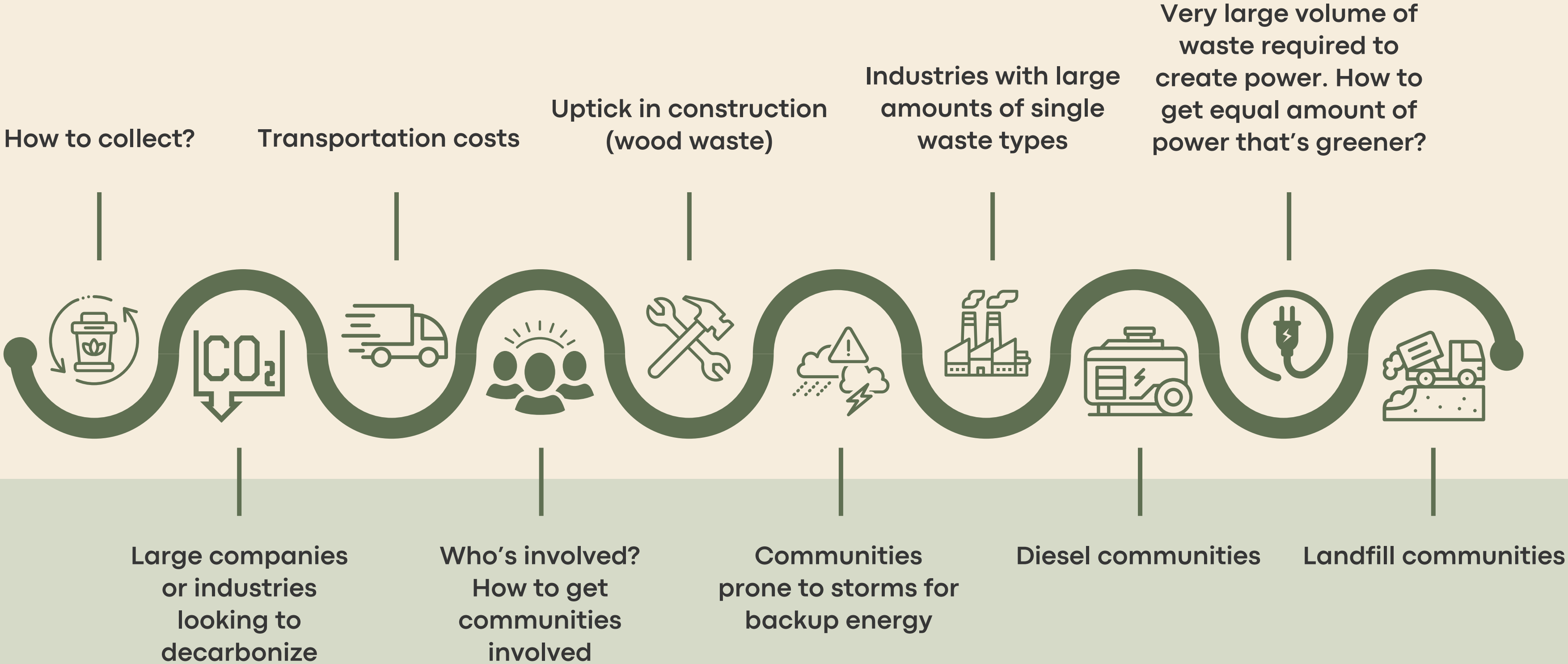
Create a new business to implement
existing products or technologies;
logistics



Policy

Create a new policy/implementation plan

SOME CONSIDERATIONS



SOME EXAMPLES

Port-Cartier
Biochar
Plant, QC

Atikokan
Generating
Station, ON

Port
Belledune, NB

Saskatoon,
SK

Clover Bar
Edmonton,
AB

Ridge
Landfill,
Blenheim, ON

Transform wood residue into biochar that sequesters carbon. Seek to sequester 75,000 tonnes of carbon per year selling certified carbon credits by First Climate.

100% wood pellet fueled power which generates 205 MW of electricity to provide power to 70,000 homes. 75% less emissions than traditional coal fired power plant.

Converting coal fired power plant to biomass to generate 450 MW of electricity using torrefied/steam-cracked pellets.

Began operation in 2014. Reduce over 50,000 tons of emissions per year, generates renewable electricity. Creates \$1.3M in revenues for the City from the sale of power.

Produced 2MW of energy and reduces GHG. This is the only facility in Alberta that recovers landfill gas and uses it to generate renewable energy.

Generate enough power for 40,000 homes.