

The Future of Clean Energy

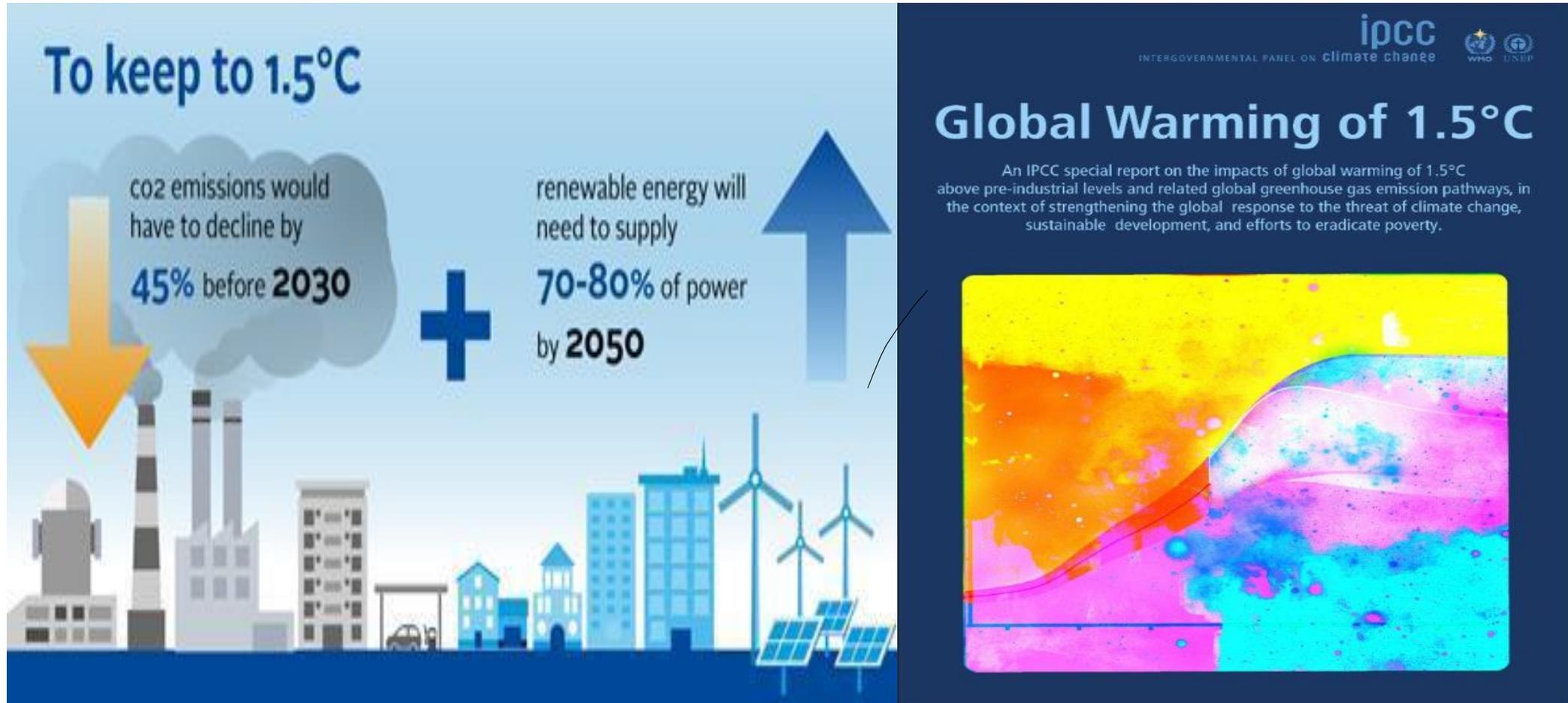
Lead the transition to low-carbon energy by producing and using renewable natural gas



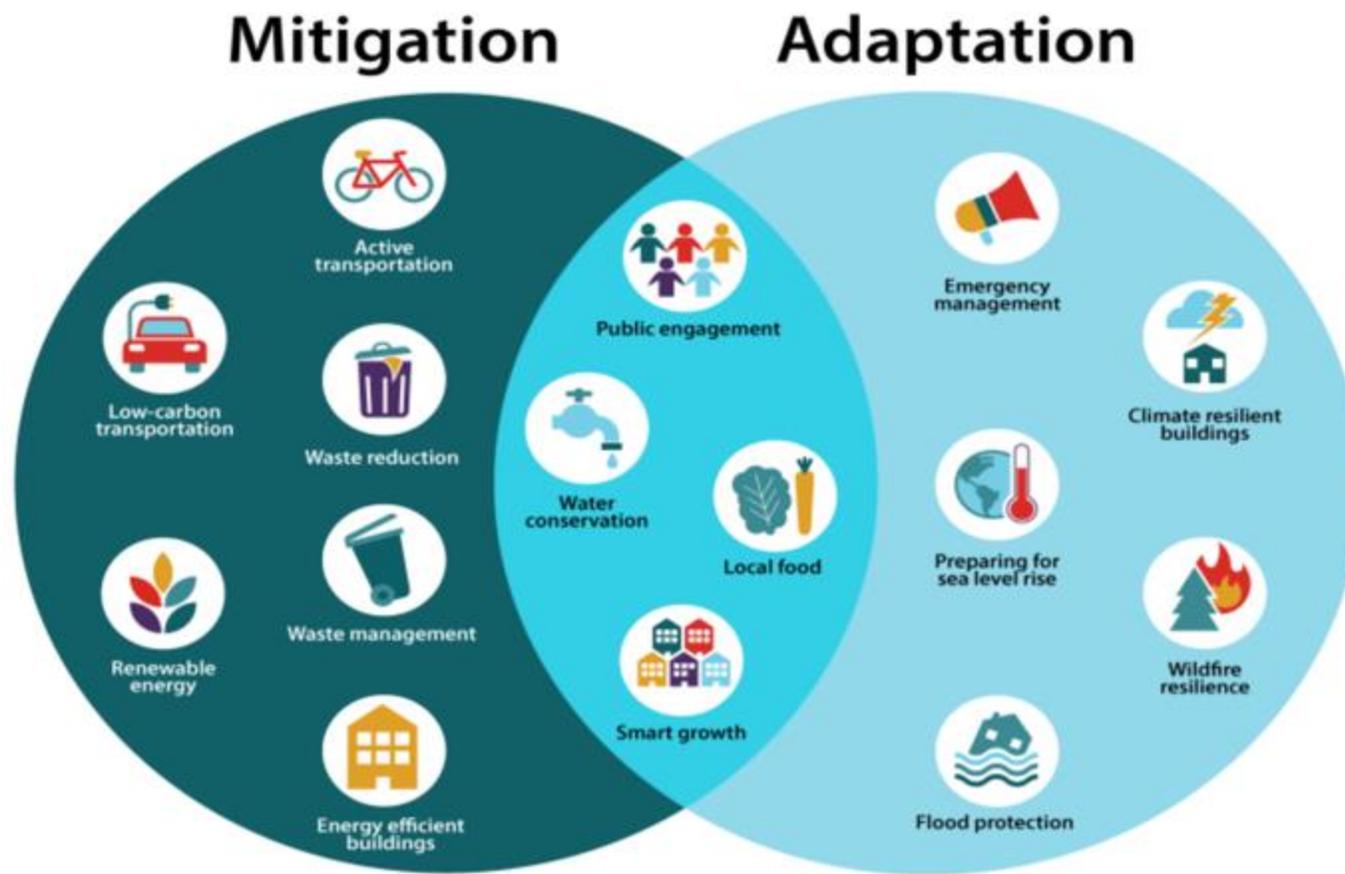
WHAT WE'LL COVER

- Overview of RNG
- Enbridge RNG programs
- RNG Opportunities for Businesses
- Questions

THE DRIVER – TODAY'S CLIMATE LANDSCAPE



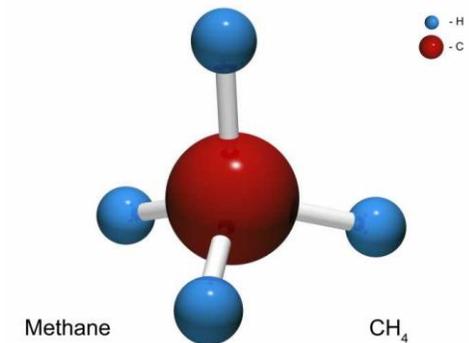
Doing what is
Right...



- [Source: Climate Adaptation - District of Squamish - Hardwired for Adventure](#)

What is RNG

- Not a fossil fuel
 - Can be consumed in any application where fossil gas is used (e.g. heating, CHP)
- Prevents methane (25x GHG of CO₂) emissions
- Converting biogas will lower GHG emissions
- Doesn't add carbon to the environment

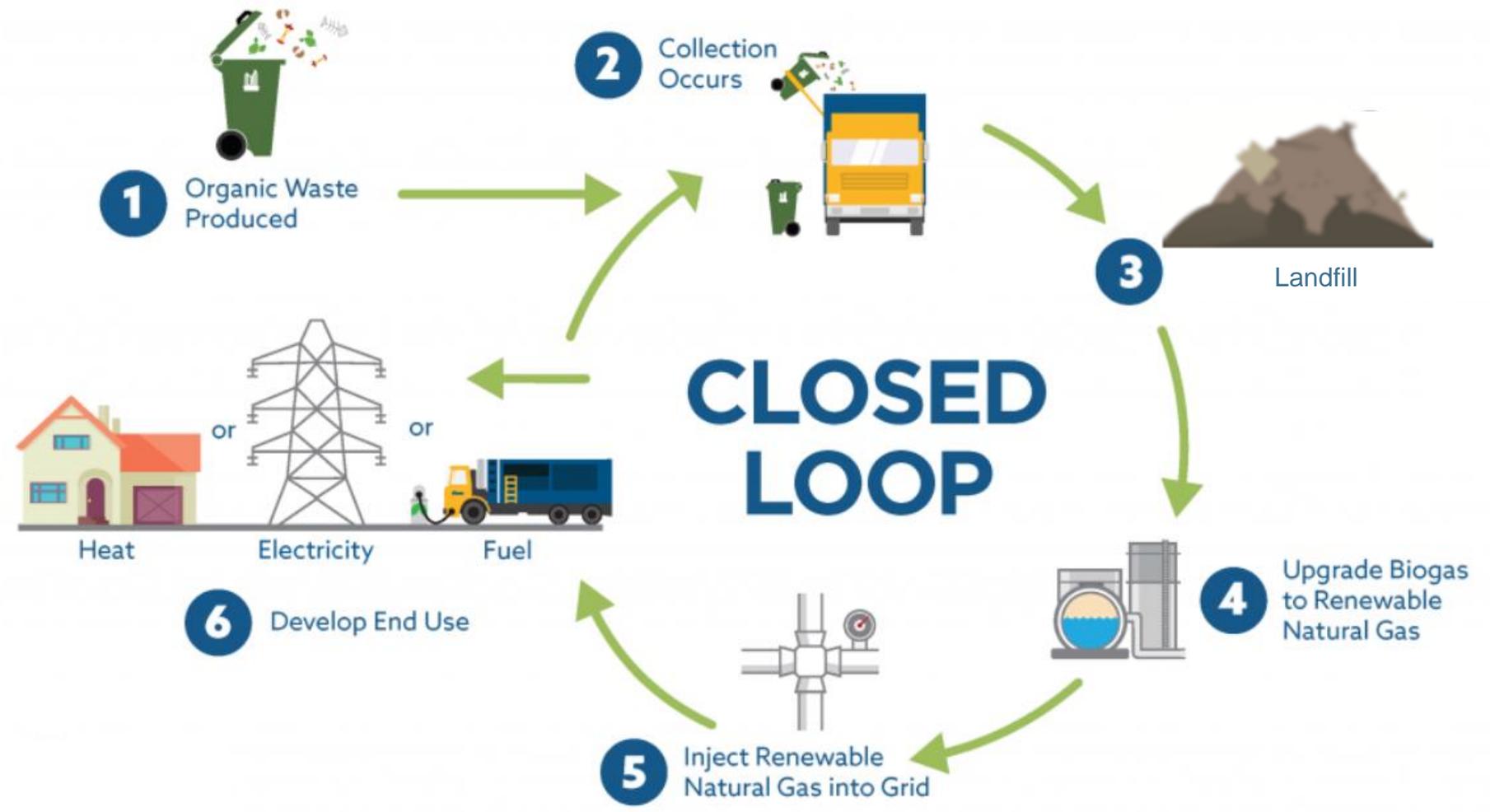


METHANE EMISSIONS = 25X GHG OF CO₂

RNG vs Conventional Natural Gas



What is a Circular Economy?



Low-Carbon Growth - RNG

Expanding Utility Portfolio



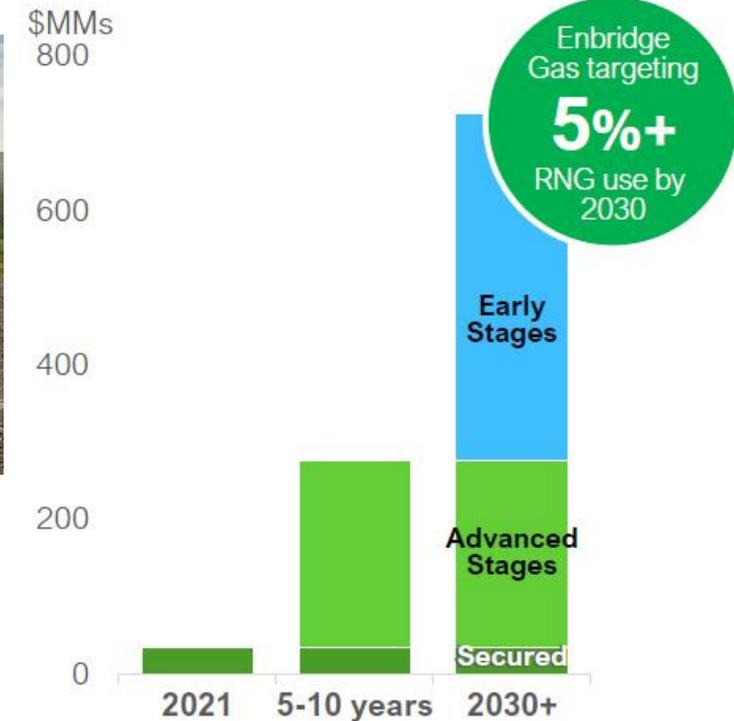
- Focused on In-franchise investments
- Current projects reduce 93,000 tCO₂e emissions annually
- **~55 in-franchise projects in development**

Strategic Partnership



- Partnered with Walker Industries & Comcor Technologies
- Cross-Canada wellfield to injection facilities serving landfills

Capital Outlook



Utilize existing infrastructure to lower emissions and maintain affordable energy supply

RNG OVERVIEW

Unlike fossil fuels, RNG is created from:



Food processing organic waste



Agricultural waste, such as leftover crops and animal manure



Bio-solids from wastewater treatment plants



Landfills

1

Waste recovery

Organic waste, such as wastewater treatment sludge, food waste or manure is delivered to a biodigester.

2

Anaerobic digestion

The biodigester breaks down the organic waste, creating biogas. The byproduct of anaerobic digestion, digestate, can be converted into fertilizers that return nutrients back to the soil.

3

Upgrading

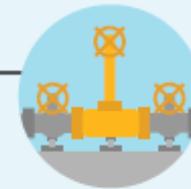
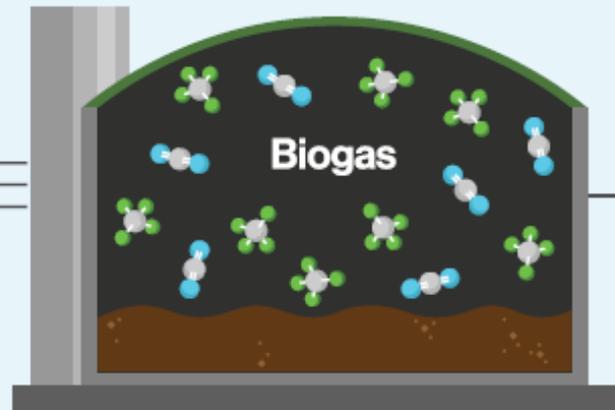
- The biogas is cleaned to meet gas quality specifications.
- Landfill gas is captured and sent directly for upgrading.

4

Added to system

The resulting RNG is added to the existing natural gas infrastructure to be sold and distributed to customers—either directly into the pipeline or to fuel the producer's own needs.

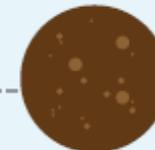
If we harness only **10%** of Canada's potential, RNG can help heat up to **one million homes for one year.***



Homes and businesses



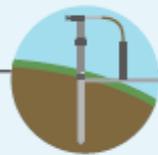
Fuel fleets



Byproduct / digestate

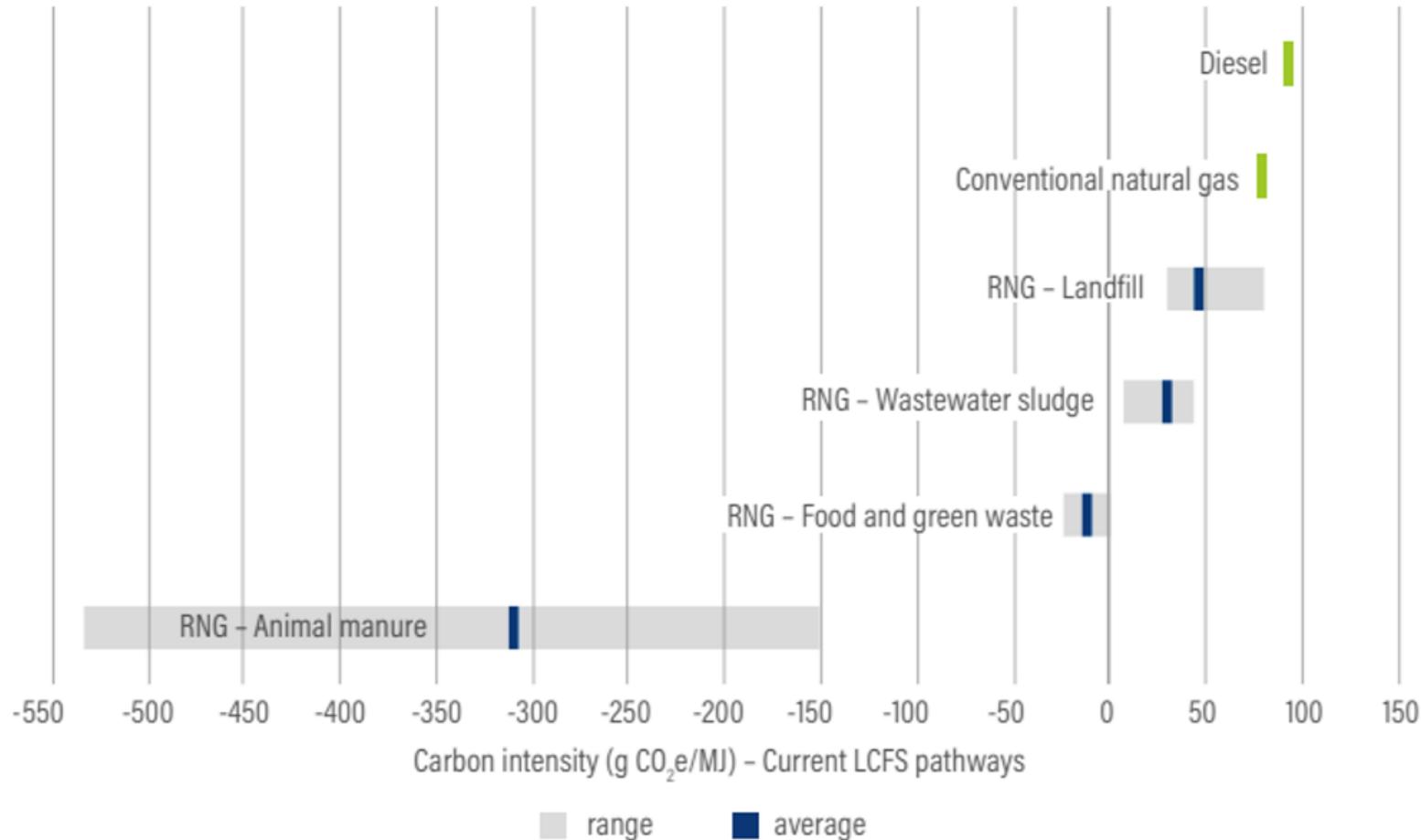


Fertilize soil



Landfill gas is captured

RNG: Carbon Intensity



Illustrative example

California Air Resources Board
(CARB, 2020)

- Canada's Clean Fuel Regulation (Dec 2021) will include RNG carbon intensity methodology

RNG ADVANTAGES

RNG: a smart strategy

Created from gases released when organic waste decomposes, this carbon-neutral fuel provides a proven source of energy that also helps manage waste, reduce carbon emissions and fight climate change.

Fuel the future

Utilities across Canada have set ambitious RNG targets, aiming to have a five percent blend of RNG in all natural gas streams by 2025 and 10 percent by 2030. This would result in a 14 metric tonne reduction in greenhouse gas (GHG) emissions by 2030 — equivalent to taking 3.1 million cars* off the road.

*Source: oga.ca/natural-gas-101/the-renewable-natural-gas-opportunity

Benefits of RNG



A circular economy approach

RNG turns organic waste into renewable energy that can be used in business, industrial, residential and transportation applications.



A sustainable energy source

Low-carbon energy is created by capturing and cleaning landfill gas or biogas. The digestate (byproduct of anaerobic digestion) can be converted into fertilizer, returning valuable nutrients back into the soil.



A path to net zero

RNG can help reduce GHG emissions by capturing methane that would otherwise be released into the atmosphere.



A clean energy network

RNG is delivered through the existing natural gas infrastructure where it can be used to heat homes and businesses.



A cost-effective solution

RNG is an effective way to reduce CO2 emissions and manage costs.



An effective way to create energy resilience

As the RNG supply is distributed by underground pipes, it is reliable and resilient against extreme weather conditions.

Why RNG is complementary to Decarbonization



With **net-zero emissions**, it's a cost-effective way to meet climate change goals



Fewer service interruptions than electricity and is resilient against extreme weather



Leverages the existing natural gas infrastructure and vehicles



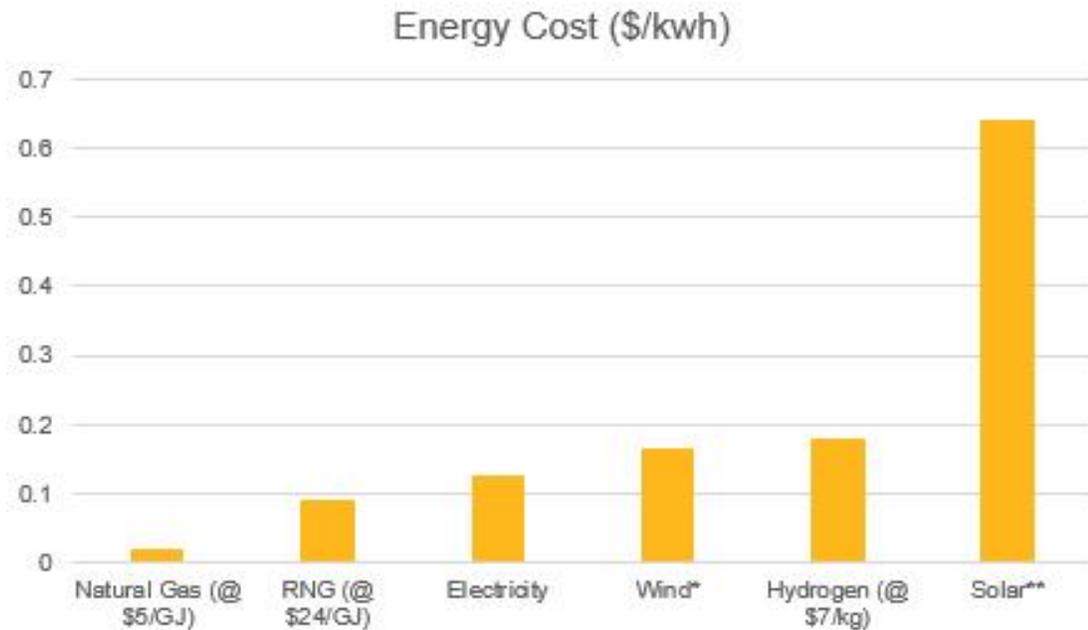
Doesn't contribute to **peak electricity demand**.



By repurposing organic waste, RNG reduces GHG emissions

RNG @ \$22/GJ = ¢ 8.0/kWh is a competitive renewable fuel

ENERGY PRICE COMPARISON



Did you know...if RNG costs \$22/GJ to produce/procure:

- This is equivalent to \$0.08/kWh
- Off-peak electricity Ontario is priced at \$0.082/kWh



*<https://parkergallantenergyperspectivesblog.wordpress.com/2016/12/08/how-much-is-wind-power-really-costing-ontario/>

**<http://www.solarelectricityhandbook.com/canada-feed-in-tariff.html>

RNG: cost considerations

- Supply costs
 - Price competitive with electricity
- Avoided Carbon Charge
 - \$50/tCO₂e (2022) → \$170/tCO₂e (2030)
 - RNG supply avoids federal carbon charges on your utility bill
 - **If \$22/GJ on long term contract**, this avoided charge can be 12-17% of your RNG supply cost

Did you know...if RNG costs \$22/GJ to produce/procure:

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- Off-peak electricity Ontario is priced at \$0.082/kWh

Electricity rates and prices (June 28, 2022)¹



RNG supply can be a cost-competitive pathway to realize GHG emissions reductions

¹ <https://www.oeb.ca/rates-and-your-bill/electricity-rates>

RNG VALUE CHAIN

Enbridge
Services

Biogas Gas Generation



Anerobic Digestion

- Waste water treatment plants
- Municipal and merchant digesters
- Farms
- Public and private large landfills

Thermo-Chemical Gasification of biomass and organics

LFG Collection



Wells are drilled at the landfill for landfill gas collection and are put under vacuum for central collection

Biogas Clean Up



LFG or Biogas is cleaned and conditioned to pipeline specifications

- Engineering and Design
- Equipment suppliers and manufacturers
- Construction and Operations

Distribution and Transmission



An injection station and service is required from the connecting pipeline or gas distributor
Service fees and tariffs
Rate-based utility assets

Sales and Marketing



Tidal arranges for transport and buy/sell agreements for the RNG and its associated Environmental attributes.

SUCCESS STORIES



Toronto

AD
315k GJ



Niagara

Landfill
800k GJ



London

AD
120k GJ



Hamilton

WWTP
100k GJ

Enbridge Gas RNG offerings



- **RNG Injection Service**

- Our utility will work with RNG producers to interconnect their RNG facility to our pipeline grid. We work to deliver an interconnection assessment of best fit for your project.
- Regulated utility services included the build and use of injection station and pipe interconnection, and the transportation and production account balance service at our Dawn Storage Hub just north of Chatham, Ontario.

- **Biogas Upgrading Service**

- We have invested in and continue to seek opportunities to invest in RNG production projects upstream of the utility injection station.
- This includes projects outside of our utility franchise areas (beyond Ontario).

- **Voluntary RNG program¹**

- We currently offer a pilot voluntary RNG program for residential and small commercial customers to support.
- This pilot will inform future versions of a voluntary program that we intend to offer with greater fit and optionality for all customer rates

- **Other RNG related services include:**

- Matching RNG producers with offtake opportunities via established energy marketers, large utility customers
- Increased functionality and visibility for spot RNG transactions at Dawn Storage Hub
- Utility customers can blend in 3rd party RNG supplies into new/existing distribution services (including their own RNG product)
- Turnkey solutions for RNG/CNG transport applications – best value for RNG end use

Proposed Enbridge Gas RNG offerings

Proposed RNG program: Low Carbon Voluntary Program (LCVP)

- To support our customer's Environmental, Social and Governance goals, Enbridge Gas has submitted a proposal to the Ontario Energy Board (OEB) to launch LCVP to expand customer access to RNG:
 - – increase RNG in our system supply beginning with one percent as early as 2025 and increasing by 1% (5.3 PJ) each year until reaching 4% by 2028 (21 PJ).
 - – The proposed program would replace the current Voluntary OptUp program for residential customers.
 - – Any RNG not elected through the voluntary LCVP would be incorporated into Enbridge Gas's system supply. All system gas customers would share the benefits and costs of any remaining supply.

Key features of the proposed LCVP

- Simplified procurement of RNG: Enbridge Gas-managed, reducing administrative burden on customers.
- Customizable: ability to select how much RNG is right for individual operations
- Reduced carbon emissions and Federal Carbon Charge.
- Ease of implementation: RNG supply requires no upgrades to equipment or infrastructure.

Low Carbon Voluntary Program Benefits

Program participants and Enbridge Gas system customers will have access to the most economic supply of RNG by accessing supply through cost-effective long-term contracts.

– Enbridge Gas is aligning the RNG demand of all of our customers with the proposed program.

With RNG supply, there are a few benefits for large-volume customers:

- 1) It is not subject to the Federal Carbon Charge (if applicable)
- 2) It creates Clean Fuel Regulation Credits. The value of these credits generated could be streamed to customers to reduce the cost of RNG.

Q&A

RNG 101

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