2024 RNG Meeting

Enbridge Gas Ontario

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September 4, 2024

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RNG Meeting Agenda

Agenda item	Time	Speaker
Welcome Message and Safety Moment	10	Amy Mikhaila
Regulatory Update	20	Stephanie Fife
Policy and Market Development	30	Cora Carriveau
RNG Project and Connections Update	20	Steve Rakidzioski
CNG and RNG for Transportation	30	Joey Cyples
Closing Remarks	10	Jim Redford

Regulatory Update

Stephanie Fife
Technical Manager, New Energy Supply

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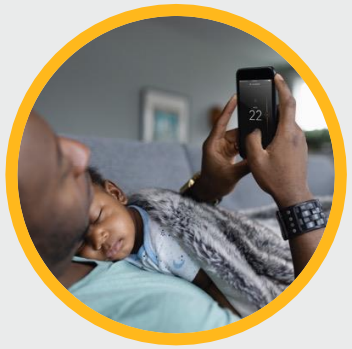
Enbridge is advancing reliable and cost-effective solutions for Ontario's net-zero energy future

Conservation



Helping homes, business and industry use less energy through conservation programs

Renewable gases

Advancing the transition to renewable gases:

- Hydrogen
- Renewable natural gas
- RNG programs and hydrogen blending

Cleaner energy technologies

For fleets and heavy transport that can't be practically electrified:

- CNG
- RNG
- Hydrogen

For reliable, cost-effective and sustainable heat:

- Hybrid heating
- Geothermal
- CHP
- Solar PV
- Waste heat recovery

For energy-intensive processes that can't be electrified:

- Cleaner and lower-emission gases
- Carbon capture and storage

Proposal for Lower Carbon Energy Procurement

- Seeking approval from the OEB to procure lower carbon energy (beginning with RNG)
  - Procure up to 1% (5.3 PJ) of Enbridge Gas' supply in 2026, increasing 1% annually to 4% (21.1 PJ) in 2029
  - Program has two components:
    1) Low Carbon Voluntary Program (LCVP) - customizable program available to large volume sales service customers (>15,000 m^3 annually) to receive elected % supply as low carbon energy
    2) Procured lower carbon supply cost and benefits not elected under LCVP to be incorporated as part of supply for all customers
       - Limit impact of $2/month for an average residential customer per % of supply
- Propose to end existing voluntary RNG program upon OEB approval of LCVP

Reduces 1.06 Mt of Carbon Emissions by 2029 and $150 million in Federal Carbon Charges for customers.

Timeline

Enbridge Gas Ontario is before the Ontario Energy Board (OEB) for the 2024 Rebasing and IRM – Phase 2 (EB-2024-0111). The request to procure lower-carbon energy is part of that application.

April 2024

Evidence filed
Filed evidence requesting approval for the Low Carbon Voluntary Program (LCVP).

June 2024

Interrogatories
Responded to about 70 questions with 203 subparts from nine intervenors related to the LCVP.

July 2024

Technical Conference
The technical conference was an opportunity for intervenors to ask clarifying questions about the interrogatory responses.

Fall 2024

Settlement Conference
The settlement conference is scheduled for Sept. 10-12, 2024.

Oral Hearing
If required, the anticipated timing for the oral hearing is Fall 2024.

Decision
Anticipated early Q2 2025

Upon OEB approval, the current target date for RNG deliveries is **January 1, 2026.**

Canadian Policy and Market Development

Cora Carriveau
Climate Policy

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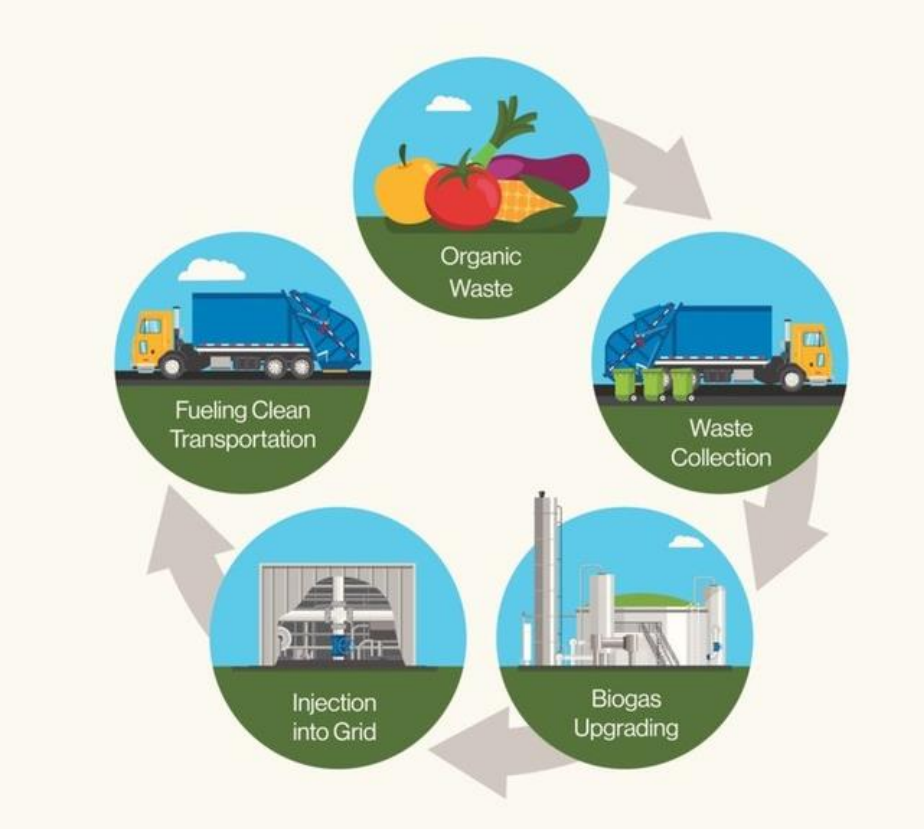
Canadian Policy and Market Development Overview

Federal

- Clean Technology Investment Tax Credit
- Clean Fuel Fund
- Clean Fuel Regulation

Provincial

- Emissions Performance Standards



Federal Policy and Programs

Clean Technology Investment Tax Credit

- Budget 2024 consultation – **submissions due Sept 11!**
- Amendments to Section 127.45 of the Income Tax Act to support generation of electricity and/or heat from waste biomass – see explanatory notes for legislative proposals
- Potential to support installation of anaerobic digestors or landfill gas collection systems?
- However, equipment that produces chemicals (digestate?) or fuels (RNG) for sale are excluded
- Excludes costs from “preliminary work activities” (i.e. feasibility studies, engineering and design)
- Share your feedback: consultation-legislation@fin.gc.ca

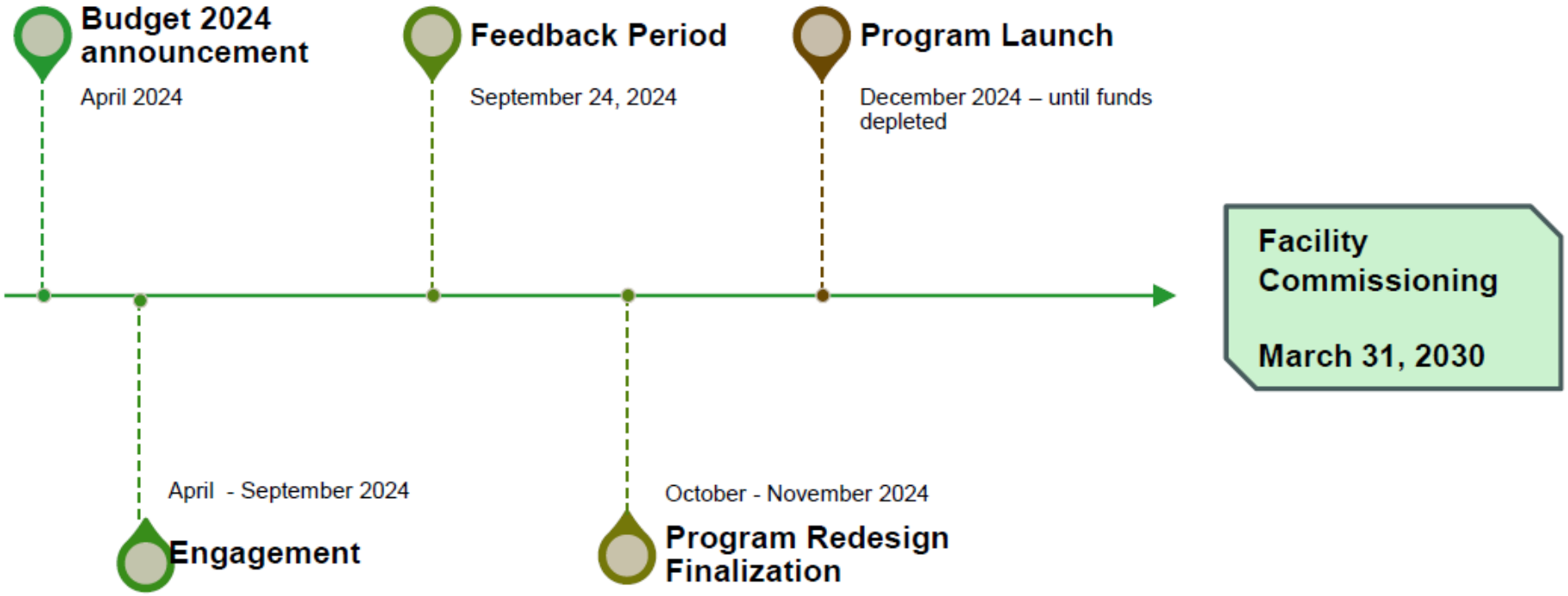
Federal Policy and Programs

Clean Fuel Fund (CFF2.0)

- Natural Resources Canada is re-tooling right now! – **submissions due Sept 24!**
- Webinar on Sept 10
- Confirmed elements:
  - $50M or 30% of project capital expenses (includes feasibility and FEED studies)
  - Projects must be commissioned by March 31, 2030
  - Applicant requirements: >5 yrs in clean fuel space, have already operated a fuel production facility, >20 employees
- Seeking feedback on:
  - RNG eligibility requirements: >50,000 GJ/yr production, Carbon Intensity <10 gCO_{2e}/MJ
  - Application requirements: executed land access agreements, secured financing, 5-year offtake
- Share your feedback: cleanfuelsfund-fondsdecarburantspropres@nrcan-rncan.gc.ca

Clean Fuel Fund (CFF2.0)

Program Timeline



Federal Policy and Programs

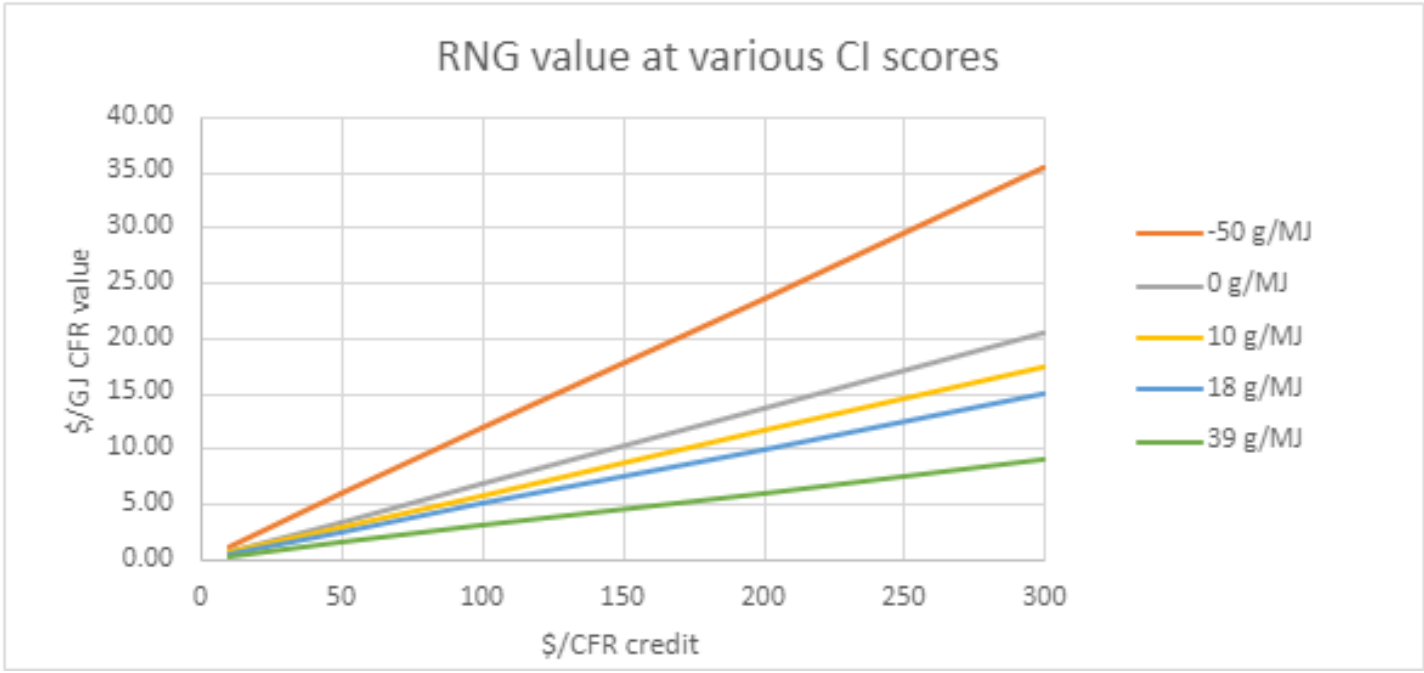
Clean Fuel Regulation (CFR)

- Came into force on June 6, 2022. Credit market began in 2023.
- RNG can create Liquid CFR credits where it is used in CNG vehicles, or Gaseous CFR credits where it is used for heat or electricity.
- RNG exported to another country is ineligible to create CFR credits.
- CFR credits are created three to six months after RNG deliveries.
- The number of CFR credits created by RNG depends on its carbon intensity (CI), which must be determined using ECCC's OpenLCA fuel model.
- 18 months of operational data is needed to obtain an approved CI, and then an annual 3rd party verification of the CI is required.
- In 2023, 24,540 Gaseous CFR Credits (0 Liquid) were created from RNG.

Federal Policy and Programs

Clean Fuel Regulation (CFR)

- How much are CFR credits worth?
- 17 RNG suppliers had an approved CI (ave 30 gCO_{2e}/MJ, min 18 gCO_{2e}/MJ).
- Average CFR credit prices as reported by ECCC in July 2024:
  - 2022: $142/CFR credit
  - 2023: $127/CFR credit
- ECCC Report did not identify Gaseous vs Liquid CFR credit sale prices



Provincial Policy and Programs

Emissions Performance Standards (EPS)

- Came into force in Ontario on January 1, 2022. EPS is mandatory for facilities emitting > 50,000 TCO_2e/yr, voluntary for > 10,000 TCO_2e/yr.
- In April 2024, EPS recognized Ont produced RNG purchases as a means to lower facility emissions.
- Carbon charges only apply to emissions exceeding a facility's annual emissions limit.
- Facilities emitting under their annual emissions limit will receive Emissions Performance Units (EPUs) from the government, which can be banked or sold to other EPS participants. 1 EPU = 1 TCO_2e
- EPUs have a 5-yr lifespan and typically sell for under the annual carbon charge price (e.g., \$80/TCO_2e for 2024).
- EPS and CFR programs are complementary to each other, and not mutually exclusive.

RNG Project and Connections Update

What's new in 2024

Steve Rakidzioski
Specialist, RNG

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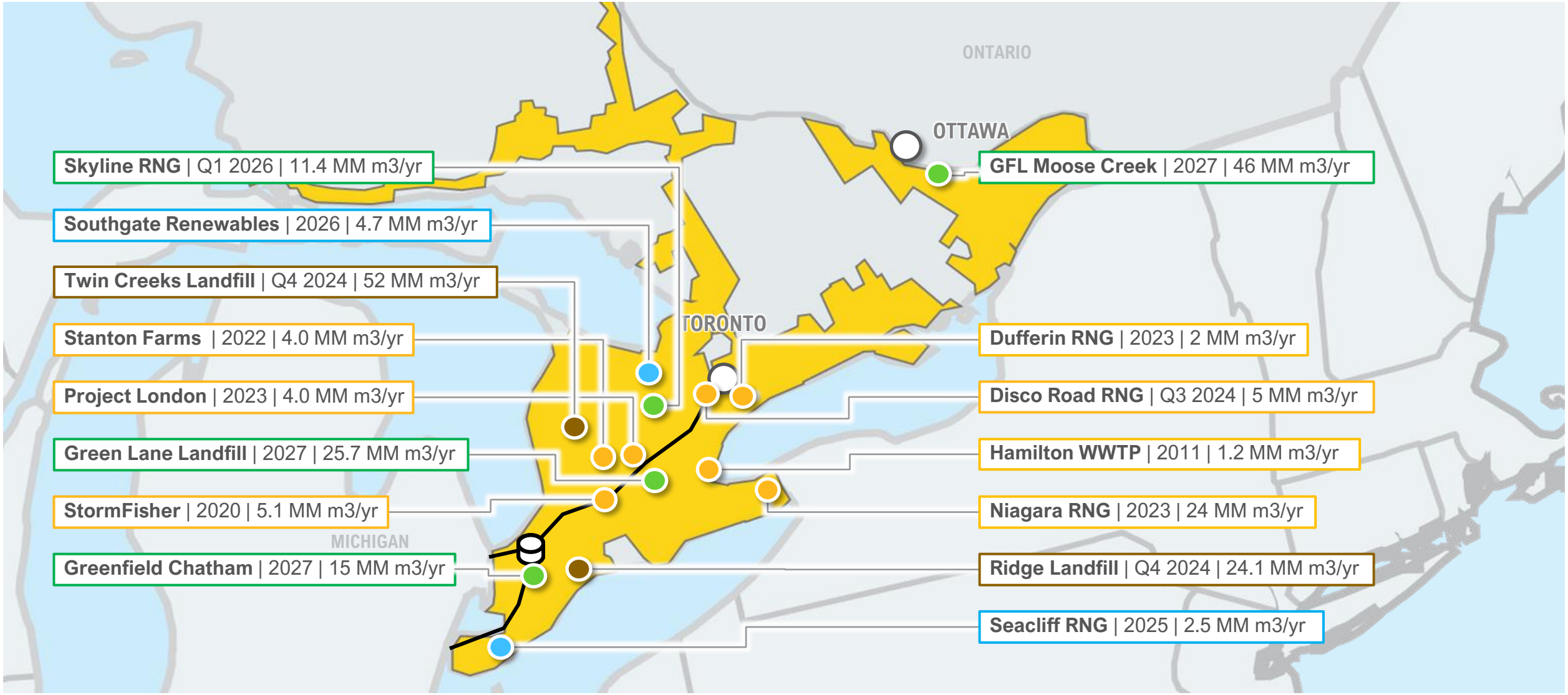
RNG: Planned | Approved | Construction| In Service

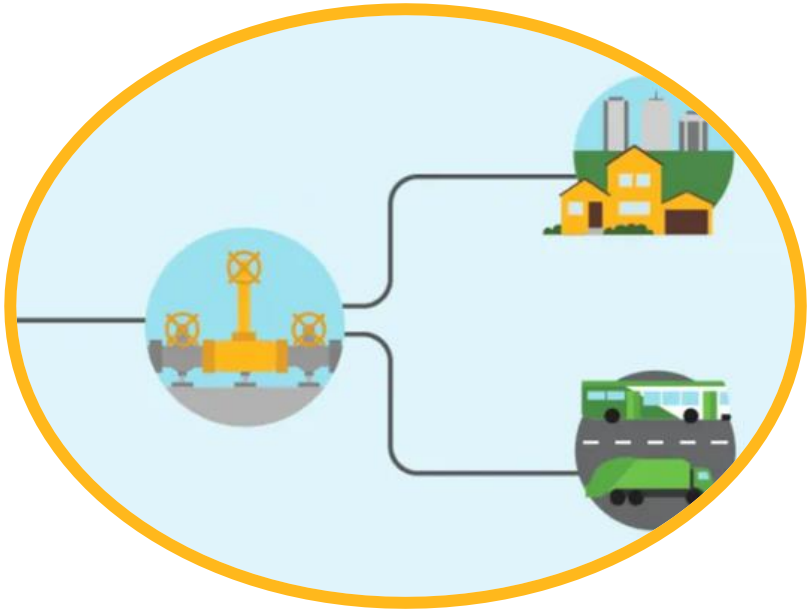


Planned: 4 | Approved: 2 | In Construction: 2 | In Service: 7

Toronto’s Disco Rd RNG Facility Commissioned Aug 2024

New interconnect options

As of August 1, 2024, producers may elect to build an Enbridge approved injection station



Contestable Work Option

- Producers can choose to construct Injection Stations.
- Enbridge Gas provides design and bill of materials.
- Work must be completed by Enbridge approved Contractor with Enbridge Construction Supervisor on site.
- Asset transferred to EGI upon commissioning at no cost.

Standard and Non-Standard Designs

- Four standard designs available; non-standard designs incur additional costs.

No pipeline for your RNG project? No problem.

RNG Central Injection Hubs: Unlocking Opportunities Across Ontario.

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Joey Cyples, Business Development
September 4, 2024

What is an RNG virtual pipeline?

System Overview

- System for transporting RNG from production to a central injection site
- Involves: **Compression**, **Storage**, **Transportation**, and **Decanting**
- High-pressure RNG transported via storage cylinders on tube trailers

Why virtual pipelines?

- RNG production often far from gas networks or end-users
- Physical pipelines may be unfeasible due to **capacity constraints**, regulation, geography, social acceptance, **economics**
- **Compression** conditions favourable at the production site
- **Road networks** suitable for transportation

Process

Compression Site

- Design optimized site layout
- RNG-specific compression (farm and decant)

Transportation

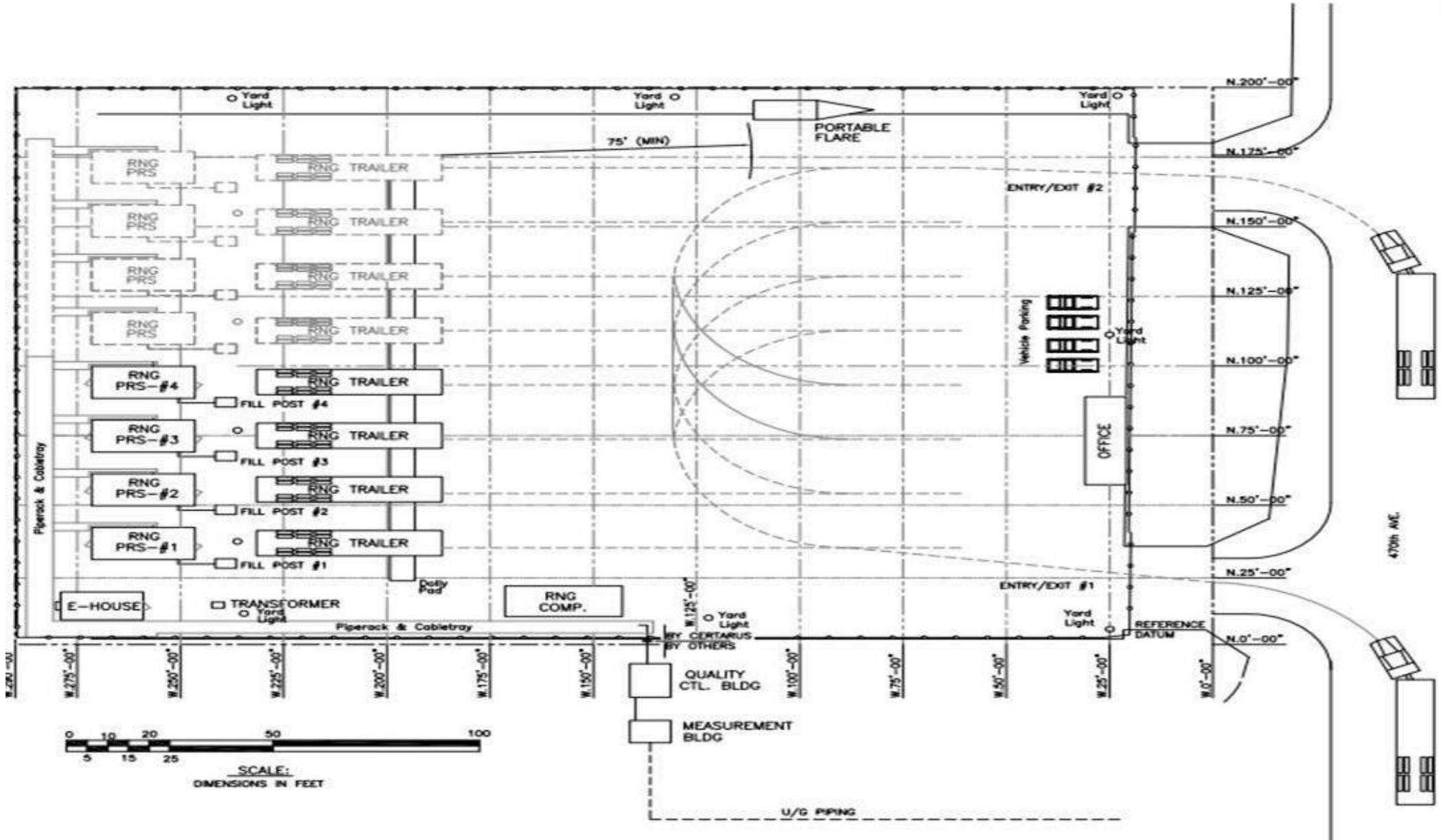
- Trailers transported to the injection site

Decompression and Injection

- Design optimized layout
- Decant trailers into gas distribution system using pressure reduction systems

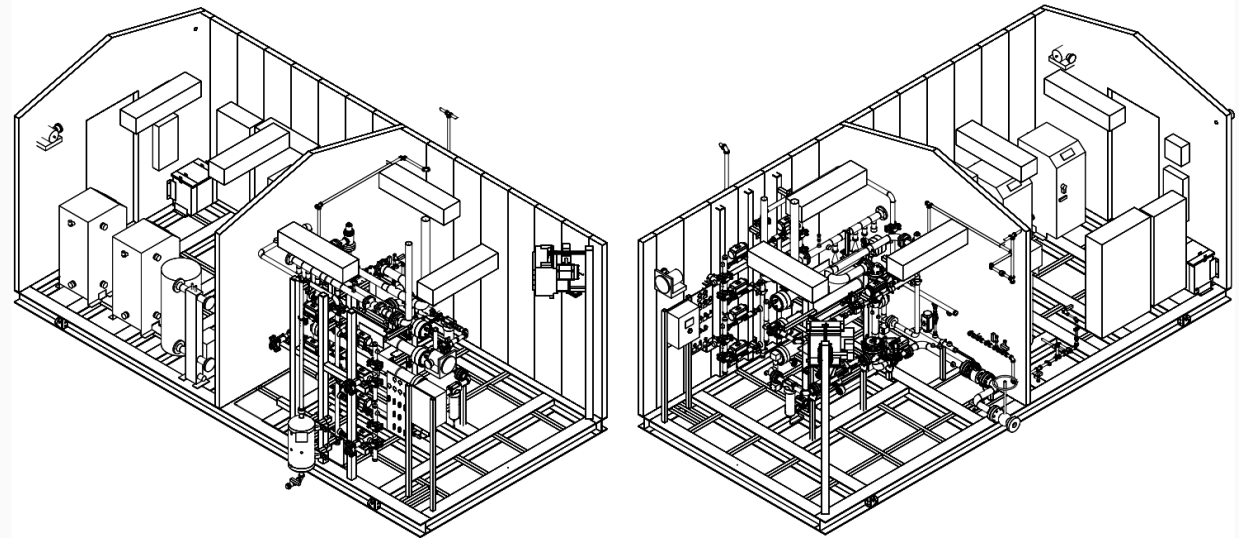
From RNG Compression to Decanting into the Gas Distribution System – A Complete End-to-End Solution.

Injection site concept



Injection station examples

Photos by courtesy of Certarus Ltd.



Plant and safety considerations

Plant Sizing

- Limited by the number of tube trailers and drivers available
- Minimum size governed by equipment turn-down

Scheduling

- Flow rate affects the number of tube trailers and delivery frequency

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Moisture Content

- Gas needs to be sufficiently dry
- May plug lines if excess water is present

Safety

- Windsock required
- E-stops are critical
- Push button gates for security

Site Layout

- Need sufficient space for tube trailers to maneuver and decant

Site Planning

- Find site with lowest pressure and highest capacity

Module design considerations

Pressure Reducer

- Need to choose gas or electric heating
- Dependent on electricity cost, gas costs

.

Decanting Station

- Consider correct materials for cold temp operation (e.g. fittings and hoses)
- Slow long heat transfer from depressurizing tube trailers

Pre-injection

- Booster compressor and de-ox turndown determined by max flow of feedstock sites and min flow of site connected by pipeline

Tube Trailers

- Min discharge pressure needs to be ~300 psi to reduce pressure cycling amplitude and increase life

Key Opportunities

RNG Supply Chain

Producers: Supply RNG to the injection hub.

Logistics Partners: Transport RNG from production sites to hub.

Technology Providers: Provide compression, upgrading, and injection technologies.

End Users

Transportation Fleets: Use RNG for low-carbon fuel.

Utilities: Integrate RNG into energy generation.

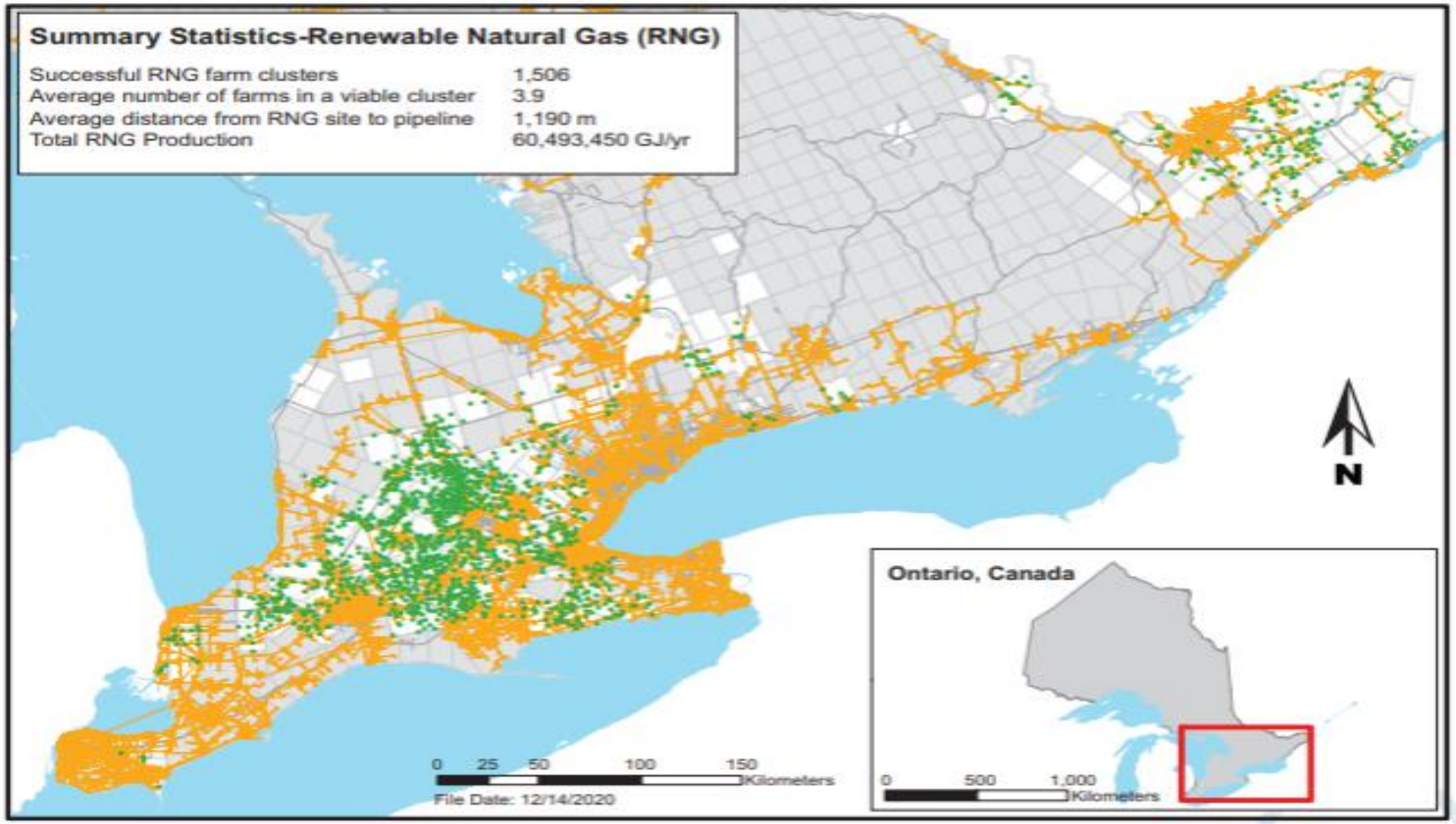
Industrial Consumers: Leverage RNG to meet sustainability goals.

Support and Investment

Financial Investors: Invest in RNG infrastructure projects.

Government/Regulatory: Support through incentives and policies.

Market Opportunity Overview



Legend

Status

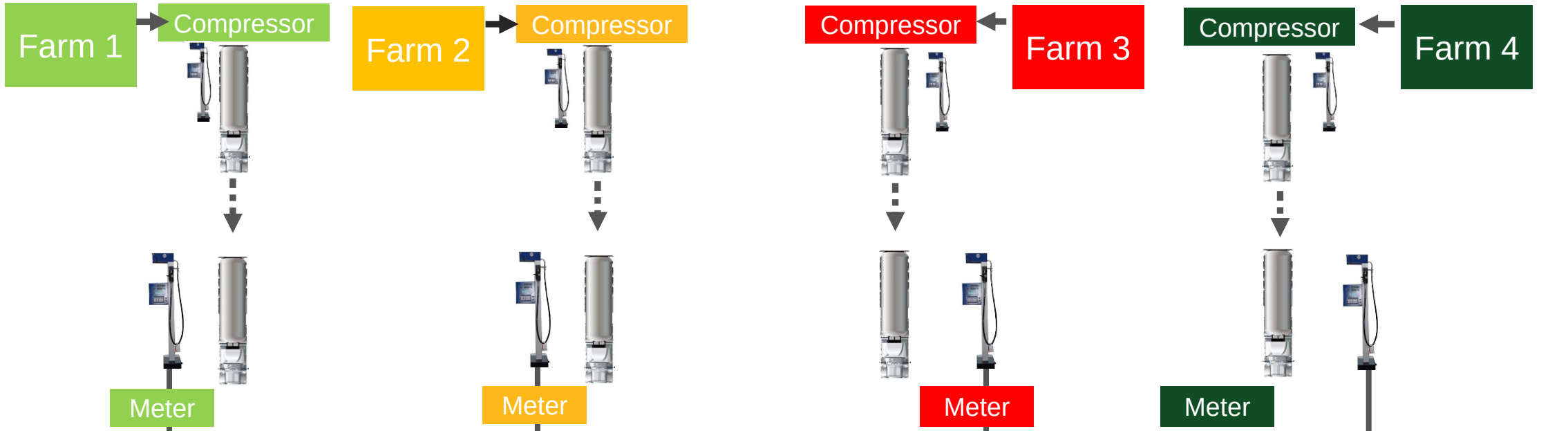
- RNG Cluster site
- Natural Gas Pipeline Network
- Ontario Road Network
- No livestock data
- Township with livestock data available for clustering

Scenario Assumptions:

1. Maximum of 5 farms per RNG cluster
2. RNG Price $35/GJ
3. $750,000/km gas pipeline installation cost
4. Off-farm material at:
   - 50% manure
   - 50% vegetative food waste

Canadian Biogas Association, Agricultural RNG Resources Clustering Study

RNG Process Flow



Pressure Reduction System (decanter)

Enbridge RNG Injection System (Meter, odourant, telemetry, gas analyzer)

Enbridge Distribution Pipeline