

Work Package XI:

International Advisory Board

Canada

Update on biomethane/biogas – Canada

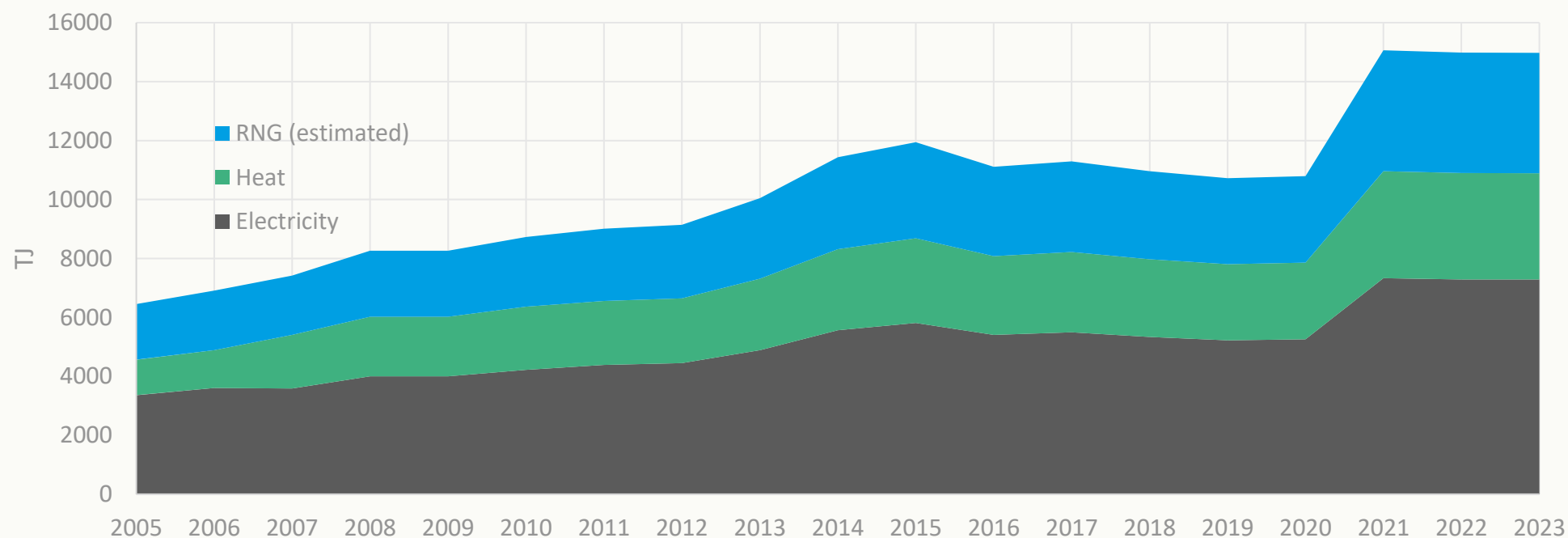
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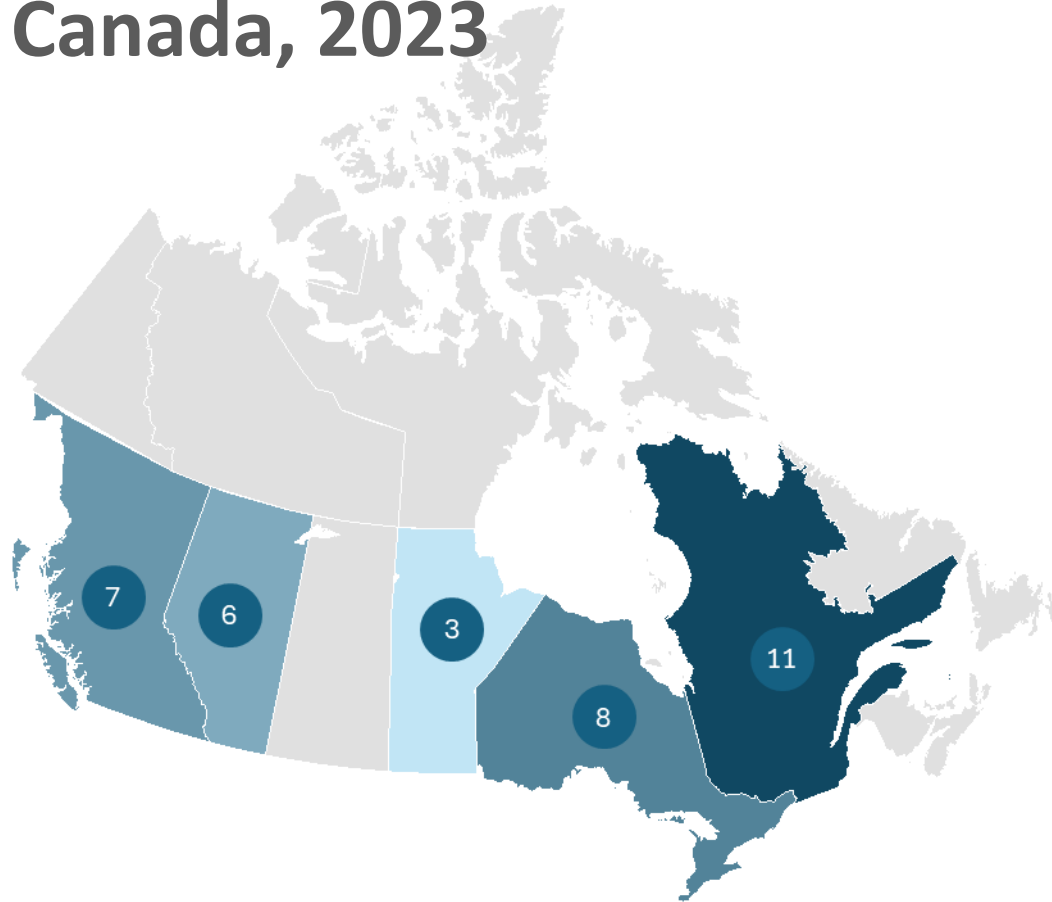
This project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under Grant Agreement No. 101075676.



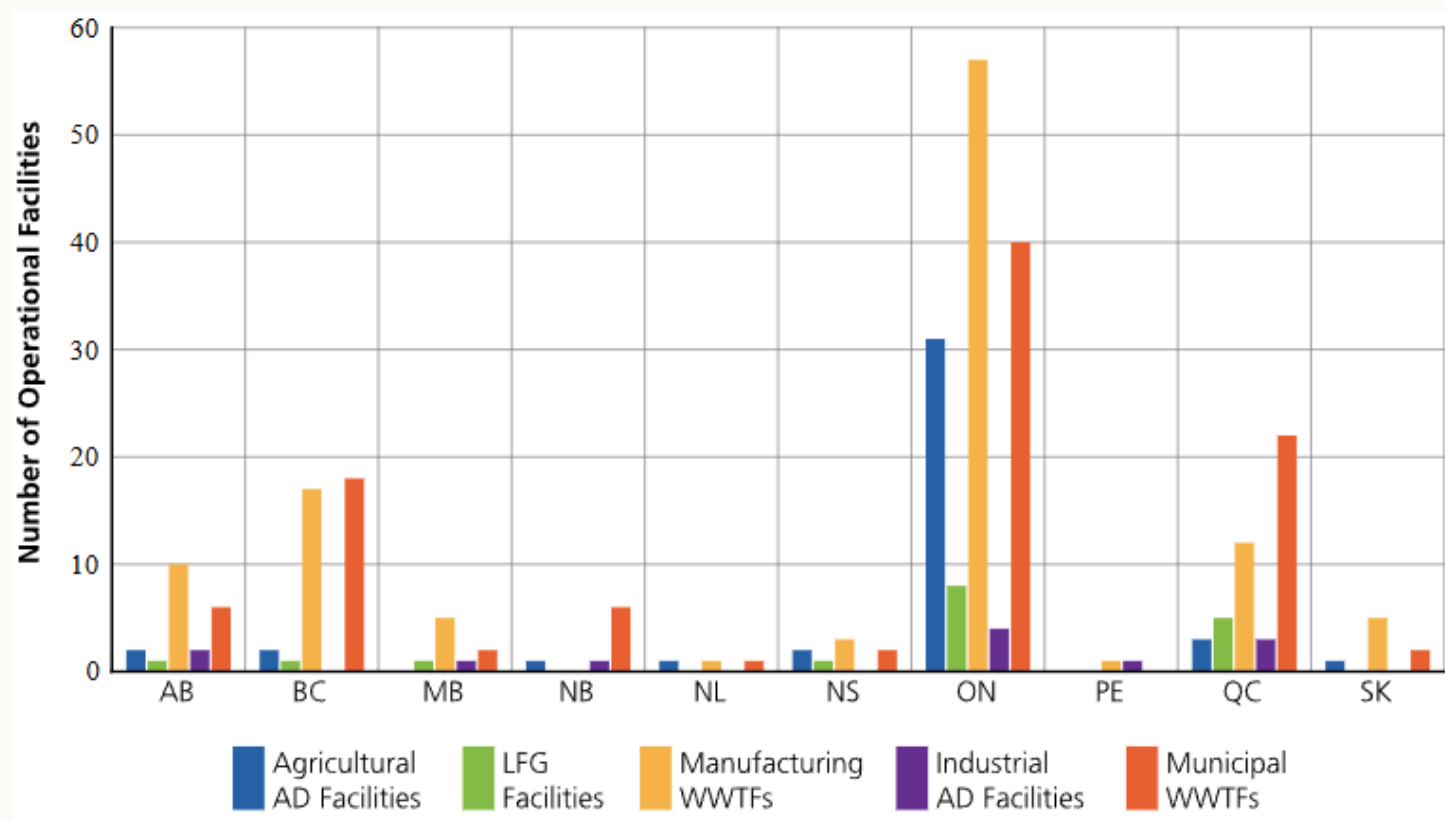
Evolution of biogas use in Canada, 2005-2023



Biogas projects in Canada, 2023



Market uptake in Canada: Provinces & Sectors



<https://biogasassociation.ca/>

RNG Production techniques

1. Biomethanation plants use anaerobic digestion to optimize the process of biomass degradation, in an oxygen-free and temperature-controlled environment: there are already units installed and operating across Canada and ongoing R&D to extend biomethanization on residual biomass (e.g. pulp and paper sludge; biomass steam-explosion residues and liquors)

Hydrolysis, Acidogenesis, Acetogenesis and Methanogenesis are the four in-series (and parallel) steps taking place. They are subject of fairly intensive R&D activity to optimize the CH₄ yield. Various active bacterial biomasses are tested and the role of inhibitors is investigated.

2. Cleaning and purifying the captured biogas, mainly by removing heteroatoms impurities (i.e.; sulphur compounds) are used and are also subject to R&D endeavours.
3. Pyrogasification of biomass in the absence of oxygen with or without a subsequent catalytic conversion step produces a synthesis gas that can be converted into biomethane through catalytic processes.
4. Methanation is another route under development: this is achieved through catalytic hydrogenation of CO₂ obtained, for example, by purification of biogas.

References

1. https://www.ville.quebec.qc.ca/apropos/planification-orientations/matieres-residuelles/valorisation_matieres_organiques/
2. <https://www.ctbm.ca/technologies.php>
3. <https://gowlingwlg.com/en/insights-resources/articles/2021/canadian-biogas-advancements-and-opportunities/>

Policy support for renewable gas

Renewable gas mandates:

Quebec (2019): 5% renewable content in natural gas by 2025
 10% renewable content by 2030

British Columbia: FortisBC plans 15% renewable content by 2030 (2% in 2025)

Opt-in programs: Enbridge Gas (Ontario), FortisBC (BC)
 Ratepayers provide voluntary payments (C\$2) to support
 biogas development

Policy support for low carbon fuels

Canada:	Clean Fuel Standard (2022)
BC:	Low Carbon Fuel Standard (2022)
Quebec:	Regulation respecting the integration of low-carbon-intensity fuel content into gasoline and diesel fuel

None of these policies include gaseous fuels at this time, although BC has previously adopted LCFS for CNG vehicles

Offset systems

Canada:	Greenhouse Gas Offset Credit System (2023) Includes landfill gas abatement but not biogas (yet)
BC:	Greenhouse gas offset protocol (2022) includes biogas substitution
Alberta:	Alberta Emission Offset System Includes biogas production for energy generation
Quebec:	Quebec carbon market offset credits Includes biogas for energy generation

Carbon pricing

Canada has removed the consumer carbon tax, which was set at C\$80/t. This was a backstop price which covered all provinces without their own system

- BC has removed their provincial-level carbon price
- Quebec currently ~C\$48/t (through cap-and-trade, with California)

Industrial carbon pricing continues, applying to large emitters (10 kt+ CO₂e/year); none of these systems currently use RNG/biogas but could in the future

Discussion

1. Only 14% of the biogas potential is so far exploited.
2. While policy and support are important for the biogas & RNG sector to achieve its full potential, most of the potential projects are under development to demonstrate their technology value to business and communities. There are currently 43 RNG projects under development which account for an additional 16.85 PJ.
3. Barriers to realizing the full potential of biogas & RNG energy in Canada: need for significant investment tax credits (ITC) for clean tech and hydrogen.
4. Challenges connecting to the natural gas and electricity grid.
5. Lack of technology understanding and awareness.

<https://biogasassociation.ca/>