

# BIOGAS IN CANADA

International Panel – Global Opportunities for Advancing Biogas  
Biocycle REFOR19  
Madison, Wisconsin  
October 28-31, 2019



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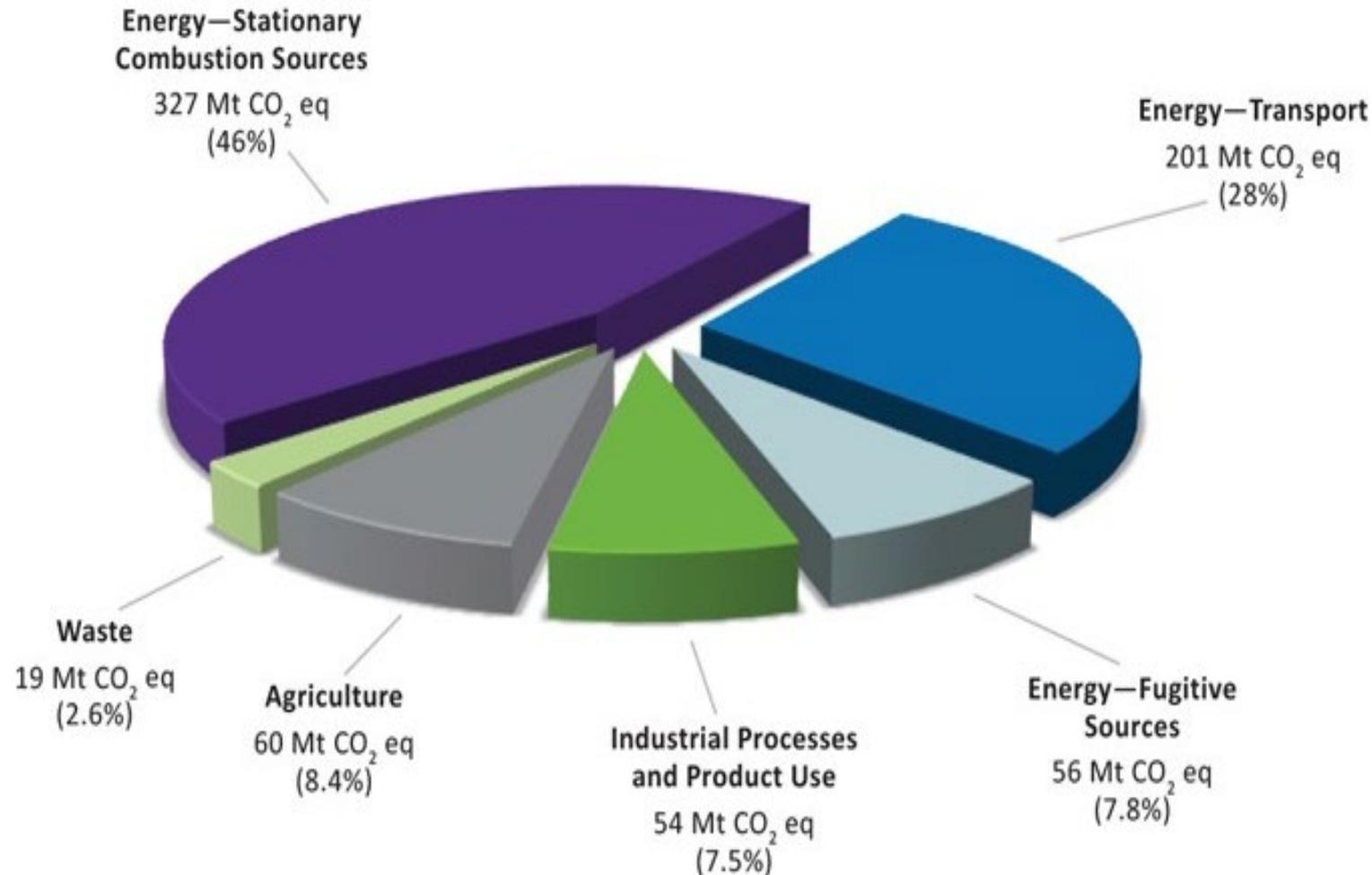
# Canada's Transition to a Low Carbon Future

- Tackling climate change is a priority and an opportunity to shift towards a low carbon economy
- **Pan-Canadian Framework on Clean Growth and Climate Change**
  - Pricing carbon pollution
  - Complementary measures to further reduce emissions across the economy
  - Measures to adapt to the impacts of climate change and build resilience
  - Actions to accelerate innovation, support clean technology, and create jobs

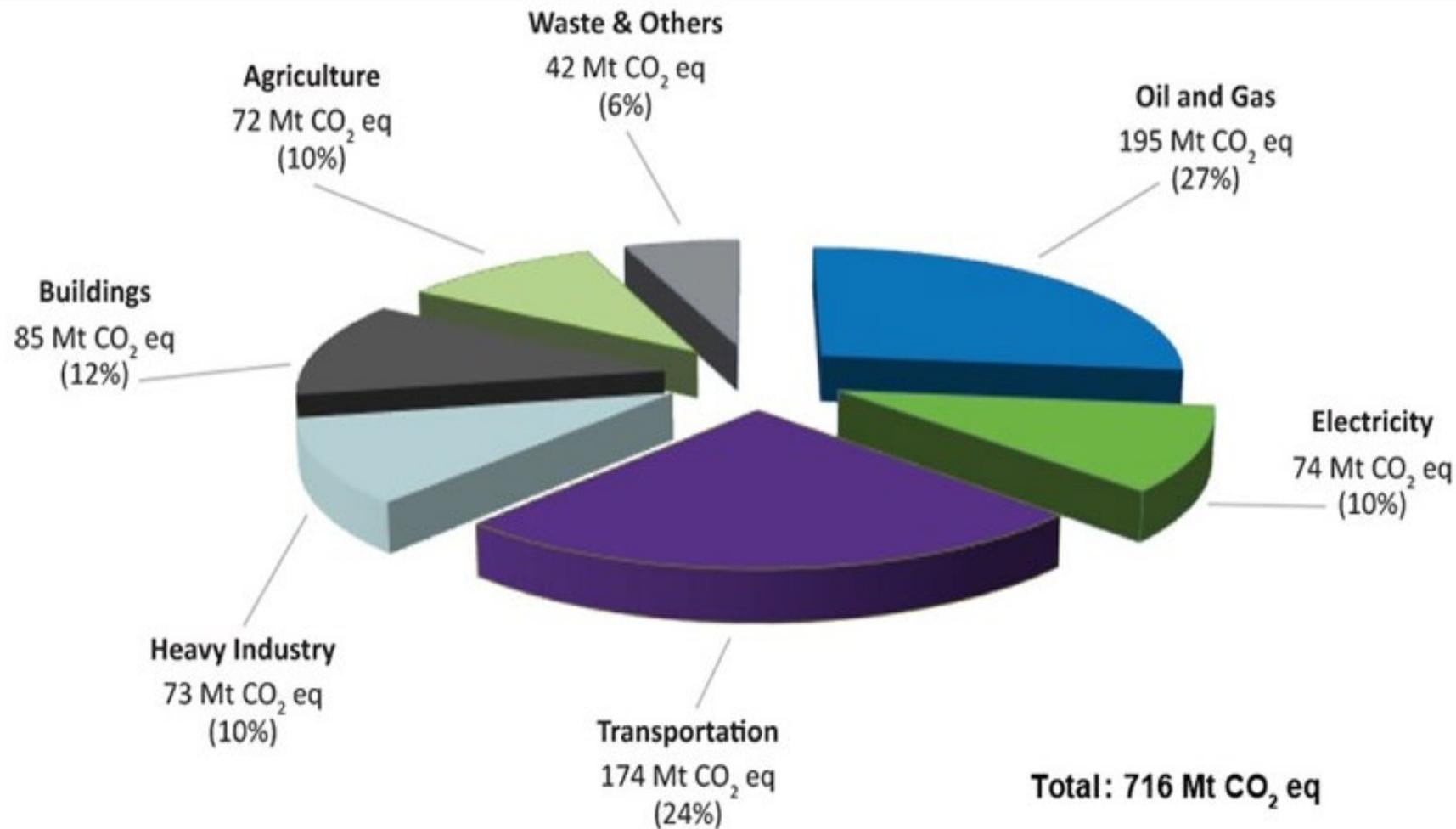
<https://www.canada.ca/en/services/environment/weather/climatechange/pan-canadian-framework.html>



# Canada's GHG Emissions by IPCC Sector (2017)

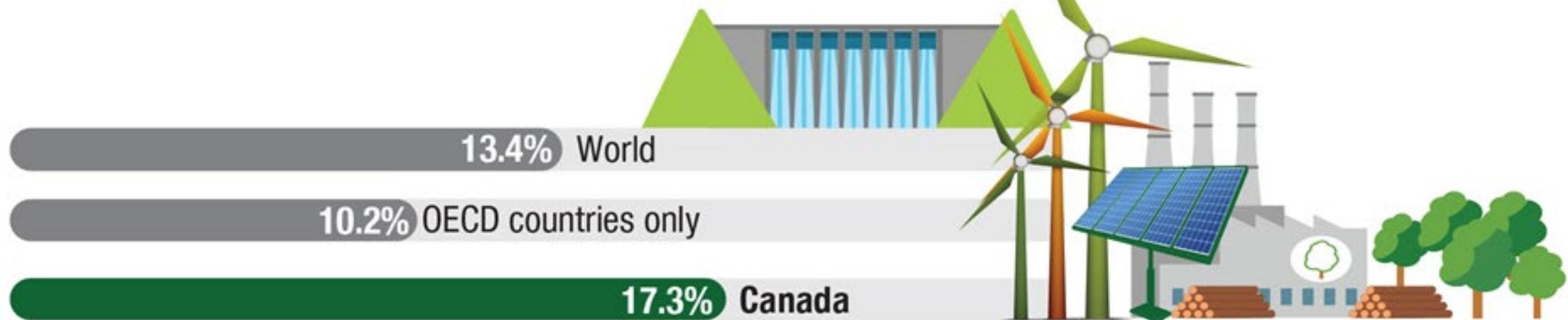


# Canada's GHG Emissions by Economic Sector (2017)



# Canada is a Leader in Renewable Energy

Share of energy supply from renewable sources (2017)



Source: Natural Resources Canada

<https://www.nrcan.gc.ca/science-data/data-analysis/energy-data-analysis/energy-facts/renewable-energy-facts/20069>

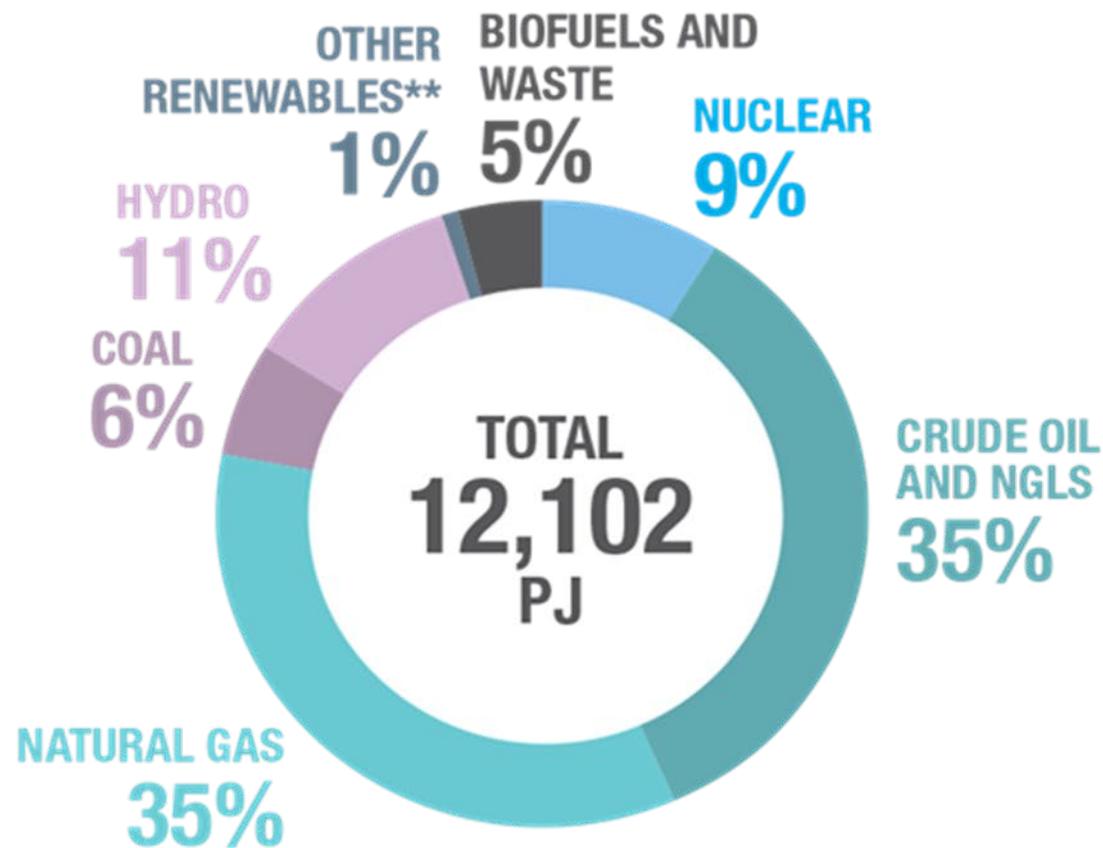


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# Canada's Total Primary Energy Supply\* (2017)



\* Not including electricity trade  
\*\* "Other renewables" includes wind, solar, wood/wood waste, biofuels and geothermal

Source: Natural Resources Canada

<https://www.nrcan.gc.ca/science-data/data-analysis/energy-data-analysis/energy-facts/energy-and-greenhouse-gas-emissions-ghgs/20063>

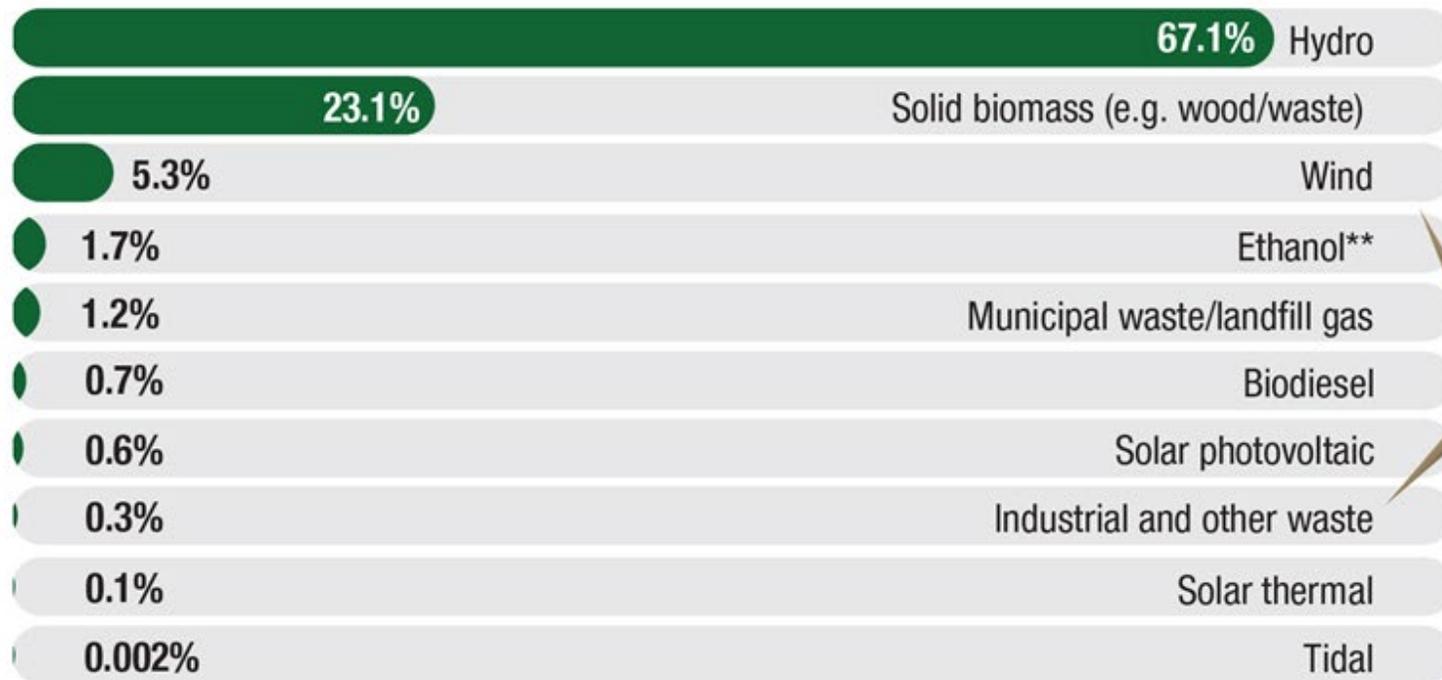


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# Canada's Renewable Energy Sources



**Total Renewable Energy  
2,119 PJ or 50.6 MTOE**

**(Includes energy consumed  
for electricity and heat  
production, and biofuels for  
transportation)**

Source: Natural Resources Canada

<https://www.nrcan.gc.ca/science-data/data-analysis/energy-data-analysis/energy-facts/renewable-energy-facts/20069>

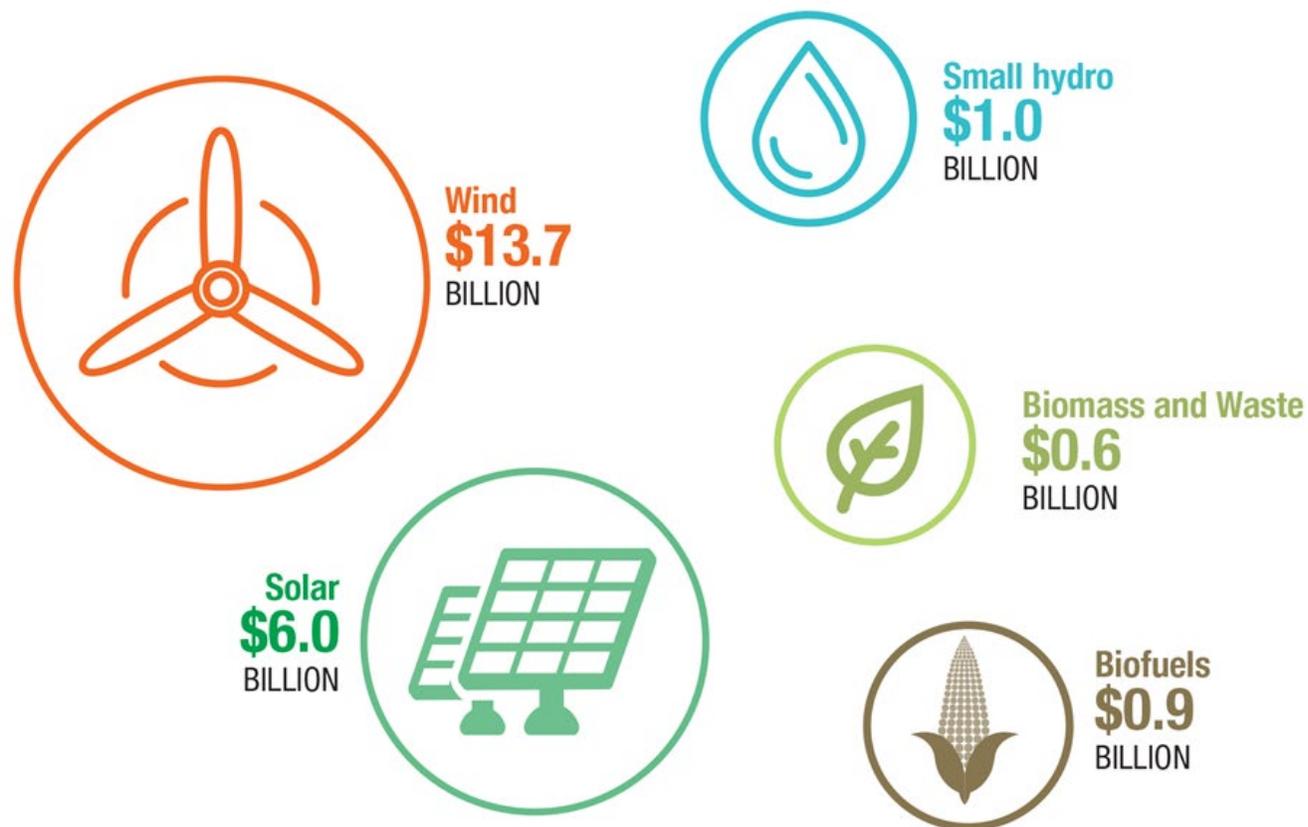


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# Canada's Investment in Renewable Energy (2013-2017)



Source: Natural Resources Canada

<https://www.nrcan.gc.ca/science-data/data-analysis/energy-data-analysis/energy-facts/energy-and-economy/20062>



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# Biogas and RNG in Canada

## Biogas and RNG Energy Capacity

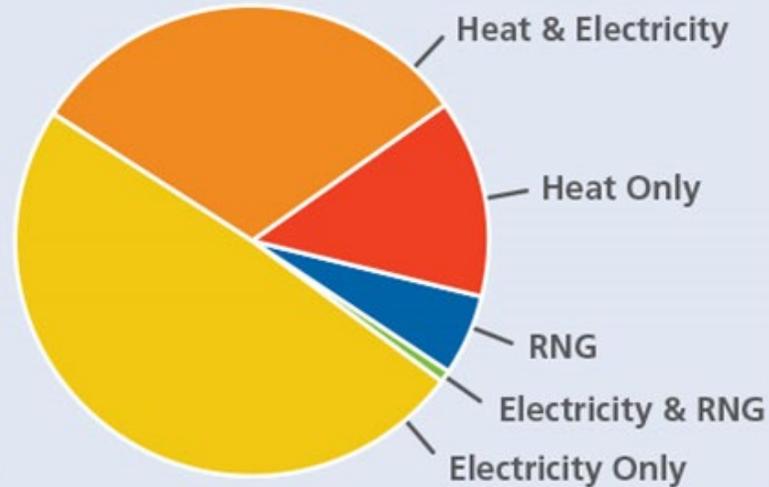
Operational and initiated projects generate:

Greater than

**196 MW**

Greater than  
**& 400,000 GJ**  
from RNG

## Biogas Energy Utilization



Provincial energy and waste management policies have been the main drivers for biogas production and use (i.e. power or renewable gas)

## Operating Biogas and RNG Projects in Canada



Source: Canadian Biogas Association  
[https://biogasassociation.ca/about\\_biogas/projects\\_canada](https://biogasassociation.ca/about_biogas/projects_canada)



# Agriculture and Agri-food Sectors

- 61 operational biogas facilities, and at least 5 more planned or under construction
  - Livestock operations (52%)
  - Food processing facilities (33%)
  - Greenhouse operations (5%)
  - “Other” (10%)
- Ontario, Quebec and Alberta have the most, with Ontario accounting for 64%
- Several end-uses for biogas
  - 64% generate electricity for sale to the grid
  - Remaining facilities generate heat and electricity for on-site use
  - Only two upgrade biogas into renewable natural gas (RNG)

Source: 2018 study by Canadian Biogas Association and Government of Canada, [https://biogasassociation.ca/resources/Canadian\\_agricultural\\_biogas\\_study](https://biogasassociation.ca/resources/Canadian_agricultural_biogas_study)



# Opportunities for Biogas and RNG in Canada

**Realizing the full potential of biogas development from all major sources\* could lead to:**

- Biogas production equivalent to about 3% of Canada's natural gas demand, or about 1.3% of Canada's electricity demand
- Capital investment of \$7 billion (CDN)
- Economic spin-offs of \$21 billion (CDN) to the Canadian Economy
- 17,000 construction jobs for a period of one year
- 2,650 ongoing long term operational jobs
- 100 new and expanded Canadian companies, including biogas system designers and developers, equipment suppliers, and laboratories

\* agricultural organics (excluding energy crops), landfill gas, residential and commercial source separated organics, municipal wastewater

Source: Canadian Biogas Association [https://biogasassociation.ca/about\\_biogas/biogas\\_potential](https://biogasassociation.ca/about_biogas/biogas_potential)



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# Opportunities for Biogas and RNG in Canada

- Federal “Clean Fuel Standard” under development
- Natural gas suppliers/utilities are increasing renewable content
  - Canadian Gas Association aiming for 5% renewable content by 2025, and 10% by 2030
  - E.g. Fortis BC (British Columbia), Enbridge/Union Gas (Ontario), and Energir (Quebec) are entering into long-term supply agreements with biogas producers
- Municipal organics diversion is increasing
  - Federal, provincial and territorial governments committed to reduce total waste disposal by 30% by 2030, and 50% by 2040
  - 80% of households will have curbside organics diversion (under existing and proposed provincial and municipal plans)

Source: Canadian Biogas Association [https://biogasassociation.ca/about\\_biogas/biogas\\_potential](https://biogasassociation.ca/about_biogas/biogas_potential)



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# Opportunities for Biogas and RNG in Canada

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Source: Canadian Biogas Association [https://biogasassociation.ca/about\\_biogas/biogas\\_potential](https://biogasassociation.ca/about_biogas/biogas_potential)



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# Challenges for Biogas and RNG in Canada

- Cost / raising investment
- Economics of small scale operations
- Feedstock supply
- Connections to the grid and gas network
- Operator training and technical support
- Community resistance
- Land application of digestate

Source: 2018 study by Canadian Biogas Association and Government of Canada, [https://biogasassociation.ca/resources/Canadian\\_agricultural\\_biogas\\_study](https://biogasassociation.ca/resources/Canadian_agricultural_biogas_study)



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# The Global Methane Challenge

- The Global Methane Challenge is an opportunity to showcase methane initiatives to a world-wide audience
- Purpose is to raise awareness about methane emissions, showcase policies and technologies, and encourage reduction around the world
- Participation is voluntary, and provides international exposure to projects, policies, and emerging technologies

## Landfill Gas Capture and Utilization Feasibility



- Environment and Climate Change Canada is working to encourage greater LFG collection and utilization across provinces and municipalities through feasibility studies of LFG capture in small, medium and large landfills
- This work includes developing a comprehensive landfill database, LFG modelling, assessment of existing technologies, and cost-per-tonne assessments
- Capture and utilization information will be made available to regional governments in order for them to make informed decisions about managing GHGs from landfills in their jurisdiction

## Initiatives to Prevent GHG Emissions through Diversion and Prevention of Organic Waste



- Environment and Climate Change Canada is doing extensive work to provide information to provincial, municipal and private sector organizations on the waste reduction and diversion options available for organics
  - GHG calculator for waste diversion scenario planning
  - Canadian Forum on Food Waste and Loss
  - "Taking Stock Report" that will identify current actions and opportunities
  - National Framework to measure and report food waste and loss
- Expected outcomes are greater awareness of food loss, and informed decision making by jurisdiction when planning waste diversion infrastructure

## International Collaboration to Address Methane Emissions



- Environment and Climate Change Canada is working collaboratively with several international partners to address methane emissions in 6 countries
- Work includes helping countries account for methane in their National Determined contributions, and achieving methane reductions in major methane-emitting sectors, including waste



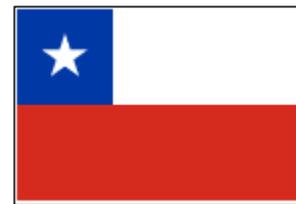
Vietnam



Senegal



Côte d'Ivoire



Chile



China



Mexico

## Canadian Agricultural Partnership

- The *Canadian Agricultural Partnership* is a five-year, \$3 billion investment by federal, provincial and territorial governments to strengthen the agriculture and agri-food sector
- It includes cost-shared programs by federal, provincial and territorial governments
- It supports initiatives that have the potential to lead the way to broader adoption or application of BMPs on farms and by the sector more generally
- The program also aims to support efforts to understand the potential impacts of GHGs as well as approaches to mitigate agricultural GHG emissions