



Biogas & Renewable Natural Gas (RNG)

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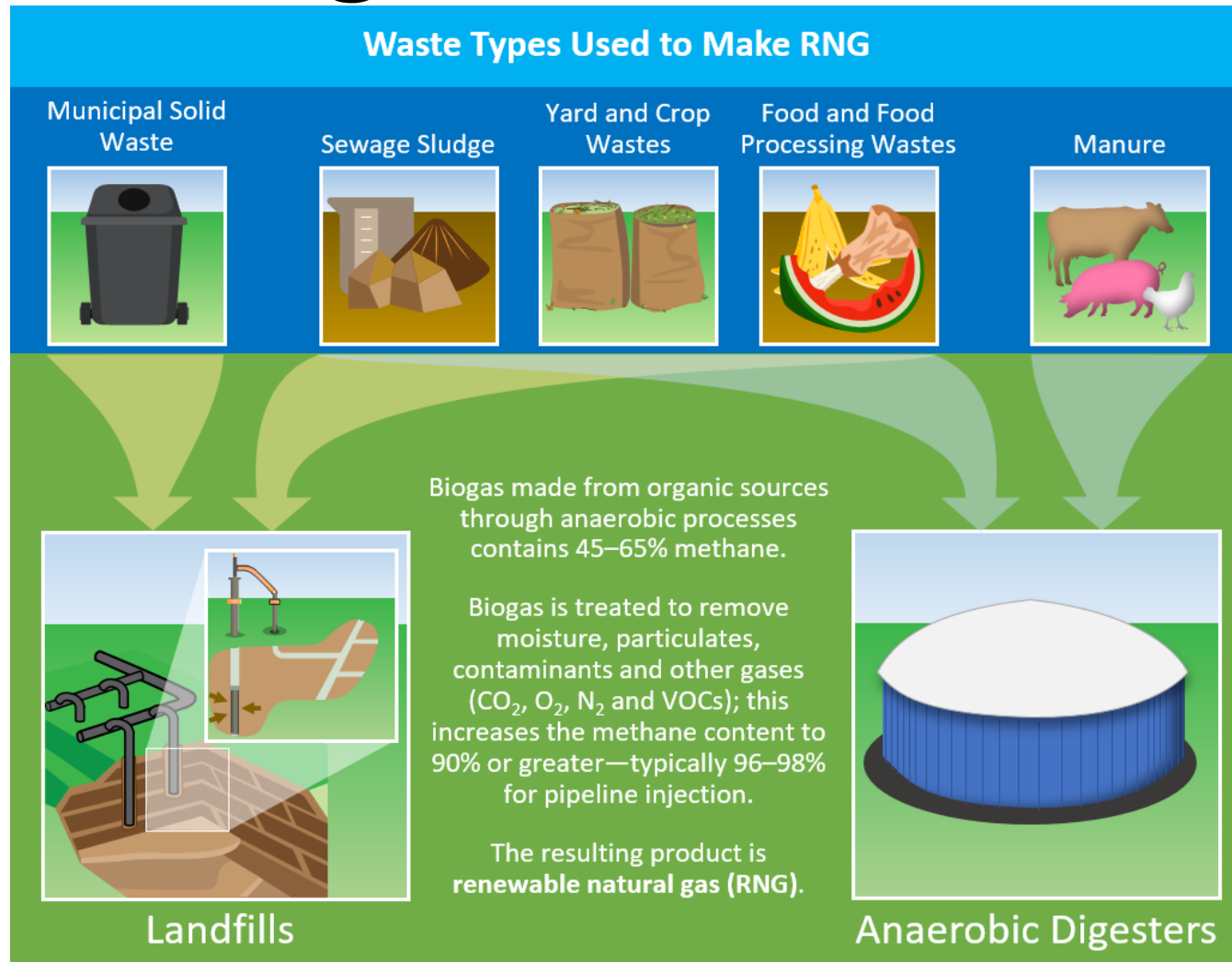
Public Service Commission of Wisconsin

Biogas vs. RNG

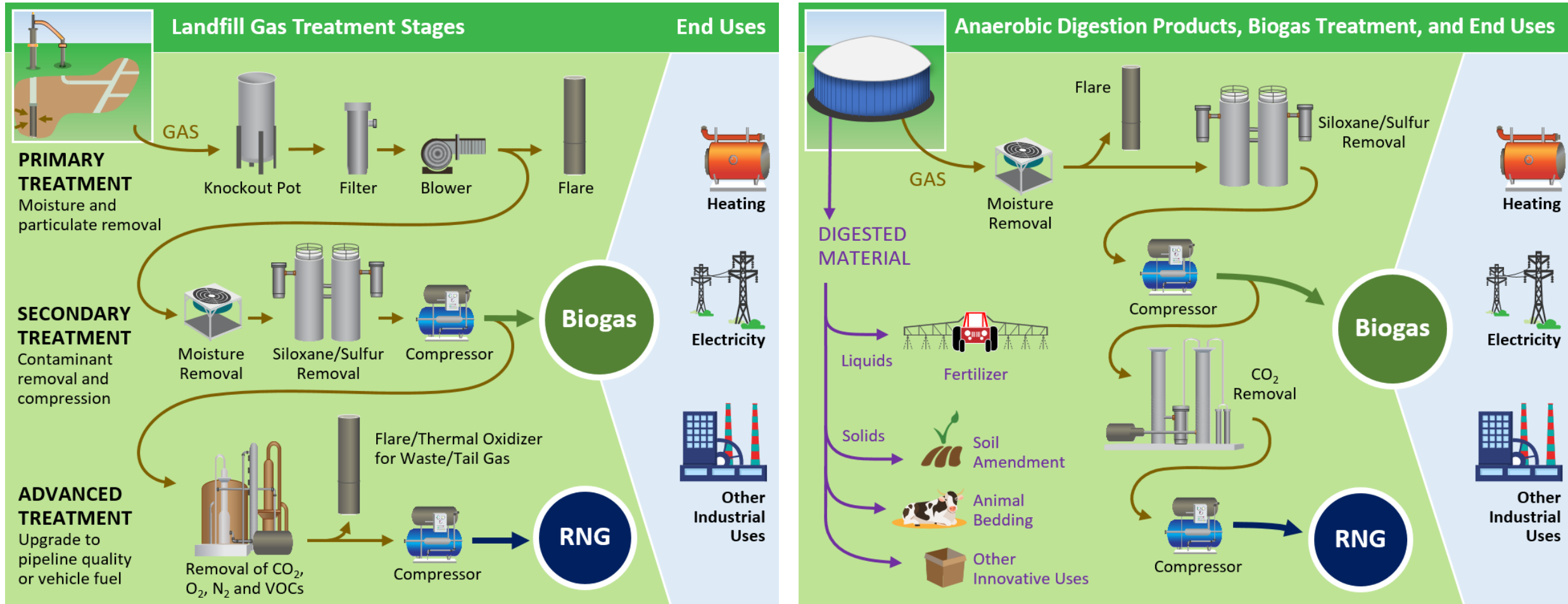
Biogas – a renewable energy source produced from the breakdown of organic matter such as food or animal waste (45-65% methane)

Renewable Natural Gas (RNG) – Biogas that has been upgraded to “pipeline quality” natural gas (>95% methane)

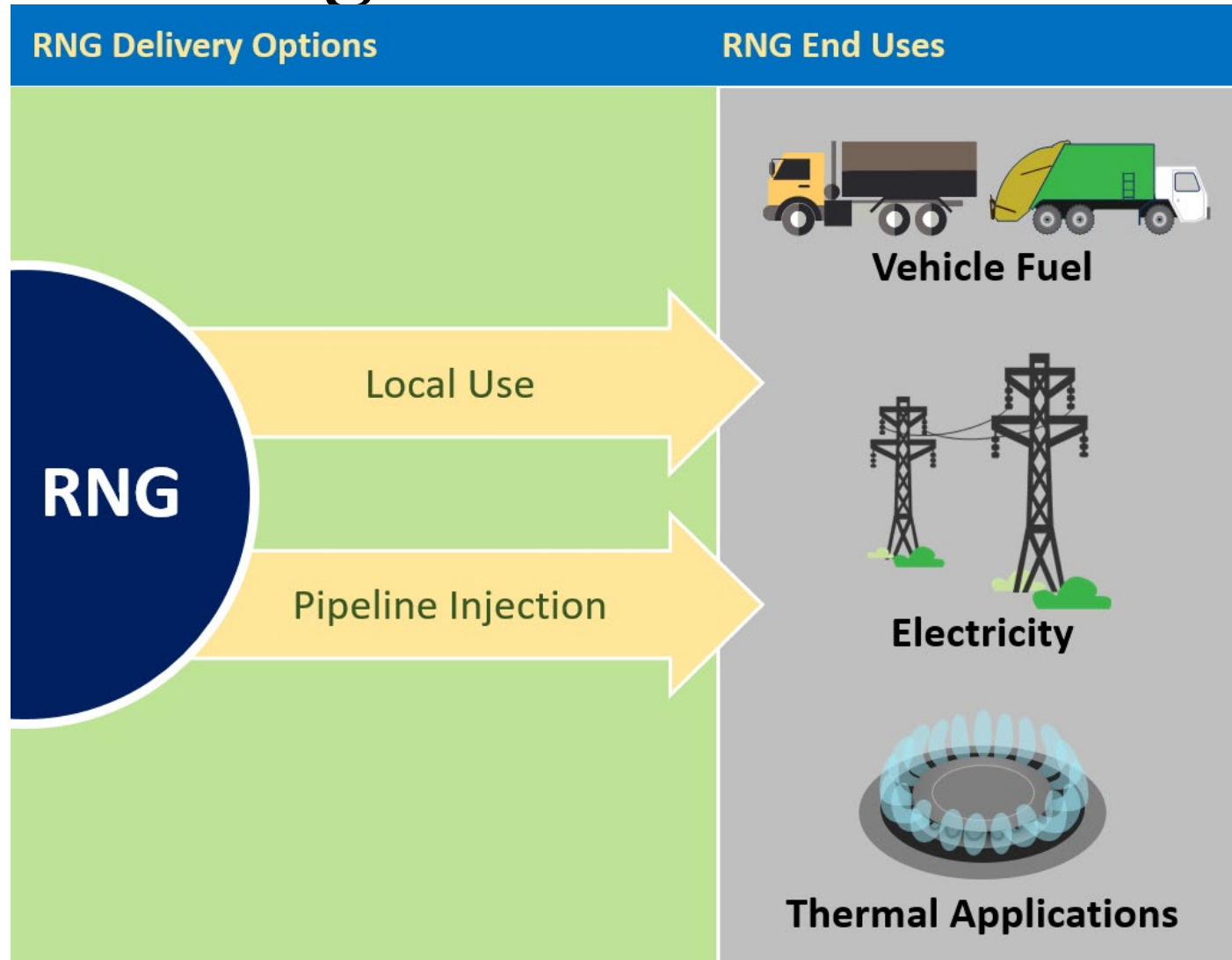
Biogas/RNG Process



Biogas/RNG Process



Biogas/RNG Process



Digesters



https://www.orix.co.jp/grp/en/orix_in_action/entry/2022/08/08/153000

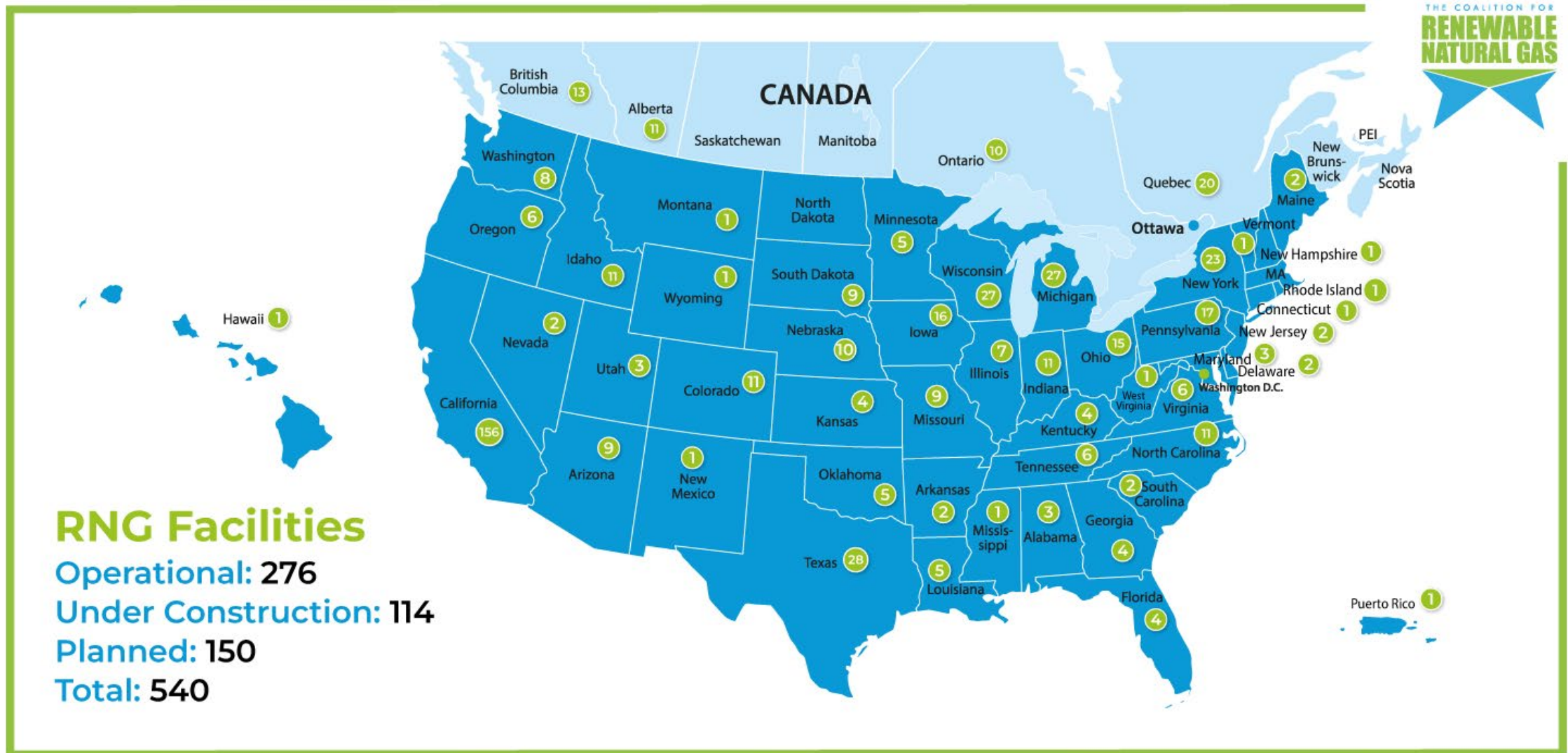
Landfills



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“Virtual” pipelines





Biogas/RNG Pipeline History

- 1980s, 90s, & 00s – Biogas pipelines from landfills to nearby end users for electric/heat generation
- 2010s – RNG injection into interstate pipelines
 - Federal Renewable Fuel Standard (RFS)
 - California Low Carbon Fuel Standard (LCFS)
- 2020s – RNG injection into distribution pipelines
 - Four distribution companies in Wisconsin have modified tariff to allow RNG into pipelines

Biogas/RNG – Pipeline safety

- Most biogas/RNG pipelines are GATHERING pipelines, with a couple exceptions
- What does this mean?
 - Limited pipeline safety jurisdiction
 - Some pipelines not jurisdictional to some or all of Part 192
- Gathering type depends on:
 - API RP 80
 - 49 CFR 192.8
- Exceptions – transmission pipelines
 - Incidental gathering >10 miles (192.8(a)(5))
 - Pipeline from RNG source (digester/landfill) directly to a large-volume customer

Biogas/RNG pipeline issues

- Often discover pipelines after/during construction
- Issues with wrong pipe or inadequate construction
- Some have not been members of the state one-call



Biogas/RNG pipeline issues



Biogas/RNG - Siting

- Most biogas/RNG pipelines are intrastate, meaning that siting falls with the states
- Siting requirements vary by state
 - In Wisconsin, the PSC only has siting authority over “public utilities”
 - Most RNG pipeline operators do not meet “public utility” definition
 - Utilities in Wisconsin require tariff change to accept RNG into distribution system
- Many still subject to pipeline safety regulations during construction & operation

Biogas/RNG – Gas quality

- Quality requirements differ by state/operator
- Certain constituents in gas need continuous monitoring (O₂, H₂S, CO₂)
- Other important constituents to monitor such as Siloxanes
- 950-990 BTU
 - May vary from traditional natural gas supplies (commonly 1050 BTU and have seen as high as 1100 in recent years)
- Consider some redundancy for quality monitoring

Other resources

General Information and Reports

[Introducing Renewable Biogas into the Natural Gas Delivery Infrastructure](#)

[An Overview of Renewable Natural Gas From Biogas](#)

RNG Project Lists and Maps

[RNG Project Map](#)

[Renewable Natural Gas Database | Argonne National Laboratory \(anl.gov\)](#)

[Livestock Anaerobic Digester Database](#)

[RNG Facilities in North America](#)

Gas Quality

[Guidance Document for the Introduction of Landfill Derived Renewable Gas into Natural Gas Pipelines](#)

[Guidance Document for Introduction of Dairy Waste Biomethane](#)

[Major Transmission Pipeline Tariffs](#)

[Renewable Natural Gas Quality Specifications in North America](#)

[Interconnect Guide for Renewable Natural Gas \(RNG\) in New York State](#)

[Assessing Heating Value and Maximum Siloxane Specifications](#)

Questions?