Biogas & Renewable Natural Gas (RNG)

Alex Kirschling

Natural Gas Engineering Supervisor

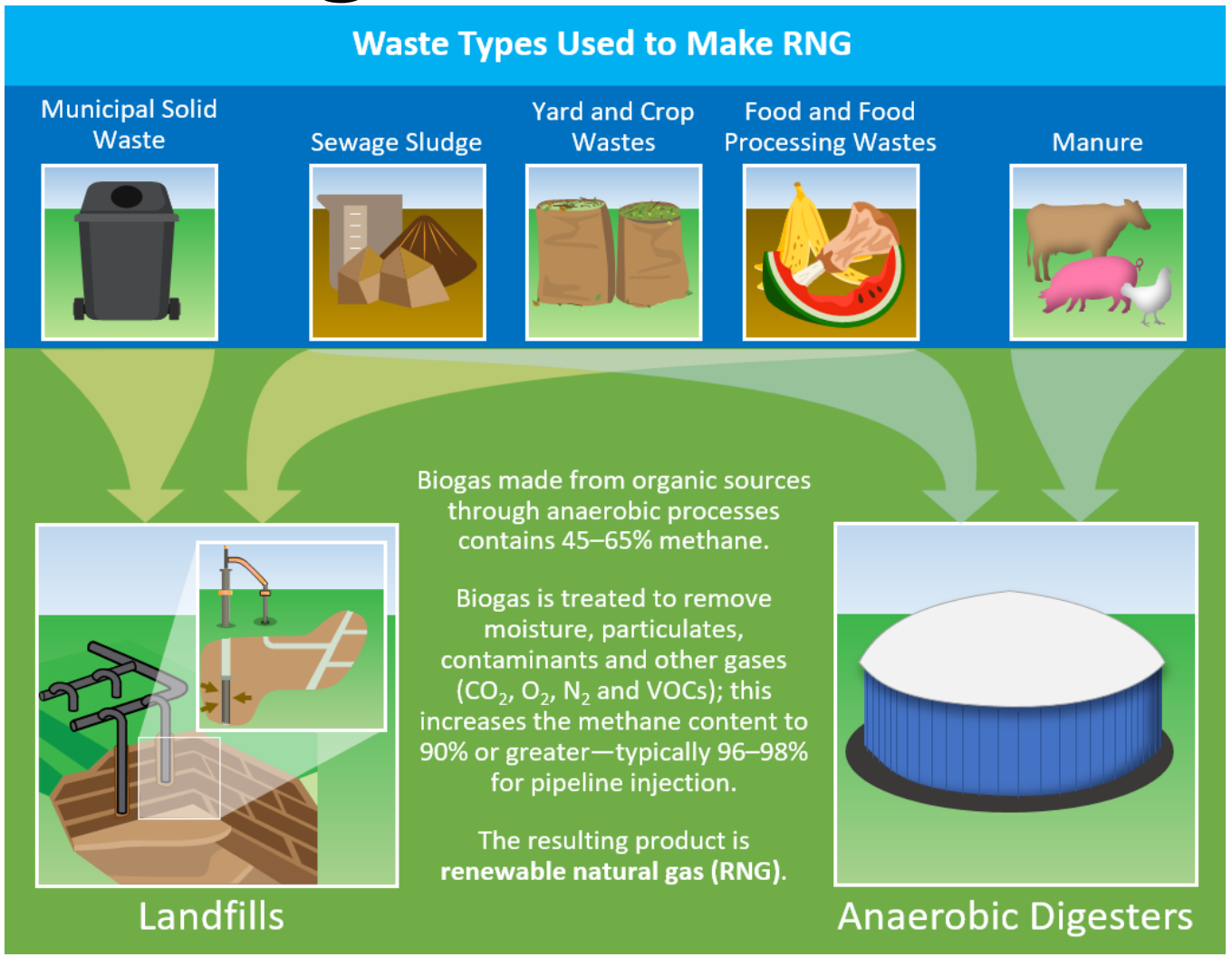
Public Service Commission of Wisconsin

Biogas vs. RNG

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

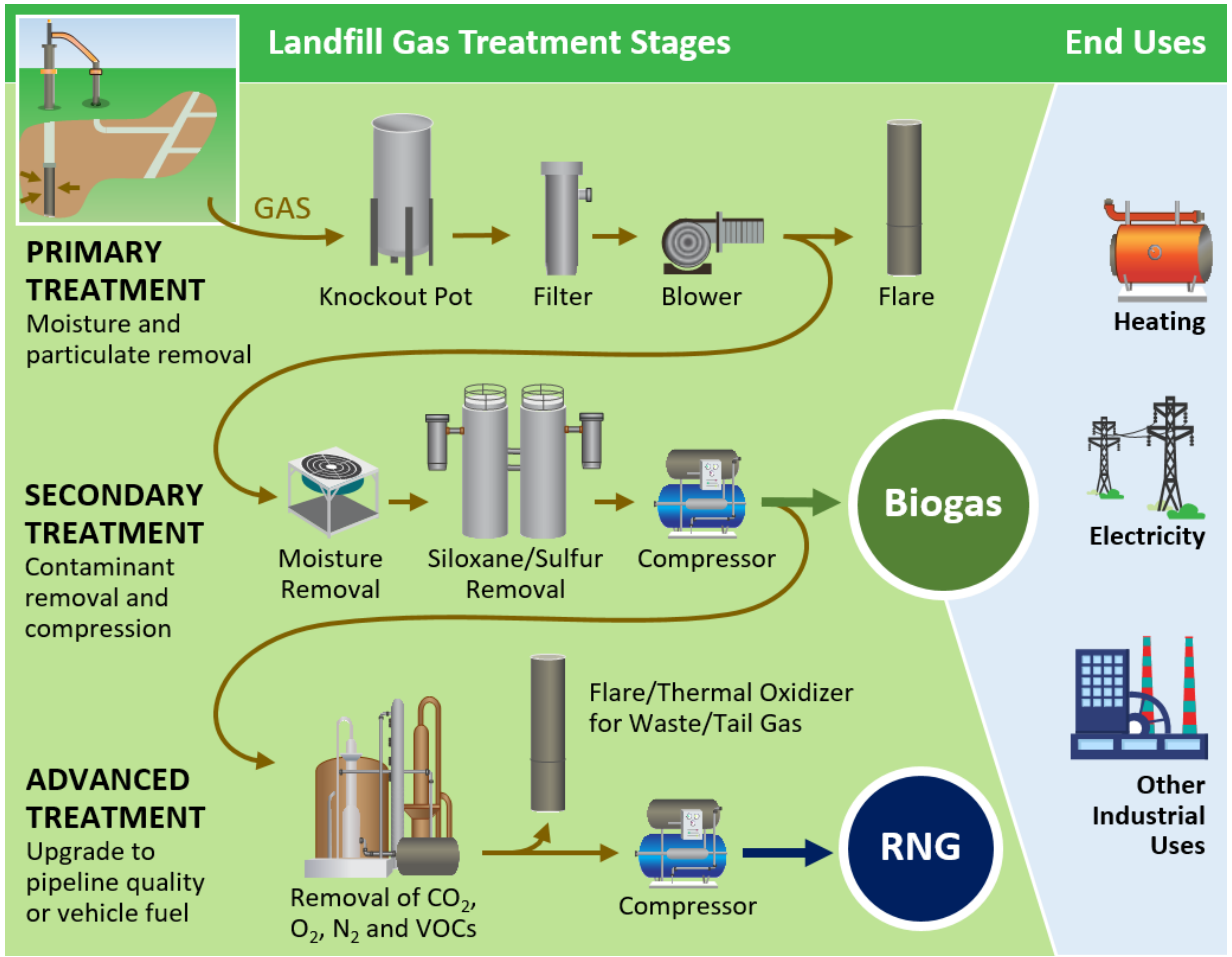
Renewable Natural Gas (RNG) – Biogas that has been upgraded to “pipeline quality” natural gas (>95% methane)

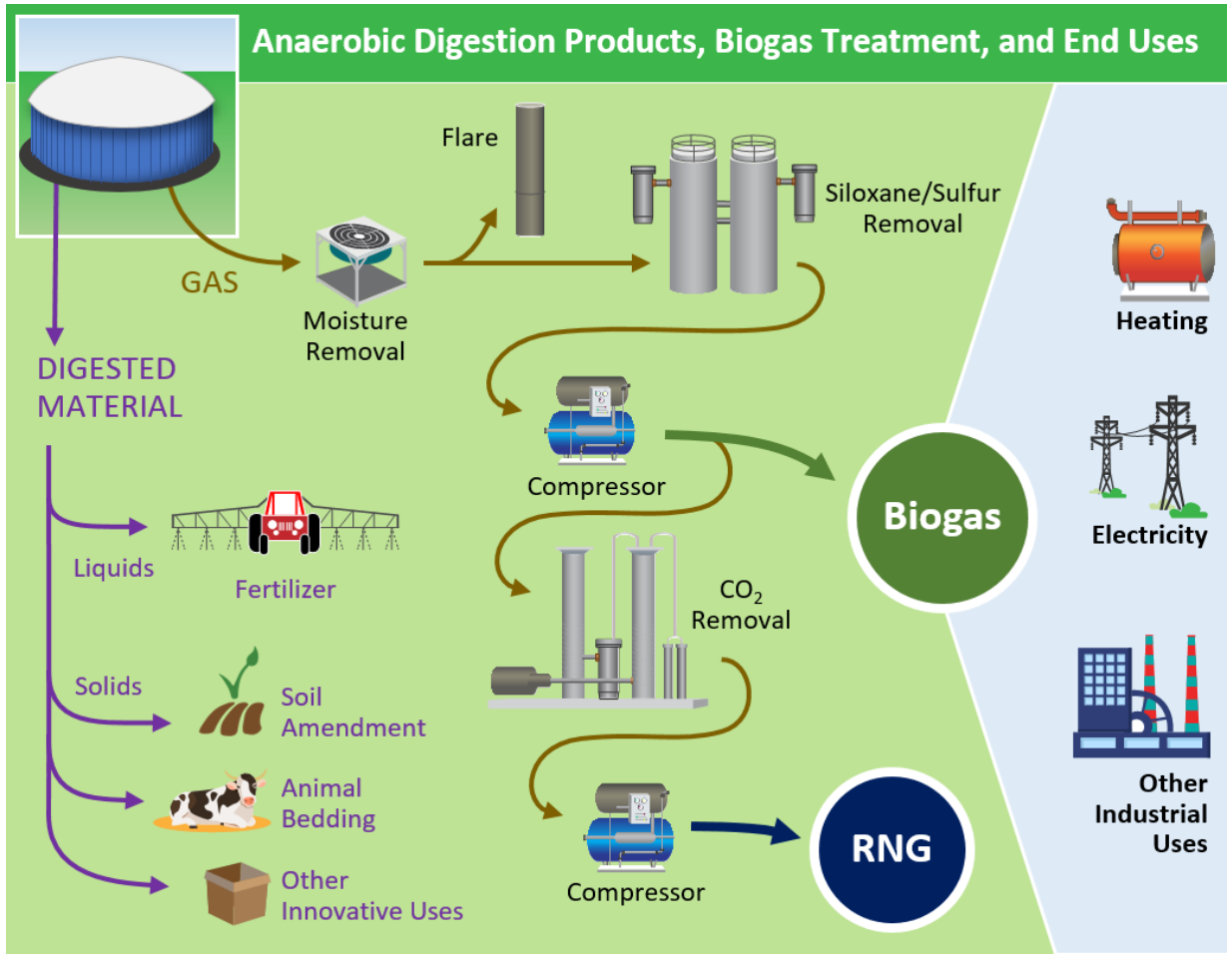
Biogas/RNG Process



https://www.epa.gov/lmop/renewable-natural-gas

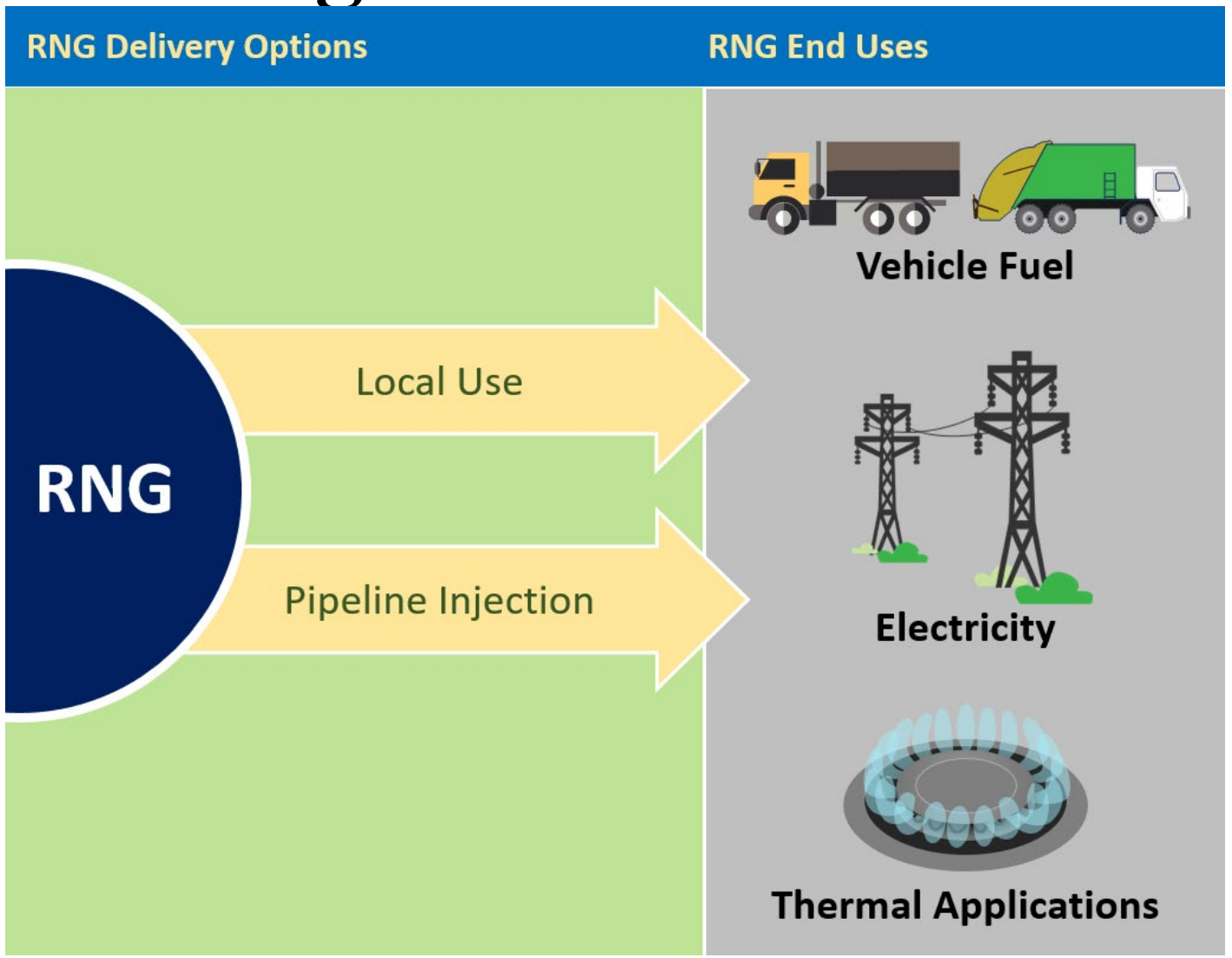
Biogas/RNG Process





https://www.epa.gov/lmop/renewable-natural-gas

Biogas/RNG Process



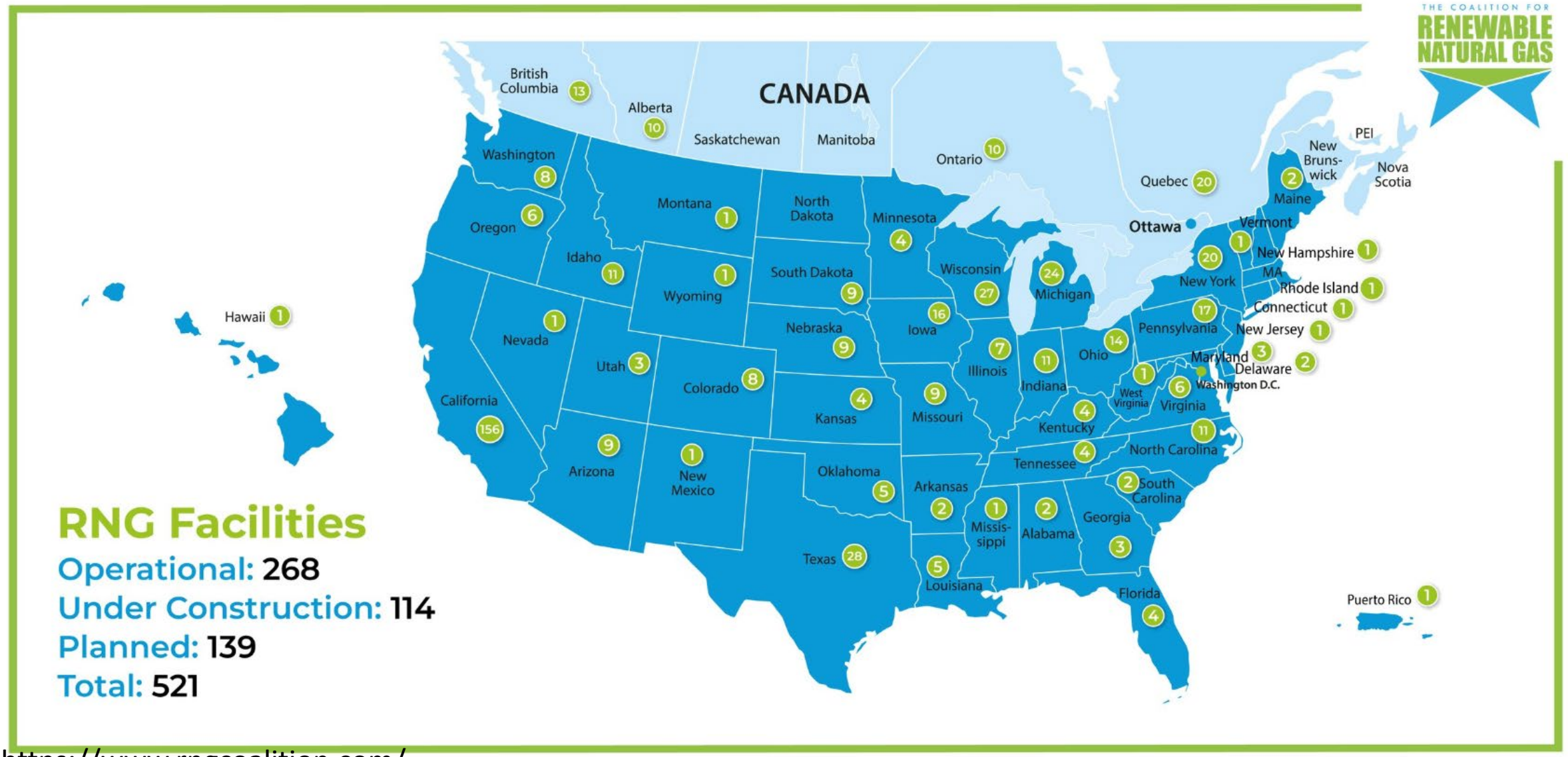
https://www.epa.gov/lmop/renewable-natural-gas

Digesters

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

Landfills

“Virtual” pipelines



https://www.rngcoalition.com/

RNG in Wisconsin

- 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

How does Biogas/RNG affect my state?

- Siting
- Gas quality
- Pipeline safety

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 (more in a few slides)

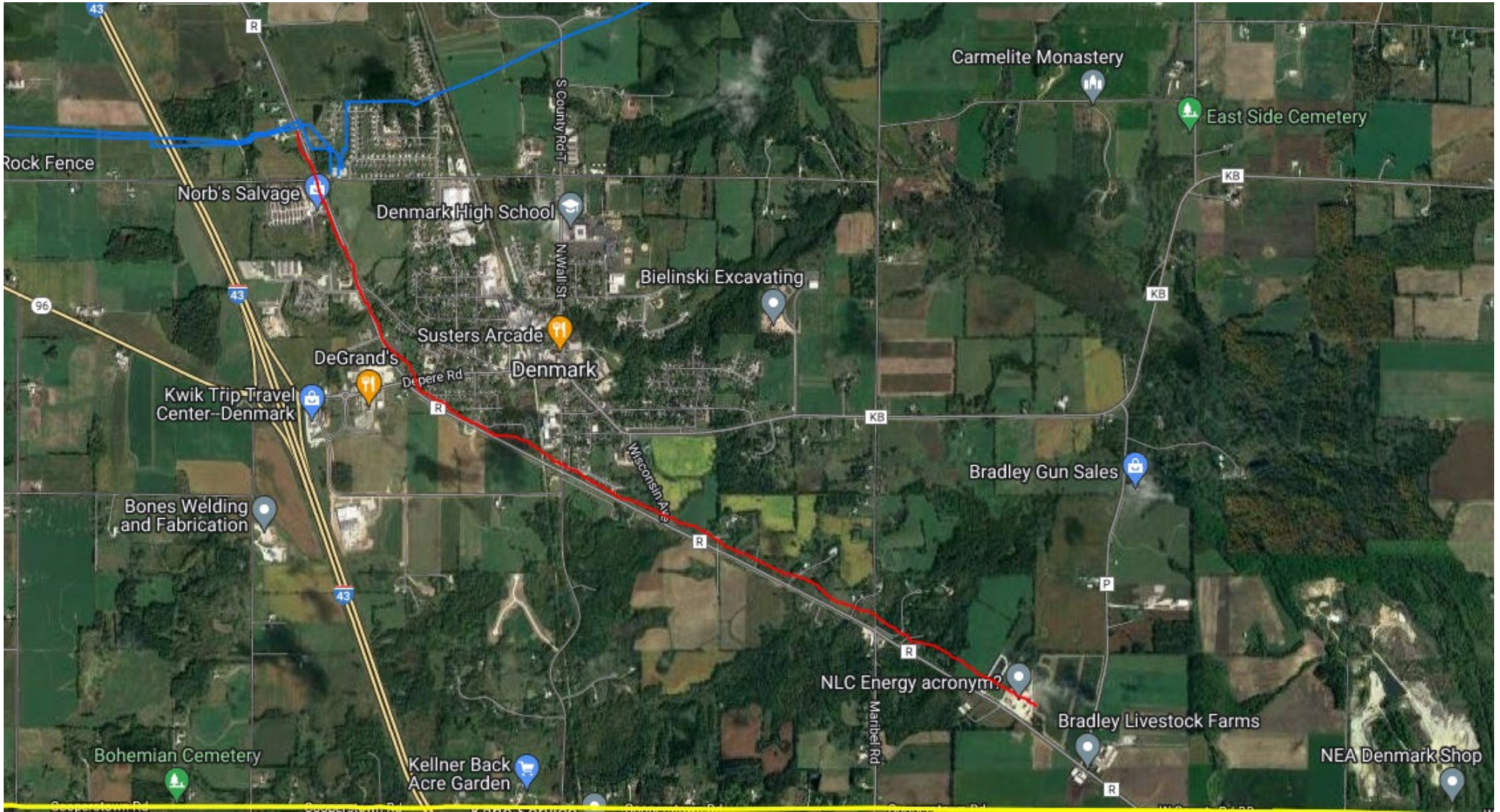
Biogas/RNG – Gas quality

- 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

Biogas/RNG – Pipeline safety

- Most biogas/RNG pipelines are GATHERING pipelines, with a couple exceptions
- What does this mean?
  - Limited jurisdiction
    - Some pipelines do not have to follow pipeline safety regulations at all
  - Less safety requirements apply to some pipelines
    - Odorization not required
    - Emergency procedures not required
    - Operator qualification not required
    - Integrity management program not required

RNG gathering pipeline



Biogas/RNG pipeline issues

- Often discover pipelines after/during construction
- Issues with wrong pipe/inadequate construction
  - Added state rule in WI requiring construction standards filed with PSC
- Some have not been members of the state one-call

Other resources

General Information and Reports

Introducing Renewable Biogas into the Natural Gas Delivery Infrastructure
Renewable Natural Gas (RNG)
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 LandfillDerived 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?

PSC of WISCONSIN