

Renewable Natural Gas a Greenwashed Poster Child

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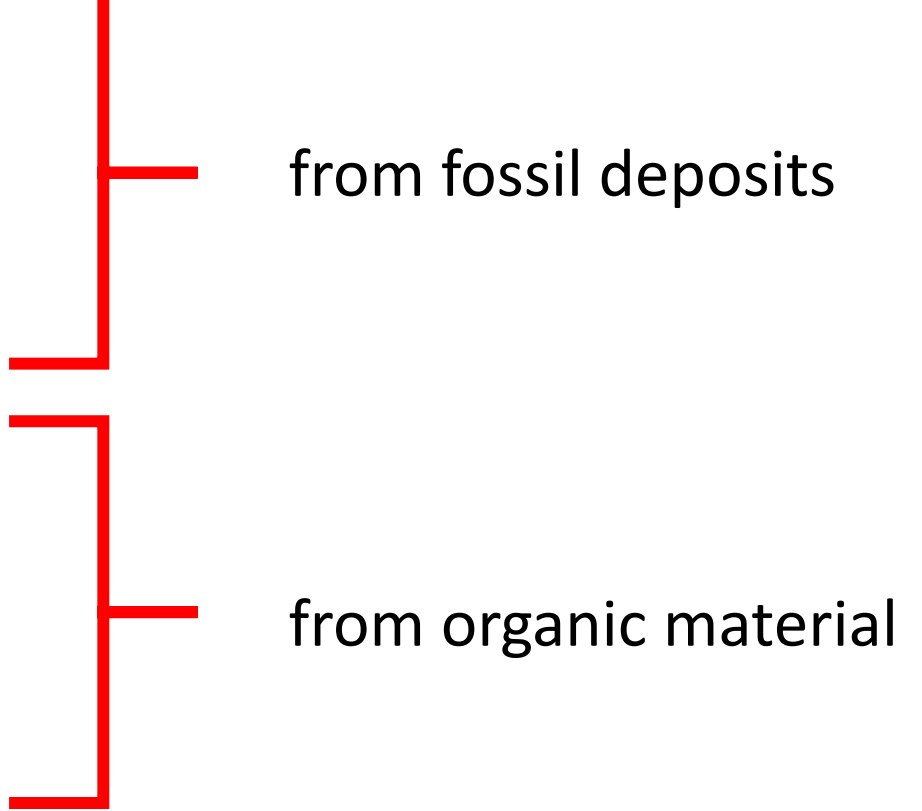
BALE

20 September 2023

The case against RNG

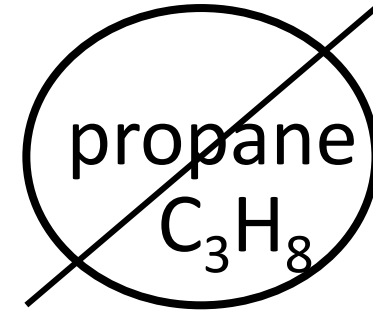
- RNG and fossil gas: same molecule, different sources
- RNG produced and burned out of state counts in VT's renewable portfolio
- RNG costs far more to produce than fossil gas
- Energy sources with much lower emissions are displaced
- \$\$ spent on RNG infrastructure and contracts could instead be spent on reducing energy use & emissions

Terminology

- **Conventional** natural gas
 - Natural gas from **fracking** (~79%)
 - **Biogas**
 - Result of anaerobic decomposition
 - **Renewable** natural gas
 - refined from biogas to “pipeline quality”
 - **Renewable attribute**
 - Abstraction that can be stripped from the gas and sold separately
- 
- The diagram consists of two red brackets on the right side of the slide. The top bracket groups 'Conventional natural gas' and 'Natural gas from fracking (~79%)' and is labeled 'from fossil deposits'. The bottom bracket groups 'Biogas' and 'Renewable natural gas' (with its sub-point 'refined from biogas to pipeline quality') and is labeled 'from organic material'.
- from fossil deposits
- from organic material

More terminology

- Natural gas is methane *not*
 CH_4



Methane is a potent greenhouse gas

- **Pipeline quality** gas is commonly 96% – 98% methane
- **Life cycle emissions** include those from production, transmission and combustion: **source to burner tip**

The bridge fuel myth

- NG produces less CO₂ than other fossil fuels when burned
 - Fracking boom drove cost of NG way down, supply way up

However

- Methane is a potent greenhouse gas
 - 86x worse than CO₂ over 20 years if released to atmosphere
- Lifecycle emissions make NG worse than other fossil fuels
- See research by Howarth & others ●

The current myth

- Proponents claim RNG has lower emissions than fossil gas, in some cases even *negative* emissions
- RNG provides a transition to a future without fossil fuels

However

- It's the same molecule: methane
 - Commingled with fossil gas in transmission pipelines
 - Still 86x worse than CO₂ over 20 years
- Lifecycle emissions may be higher than for fossil gas
- The potential supply is only 5% of current demand for gas

Examples of RNG sources

all in Vermont Gas Systems' portfolio

- Municipal Waste Water Treatment Plants
- Food Waste Digesters
- Landfills
- Manure pits at industrial scale animal farms

Three options for landfill gas

Federal regulations require large landfills to capture gas

Prevents methane (CH₄) from venting to the atmosphere

- Default: Flare it – burning turns CH₄ into CO₂
 - Lebanon, NH municipal landfill does that
- Option 2 is better: burn it to generate electricity on site
 - Washington Electric Co-op does that at Coventry landfill
 - Minimal processing, minimal additional energy input required
- Option 3: process into RNG & put it in pipeline – highest emissions
 - Requires supplementary fuel, which produce emissions
 - CH₄ released during insertion to pipeline and along route to destination

VT's largest source of RNG

- Seneca Meadows -- largest landfill in NY
- VGS 14.5 yr contract approved by PUC Nov 2022
 - Option to increase volume each year
 - Option to extend to to 2042
 - PUC decision being appealed to VT Supreme Court

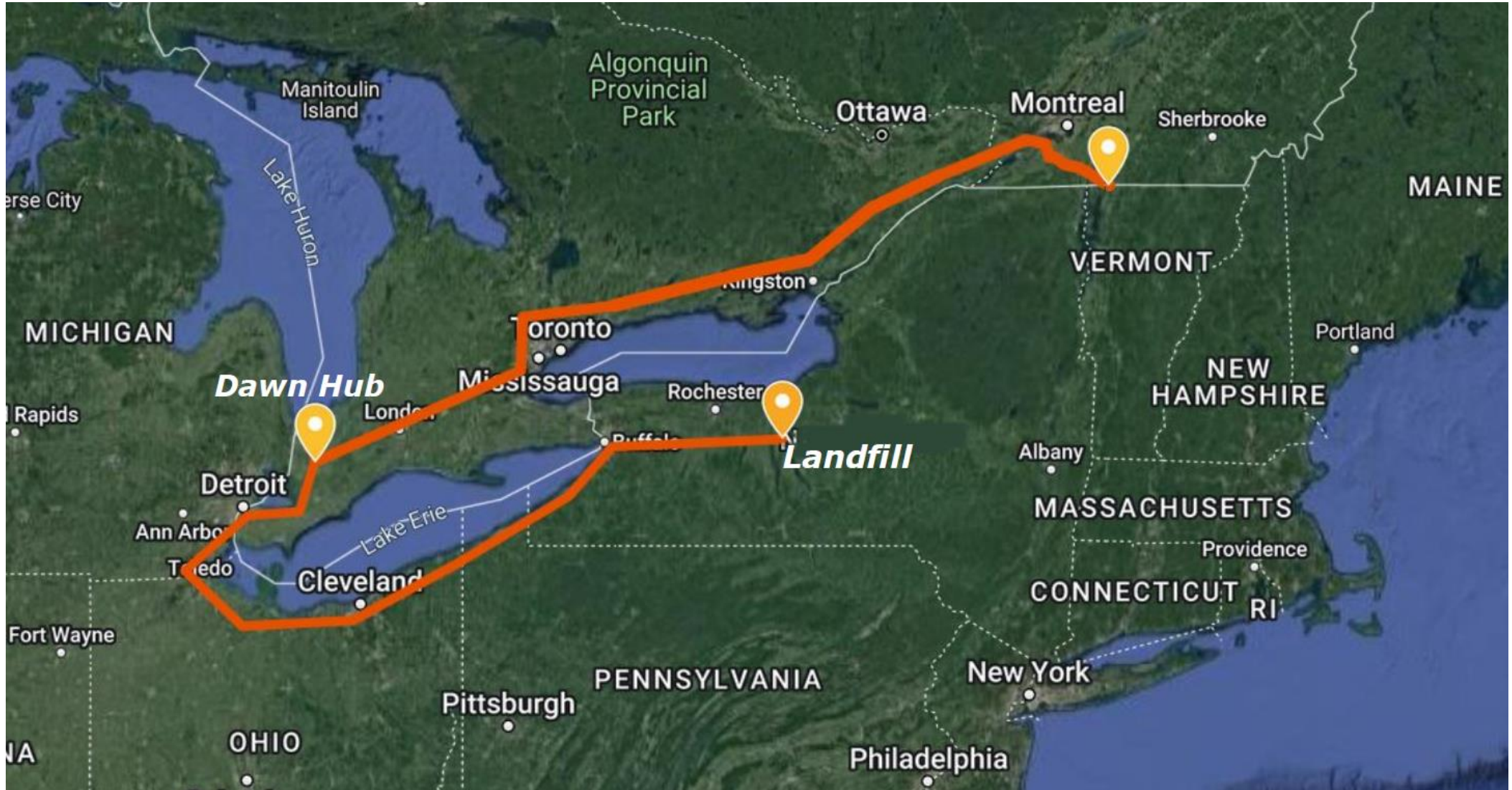
Seneca Meadows operation

- Largest landfill in NY
- Owned and operated by Texas corporation
- Footprint of 400 acres, 280' high
- 6000 metric tons of garbage per day
- Air quality problems
- State has identified **lung cancer cluster** around landfill
- Town wants LF to shut when state permit expires in 2025
- 15-yr expansion plan: add 47 acres, raise height to 350'

RNG production at Seneca Meadows landfill

- Houston-based Archaea Energy produces both electricity and RNG from biogas at the landfill
 - Proposes to expand RNG production and convert gas-to-electric operation to run on RNG
 - That will increase emissions per unit energy produced
- Archaea bought by oil giant BP in 2022 for \$4.1 billion
- Operates 50 RNG and landfill gas-to-energy facilities in US
- Projects 5-fold growth by 2030 with 80+ new projects

The “physical pathway” of the RNG from Seneca Meadows





VGS Renewable
Natural Gas

Program Manual

Vermont Gas Systems

Updated August 20, 2019

https://lists.vitalcommunities.org/lists/d_read/thetford/2019-RNG-Manual-for-electronic-1%20copy.pdf

“Although out-of-state VGS Renewable Natural Gas resources may not physically flow to the VGS system, the environmental attributes will be dedicated to Vermont Gas customers.”

Emissions accounting for landfills

- Models compute a lifecycle emissions factor (“carbon intensity”)
- Based on CA modeling, VGS claims Seneca Meadows RNG has lifecycle emissions 56% that of fossil gas

However

- Howarth testified to Senate that RNG has no GHG benefit and may cause greater emissions than fossil fuel ●

How PUC decided about landfill RNG

- ***Irrelevant*** that out-of-state gas doesn't reach VT.
- Compares VGS's figure of carbon intensity ***only*** to that of fossil gas.
 - Ignores evidence that energy could be – and is -- generated at the landfill with lower emissions.
 - Ignores evidence that emissions can be reduced at less cost.

Proposed Factory Farm RNG project

- Located at industrial scale, 4000 cow Pleasant Valley Farms (Berkshire, VT)
 - Liquid manure management *maximizes* methane production
- Project to be owned, operated by applicant Bellevue RNG
 - wholly owned subsidiary of Novilla Investment Holdings, LLC
- VGS will build and own the 8-mile distribution pipeline
 - The pipeline will have 24 stream crossings
 - applicant claims flood hazard rules do not apply

Proposed Factory Farm RNG project

- Unlike landfills, farms ***not*** required to prevent gas from venting to atmosphere
- Project would replace on-site biogas-fueled electric generation with RNG production.
 - Will increase emissions per unit of energy generated
 - Will generate greater revenue
- RNG would be credited for ***negative*** emissions. ●

Pleasant Valley Farms not a green operation

- 2011: Warning from State regarding **drug residues** found in milk.
- 2015: Warning from U.S. FDA – inadequate conditions for animals likely to cause **drug residues** to enter the food supply.
- 2016: **illegal discharge** of ag waste into stream draining into heavily polluted Missisquoi Bay
- 2019: reports of “hideous migrant worker living quarters” and leaking manure lagoons [*commentary in VTDigger*]
- 2020: Sued by the State for violations, including illegally **constructing a 10 million gallon manure pit without a permit**

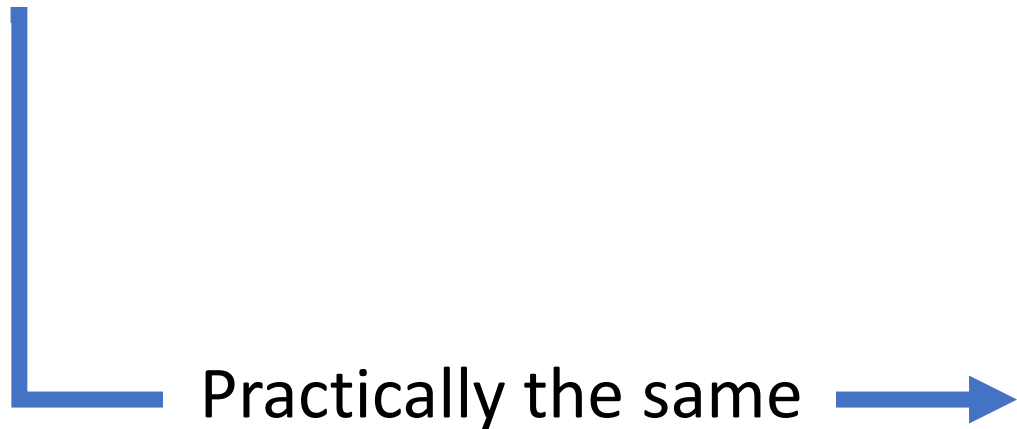
Clean Heat Standard

2023 Affordable Heat Act sets these requirements:

- Fuel dealers must generate or buy “clean heat credits”
- Credits for biofuels depend on lifecycle emission factors (generated by a model)
- Pipeline RNG gets special treatment
- PUC responsible for standard’s implementation details ●

3rd party certification of Iowa gas contract

“... existence of a physical pathway comprised of interconnecting pipeline systems between the injection point at the Facility and point of extraction at VGS end.”

 Practically the same →

2023 Affordable Heat Act

(c) For pipeline renewable natural gas and other renewably generated natural gas substitutes to be eligible [for clean heat credits], an obligated party shall purchase renewable natural gas and its associated renewable attributes and ***demonstrate that it has secured a contractual pathway for the physical delivery of the gas from the point of injection into the pipeline to the obligated party's delivery system.***

STATE OF VERMONT
PUBLIC UTILITY COMMISSION

Case No. 20-0384-PET

Petition of Vermont Gas Systems, Inc. for approval of an out-of-state renewable gas purchase contract with a term exceeding 5 years pursuant to 30 V.S.A. § 248(i)

Order entered: 03/05/2020

ORDER OPENING INVESTIGATION AND NOTICE OF SCHEDULING CONFERENCE

“... the out-of-state RNG need not and may never enter the VGS pipeline. The out-of-state RNG will enter a pipeline system to be used by others with VGS being credited for the RNG attributes.”

Where do things go from here?

Watch these cases

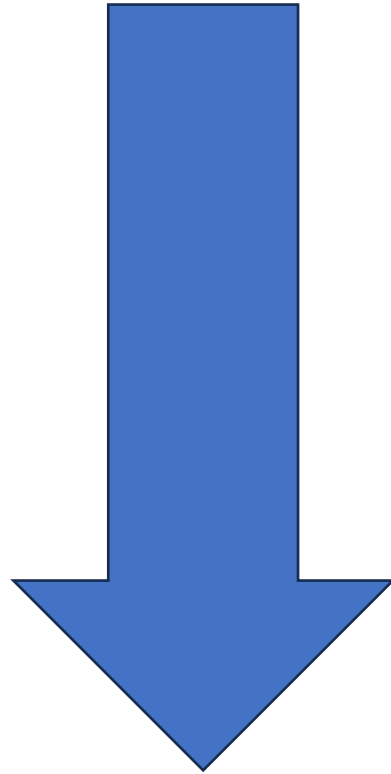
- Catherine Bock's appeal of Seneca Meadows RNG approval (VT Supreme Court docket 23-AP-084)
- PUC's decision of Bellevue RNG digester in Berkshire (PUC docket 23-0880-PET)
- PUC's implementation of Clean Heat Standard (PUC dockets 23-2220-RULE & 23-2221-INV)

Summary

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Extra stuff

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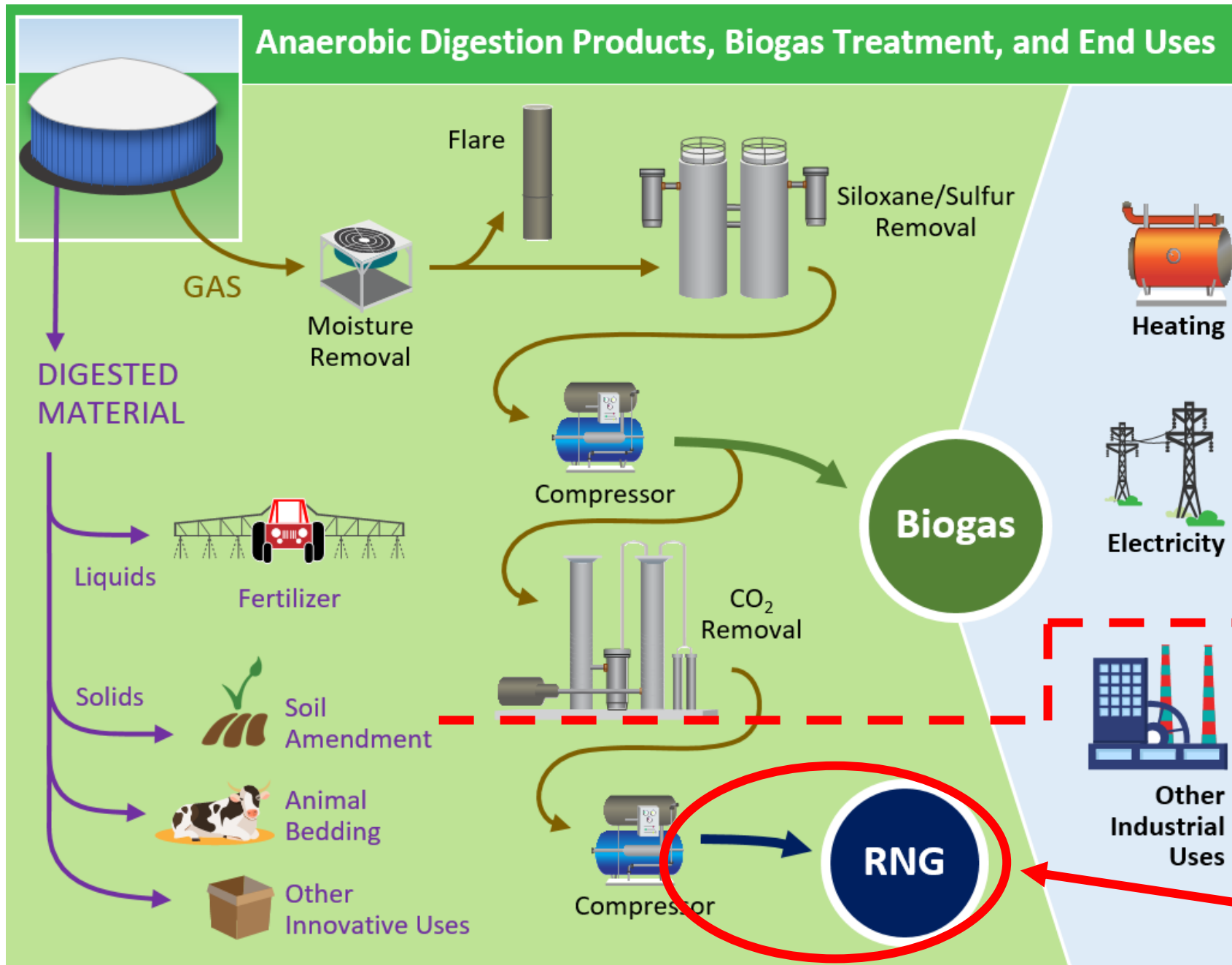


From Howarth's CV

- Tenured faculty at Cornell 1985
- Endowed professor at Cornell since 1993
- Adjunct Senior Scientist at the Marine Biological Lab in Woods Hole, MA since 2000.
- Decades of work on the consequences of global climate change, on emissions of methane from the oil & gas industry as a driver of climate change, on the production and use of hydrogen, and on alternative energy policies.
- 200 peer-reviewed papers
- one of the most highly cited environmental scientists in the world.
- briefings and testimony at
 - the White House
 - the U.S. Congress and committees of the US Senate
 - the Canadian Senate
 - the European Parliament
 - the Irish Parliament
 - the Senate and Assembly of the State of New York
 - New York courts
 - Vermont Senate Natural Resources and Energy Committee
- many committees of the US National Academy of Sciences and the International Council of Science, having chaired several of these
- Currently, one of 22 members of the New York State Climate Action Council, the body charged by law with the development of the implementation blueprint (“Scoping Plan”) for New York’s progressive climate law, the Climate Leadership & Community Protection Act of 2019.

From Howarth's testimony

Vermont Gas Systems apparently gets financial credits for this scheme through trading mechanisms established by the California Air Resources Board (CARB). The CARB's policy on RNG is based on old, out-of-date science. They simply are wrong that there is any greenhouse-gas benefit from using RNG, and in fact the use of RNG may lead to greenhouse gas emissions that exceed those from using fossil natural gas. **The State of New York will now be discouraging the production of RNG such as that from Seneca Meadows Landfill, based on the Climate Action Council's final Scoping Plan. I respectfully ask that the State of Vermont not encourage a policy that runs counter to the policy of New York, and do so based just on paper credits without even any actual delivery of any RNG to Vermont.** California started a bad policy in this area, and one that we in New York hope to reverse at least within our State.

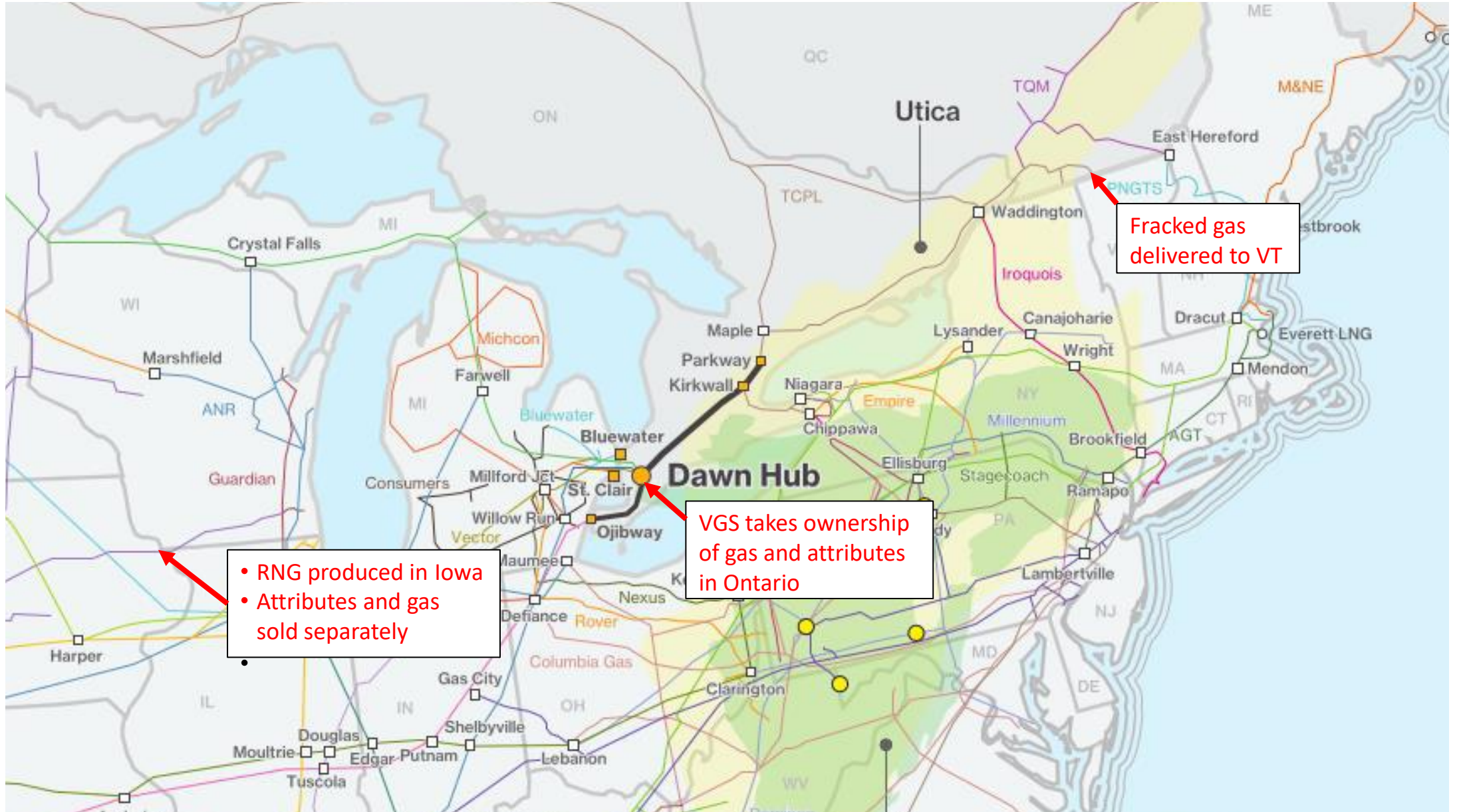


No requirement to capture methane from farms

Baseline emissions for energy

Increased emissions

Methane leaks



Fracked gas delivered to VT

VGS takes ownership of gas and attributes in Ontario

- RNG produced in Iowa
- Attributes and gas sold separately