



Fact or Fiction: Demystifying Renewable Fuel Certificates

Rupali Tripathi

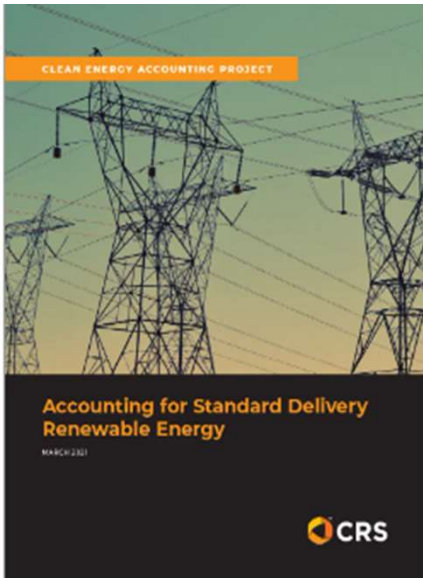
RENEWABLE FUELS, MANAGER
CENTER FOR RESOURCE SOLUTIONS

RENEWABLE ENERGY MARKETS™ 2024 CONFERENCE
SEPTEMBER 16-18, 2024

Center for Resource Solutions

Nongovernmental Organization (NGO) creating policy and market solutions to advance sustainable energy since 1997.

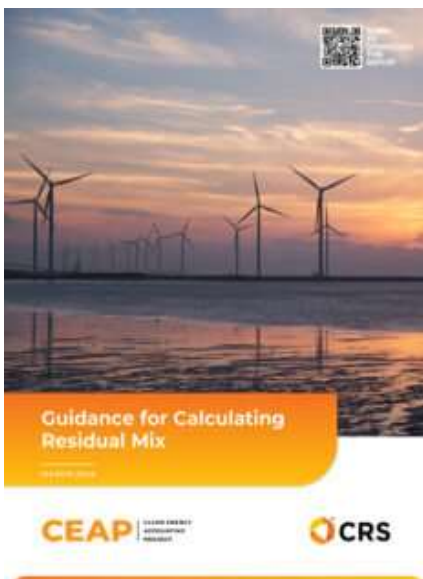
- Renewable energy and climate policy
 - Clean Energy Accounting Project (CEAP)
 - Expert assistance
- Renewable Energy Markets™ annual conferences
- Green-e® certification for suppliers and users of renewable electricity, carbon offsets, and renewable fuels in the voluntary market



Guidance for Supplier Clean Electricity Procurement

AUGUST 2023

CEAP | CLEAN ENERGY ACCOUNTING PROJECT



Guidance for Calculating Residual Mix

OCTOBER 2023

CEAP | CLEAN ENERGY ACCOUNTING PROJECT



Why Certification?

Green-e[®] Certification

- Global leader in renewable electricity certification
- Consumer protection for voluntary renewable electricity purchases
- 125 million MWh in retail transactions certified in 2023, enough to power 4 out of 5 U.S. households for a month.



Green-e

Certificates and Certification: RFC Issuance vs Purchasing



Tracking Systems:

- Issue tradable certificates
- Based on meter data
- No double issuance for the same dth
- Review a producer's existence, licensing, capacity, etc.

Third-Party Certification:

- Supplemental to a tracking system
- Assess renewable fuel eligibility based on quality criteria such as environmental performance
- No double selling or double claiming
- Required customer disclosures and marketing oversight

Benefits of Certification

Consumer Credibility. Green-e® is the leading 3rd party verification in renewable energy markets. It is recognized by many businesses as the gold standard for renewable energy sourcing and is mentioned by some corporate sourcing policies.

Risk Reduction. Protects against double counting and claiming, creating confidence in clean energy purchases.

Quality Assurance. Certified renewable energy products meet rigorous environmental, sustainability, and marketing claims standards.

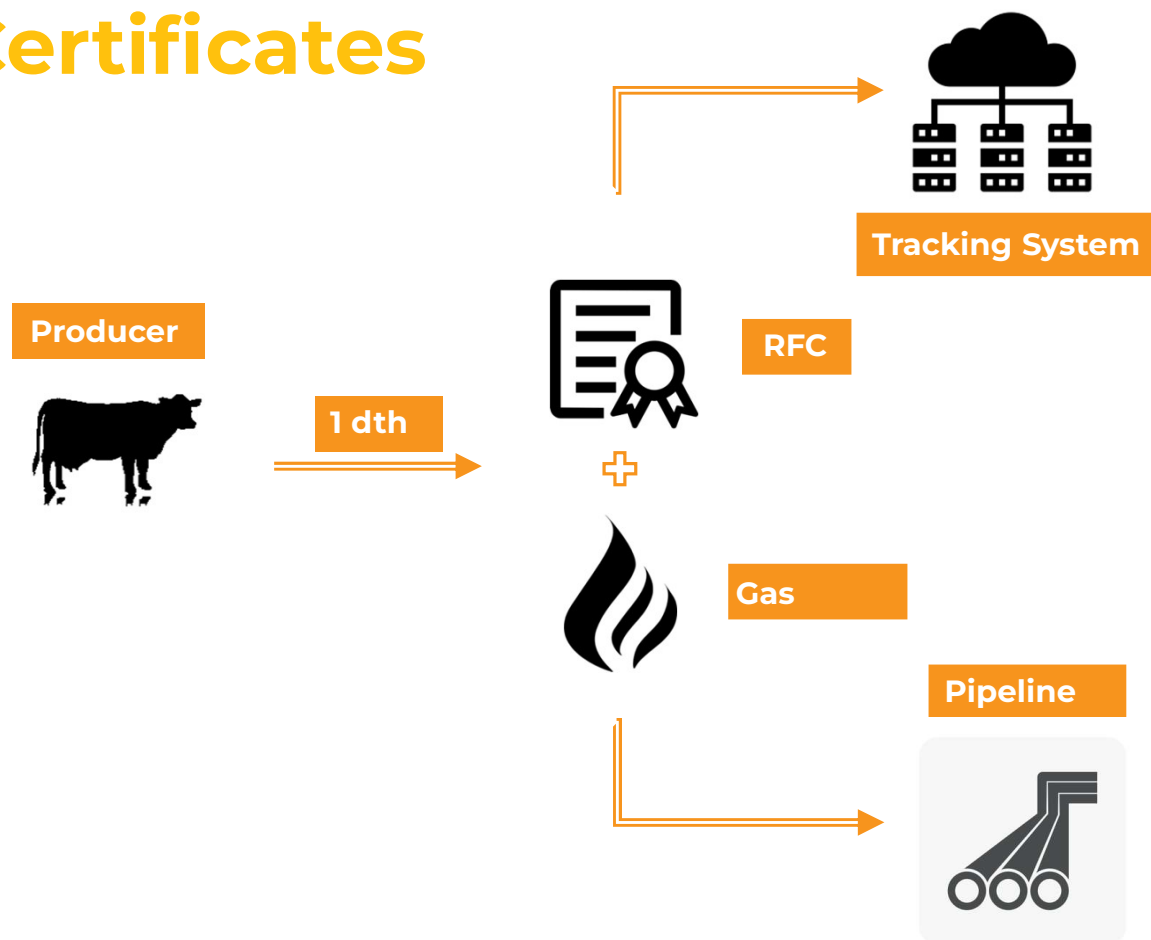
Stakeholder-driven standards. Developed by an Independent Governance Board, including important environmental stakeholders such as the Union of Concerned Scientists, Natural Resources Defense Council (NRDC), and CDP.

Green-e[®] Renewable Fuels Program

Renewable Fuel Certificates

1 RFC represents the environmental attributes of **1 dekatherm** of renewable fuel that can be paired with gas consumption.

RFCs are essential for tracking renewable fuel production and delivery



Green-e® Renewable Fuels

Objectives

- Accelerate the adoption and drive voluntary market demand of renewable fuels, while ensuring that the fuel is from sustainable renewable resources and meets the highest environmental standards
- Ensure customers are protected in their purchase and ability to make verifiable usage claims

Participant Types

- Renewable fuel producers
- Brokers
- Marketers
- Traders
- Utilities
- Retailers
- End-consumers (buyers)

Product Types

Retail and wholesale transactions for:

- Bundled (fuel + RFCs)
 - Delivered via pipeline system
 - Trucked
 - Raw fuel delivered directly to consumer
- Unbundled
 - Renewable fuel certificates (RFCs)



Requirements & Verification.

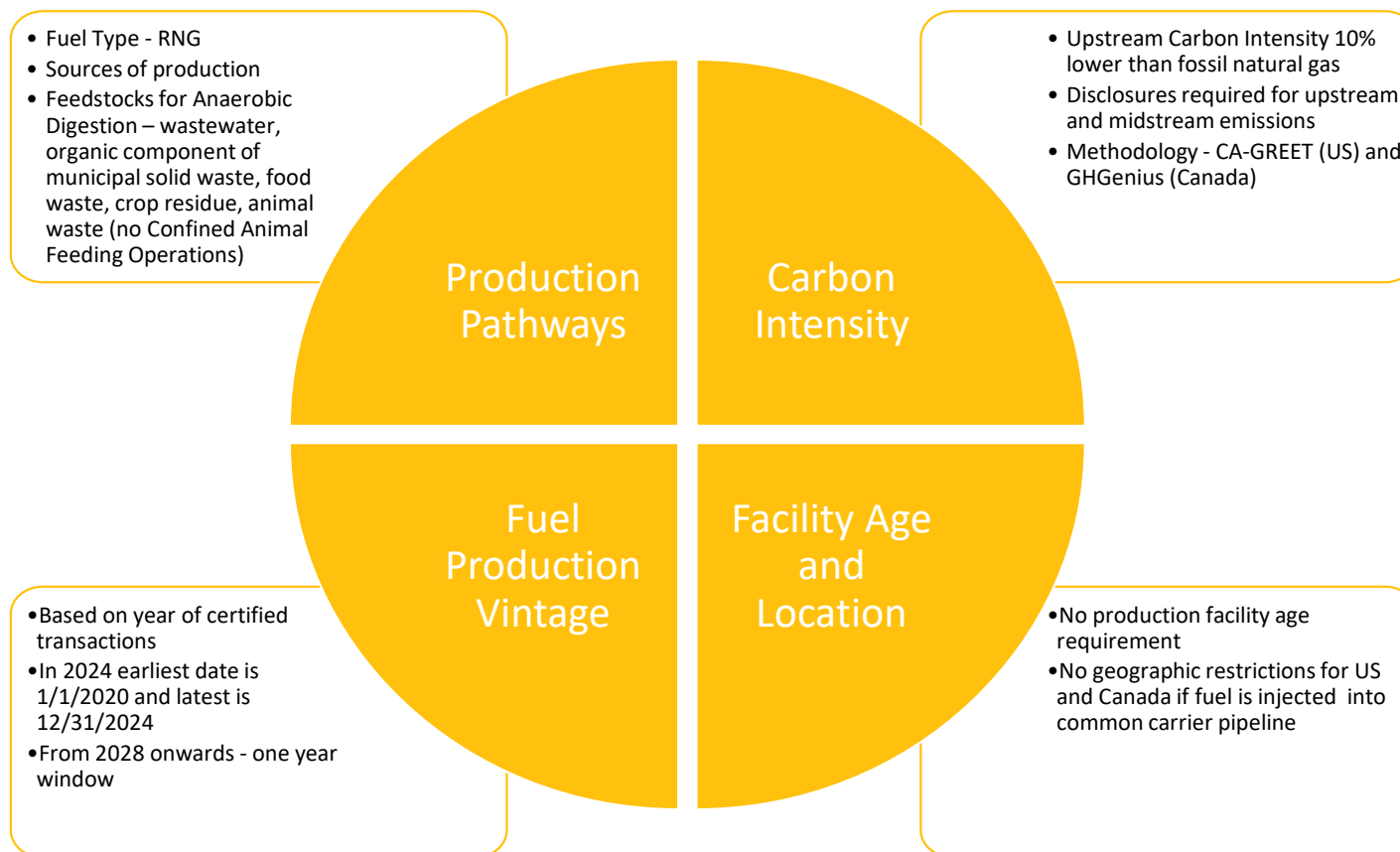
Standard

- Initial focus on biomethane from waste sources; plans to add green hydrogen
- Covers U.S. and Canada
- Regulatory surplus required: no RINs or LCFS credits for the same dekatherm sold in a Green-e® certified transaction
- Verification and audit required
- No double counting, double selling, double claiming

Code of Conduct

- Consumer disclosures and marketing compliance review

Requirements



Production Pathways

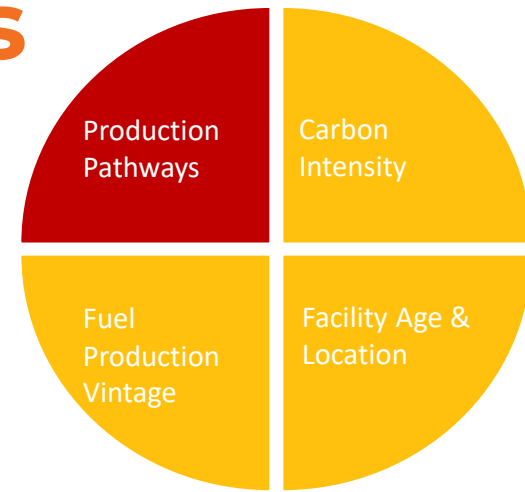
A. Fuel Type: Biomethane

B. Sources of Production:

1. Digester Gas
2. Landfill Gas

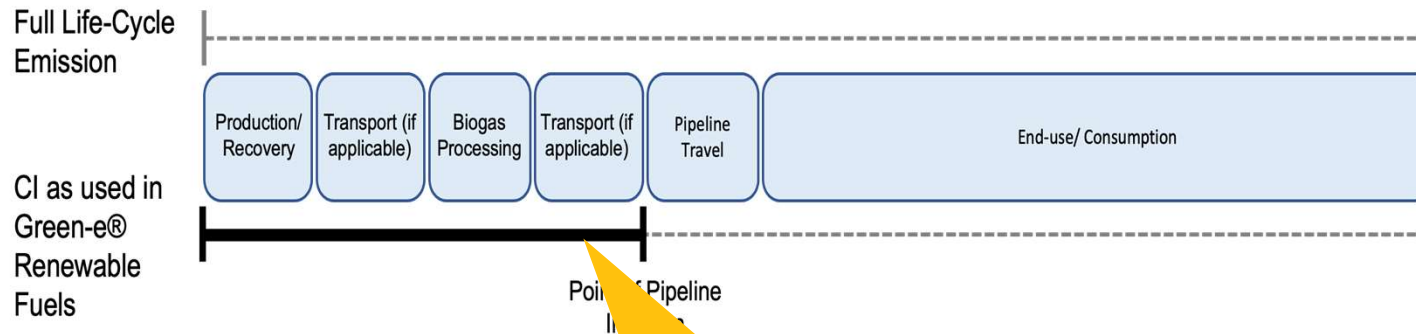
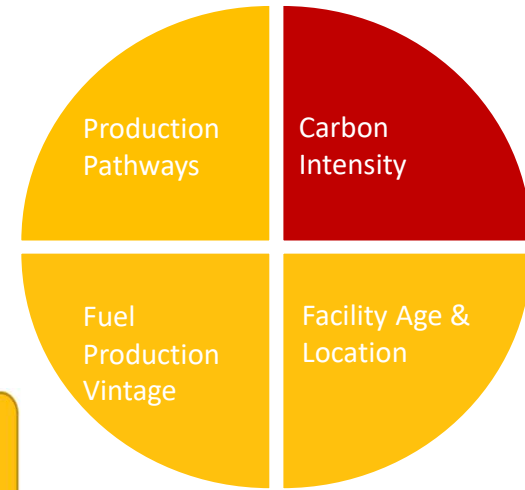
C. Feedstocks for Anaerobic Digestion

- A. Wastewater
- B. Organic component of municipal solid waste when separated prior to landfilling
- C. Food waste
- D. Vegetative matter, such as yard waste, shrub, or chaparral
- E. Crop residue
- F. Animal waste (from farms that are not CAFOs)



Carbon Intensity

Carbon Intensity (CI) is the amount of greenhouse gas emissions produced during the production of a unit of energy. Green-e® Renewable Fuels requires CI to account for the production emissions (including leakage) up until the point of pipeline injection.



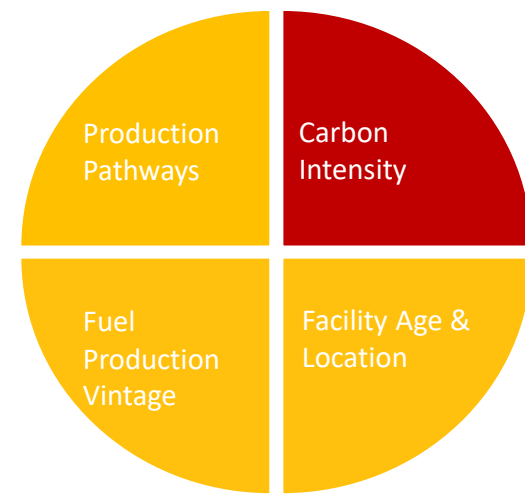
For demonstration only; Not proportional

Must be 10% lower than fossil natural gas (9.38 gCO₂e/MJ)

Carbon Intensity

Carbon Intensity (CI) score required

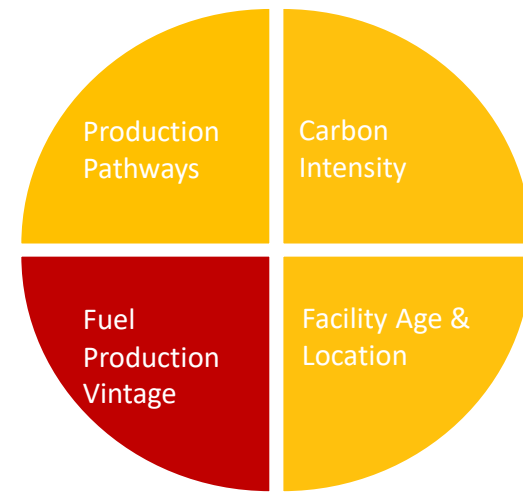
- Maximum upstream CI must be 10% lower than fossil natural gas (9.38 gCO₂e/MJ), up to the point of injection into the pipeline
 - Must be third-party verified
- Disclosures required: CI score for each production pathway that includes upstream and midstream emissions to customers, including pipeline leakage. Reporting downstream CI is optional.
- Accepted Methodologies: CA-GREET (US), GHGenius (Canada)



Vintage

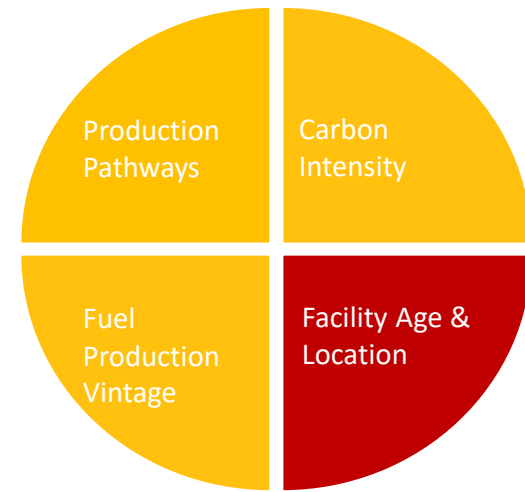
Table 2: Fuel Production Vintage based on Year of Certified Transaction

Year of Certified Transaction	Earliest Eligible Fuel Production Date ⁷	Latest Eligible Fuel Production Date
2021	1/1/2017	12/31/2021
2022	1/1/2018	12/31/2022
2023	1/1/2019	12/31/2023
2024	1/1/2020	12/31/2024
2025	1/1/2021	12/31/2025
2026	1/1/2025	12/31/2026
2027	1/1/2026	12/31/2027
2028 and beyond	Increases by 1 year annually	Increases by 1 year annually



Additional Requirements

- No production facility age requirement
- No geographic restrictions for contiguous U.S. and Canada if fuel is inserted into common carrier pipeline.
- Electronic tracking systems encouraged, not required
- Gas utilities: voluntary program costs may not be allocated to customers that are not participants



Verification

2 separate verification processes

1. At the facility level

- Annual facility attestations
- Includes carbon intensity score verification

2. At the transaction level

- Annual verification audit
- Supply vs sale comparison

Annual Marketing Compliance Review

Coming Soon: Green-e® Renewable Fuels Extensions

- **Renewable Hydrogen**

- Goal is to accelerate the adoption of renewable hydrogen while ensuring:
 - Hydrogen is from sustainable renewable sources
 - Environmental and consumer protection requirements

First draft for public stakeholder comment period: Out in October 2024

Join the **Renewable Hydrogen Stakeholder list** if interested in learning more

Email rupali.tripathi@resource-solutions.org.

Contact.

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Fact or Fiction: Demystifying Renewable Fuel Certificates

M-RETS Presentation
September 16, 2024

- Benjamin Gerber, President & Chief Executive Officer, M-RETS Ben@mrets.org



M-RETS
Renewable Electricity



M-RETS
Renewable Thermal

Background



www.mrets.org



M-RETS creates and tracks Renewable Thermal Certificates (RTCs) and Renewable Electricity Certificates (RECs) across North America.



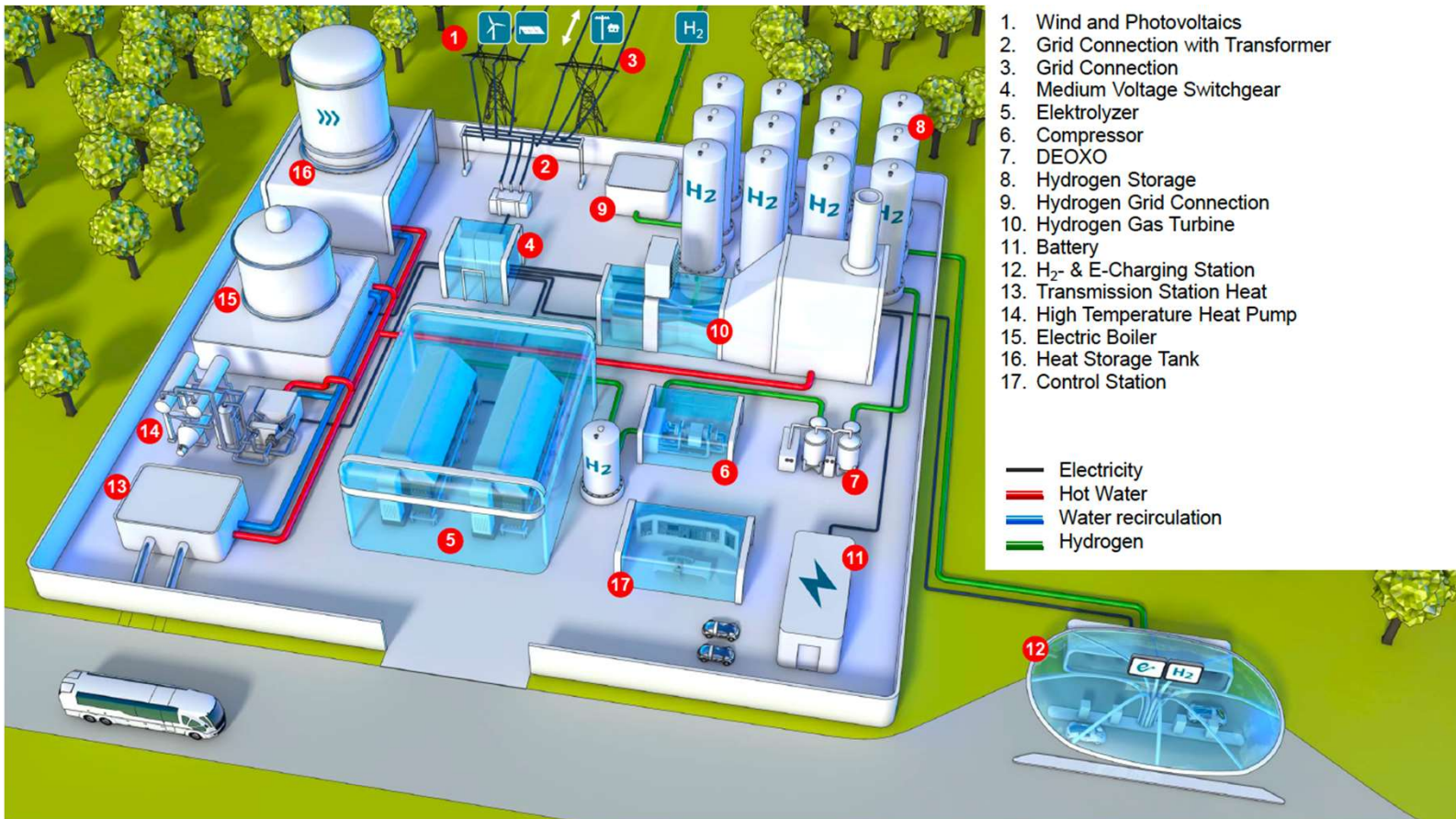
M-RETS RECs are able to contain hourly data information and peak/off-peak and RTC's may include verified carbon intensity data.



M-RETS supports RTC and REC compliance and voluntary markets in one easy to use platform that utilizes the latest software.

- **Mission:** M-RETS validates the environmental attributes of energy to serve as a trusted centralized gateway to environmental markets.
- Independent non-profit 501(c)(4) with a stakeholder board.
- M-RETS tracks in all states and provinces.

Clean electrons and clean molecules are the input to the fuels and decarbonized economy of the future.



M-RETS

Source – Siemens

What Does Renewable Thermal Mean?

Biogas - means a mixture of CO₂ and hydrocarbons, primarily methane gas, from the biological decomposition of organics.

Renewable Natural Gas - Biogas upgraded to meet pipeline quality standards so it may blend with, or substitute for, geologic natural gas.

Blue Hydrogen - H produced from natural gas—usually via steam reforming with CCS.

Green Hydrogen - H produced using renewable electricity—often curtailed—to produce hydrogen via electrolysis.

Low Carbon Fuels – Ethanol, Biodiesel, Green Methanol, Green Ammonia, and other low carbon fuels may qualify (please speak with M-RETS staff).

Other – heat pumps, waste heat recovery, solar thermal, renewable liquid fuels, etc.

Supported Thermal Resources



Thermal Resources

- Biogas
- Compost Heat Exchange System
- Heat Pumps
- Hydrogen
- Methanol
- Renewable Natural Gas
- Solar Thermal
- Woody Biomass System
- Biomethane/RNG (pipeline quality)
-

State of the System in #'s Q2 2024 Data

- 73 Active Organizations
- 69 Active Generators
- 13,607,487 Certificates issued since 2020
- 1,775 unique transactions
- Retirements
 - Compliance - 425,889 (WA CFS/OR CFP)
 - Voluntary - 3,006,708

What does an RTC look like?

RTC Information

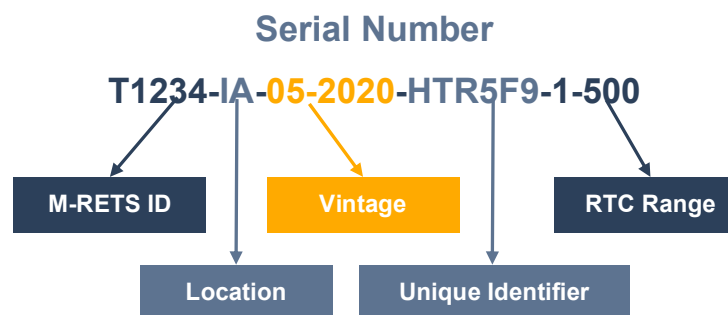
**Dekatherm (Dth) Renewable Thermal =
1 Renewable Thermal Certificate**

Certificate Details include:

- Serial Number (See Example)
- Account
- Project
- Thermal Resource
- Feedstock
- Vintage
- Location
- Quantity

Carbon Pathways (If Applicable)

IRE Verification (If Applicable)



***IRE stands for Independent Reporting Entity which is a third party that reports data
On behalf of a generator M-RETS.**



RTC Batch Details



Serial Numbers T1111-ND-11-2023-4134E3B2-1 to 100

Generator Unit Name	My Biogas generator
Generator Facility Name	Jones Farm
Asset ID	M1111
Account	My biogas account
Thermal Resource	Biogas
Vintage	2023-11-01
Quantity (RTCs)	100

Carbon Pathways

Tool Name	Carbon Intensity	grams CO2 / Dth	Date Range	CP Endpoint	CP Endpoint Description
GREET v1.3.0.13239	-25.68	-27092.4	2023-01-01 - 2025-01-01	Injection Point	Higher CI example

Eligibilities

Oregon

Independent Report Entity verified

Injection Receipt: [MN_100__CFE_Memo_.docx](#)



M-RETS

THANK YOU

- Contact:

- Benjamin Gerber, President & Chief Executive Officer, M-RETS
Ben@mrets.org



RTC Overview

Renewable Thermal Collaborative
September 2024

The Challenge of Decarbonizing Thermal

Renewable Thermal: Beyond Electricity



50% OF GLOBAL
final energy is comprised
of energy used for heating
and cooling



\$270 BILLION
amount heating and
cooling cost in the
United States annually.



39% OF GHG
emissions from energy-
related sources can be
attributed to heating
and cooling.

Facilitated by:



The world already has great renewable electricity solutions but if we are to keep the warming of the planet below 2 degrees then we also need great renewable thermal solutions.

Barry Parkin, Chief Sustainability and Health & Wellbeing Officer, Mars

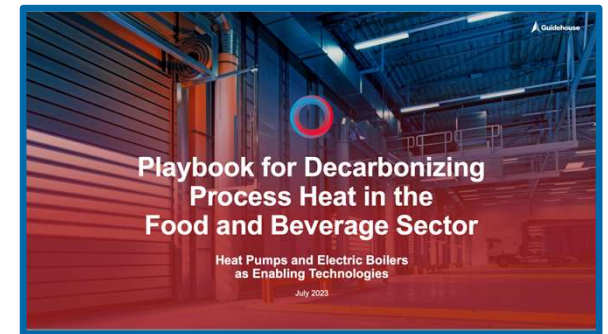
What is the RTC?

The RTC is the only global, buyer-led coalition focused on decarbonizing thermal energy with renewable solutions.

We focus our work across the intersecting issues of **technology, market development, and policy.**

RTC Members (buy-side) and Solutions Providers (supply-side) are invited to participate in multiple RTC workstreams to:

- Identify and address barriers;
- Accelerate solutions;
- **Implement** projects and policies.



RTC Members



RenewableThermal.org

/

info@renewablethermal.org



RTC Solutions Providers



RenewableThermal.org

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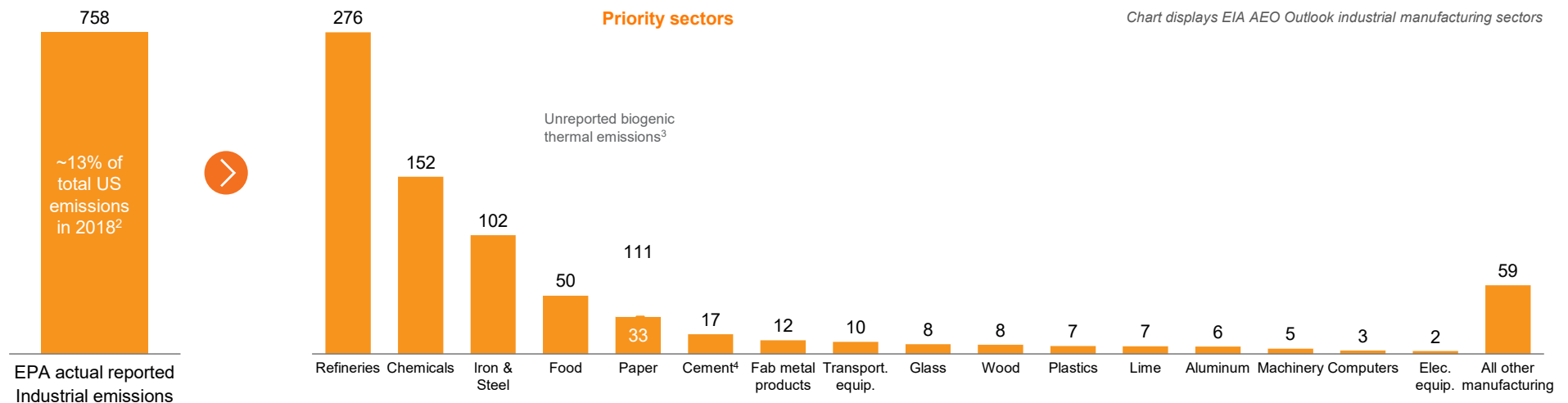
info@renewablethermal.org

RENEWABLE
THERMAL
COLLABORATIVE

US industrial thermal emissions totaled 758 million tonnes of CO₂e in 2018¹

US industrial thermal emissions for all industrial manufacturing sectors (2018)¹

Million tonnes of CO₂e



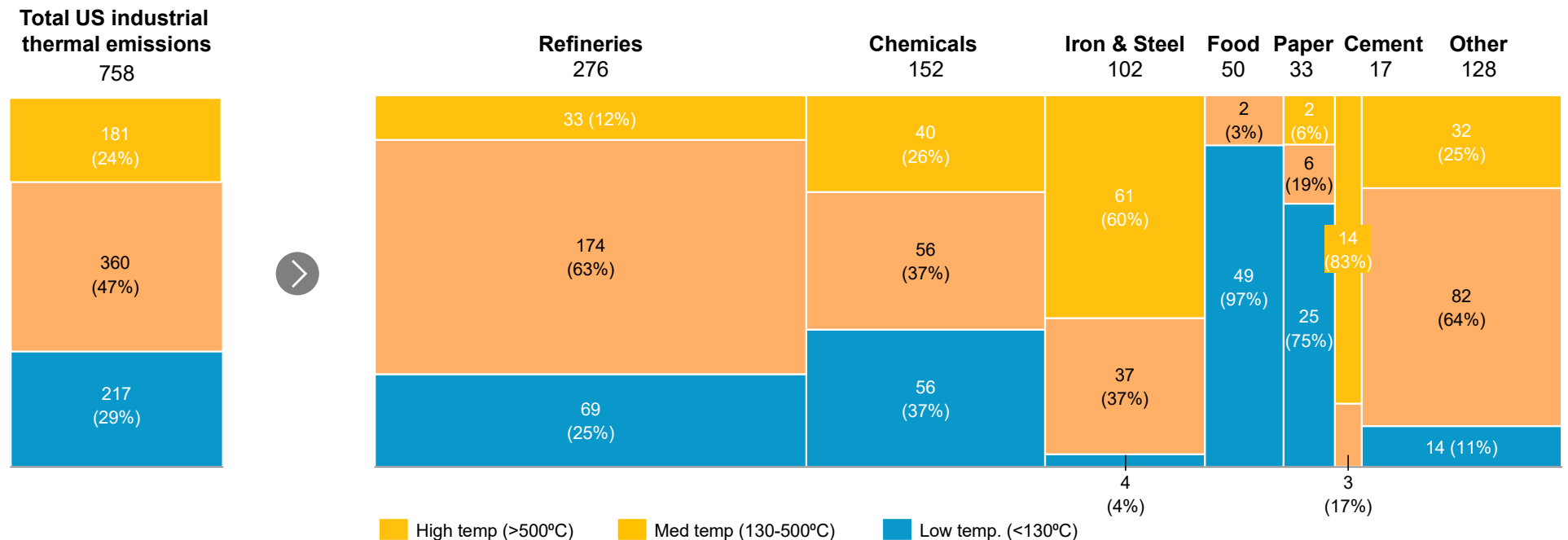
1. Based on AEO 2019 Outlook for 2018 energy consumption by combustible fuel (excludes purchased electricity) for each sector, and EPA emissions intensity of individual fuels except for biomass, which is estimated at 15 kg CO₂e/mmBtu; excludes non-manufacturing sectors of Agriculture, Construction, Mining 3. Biogenic emissions are considered 'net zero' by the EPA and are not included/reported in US industrial thermal emissions 2. Based on net emissions (including sinks) of 5,903 million tonnes of CO₂e in 2018; gross emissions were 6,677 million tonnes of CO₂e 4. Cement sector is estimated to represent 71.8% of the EIA Cement & Lime sector energy consumption Source: US EIA Energy Outlook 2019 (2018 data); EPA emissions (AEO 2019 Outlook June 2022); NREL (cement energy consumption)

[RenewableThermal.org](https://renewablethermal.org)

info@renewablethermal.org

Low & medium heat processes dominate industrial thermal emissions and account for ~76% of total

Estimated share of 2018 thermal emissions by temperature range (million tonnes of CO₂e)



Notes: Energy usage by temperature range was used as a proxy for thermal emissions by temperature range, most of industrial heat is fueled by natural gas across low, medium, and high temperature processes; certain sector emissions (e.g. Iron & Steel, Cement) may skew more towards the higher temperature range as these sectors combust fuels with higher carbon intensity for high temperature processes (e.g. coal in steel making) Source: NREL Manufacturing Thermal Energy Use in 2014 (provides thermal energy use by temperature); EIA Outlook 2019 (provides 2018 energy consumption by fuel); EPA emissions intensity by fuel

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Parallel pathways to decarbonize industrial heat¹



Electrify industry processes

- Electrify low temperature processes with cost competitive heat pumps
- Electrify remaining US steel blast furnaces with DRI-EAF2
- Electrify steam boilers & deploy other electric resistance technologies in medium-high temp. processes



Green the grid

- Enter (V)PPAs to reduce electric carbon footprint where possible
- Accelerate the transition to a carbon free electric grid to meet industrial green electricity needs



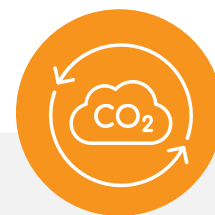
Deploy renewable fuels

- Deploy RNG as supply constraints allow
- Deploy biomass from waste feedstock; develop and deploy BECCS (Bio-energy w/ CCS) for new and existing biomass combustion
- Develop, procure, and deploy green hydrogen



Deploy renewable technologies

- Deploy solar thermal where economically viable
- Pair thermal storage with intermittent renewables; use cases likely to grow as grid mix of renewable grows
- Clean tech combinations e.g., heat pumps with geo or solar thermal



Capture & store carbon

- Deploy CCS & DAC using scale efficiencies as a short- and medium-term lever in specific sectors. Phase down CCS as industry transitions to clean processes

Energy efficiency spans across pillars¹

1. This roadmap focusses on growth of renewable thermal energy and related technologies; for prioritization purposes, industrial heat application process changes and energy efficiency have not been modeled (except for electric heat pumps and EAF); please refer to the DOE industrial decarbonization roadmap for information on process changes and energy efficiency 2. Direct reduced iron in an electric arc furnace with green hydrogen

Company Perspectives

RTC Principles

- Market-based accounting approaches for scope 1 provide incentive and access for companies to scale their investments to meet their targets.
- For technologies that use common carrier pipelines (or similar situations), book and claim allow companies to invest in clean fuels while taking credit for RTE use in their scope 1 footprint.
- Direct generation or sourcing of RTE technologies today is often inefficient, infeasible, or cost-prohibitive for most users.
- Accommodate ambitious and feasible corporate climate action.
- Enable the adoption of energy technologies that are necessary to decarbonize thermal energy use
- Ensure the credibility, transparency, and environmental integrity of the Protocol
- Maintain the validity of existing renewable energy procurement contracts and ensure certainty for future procurement.

Q&A