



# Renewable Fuels

## Green-e<sup>®</sup> Renewable Fuels Standard

**Version 1.1**

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# I. Introduction

This Green-e® Renewable Fuels Standard (“Standard”) document provides requirements for Green-e® certification of renewable fuel production, sales, and consumption.

The Green-e® certification programs are administered by the nonprofit Center for Resource Solutions and promote the use of high-quality renewable energy and carbon reductions by providing environmental standards and consumer protection to support voluntary purchasing and use of renewable energy and carbon offsets. High-quality renewable energy and offset standards and certification accelerate the development of renewable and carbon markets, and provide consumers a meaningful mechanism through which they can express demand for renewable options and greenhouse gas (GHG) reductions. For more information on the objectives of this Standard, please see the Terms of Reference available at: <https://www.green-e.org/renewable-fuels/documents>.

This Standard applies to the certification of renewable fuel transactions and end use, as well as the verification of specific fuel production pathways. Producers, sellers, and users of renewable fuel products and Renewable Fuel Certificates (RFCs) may apply to: offer renewable fuel products or RFCs certified under the Standard; verify eligible renewable fuel pathways; or certify renewable fuel purchasing by visiting <https://www.green-e.org/renewable-fuels>.

Version 1.1 of this Standard is only applicable to biomethane. Other renewable fuels may be considered in the future. Additional details about the Green-e® certification criteria, the application process, verification processes, marketing compliance review, and other information can be found in the Green-e® Renewable Fuels Code of Conduct. In addition, the Green-e® Glossary defines many of the terms that appear in this Standard. Both will be available at the time of publication at <https://www.green-e.org/renewable-fuels>. For more information and background on the Green-e® Certification program, including program governance, visit <https://www.green-e.org>.

## A. Definitions

CRS publishes the Green-e® Glossary that defines many of the terms used throughout the Standard and other Green-e® documents. The glossary is available at: <https://www.green-e.org/glossary>. In addition, certain specific definitions are provided below:

1. **Biogas:** Biogas is a mixture of gases made from the decomposition of organic material. It consists mainly of methane and carbon dioxide, with varied amounts of hydrogen sulfide, ammonia, siloxanes, and trace amounts of other gases.
2. **Biomethane:** Biomethane (also called Renewable Natural Gas [RNG]), is biogas that has been cleaned and upgraded to meet gas pipeline purity specifications. The remaining high-BTU gas is predominantly methane (over 94%), and once upgraded to pipeline quality standards, it may blend or be used interchangeably with fossil fuel-derived natural gas.
3. **Concentrated Animal Feeding Operation (“CAFO”):** A facility that confines the number of animals in Table 1 and meets the following size-specific criteria:
  - a. Large CAFO: Any farm over this size is considered a CAFO
  - b. Medium CAFO: Considered a CAFO based on farm size AND if either of the following criteria is met;
    - i. has a manmade ditch or pipe that carries manure or wastewater to surface water; or
    - ii. the animals come into contact with surface water that passes through the area where they’re confined.
  - c. Small CAFO: A farm at or below this threshold is only considered a CAFO if it has been designated a CAFO by a relevant permitting authority.

Table 1: Size Thresholds for Determining Whether Farms are Considered CAFOs

| Animal Sector   | Size Thresholds (number of animals) |                  |                  |
|---|-------------------------------------|------------------|------------------|
|   | Large CAFO                          | Medium CAFO      | Small CAFO       |
| Cattle or cow/calf pairs  | 1,000 or more                       | 300 - 999        | less than 300    |
| Mature dairy cattle   | 700 or more                         | 200 - 699        | less than 200    |
| Veal calves   | 1,000 or more                       | 300 - 999        | less than 300    |
| Swine (weighing over 55 pounds)   | 2,500 or more                       | 750 - 2,499      | less than 750    |
| Swine (weighing less than 55 pounds)  | 10,000 or more                      | 3,000 - 9,999    | less than 3,000  |
| Horses  | 500 or more                         | 150 - 499        | less than 150    |
| Sheep or lambs  | 10,000 or more                      | 3,000 - 9,999    | less than 3,000  |
| Turkeys   | 55,000 or more                      | 16,500 - 54,999  | less than 16,500 |
| Laying hens or broilers (liquid manure handling systems)                      | 30,000 or more                      | 9,000 - 29,999   | less than 9,000  |
| Chickens other than laying hens (other than a liquid manure handling systems) | 125,000 or more                     | 37,500 - 124,999 | less than 37,500 |
| Laying hens (other than a liquid manure handling systems)                     | 82,000 or more                      | 25,000 - 81,999  | less than 25,000 |
| Ducks (other than a liquid manure handling systems)                           | 30,000 or more                      | 10,000 - 29,999  | less than 10,000 |
| Ducks (liquid manure handling systems)  | 5,000 or more                       | 1,500 - 4,999    | less than 1,500  |

CRS may, at its sole discretion, aggregate multiple farms that provide feedstocks to a single digester, for the purposes of determining whether the applicable CAFO threshold is met and therefore that those farms meet the CAFO definition.

4. **Feedstock:** Any raw or unprocessed material from which renewable fuels are derived.
5. **Pathway:** A fuel pathway is a specific combination of: (1) feedstock, (2) production process, and (3) fuel type.<sup>1</sup>
6. **Participant:** In this Standard, entities entering into a Green-e® certification agreement with the Center for Resource Solutions for the sale or use of a certified renewable fuel product are referred to as “Participants” in the Green-e® program. Participants may be renewable fuel producers,<sup>2</sup> sellers of renewable fuels or RFCs, purchasers of renewable fuel or RFCs, or entities undertaking other means of procuring, transacting, or consuming renewable fuel. Participants must have one or more certification contracts with CRS and maintain compliance with the program’s requirements in order to gain and maintain their Green-e® certification.
7. **Renewable Fuel Certificate (“RFC”):** A contractual instrument that represents and conveys all attributes of a unit of renewable fuel from production until delivery to a renewable fuel consumer. Such attributes may include, but are not limited to: the feedstock and production process used; the renewable fuel type; the location of the production; the time of production; the air emissions associated with production, transport, and leakage (i.e. the Carbon Intensity); all other legally available environmental benefits of production through delivery; greenhouse gas avoidance, destruction, offsetting and other benefits; and all other information relevant to using and claiming the benefits of production. RFCs are created when renewable fuel is injected into a pipeline (or other point for customer use) for later consumption and are denominated in the same units (e.g., MMBtu, dekatherm, gigajoules) as the associated fuel produced. Total benefits and impacts include those that occur until the point of customer RFC use. RFCs facilitate tracking, transacting, and using renewable energy fuels. RFCs may be transacted separately from energy or fuels.

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<sup>1</sup> This Standard does not include requirements around end uses. Instead, the focus is on (1) fuel type, (2) fuel production process, and (3) feedstock.

<sup>2</sup> Fuel producers may have their fuels used in an approved production pathway without a certification contract with CRS, in which case the fuel producer is not a Participant and they may not claim to offer a Green-e certified product.

## **B. Usage and Geographic Range of the Criteria**

These certification criteria are intended to be used by Green-e® Participants with production, sales, and/or use of renewable fuels and RFCs that are generated in all regions of the United States (defined as the fifty States, the District of Columbia, the Commonwealth of Puerto Rico, Guam, American Samoa, the United States Virgin Islands, the Northern Mariana Islands, and associated territorial waters and airspace) and Canada (defined as the ten provinces and the Northwest Territories, Nunavut and Yukon). See also Section VIII.A regarding where fuel production facilities may be located.

## **II. Participant and Product Types**

CRS administers different certification options for different types of Participant organizations. Participants in the Green-e® program can include: renewable fuel producers, brokers, marketers, traders, pipeline operators, utilities, retailers, and end-consumers.

Participants may certify the sale or use of one or more of the following types of renewable fuels products: renewable fuel, with its RFCs, (a “bundled” product) delivered through the natural gas pipeline system to an end-user; bundled renewable fuel trucked or otherwise delivered to an end-user; bundled raw biofuels delivered directly to a consumer; unbundled RFCs sold to a retail fuel user; wholesale bundled or unbundled sales.

As the market evolves, CRS will consider other market participants and product types.

## III. Production Pathways

Renewable fuel pathways supplying renewable fuels used in Green-e® certified products must meet all applicable rules in the Standard at the time of production unless the pathway has received an exemption by the Green-e® Governance Board. Only the following renewable fuel production pathways may be used in Green-e® certified products in Canada and the U.S. Other production pathways may be added in the future in response to market demand.

Each pathway must be reviewed and approved by CRS before the resulting fuel can be used in a Green-e® certified product.

### A. Fuel Types

Biomethane is the only fuel type approved under this Standard. Other renewable fuels may be considered in future versions of this Standard.

### B. Production Facility

The types of biomethane production facilities approved under this Standard are:

1. **Anaerobic Digesters**  
Projects that use anaerobic digestion to convert the energy in organic feedstocks. This Standard only allows organic waste feedstocks such as food waste, yard waste, and municipal wastewater. See Section III.C for specific feedstock requirements.
2. **Landfill Gas (LFG) Methane Capture**  
Projects that capture biogas produced in a landfill and process the gas into biomethane. See Section IV for specific production requirements.

### C. Feedstocks for Anaerobic Digestion

This Standard only permits feedstocks from organic waste resources -- defined as unusable remains, residues, or byproducts -- with a biogenic

origin. This Standard also addresses feedstock collection, processing, transport, and storage. CRS reserves the right to require additional documentation to verify GHG and environmental impacts of any feedstock. In some instances, third-party verification may be required.

Only the amount of fuel generated from the eligible feedstocks may count towards the certified product. Facilities producing fuel using 5% or less of non-eligible fuels as a percent of total heat input (on a BTU basis, for example) may produce eligible fuels, however those BTUs generated from non-eligible fuels are not eligible for sale in Green-e® certified fuel products and must not be included in eligible BTUs produced at such a facility. The assessment of whether the 5% threshold is exceeded must be made on a periodic basis, at least quarterly. Periods for which the 5% threshold is exceeded must be excluded from Green-e® Energy certified sales.

The following feedstocks are permissible under this Standard:

1. Municipal, industrial, and commercial wastewater
2. The organic component of municipal solid waste when separated out prior to landfilling
3. Food waste (e.g. collected at municipal composting facilities) and food and beverage processing waste
4. Vegetative matter, such as yard waste, shrub, or chaparral, that is removed from within 200 feet or less of homes, built infrastructure (such as powerlines), and other man-made structures
5. Crop residue  
Agricultural crop residue that is unmerchantable as food or as animal feed.<sup>3</sup> For example, crops intended for human or animal consumption but damaged by drought or storms would qualify, as would crops with a non-energy primary purpose, such as waste from animal feed production. For the purposes of this Standard, a tree is not an agricultural crop.
6. Animal waste
  - a. Manure and feathers<sup>4</sup>

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<sup>3</sup> Saleable food crops or animal feed are explicitly excluded from certification under this Standard.

<sup>4</sup> CRS is investigating potential eligibility of animal waste from other sources.

- b. Animal waste facilities that meet the Concentrated Animal Feeding Operation (CAFO) definition in Section I.A are eligible under this Standard if the facility meets the requirements in Appendix A: Concentrated Animal Feeding Operation (CAFO) Requirements
- c. The boundaries of a biodigester project using animal waste are defined as:
  - i. Collection, storage, processing and disposal of animal waste
  - ii. Management and disposal of digestate
  - iii. Gas handling equipment

## IV. Production Requirements

All facilities that contribute to the production pathway (including feedstock production facilities) must comply with all local, sub-national, national and regional laws, regulations and ordinances, and meet all requirements related to emissions to the air, surface water, groundwater, and land.<sup>5</sup>

- A. Digestate management: In addition to meeting all applicable regulations for digestate management, facility owners must ensure digestate left over from fuel production is sustainably managed (e.g. beneficially reused, not landfilled, applied as a soil amendment without spraying, cleaned to the point of being able to be discharged safely to the environment).
  - 1. This requirement may be met by demonstrating certification under the American Biogas Council Digestate Certification Program
- B. In the case that a producer is receiving carbon offsets for methane capture (from the collection, processing or use of a feedstock, or any other aspect of the biomethane production pathway), the corresponding amount of biomethane from that facility is ineligible under this Standard.

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<sup>5</sup> In the case that a permit violation at a facility that contributes to the production pathway is not resolved within 90 days of the notice of violation (or within the period of time allowed by the violation issuing authority, if longer than 90 days), the supply from that facility will not be certified from the date of non-compliance until the date that the violation issuing authority considers the issue to have been resolved. Repeated or severe violations may be grounds for exclusion from eligibility.

## V. Carbon Intensity (CI)

This Standard strives to promote renewable fuel resources that, on a total life cycle basis, decrease atmospheric greenhouse gas concentrations in time frames that are meaningful in addressing global climate change. An analysis is required to account for the upstream emissions (emissions from leakage, extraction, production, and processing operations) of a given renewable fuel pathway. Each pathway is required to undergo a third-party analysis from a CRS-approved verifier, and the CI of the renewable fuel must be at least 10% lower than the CI of fossil natural gas up to the point of injection into the pipeline system. Accepted methodologies for calculating a CI value are listed on the Green-e® website, along with accepted sources and methods for determining the CI value of fossil natural gas. The CI of the renewable fuel, at the point of customer receipt and including pipeline and transportation leakage, must be disclosed to customers in accordance with the Green-e® Renewable Fuels Code of Conduct.

## VI. Vintage of Renewable Fuel

For Green-e® certified transactions made during a given calendar year, the fuel used in that transaction must have been injected into a pipeline (or produced, in the case of on-site fuel production and use) within a certain number of years prior to the year of sale, in accordance with Table 2 below. Proper claims and ownership of attributes / RFCs must be proven regardless of the date of fuel injection, in accordance with Sections IX and X.

Table 2: Fuel Vintage based on Year of Certified Transaction

| <b>Year of Certified Transaction</b> | <b>Earliest Eligible Fuel Pipeline Injection Date<sup>6</sup></b> | <b>Latest Eligible Fuel Pipeline Injection Date</b> |
|--------------------------------------|---|---|
| 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                        |

## VII. Production Facility Age

There is no age limit for fuel production facilities for their output to be certified or used in a Green-e® certified transaction.<sup>7</sup>

## VIII. Location of Facilities

### A. Geographic Location

Renewable fuel production facilities providing fuel or RFCs for certified products must be located within Canada and the U.S. (as defined in Section I.B). Renewable fuel production facilities located in other countries, including those importing energy into Canada and the U.S., may be considered for future versions of the Standard or a separate certification standard appropriate to those regions.

For participants on Hawaii, the Commonwealth of Puerto Rico, Guam, American Samoa, the United States Virgin Islands, the Northern Mariana

<sup>6</sup> Through sales year 2023, Participants may apply to use fuel injected into a common carrier pipeline between 5 and 15 years in the past on a first-come-first-served basis at the discretion of CRS, with a cap of 4 million MMBTU across all Participants for such fuels that are applied through sales year 2023.

<sup>7</sup> CRS may seek feedback on implementing a production facility age limit for future versions of this Standard.

Islands pursuing end-user certification, biomethane must be produced and consumed on the same state / territory unless the following criteria are met:

1. It can be proven that the island imported gas from another area of the U.S. or Canada (for example, in the form of LNG or CNG imports); and
2. Any imports of natural gas must be accompanied by a RFC from the same pipeline system as the imported gas

## **B. Fuel Transport**

Renewable fuels used in Green-e® certification are required to use the book-and-claim system of accounting, including for transactions that are for physical or contractual flows of gas through a pipeline, to substantiate ownership and transfer of renewable fuels and/or RFCs.<sup>8</sup> CRS requires specific disclosures regarding region of production and method of fuel transport, described in Green-e® Renewable Fuels Code of Conduct. The following fuel transportation methods (or combinations thereof) are allowable under this Standard; in all cases, CRS reserves the right to require additional documentation for verification purposes.

1. Pipeline-Connected Biomethane Production Facilities: The biomethane production facility (where raw biogas is processed into biomethane) is connected to a common carrier pipeline where the biomethane can be injected and transported along the pipeline system.
2. Standalone Biomethane Production Facilities: For standalone biomethane production facilities not directly connected to a pipeline, the fuel may be transported by truck or other means to a common carrier injection site if:
  - a. The overall Carbon Intensity calculation includes the entire transportation of the fuel (vehicle type, fuel type, distance traveled), and

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<sup>8</sup> The book-and-claim system of accounting refers to a chain-of-custody model in which RFCs are used to represent the transfer and ownership of renewable fuel. This method is used because once biomethane is injected into the pipeline system, it blends with fossil-derived natural gas, and the source of the molecules becomes unidentifiable. The book-and-claim method allows RFCs to be transacted independently of the physical transfer of fuel so that RFCs may be used to substantiate ownership of biomethane injected anywhere along the gas pipeline network. Book-and-claim accounting is also used by the California Air Resources Board to track renewable transportation fuels for the LCFS program.

- b. The total Carbon Intensity remains under that of the established Carbon Intensity threshold
3. Raw Biogas in Off-site Biomethane Production Facilities: In the case that the biogas production facility is not co-located with the biomethane production facility (where the raw biogas is purified and processed into biomethane) the biogas may be transported by truck or other means to a biomethane production facility (to be injected into a pipeline) if:
  - a. The overall carbon intensity calculation includes the entire transportation of the fuel (vehicle type, fuel type, distance traveled), and
  - b. The total Carbon Intensity remains under that of the established Carbon Intensity threshold
4. Raw Biogas Consumed On-site or Delivered to a Consumer: Raw biogas may be consumed on-site by the producer or delivered directly to another consumer (e.g. via a private pipeline or truck) and the use or sale may be Green-e® certified, if:
  - a. Attributes / RFCs are not sold separately; they must be retained and claimed by the consumer, and
  - b. The overall carbon intensity calculation includes the entire transportation of the fuel (vehicle type, fuel type, distance traveled), and
  - c. The total Carbon Intensity remains under that of the established Carbon Intensity threshold in Section V

## IX. Renewable Fuel Product Specifications

### A. Fully Aggregated Renewable Product

To the extent allowable under Canadian and the U.S. legal and regulatory structures, all environmental attributes that can be owned that are associated with the fuel production must be aggregated in a Green-e® certified product. None of the attributes of production may be sold off, transferred, or claimed elsewhere or by another party. There must be a legally enforceable contract, instrument (e.g. RFC), or collection of contracts and/or

instruments in place to substantiate the exchange and exclusive ownership of the renewable attributes.

## **B. Regulatory Surplus: Renewable Quotas, Targets, Other Mandates and Incentives**

Green-e® certified products must be comprised of eligible renewable fuel supply over and above any amount required by applicable sub-national, national or regional requirements or legislation. The Green-e® program does not certify renewable fuel or RFC production, usage, and/or transactions that result in double counting, including double counting between compliance and voluntary markets, as in Section IX.C.3, below (e.g. one party claiming the renewable fuel for their own voluntary use and another party claiming it toward compliance with the Low Carbon Fuel Standard (LCFS), Renewable Fuels Standard (RFS), or other state compliance quotas).<sup>9</sup>

In the event that the Seller of a certified product benefits from the sale of biomethane, for instance under a reduced cap-and-trade compliance obligation, those GHG benefits must be passed on to customers.

Only for a certified renewable fuel product that meets 100% of a customer's gas usage or a Green-e® Direct certified purchase of a renewable fuel product, Green-e® allows a percentage of the product content to be satisfied with renewables reported toward a renewable portfolio standard (RPS) or other similar state / provincial policy, up to the amount that is attributable to the customer of the voluntary product.<sup>10</sup> All such resources must also go through the Green-e® verification process, and meet all other applicable Green-e® eligibility and disclosure requirements. Distribution of renewable fuels reported toward an RPS or similar policy must be consistent across the gas usage on which the policy's obligation calculations are based, and allocating all such renewables to one customer type or group of customers is not allowed. However, variability of geographic location of generation (not

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<sup>9</sup> However, the buyer of a Green-e® certified renewable fuel product may be able to report their certified purchase toward a compliance program in order to demonstrate their own compliance with that program, depending on that program's rules.

<sup>10</sup> As a general principal, Participants offering a certified renewable fuels product that meets 100% of a voluntary customer's gas usage with renewable fuels are not required to provide the customer with Green-e® eligible renewables for more than 100% of the customer's gas usage.

renewable resource type) is allowed to the extent required by a Participant's or Participant's supplier's policy obligations under the laws of said state / province.

## **C. Double Counting, Double Selling, and Double Claiming**

A given amount of renewable fuels and any associated attributes can be applied to an end consumer's claim of using renewable energy only once.<sup>11</sup> Renewable fuels or attributes that can be reasonably attributed to a party other than the user of a certified product may not be used in Green-e® certified products. Examples of prohibited double uses include, but are not limited to:

1. When the same supply or attributes are sold to more than one party, or any case where another party has a conflicting contract for the attributes or renewable fuel;
2. When the same supply is claimed by more than one party, including any expressed or implied environmental claims made pursuant to fuels coming from a renewable resource, environmental labeling or disclosure requirements. This includes representing the fuel from which attributes are derived as renewable if the RFCs are not also owned and retired/cancelled<sup>12</sup>;
3. When the same supply is used by an entity to meet a delivery or consumption mandate for renewable fuel and is also used in certified sales, transactions, or consumption by another entity under the Green-e® program; or
4. When another party uses one or more attributes of the renewable production (see Section IV.A. on Fully Aggregated Renewables for details). This includes when supply or associated attributes are sold as a certified product to one party, and one or more attributes associated with the same unit of production (such as CO<sub>2</sub> reduction or offset) are sold to another party.

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<sup>11</sup> For further resources on double claims, see <https://resource-solutions.org/learn/rec-claims-and-ownership/>

<sup>12</sup> An example of such representations includes use of renewable energy in calculating product or portfolio resource mixes for the purpose of marketing or disclosing to energy end-users when the attributes have been sold off or claimed separately.

In all cases, the relevant government agency(is) in Canada and the U.S. must be notified by or on behalf of the Participant in writing at least annually of all production used in Green-e® certified products. A renewable fuels tracking system or other entity that already provides this information to the relevant agency(ices) may satisfy this requirement if approved by CRS.

## **X. Additional Criteria**

### **A. Third Party Verification**

CRS requires that Green-e® certified products undergo an annual verification process to substantiate supply (pathways) and certified sales, purchases and claims. The Green-e® Participant must employ an independent qualified auditor(s) and/or verifier(s) to conduct this verification in accordance with verification procedures supplied by CRS. Required auditor/ verifier qualifications are specified in the Green-e® Verification Requirements. The results of the verification and selected supporting documents must be made available to CRS and verification is not considered completed until all materials are submitted and accepted as complete and final by CRS. All audit and verification costs are the responsibility of the Green-e® Participant undergoing verification.

### **B. Use of Electronic RFC Tracking Systems**

CRS supports the use of electronic RFC tracking systems to facilitate production facility registration/validation, the documentation of fuel production, and chain-of-custody tracking of RFCs and RFC retirements. Electronic RFC tracking systems can facilitate participant compliance with the criteria in this Standard and other program requirements. CRS's audit and verification procedures will provide instruction on how to use RFC tracking systems as part of Green-e® requirements. CRS will provide a list of approved tracking systems with any additional requirements for the use of such systems on the Green-e® website. Tracking systems seeking approval under this Standard will be assessed by CRS.

### **C. Consumer Disclosure**

Certified transactions and sales by Participants must disclose specific product information to each purchaser. Disclosures are described in Green-e® Renewable

Fuels Code of Conduct. Disclosures will include information such as fuel type, production process, feedstock type, location of production, Carbon Intensity score in comparison to that of natural gas, and vintage of production. Customers receiving certified retail gas products must also receive disclosure about the percentage or amount of non-renewable gas they are receiving from the seller over the same period.

## **D. Renewable Fuels Products Offered by Gas Utilities**

### 1. Product Pricing

In no case should the above market costs of the energy used directly for a certified utility renewable fuels program be allocated to customers who are non-participants in the program. If such costs are related to public policy initiatives deemed acceptable by their regulators, a gas utility may appeal to the Green-e® Governance Board for approval.

### 2. Regulatory Approval

Certification is only available to programs that have been approved by an appropriate regulatory or oversight body with jurisdiction over the program prior to the program's nomination for certification.

## **XI. Governance and Revisions to the Standard**

The Standard is a dynamic document and may be updated over time to accommodate changes in renewable fuel markets, policy changes that affect renewable fuels, and/or innovations in renewable fuel technology.

All revisions and calls for comments will be posted on the Green-e® website ([www.green-e.org](http://www.green-e.org)). For any substantial changes to this Standard,™ Center for Resource Solutions commits that:

- A. Stakeholders will be solicited in advance of Green-e® Governance Board meetings for input on substantive policy change issues; and
- B. At least one year of notice (following the date of announcement of Board approval) will be granted to Participants and other stakeholders before the substantive changes go into effect (though Participants may choose to follow the updated language immediately), unless a timelier change is necessary to respond to a significant and imminent problem threatening the integrity of renewable fuels markets.

Details of the standard-setting process and of how to submit comments or grievances are available at: <https://www.green-e.org/about/standard-setting>.

# Appendix A: Concentrated Animal Feeding Operations (CAFO) Requirements

A facility that meets the definition of Concentrated Animal Feeding Operation (CAFO) in Section I.A.3 of the Green-e® Renewable Fuels Standard (“Standard”) is subject to the following requirements for the animal waste produced at the facility to be eligible for use in a Production Pathway recognized under the Standard:

1. The expansion of existing CAFOs and the construction of new CAFOs are not allowed.
2. A facility must have been first licensed to operate prior to August 6, 2025. No facilities first licensed after August 6, 2025 are eligible.
3. The facility must obtain and maintain a current National Pollutant Discharge Elimination System (NPDES) permit, even if a NPDES permit is not normally required by state or federal law.
4. A current Comprehensive Nutrient Management Plan (CNMP) is required as part of the NPDES permit. All sections of the CNMP that describe waste management practices and potential pollution to the surrounding community and environment are required to be available publicly online, and a link to the CNMP from an approved project will be posted on the Green-e® program website. Any sections of the CNMP that describe personal or confidential business information (e.g., financial information, proprietary business practices, personal or family contact information, etc.) or are otherwise outside of the scope of waste management or potential pollution may be redacted. CRS may request additional information about any section of the CNMP, including redacted sections, to verify that they are outside of this scope.
5. Prior to approval of the project by CRS, an initial notice with CRS-approved language and disclosures must be sent to community members (in English and in the primary language(s) of local residents) within a 5-mile radius of the CAFO (including waste or digestate application areas), providing the community with a 45-day period to report anonymous complaints to CRS related to, for example, odors, pollution, water use, and other environmental impacts. Anonymous complaints may be reported to CRS via telephone, physical mail, and electronic mail. Instructions for each communication method will be provided to the community. A larger radius for community notices may be required, depending on site-specific circumstances, at CRS’s discretion. CRS may also conduct outreach to local stakeholders, including

local nonprofit organizations and will check with the local jurisdiction to see whether any complaints have been lodged against the facility. Farmers and facility owners may not provide any misleading information to community members about the environmental impacts of the facility and/or farm and are prohibited from engaging in tactics to intimidate community members about registering complaints. Any complaints received by CRS will be reviewed by the Renewable Fuels subcommittee of the Green-e® Governance Board, and a determination will be made by this subcommittee about approval, rejection, and/or remedies required of the facility. An updated notice must be sent to community members annually, and complaints may be received by CRS and considered at any time by this subcommittee, regardless of current facility approval status.

6. Facilities may not be located in areas with karst geology.
7. Spray field systems (the use of high-pressure equipment to apply or dispose of waste, effluent and/or digestate) are not allowed.
8. Lagoons that are open to the air (open air waste pits) are not allowed.
9. Facilities with lagoons for waste storage or digestate liquid that are within 100 feet of a 100-year floodplain, as defined by the Federal Emergency Management Agency (FEMA), are not allowed. A facility without a lagoon that is located in a 100-year floodplain must demonstrate that stored waste will not be impacted and/or breached by flooding.
10. The facility must disclose to CRS each incident of breach or overflow of lagoon waste within the past 5 years and demonstrate steps taken to prevent future incidents. Significant breaches or overflows of waste may result in disqualification of the facility.
11. Facilities must have covers over all lagoons. Lagoons must be properly sealed to ensure that no gases are being emitted. If CRS receives complaints or becomes aware of odors in the surrounding communities, CRS may require facilities to perform air monitoring and/or other corrective activities to prevent air emissions and odors.
12. Facilities must comply with the following restrictions for nitrogen control
  - a. All lagoons that contain manure must be synthetically lined
  - b. Digestate applications in the fall or winter, after crops have been harvested, are not permitted
  - c. All fields must be sampled prior to digestate application to limit the application to less than the calculated agronomic uptake of the field

- d. The background concentration of nitrogen in the fields must not exceed 15 mg/kg in any 1-foot interval from 0-3 feet
- e. Facilities with tile drains, drain tiles, or other subsurface drain networks are ineligible for digestate land application
- f. Fields with nitrogen concentration ranges greater than or equal to 15 mg N/kg as determined by an initial soil test must follow the digestate application criteria and schedule in Table 1

**Table 1. Digestate Application Restrictions for Nitrogen Control<sup>13</sup>**

| Fall Average Residual N in Upper 2 feet (NH <sub>4</sub> -N+NO <sub>3</sub> -N) | Digestate Application Restrictions Based on Measured Fall Average Residual Soil Nitrogen Levels (NH <sub>4</sub> -N+NO <sub>3</sub> -N) <sup>[1]</sup> |                              |                               |                               | Split Application Schedule for Digestate Applied by Irrigation (Crop Year 3+ Only) |  |
|---|--|------------------------------|-------------------------------|-------------------------------|--|--|
|   | Crop Year 1 (Fall of Previous year)  | Crop Year 2 (Fall of Year 1) | Crop Year 3+ (Fall of Year 2) | Crop Year 4+ (Fall of Year 3) | Portion of winter crop application made in fall (Oct-T200)                         | Portion of winter crop application made in spring (After T200) |
| ≤ 15 mg N/kg  | 100% of agronomic rate   | 100% of agronomic rate       | 100% of agronomic rate        | 100% of agronomic rate        | ≤ 100%   | Balance  |
| 15.1-25 mg N/kg   | 100% of agronomic rate   | 100% of agronomic rate       | 95% of agronomic rate         | 90% of agronomic rate         | ≤ 66%  | Balance  |
| 25.1-35 mg N/kg   | 95% of agronomic rate  | 85% of agronomic rate        | 80% of agronomic rate         | 75% of agronomic rate         | ≤ 33%  | Balance  |
| 35.1-45 mg N/kg   | 90% of agronomic rate  | 80% of agronomic rate        | 70% of agronomic rate         | 60% of agronomic rate         | 0%   | Balance  |
| > 45 mg N/kg  | No application   | No application               | No application                | No application                | —  | —  |

<sup>13</sup> Table 1 adapted from Washington CAFO manure application regulations for nitrogen control: [https://www.centerforfoodsafety.org/files/care-v-dbd-consent-decree\\_37210.pdf](https://www.centerforfoodsafety.org/files/care-v-dbd-consent-decree_37210.pdf)

For the purposes of interpreting Table 1:

- a) Nitrogen agronomic rate limitations shall apply to both the winter and summer crop, unless follow-up soil nitrogen measurements fall into a lower category, or crop tissue (basal stem and leaf sampling) measurements show a deficiency in the crop tissue for nitrogen.
- b) For Crop Year 3 and thereafter, winter manure applications will be split into a fall and early spring application as indicated in Table 1 for fields to which digestate is applied by irrigation.
- c) If a given Application Field exceeds 25 mg N/kg for three (3) years in a row after Crop Year 1, then the facility shall reduce the application limit for that field from 75% to 50% until the nitrogen level drops below 15 mg N/kg.
- d) If a given Application Field exceeds 35 mg N/kg for two (2) years in a row after Crop Year 1, then the facility shall apply no digestate to that field until the nitrogen level drops below 15 mg N/kg.

### 13. Testing Requirements and Limits

- a. A facility that is within 300 feet of surface waters must perform testing of that surface water for pollutants/nutrients upstream and downstream of the facility. Testing must be performed on a quarterly basis at a minimum with a high and low water sampling. A minimum of one upstream and three downstream measurement is required for each facility during each quarterly test. For the pollutants/nutrients listed in section Table 2 below, the downstream water testing results may not exceed the higher of: a Statistically Significant Increase (SSI)<sup>14</sup> over the upstream measurements; or the limits listed in Table 2
- b. A facility that meets at least one of the four criteria below must perform groundwater testing upgradient and downgradient of any animal waste storage, processing, lagoons, and application
  - i. High groundwater level / shallow depth to groundwater (the depth threshold may vary depending on site specific conditions, including but not limited to, soil type and drought conditions)
  - ii. Nearby surface waters that are impaired for nutrients and/or bacteria
  - iii. Within 100 feet of a floodplain
  - iv. Within 5 miles of a drinking well (either a domestic well or a community water system)

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<sup>14</sup> For example, the Environmental Protection Agency's guidance on Statistically Significant Increase (SSI) is an acceptable method, though other methods may be used

Testing must be performed on a quarterly basis at a minimum. Installing continuous monitoring wells at the project site is one way to comply with the testing protocol but is not required. A minimum of one upgradient measurement and one downgradient measurement is required for each facility during each quarterly test. For the pollutants/nutrients listed in section Table 2 below, the downgradient groundwater testing results may not exceed the higher of: a Statistically Significant Increase (SSI) over the upgradient measurements; or the limits listed in Table 2

- c. All monitoring of pollutants and nutrients must be made public and available in real-time online

**Table 2. Pollutant and Nutrient Limits<sup>15</sup>**

| <b>Pollutant/Nutrient</b>  | <b>Groundwater Limits</b>                    | <b>Surface Water Limits</b>                  |
|--|--|--|
| Total Nitrogen (N):  | 6 mg/L                                       | 6 mg/L                                       |
| Nitrite  | 1.0 mg/L                                     | 0.5 mg/L                                     |
| Nitrite plus nitrate (mg/L as N)   | 7.5 mg/L                                     | 7.5 mg/L                                     |
| Total Ammonia Nitrogen (TAN) <sup>16</sup> at a given temperature and pH | 1.9 mg/L TAN at pH 7.0 and temperature 20 °C | 1.9 mg/L TAN at pH 7.0 and temperature 20 °C |
| Phosphorous  | 0.1 mg/L                                     | 0.025 mg/L                                   |
| Total Suspended Solids (TSS)   | 30 mg/L                                      | 30 mg/L                                      |
| Fecal coliforms, including Escherichia coli (E. coli)                    | Negative <sup>17</sup>                       | 235 MPN/100 mL                               |

<sup>15</sup> Facilities must comply with the Environmental Protection Agency's drinking water limits specific to the state where the facility is located if state limits are stricter than those listed in Table 2

<sup>16</sup> As TAN thresholds vary, testing shall follow guidelines set forth here by the [Environmental Protection Agency's \(EPA\) Final Aquatic Life Ambient Water Quality Criteria For Ammonia-Freshwater 2013](#)

<sup>17</sup> For all facilities regardless the size maximum contamination level is violated when: Any repeat sample is total coliform positive

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