

1 **Public Consultation: Clarifying Renewable Natural Gas Eligibility Using** 2 **Quantitative Gas Quality Criteria for Certificate Issuance**

3 **Consultation Process & Timing**

4 CleanCounts is accepting stakeholder feedback on the following proposed update to the RTC Operating
5 Procedures through **Monday, February 23, 2026**. Stakeholders are encouraged to submit feedback using the
6 provided **Excel feedback form** found on [CleanCounts Blog posting](#) related to this consultation. Stakeholders
7 should put “Public Consultation” in the subject line of their email with their attached Excel spreadsheet response
8 form. Spreadsheet feedback can be submitted by email to feedback@cleancounts.org.

9
10 Questions? Please contact James Critchfield, Head of Registry & Market Integrity at james@cleancounts.org.

11
12 **Submitted comments—and the names of any individuals or organizations—will not be attributed or made**
13 **public as part of this consultation.**

14 **Questions for Stakeholder Feedback**

15 Stakeholders are invited to provide feedback on the following questions, with reference to data, operational
16 experience, or publicly available standards where possible (please provide links or citations that easily identify the
17 source and other relevant information in your response):

18
19 **1. Tariff Dataset Adequacy**

20 Does the analysis of effective Federal Energy Regulatory Commission (“FERC”) NGA interstate pipeline
21 tariffs reasonably capture the outer bounds of gas quality accepted within the U.S. common carrier
22 pipeline system? If not, please identify specific tariffs or data sources that would materially alter the
23 observed envelope.

24 **2. Parameter Completeness**

25 Are there gas quality parameters commonly enforced in interstate pipeline tariffs that should be included
26 or more explicitly addressed in the proposed framework? If so, please identify those tariffs and provide
27 links or citations that easily identify the source and other relevant information in your response.

28 **3. Use of an Outer Boundary**

29 Does defining an outer gas quality envelope based on existing tariff practice appropriately reflect the
30 market’s understanding of interchangeability without prescribing typical or preferred operating
31 conditions?

32 **4. Registry Administration**

33 From an administrative perspective, does a gas-quality-based eligibility threshold provide greater clarity
34 and consistency than reliance on pipeline injection status alone? What minimum data should be reported
35 to CleanCounts to demonstrate gas-quality and “Proof of Standard” eligibility?

36 **5. Market Transparency**

37 Would certificate classification based on quantitative gas quality characteristics improve transparency and
38 comparability for buyers and sellers of RNG attributes?

39 **6. Governance and Evolution**

40 Is the proposed approach for periodically updating the gas quality envelope as tariffs evolve sufficient?

41 What additional safeguards or processes should be considered?

42 7. **Other feedback?** Stakeholders are encouraged to submit other comments and feedback as needed.

43 **Purpose of This Consultation**

44 The U.S. gas market has long distinguished renewable natural gas (RNG, or biomethane) from raw or lightly
45 upgraded biogas based on physical gas quality and the ability of the gas to substitute for conventional natural gas
46 without adverse impacts to pipelines, equipment, or end users. This distinction is grounded in the concept of
47 interchangeability: RNG is understood to be biogenic gas that has been sufficiently upgraded to meet gas quality
48 standards associated with common carrier natural gas systems.

49
50 Since the inception of the RTC registry, CleanCounts has applied this distinction in practice by relying on
51 physical injection into a common carrier pipeline as a proxy for meeting pipeline gas quality requirements. This
52 approach reflected the assumption that such pipelines enforce tariff-based gas quality standards designed to ensure
53 safe, reliable transport and downstream use.

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55 Over time, reliance on pipeline injection as a proxy has become increasingly difficult to administer and
56 insufficiently precise. In particular, the characterization of “common carrier” status has proven ambiguous in
57 some cases, and pipeline connectivity alone has not consistently provided clear, objective evidence that gas meets
58 gas quality characteristics associated with interchangeability.

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60 The purpose of this consultation is to seek stakeholder input on an alternative, quantitative approach that
61 clarifies—rather than redefines—the existing and widely accepted definition of RNG. The proposed approach
62 grounds RNG eligibility directly in observable gas quality characteristics derived from the universe of federal
63 interstate pipeline gas quality tariffs, removing the need to infer gas quality indirectly through pipeline
64 classification or delivery pathway.

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66 This proposal is intended to align with the CleanCounts Metering & Measurement Guide by (i) anchoring
67 eligibility in measurable gas-quality parameters, (ii) requiring that sampling/measurement occur at the
68 Measurement Boundary (i.e., the last point before delivery across the Project Boundary), and (iii) standardizing
69 minimum reporting coverage and documentation for certificate designation.

70 **Registry Administration Challenge**

71 CleanCounts RTC registry has historically relied on physical injection into a “common carrier” pipeline as a
72 proxy for gas quality and interchangeability. In practice, this proxy has proven ambiguous and increasingly
73 difficult to apply consistently.

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75 Determining whether a specific pipeline qualifies as a common carrier often requires substantial, case-specific
76 research by registry staff, including review of ownership structures, regulatory status, tariff applicability, and gas
77 quality provisions. Publicly available information is frequently incomplete or inconclusive, particularly for
78 intrastate and utility-owned systems, requiring staff to exercise judgment to infer gas quality expectations
79 indirectly.

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81 This ambiguity has introduced administrative burden and inconsistent outcomes and has generated feedback from
82 downstream stakeholders. Some buyers have expressed concern that certificates identified as RNG do not always

83 reflect gas quality characteristics consistent with interchangeability assumptions. Some producers and brokers
84 have similarly raised concerns about being underbid by gas certificates that do not meet broadly accepted
85 interchangeability-related gas quality characteristics but are nonetheless presented as RNG based on pipeline
86 connectivity alone.

87
88 When ambiguity undermines confidence in certificate meaning, the integrity of the registry and the market it
89 supports are affected. **The objective of this proposal is not to establish new standards, but to clarify existing,
90 widely accepted definitions of RNG by anchoring registry eligibility in observable, quantitative gas quality
91 characteristics.** Doing so reduces reliance on proxy determinations, improves administrative consistency, and
92 supports market and registry integrity by aligning certificates more directly with the physical attributes of the gas.

93 Why Gas Quality Is the Relevant Physical Criterion

94 Gas quality determines whether one gaseous fuel can substitute for another without degrading performance or
95 introducing safety and reliability risks. In natural gas systems, variations in gas composition directly affect:

- 96
- 97 • combustion performance and thermal efficiency;
- 98 • safety and emissions characteristics; and
- 99 • the integrity and durability of pipelines, compressors, meters, and end-use equipment.

100
101 Two parameters are foundational to this determination¹:

- 102
- 103 • **Higher Heating Value (HHV)**, which reflects the energy content of the gas; and
- 104 • **Wobbe Index**, which characterizes the rate of energy delivery through a burner orifice at constant pressure
105 and serves as a primary indicator of burner compatibility.

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107 Inert constituents—such as carbon dioxide (CO₂), nitrogen (N₂), and oxygen (O₂)—dilute energy content, alter
108 combustion chemistry, and can contribute to flame instability, increased emissions, and material degradation. As
109 inert content increases, both HHV and Wobbe Index decline. Gas that falls outside established ranges for these
110 parameters may be usable in controlled or site-specific applications, but it is not interchangeable with natural gas
111 across interconnected pipeline systems and general end-use equipment.

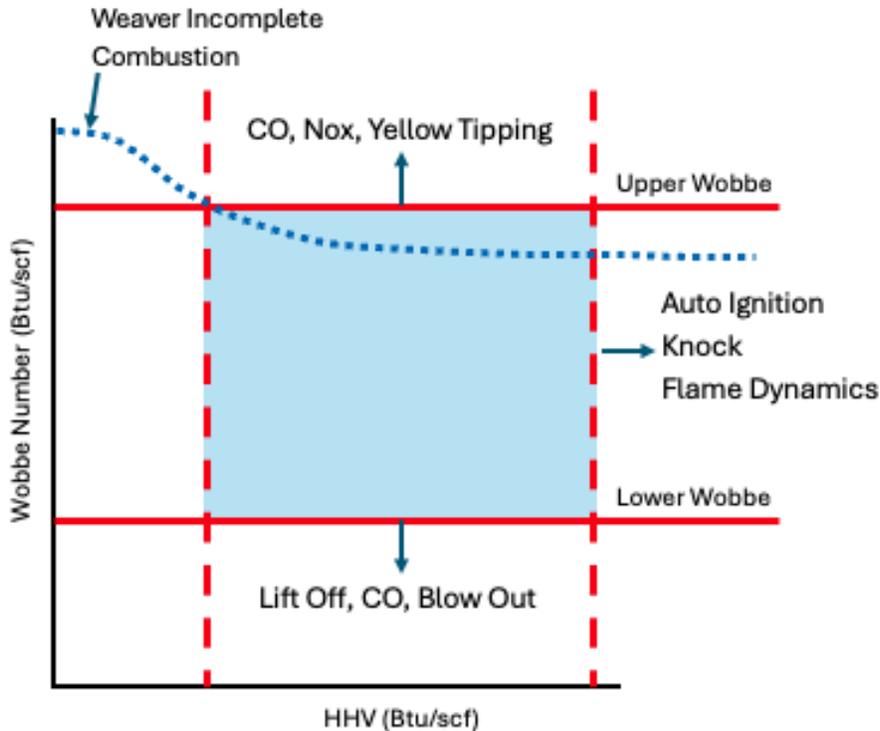
112
113 Figure 1 illustrates the conceptual operating envelope within which gas quality supports stable combustion,
114 acceptable emissions, and reliable system performance. Within this envelope, bounded by lower and upper HHV
115 and Wobbe limits, gas is broadly interchangeable with natural gas. Outside this range, combustion-related issues
116 become increasingly likely, limiting interchangeability.

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¹ All gas-quality values in this consultation are assumed to be expressed at standard reference conditions and on a consistent basis (e.g., dry basis where applicable). Where tariffs use different reference conditions or bases, values are normalized for comparison.

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Figure 1: Conceptual Interchangeability Envelope for Gaseous Fuels (illustrative)



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Figure 1 is an adaptation from NGC+ Interchangeability Work Group, “White Paper on Natural Gas Interchangeability and Non-Combustion End Use,” Natural Gas Supply Association (NGSA) and Interstate Natural Gas Association of America (INGAA), February 28, 2005, 63 pp., Washington, D.C.

127 How Gas Quality Is Regulated in the U.S. Pipeline System

128 Interstate natural gas pipelines operate under tariffs regulated by the Federal Energy Regulatory Commission
129 (FERC) pursuant to the Natural Gas Act (NGA). More than 190 distinct FERC NGA tariffs currently govern
130 interstate pipeline operations². These tariffs are legally enforceable instruments that establish the gas quality
131 characteristics required for gas to be accepted for transport on the common carrier pipeline network.

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Across tariffs, gas quality provisions commonly specify allowable ranges or limits for:

- 135 • **Higher Heating Value**, expressed as minimum and/or maximum thresholds;
- 136 • **inert and diluent gases**, including additives, CO₂, N₂, and O₂;
- 137 • **sulfur compounds and other contaminants**, such as hydrogen sulfide (H₂S); and
- 138 • **Wobbe Index**, in cases where interchangeability considerations are explicitly addressed.

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Each interstate pipeline applies and enforces its own tariff-specific requirements at the point of receipt. While

² Fed. Energy Regul. Comm’n (FERC). (n.d.) eTariff – FERC interstate tariff list. Retrieved December 2025, from <https://etariff.ferc.gov/TariffList.aspx>.

141 individual limits vary, the collective body of FERC-regulated tariffs defines the physical and commercial
 142 boundary of gas that the U.S. interstate pipeline system has determined to be acceptable for transport,
 143 commingling, and downstream delivery.

144 **FERC Tariff Research: Scope and Method**

145 CleanCounts conducted a review of more than 190 effective FERC-regulated interstate pipeline tariffs, identified
 146 by tariff identification number (Tid), to characterize the range of gas quality requirements applied across the U.S.
 147 common carrier system. The review focused on tariff provisions governing gas quality at points of receipt.

148
 149 For each tariff, reported gas quality requirements were extracted for key parameters, including minimums,
 150 maximums, and applicable limits. Where tariffs expressed requirements in differing units or formats, values were
 151 normalized to enable comparison when possible. The analysis relied solely on published tariff language and did
 152 not infer operational practices beyond what is explicitly stated in the approved tariff.

153
 154 The objective of this research was not to identify a single “typical” pipeline specification. Rather, it was to
 155 document the outer bounds of gas quality that interstate pipelines deem acceptable within the U.S. system. Taken
 156 together, these bounds define a quantifiable, empirical envelope that reflects existing pipeline practice and
 157 provides quantitative context to the market’s long-standing understanding that RNG is upgraded biogas that is
 158 interchangeable with common carrier natural gas.

159
 160 CleanCounts is not proposing to verify tariff applicability on a project-by-project basis. Tariffs are used here as a
 161 published evidence base to derive an outer envelope of interchangeability-related gas-quality criteria. Compliance
 162 demonstrations under this proposal rely on measurement and reporting at the Measurement Boundary, consistent
 163 with the CleanCounts Metering & Measurement Guide.

164 **Observed Federal Interstate Pipeline Gas-Quality Envelope**

165 **Table 1** summarizes the observed ranges for key gas quality parameters across effective FERC NGA tariffs.

166 **Table 1: Summary of Gas Quality Ranges Across FERC NGA Tariffs³**

Criterion	Minimum Observed	Maximum Observed	% of Tariffs with Reported Values
High Heating Value - Minimum	900 Btu/scf	1,022 Btu/scf	93%
High Heating Value - Maximum	1,022 Btu/scf	1,400 Btu/scf	67%
Wobbe - Minimum	1,195 Btu/scf	1,340 Btu/scf	14%
Wobbe - Maximum	1,378 Btu/scf	1,400 Btu/scf	19%
Total Inerts	2%	5%	64%
CO₂	1%	3%	84%
N₂	1%	4%	36%
O₂	0.1%	1%	88%
H₂S	(varies)	(varies)	94%

167 *LHV (Minimum/Maximum) can be calculated from observed HHV with a ranges of 810/920 and 920/1260 respectively

³ H₂S limits are commonly expressed in tariffs as ppmv or grains per 100 scf (not percent). Because units and expressions vary materially across tariffs, Table 1 summarizes reporting coverage but does not present a single percent-based envelope for H₂S.

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Not all tariffs specify every parameter. Viewed collectively, however, the dataset defines a national gas-quality envelope representing the range of conditions under which gas has been accepted for transport on the interstate pipeline system.

172 **Distribution of Gas Quality Requirements**

173 In addition to minimum and maximum values, the distribution of reported tariff limits provides insight into how
174 gas quality requirements are applied in practice. Figure 2 presents histograms illustrating the frequency and
175 clustering of reported limits for selected parameters summarized in Table 1.

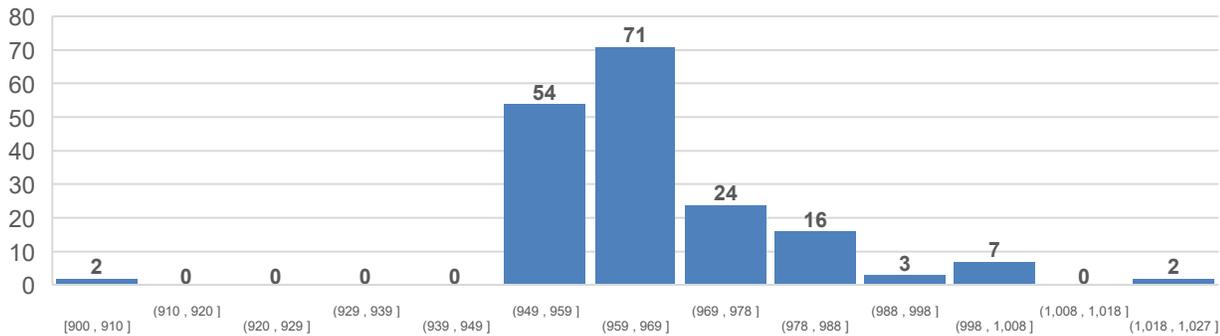
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177 These distributions highlight areas of convergence across pipelines as well as the presence of more permissive or
178 restrictive outliers, helping to contextualize the observed outer bounds of the tariff envelope.

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Figure 2: Distribution of Selected Gas Quality Parameters Across FERC NGA Tariffs

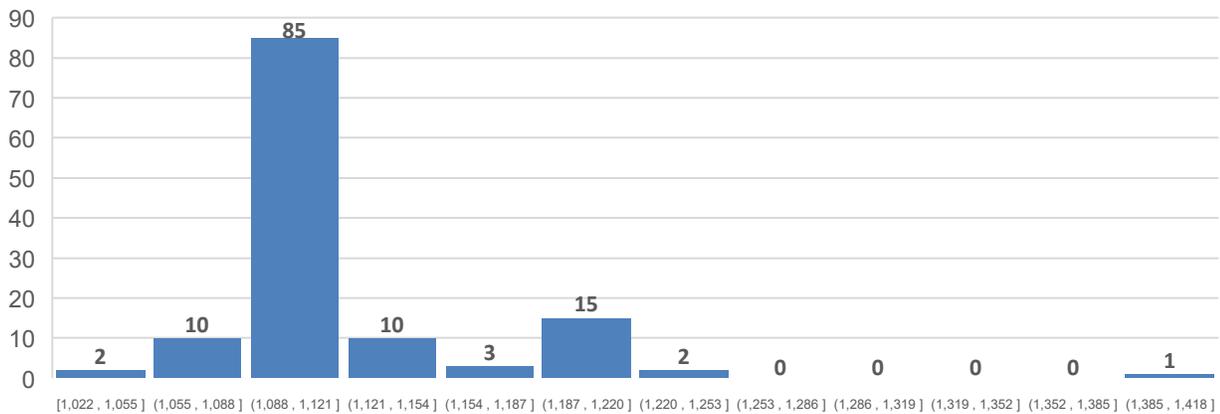
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HHV - Minimum

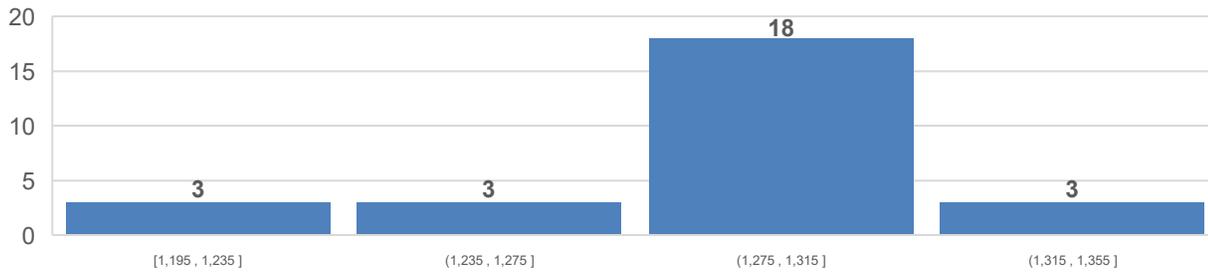


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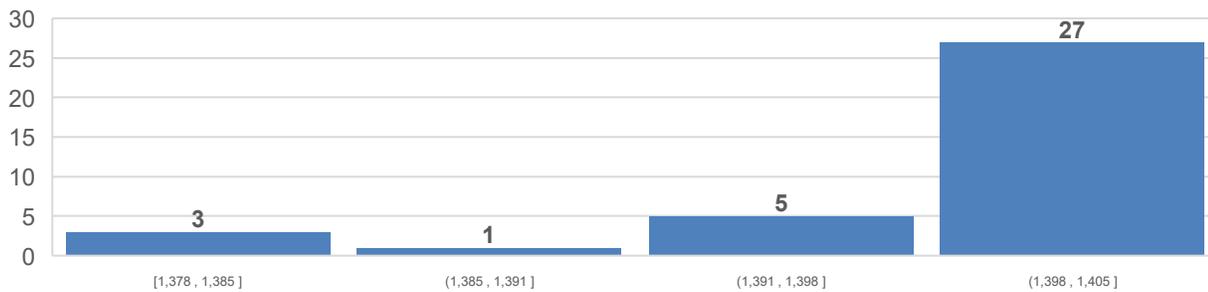
HHV - Maximum



Wobbe - Minimum



Wobbe - Maximum



Relationship to Local Distribution Company (LDC) Pipeline Gas Standards (Supplemental Evidence)

CleanCounts examined research on an additional 17 distribution gas pipelines. This research indicates that distribution pipeline requirements generally fall within the envelope of FERC pipeline gas quality tariff requirements.

Table 2 — Observed Gas Quality Ranges Across Distribution Pipeline Tariffs

Criterion	Minimum Observed	Maximum Observed
High Heating Value - Minimum	960 Btu/scf	985 Btu/scf
High Heating Value - Maximum	1,100 Btu/scf	1,155 Btu/scf
Wobbe - Minimum	1,270 Btu/scf	1,305 Btu/scf
Wobbe - Maximum	1,370 Btu/scf*	1,400 Btu/scf
Total Inerts	2.7%	4%
CO₂	1%	3%
N₂	1%	4%
O₂	0.1%	0.5%

*The Wobbe minimum value represents a nominal difference from the FERC tariff gas quality envelope.

194 **Relationship to Gas Appliance Design Assumptions**
 195 **(Supplemental Evidence)**

196 Federal residential gas appliance test procedures provide an independent reference point for gas
 197 interchangeability⁴. DOE residential appliance test methods assume natural gas with an HHV of approximately
 198 **1,025 Btu/scf ±4%**⁵, corresponding to a range of roughly **984–1,066 Btu/scf**.

199
 200 Using a representative U.S. gas specific gravity of approximately **0.60**, this HHV range corresponds to an implied
 201 Wobbe Index range of approximately **1,270–1,376 Btu/scf**.

$$\text{Wobbe} = \frac{\text{HHV}}{\sqrt{\text{SG}}} \Rightarrow \sim 1,270 \text{ to } 1,376$$

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 205 This appliance-assumed range lies entirely within the observed FERC tariff gas quality envelope, indicating
 206 alignment between pipeline gas quality standards and appliance design assumptions. Raw or lightly upgraded
 207 biogas, by contrast, typically falls well below these HHV and Wobbe ranges and therefore does not meet
 208 interchangeability expectations associated with natural gas service. Note: The Wobbe Index relationship depends
 209 on specific gravity and reference conditions; this calculation is illustrative and not used as a compliance standard.

210 **Implications for RNG Classification**

211 The combined evidence from interstate pipeline tariffs and appliance design assumptions indicates that gas falling
 212 within the observed tariff envelope is compatible with natural gas infrastructure and end-use equipment under at
 213 least some operating conditions. Gas outside this envelope may be suitable for site-specific applications but is not
 214 interchangeable with natural gas on the common carrier system.

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 216 This provides a quantitative basis for distinguishing RNG from biogas that is consistent with existing market
 217 understanding and federal common carrier pipeline requirements.

218 **Proposed Certificate Classification Based on Gas Quality**

219 Under this proposal, CleanCounts would classify gas for certificate issuance based on gas quality characteristics
 220 rather than common carrier pipeline injection status, while continuing to disclose relevant delivery information.

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 222 **Table 3: Proposed Certificate Categories**

Certificate Category	Description
RNG / Biomethane	Gas that meets the observed FERC tariff gas-quality envelope.
Biogas	Gas that does not meet the observed FERC tariff gas-quality envelope.

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 224 This approach allows gas to be evaluated based on its physical characteristics and interchangeability, independent
 225 of whether it is used onsite, transported by private pipeline, or delivered through a common carrier system. Biogas
 226 will still be eligible for Renewable Thermal Certificates.

⁴ U.S. Dep’t of Energy . (n.d.) Appendix E to Subpart B of Part 430 – Uniform Test Method for Measuring the Energy Consumption of Water Heaters (10 C.F.R. § 430, Supart B, App. E). Retrieved December 2025, from <https://www.ecfr.gov/current/title-10/chapter-II/subchapter-D/part-430/subpart-B/appendix-Appendix%20E%20to%20Subpart%20B%20of%20Part%20430>

⁵ NGC+/INGAA white papers indicate a Wobbe band rule of ±4% from local historical gas quality standards as anchored in the legacy gas appliance fleet.

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CleanCounts intends this proposed classification scheme to only apply to certificates issued within the RTC registry. Should a program or policy indicate a different characterization of RNG or biogas, CleanCounts has the capability to differentiate and serve these program and policy requirements by assigning additional qualifying attributes to sources, such as through the application of an eligibility flag.

The following represents several examples based on a gas source that exhibit a HHV, Wobbe, and inerts composition equivalent to biogas as described under this proposal. Additional qualifying attributes would be added to the source of production to clearly indicate program or policy acceptance.

Table 4: Proposed Attribute / Eligibility Flags for Divergent Gas Standards

Examples	Program / Policy	Registry Category	Qualifying Attribute / Eligibility Flag
Example A	ISCC Certification	RTC = Biogas	ISCC Biomethane Quality Gas
Example B	State “A” Regulatory Program	RTC = Biogas	State “A” RNG Quality Gas
Example C	Voluntary “B” Standard	RTC = Biogas	“B” Standard RNG Quality Gas

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* The table assumes that the gas reported to CleanCounts does not meet the CleanCounts RNG gas-quality envelope but may meet a program’s RNG/biomethane definition through different criteria.

Similarly, if a source presents as RNG under this proposal and a program/policy views the gas as “biogas” the production would also carry a qualifying attribute or eligibility flag to distinguish these differences.

243 Governance and Evolution of the Gas-Quality Envelope

244 The FERC tariff corpus is public and is expected to evolve over time. CleanCounts will periodically review
245 effective tariffs to reassess the observed gas-quality envelope. Stakeholders may propose updates by citing and
246 presenting evidence on newly effective or revised tariffs. The qualifying envelope may expand or contract as
247 federal pipeline practice changes, ensuring that registry criteria remain aligned with observable, current standards.

248 Outcome

249 This proposal clarifies the existing understanding that RNG is upgraded biogas that is interchangeable with
250 natural gas on common carrier systems by grounding that understanding in quantitative, observable gas quality
251 data. By shifting from proxy-based determinations to explicit gas quality criteria, the registry can issue certificates
252 based on what the gas is, rather than on ambiguous interpretations of how or where it is delivered.

253 RNG References

254 The following is a non-exhaustive list of RNG references used in the development of this proposal. These
255 references provide contextual definitions; the proposed eligibility method in this consultation is based on
256 quantitative gas-quality criteria derived from the tariff dataset described above.

257
258 **Table 5: Reference Sources for RNG and Biomethane Definitions**

Organization	Definition	Source
American Gas Association & American Biogas Council	"Renewable Natural Gas (RNG): Pipeline compatible gaseous fuel derived from biogenic or other renewable sources that has lower lifecycle CO2e emissions than geological natural gas."	https://americanbiogascoal.org/definitions-3/
American Biogas Association and	"Biomethane: biogas-derived, high-BTU gas that is predominately methane after the biogas is upgraded to	https://americanbiogascoal.org/definitions-3/

Coalition for Renewable Natural Gas	remove most of the contaminants and a majority of the carbon dioxide (CO ₂) and nitrogen (N ₂) found in biogas."	
Florida State Statute Section 366.91(2)	"(f)“ Renewable natural gas ” means anaerobically generated biogas, landfill gas, or wastewater treatment gas refined to a methane content of 90 percent or greater which may be used as a transportation fuel or for electric generation or is of a quality capable of being injected into a natural gas pipeline."	https://www.flsenate.gov/Laws/Statutes/2025/366.91,
Center for Resource Solutions	"Biomethane 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."	https://www.green-e.org/docs/rf/Green-e%20Renewable%20Fuels%20Standard.pdf
Chevron	"Bacteria naturally break down organic waste and produce raw methane, carbon dioxide (CO ₂) and other gases. The process is called “anaerobic digestion.” The raw methane is between 45% and 65% pure, not quite ideal for commercial use. It must be treated, or “upgraded,” to remove contaminants and reach nearly pure levels, typically 95% or higher . After RNG is upgraded, it can then be injected and transported through natural gas pipeline networks and used as a substitute that is virtually indistinguishable from natural gas. The difference is RNG is produced from biological materials instead of fossil fuel deposits." (emphasis added)	https://www.chevron.com/newsroom/2022/q2/things-to-know-about-renewable-natural-gas
National Grid	"To upgrade biogas to RNG, the methane content is increased by removing water vapour, carbon dioxide, hydrogen sulphide and other impurities. This biomethane product can then be injected into pipelines and used as a substitute for natural gas."	https://www.nationalgrid.com/stories/energy-explained/what-is-renewable-natural-gas-rng
U.S. Department of Energy Alternative Fuels Data Center	"Renewable natural gas (RNG) is a pipeline-quality gas that is fully interchangeable with conventional natural gas and thus can be used in natural gas vehicles. RNG is essentially biogas (the gaseous product of the decomposition of organic matter) that has been processed to purity standards. Like conventional natural gas, RNG can be used as a transportation fuel in the form of compressed natural gas (CNG) or liquefied natural gas (LNG)."	https://afdc.energy.gov/fuels/natural-gas-renewable
California Public Utilities Commission	Biomethane—also referred to as renewable natural gas or “RNG”—is combustible gas produced from the anaerobic decomposition of organic materials (i.e., biogas) that is captured and then purified to a quality suitable for injection into an IOU-operated gas pipeline. For IOU procurement purposes, "biomethane" also includes bio-synthetic natural gas derived from organic	https://www.cpuc.ca.gov/industries-and-topics/natural-gas/renewable-gas

	<p>feedstock. Major sources of biomethane include non-hazardous landfills, wastewater treatment facilities, organic waste, and animal manure. Biomethane can capture methane emissions from the waste sector and be used as a direct replacement for fossil natural gas to help California reduce its GHG emissions.</p>	
<p>U.S. Environmental Protection Agency</p>	<p>“RNG is a term used to describe biogas that has been upgraded to use in place of fossil natural gas, either locally or remotely....RNG is a term used to describe anaerobically-generated biogas that has been upgraded (or refined) for use in place of fossil natural gas. Raw biogas typically has a CH₄ content between 45 and 65 percent, depending on the source of the biogas, and must go through a series of steps to be converted into RNG. Treatment includes removing moisture, carbon dioxide (CO₂) and trace-level contaminants (including siloxanes, volatile organic compounds [VOCs] and hydrogen sulfide [H₂S]), as well as reducing the nitrogen (N₂) and oxygen (O₂) content. Once purified, the RNG has a CH₄ content of 90 percent or greater. RNG injected into a natural gas pipeline commonly has a CH₄ content between 96 and 98 percent.</p>	<p>https://www.epa.gov/sites/default/files/2020-07/documents/lmop_rng_document.pdf</p>
<p>U.S. Internal Revenue Service</p>	<p>(10) Low-GHG natural gas. The term “low-GHG natural gas,” which includes renewable natural gas, means compressed or liquefied gas that meets the specifications of ASTM International D8080-21 and that has an emissions rate that is not greater than 50 kg of CO₂e per MMBtu.</p>	<p>https://www.irs.gov/pub/irs-drop/n-24-49.pdf</p>
<p>ASTM</p>	<p>ASTM D8080 characterizes natural gas by quantitative energy and interchangeability parameters rather than by delivery pathway. When expressed in customary U.S. units, the standard specifies a minimum lower heating value of approximately 890 Btu/scf and a Wobbe Index range of approximately 1,235–1,425 Btu/scf (HHV basis) at standard reference conditions. Together, these requirements define a methane-rich gaseous fuel suitable for combustion in internal combustion engines and distinguish pipeline-quality natural gas from lower-energy biogas streams.</p>	<p>https://store.astm.org/d8080-21.html</p>
<p>BiogasWorld</p>	<p>Identifies some historical values for pipeline injection for upgraded biogas. The article is dated from 2019. One particular value for Vermont Gas of >800 Btu/scf cannot be confirmed based on available data at the time research was done for this proposal.</p>	<p>https://biogasworld.com/news/renewable-natural-gas-quality-specifications-in-north-america/</p>

261 **Proposed Registry Operating Procedures Update (*Illustrative*)**

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263 **Section X: Renewable Natural Gas Designation**

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265 **Classification of Renewable Natural Gas**

266 Renewable Natural Gas (RNG) is biogenic gaseous fuel (biogas) upgraded to and interchangeable with
 267 conventional U.S. pipeline-grade natural gas. RNG may be utilized directly whether onsite to serve useful
 268 demand, trucked, or via pipeline distribution. RNG must at a minimum meet all the following criteria when
 269 measured at the Measurement Boundary (as defined in the CleanCounts Metering & Measurement Guide), i.e.,
 270 the last point before delivery across the Project Boundary under an eligible delivery configuration.:

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272 **1. Higher Heating Value (HHV)**

- 273 • ≥ 900 Btu/scf and $\leq 1,400$ Btu/scf
- 274 • Propane enrichment (up to 5% by volume) is permitted only where it is allowed under the project's
 275 executed delivery or custody-transfer arrangement and where the enrichment rate and volumes are
 276 separately measured and reported to CleanCounts. CleanCounts does not verify underlying tariffs or
 277 interconnect agreements; the producer must retain supporting records and provide them upon request
 278 or independent review.⁶

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280 **2. Wobbe Index (HHV basis)**

281 $\geq 1,195$ Btu/scf and $\leq 1,400$ Btu/scf

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283 **3. Total Inerts (maximum)**

284 $\leq 5\%$ by volume, of which:

- 285 • $N_2 \leq 4.0\%$
- 286 • $CO_2 \leq 3.0\%$
- 287 • $O_2 \leq 1.0\%$

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289 **4. Contaminants (minimum)**

- 290 • The producer must maintain records and provide them upon request or independent review that
 291 production gas volumes meet or exceed the project's delivery configuration specifications regarding
 292 sulfur, moisture, particulates, trace compounds and hydrogen sulfide limits to ensure safe end-use
 293 combustion.

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Table 1: Gas Quality Requirements for Certificate Designation

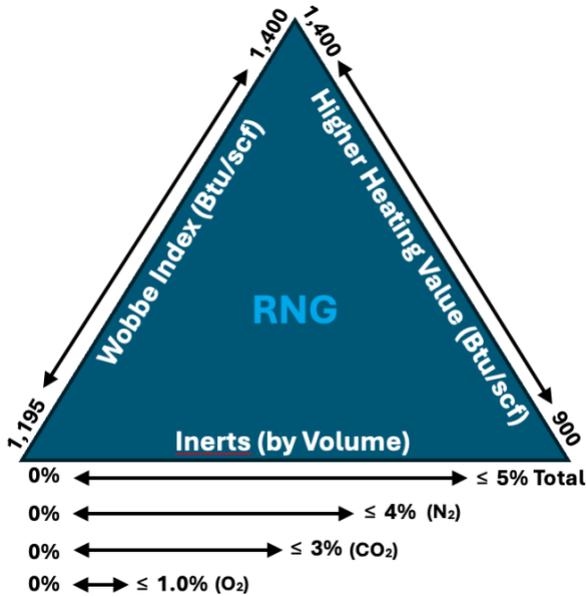
Gas Classification for Certificate Designation	HHV	Wobbe Index (HHV Basis)	Total Inerts (including additives)	N ₂	CO ₂	O ₂	Delivery Mode
Renewable Natural Gas or Biomethane	≥ 900 Btu/scf and $\leq 1,400$ Btu/scf	$\geq 1,195$ Btu/scf and $\leq 1,400$ Btu/scf	$\leq 5\%$ by volume	$\leq 4\%$ by volume	$\leq 3\%$ by volume	$\leq 1\%$ by volume	Gas classification is not distinguished based on gas

⁶ This accommodation is intended to be non-continuous blending of only propane to enrich RNG gas on a temporary basis to meet pipeline gas quality specifications. It is proposed for consistency with some regulatory program requirements.

<p>Biogas</p>	<p>Eligible biogenically derived gas that does not meet one of the RNG gas-quality criteria in Table 1 or does not meet the RNG Proof of Standard (coverage and representativeness) under Section B.2.</p>	<p>delivery mode</p>
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Figure X: CleanCounts RNG Triangle



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Classification of Biogas

Biogas is renewable, biogenic gas that does not meet all criteria for RNG (gas quality and/or RNG Proof of Standard). Biogas may be utilized directly within the project boundary to serve useful demand, trucked, or via pipeline distribution, but does not qualify as renewable natural gas for registry certificate issuance purposes.

307

Explicit Condition

Gas delivered to end-use applications that does not meet the RNG criteria above, regardless of whether it is delivered through or injected into private pipeline systems, utility owned systems, trucked, or delivered directly to a user(s) does not qualify as RNG within these delivery systems for registry purposes.

310
311

Reporting Requirements

312
313

A. Reporting and Data Requirements

314
315

1) Applies to all projects:

316

- **Report to CleanCounts:**

317

(a) gas volumes and

318

(b) gas quality data sufficient to support the project’s certificate designation.

319

- **Qualified gas quality sources:**

320

(a) pipeline/utility custody-transfer or interconnect reports;

321

(b) producer online analyzer outputs (e.g., GC); or

322

(c) independent laboratory results.

323

- **Minimum gas quality fields** (as applicable):

- 324 (a) HHV,
325 (b) Wobbe Index (HHV Basis),
326 (c) CO₂, N₂, O₂, and total inerts, and
327 (d) other composition fields used to substantiate gas quality or energy content.

328 • **Definitions (for this section):**

- 329 (a) Operating hours: means hours with non-zero measured gas flow at the eligible
330 delivery/measurement point.
331 (b) Eligible delivery or measurement point: means the point of metering at the Measurement
332 Boundary including custody transfer or injection/interconnection points identified in the
333 CleanCounts Measurement and Metering Guide. No processing, blending, or handling steps that
334 could alter reported quantity or quality may occur between the Measurement Boundary and
335 delivery across the Project Boundary per CleanCount's Measurement & Metering Guide.
336

337 **B. Certificate Designation Requirements**

338 2) RNG certificate designation

- 339 • **Qualification:** Baseline qualified testing measurement showing gas quality inside the defined RNG
340 gas quality envelope.
341 • **Cadence:** Monthly submission may use the operational monitoring/sampling results available for that
342 month.
343 • **Measurement basis** (any of the following):
344 ○ Pipeline/utility interconnect or custody-transfer reports (including pipeline-owned analyzers); or
345 ○ Producer online analyzer (e.g., GC) outputs; or
346 ○ Periodic sampling/lab analysis used for operational/delivery-point compliance.
347 • **Proof of Standard (Must satisfy one of the following)**
348 ○ **Path A (continuous/near continuous metering):** gas quality composition measured at hourly
349 average or finer resolution (event logs acceptable) for $\geq 80\%$ of operating hours each month.
350 Where the pipeline/utility owns the analyzer, CleanCounts may accept daily summaries or
351 compliance statements derived from continuous monitoring; or
352 ○ **Path B (periodic sampling):** sampling that is representative of normal operations (minimum of
353 four (4) time-stamped sample events per month, spaced to represent normal operations), plus
354 additional sampling following material operational changes or sustained process upsets.
355 ○ **Reporting Resolution (to CleanCounts):** For Path A, hourly data or daily average summaries
356 are acceptable. For Path B, report time-stamped sample results (sample date/time, method, and
357 location) and do not impute daily averages from periodic samples. With CleanCounts per-
358 approval, producers may utilize approved third-party reviewers to confirm and report Proof of
359 Standard data.
360 • **Material change notice:** Notify CleanCounts within 30 days of any change reasonably expected to
361 affect gas quality (e.g., upgrading/blending changes, major equipment change, feedstock change,
362 sustained process upset).
363 • **Measurement & Metering Compliance:** All Proof of Standard measurements/samples must be taken
364 on the same gas stream at the Measurement Boundary (or at a documented equivalent point that is
365 representative of the Measurement Boundary stream).
366

367 3) Biogas certificate designation

- 368 • **Qualification:** Biogas is the default designation for projects that do not meet the RNG Proof Standard
369 in Section B.2.
370 • **Baseline Reporting:** provide a baseline qualified test demonstrating gas quality outside the RNG gas
371 quality envelope or otherwise demonstrating that RNG Proof Standard is not met.
372 • **Reclassification:** Biogas projects are not required to report ongoing gas quality for biogas certificate

373 issuance unless they wish to reclassify to receive certificates under the RNG certificate requirements
374 outlined above.

375
376 CleanCounts may require updated baseline evidence upon material change that could reasonably be
377 expected to move any reported gas production into (or out of) the RNG envelope.

378 379 C. Delivery-mode requirements and documentation

380 (Apply in addition to designation requirements.)

381 382 4) Delivery mode documentation (required)

383 Gas producers shall document and disclose:

- 384 • Mode of gas delivery (common carrier pipeline, transported batch, dedicated/non-tariff pipeline, etc.)
- 385 • Regulated pipeline name (if applicable)
- 386 • The pipeline's Federal PHMSA safety identification number (as applicable)
- 387 • Other pipeline identifiers as indicated within the registry (e.g., interconnect ID, meter station ID,
388 latitude/longitude of pipeline injection point)
- 389 • Any associated gas quality standards and the source reference (e.g., pipeline/LDC interconnect
390 specification, executed custody-transfer specification, or other documented specification)

391 392 5) Common-carrier / tariffed pipeline injection

- 393 • Gas quality reporting may rely on pipeline/utility interconnect or custody-transfer data used to
394 demonstrate compliance with applicable pipeline specifications.
- 395 • Submit data accordingly to the cadence and coverage for indicated certificate designations.

396 397 6) Tube truck / rail / other transported batches

398 For each batch (or discrete delivered load):

- 399 • **Default:** on-load and off-load volume + quality
- 400 • **Exception** (off-load quality waiver): off-load quality measurement may be waived with CleanCounts
401 preapproval if the producer demonstrates, at a minimum, the following controls:
 - 402 ○ tamper-evident seals with seal IDs recorded at on-load and verified at off-load points,
 - 403 ○ seal logs and two-party seal verification at off-load (driver and receiver),
 - 404 ○ chain of custody documentation (batch ticket/bill of lading) linking origin, carrier, container ID,
405 destination, and timestamps,
 - 406 ○ documentation of intermediary stops,
 - 407 ○ route integrity evidence (GPS telemetry or equivalent carrier dispatch logs), and
 - 408 ○ on-load and off-load volume reconciliations associated with the loaded and delivered quantities.
- 409 • If an off-load quality waiver is granted, CleanCounts may also require a risk-based control set (e.g.,
410 random off-load testing, periodic third-party inspection, or carrier quality-management attestation)
411 depending on factors related to the delivery of gas.
- 412 • **Issuance volume rule:** certificates shall be issued on the lesser of the on-load volume and the off-
413 load volume for each batch.
- 414 • **Batch traceability:** on-load and off-load measurements shall be linked to a batch identifier (e.g.,
415 trailer ID, ticket number, custody-transfer record, and intended end-use delivery application when
416 available).

417 418 7) Dedicated / non-tariff pipeline delivery (non-common-carrier)

419 This section applies where delivery occurs through a dedicated or private pipeline arrangement that is not
420 governed by a published common-carrier tariff specifying receipt-point gas-quality limits..

- 421 • **Cadence and Coverage:** report gas quality and volume as indicated under the certificate designation

requirements in Section B.

D. CleanCounts verification

CleanCounts may request additional supporting records based on risk (e.g., spot checks, lab chain-of-custody, instrument calibration/maintenance logs where the producer owns the analyzer). Where producer-owned analyzers are used, calibration/maintenance evidence should be retained and made available consistent with the Metering & Measurement Guide’s documentation expectations.

Table 2: Certificate Designation Requirements

Designation	Required evidence	Submission Cadence
Renewable Natural Gas / Biomethane	Pipeline/utility interconnect or custody-transfer reports; producer GC/analyzer outputs; or periodic sampling/lab used for compliance	Monthly submission; must meet RNG Proof Standard (Path A or Path B). For Path A, daily average summaries are acceptable. For Path B, submit time-stamped sample results; daily averages shall not be imputed from periodic samples.
Biogas (Default Gas Status)	Baseline qualified test and/or documentation sufficient to demonstrate RNG Proof Standard is not met	No ongoing gas quality reporting; option to reclassify under RNG requirements

Table 3: Delivery Mode Requirements and Documentation

Delivery Mode	Required Documentation	Measurement Points	Issuance Volume Rule
Common-carrier / Tariffed pipeline injection	Pipeline name, PHMSA safety ID (as applicable), interconnect identifiers, tariff/docket references for quality standard	Per pipeline/utility custody-transfer or interconnect.	Per designation / Operating Procedures requirements
Transported batches (e.g., tube truck, rail etc.)	Carrier, batch identifiers, custody tickets, intended delivery end point	On-load and Off-load points: both volume, gas quality data, unless off-load gas quality waiver is approved with minimum alternative controls	Per RTC Operating Procedures; where multiple measurements exist (e.g., load/unload), issuance is governed by the lower reconciled quantity.
Dedicated / non-tariff pipeline (non-common carrier)	Delivery configuration, pipeline identifiers (as applicable), any contractual quality standard requirements	Eligible delivery/measurement point per definitions and the CleanCounts Measurement and Metering Guide	Per designation / Operating Procedures requirements