



Digital Natural Gas Units & Methane Performance Certifications

EXAMPLE USE CASES¹

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Working with an ecosystem of producers and consumers, data refinery partners, independent standards bodies, and other stakeholders, and building on principles established for environmental and energy markets, sustainability standards, and GHG accounting, Xpansiv has created the Digital Fuels Program™² (DFP) to enable market participants to define, register and transact the environmental attributes of natural gas, crude oil, aviation fuel, hydrogen and other energy fuels.

We illustrate here how one of the environmental attributes associated with responsible production of natural gas – reduction of upstream, fugitive methane emissions – can be used by DFP participants to meet their ESG and sustainability goals.

A New Class of Digital Assets for Responsibly Produced Natural Gas

As part of the DFP, Xpansiv has developed standardized digital assets specific to claiming the environmental impacts and risks associated with natural gas production:

- **Digital Natural Gas™ (DNG)**

“An immutable digital record representing the complete physical and energy profile of a specific production unit of natural gas through an immutable provenance chain back to the source.”

- **Methane Performance Certificate™ (MPC)**

“A certification derived from Digital Natural Gas representing avoided methane emissions from production of a specific unit of natural gas.”

The two digital assets are inter-related. The first collects and records empirical data associated with a given unit of natural gas (MMBtu) production, capturing and verifying all standardized attributes and associated third-party assessments (i.e., DNG). The second converts DNGs into a standardized amount of upstream fugitive methane emissions avoidance claims based on, and substantiated by, the empirical information (i.e., MPC). Both the DNG and MPC are registered by natural gas producers as encrypted data files, with the MPC a comprehensive, auditable record of all decision-useful methane information that can be claimed, audited, and attached to the use and consumption of natural gas.

For the initial iteration of the MPC, Xpansiv and S&P Global Platts have established a methane emissions intensity of 0.10% as a threshold to determine whether a unit of natural gas production is eligible for issuance of MPCs. Xpansiv expects to re-evaluate this threshold based on input from market stakeholders.

For individual MMBtus registered as DNGs, methane emissions intensities are determined based on production data taken directly from automated, continuously operated processes (e.g., using ClearTracker calculations), and in some cases, methane monitoring instrumentation at the well pads and production facilities (e.g., using Project Canary³ data). Where available, methane and other environmental readings from other secondary data sources (e.g., methane measurements and estimates from aerial level monitors and satellites) can supplement and help validate the primary production and on-site monitoring data.

¹ Jeff Cohen, Xpansiv

² https://pub.lucidpress.com/DigitalFuelsProgram/#ZRIBRIPTp_5G

³ <https://www.projectcanary.com/>

In addition to quantification of methane emissions, standardized attributes in a DNG asset can also include third-party certifications of “ESG performance” of natural gas production (e.g., Project Canary TrustWell⁴, Equitable Origin⁵).

Example Producer Scenarios

VULCAN ENERGY and Xpansiv onboard data from production of **1,000,000 MMBtu** of natural gas onto the Digital Fuels Registry, encoded in DNG and with a methane emissions rate of **0.095%**⁶.

- Using the most recent data for U.S. baseline emissions associated with natural gas production and the 20-year Global Warming Potential for methane³, a producer of 1,000,000 MMBtus with a 0.095% methane emissions intensity would be issued **782,000 MPCs**, representing a reduction of approximately 4,800 metric tonnes of CO₂ equivalent relative to the baseline (**4,800 tCO₂e**).

EONS and Xpansiv onboard data from production of **1,000,000 MMBtu** of natural gas onto the Digital Fuels Registry, encoded in DNGs with a methane emissions rate of **0.02%**.

- Using the same Quantification Framework methodology as used for PRODUCER #1, a producer of 1,000,000 MMBtus with a methane-emissions intensity of 0.02% would be issued **954,000 MPCs**, representing a reduction of approximately 5,900 tons of CO₂ equivalent relative to the baseline (**5,900 tCO₂e**).

GOLDEN STATE STRATA onboarded data from production of **1,000,000 MMBtu** of natural gas that has the same methane emission profile as **VULCAN ENERGY (0.095%)**, and in addition has received a **TrustWell GOLD certification** of responsibly sourced natural gas documented with on-site auditing of design and operational excellence that exceeds best industry practices.

- With a methane emission rate of 0.02%, PRODUCER #3 is also issued **782,000 MPCs** representing a reduction of **4,800 tCO₂e**.

SILVERERADO and Xpansiv onboard data from production of **1,000,000 MMBtu** of natural gas onto the Digital Fuels Registry, encoded in DNGs with a methane emissions rate of **0.20%**, and in addition has received a **TrustWell SILVER certification**.

- Because the methane emission rate exceeds the initial threshold of 0.1%, no MPCs would be issued for this specific volume of gas production. However, the producer would still be able to register DNGs that include other environmental attributes such as the TrustWell Silver certification in this example (or another third-party certification such as Equitable Origin) that could be transferred to downstream natural gas buyers or other market participants.

³<https://www.projectcanary.com/>

⁴Project Canary TrustWell™ certifications include Platinum, Gold, and Silver ratings that measure the environmental performance of individual natural gas production facilities based on a wide range of design and operational parameters ;<https://www.projectcanary.com/operationalize/>

⁵Equitable Origin relies on self-and independent assessments of a sampling of production sites against its EO100 standard which includes focus on human rights, social impacts, and community development, and indigenous peoples rights, fair labor and working conditions;<https://energystandards.org/eo100-certification-process/>

⁶See Sections 3.0 and 4.0 of the Asset Specification for Digital Natural Gas and Methane Performance Certificates“(Asset Specification”) for an overview of how methane emissions intensities are determined for individual production sources, and how MPCs are calculated.

Example Buyer Scenarios

ATLANTIC POWER & LIGHT is an electric utility that purchases all **782,000 MPCs** that are registered to **VULCAN ENERGY**, representing a reduction of **4,800 tCO₂e** relative to baseline⁷.

BOOZOO GAS & ELECTRIC is a utility that purchases **500,000 MPCs** that are registered to **EONS** along with **500,000 MPCs** that are registered to **GOLDEN STATE STRATA**, representing a total reduction of **6,179 tCO₂e** relative to baseline.

MIGHTY MID-STREAM operates processing, storage and transportation of natural gas which purchases **400,000 MPCs** that are registered to **EONS**, representing a reduction of **2,472 tCO₂e** relative to baseline.

LNG.LNG is a producer of liquefied natural gas (LNG) that purchases **400,000 MPCs** that are registered to **GOLDEN STATE STRATA**, representing a reduction of **2,472 tCO₂e** relative to baseline.

fCELL is a fuel cell manufacturer that purchases **1,000,000 DNGs** that are registered to **SILVERADO**.

Example Applications of DNGs and MPCs

The following chart summarizes how each of the example producers and buyers listed above could consider using the DNGs and MPCs via the DF registry.

For producers and buyers of MPCs seeking to make claims related to their greenhouse gas emission inventories or other ESG performance targets, each Methane Performance Certificate represents a synthetic MMBtu of natural gas produced with **zero upstream methane emissions relative to a baseline**, converted from and substantiated by an amount of DNG assets.

Potential Claims by a Producer of MPCs

The DNG is designed to provide transparency to customers, investors, regulators and other stakeholders on the complete environmental performance profile of underlying physical assets. Natural gas producers that register DNGs can provide an auditable data chain starting at the well pad, with attributes including origin/provenance, monitoring, reporting, and verification protocols, third-party certifications, and methane emissions. Registering this information via an immutable, digital file can also be valuable for producers in tracking and demonstrating compliance with state and federal regulatory requirements⁸, as well as with voluntary frameworks (e.g., Oil and Gas Methane Partnership⁹).

A natural gas producer that is issued and registers an MPC can subtract equivalent GHG emissions from their Scope 1 emission calculation. In this case, the producer would need to assess whether and how the baseline for upstream methane emissions in the MPC Quantification Framework aligns with their Scope 1 methodology.

⁷Using Equation 8 of the Quantification Framework and applying the 20-year GWP for methane (IPCC, 2022), each MPC represents a reduction of 0.0061 tCO₂e relative to the current estimated baseline.

⁸<https://www.federalregister.gov/documents/2021/11/15/2021-24202/standards-of-performance-for-new-reconstructed-and-modified-sources-and-emissions-guidelines-for>

⁹<https://www.ogmpartnership.com/>

PRODUCER	ASSET	POTENTIAL APPLICATION/CLAIM
VULCAN ENERGY	782,000 MPCs	Deduction of 4,800 tCO ₂ e from reported Scope 1 emissions based on production of 1 Million MMBtus
EONS	954,000 MPCs	Deduction of 5,900 tCO ₂ e from Scope 1 emissions based on production of 1 Million MMBtus
GOLDEN STATE STRATA	<ul style="list-style-type: none"> • 782,000 MPCs • 1,000,000 DNGs with TrustWell Gold Certification 	<ul style="list-style-type: none"> • Deduction of 4,800 tCO₂e from Scope 1 emissions based on production of 1 Million MMBtus • Production of 1 Million MMBtus of “responsibly sourced natural gas” with TrustWell Gold certification
SILVERADO	1,000,000 DNGs with TrustWell Silver Certification	<p>Production of 1 Million MMBtus of responsibly sourced natural gas with TrustWell Silver certification</p> <ul style="list-style-type: none"> • Production was not eligible for MPCs so no GHG deductions convey with the DNGs

Potential Claims by a Buyer of MPCs

A natural gas consumer (e.g., an electric power utility, a chemical manufacturer, an LNG company) or other downstream customer that acquires an MPC can potentially make an adjustment to their GHG accounting by deducting equivalent GHG emissions from their Scope 3 emission calculation. MPCs that are transferred to downstream customers can be used, for example, in “balancing” downstream GHG emissions for a specific LNG cargo transaction, to reduce the lifecycle GHG impacts of industrial chemicals that are produced with natural gas as a feedstock, or to adjust the GHG emissions associated with natural gas-based fuel cell power generation. In all of these cases, the buyer would need to assess whether and how the baseline for upstream methane emissions in the MPC Quantification Framework aligns with their Scope 3 methodology.

Energy companies, including natural gas producers can also purchase and retire MPCs as part of their commitments to reducing methane emissions under voluntary pledges such as EPA’s Natural Gas STAR Program Methane Challenge¹⁰, Our Nation’s Energy Future Coalition (ONE Future)¹¹, and the COP 26 Global Methane Pledge¹².

Alternatively, a buyer could consider deducting the number of MMBtus (registered as DNGs) that substantiate the MPCs (i.e. zero fugitive methane emissions) from their energy consumption calculations as part of their Scope 3 accounting. For each MMBtu that is subtracted from Scope 3 emissions, the natural gas consumer or other MPC buyer can calculate a corresponding GHG emission reduction using their own combination of internal data, established emission factors, independent, third-party input, or other available methodologies.

¹⁰<https://www.epa.gov/natural-gas-star-program/methane-challenge-program>

¹¹<https://onefuture.us/>

¹²https://ec.europa.eu/commission/presscorner/detail/en/statement_21_5766

For purposes of this document, we present GHG emission reductions and adjustments to energy consumption that are calculated using the MPC Quantification Framework referenced previously.

BUYER	ASSET	POTENTIAL APPLICATION/CLAIM
ATLANTIC POWER & LIGHT	782,000 MPCs from Vulcan Energy account	Deduction of 4,800 tCO ₂ e from Scope 3 emissions attributable to 1 Million MMBtus of consumed gas, produced with zero upstream methane emissions
BOOZOO GAS & ELECTRIC	<ul style="list-style-type: none"> • 500,000 MPCs from EONS account • From Golden State Strata account, 500,000 MPCs along with 500,000 DNGs with TrustWell Gold certification 	<ul style="list-style-type: none"> • Deduction of 6,179 tCO₂e from Scope 3 emissions attributable to over 1 Million MMBtu of natural gas produced with zero upstream methane emissions • Investment in 500,000 MMBtus of responsibly Natural Gas that is certified as TrustWell Gold
MIGHTY MIDSTREAM	400,000 MPCs from EONS account	Deduction of 2,427 tCO ₂ e from the upstream segment of lifecycle GHG emissions of natural gas that is stored and transported to downstream customers
LNG.LNG	400,000 MPCs from GOLDEN STATE STRATA account	Deduction of 2,427 tCO ₂ e from the upstream segment of lifecycle GHG emissions of a cargo of LNG
fCELL	1,000,000 DNGs from Silverado account	Supporting production of 1 Million MMBtu of responsibly sourced natural gas that is certified as TrustWell Gold

Registration, Settlement, Transaction, and Retirement

As described in the Digital Fuels Program Governance Framework¹³, certified data and related attributes comprising the DNG and derived fungible products such as MPC are permanently maintained as immutable, cryptographic “fingerprints,” with unique digital identifiers, hashtags, metadata, or other verifiable data chains, traceable to the underlying physical units of natural gas commodity.

- DNGs and MPCs are serialized and registered in an encrypted, immutable file format on an approved registry.
- MPCs, responsibly sourced certifications, GHG emission reductions and other environmental claims are generated, transferred, collateralized, permanently retired, or otherwise disposed of on a registry in an immutable format by asset owners.
 - MPCs and other fungible exchange instruments can be deposited from the Xpansiv Registry to asset owner holding accounts on Xpansiv market CBL, where they can be held, offered, sold, encumbered, transferred, and settled.

¹³https://pub.lucidpress.com/DigitalFuelsProgram/#ZRIBRIPTp_5G