

bp



Natural gas & net zero

Where do we start?

Solutions for natural gas consumers
September 12, 2022



Introduction



Mark Aufmuth

Managing Director,
Low Carbon & Cross Commodity



Disclaimer



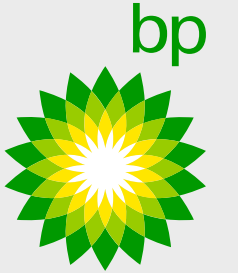
This presentation and its contents have been provided to you for informational purposes only. This information is not advice on or a recommendation of any of the matters described herein or any related commercial transactions.

bp is not responsible for any inaccuracies in the information contained herein. bp makes no representations or warranties, express or implied, regarding the accuracy, adequacy, reasonableness or completeness of the information, assumptions or analysis contained herein or in any supplemental materials and accepts no liability in connection therewith. bp deals and trades in energy related products and may have positions consistent with or different from those implied or suggested by this presentation.

This presentation may also contain forward-looking statements. Any statements that are not historical facts, including statements about bp's beliefs or expectations, are forward-looking statements. These statements are based mostly on publicly available information, estimates and projections and you should not place undue reliance on them. These statements are not guarantees of future performance and involve certain risks and uncertainties, which are difficult to predict. Therefore, actual future results and trends may differ materially from what is forecast, suggested or implied in any forward-looking statements in this presentation due to a variety of factors. Factors which could cause actual results to differ from these forward-looking statements may include, without limitation, general economic conditions; conditions in the markets; behavior of customers, suppliers, and competitors; technological developments; the implementation and execution of new processes; and changes to legal, tax, and regulatory rules. The foregoing list of factors should not be construed as exhaustive. bp disclaims any intention or obligation to publicly or privately update or revise any forward-looking statements, whether as a result of new information, future events, or otherwise.

Participants should seek their own advice and guidance from appropriate legal, tax, financial and trading professionals when making decisions as to positions to take in the market.

2019 vs ¹today



How has the gas market evolved?

	Sep 9, 2019	Sep 9, 2022*
NYMEX HH natural gas	\$2.59	<i>\$7.99</i>
Chicago winter strip	\$2.90	<i>\$8.24</i>
US gas production	~93 bcf/d	<i>~96 bcf/d</i>
US LNG exports	~6 bcf/d	<i>~11 bcf/d</i>

Natural gas

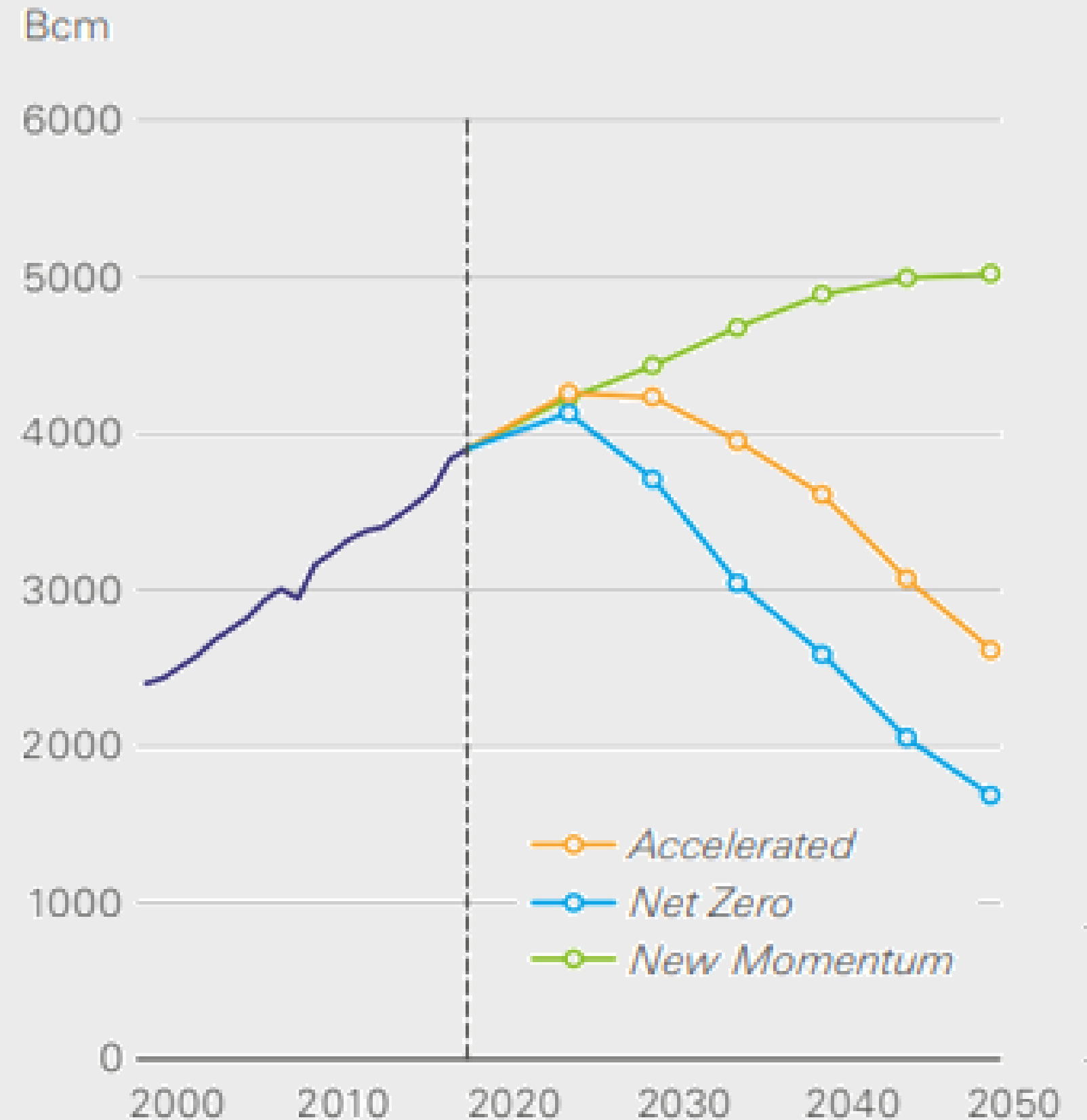
can help support the transition to a low carbon energy system

Energy Outlook 2022 is focused on three main scenarios:

- ① Accelerated
- ② Net Zero
- ③ New Momentum

Global gas demand grows initially in all three scenarios.

Accelerated gas demand



Natural gas

can potentially play two important roles as the world transitions to a low carbon energy system

1

Increasing the speed at which fast-growing emerging economies reduce their dependency on coal.

2

Providing a source of low carbon energy when combined with carbon capture, use and storage.



bp is tackling

415 Mt of emissions

55 Mt

from

operations

+

360 Mt

from the carbon content of

upstream oil and gas production

bp is determined to get to

net zero

and to help the world do the same.

We have the risk management expertise and products to help you navigate the energy transition.

A leading supplier of
carbon offsets,
with a portfolio of
100+ projects around
the world

A leading supplier of
renewable natural gas
(RNG)

Largest **natural gas**
marketer in the US

A leading marketer
of **renewable**
energy credits
(RECs)

Award-winning
Structured Solutions
team—providing **energy**
price risk management
to third parties

Capital markets + the energy transition

Sustainable investing is already **mainstream**



“As the transition accelerates, companies with a well-articulated long-term strategy, and a clear plan to address the transition to net zero, will distinguish themselves with their stakeholders.”

–Larry Fink’s 2021 letter to CEOs
Blackrock

Potential benefits of a well developed ESG plan:

- Increased access to capital
- Decreased borrowing costs
- Decreased insurance premiums



ESG investing + focus on climate disclosures:

- Task Force on Climate-related Financial Disclosures (TCFD)
- Sustainability Accounting Standards Board (SASB)
- Climate Disclosures and the SEC

SEC Proposed rule

The Enhancement and Standardization of Climate-Related Disclosures for Investors

Overview

The goal is to allow for more consistent, comparable, and reliable information for investors to make informed decisions on the impacts of climate-related risks on current and potential investments. It will require public companies to make substantial new climate-related disclosures in their SEC filings.

Required disclosure categories

- > Material Climate Impacts
- > GHG Emissions, including Scope 1, 2, & 3 emissions
- > Targets or Transition Plans

Status

- > Comments due: June 17, 2022
- > If adopted, large filers start disclosing Scope 1 and 2 Emissions in 2023 (filed in 2024) and Scope 3 Emissions in 2024 (filed in 2025).

GHG emissions

Scope 1

Direct GHG emissions from operations that are owned or controlled by a registrant.

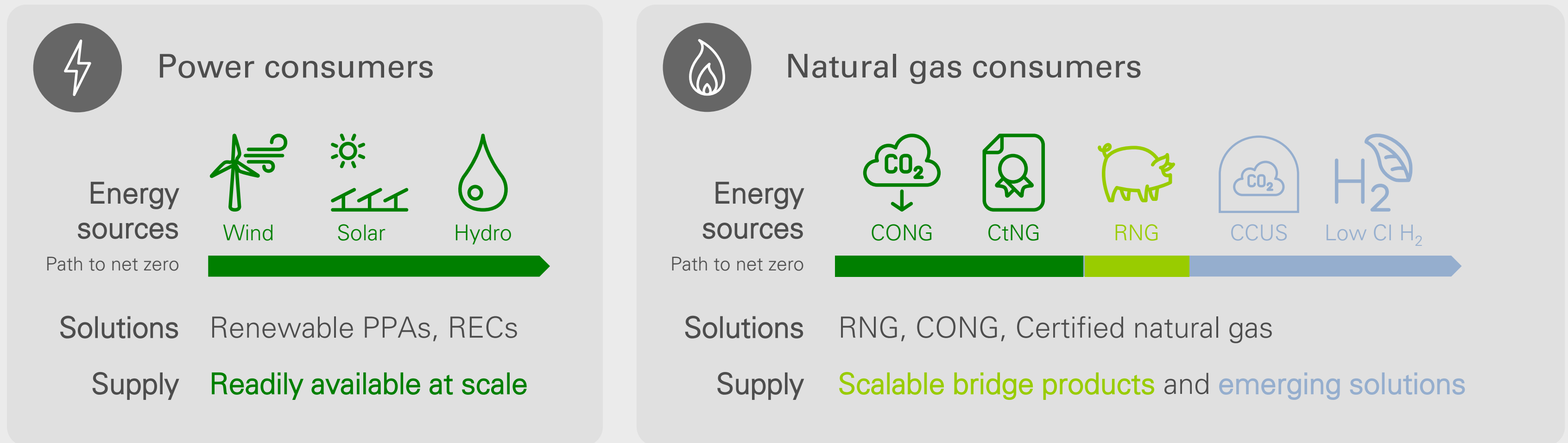
Scope 2

Indirect GHG emissions from the generation of purchased or acquired electricity, steam, heat, or cooling that is consumed by operations owned or controlled by a registrant.

Scope 3

All indirect GHG emissions not otherwise included in a registrant's Scope 2 emissions, which occur in the upstream and downstream activities of a registrant's value chain.

The path to net zero for *natural gas* consumers is complex



● Available at scale ● Expensive, scarce at scale ● Emerging solution

Natural gas consumers can start bridging the gap to net zero now.

Show stakeholders you are engaged and planning for the energy transition that is already underway.



Renewable natural gas

(RNG, Biogas)

Biogas is predominantly produced from organic waste that would otherwise release GHG compounds into the atmosphere—potentially creating a negative carbon intensity fuel.

Common sources of organic waste include landfills, agricultural manure, food waste, municipal solid waste, and biomass. Biogas can be upgraded to renewable natural gas (RNG) and injected directly into the gas grid.



Average CI (g CO ₂ e/MJ) ²	Fossil Natural Gas	80
	Landfill	46
	Manure	-271

Details

Under global renewable fuel programs, biogas generates regulatory credits when consumed as a transport fuel.

In the US and Canada, the main programs are:

- US Renewable Fuel Standard (RFS)
- California Low Carbon Fuel Standard (LCFS)
- Washington State's Clean Fuel Standard
- Oregon Clean Fuels Program
- B.C. Low Carbon Fuel Standard (BCLCFS)

Costs

Indicative adder to natural gas commodity cost:

\$18.00+ USD per mmbtu¹

¹ Indicative spot adder as of September 2022. Price range reflects the range of carbon intensities associated with different sources of RNG.

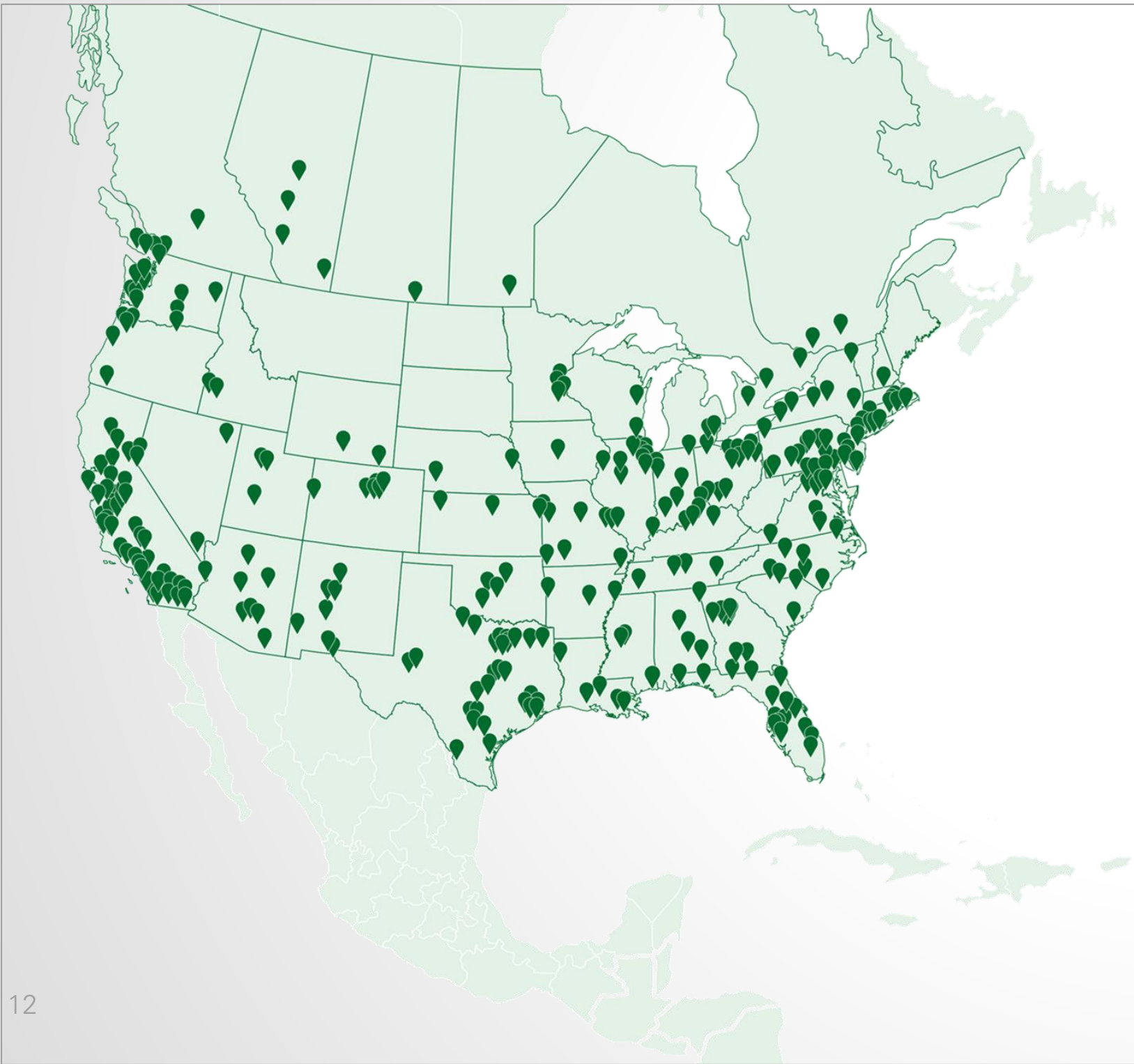
² An Overview of Renewable Natural Gas From Biogas (EPA, July 2020) EPA 456-R-20-001; Citing CARB LCFS-Certified Pathways.

Our North American biogas footprint

In 2019, Clean Energy dispensed 60% of U.S. on-road natural gas fuel and provided 63% of all RNG consumed.



Clean Energy RNG Delivery



bp North American RNG Production



In March 2021, bp & Aria Energy's JV committed to **Aligned Digesters**, funding biogas production facilities on three dairy farms in California's Central Valley, that will produce ultra-low carbon intensity RNG from farm waste rather than allowing it to decompose and release methane into the atmosphere.

Carbon offset natural gas (CONG)

CONG is pipeline natural gas combined with an obligation to retire voluntary carbon offsets on behalf of a customer.

A carbon offset represents **one metric ton of CO₂ emission equivalent** that has been avoided, reduced or removed from the atmosphere

Each carbon offset project in bp's portfolio has been **verified by third-party firms** accredited under the applicable offset project standard.



Natural gas



Carbon offsets

Details

bp offsets meet or exceed the standards published by the listing registries to ensure they are:



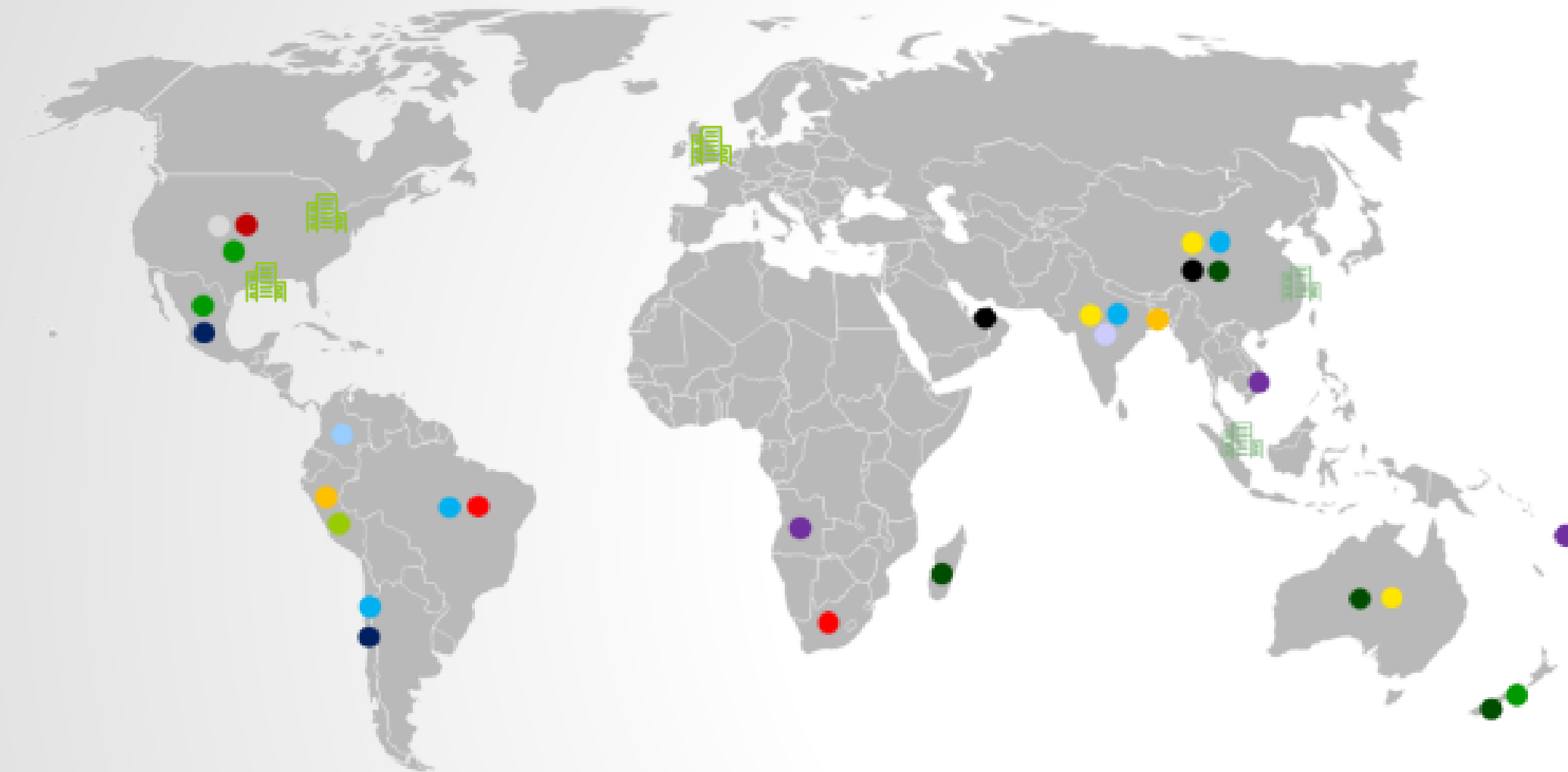
- **Real** – represent GHG reductions in tons of CO₂e that can reliably be estimated
- **Additional** – incremental to what would have happened without the offset
- **Verifiable** – by a qualified independent third party
- **Permanent** – any reversal should be accounted for and compensated

Costs

Indicative adder to natural gas commodity cost:

\$0.25+ per mmbtu¹

Our carbon offset portfolio



Example projects

- Agriculture methane
- Biomass
- Efficient cookstoves
- Fugitive emissions
- Landfill
- Mine gas
- NCS – afforestation, reforestation
- NCS - IFM
- NCS – REDD+
- ODS
- Renewables - hydro
- Renewables - solar
- Renewables - wind
- Upstream
- Wastewater
- Low carbon trading offices

There are many types of offsetting projects, from projects that utilize technology to remove or prevent carbon emissions, such as mine methane capture and destruction and landfill gas capture, to home-based projects such as efficient cookstoves, to nature-based projects, such as afforestation and reforestation, to name a few.

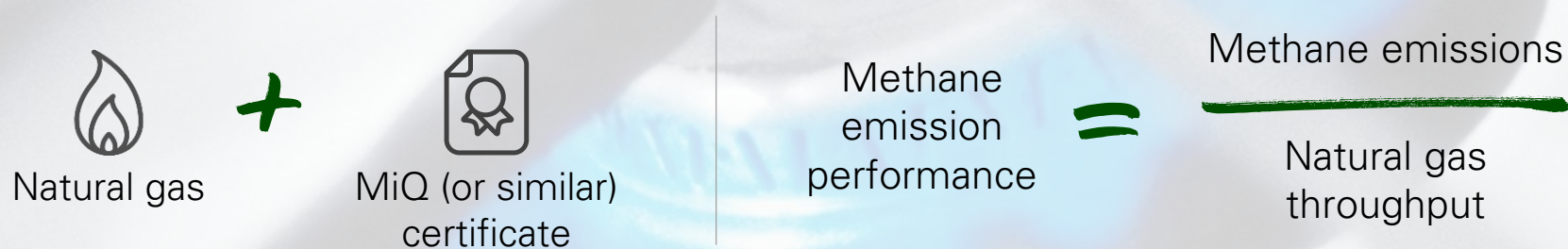
Each carbon offset project in bp's portfolio has been verified by third-party firms accredited under the applicable offset project standard. bp offsets meet or exceed the standards published by the listing registries on which they are listed.

Certified natural gas

(CtNG)

Certified Gas is pipeline-quality natural gas accompanied by an MiQ certificate (or similar third-party accreditation).

The MiQ Certificate represents a producing facility's methane emissions performance—that is, generally, the ratio of methane emissions relative to natural gas throughput—for a volume of gas that is graded to an independent MiQ Standard.



bp can retire MiQ certificates on behalf of the buyer, or transfer the certificates to the buyer's registry account

Certified Gas can be transacted via a NAESB—with the MiQ retirement or transfer terms documented in a special transaction confirmation

Details



The MiQ Standard assesses three criteria:

- Methane emission performance
- Monitoring technology deployment
- Operating practices that promote a culture of emissions management and continuous improvement

Other third-party accreditations in the Certified Gas market include Project Canary, Equitable Origin 100, and Platts MPCs.

Costs

Indicative adder to natural gas commodity cost:

\$0.03+ per mmbtu¹

¹ Indicative spot adder as of September 2022.

Hydrogen

Low carbon hydrogen is attracting interest as a clean alternative to fossil fuels that can be used in **hard-to-abate sectors**, such as industrial use and transportation.



Signposts to watch

- Inflation Reduction Act | production tax credit
- DOE hydrogen hub development
- Results of natural gas LDC H2 blending pilots



bp aims to capture **10% of the low carbon hydrogen market** by 2030 in core markets.

We will also build positions in both **green** and **blue** hydrogen in the US, UK, Europe, China as well as Australia.

Hydrogen types

Green hydrogen

Electrolysis of water using renewable power

Blue hydrogen

When natural gas is reformed (or when coal is gasified) and the CO2 is captured and stored (CCUS)

Grey (or black) hydrogen

Produced via natural gas (or coal) without CCUS

CCUS

Carbon capture utilization & sequestration

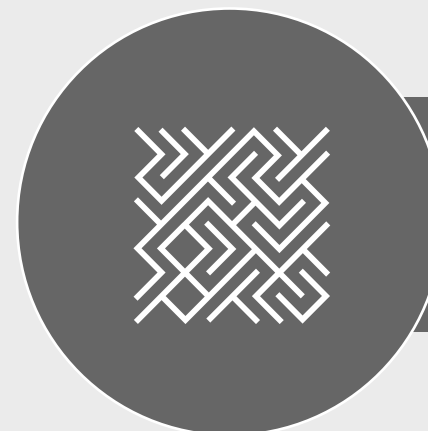
CCUS describes a group of process technologies that **remove** carbon dioxide emissions and **store** them deep underground, **preventing them from being released** into the atmosphere.

Captured CO₂ can also be **utilized directly or as a feedstock** in industrial or chemical processes, to produce valuable carbon-containing products. This can result in a **portion of the CO₂ being permanently stored**.



Implications

In the US, Section 45Q of the tax code provides a **tax credit per metric ton of qualified CO₂ sequestered or utilized**



bp is the lead technical partner and operator of **Net Zero Teesside** (NZT)

NZT has the potential to be the UK's **first commercial full-chain CCUS project** – capturing CO₂ from gas-fired power generation—and could sequester up to 10mm mt CO₂ /yr

bp ventures



Solidia

'Cures' concrete blocks using captured CO₂ instead of water.



Carbonfree Chemicals

Converts flue gases into chemicals used to make products including baking soda and precipitated calcium carbonate

Questions

Connect with me



Mark Aufmuth

Managing Director,
Low Carbon & Cross Commodity
mark.aufmuth@bp.com

