



# BCarbon Stakeholder Meeting

May 11<sup>th</sup>, 2023

# Agenda



- Upcoming meetings & schedule changes
- Richard Hall - Carbon Market Trends
- Jim Blackburn, Paul Lanning, Bryan French – Methane protocol walkthrough

# Upcoming Meetings

- ***Stakeholder Working Group*** –  
Thursday, June 8<sup>th</sup> at 9 AM CT
- *Stacked Benefits Subcommittee* –  
Wednesday, May 17<sup>th</sup>, 2 PM CT
- *Living Shorelines Subcommittee* –  
Wednesday, May 24<sup>th</sup>, at 2 PM CT
- *DEI Subcommittee* – Tuesday, June  
6, 3 PM CT
- *Soil Metrics Subcommittee* – Friday,  
June 9, 1 PM CT



# “Cracking the Black Box”

## A Basic Framework for Assigning Value to Nature-Based Climate Solutions

Spring 2023

*Prepared by Richard W. Hall, Buckhead Resources Inc.*

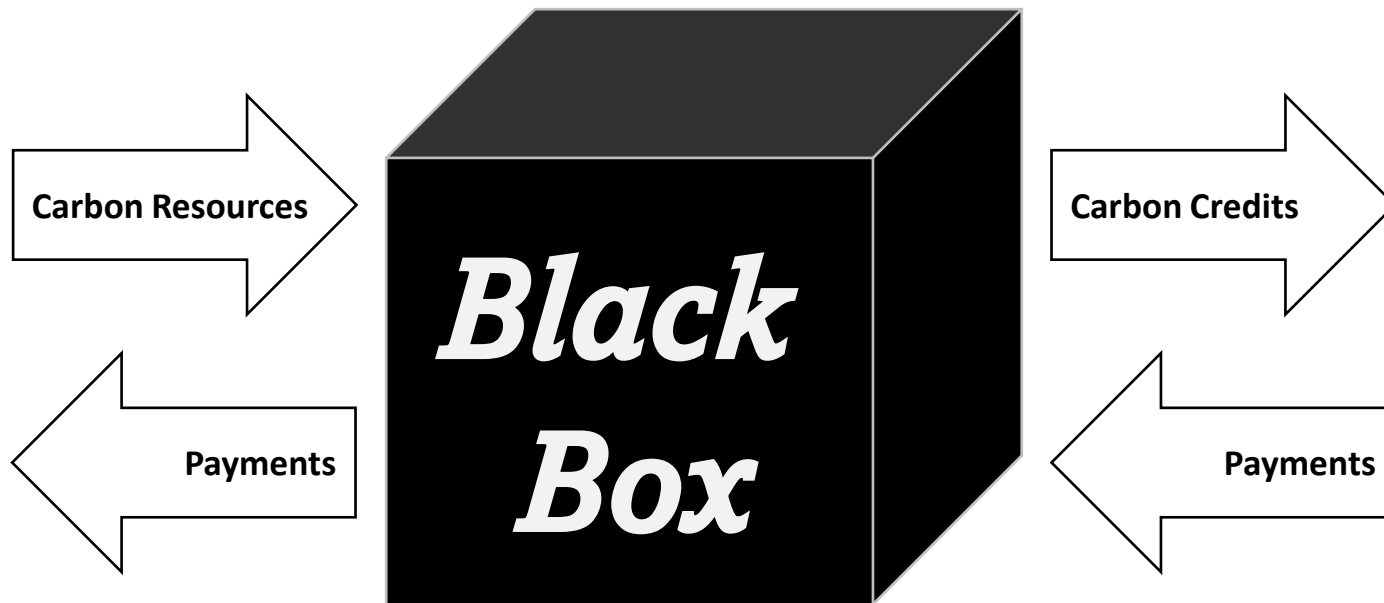
## Solution Providers



## Key Opportunities and Challenges

There is an overwhelming amount of enthusiasm and interest in addressing the challenges associated with climate change through effective market-based solutions. However, there is broad confusion and lack of clarity around fundamental market structures and mechanisms for nature-based climate solutions. This has fostered distrust and controversy. Though there have been calls for higher quality and integrity within the markets, there is also great need for broader understanding and acceptance of basic solutions and value propositions.

## Solution Consumers



**Terms recently applied to carbon markets by key market players and stakeholders:**

*"Crisis of confusion"*

*"Nauseatingly complex"*

*"Labyrinthine"*

*"Opaque"*

*"Trying hard to understand it but would still get a C on the exam"*

# Market Integrity and Clarity

## *Lessons Learned from New and Used Car Markets*

There has been much discussion within the broader carbon markets around market integrity. Though there is broad consensus around the obvious need for market integrity, the real issue for most participants is actually market clarity, or a lack thereof. The current market for nature-based solutions is based on a large pool of heterogeneous resources that are valued based on multiple factors, some of which can be quite subjective. The markets for new and used cars offer useful, and at times amusing, illustrations of a market for a large pool of products with multiple factors influencing value. See the illustration below. The basic framework in this example enables buyers and sellers to more effectively assign values to a wide range of new and used cars based on their own specific criteria. Certain aspects of this basic approach can also be applied to nature-based climate solutions.



- Make – Wagon Queen
- Model – Family Truckster (Color: Metallic Pea)
- Year – 1983 (New)
- Mileage - 250
- Location – Cook County, IL
- Condition - Good
- Extras – *You think you hate it now, but wait 'til you drive it.*
- Estimated Value - \$4,500.00



- Make – Wagon Queen
- Model – Family Truckster (Color: Metallic Pea)
- Year – 1983 (Used – less than 1 month)
- Mileage – 2,150
- Location – Maricopa County, AZ
- Condition - Poor
- Extras – *Four bald tires and a tow included for just \$500!*
- Estimated Value: \$750.00

# Nature-Based Climate Solutions

## *Ecosystem Services*

- Ecosystem services refer to goods and services generated by natural systems
- There are four broadly recognized categories of ecosystem services:
  - Regulating
  - Provisioning
  - Cultural
  - Supporting
- Historically markets have focused on provisioning services
  - Provisioning services include tangible goods such as timber, food and fuel produced by natural systems
- Over time markets have developed for other types of ecosystem services that previously had little to no recognized economic value
- Nature-based climate solutions are considered to be a regulating service
  - There has been significant growth in the markets for nature-based climate solutions based on natural systems' ability to sequester carbon

# Nature-Based Climate Solutions

## *Market Structure*

- Nature-based climate solutions are generally divided into three broad categories:
  - Forest resources (forest carbon)
  - Soils (soil carbon)
  - Aquatic resources (blue carbon)
- Carbon credits are tradeable environmental instruments that derive value primarily from underlying nature-based or technology-based climate solutions
  - Carbon credits are issued by established registries or other authorities and are converted to offsets upon retirement or utilization
  - Carbon offsets can no longer be traded once they are retired or utilized
  - Carbon offsets can be further divided into avoidance and removal solutions
    - Avoidance solutions are based on avoided emissions through various initiatives or activities
    - Removal solutions are based on actual removal of greenhouse gases from the atmosphere
- Markets for nature-based climate solutions are generally divided into two broad categories:
  - Compliance markets can be structured as cap-and-trade programs with tradeable carbon allowances and / or carbon offsets
    - In some markets, carbon offsets may be used in lieu of carbon allowances
  - Voluntary markets are much broader and may include a wide variety of carbon offsets and other solutions
- Below is a list of some of the primary registries that currently serve as de-facto market regulators for nature-based carbon offsets as well as other types of offsets:
  - Verra
  - American Carbon Registry
  - Climate Action Reserve
  - Gold Standard



# Nature-Based Climate Solutions

## *Establishing Validity and Market Value*

**The following criteria are widely recognized as being essential for nature-based climate solutions to have actual market value:**

- **Real**
  - Solutions should be actual versus aspirational
  - Solutions with values based primarily on modelled counterfactual scenarios and subjective criteria may be subject to higher level of scrutiny
- **Verifiable**
  - Solutions should be measurable and subject to additional confirmation through audit processes
  - Solutions may be based on a combination of actual measurements and index values
  - Effective monitoring, reporting and verification processes (MRV) throughout the life of projects that generate marketable nature-based climate solutions are essential
- **Enforceable**
  - Solutions should be backed by sound legal structures and contractual arrangements
  - All relevant property rights should be clearly defined
  - Project locations within jurisdictions that have established legal systems support enforceability
- **Durable**
  - Nature-based climate solutions are rarely actually permanent
  - Therefore, a measure of durability is necessary to establish value
- **Additional**
  - Solutions should be over and above what may be considered business as usual
  - Additionality is a subjective criteria; as with durability, additionality can be measured in degrees as opposed to being interpreted as a binary concept

# Nature-Based Climate Solutions

## *Supply and Demand*

- Supply for nature-based solutions can be sourced from an extraordinarily wide and varied pool of resources with different economic and ecological values
  - Published prices currently range from less than one dollar to over one hundred dollars per metric ton of CO<sub>2</sub>e for different types of climate solutions
- Demand for nature-based climate solutions can be divided into four broad categories:
  - Regulatory requirements
    - Primarily applicable to Scope 1 emissions
  - Operational needs (net-zero and carbon neutral commitments)
    - Applicable to Scope 1, Scope 2 and in some case all or part of Scope 3 emissions
  - Marketing objectives
    - Applicable to Scope 1, Scope 2 and Scope 3 emissions
    - Higher level of flexibility than regulatory or operational requirements
    - May be subject to scrutiny by consumers, regulators and other stakeholders
  - Charitable and philanthropic goals
    - High level of flexibility to meet a broad range of goals and objectives
- A brief description of the Scope 1, 2 and 3 categories is included on the following page
- As with all markets, values for nature-based climate solutions are influenced by basic supply and demand principles
- Nature-based climate solutions with different attributes may have different ecological and economic values that are reflective of those attributes
  - Some solutions may generate more ecological and economic value than others
  - Some solutions may be more suitable for certain goals and objectives than others
  - Duration and additionality are key variables that may influence value

# Nature-Based Climate Solutions

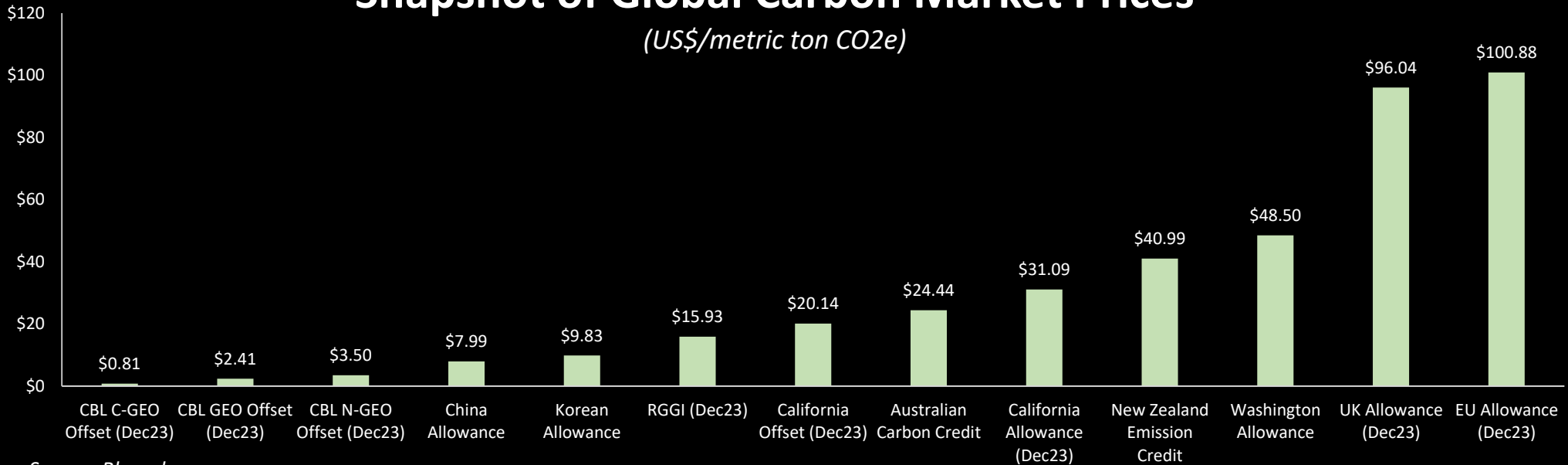
## *Emission Scope Categories*

**The Greenhouse Gas Protocol sets greenhouse gas accounting standards and divides greenhouse gas emissions into three broad categories:**

- **Scope 1**
  - Scope 1 emissions refer to direct emissions by a reporting party
- **Scope 2**
  - Scope 2 emissions refer to indirect emissions by a reporting party from purchased energy sources
  - Scope 2 emissions are commonly addressed through renewable energy credits (REC's)
- **Scope 3**
  - Scope 3 emissions refer to indirect emissions within a reporting party's supply chain
    - This may include upstream emissions associated with suppliers and contractors as well as downstream emissions associated with products produced by a reporting party
  - Scope 3 emissions are generally outside the direct control of a reporting party and present significant reporting challenges

# Snapshot of Global Carbon Market Prices

(US\$/metric ton CO<sub>2</sub>e)



Source: Bloomberg

All prices converted to US\$ per metric ton CO<sub>2</sub>e as of March 3, 2023 except Washington allowance

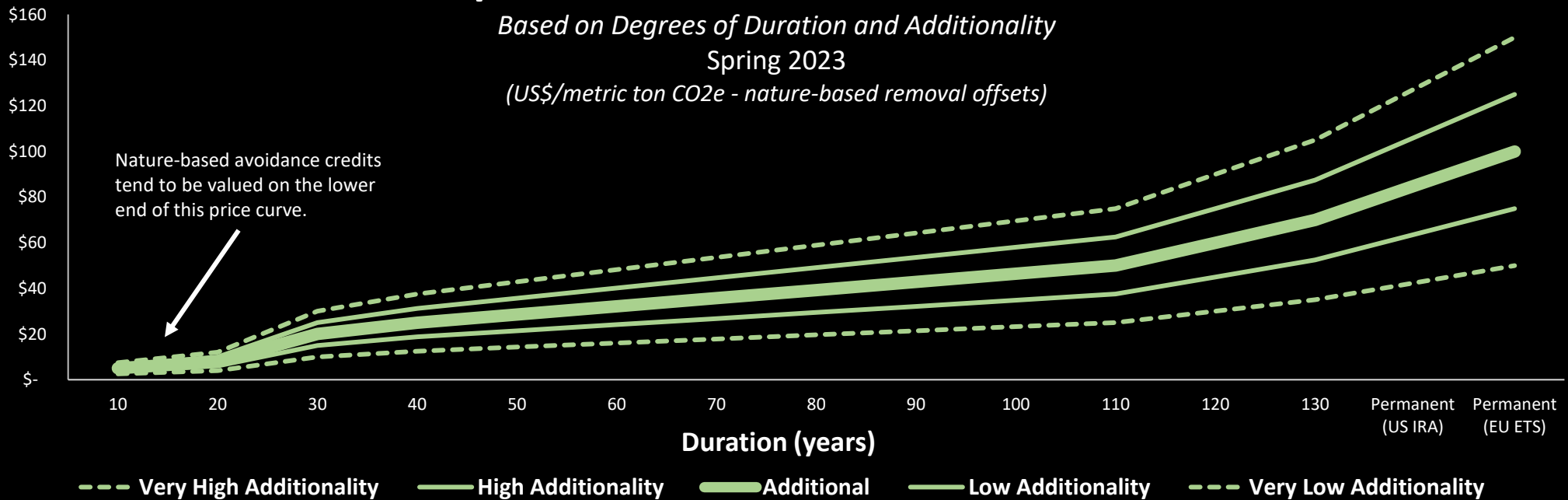
Washington allowance price is as of March 7, 2023

## Sample Price Curve for Carbon Offsets

Based on Degrees of Duration and Additionality

Spring 2023

(US\$/metric ton CO<sub>2</sub>e - nature-based removal offsets)



In addition to actual market data, this chart incorporates assumptions and extrapolations based on actual market data.

This chart is formatted for illustrative purposes and should be used as a general reference only.

# Nature-Based Climate Solutions

## *Key Attributes for Assigning Values*

Forest Carbon

Soil Carbon

Blue Carbon

- Region
- Ecosystem Type
- Age Class (New / Existing)
- Duration
- Location (County / State)
- Condition
- Co-Benefits

### **Standard unit of measure:**

- *Metric ton of annual sequestration (removal) of carbon dioxide equivalent (CO<sub>2</sub>e) within natural ecosystems can be used as a primary metric and unit of value.*
- *Calculations for projects with blended avoidance and removal credits can be reformatted and converted in order to facilitate consistent comparisons (“apples to apples”) among multiple projects and protocols.*

# Nature-Based Climate Solutions

## Examples

	Example 1 Forest Carbon	Example 2 Forest Carbon	Example 3 Soil Carbon	Example 4 Soil Carbon	Example 5 Blue Carbon	Example 6 Blue Carbon
<b>Region</b>	Northeast - U.S.	Southeast - U.S.	Rocky Mountain South – U.S.	Rocky Mountain South – U.S.	Eastern Gulf Coast – U.S.	Western Gulf Coast – U.S.
<b>Ecosystem</b>	Maple beech birch forest	Managed loblolly pine forest	Rangeland	Rangeland	Coastal mangrove forest	Oyster Reef
<b>Age Class</b>	80 years (existing forest)	5 years (existing forest)	100+ years (existing rangeland)	New (converted rangeland)	50 years (existing mangrove)	New (constructed reef)
<b>Duration</b>	50 years	10 years	20 years	100 years	40 years	100 years
<b>Location</b>	Franklin County, New York	Meriwether County, Georgia	McKinley County, New Mexico	McKinley County, New Mexico	Collier County, Florida	Brazoria County, Texas
<b>Condition</b>	Very good (fully stocked – 85% canopy cover)	Very good (fully stocked – 95% canopy cover)	Good (full vegetative cover)	Poor (full vegetative cover after conversion)	Average (partial vegetative cover)	Poor (new water feature after construction)
<b>Co-benefits</b>	Water quality, biodiversity, cultural	Water quality, “climate-smart forestry”	Biodiversity	Biodiversity, water quality	Biodiversity, water quality, erosion control	Biodiversity, water quality, erosion control
<b>Estimated Unit Value of Climate Solution</b>	<b>High</b>	<b>Low</b>	<b>Moderate</b>	<b>High</b>	<b>High</b>	<b>Very High</b>

# Summary

- Nature-based climate solutions serve a valuable role in a long-term, “all of the above” approach to addressing climate change
  - There is an extraordinary variety of viable and effective nature-based climate solutions that can be implemented around the world
  - These solutions have different ecological and economic values and can be used to meet a range of climate goals and objectives
- As the volume of transactions for nature-based climate solutions continues to grow, markets should become more liquid and transparent
  - This growth will require new approaches that address the current inefficiencies and lack of clarity in the markets
- Applying a consistent valuation framework based on annual amounts of carbon sequestered within natural ecosystems would facilitate more transparent and efficient markets for nature-based climate solutions
  - This framework could take into account the high degree of variability among different types of solutions and enable market participants to more effectively assign values to different types of solutions, especially when addressing duration and additionality
    - Qualitative and subjective criteria associated with duration and additionality requirements for nature-based avoidance solutions have created some of the most significant challenges and have been the primary sources of controversy within the broader carbon offset markets
  - Though there may be greater emphasis on market metrics based on nature-based removals, there may still be opportunities for continued use of certain types of avoidance solutions
- Higher values associated with co-benefits may also be incorporated into the total value of various types of nature-based climate solutions
  - This may be particularly relevant given the growing emphasis on biodiversity and water quality

# Additional References

- <https://www.fs.usda.gov/ccrc/topics>
- [https://www.fs.usda.gov/sites/default/files/fs\\_media/fs\\_document/wo-95-consideringforestandgrasslandcarboninlandmanagement-508-92517.pdf](https://www.fs.usda.gov/sites/default/files/fs_media/fs_document/wo-95-consideringforestandgrasslandcarboninlandmanagement-508-92517.pdf)
- [https://www.usda.gov/sites/default/files/documents/USDATB1939\\_07072014.pdf](https://www.usda.gov/sites/default/files/documents/USDATB1939_07072014.pdf)
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- [https://www.usda.gov/sites/default/files/documents/White Paper WEB71816.pdf](https://www.usda.gov/sites/default/files/documents/White_Paper_WEB71816.pdf)
- <https://crsreports.congress.gov/product/pdf/R/R46313>
- [https://www.fs.usda.gov/nrs/pubs/gtr/gtr\\_nrs202.pdf](https://www.fs.usda.gov/nrs/pubs/gtr/gtr_nrs202.pdf)
- <https://repository.library.noaa.gov/view/noaa/40456>





# CH<sub>4</sub>-Zero

Introduction to BCARBON

Plugging Oil and Gas Wells  
For  
Methane Capture and Reclamation

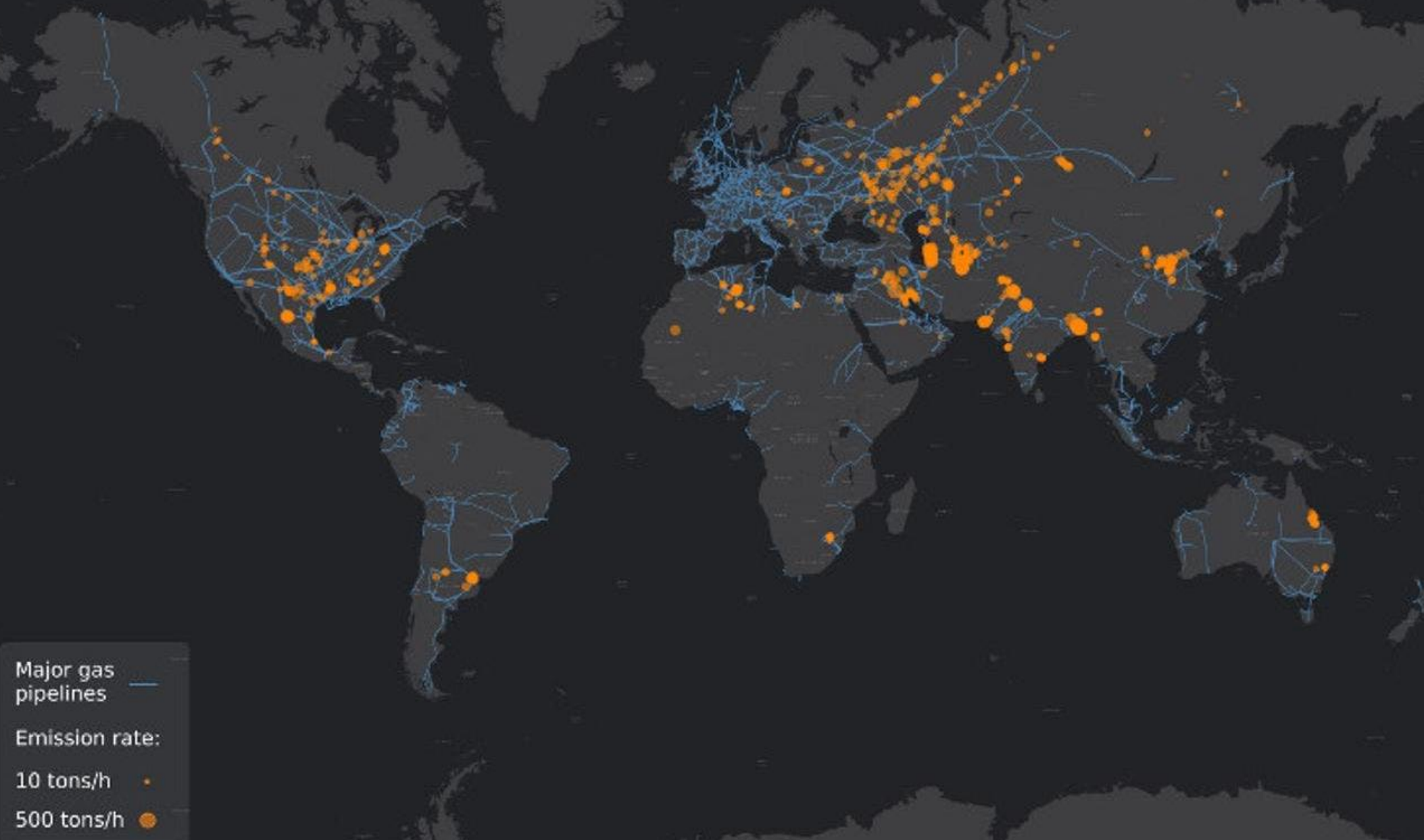
# Introduction to the BCarbon Methane Capture and Reclamation Protocol

- Several natural gas protocols brought to BCarbon by outside parties
- Selected best protocol for rigor and additionality
- Reviewed by external experts
- Modified to address concerns
- Intended to be compatible with digital MRV

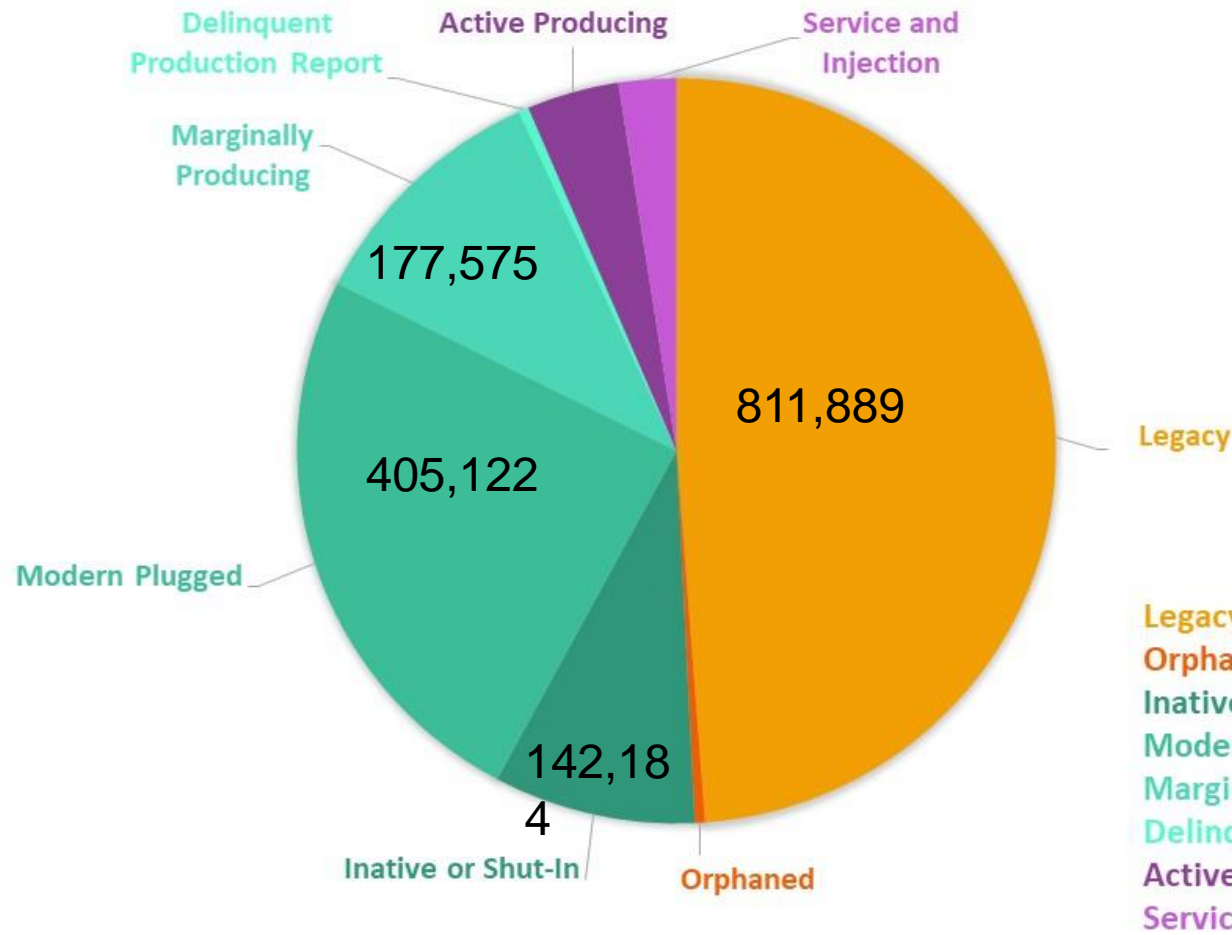
# Why BCarbon is concerned about Methane

- Methane is responsible for 25+% of the rise in global temperatures since the Industrial Revolution.
- Methane traps approximately 84 times as much heat as Carbon Dioxide over the first 20 years after reaching the atmosphere.
- EPA estimates there are 3.7 million abandoned Oil and Gas wells including shut-ins and wells with no recent production in U.S.

# Leaking Natural Gas Wells: A Global Issue



## Well Classification in Texas



Excluding Orphaned and legacy wells, over **724,700 methane credit eligible wells** in Texas alone

Legacy	49%	804,873
Orphaned	0%	7,016
Inative or Shut-In	9%	142,184
Modern Plugged	25%	405,122
Marginally Producing	11%	177,575
Delinquent Production Report	0%	7,145
Active Producing	4%	64,941
Service and Injection	2%	40,449

Chart by Melanie Martin, BCarbon. Statistics from Commission Shift based on August 31, 2021 TRRC data.

# Additionality & Regulatory Compliance

## **Additionality**

A well is Additional if, at the time of plugging, no person or entity has a firm, non-extendable legal obligation to plug it either (a) by law, regulation, statute, court order or other government requirement, or (b) by private contract (e.g., pursuant to a lease, service, or other agreement with a third party).

No offsets will be granted for a well that is included in a project registered under another carbon offset protocol, whether with BCarbon or another carbon registry.

## **Regulatory Compliance**

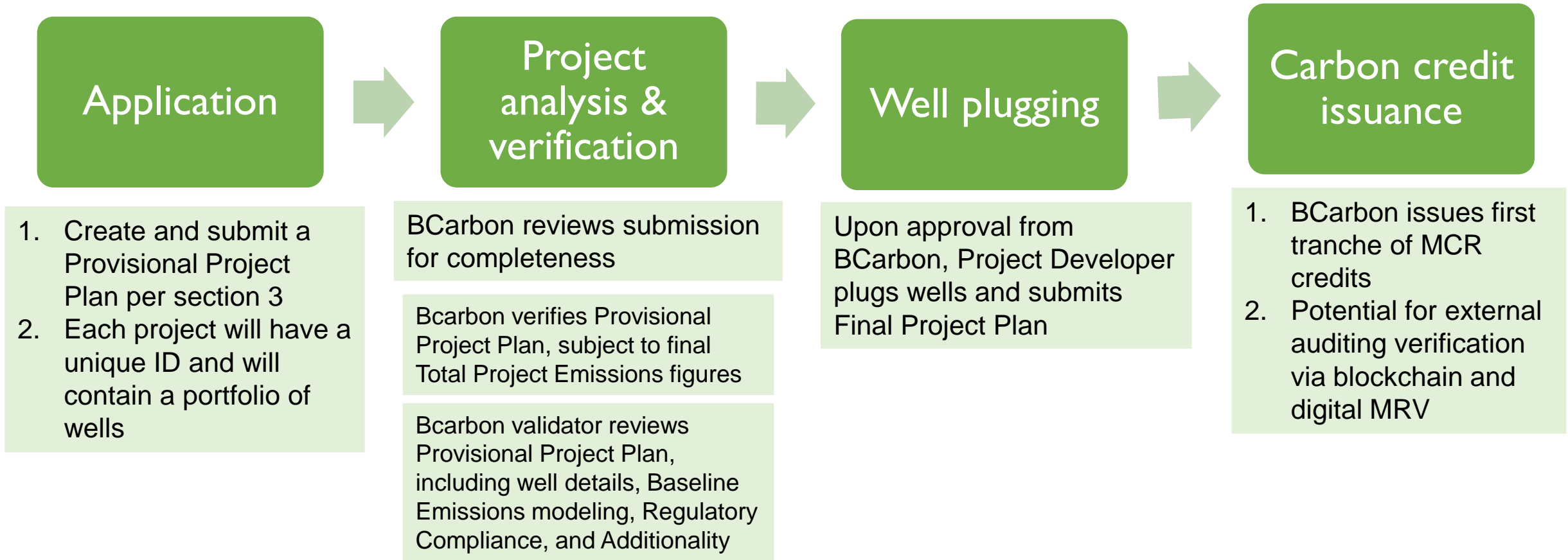
Wells must be in compliance with the Local Regulator or, in the course of the project, be brought into compliance with the Local Regulator.

At the conclusion of the project, the wells covered must receive approval from the Local Regulator that they have been appropriately plugged and decommissioned, including removal of any equipment and suitable remediation of the site surface soil and vegetation, as required to maintain Regulatory Compliance.

# Methane Capture & Reclamation Protocol Requirements

- Only target leaking inactive wells in the United States
- To earn credit, plugging a well must be Additional
- Each well requires an engineer's validation of estimated methane emissions and carbon credits issued per well
- Require the clean-up of the well pad and removal of all surface equipment back to State standards

# Protocol Process: Application, Validation & Issuance





# Well Eligibility

- **Positive Test:** Presence of methane detected at wellhead
- **Geographic scope:** Projects must be located in the United States
- **Accepted well types:** On-land wells registered with the appropriate Local Regulator as oil or natural gas producing wells
- **Well with proof that either:** The well has been transitioned to a non-producing status in filings with the Local Regulator; or there has been no net production in the past 3 months

# Carbon Offset Quantification

## Standardized Open Source Tools and Procedures to Avoid Gaming the System

Carbon offsets calculated using BCarbon standardized quantitative tools are validated and approved by third-party engineering firm such as Ralph E. Davis.

1. Project Developers will use BCarbon's standardized decline rate curve tool to calculate the quantity of methane in the reservoir.
2. Project Developers will use BCarbon's standardized leak probability model to calculate the expected methane leak over the crediting period.



# Credit Issuance Framework

Fifty percent of total issuable credits will be issued upon acceptance of BCarbon's review of the Final Project Plan.

Ten percent of total issuable credits will be issued on the second anniversary of first credit issuance and then annually until 100% of credits have been issued.

Tranche 1: Upon Completion of BCarbon's review of the Final Project Plan	50% of credits
Tranche 2: Two years from the date of Tranche 1 issuance	10%
Tranche 3: Three years from the date of Tranche 1 issuance	10%
Tranche 4: Four years from the date of Tranche 1 issuance	10%
Tranche 5: Five years from the date of Tranche 1 issuance	10%
Tranche 6: Six years from the date of Tranche 1 issuance	10%

# Digital Monitoring, Reporting and Verification

Each project is assigned a Unique ID which allows access to “digital MRV” (d-MRV) and asset level data that records:

- the complete crediting “lifecycle” of the Project including credit issuances, transfers and retirements;
- relevant information from field monitoring, emission factors, data refinements, verifications, and other relevant inputs;
- the complete profile of physical and environmental attributes of the Project including the environmental conditions determined from the site analysis

“Roles-based” access to d-MRV asset level data is provided through a 3rd party registry that is integrated with BCarbon to participants in the generation and market application of the BCarbon credits including owners of primary data (e.g., landowners, operators, and Project Developers) and secondary data refiners, and 3rd party auditors.



# Provisional Project Plan Template

**Prior to commencing field activities, Project Developers will submit a Provisional Project Plan to BCarbon**

- Summary well overviews for each well in the project
- Standardized GHG calculation spreadsheet for each well in the project
- Additionality narrative demonstrating that no legal obligation to plug the well exists
- Well plugging plan unique to each well in the project
- Methane concentration method utilized to determine emissions
- Proof of title to plug the well.
- Proof of ability to receive Environmental Attributes (credits issued from successful P&A activity)

# Next Steps

- Send Final Draft Protocol to Stakeholder Group – *May 15 (or prior)*
- Receive Stakeholder comments – *June 1*
- Bring Finalized Protocol to Stakeholders for Approval – *June 8*
- Once Approved Implementation of Well Plugging and Subsequent Issuance of Methane Capture and Reclamation Credits – *TBD (ASAP)*