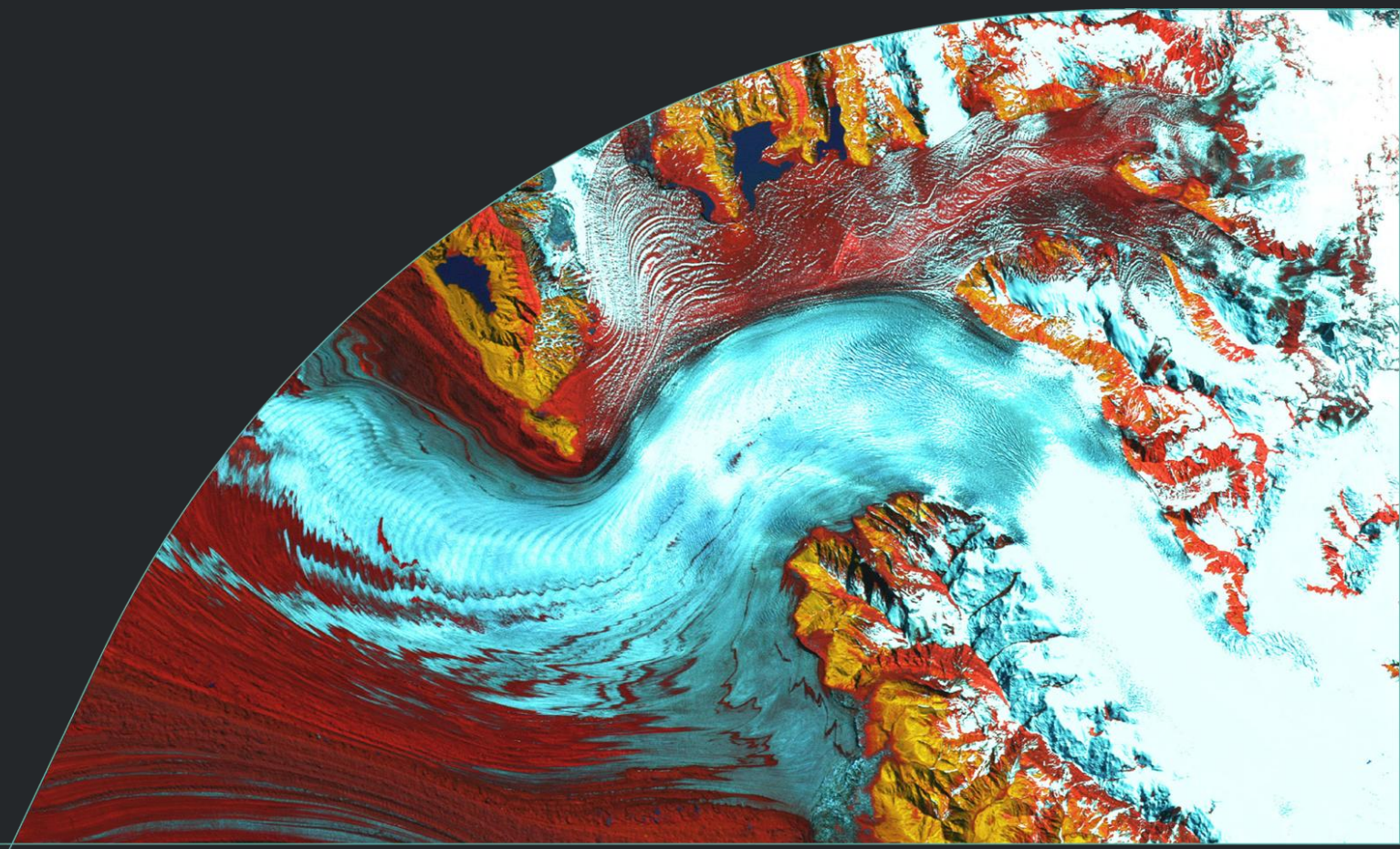
Mine Methane Credits

FOR THE WEST VIRGINIA LAND & MINERAL OWNERS ASSOCIATION



11.12.2026

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Presenter



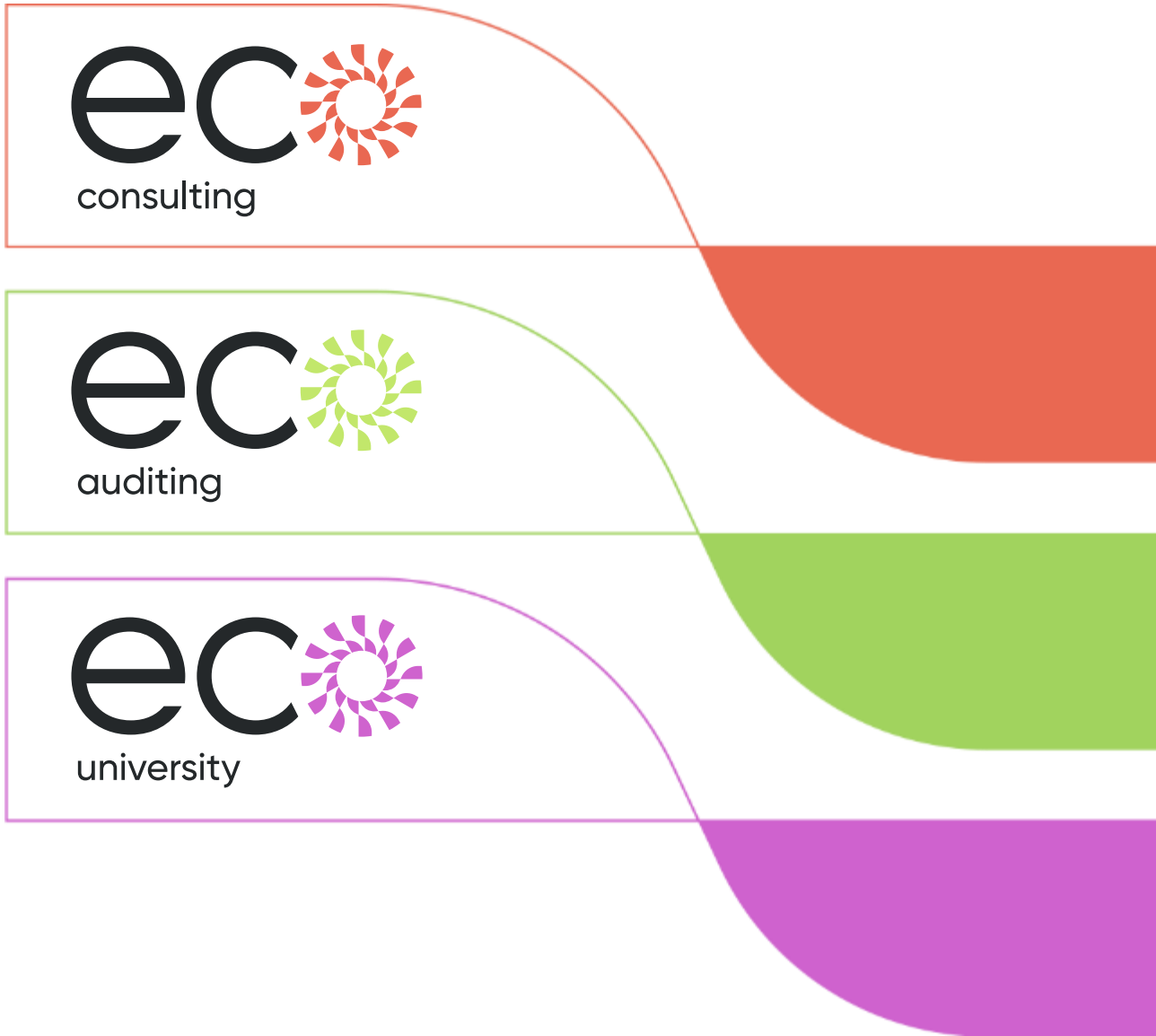
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- An advisory firm with an exclusive focus on the energy transition and decarbonization recently acquired by leading global assurance partner LRQA.
- A team of engineers, scientists, auditors, consultants, and researchers passionate about their work.
- Living and working at the intersection of climate policy, innovative technologies, and the carbon marketplace.
- Helping clients navigate the disruption caused by carbon emissions and climate change.

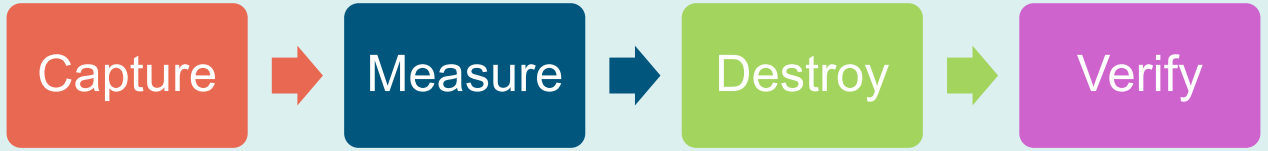


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Why Mine Methane Matters

- Methane that must be managed for mine safety can otherwise be vented directly to the atmosphere
- Credits represent the net CO_2-equivalent reduction after project energy use and incomplete destruction are deducted
- **Baseline:** Methane would have been released to the atmosphere absent the project
- **Project:** Captured methane is destroyed, with energy use and uncombusted methane counted

THE BASIC IDEA



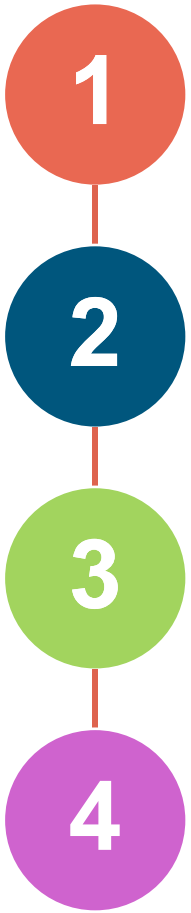
THE CORE EQUATION

$$Emissions\ reductions = Baseline\ emissions - Project\ emissions$$

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Four Eligible Mine-Methane Activity Types

- California Air Resources Board (CARB) and American Carbon Registry (ACR) documents both organize eligibility around the methane source and mine status
- Eligibility starts with correct mine classification and methane-source boundaries
- Protocols exclude virgin coalbed methane unrelated to mining



Ventilation Air Methane
Active underground mine ventilation system
VAM oxidation or other qualifying destruction

Underground Drainage
Active underground mine drainage wells and boreholes
Flaring, power, heat, vehicle fuel and other eligible uses

Surface Mine Drainage
Active surface mine wells tied to mining
Capture and destruction of eligible surface mine methane

Abandoned Mine Methane
Abandoned underground coal mine wells/boreholes
Recovery and destruction after mining ends

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CARB Compliance Protocol: Regulated Route to Credits

- The 2014 protocol applies to U.S. projects under California's compliance offset framework
- Specifics: U.S. projects, 10 reporting periods, third-party verification
- Project history matters: pre-existing destruction and prior pipeline injection can remove volumes from crediting

Eligibility Gates

- Correct Mine Safety and Health Administration (MSHA) classification
- Capture methane otherwise emitted
- Install a qualifying destruction device
- Pass legal requirement and performance-standard tests

Important Exclusions

- Virgin coalbed methane outside mine boundaries
- Enhanced drainage using CO_2, steam or other fluids
- Mountaintop-removal surface mines
- Flooded abandoned mines or sections

Pipeline Injection

- Active underground mine pipeline injection is business-as-usual and ineligible
- Abandoned-mine injection is also ineligible where the mine injected while active

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ACR Methodology: Broader Geography, Different Pathway

- ACR Version 1.1 preserves the core capture-and-destruction logic while expanding location and some eligibility treatment.
- Specifics: North American projects, 10-year crediting period, validation and verification by an ACR-approved body
- Performance standard or ACR three-prong additionality test, depending on activity

Pipeline Injection	Project Scope	Crediting Logic	Verification Record
• Potentially eligible for selected activities if the project passes ACR's additionality test • This differs materially from CARB	• Active underground VAM, active underground drainage, active surface drainage, and abandoned underground recovery	• Baseline venting minus project energy, combustion CO_2, and uncombusted methane	• Mine plans, permits, meter calibration, device operation, and source testing must support the claimed reductions

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CARB vs. ACR: Same Science, Different Rulebooks

Topic	CARB	ACR
Program Type	California compliance offset protocol	Carbon crediting program
Geography	United States only	North America
Crediting Period	10 reporting periods	10 years
Pipeline Injection	Ineligible for active underground drainage; limited abandoned-mine restrictions	May require ACR three-prong additionality test
Monitoring Cadence	VAM often every 2 minutes; drainage generally every 15 minutes	Readings generally not exceeding 15-minute intervals
Verification	CARB-accredited offset verification body	ACR-approved validation and verification body

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How Emission Reductions Are Quantified



NET EMMISSIONS REDUCTION (ER) EQUATION*

$$Net\ ER = Methne\ that\ would\ have\ been\ emitted - project\ emissions$$

*For drainage projects, methane destroyed = measured methane sent to the device × destruction efficiency; the protocols use a methane combustion CO_2 factor of 2.744 metric tons CO_2 per metric ton CH_4 combusted

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Monitoring is the Project's Revenue Meter

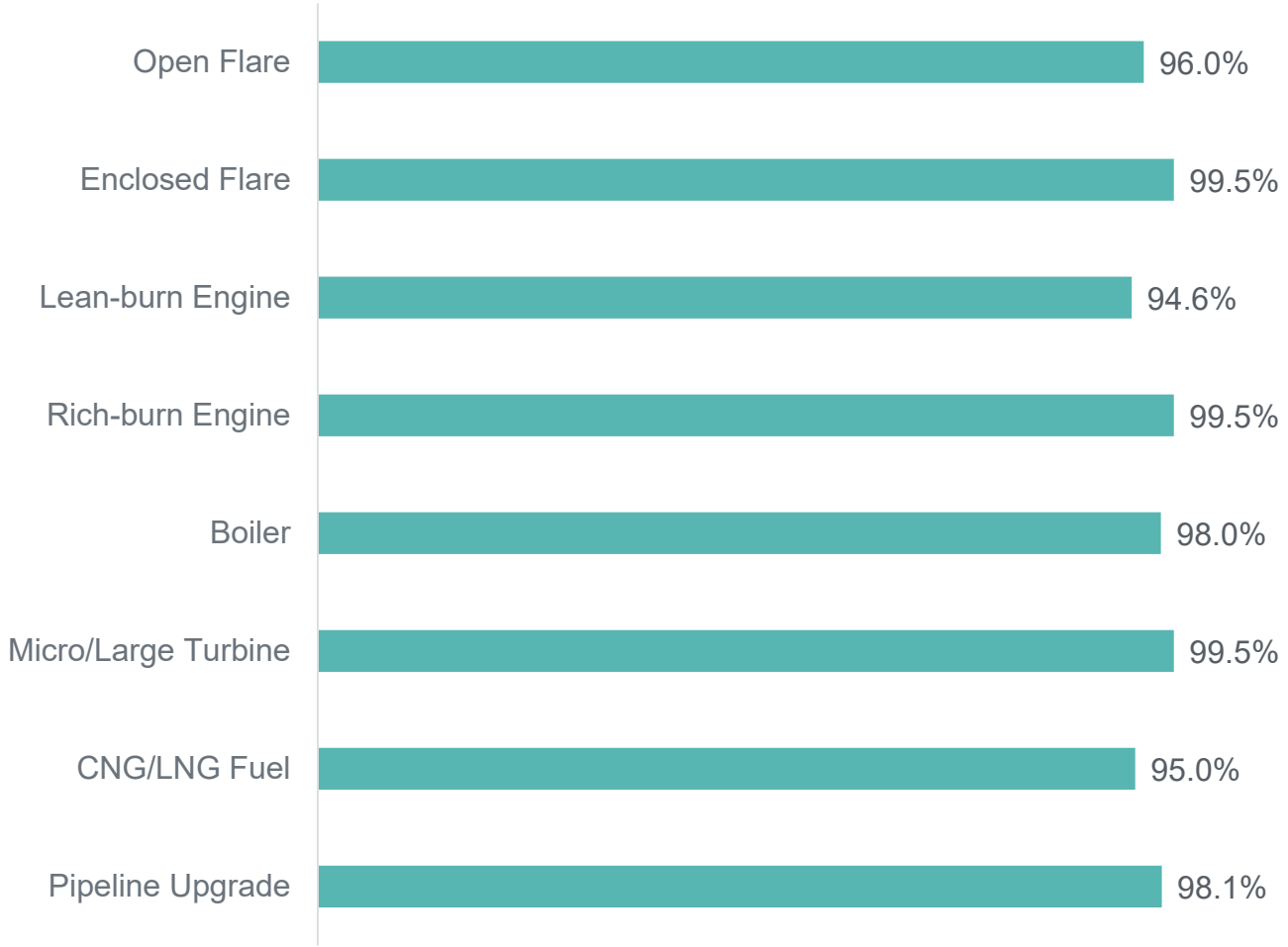
- No defensible data means no defensible credits
- Continuous measurement of flow, methane concentration, device operation, and sometimes temperature and pressure

Device Uptime	Meter QA/QC	Data Gaps	Records to Retain
• No reductions during periods when the destruction device is not operational • CARB and ACR use >500°F thermocouple readings for flares	• Quarterly inspection and maintenance • Calibration checks • Documented drift	• Limited substitution only when corroborating parameters confirm normal operation • More than one week: no credits	• Calculations, • Flow data • Methane data • Device records • Calibration, maintenance • Permits • Mine maps

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Destruction Device Efficiency Affects Credit Volume

- Default efficiencies show why device selection and reliable operation matter
- Illustrative effect for example: at 10,000 t CH_4 sent to a device, a 96.0% default destroys 9,600 t; a 99.5% default destroys 9,950 t before other deductions.



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What This Means for West Virginia Land and Mineral Owners

- Mine methane credits can create value, but ownership, eligibility, and operating discipline determine whether the value is real
- Bottom line: flare projects are technically straightforward compared with many carbon projects, but eligibility and data history can make or break crediting



Screen the Asset
Confirm MSHA status, mine type, mine maps, methane source and prior destruction/pipeline history

Clarify Rights
Document who owns or controls the mine methane, surface access, wells, equipment and environmental attributes

Choose the Program
CARB and ACR differ on geography, pipeline injection, monitoring and administrative requirements

Design for Verification
Build metering, calibration, data retention and device uptime into the project from day one

Model Net Economics
Forecast credits after destruction efficiency, project emissions, downtime, verification and program costs.

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Q + A

Thank You

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