Carbon and Climate Credit Markets

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October 10th, 2024
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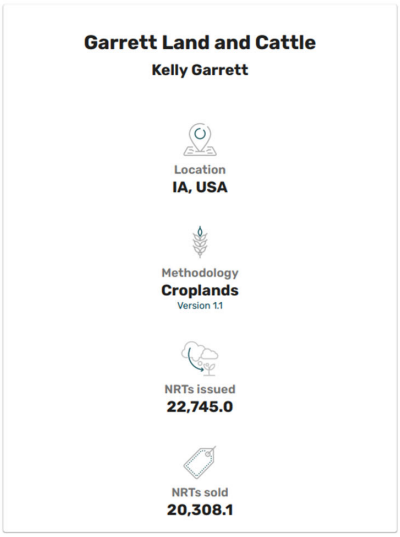
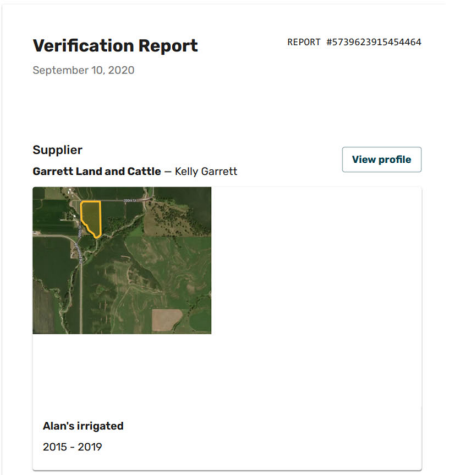
Main questions:

What is a carbon credit or offset?

How do carbon farming programs interact with leasing agreements?





Who's paying for carbon offsets and why? **Companies/entities internalizing negative externalities**

- The standard for accounting and reporting GHG emissions is the Greenhouse Gas Protocol. The first version was published in 2001 and divided emissions into 3 categories:
  - Scope 1: Direct emissions from sources owned/controlled by company.
  - Scope 2: Emissions due to generation of electricity purchased by the company.
  - Scope 3: Optional reporting category containing all other indirect emissions. These emissions are produced by sources outside the organization.
    - Example sources – Extraction/production of inputs purchased, transportation of purchased materials, use of goods sold.

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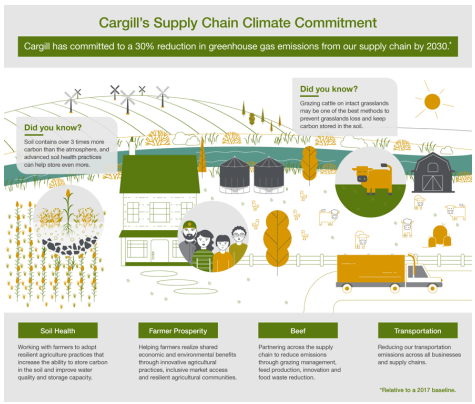
Who's paying for carbon credits and why?
Corporate Climate Pledges (CSR)

Cargill

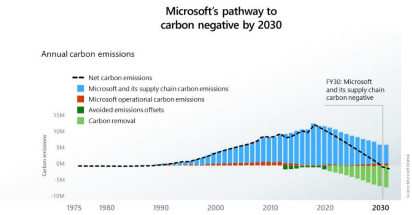


Source

PepsiCo

Source

Microsoft



Source

European Carbon Credit Market

EU ETS – is the European carbon credit contract which is exchange traded. It is a Futures contract for the purposes of trading and delivering EUAs (European Union Allowance – the official name for the region's emission allowances). One EUA allows the holder to emit one ton of CO2 or C02 equivalent greenhouse gas.

Nature Based Carbon Offset

N-GEO futures contracts are comprised of Nature-Based offsets projects from the Verra registry – projects that fall under the Agriculture, Forestry, or Other Land Use (AFOLU) categories. Nature-based solutions can provide valuable contributions to biodiversity, but it's also often considered more difficult to accurately verify the amount of carbon actually offset in nature-based projects.

Demand

- How big is current demand?
  - 155 million credits purchased and retired in 2022. Down from 161 million the previous year but higher than the 93 million carbon credits purchased in 2020.
- Of the 1.3 million metric tons of offsets Microsoft contracted for 2021, almost 200,000 metric tons are from soil carbon sequestration.

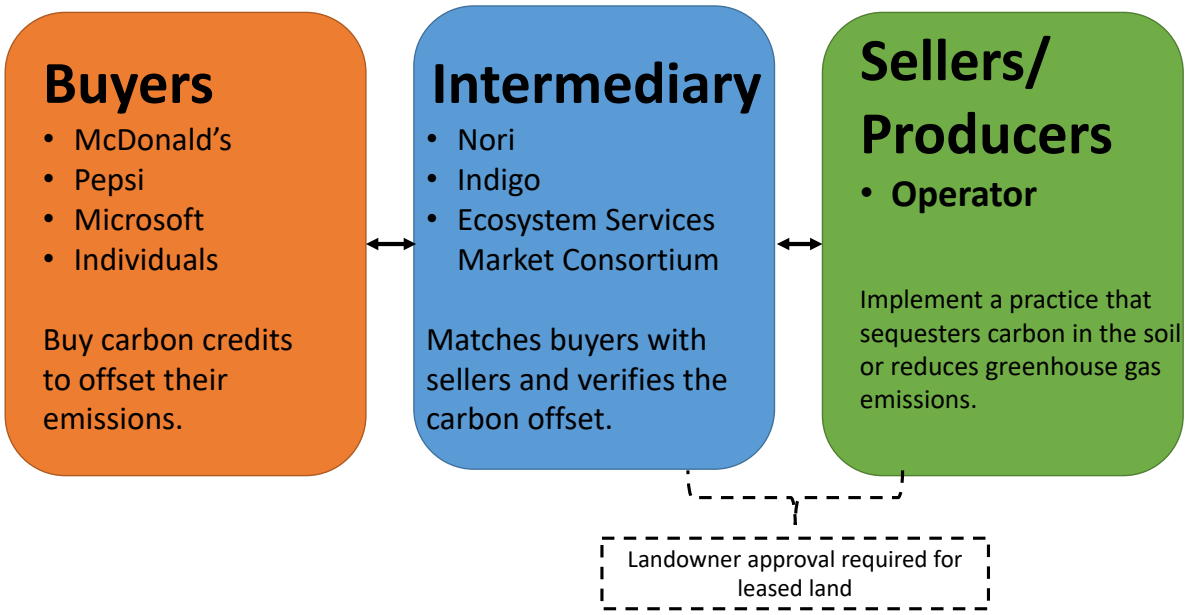
Departing flights

Total price includes taxes + fees for 1 adult. Additional bag fees and other fees may apply.

Sort by:

	11:04 AM – 10:55 PM American, Alaska · Operated by Skywest Airlines ...	14 hr 51 min MHK–FAI	2 stops DFW, SEA	772 kg CO_2	$796 round trip

Agricultural Carbon Credit Market Structure



Why are contracts between intermediaries and operators?

Determinants of carbon credit quality:

1. Additionality
2. Permanence
3. Leakage
4. Uncertainty

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What determines carbon credit quality?

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2. Permanence
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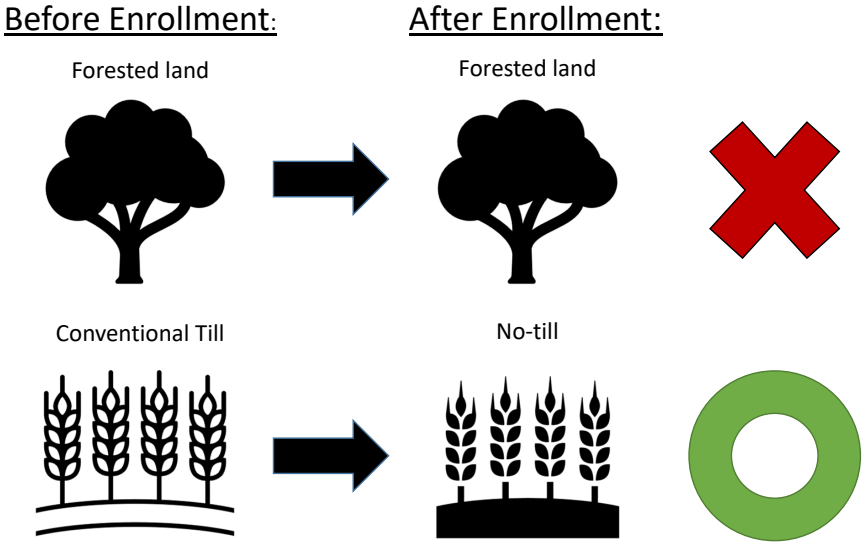

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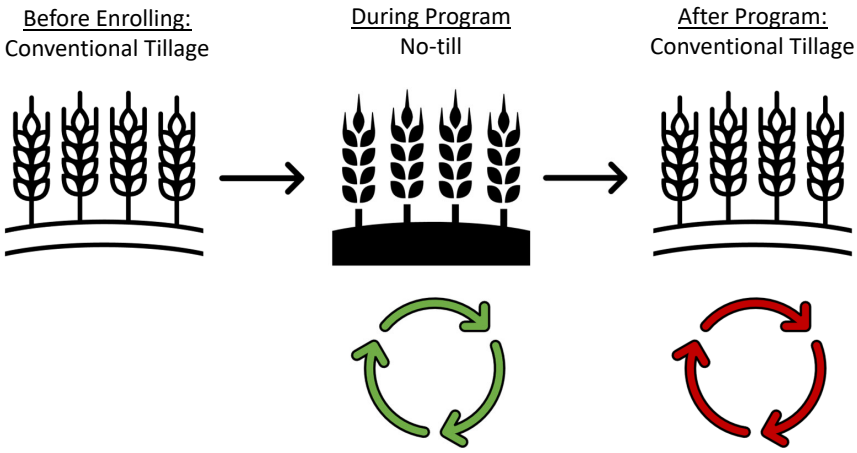


Why are contracts and payments made between intermediaries and operators?

Reasons:

1. Operators affect carbon sequestration through management decisions.
2. Operators likely bear the costs (or benefits) of soil carbon improving actions and **enrollment**.

What are the costs?

$$\text{Net payment per acre} = \frac{\$}{\text{ton of carbon}} \times \frac{\text{tons of carbon sequested}}{\text{acre}} - \textbf{cost/benefit of changing management} - \textbf{transaction cost}$$

- Example costs/benefits of changing management:
  - Cover-crop seed, planting, etc.
  - Decrease in fuel use when adopting conservation tillage.
- Example transaction costs:
  - Entering 5 years of farm management data.
  - Subscription for using software like Granular or FieldView Plus.
  - Soil sampling if not paid for by the intermediary.

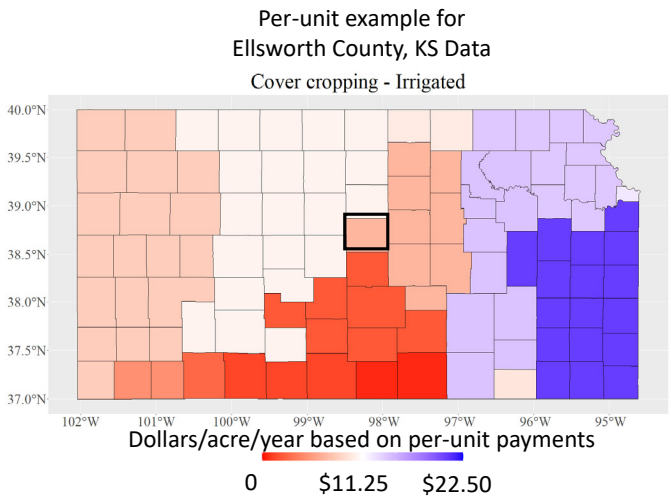
Caution - Payments vary

Payments may be made **per-acre** or **per-unit**:

- **Per-acre**: $3 acre/year for no-till/strip-till; $6/acre/year for cover cropping; $9/acre/year for adopting both.
- **Per-unit**: $20/ton of additional carbon sequestered over 5 year term.

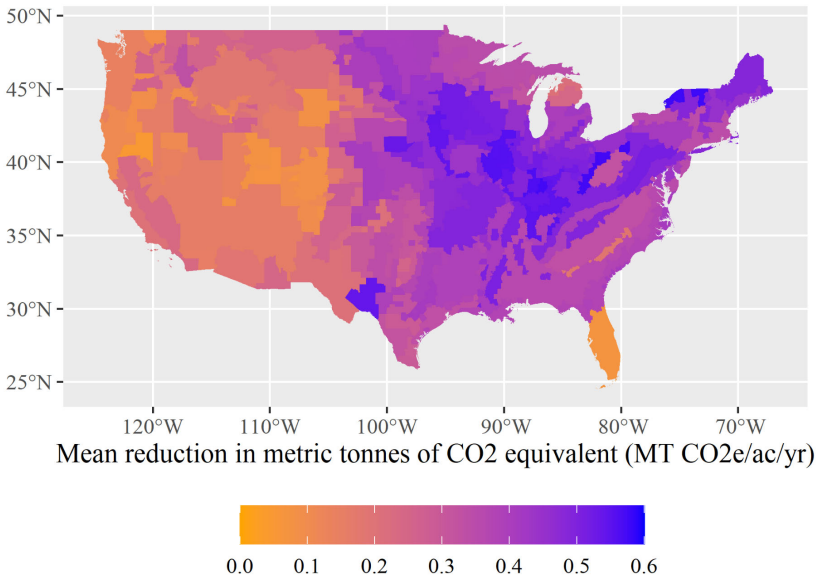
*Data in figure from COMET Planner tool and averages estimates for two scenarios:

1. Add Legume Seasonal Cover Crop (with 50% Fertilizer N Reduction) to Non-Irrigated Cropland
2. Add Non-Legume Seasonal Cover Crop (with 25% Fertilizer N Reduction) to Non-Irrigated Cropland

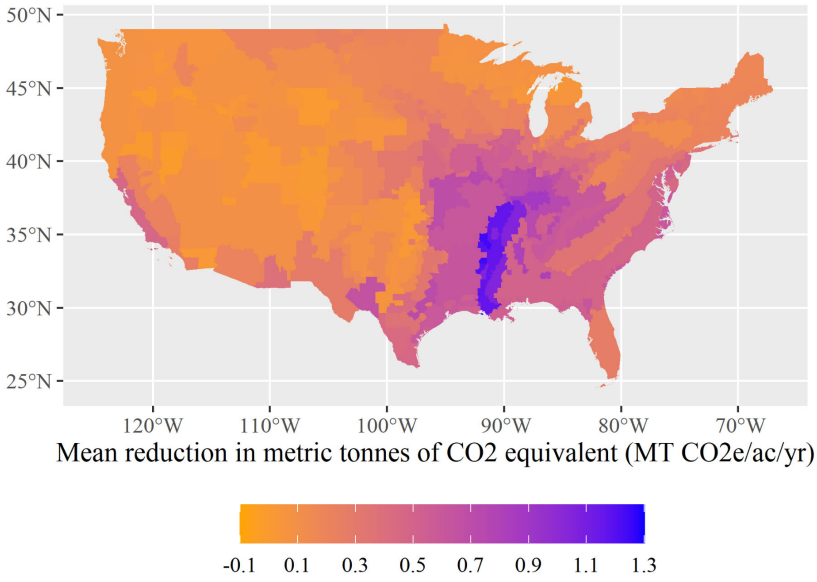


Irrigated		
Minimum	Average	Maximum
$0/acre/year	$7.05/acre/year	$32.25/acre/year
-0.76 MT CO2e/acre/year	0.47 MT CO2e/acre/year	2.15 MT CO2e/acre/year

Tillage reduction scenarios



Cover cropping scenarios



What's next?

Ask questions of Market Administrators (e.g. Indigo) before enrolling or approving enrollment:

1. How long does a field need to be enrolled in the program? What happens if the practice cannot be maintained for the length of the contract?
2. If a leasing agreement is terminated, can the carbon contract be transferred to the next tenant?
3. If a lease is terminated early, will the tenant face liabilities from the intermediary?

Clarify leasing agreements:

1. Are the costs and benefits of participation split between operator and land owner?
2. Are payments used to compensate operators for making asset-improving changes to management?

Some Current Opportunities in KS

Market Administrator	Eligibility Criteria	Data Required	Payment
Bayer	**Adopt cover-crops**, no-till/strip-till, or nitrogen management. Can also receive one-time payment for historical/early adoption of up to $48 per acre.	Farm management records; share enrolled acreage using Climate FieldView platform.	**$6 per acre per practice for no-till/strip-till and cover crops. $4 for nitrogen management in fields planted with corn.**
Indigo	**Adopt at least one regenerative practice such as: cover crops**, improving cover crop diversity or growth period, reduced tillage or fertilizer, diversifying crop rotation.	3-5 years of historical data plus current season data; Soil samples optional.	Estimates **$3,347 per year for cover crops**, $7,854 per year for reduced tillage, **and $9,866 per year for both on 1,000 acres in Ellsworth, KS.**
CarbonNow -Locus AG	**Must purchase and apply Locus Ag soil probiotics.** Applying the probiotic is the practice change.	Farm management data required. Commitment is for 4 or 10 year term.	States a $48 minimum per acre payment over 4 years. 75% of annual payment at start of season

Current Opportunities – cont.

Market Administrator	Eligibility Criteria	Data Required	Payment
Corteva	**Adopt cover-crops,** reduce tillage, or increase nitrogen efficiency **post harvest 2020 to qualify**. Includes barley, canola, chickpeas, corn, cotton, dry edible beans, dry field peas, flax, lentils, millet, oats, rye, sorghum, soybeans, sunflowers, triticale, dry wheat.	3-5 years of historical data plus current season data; Soil sampling and certification paid for by Corteva and Indigo. Must use Granular software.	Reports a range from $6 to $30/acre/year. Guaranteed $15/credit, producer shares 75% of price increases.
TruTerra	**2025 Truterra® Financial Assistance – a USDA Supported Program:** Supports eligible farmers' conversion to strip/no-till and/or addition of cover crops in CY2025 by providing financial incentives on a maximum of 500 acres per farmer across one or more field boundaries. **2024 Truterra® Early Adopter – a USDA Supported Program:** Rewards eligible farmers who made the transition to strip/no-till before crop year 2015. Includes soil sampling and data collection which will contribute to	3 years of farm management records prior to new practice adoption, then five years of data during program enrollment.	Past payments offered $20/ton of additional carbon sequestered over 5 year term.

Questions?

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