CARBON FORESTRY OVERVIEW

California Land and Water Conservation Conference

Julius Pasay
March 8, 2018
Presentation Outline

• About The Climate Trust
• Carbon market background
• Grassland avoided conversion
• Carbon forestry basics
• Opportunities for landowners
• Carbon finance and Climate Trust Capital Fund II
The Climate Trust mobilizes conservation finance to maximize environmental returns.
History

- Managed over $43M in carbon projects that reduced greenhouse gases by 3.7M tons
- 20 years experience in carbon markets—we’re the oldest carbon market entity in the nation
- Nonprofit founded under 1st legislation in the U.S. to curb emissions from Oregon-based fossil fuel plants – we select and manage pollution reduction projects on their behalf
- U.S. Offsets
  - Sectors: forestry, grasslands, and livestock methane
  - Compliance and voluntary programs
- In 2016, launched Climate Trust Capital Fund I – $5.5M pilot Carbon Investment Fund

Invest with purpose.
Project Portfolio  Completed and active projects since 1997
Accomplishments

• Writing the first standard for a U.S. offset project in 2001
• Founding the Offset Quality Initiative in 2007
• Receiving the American Carbon Registry’s Commitment to Quality Award in 2014 while transacting the first ever grassland conservation and nutrient management agricultural credits
• Recognized by Ecosystem Marketplace’s 2014 Carbon Markets Survey as a Top 5 offset provider in North America
• Launching Climate Trust Capital and securing a $5.5M PRI from Packard Foundation to seed investment fund in 2016

Accomplishments

3.7 MILLION
Total tons greenhouse gas reduced

$36 MILLION
Total committed to projects

5.9 MILLION
Contracted emissions reductions (tons)

58
Total projects
Carbon Market Background
Why Does the Cap and Trade Carbon Market Exist?

A method to limit greenhouse gas emissions

Two ways to limit GHG emissions:

- Operational reductions
- Pay to pollute

Pay to Pollute = Regulatory Permits to emit “excess” greenhouse gases

- *Allowances* are a permit to pollute *distributed* by a regulator to an entity, through free allocation, auctioning, or a combination
- *Offsets* are a permit to pollute based on purchasing a third-party verified project action that avoids, sequesters or displaces GHGs – *approved* by a regulator
Carbon Schemes Aren’t New

- 1980s-1990s First Trading Programs
- 1992 – Rio Convention
- 1997 – Kyoto Protocol
- 2000s – Voluntary Markets
- 2009 – Regional Greenhouse Gas Initiative
- 2013 – California Cap and Trade
- 2017 – Quebec and Ontario Cap and Trade

Invest with purpose.
Carbon Pricing Around the World
California Cap and Trade Market
Largest U.S.-Based Carbon Market

- AB32: Statewide limit on GHG emissions for covered sources
- GHG limits decrease annually
- Administered by CA Air Resources Board (ARB)
- In July 2017, program extended to 2030
- Compliance instruments can be traded
  - Allowances and Offsets
  - Offset Sectors
    - Livestock digesters, forestry, ozone depleting substances, mine methane, rice cultivation & urban forestry
  - Offset Limits
    - Can be used in place of allowances, but are limited to 8% of total permits used (4% by 2021; 6% by 2026)
- Links to other cap and trade programs: Quebec & Ontario
Voluntary Markets briefly

Voluntary carbon market actor – an entity that volunteers to offset its emissions by purchasing carbon credits that reduce the amount of carbon in the atmosphere

Top voluntary standards include:
• Climate Action Reserve (CAR) – CA predecessor to ARB
• American Carbon Registry (ACR) – Division of Winrock International
• Verified Carbon Standard (VCS) – Non-profit in Washington DC
Voluntary Markets  Key drivers for buyers

• Project integrity
• Geography
• Charisma
• Relation to business
• Risk mitigation
• Preparation for future compliance
• Public perception benefits
• Price

Invest with purpose.
Voluntary Markets  Alternative project types

- Grassland Avoided Conversion
- Wetland Restoration
- Landfill Gas Destruction
- Truck Stop Electrification
- Reduced Agricultural Nitrogen
- Energy Efficiencies in Thermal Applications
- And many more!

Invest with purpose.
U.S. Avoided Conversion of Grasslands Offsets
Avoided Conversion of Grasslands Overview

- Protocol of the Climate Action Reserve
- Protects Grasslands and Soil Carbon
- Must record No-till Conservation Easement
- Can stack with NRCS enhancement programs such as Agricultural Conservation Easement Program, WHIP, EQIP etc.
- 50-year crediting period, 100-year permanence
- Project Cooperatives can reduce costs
- Climate Trust Capital funding moves cash flows forward to help pay for CE
Avoided Conversion of Grasslands  Basic Requirements

- Record No-Till Conservation Easement
- Demonstrate sustainable grazing
- Eligible land capability class soils: I-IV, limited V-VI
- Land use conversion pressure avoidance

GrassTool

- Calculates carbon by reporting period with inputs:
  - Acres by soil capability class
  - County (conversion pressure)
  - Animal Grazing Days
  - Time since grassland (10, or 30+ years)
  - Other emissions (fuel, electricity, wildfire)
Avoided Conversion of Grasslands

Climate Trust Capital Finance Example

- Climate Trust Capital develops the project
- Guaranteed Buyer/Price (voluntary market)
- Cash flows up-front assists with CE purchase
U.S. Forestry-Based Offsets
Offsets Are Governed By Protocols

• 1 offset credit (alt. to allowance credit ) = 1 metric ton of atmospheric CO\textsubscript{2}

• Protocol *qualifies*
  - No federal, state or local laws require the project activity
  - Permanence must be managed for carbon – 40/100 years
  - Projects allow conservation easements but they may affect baseline if they are pre-existing and restrict harvesting

• Protocol *quantifies*
  - Projects must achieve GHG reductions above and beyond “business as usual” activities
  - Credited above average regional stocking levels “common practice”
  - Forest carbon inventories – standing and future (thru G&Y modeling)
    - i. Updated regularly and independently verified

*Invest with purpose.*
Two Offset Types: Compliance and Voluntary
## Compliance vs. Voluntary Offsets Overview

<table>
<thead>
<tr>
<th></th>
<th>Required by law</th>
<th>Decision made by Organization</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Buyer Motivation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commitment Period - Years</td>
<td>100</td>
<td>40 (ACR)</td>
</tr>
<tr>
<td><strong>Baseline Calculation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Markets</td>
<td>Common practice</td>
<td>NPV Analysis (ACR)</td>
</tr>
<tr>
<td><strong>Markets</strong></td>
<td>Regulated/Transparent</td>
<td>Non-Regulated/Opaque</td>
</tr>
<tr>
<td><strong>Price</strong></td>
<td>$12.75 as of 1/5/18 (spot CCO8)</td>
<td>Range as large as $0-$20, often $5-$10</td>
</tr>
<tr>
<td><strong>Price Floor</strong></td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td><strong>Program Expiration</strong></td>
<td>2030 * (could be extended)</td>
<td>None</td>
</tr>
<tr>
<td><strong>Product Type</strong></td>
<td>Standardized</td>
<td>Differentiated</td>
</tr>
<tr>
<td><strong>Approval Required</strong></td>
<td>ARB</td>
<td>3rd party registry</td>
</tr>
<tr>
<td><strong>Market size</strong></td>
<td>$4.2B from 2017 -2030</td>
<td>$633M from 2017-2030</td>
</tr>
</tbody>
</table>
U.S. Based Voluntary and Compliance Projects

Figure 3. Location of Voluntary and Compliance Forest Carbon Projects in the United States by Market, 2016

Source: Ecosystems Marketplace
December 2017 report
How Do Forest Owners Generate Carbon Offsets?

• Reforestation

• **Improved Forest Management** > 90% CA compliance forestry projects

• Avoided Conversion
ARB Forest Offset Project Locations

- Most of the U.S. is eligible
- Common practice stocking (for baseline) listed by geographic supersection, forest type, site index
- IFM project size generally several thousand acres

Eligibility Criteria for IFM CA-Compliance Offsets

Highlights

- Maintain or increase carbon stocks
- Private or public ownership (no federal lands, except Tribes)
- Sustainably managed through:
  - SFI, FSC or Tree Farm certification
  - Or uneven aged management (>40% cover)
  - Or state/federal approved and monitored management plan
- Even-aged harvest unit limit of 40 acres
- Native species predominate
- Conservation easements may affect credit generation
How Do CA Compliance IFM Carbon Offsets Work?

Forest carbon stocking is compared against a baseline delineated by U.S. ecoregion Carbon stocking above the baseline is eligible for offsets

• **How?** Stocks are determined by inventory and are 3rd party verified

• **What?** Stocks primarily depend on above- and below-ground live tree biomass and standing dead tree biomass

• **When?**
  - First Year—Above common practice: initial offset issuance = the “FLUSH”
  - Annual Growth—Forest management to increase carbon stocks, net of removals
    - Annual verification
    - Every 6 years re-inventory and full verification
CA Compliance IFM Carbon Offsets Cont.

Buffer Pool
- Acts as insurance against fire, insect damage, etc. – “Unintentional Removals”
- Up to ~20% of offsets (flush and annuals) based on risk factors

Logical Management Unit Concept
- If a landowner owns more than one property in the area, the baseline inventory will be weighted by conditions on those non-project landholdings
- Ensures owners don’t overharvest in one area and claim carbon offsets from another

Voluntary IFM projects compare carbon stocking to a baseline determined through net present value maximizing scenario

Invest with purpose.
Offset Project Lifecycle Example

First Year…The Flush

- Feasibility Study
- Project Development Costs – $100-$400k
  - Carbon Inventory
  - 3rd Party Verification
- Offsets Registered and Issued
- Offsets Sold

Subsequent Years

- Annual Project Monitoring $10-25k
- 6-Year Verification $90-250k
- Offsets Registered and Issued
- Offsets Sold

Offset Project Lifecycle Example
CA offset types differ depending upon invalidation period

Three types of California Carbon Offsets (CCOs)
- CCO – no invalidation period
- CCO3 – 3 year invalidation period
- CCO8 – 8 year invalidation period
Offset Type Prices Increase as Invalidation Decreases Compliance Credits

Permits bought or granted. Not offsets.

*less than 0.1 % of projects actually invalidated
Historic California-Compliant Offset Prices

California Carbon Offset Historic Price ($/CCO8 spot)
Where Are Offset Prices Headed?

- California will not auction allowances below the “Auction Reserve Price”
- The Auction Reserve Price increases at 5% + CPI annually
- Offsets have traded, on average, at a 21% discount to allowances
North American Demand for Offsets Chart

Invest with purpose.
U.S. Market Outlook

Overall Carbon markets are maturing and expanding
- California cap and trade program extended to 2030
- Linkages to Quebec, Ontario
- More potential linkages—Washington, Oregon, Mexico
- Aviation Sector will be increasingly involved
  - Voluntary first—Compliance later?

California post-2020 rules limit non-California offset participation
- Offset usage decreases from 8% to 4% in 2021 and back to 6% in 2026
- Non-California based projects limited to 50% of total (in other words, 2% and 3% of non-CA projects)

Offset Prices
- California cap and trade
  - Upward pressure: Price Floor will continue until 2030
  - Downward pressure: Oversupply of non-CA projects?
- Voluntary – Corporations/Organizations continue to buy, but not compelled
Opportunities for Forest Landowners
Traditional Carbon Forestry Models

Model 1
- Landowner hires developer
- Landowner pays upfront development costs
- All credit revenue to landowner
- All credit risk assumed by landowner

Model 2
- Landowner contracts with developer
- Developer pays upfront development costs
- Credit revenue pays back developer
- Revenue share between landowner and developer
- Still low credit risk mitigation

Carbon project risk remains with landowner in either scenario. Historically, low opportunity for no/small-flush projects with low early revenue.
Have These Models Worked?

YES

• 62M offsets have been issued for 61 forest projects since 2013
  o Over 120 additional projects proposed

BUT

• High transaction (development) cost hurdle
• Focus on high flush projects
  o Because development costs paid back in year 1
  o Because lower credit risk with early credit cash flow
  o This limits ability to do forest restoration or transitions to longer rotations
Climate Trust Capital

Carbon Finance for Forestry Example

**Project Carbon Net Revenue (without carbon finance)**

- Year 0: $(375,750)
- Year 1: $623,399
- Year 2: $281,347
- Year 3: $344,315
- Year 4: $239,923
- Year 5: $334,339
- Year 6: $476,631
- Year 7: $561,327
- Year 8: $637,588
- Year 9: $650,316
- Year 10: $663,269

**Landowner Carbon Net Revenue (with carbon finance)**

- Year 0: $994,311
- Year 1: $123,825
- Year 2: $140,674
- Year 3: $167,157
- Year 4: $119,962
- Year 5: $238,316
- Year 6: $280,664
- Year 7: $318,794
- Year 8: $325,158
- Year 9: $331,635
A New Approach to Carbon Forestry

Climate Trust Capital Fund II
Based on its successful $5.5M pilot carbon investment Fund I, Climate Trust Capital is looking at ways to offer forest owners a different approach to carbon forestry.
Value Proposition  Managing the risks inherent with carbon markets

Based on 20 years of carbon market experience, Climate Trust Capital can mitigate credit risk, leverage deep technical knowledge to perform exhaustive due diligence and ensure project performance, and fully recognize risk reward

Our Experience Produces

• We take an active role to ensure projects produce the expected yield of credits—stewarding projects through monitoring, reporting, verification and the sale of credits
• We believe carbon prices are undervalued and will provide investors with long-term, risk-adjusted returns
• We hedge the carbon-only risk with the addition of a real assets strategy—a stable, mature market with capital preservation, and multiple income streams

Our Experience Sells

• We sell credits for our projects—leveraging our preferred-status relationships with several large buyers for smooth and straightforward transactions
• We have successfully transacted close to $10M in quality offsets, earning a reputation for integrity with voluntary and compliance buyers

Invest with purpose.
Fund I Snapshot

A 10-year private equity fund that invests in carbon offsets

**Size:** $5.5 million  
**Term:** 10 years  
**Investment thesis:** Carbon offsets are currently undervalued on a risk adjusted basis  
Fund I invests in carbon projects with a guaranteed minimum return  
**Carbon Markets:** California compliant focused; voluntary markets capped at 20% of Fund I  
**Geographical focus:** U.S.  
**Sectors:** forestry, dairy digesters, grasslands

**Fund I Model**

- **Upfront investment** based on anticipated carbon credit generation  
- **Guaranteed minimum carbon value**  
- **Revenue share** rewards project developers as carbon prices increase

*Invest with purpose.*
Pathway to Scaled Fund II $75M 10-yr fund

Setting the stage

• Market certainty through 2030—linkages expected to increase
• Investment-grade carbon offset investments exist
• Experienced developers, inventory specialists, and carbon investment legal experts have emerged

Advancing Fund II

• Established deal structure that mitigates risk for project partners
• Executed Fund I contracts provide an important template for future investments
• Strong foundation of operational controls and cash flow projection protocols established
Climate Trust Capital Fund II Snapshot
A 10-year private equity fund that invests in carbon offsets

**Size:** $75 million

**Investment thesis:** Carbon offsets are currently undervalued on a risk adjusted basis. Fund II will invest in carbon-only projects from multiple sectors and, in some cases, the underlying assets generating offsets, to provide both income and capital appreciation.

**Carbon Markets:** California compliant focused; voluntary markets

**Geographical focus:** U.S., may include Canada

**Risk profile:**
- *Lower risk* – Underlying assets (forestry-focused) will generate carbon offsets—providing multiple revenue streams, inflation hedge, and capital preservation.
- *Higher risk* – Investments based solely on future carbon offset revenues.

**Target Investors:** Family offices, endowments and foundations, pension funds

*Invest with purpose.*
Fund II — What to Expect

Leverages its experience from Fund I to offer both:

• Carbon only investments
  o Multiple sectors (forest, grassland, biodigesters, etc.)
• Real assets with carbon potential
  o Focus on forests

A different approach

• Buy or joint venture forestland with carbon offset potential, conservation value, sustainable timber harvests and other income
  o Potential to partner on new acquisitions with land trusts
• Seek out forests where carbon values can integrate with timber value
• Can invest in below common practice, no flush, forest restoration projects

Capitalizing on timberland’s investment characteristics to “hedge” carbon risk

• Stable, mature market
• Capital preservation – inflation protection
• Multiple income streams

Invest with purpose.
THANK YOU!

Julius Pasay, The Climate Trust
Jpasay@climatetrust.org