CCX Forestry Carbon Offset Programs

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Status of the U.S. Carbon Market

- A developing, voluntary market
- No national, regulatory greenhouse gas reduction scheme … **YET!**
- Many local, state, and regional systems and registries for reducing greenhouse gas emission exist
  - Regional Greenhouse Gas Initiative in several northeastern states
  - Department of Energy National Voluntary Reporting of Greenhouse Gases Program
  - California Climate Action Registry
  - Georgia Carbon Sequestration Registry

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The Chicago Climate Exchange (CCX)

- North America's only active, voluntary and legally-binding GHG trading system
- Began GHG trading operations in 2003
- CCX membership system
  - CCX members make a voluntary, but legally binding commitment to meet annual GHG emission reduction targets of 6 percent by 2010
  - GHG trading among members
  - Large forest landowners can be a member
  - Small forest landowners can participate in providing offsets through an aggregator: An aggregator is a CCX-registered entity that pools smaller projects to allow them to be marketed on the exchange
  - Forestry is one of several types of CCX offset projects

CO_2 Equivalents – The Carbon credit

- Computing CO_2 equivalents (CO_2e)
  - Carbon weight (C) = Tree Biomass dry weight/2
  - $CO_2e = C*3.67$
    (based on molecular weights of C and O)
- 1 metric ton CO_2e is about 92% of 1 ton of green wood
- 100 MT CO_2e = 1 CCX CFI (trading unit)

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Historical Price Trends of CCX CFIs

The Texas Players

- Aggregators
  - Agragate Climate Credits Corporation
  - Delta Institute
  - F&W Forestry Services
- Associate Aggregators
  - The Carbon Group
  - Dogwood Carbon Solutions
- Verifiers
  - American Forest Management
  - Larson & McGowin
  - Texas Forest Service

Three CCX Offset Forestry Protocols

- Afforestation Protocol
- Sustainably Managed Forests Protocol
- Long Lived Wood Products Protocol

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Afforestation – Eligibility

- Planted land that was not forested prior to January 1, 1990
- **Trees may not be cut for 15 years**
- Carbon credits are awarded based on annual increases in carbon stocks as determined by
  - CCX carbon accumulation tables
  - Direct measurement / modeling
- Carbon credits back dated to 2003

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Sustainably Managed Forests - Eligibility

- Evidence of sustainable forest management (SFI, Tree Farm group certification, FSC)
- Forests do not need to be afforested from non-forest lands
- Owners must make a 15-year commitment of sustainable management
- Owners must provide documentation of net increases in carbon storage
- A baseline of carbon storage must be established in order to measure / model annual net increases

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Long Lived Wood Products - Eligibility

- Evidence of Sustainable forest mgt – certification
- Must have exclusive right to sequestered carbon
  - **– Timber sale contracts must be explicit!!!**
  - Exclusive contract w/ aggregator
- Net carbon increases are determined by % carbon remaining in wood products at the end of 100 years
- Participants report harvest quantity and % product class category (i.e. % softwood pulpwood)
- Using DOE guidelines, CCX developed factors that convert volume of wood harvested in each category to the quantity of carbon in use at the end of 100 years

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Special Circumstances

Catastrophic Loss

Acquisition / Disposition of Forest Land

Harvesting

Switching between protocols

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Reduced Credits from Catastrophic Loss

- CCX Forest Carbon Reserve Pool
  - 20% of earned offsets are put into the Reserve Pool
  - Credits from the Reserve Pool can be used to compensate for catastrophic losses
  - Remaining credits in the Reserve Pool shall be released to forest owners near the end of the market period

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Land Acquisitions / Dispositions

- Credits adjusted annually to account for forestland acquisition / disposition
- May enroll acquired forest land if it meets protocol criteria – added to baseline
- Disposed land may have to forfeit credits back to CCX unless:
  - New landowner enrolls land in CCX program

    or
  - Maintains forest certification through commitment period and ensures that carbon stocks are non-decreasing from purchase through market period

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Reduced Carbon Credits from Thinning

- For each stand, reduced carbon credits from thinning needs to be accounted for financially
- For a carbon pool, hopefully there is enough growth in other non-thinned stands to offset the credit loss from thinned stands so an actual refund of carbon credits will not be necessary
- If the whole carbon pool is from a single landowner, maintaining a net carbon credit gain each year could be added into management objectives to avoid a need for refund of carbon credits

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Switching from Afforestation to Managed Forest

- Projects can switch from afforestation to managed forest despite the 15 year required commitment of afforestation protocol
- One reason to switch is to thin before age 15
- Costs of switching
  - Documentation and certification for sustainable management
  - Forest inventory to establish a carbon baseline and modeling of carbon increases each year
  - Forest inventory for any changes of carbon stock due to thinning and other harvest

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Carbon Verification

- All aggregated pools must obtain verification by a third-party
- CCX-approved independent verifier: Texas Forest Service is 1 of 13
- Verification ensures that project protocols are properly followed and that the appropriate volumes of carbon dioxide are being recorded
- All offset projects are subject to an initial verification and subsequent annual verifications

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How Do I Sign Up?

- Contact appropriate organization
  - CCX – only projects > 10,000 MT CO_2e
  - Aggregator
  - Associate aggregator / consulting forester
- Calculate annual net change in carbon stocks
  - Accumulation tables / Conversion factors
  - Direct measurement / Modeling
- Agree to terms of contract, sign
- Verification
- Maintain forest land / records

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Estimated Fees

- Aggregator – 10%
- Associate aggregator – 10%
- Verification – $.20/credit
- CCX Transaction fees - $.20/credit
- Reserve – 20% of credits held back

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An Example of Potential Additional Return from CCX Forest Offset Programs

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Assumptions

- One acre loblolly pine plantation
- Site Index (Base 25) = 60
- Trees per acre @ age 1 = 750
- Thinning and Final Harvest

Thinning and Final Harvest

Year	Intensity
16	30%
23	30%
31	100%

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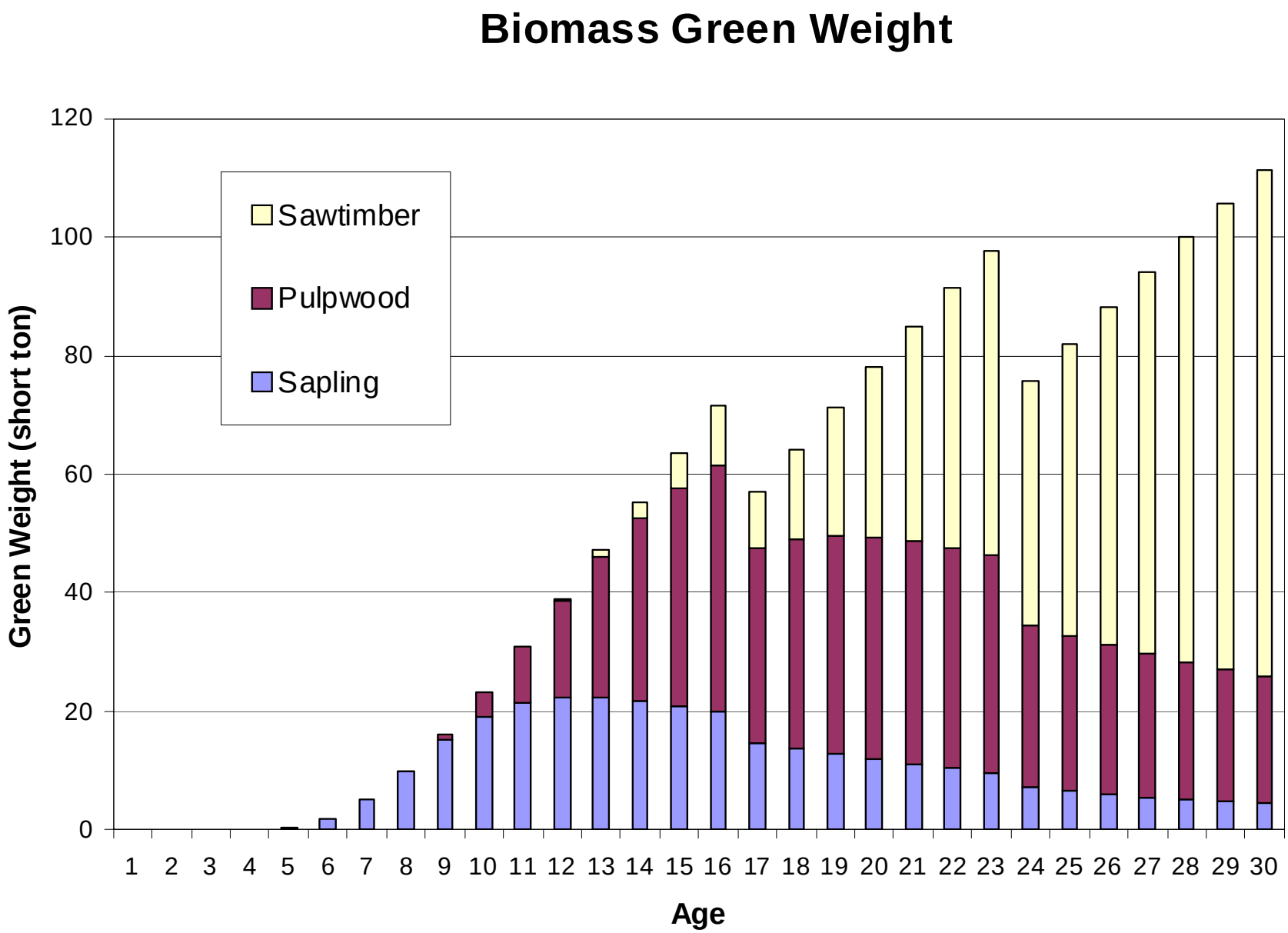
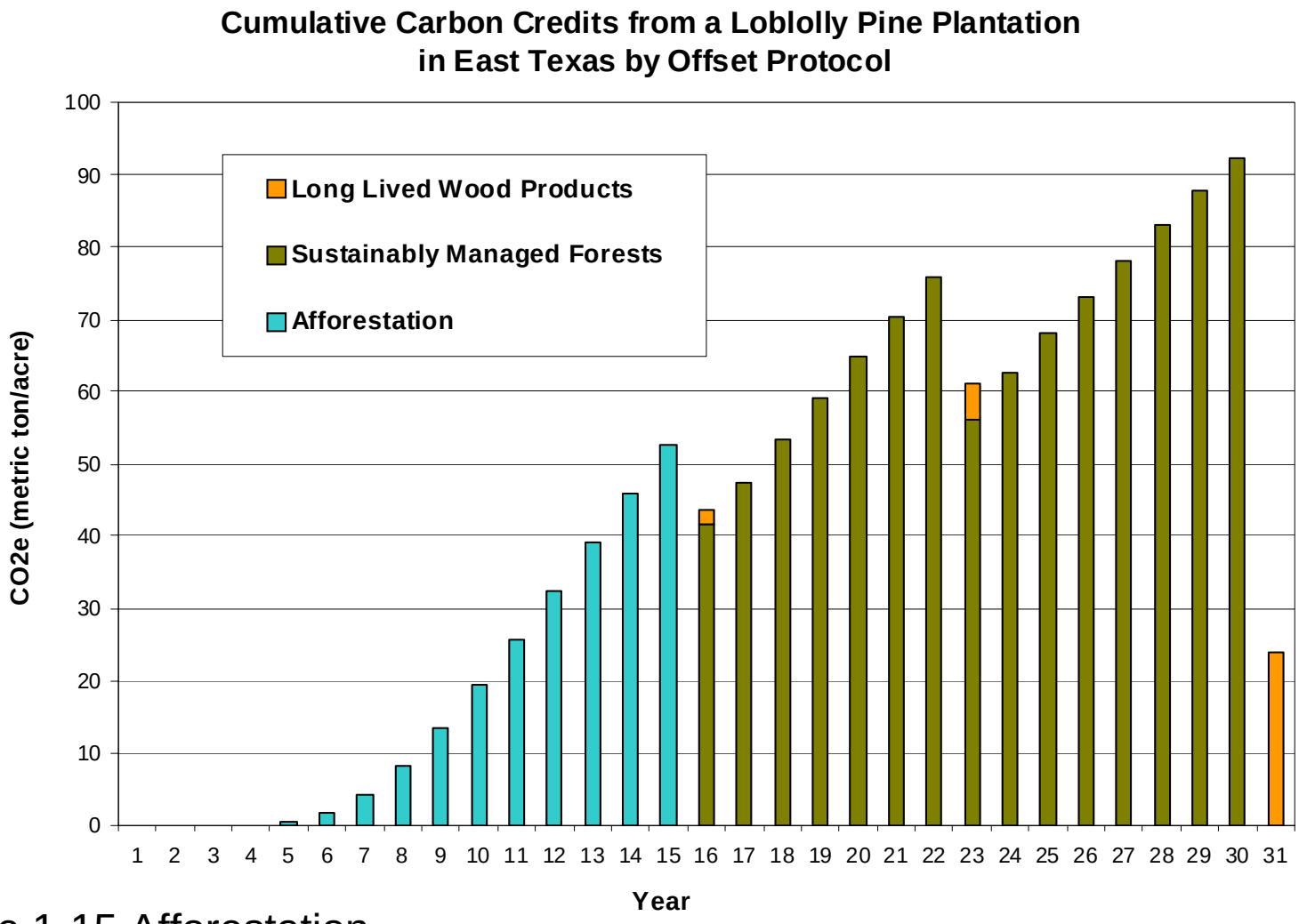
Biomass by Tree Size

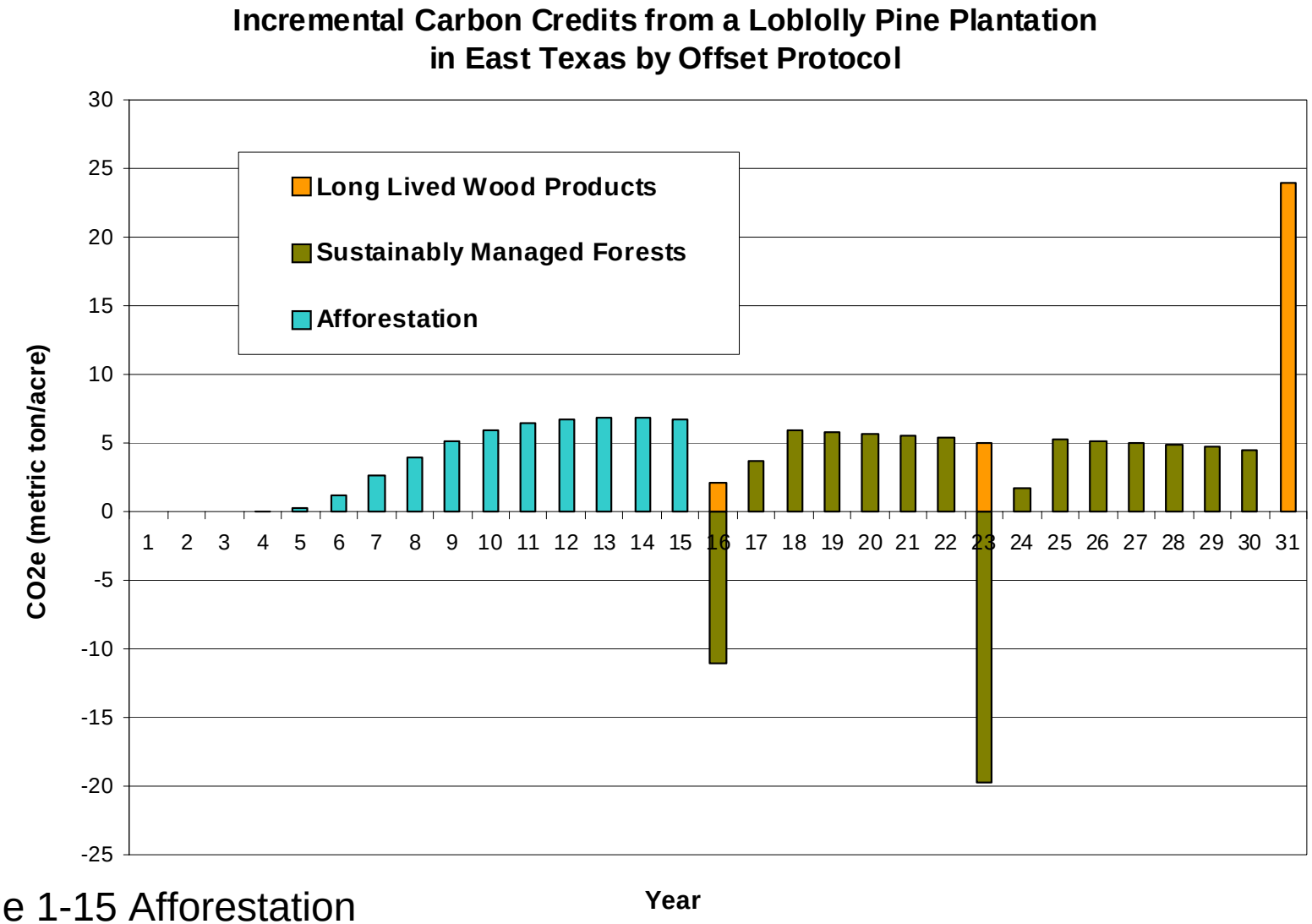


Carbon Credits by Protocol



- Age 1-15 Afforestation
- Age 16-30 Managed Forest
- Age 16, 23, and 31 Thinning & final harvest, long lived wood products

Carbon Credits by Protocol



- Age 1-15 Afforestation
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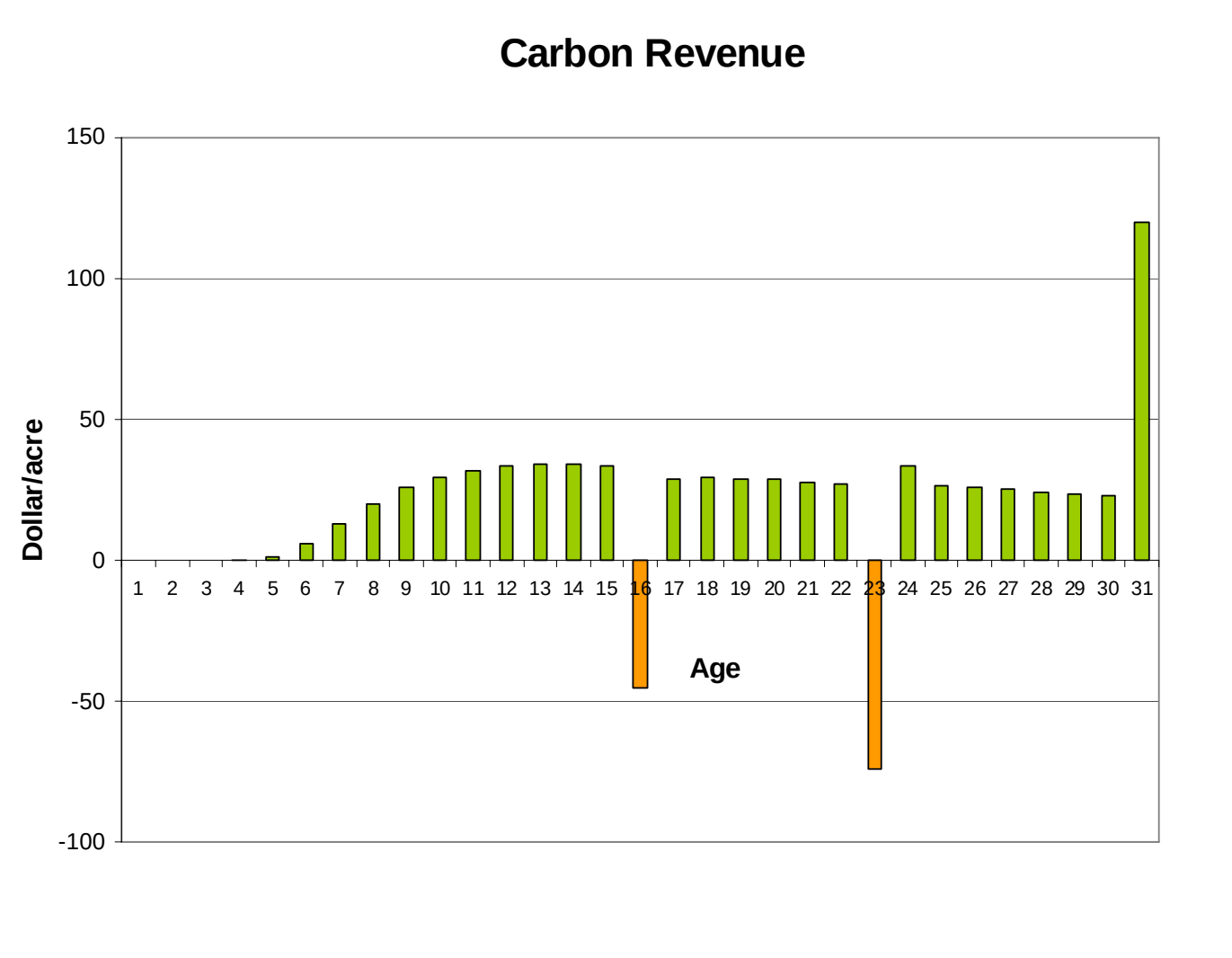
Carbon Revenue by Program

- Assuming $5/CO2e
- Thinning has negative effect on carbon revenue
- Final harvest has positive effect on carbon revenue



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Costs and Timber Revenue

- Site establishment costs: $227/ac
- Annual cost: $16/ac
- Thinning cost: 14% of thinning revenue
- Final harvest cost: 9% of final harvest revenue
- Carbon monitoring and trading cost: 25% of carbon revenue
- First thinning revenue: $212.50/ac
- Second thinning revenue: $586.40/ac
- Final harvest revenue: $2,904.80/ac

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Financial Returns for One Rotation

	NPV	IRR
With Carbon	$520.49	9.2%
Without Carbon	$364.73	7.9%

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Substantially Improve Financial Returns