Carbon Market Opportunities and Project Development Tools for Landowners

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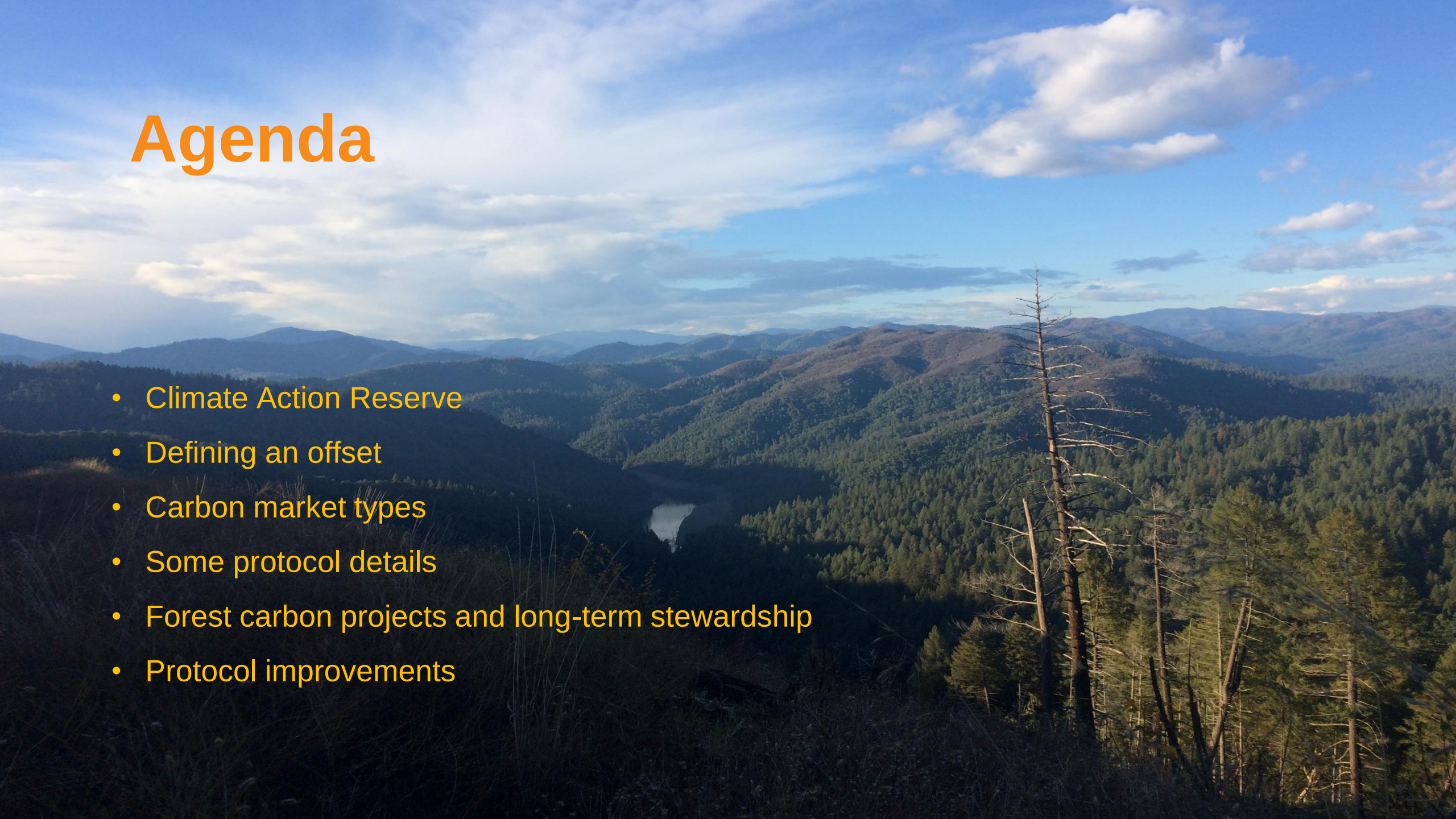
Climate Action Reserve
October 30, 2018

Agenda



- Climate Action Reserve
- Defining an offset
- Carbon market types
- Some protocol details
- Forest carbon projects and long-term stewardship
- Protocol improvements

Climate Action Reserve: a nonprofit dedicated to market-based solutions to climate change

CLIMATE ACTION RESERVE

Carbon Offsets Registry

- **Voluntary Program: primary GHG accounting standard used for voluntary carbon market**
  - Issued 78 million credits
  - 18 project types, plus user-friendly accounting tools and guidance documents
- **Compliance Program: helped develop and currently support California's pioneering cap-and-trade program**
  - Approved by CA Air Resources Board to issue carbon credits eligible for compliance use
  - Issued 45% of credits in the compliance market

Beyond GHG Offsets

- GHG policy consulting: Mexico, Ontario, Quebec, World Bank, USDA, USAID, other California agencies, and more
- Climate finance impact assessments
- GHG Mitigation Registry

How are offsets generated?

Offset Protocols Address GHG Quantification

ADDITIONAL	VERIFIABLE	REAL	PERMANENT	OWNED UNAMBIGUOUSLY
• GHG reductions would not have occurred in the absence of the carbon market incentive	• *Ex-post* third-party verification prior to credit issuance	• GHG accounting is conservative, comprehensive, and scientifically credible	• GHG reductions or removals persist for at least 100 years, accounting for any reversals	• No other parties may reasonably claim ownership of GHG reductions resulting from project

CLIMATE ACTION RESERVE

- Forest
- Grassland
- Landfill
- Livestock
- Mine Methane
- Nitric Acid Production
- Organic Waste Composting
- Organic Waste Digestion
- Ozone Depleting Substances
- Forest - ARB
- Livestock - ARB
- Mine Methane - ARB
- Ozone Depleting Substances - ARB

Listed, Registered & Completed Projects as of March 1, 2018

531 Projects
115M Credits Issued

Forest Projects
19 Voluntary
75 Compliance

Carbon market types

Compliance Market

End Buyer	Large businesses and utilities required to reduce emissions by law (California, Quebec, Ontario)
Standard	CA Air Resources Board approved protocols
Project Types	6 project types, only Forest, MMC, ODS, Livestock used to date
Credit Price	$10-$12, depends on allowance prices
Cost	Variable by project type; includes: project feasibility study, installation, on-going monitoring & reporting, verification, business development for credit sales
Risks	• Policy uncertainty re: Cap and Trade Program implementation • ROC to ARBOCs conversion risk • Invalidation

Voluntary Market

End Buyer	Any individual, business, nonprofit, municipality, utility voluntarily reducing emissions
Standard	Climate Action Reserve protocols, other carbon registries
Project Types	18 projects types
Credit Price	$1-$45+, depends on project type, location, buyer needs, co-benefits
Cost	Generally lower than compliance Variable; includes: project feasibility study, installation, on-going monitoring & reporting, verification, business development for credit sales
Risks	• Finding buyers • Price uncertainty overtime

Forest Carbon Basics

Three Project Types

- Improved Forest Management
- Avoided Conversion
- Reforestation

Variable Crediting

- Projects are credited in the first year for avoiding the risk of converting forestland or reducing forest carbon
- Annual crediting is provided for growth

Forest Attributes

- Rate of sequestration depends on: species, site class, age classes, management practices

What Does a Forest Project Consider?

ACTIVITIES

- Varies by project type; focus on sustainable forest management to increase carbon storage in trees, compared with common (baseline) practices.

CARBON POOLS

- Must account for carbon in above and below-ground live and dead trees, as well as harvested wood products.

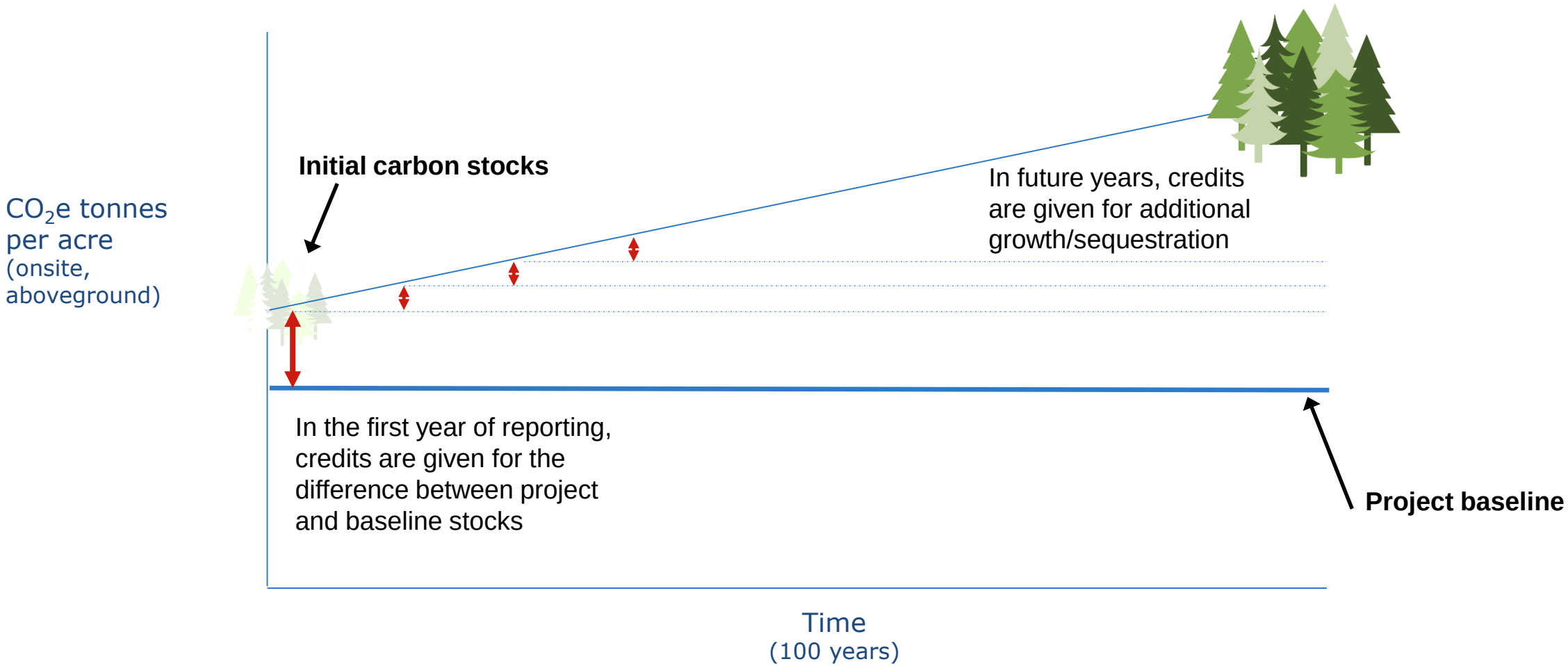
Timber Inventories

- Timber = $
- Focus on merchantable trees
- Estimating DBH, height
- Estimates are trued up at the mill

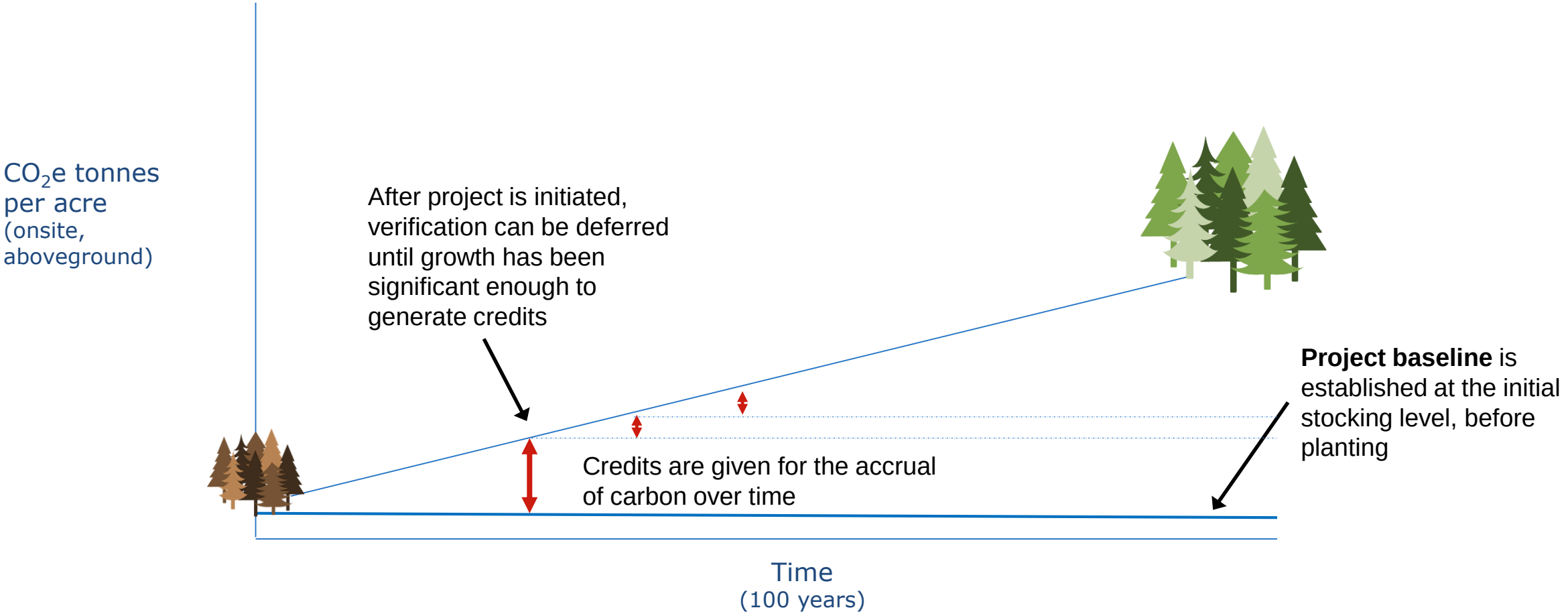
Carbon Inventories

- Carbon = $
- Focus on ALL trees
- Closer measurements of DBH, height
- Estimates are confirmed by the verifiers

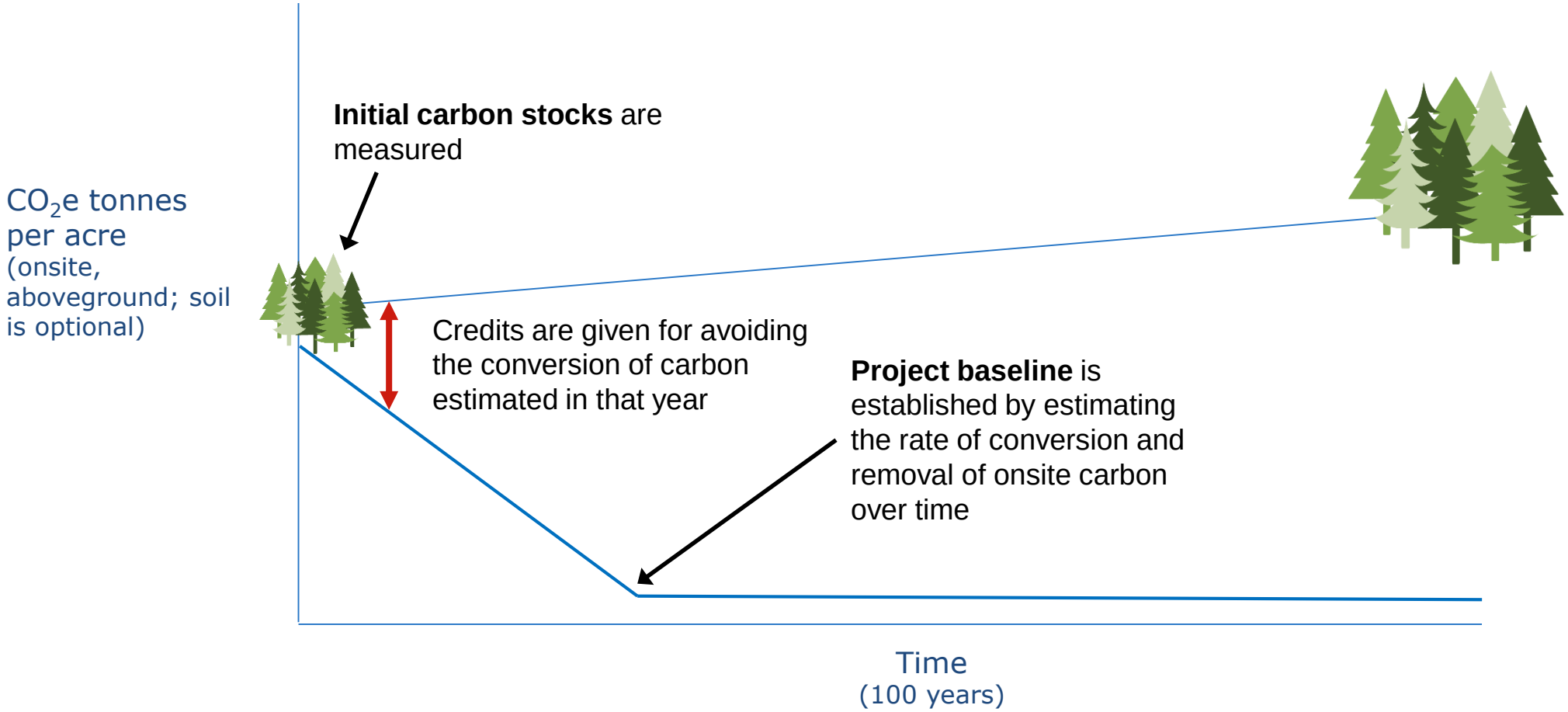
Improved Forest Management Project Crediting



Reforestation Project Crediting



Avoided Conversion Project Crediting



What Happens if the Carbon Stocks Aren't Maintained?

PERMANENCE

All credited carbon must be maintained for 100 years from the credit issuance

Unavoidable Reversals

Natural disturbances (wildfire, insects, disease, wind)
Compensated for with the Buffer Pool

Avoidable Reversals

Intentional disturbances (overharvesting)
Compensated for by the Forest Owner

Forest Carbon and Long-term Stewardship

A forest carbon project encourages maintenance activities that will maintain and/or increase growth, thereby increasing overall stocking levels.

- Extending rotation ages where forest growth remains strong
- Retaining the best growing trees at harvest
- Stocking control
- Managing for resilience

These activities are compatible with increased long term production of sustainable wood products.

Protocol Revisions to Improve Cost-Effectiveness

Project Types	Strategies
All Project Types	Verification intensity adjustments based on risk
	Computer application (standardized) for inventory analysis and annual reporting
	Modifying approach to sequential sampling (verification approach)
	Standardized inventory methodologies
	Increased downward adjustments to risk buffer contributions based on management for forest resiliency
	Verification guidance to allow for exceptions to 'in/out' tree determination
	Allowance to exclude recently disturbed plots from verification oversight
	Increased facilitation of aggregated projects
Improved Forest Management	Standardized baseline calculations
	Modifications to leakage calculations based on anticipated project harvest levels
Reforestation	Conservative ex ante crediting to finance tree planting, shifting to ex post crediting once there is ample carbon
	Exclude dead wood carbon pool from project accounting (from pre-existing trees)
Urban Forestry	Use of default values to replace need for field sampling
	Simplified estimation of canopy area

Free Tools Available for Forest Projects

Feasibility Workbook
Assess whether your land may be feasible for an IFM project

Standardized Inventory Methodology (SIM)
Our pre-verified inventory methodology is written to be compatible with the protocol – save money by skipping development of a custom methodology

Climate Action Reserve Inventory Tool (CARIT)
Manage your project inventory and grow data through FVS

Harvested wood product and credit calculation worksheets
Complete the equations required by the protocol

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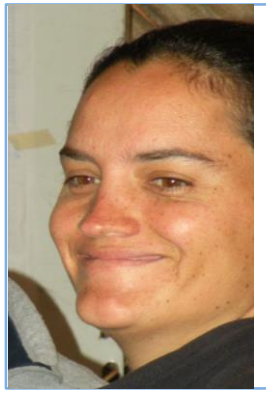

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Thank you!