

# Project-Based GHG Credits: A Market Vision and Potential Roles for Forest and Agriculture

US Forest Service

April 17, 2006

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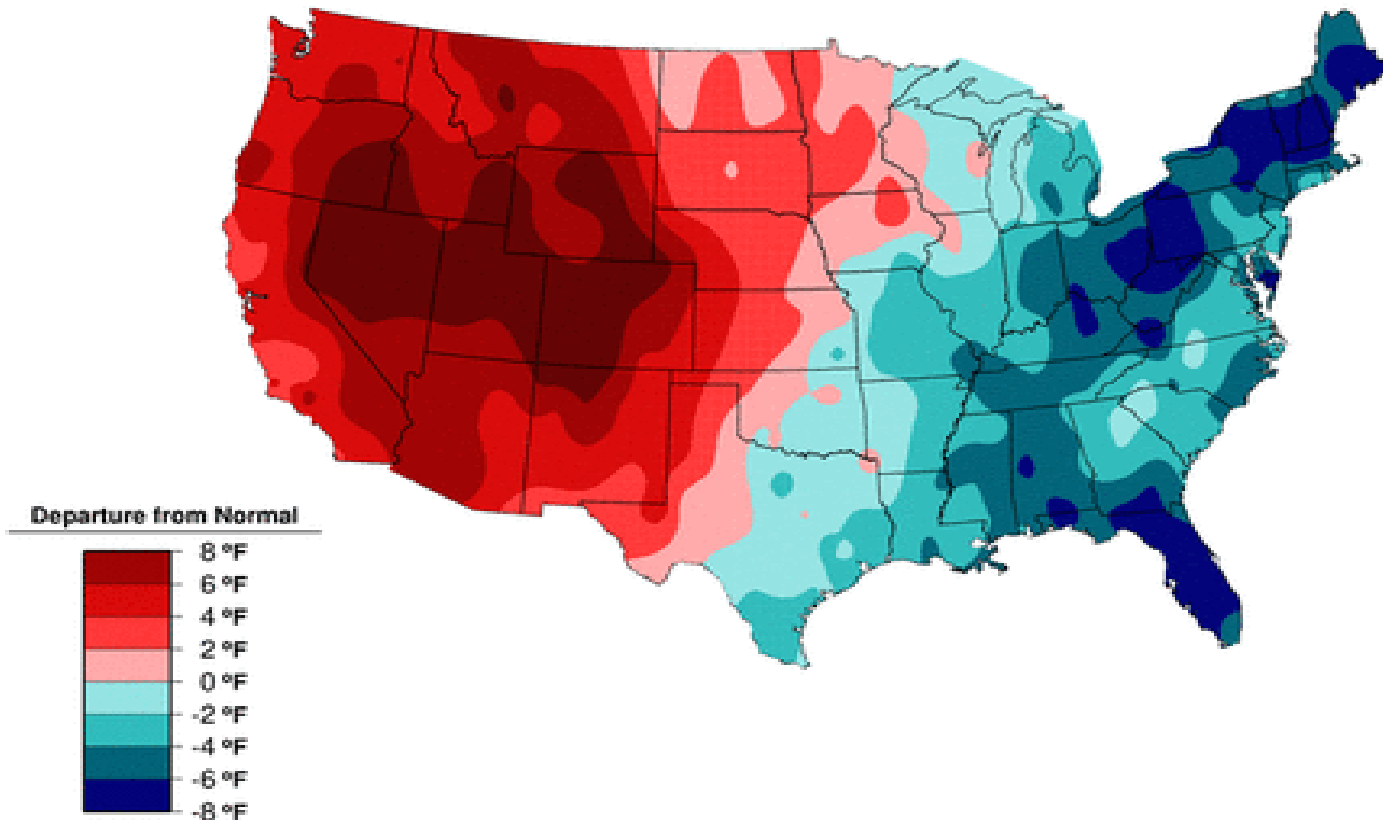
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# Topics Covered

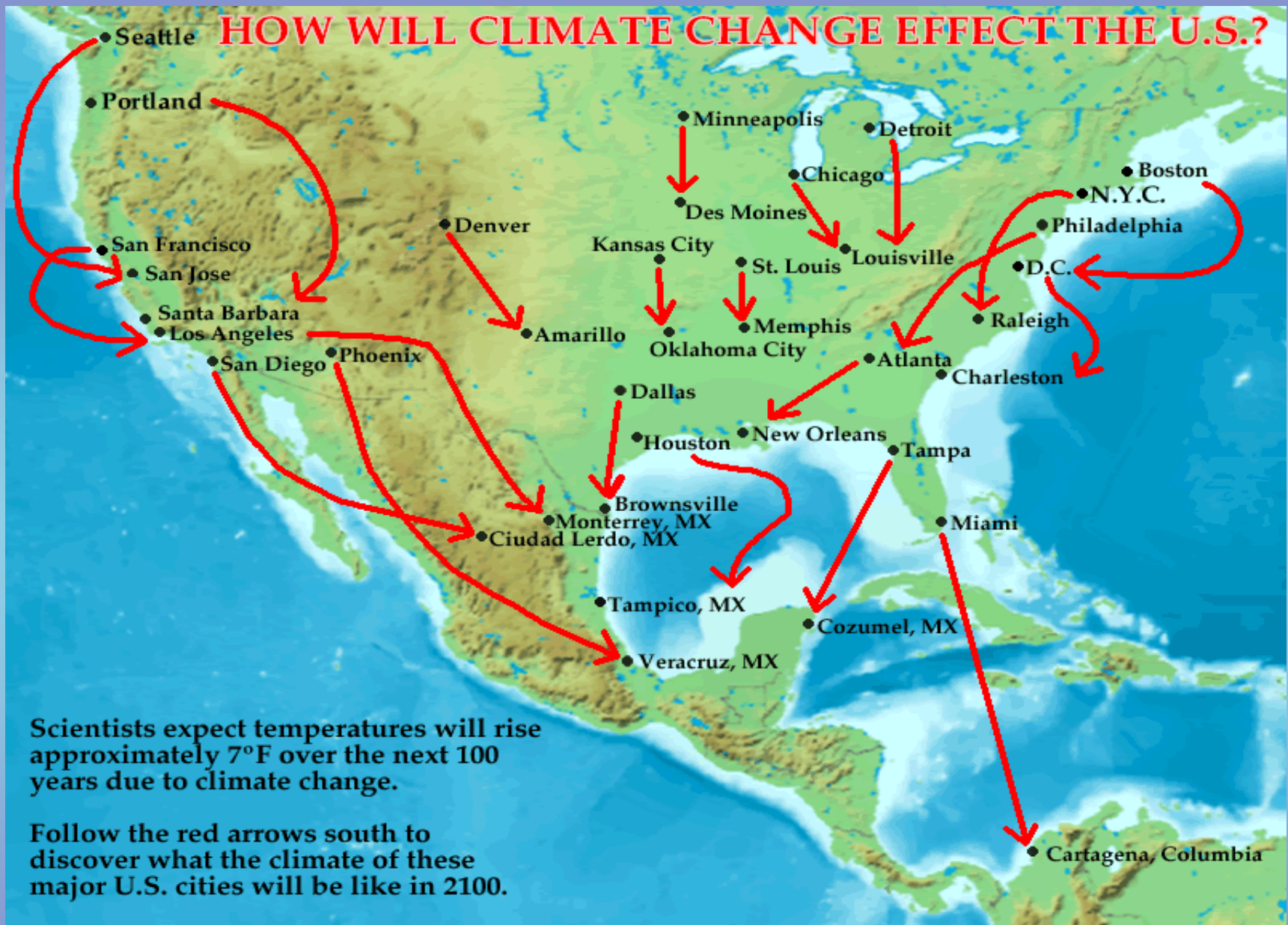
- Take away: Offsets must be of high-quality
- Visualizing climate change impacts
- What is a high-quality GHG offset
- Why are offsets valuable?
- The Climate Trust Portfolio
- Deschutes River Riparian Zone Reforestation
- Closing Remarks

# January 2003 Temperature Departure from Normal

(Departure from the 1971 - 2000 Normal)



# HOW WILL CLIMATE CHANGE EFFECT THE U.S.?



# Grinnell Glacier and Grinnell Lake Glacier National Park, 1910-1997



Photo by Kiser, GNP Archives, 1910



Photo by Fagre, 1997

# One Immediate Challenge

## 31 Proposed Coal Plants in the Interior West\*

*Many more nationally (70 to 120 by 2012)*



\* Calpine Testimony Before the Oregon Department of Energy, Portland, Oregon, October 26, 2004

# Take Away:

## Need High Offset Standards

Projects Must Create “Additional” CO<sub>2</sub> Reductions

- **Weak offsets now could allow compliance with nominal regulations while atmospheric GHGs rise**
- **Must be mitigation measures that would not occur without offset project funding**
  - Excludes common practice, regulated activities
  - Performance standards can be used as a surrogate

# On-Going Third-Party Verification



These Carbon Dioxide Offsets have been quantified and verified by an independent third party expert, Stellar Processes, who prepared a Monitoring and Verification Report in accordance with the Monitoring and Verification Plan approved by The Climate Trust for this Program.

These verified Carbon Dioxide Offsets are the result of the installation and/or implementation of energy efficiency measures at the property described below. These Carbon Dioxide Offsets were transferred to The Climate Trust by the owner of this property, Patricia Scott, pursuant to a Bill of Sale dated October 28, 2002.

#### Description of Property

21333 S. Tahyee Rd., Oregon City, OR

#### Verified Carbon Dioxide Offsets

Metric Tons	Vintage Year
0.00	2002
1.63	2003
1.63	2004
1.63	2005
1.63	2006
1.63	2007
1.63	2008
1.63	2009
1.63	2010
1.63	2011
1.10	2012
1.10	2013
1.10	2014
1.10	2015
1.10	2016
1.10	2017

Metric Tons	Vintage Year
1.10	2018
1.10	2019
1.10	2020
1.10	2021
1.10	2022
1.10	2023
1.10	2024
1.10	2025
1.10	2026
1.10	2027
1.10	2028
1.10	2029
1.10	2030
1.10	2031
1.10	2032
1.10	2033



# Offsets Reduce GHG Levels

Offset Defined: Synthesized from Dictionaries

## A project that...

1. Cancels out emissions
2. That are recorded in a GHG ledger (or the atmosphere)
3. With an end effect as if the cancelled emissions had not occurred

# Additionality of a Project Activity

## *CDM/JI Under Kyoto Protocol*

Emission reduction shall be additional to any that would occur in the absence of the certified project activity.

*Kyoto Protocol, Article 12*

A CDM project activity is additional if anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the registered CDM project activity.

*CDM modalities & procedures, paragraph 43*

# Carbon Funding and the Project Development Cycle

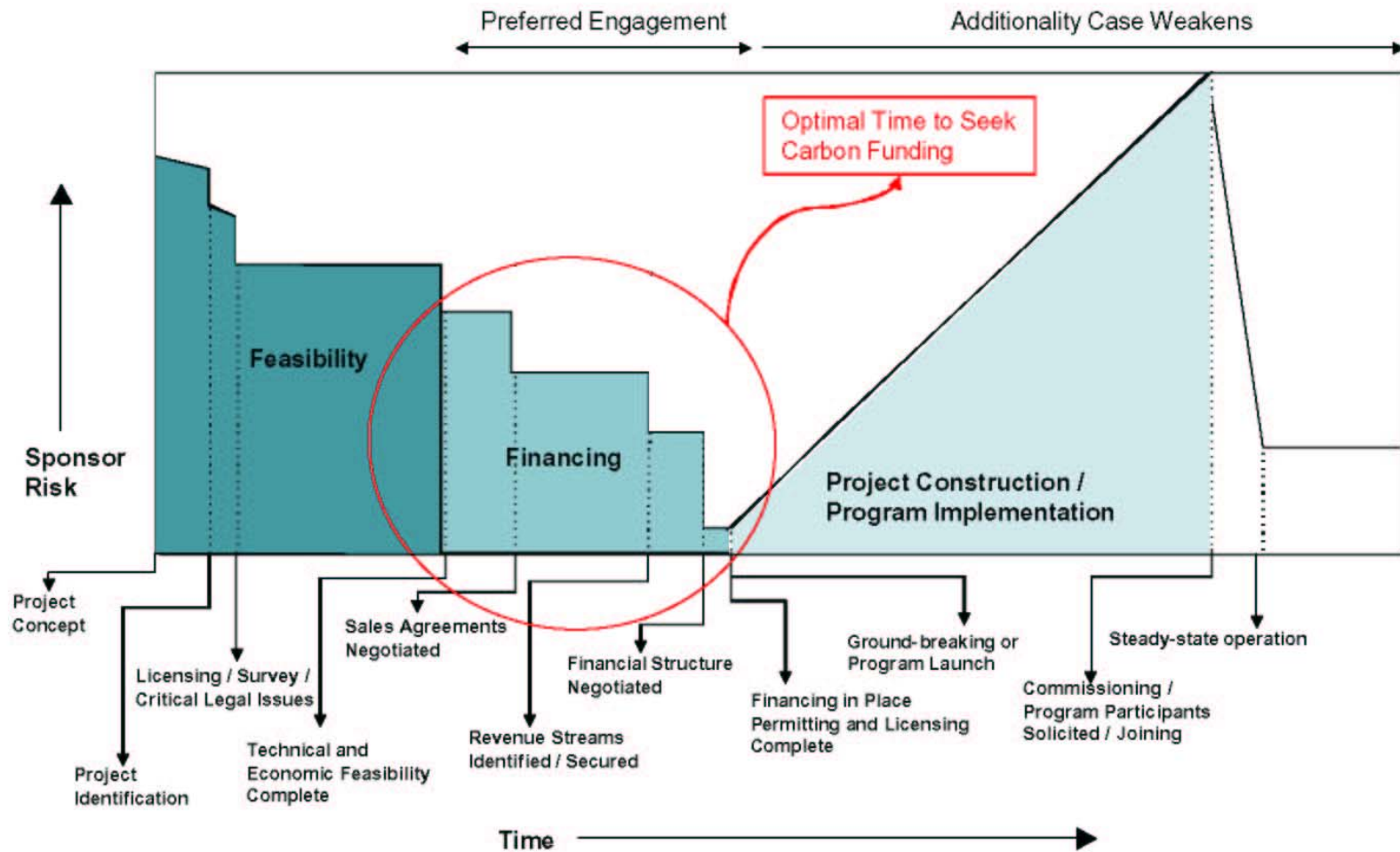
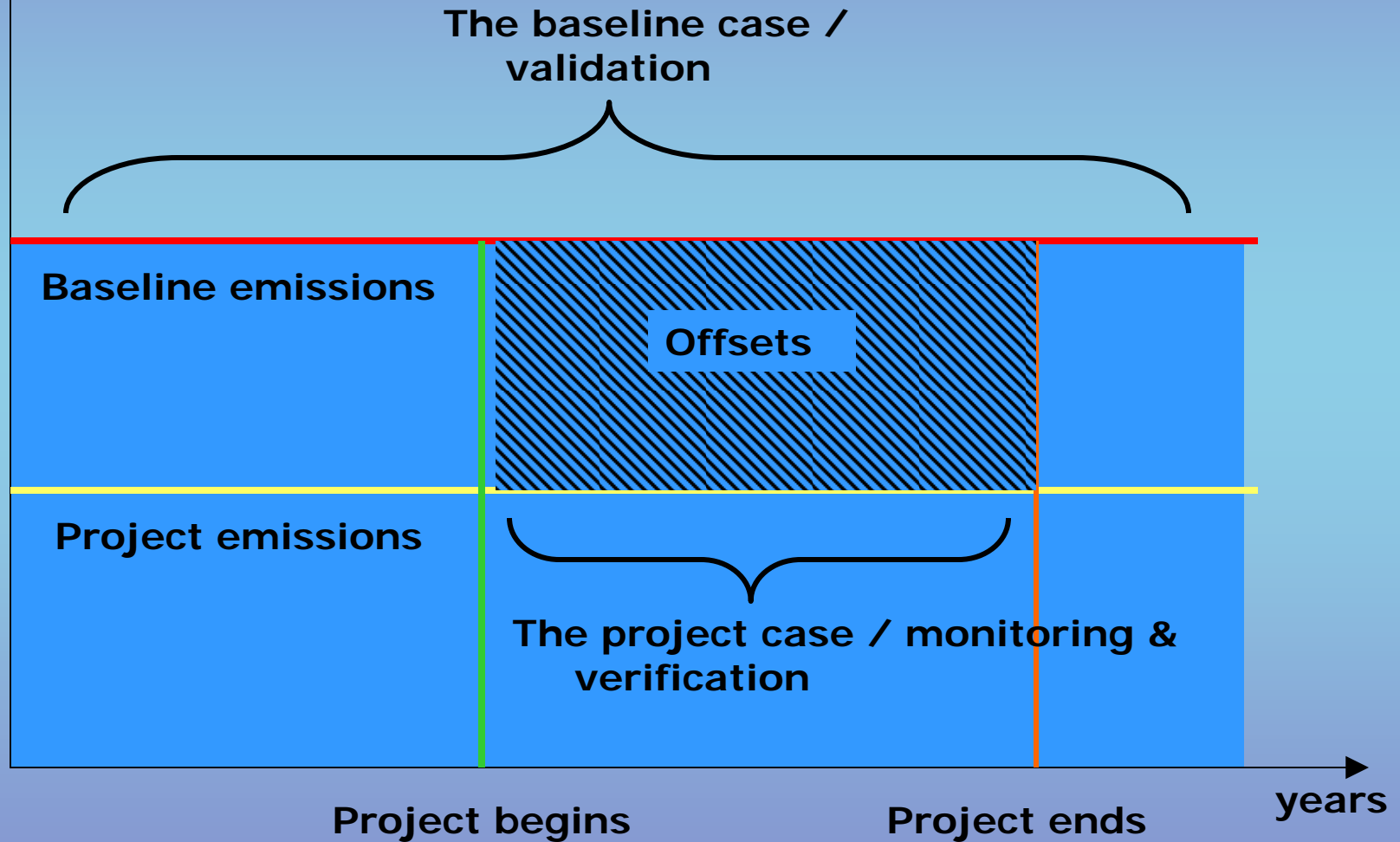


Diagram Provided Courtesy of Eenergy International Corporation

# What is an Offset?

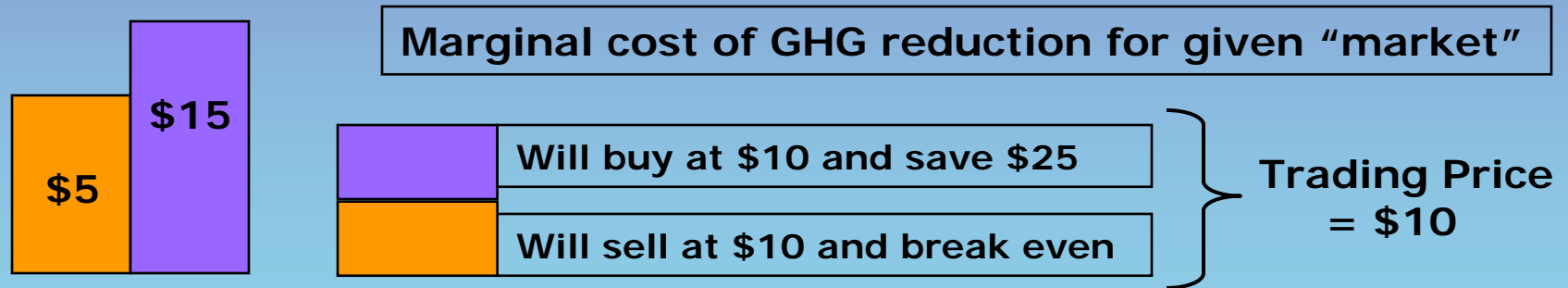
CO2 emissions



# Why Is Trading Valuable? \*

*To save scarce resources for other societal needs*

- “Cap and Trade” Logic: The gains of trade



- Both emit 100 tons and have 95 allowances = both short 5
- Without trading: Purple spends \$75, Orange \$25
  - Total expenditures of \$100
- Assume allowance market price is \$10 per ton
- With trading: Orange generates 10 tons at cost \$50, sells 5 at \$10 per ton to Purple (-\$50) and breaks even
  - Total expenditures of \$50

*Society saves \$50*

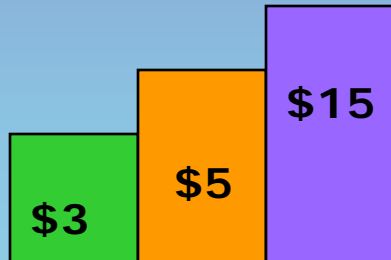
\*Prices are for illustrative purposes only

# Why Are Offsets Valuable? \*

*To save scarce resources and achieve more reductions*

- Introducing Offsets: A new market dynamic

Marginal cost of GHG reduction for given "market"



Purple	Will buy at \$3 and save \$35
Orange	Will buy at \$3 and lose \$15
Green	Will sell at \$3 and earn \$30

Offset Price = \$5

- Both emit 100 tons and have 95 allowances = both short 5
- Assume allowance market price is \$10 per ton
- With trading: Orange generates 10 tons at cost \$50, sells 5 at \$10 per ton to Purple (-\$50) and breaks even

– **TRADING ONLY: Total expenditures of \$50**

- With Offsets: Orange buys 5 at \$3 and Purple buys 5 at \$3

– **TRADING WITH OFFSETS: Total expenditures of \$30**

*Society saves \$20 more than under trading without offsets*

\*Prices are for illustrative purposes only

# Why Are Offsets Valuable?

- Achieve more reductions in non-capped sectors under cap and trade
- Support investment in low-carbon technologies – long-term goals
- Realize co-benefits
  - Other environmental
  - Socio-economic
    - Jobs, investment, environmental justice
- Achieve regional / local policy goals

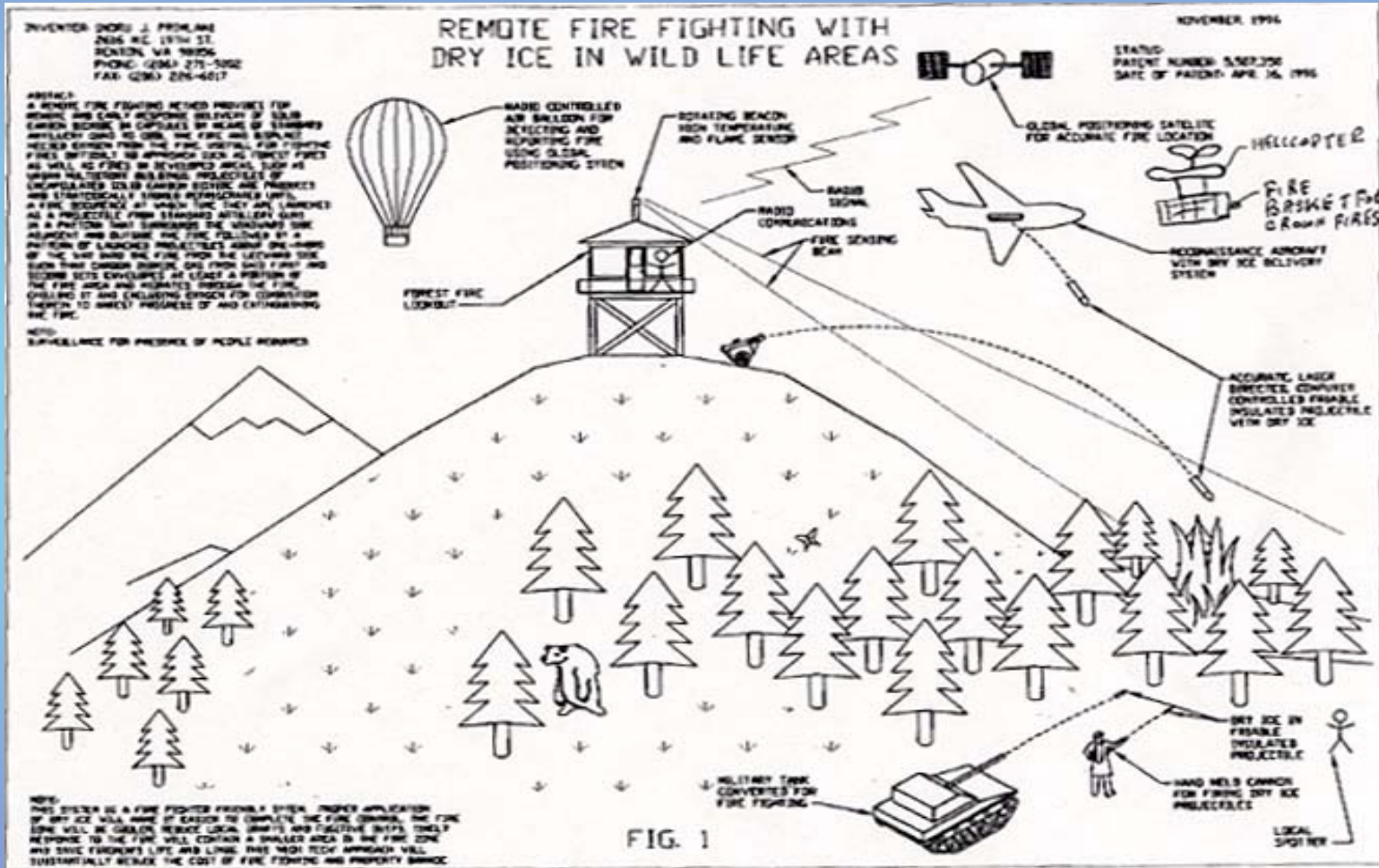
# Benefits of The Climate Trust's Offset Portfolio

*Most Projects and Benefits are in Oregon*

- **1.7 million short tons of CO2 offsets**
- **Numerous other benefits**
  - Reduce air pollution
  - Improve habitat, watersheds, and water quality; reduce soil erosion; preserve biodiversity; protect endangered species
  - Create jobs; create demand for clean energy products
  - Save money on energy; enhance energy security by reducing oil imports
  - Less traffic congestion
- **Benefit to cost ratio: 9 to 1**
- **Will invest another \$5 million in 2006**



# Dry-Ice for Fire Suppression



# Truck Stop Electrification

- I-5 Corridor in OR and WA
- “shutting-down-and-plugging-in” shifts from diesel idling to lower carbon grid electricity
- Emissions co-benefits:
  - 1,400 tons of oxides of nitrogen (NO<sub>x</sub>), 40 tons of particulate matter (PM)
- OEM increasingly “electric ready” = pent up demand
- Saving estimated 10 million gallons of diesel fuel
- 16 year contract
- 90,000 metric tons CO<sub>2</sub>



# Portland Building Energy Efficiency

- MAP project increases number of multifamily housing units with a one-stop shop for project coordination, technical and financial advice, and incentives.
- The CGBP encourages highly efficient LEED Green Building Standards.
- Deemed savings makes M&V viable technically and economically
- Partner: Portland Office of Sustainable Development.
- Tons: 247,888      Term: 5 years



# Cement Substitution

- Increase use of blended cement in eastern and western states
- Project goal: stimulate a developing environmental market
- Project and retail components



- Strict M&V traces blend to manufacturer, mixer or project owner
- Partner: East Coast Sustainable Design and Engineering Firm
- Tons: up to 350,000      Term: 3 years, with option to extend

# Innovative Financing of Wind Power

- Non-profit supporting Green Tags market retires tags
  - Climate Trust retires carbon offsets
  - Set groundwork for developing policies on green energy and emissions reductions markets
- 
- Early transaction involving energy and emission credits markets
  - Finished 7 years early
  - Tons: Over 23,000      Term: 10 years, completed early

# Internet-Based Carpool Matching



- Internet-based matching service greatly enhances speed, convenience, and safety of finding carpools and vanpools
- Extensive marketing of service is underway
- Transportation demand management expert has designed and will implement monitoring and verification of CO<sub>2</sub> benefits
- Partners range from Salem OR to Vancouver WA
  - Cities, transit agencies, state agencies, transportation management associations, large private employers
- Project statistics:
  - Tons: 70,000    Term: 10 years

# Portland Traffic Signal Timing

- Portland Department of Transportation with potential expansion to other counties and state
- Millions of dollars in end-user savings
- Strong data model for deemed reductions on conservative projections
  - Project statistics:
    - Tons: ca. 75,000
    - Term: 5-10 years



# Lumber Mill Cogeneration

- Biomass cogen and process upgrade
- Challenging to work with stressed economic sector
- Very solid M&V (low cost and accurate)
- Project statistics:
  - Tons: ca. 23,000
  - Term: 15 years





# Industrial Energy Efficiency

- Blue Heron pulp and paper industrial facility, Oregon City, OR
- Reduce energy use by 25%
- Increased capacity to use recycled paper as a raw material
  
- Project Statistics:
  - Tons: 640,000 tons CO<sub>2</sub>
  - Term: 10 years



# Ecuador Rainforest Reforestation

- Leading Latin American conservation organization (Jatun Sacha Foundation) with proven track record will reforest 600 acres with rare, endangered, endemic trees
- Site is the prime preservation target within the Ecuadorian biodiversity “hot spot” selected by Conservation International as one of its top five conservation targets world wide
- Provides 99-year conservation easement with clear intent for permanent preservation
- Partners: Conservation International & Jatun Sacha Foundation
- Project statistics:
  - Tons: 65,500      Term: 99 years



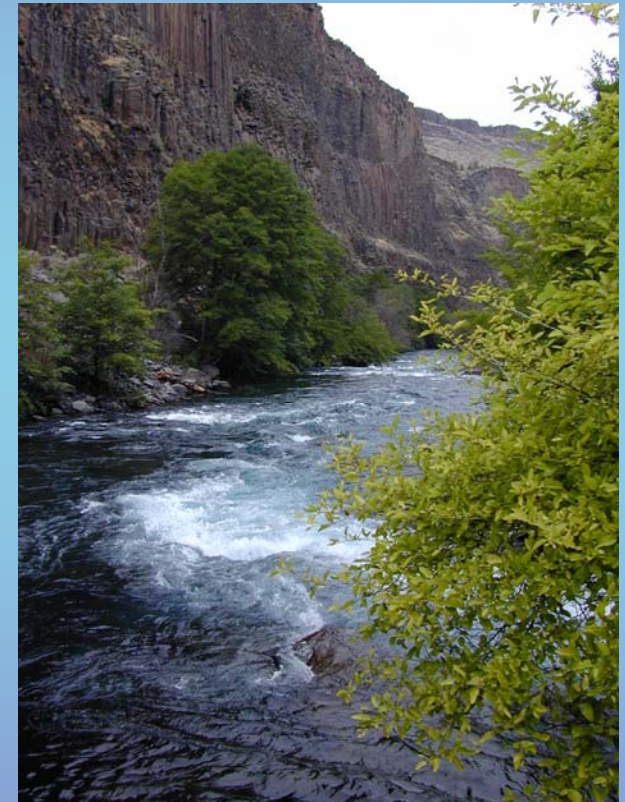
# Preservation of Unique NW Forest

- Trust funding assists Lummi Tribe in acquiring 1600 acres of land in northern WA and removing it from forest harvest cycle
- Project provides 100-year conservation easement, which protects ecologically unique forest, salmon habitat, and ceremonial lands
- Leading scientist to prepare monitoring and verification plan
- Partners: Lummi Indian Tribe
- Project statistics: Tons: 350,000                      Term: 100 years



# Deschutes Riparian Reforestation

- Central Oregon reforestation with local NGO
- Native species / strong co-benefits
- Rehabilitation of trout-bearing streams
- Groundbreaking “escrow” method
- Project statistics:
  - Tons: 233,333
  - Term: 52 years



# Deschutes Riparian Reforestation

- Additionality:
  - Insufficient incentives to landowners under existing federal programs
  - More sophisticated M&V over longer time (escrow)
  - Indigenous species
  - More burdensome legal structures

# Deschutes Riparian Reforestation

- M&V plan describes how the verifying agency (“verifier”) will:
  - Assess stand establishment,
  - **Measure baseline carbon stock**,
  - Re-measure carbon stock to find change over time, and
  - Conduct ongoing site monitoring.
- For each of these assessment activities, methods are described for designing assessments, collecting data, analyzing data, and reporting results.

# Deschutes Riparian Reforestation

- The plan is composed of several sections:
  - Overall project planning issues
  - Stocking surveys and free-to-grow certification
  - Baseline carbon stock measurement
  - Carbon stock re-measurement
  - Periodic monitoring
  - Schedules of activities
  - Budget

# Deschutes Riparian Reforestation

- The baseline carbon stock and subsequent measurements of carbon stocks at later times all use the same protocol and measure the same items. Under the DRR project with the Climate Trust sequestration is defined as any increase in biomass carbon stock over time.



# Deschutes Riparian Reforestation

- “An adjusted amount will be reported that excludes amounts stored on lands under federal conservation incentive programs, during the time that those federal contracts are in force. These amounts are called ‘adjusted verified projected carbon dioxide offsets’”.
- Projections will be made by growth modeling or use of tree or stand growth curves, using information about areas and species planted and site productivity. Reports will list inputs used in growth modeling so that, at some later time, if a different model is used to project sequestration then later projections can be compared to earlier projections.”

# US Regulatory Drivers Today

- The Oregon Standard
- The Washington Standard
- The Massachusetts Standard
- The New Hampshire Standard
- RGGI
- California's Initiatives
- West Coast Governors' Initiative
- Anticipated Federal Regulations

# Domestic Developments

- Senator Feinstein: Strong Economy and Climate Protection Act of 2006
  - **No-till or conservation tillage** – Storing additional carbon in the soil by tilling the soil less or not at all while farming.
  - **Planting trees or grasses on unused land** – Storing additional carbon in the soil by planting trees or grasses on low-value rangeland or shelterbelts between croplands.
  - **Planting biofuel crops** – Growing crops or using other materials for ethanol or other biofuels, which are alternatives to gasoline.
  - **Biomass** – Producing electricity with less or no fossil fuels, including using tree material from hazardous fuels reduction and switchgrasses or manure to generate power.
  - **Grazing** – Intensively-managed grazing systems that store more carbon in soils.

# International Developments

- Climate, Community and Biodiversity Alliance (CCBA)
  - Develop methodologies for land-use-based carbon offsets.
  - Members include
    - Conservation International
    - BP
    - Intel
    - Hamurg Institute for International Economics
    - The Nature Conservancy.
    - ENCOFOR –EU-funded
    - BioCarbon Fund of the World Bankt.

# Closing Remarks:

## What are people calling an "offset" right now?

- *Voluntary-market offsets or allowances:*
  - Varying environmental quality and regulatory efficacy.
- *Green power programs / RECs / Tags:*
  - May be subsumed into GHG reduction goals
- *Energy conservation programs:*
  - May or may not be part of GHG mitigation credit for regulated utilities

# Quality Projects: Selection Criteria

## *Fundamental Issues*

- **Additionality**
  - offset funding is necessary for the project to move forward
- **Permanence, timing leakage**
  - Technology and implementation have high likelihood of achieving goals
- **Measurability and Verification**
  - Quantification using best available analytical methods appropriate for the project (M&V)
- **Guarantees**
  - If reductions not achieved, capital returned

# Is a REC a GHG Offset? (A1: maybe)

Assume: 1 mwh = 1 metric tons CO<sub>2</sub>e

(A2: probably not here)

BEFORE REC Sale as an Offset

AFTER REC Sale as an Offset

= 1,000 metric tons CO<sub>2</sub>e

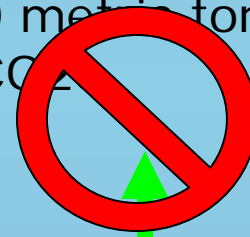
= 1,000 metric tons CO<sub>2</sub>e

1,000 metric tons CO<sub>2</sub>e

0 metric tons CO<sub>2</sub>e

1,000 metric tons CO<sub>2</sub>e

0 metric tons CO<sub>2</sub>e



1,000 mwh

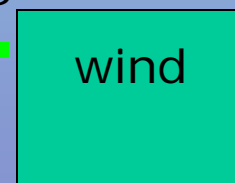
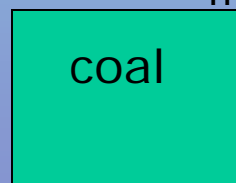
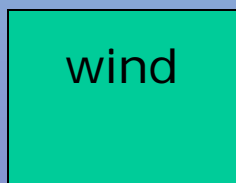
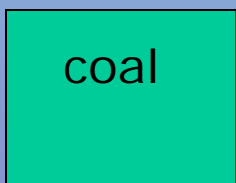
1,000 mwh

1,000 mwh

1,000 mwh



1,000 metric tons CO<sub>2</sub>e from RECS



# Need High Offset Standards

Projects Must Create "Additional" CO<sub>2</sub> Reductions

- **Weak offsets now could allow compliance with nominal regulations while atmospheric GHG rises**
  - **Mitigation measures that would not occur without offset project funding**
    - Excludes common practice, regulated activities
    - Performance standards can be used as a surrogate
  - **Project must be new to reduce atmospheric GHG**



# Humanitarian Issue?

- More than the environmental / economic toll, this may soon become a moral, humanitarian issue
  - Malaria and dengue fever on the rise
    - WHO. “Climate Change and Vector-Borne Diseases: A Regional Analysis.” Bulletin of the WHO, 2000.  
[http://whqlibdoc.who.int/bulletin/2000/Number%209/78\(9\)1136-1147.pdf](http://whqlibdoc.who.int/bulletin/2000/Number%209/78(9)1136-1147.pdf).
  - Poor countries coastal areas will be impacted, *least able to respond*
    - Georgia Institute of Technology and Massachusetts Institute of Technology peer-reviewed studies on GHG contribution to greater storm intensity, if not frequency

# Two Weeks After Katrina Hit

STORM AND CRISIS: Government Responses



Bruce Chambers/Orange County Register, via Associated Press

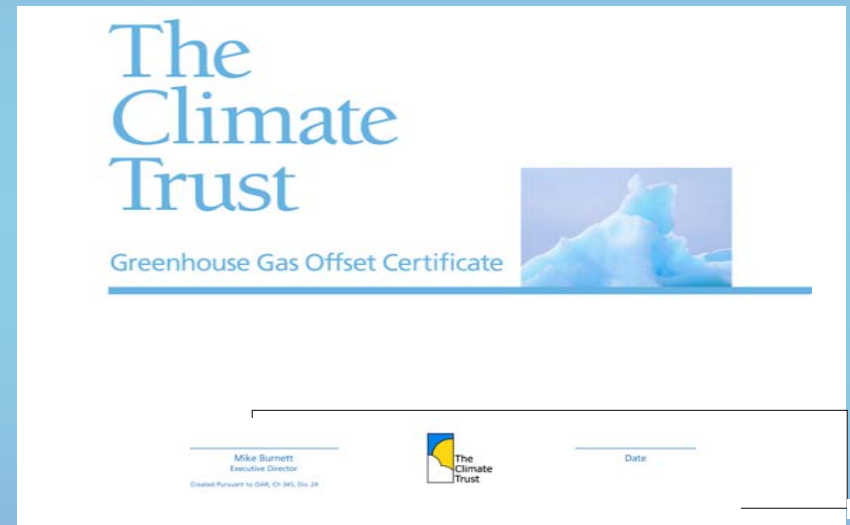
## After Two Weeks, a Rescue

A New Orleans man who had been stranded in his house for two weeks was carried to an ambulance yesterday by a search and rescue team.

SPEN

# We Have to be Optimistic (We can't afford to be pessimistic)

- All options need to be on the table – the problem is too great
- We can start acting now
  - Do your part at home and in your community
  - Discuss climate change
- High-quality offsets can achieve more at lower cost



# Thank You

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