

Carbon Credits & Carbon Markets

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Overview

- ▣ The Opportunity, the Need, the Big Picture
- ▣ The Basics – What are Carbon Credits?
- ▣ Carbon Markets – What currently exists and how do they compare?
- ▣ The North Woods Carbon Credit Partnership
- ▣ The Future – Where are carbon credits and carbon markets heading?
- ▣ Questions?



The Opportunity

- Carbon comprises about one half the mass of dry wood
- Considerable quantities of carbon are stored for long periods within long-lived wooden structures, furniture, finished goods and a myriad of other durable products made of wood (*The rate of carbon accumulation within wood products in use and in landfills was estimated by USDA at about 103 million metric tons annually in the U.S.*)
- Producing useful products from wood results in substantially less energy consumption – and particularly much less fossil energy consumption – than similar products from other raw materials.
- Lower energy consumption translates into far lower carbon emissions linked to manufacturing.



The Opportunity

Net Carbon (C) Emissions in Producing a Ton of Various Materials		
Material	Net Carbon Emissions (kg C/metric ton) ^{a/ b/}	Net Carbon Emissions Including Carbon Storage Within Material (kg C/metric ton) ^{c/}
Framing lumber	33	-457
Medium density fiberboard (virgin fiber)	60	-382
Brick	88	88
Glass	154	154
Recycled steel (100% from scrap)	220	220
Concrete	265	265
Concrete block ^{d/}	291	291
Recycled aluminum (100% recycled content)	309	309
Steel (virgin)	694	694
Plastic	2,502	2,502
Aluminum (virgin)	4,532	4,532

^{a/} Values are based on life cycle assessment and include gathering and processing of raw materials, primary and secondary processing, and transportation.

^{b/} Source: USEPA (2006).

^{c/} A carbon content of 49% is assumed for wood.

^{d/} Derived based on EPA value for concrete and consideration of additional steps involved in making blocks.

Wood Products and Carbon Protocols: Carbon Storage and Low Energy Intensity Should Be Considered
(Available at: <http://www.dovetailinc.org/files/DovetailCarbon0408hz.pdf>)

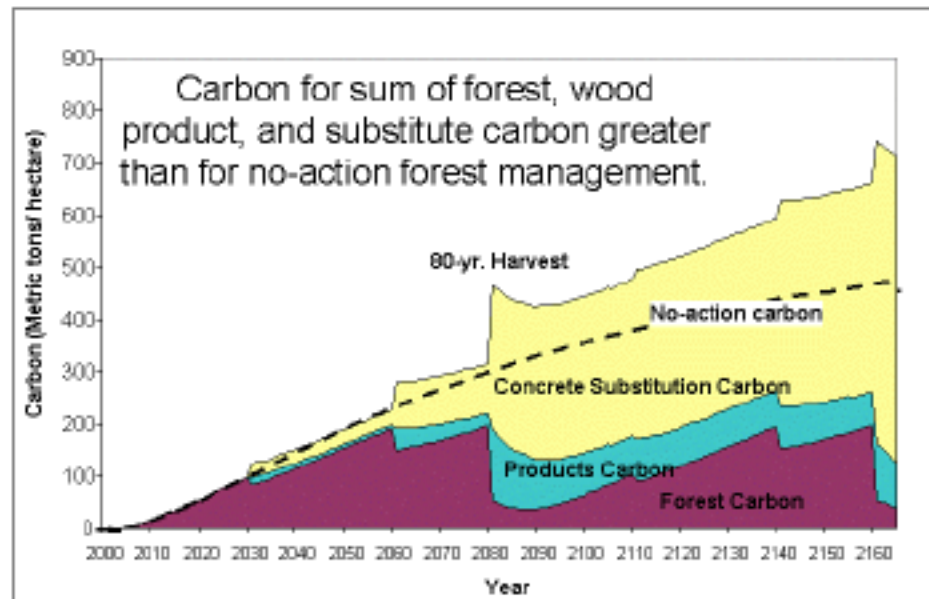
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The Opportunity

Carbon Storage Implications of Managing a Forest on an 80-Year Rotation, with Intermediate Thinnings at Years 30 and 60, and a Portion of Wood Harvested at Rotation Age Used for Long-Lived Construction Products. Substitution Comparison to Construction with Concrete.



Source: Perez-Garcia, J., B. Lippke, J. Connick, and C. Manriquez (2005); Wilson (2006).

Wood Products and Carbon Protocols: Carbon Storage and Low Energy Intensity Should Be Considered
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The Opportunity

Energy Required to Deliver 1,000,000 Btu to a Vehicle Fuel Tank

Fuel	Total Energy Required (Btu)	Fossil Energy Required (Btu)
Gasoline	1,241,000	1,241,000
Ethanol (corn - starch)	1,587,000	600,000
Ethanol (corn cellulose)	1,250,000	230,000
Ethanol (wood)	2,600,000	10,000

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SOLAR
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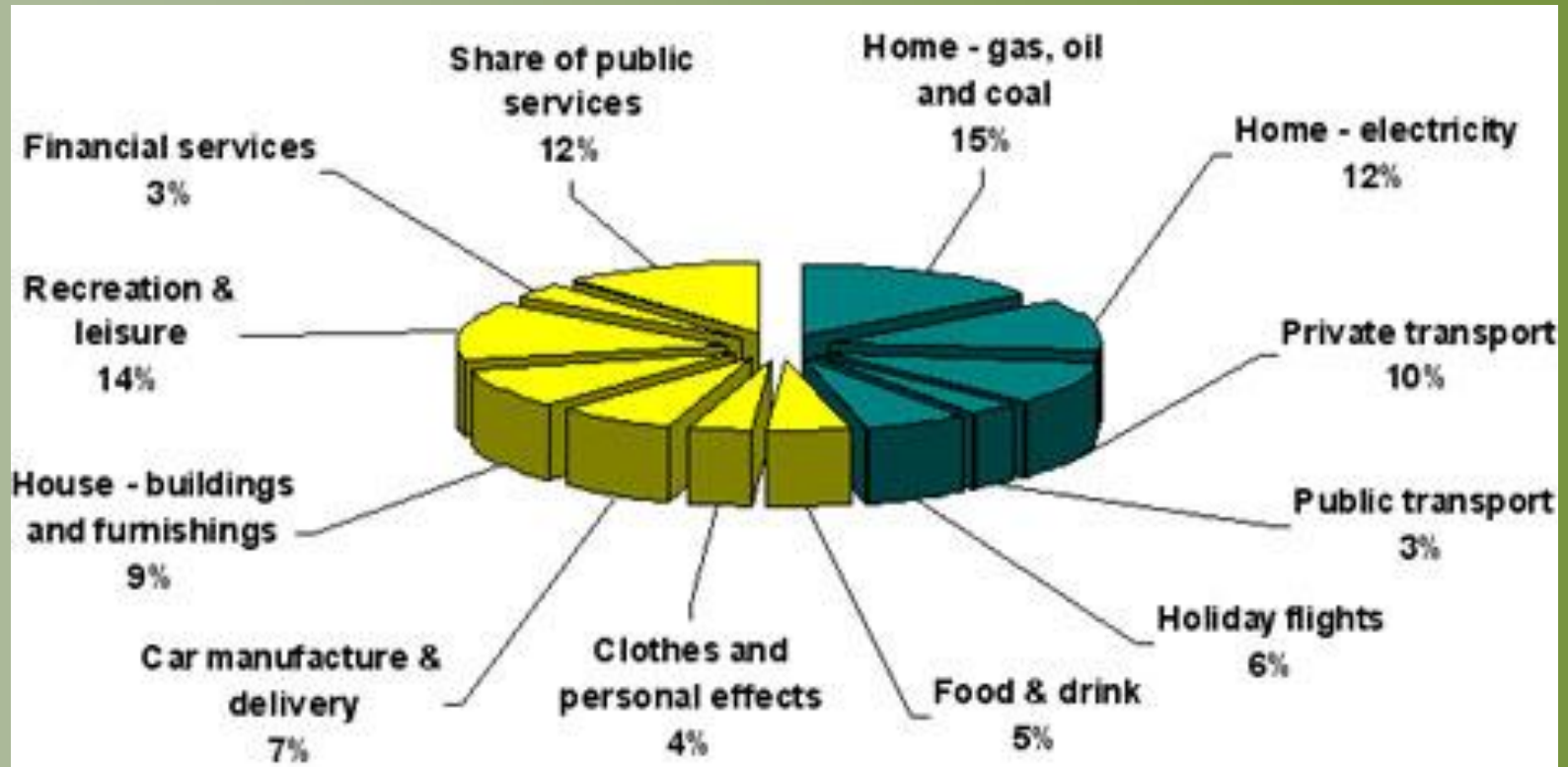


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The Need



Yellow = secondary emissions
Blue = primary emissions

<http://www.carbonfootprint.com>

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The Need

Turn it off when not in use (lights, television, DVD player, Hi Fi, computer etc. etc. ...)
Turn down the central heating and water heating slightly (try just 1 to 2 degrees C)
Use a programmable thermostat
Fill your dish washer and washing machine with a full load
Fill the kettle with only as much water as you need
Do your weekly shopping in a single trip
Hang out the washing to dry rather than tumble drying it
Sign up to a green energy supplier, who will supply electricity from renewable sources
Fit energy saving light bulbs
Install thermostatic valves on your radiators
Insulate your hot water tank, your loft and your walls
Recycle your grey water
Replace your old fridge/freezer (if it is over 15 yrs old), with a new one
Replace your old boiler with a new energy efficient condensing boiler
Car share to work, or for the kids school run
Use the bus or a train rather than your car
For short journeys either walk or cycle
Try to reduce the number of flights you take, etc, etc, etc.....

<http://www.carbonfootprint.com>

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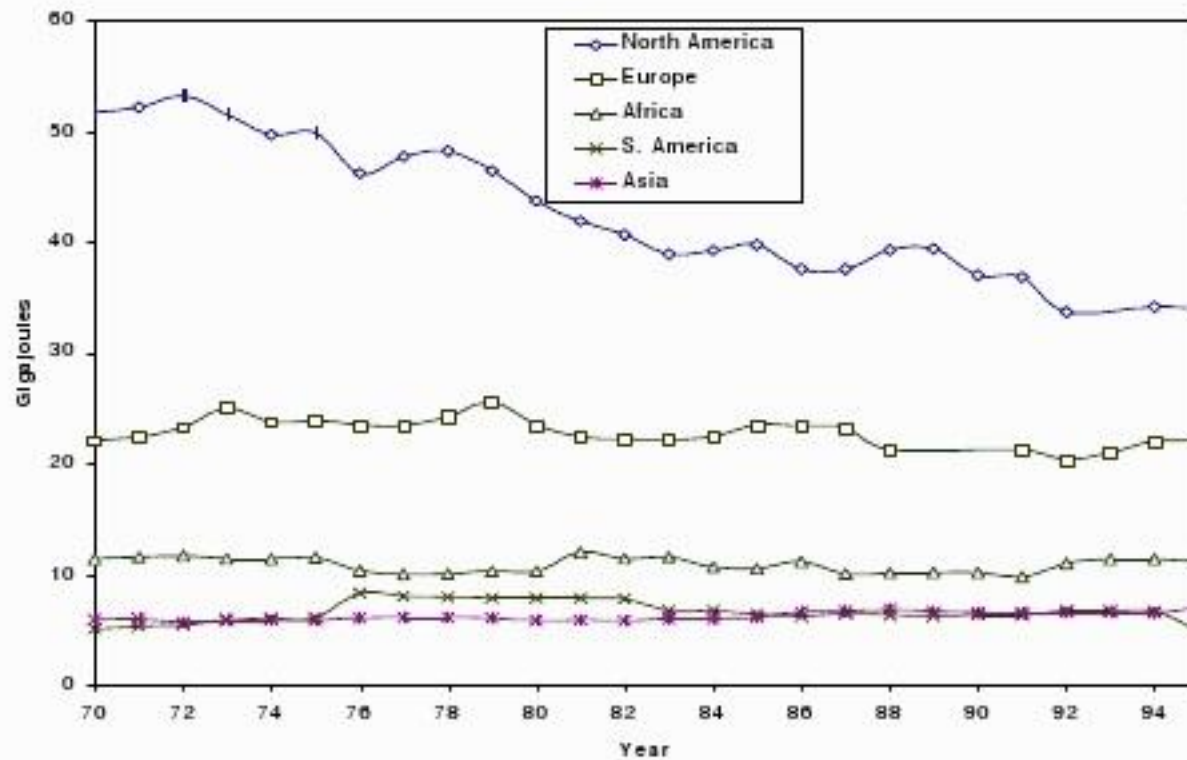


Fig. 1. Per capita household energy consumption in world regions

Source: *United Nations Statistics Division*

Note: Africa includes North and Sub-Saharan Africa; Asia includes West, South and East Asia

ST/ESA/1999/DP. 6

DESA Discussion Paper No. 6

www.un.org/esa/sustdev/publications/esa99dp6.pdf

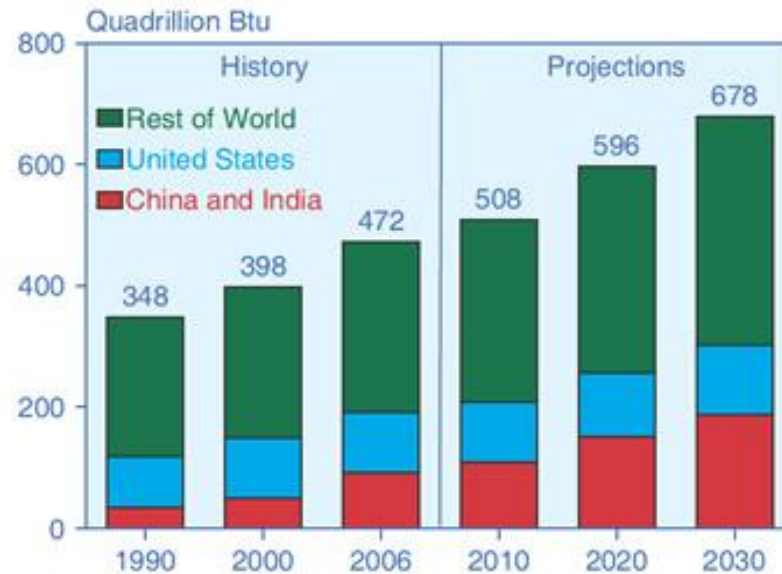
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The Need

Figure 12. Marketed Energy Use by Region, 1990-2030



Sources: **History:** Energy Information Administration (EIA), *International Energy Annual 2006* (June-December 2008), web site www.eia.doe.gov/iea. **Projections:** EIA, *World Energy Projections Plus* (2009).

Report #:DOE/EIA-0484(2009)
Release Date: May 27, 2009
<http://www.eia.doe.gov/oiaf/ieo/world.html>

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http://www.geology.ar.gov/images/modern_pumping_unit.JPG
<http://lacoastpost.com/blog/wp-content/uploads/2009/01/wind-turbine.jpg>
<http://www.solarpowerminja.com/wp-content/uploads/2009/01/solarfarm.jpg>

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International Debates Land Use Impacts



Alberta Tar Sands

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<http://www.treehugger.com/files/2009/02/indonesia-allows-more-palm-oil-plantations-on-peat-lands.php>

<http://legalplanet.files.wordpress.com/2009/05/alberta-tar-sands.jpg>

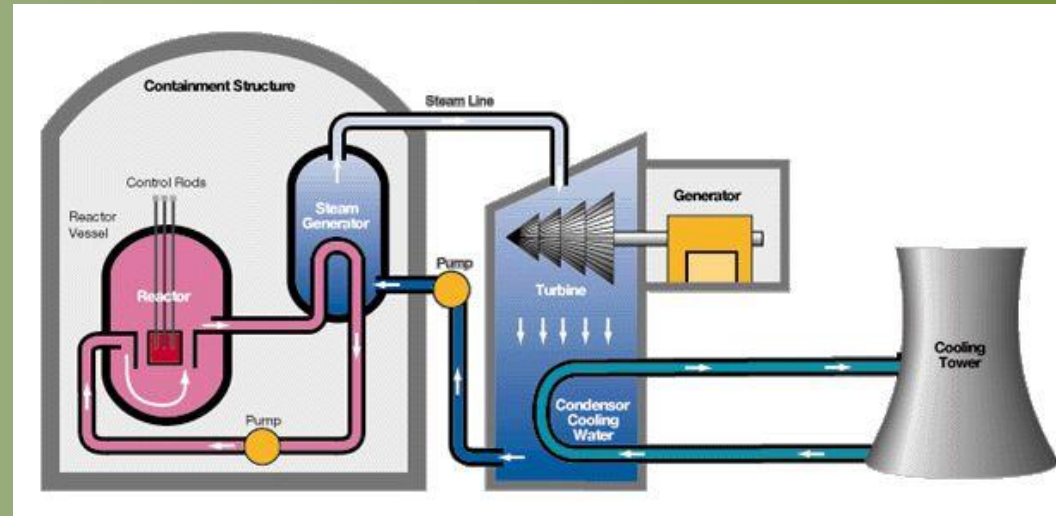
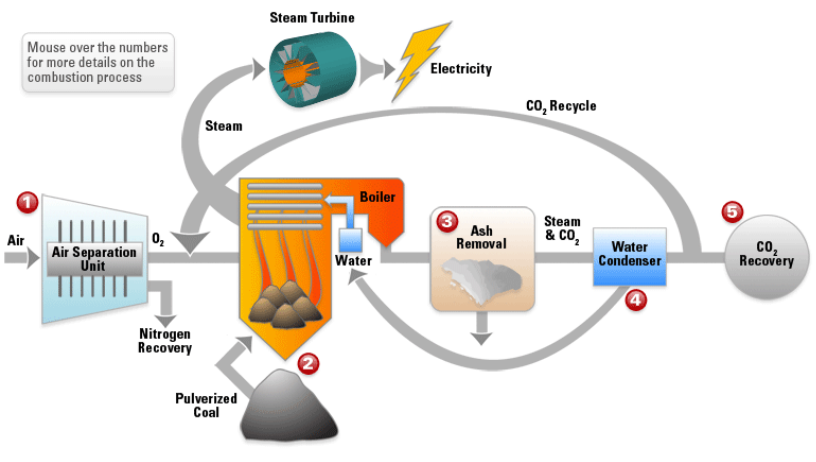
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Technology

CLEANER COAL COMBUSTION



http://www.sandia.gov/news/publications/technology/coal/images/clean_coal_diag_main.gif

<http://www.freeinfosociety.com/images/science/nuclearenergy1.jpg>

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http://www.youtube.com/watch?v=UvWH3rk6_v4&feature=player_embedded

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So, how do we move forward?

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The Basics — What are Carbon Credits?

- ❖ Carbon Credits (aka Carbon Offsets) are a market-based financial mechanism for supporting behaviors that result in measurable, verified increases in carbon storage (or decreases in carbon dioxide, CO₂, emissions).
- ❖ Other market-based mechanisms that can drive environmental behaviors include tax incentives and subsidies, public payment programs, and private or voluntary eco-labels and consumer actions.
- ❖ Carbon Credits can be voluntary or regulatory; domestic or international; large or small projects; short or long commitments; and are associated with everything from landfills to farms to forests to power plants.



Current Carbon Markets

- ❏ Chicago Climate Exchange (CCX)
- ❏ Voluntary Carbon Standard (VCS)
- ❏ Climate Action Reserve (CAR) (*formerly California CAR*)
- ❏ American Carbon Registry (ACR)
- ❏ Clean Development Mechanism (CDM)
- ❏ Regional Greenhouse Gas Initiative (RGGI)
- ❏ Department of Energy's National Reporting Program (DOE 1605b Registry)
- ❏ Midwestern Regional Greenhouse Gas Accord
- ❏ *Etc, etc, etc...*



Standards

- ❏ Carbon standards provide a set of rules and procedures for creating offsets/credits.
- ❏ The standards address:
 - ❏ Eligibility requirements
 - ❏ Calculation methodology
 - ❏ Validation process
 - ❏ Measuring and monitoring requirements
 - ❏ Public disclosure, registration, etc



Current Carbon Markets

Program	Scope	Scale	Forestry Credits?	Applicable to Midwest?
CCX	Domestic, Voluntary	\$72 million	Yes	Yes
VCS	Global, Voluntary	\$258 million	Yes	Yes
CCAR	Domestic, Voluntary	Not available (<\$1 Billion est.)	Yes	Yes
CDM	Global, Regulatory	\$6 Billion	Yes	No

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Current Carbon Markets



CCX
23 Mt
\$72.4 M



Voluntary OTC
42 Mt
\$258.4 Million

JI
41 Mt,
\$499 M

**NSW
GGAS**
25 Mt
\$224 M

EU ETS
Vol: 2,061 Mt (CO₂e)
Value: \$50,097 Million

CDM
791 Mt
\$ 5,877 Million

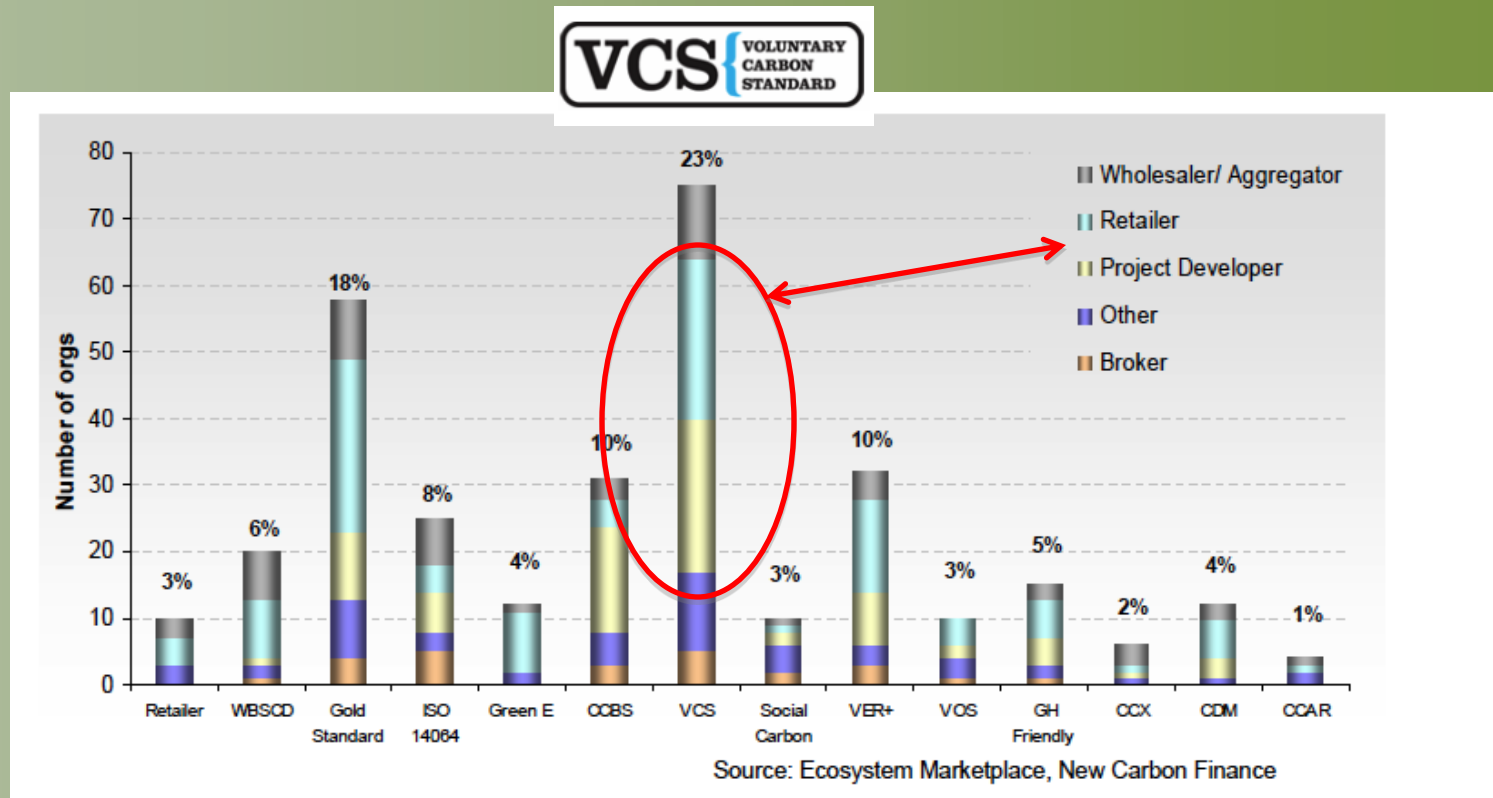
Source: Ecosystem Marketplace, New Carbon Finance, World Bank

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Preferred Carbon Market Standards



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North Woods Carbon Credit Partnership

- Aitkin County Land Department
- Cass County Land Department
- Manomet Center for Conservation Sciences
- Dovetail Partners
- Blandin Foundation



North Woods Carbon Credit Partnership

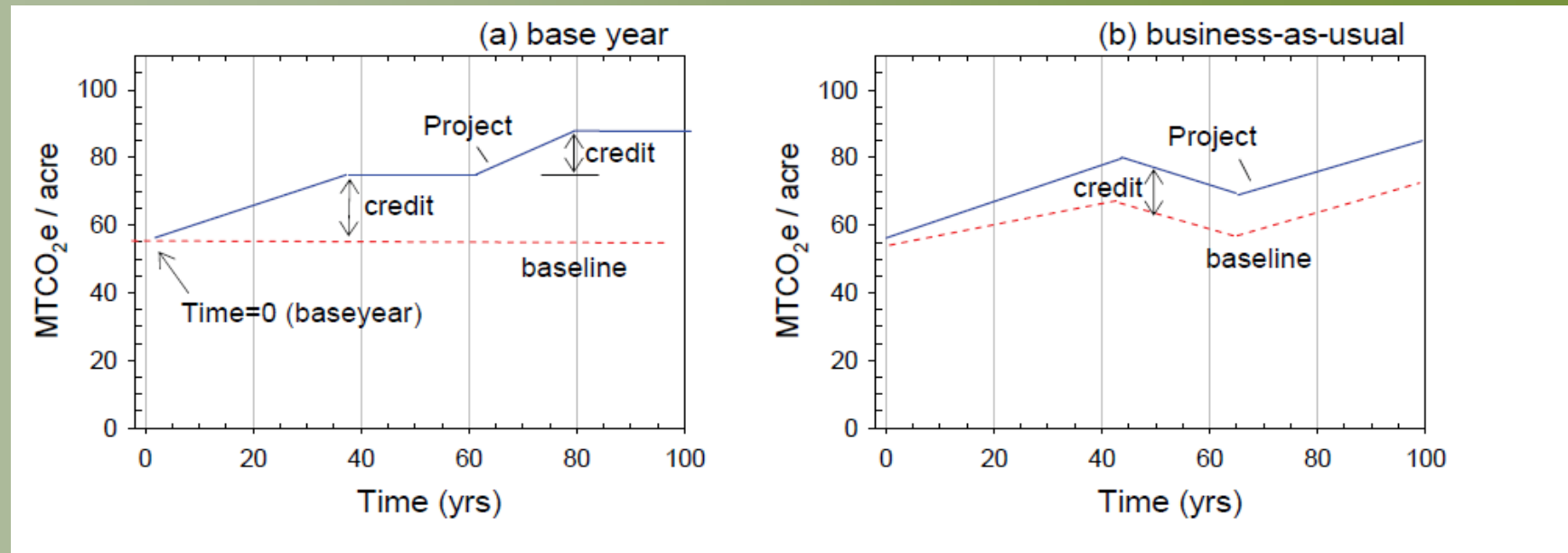
- Understand the implications of Forest Carbon Offset Markets for managed forests in Minnesota
- Create a structure to evaluate forest carbon stocks under existing Forest Carbon Offset Standards
- Evaluate Potential of Payments for other Ecosystem Services in the North Woods



North Woods Carbon Credit Partnership

CCX

VCS

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VCS Program Objectives

“VCS offsets must be:

- real (have happened),
- additional (beyond business-as-usual activities),
- measurable,
- permanent (not temporarily displace emissions),
- independently verified and
- unique (not used more than once to offset emissions).”



Results & Findings

- Negative net carbon storage under CCX
- Positive carbon storage gains under VCS possible **while maintaining overall harvest volumes**
- Need for common baseline approach and/or regionally appropriate approved methodology
- June 9-10th, 2010 Workshop and Field Tour with Updates on latest carbon offset protocols (CAR and ACR) and status of Aitkin County Project (www.dovetailinc.org)



The Future

- Increased rigor (*better accounting, more verification and stronger guidelines*)
- Increased diversity (*more markets, more protocols, more projects*)
- Increased demand (*more regulation, more private and public sector interest*)
- **The Bottom Line:** Forest-based carbon offset projects in this region can be scientifically rigorous and help inform the development of carbon protocols and policy.



Our Role

The University of Washington in 1997 articulated three approaches to reducing forest related carbon dioxide emissions (and/or increasing carbon storage):

1. Allow the growing forest to absorb carbon dioxide (through photosynthesis) and store it as wood in the forest (*including establishment of new forests on non-forested sites*).
2. Harvest the forest before it burns or decomposes and store the carbon in less rapidly decomposing forest products.
3. Use wood products as substitutes for aluminum, steel, concrete, brick, and other products that consume much greater quantities of fossil fuels (and release more carbon) in their manufacture.

Wood Products and Carbon Protocols: Carbon Storage and Low Energy Intensity Should Be Considered
(Available at: <http://www.dovetailinc.org/files/DovetailCarbon0408hz.pdf>)



The Debate

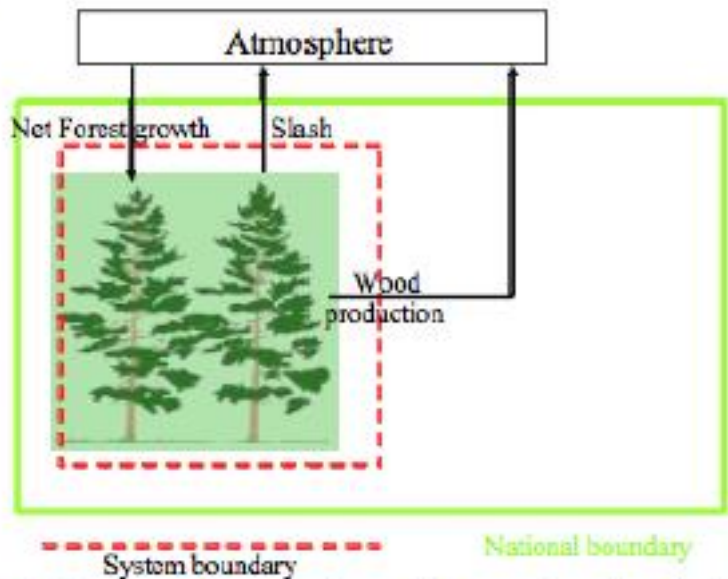
- Increasing the use of wood will not guarantee a decline in use of fossil-fuel-intensive alternatives.
- Policies that subsidize wood use might encourage increased consumption, wastefulness, and/or expanded imports/exports.



The Debate

IPCC Default Assumption

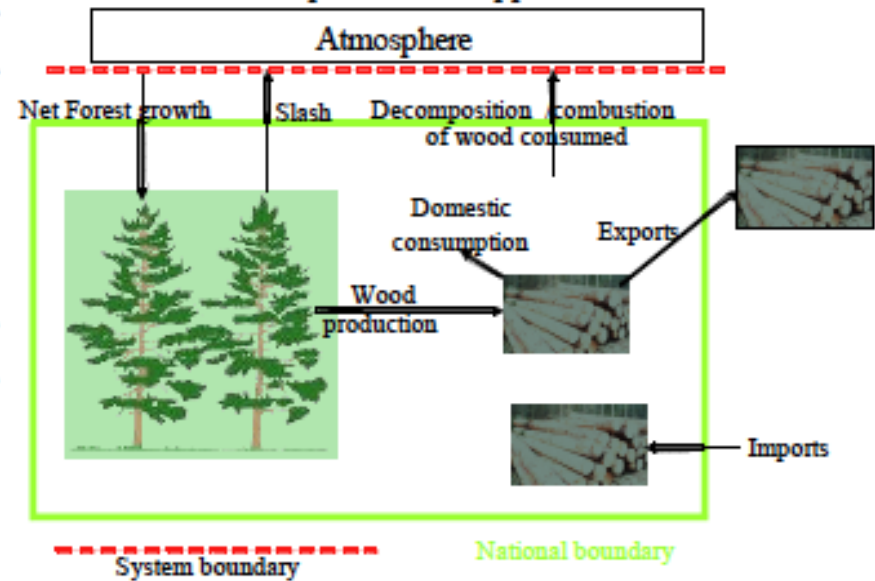
Source: Brown, Lim, and Schlarnadner (1998)



Stock change = net forest growth - slash - roundwood production

Atmospheric Flow Approach

Source: Brown, Lim, and Schlarnadner (1998)



Stock change = net forest growth - slash - decomposition/combustion of wood consumed

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The Bottom Line


- Uncertainty in carbon, biomass and biofuels policy hinders the possibilities for wood, forests and renewable resources to be a more significant part of a carbon solution.
- Creating value for diverse systems is an important policy consideration, and the forest sector needs to find a seat at the table.
- Loggers, land owners and land managers are needed to provide scientific leadership for informing the debate and allowing solutions to be tried, evaluated and improved upon.



Dovetail Reports:

-  Wood Products and Carbon Protocols: Carbon Storage and Low Energy Intensity Should Be Considered
-  Recognition of Carbon Storage in Harvested Wood Products: A Post-Copenhagen Update
-  Ecosystem Markets: New Mechanisms to Support Forestry

www.dovetailinc.org

-  June 9-10th, 2010 Workshop and Field Tour with Updates on latest carbon offset protocols (CAR and ACR) and status of Aitkin County Project

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Webinar Series

Jan.- April, 2010

News & Information

02/23/2010

Dovetail Partners' Minnesota Green Buildings Map Reaches Over 100 Sites

02/16/2010

Green Marketing Webinar on February 25th

02/02/2010

Green Building & Green Product Webinar on February 11th

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Top Dovetail Reports

- **An Environmental Quiz that Can Open the Door to Inquiry and Learning about Forests and Forestry**
- **Recognition of Carbon Storage in Harvested Wood Products: A Post-Copenhagen Update**
- **Building a Constituency of Forest Productivity Advocates: What do we know about Minnesota's Natural Resource Priorities?**
- **A Tale of Green Cities: Exploring Opportunities for MN through the Natural Step Process and Sustainable Communities in Sweden**

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