



Carbon Markets and Forestry

University of NSW, August 2010

Dr Iain MacGill, Joint Director - CEEM

www.ceem.unsw.edu.au



CEEM established ...

- *to provide a formal interdisciplinary framework* for joint work between UNSW researchers in Engineering, Business, Social Sciences, Environmental Sciences, Law...
- *through UNSW Centre* providing Australian research leadership in interdisciplinary design, analysis + performance monitoring of energy + environmental markets, associated policy frameworks
- *in the areas of*
 - Energy markets
 - Energy related environmental markets
 - National Emissions Trading, Renewable Energy Targets, Energy Efficiency, Renewable energy support...
 - Broader policy frameworks and instruments to achieve desired societal energy and environmental outcomes
 - International carbon markets, Energy efficiency...

More information at www.ceem.unsw.edu.au

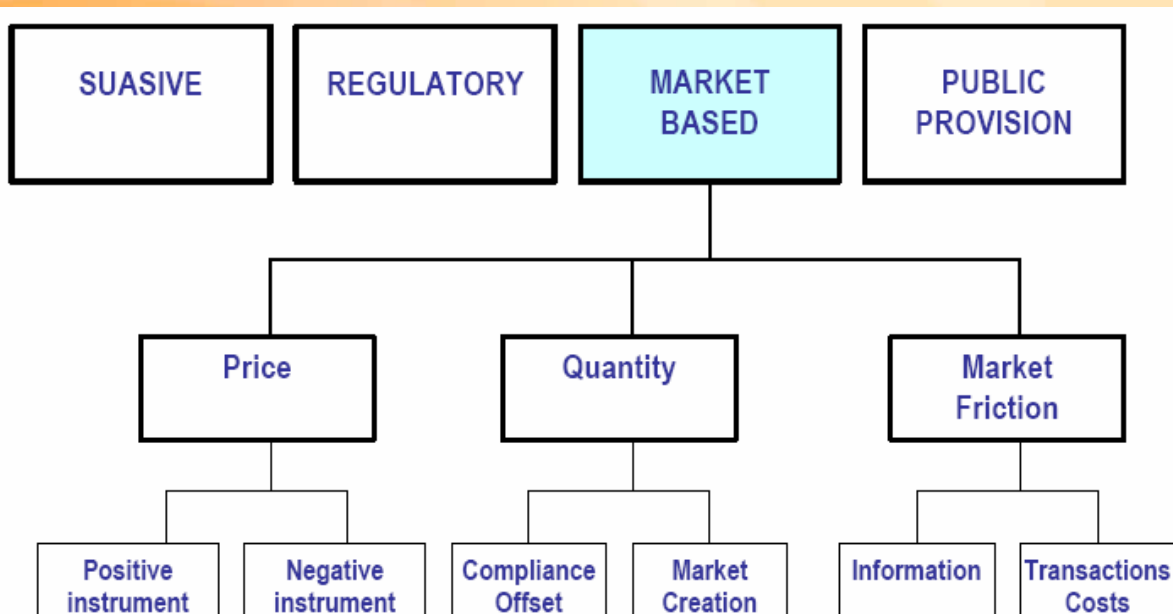
Ecosystem services and key land-use activities

- “...ecosystem services are the benefits people obtain from ecosystems” (Millennium Ecosystem Assessment)

	Forests	Cultivated / Agricultural Lands
Environmental Goods	<ul style="list-style-type: none"> • Food • Fresh water • Fuel • Fiber 	<ul style="list-style-type: none"> • Food • Fuel • Fiber
Regulating Services	<ul style="list-style-type: none"> • Climate regulation • Flood regulation • Disease regulation • Water purification 	<ul style="list-style-type: none"> • Climate regulation • Water purification
Supporting Services	<ul style="list-style-type: none"> • Nutrient cycling • Soil formation 	<ul style="list-style-type: none"> • Nutrient cycling • Soil formation
Cultural Services	<ul style="list-style-type: none"> • Aesthetic • Spiritual • Educational • Recreational 	<ul style="list-style-type: none"> • Aesthetic • Educational

(UNEP, *Payments for Ecosystem Services: Getting Started*, 2008)

Policies for delivering such services



(BDA, *Market-based instrument decision support tool*, 2008)



Possible strengths of Market-Based Instruments

- *Suasive approaches* : provision of information
 - Limits to what Codes of Practices, guidelines, R&D can achieve alone
- *Public provision* of services: public goods difficult or uneconomic to manage by private sector
 - Limits given the important role of private sector in most economic sectors
- *Regulatory approaches*: penalise non-compliance with standards, licensing
 - can promote inefficiency, inhibit innovation because usually imposes uniform requirements while land managers have different capabilities, costs & benefits
- *Market-based instruments* : incentivise change via mkt signals
 - Price; Subsidies, grants taxes, tax concessions, stewardship payments
 - Quantity; market creation, offsets schemes
 - Market Friction; accreditation, labelling
 - *Encourage those who can most cost effectively improve ecosystem services to do so.*

(Adapted from BDA, 2008)

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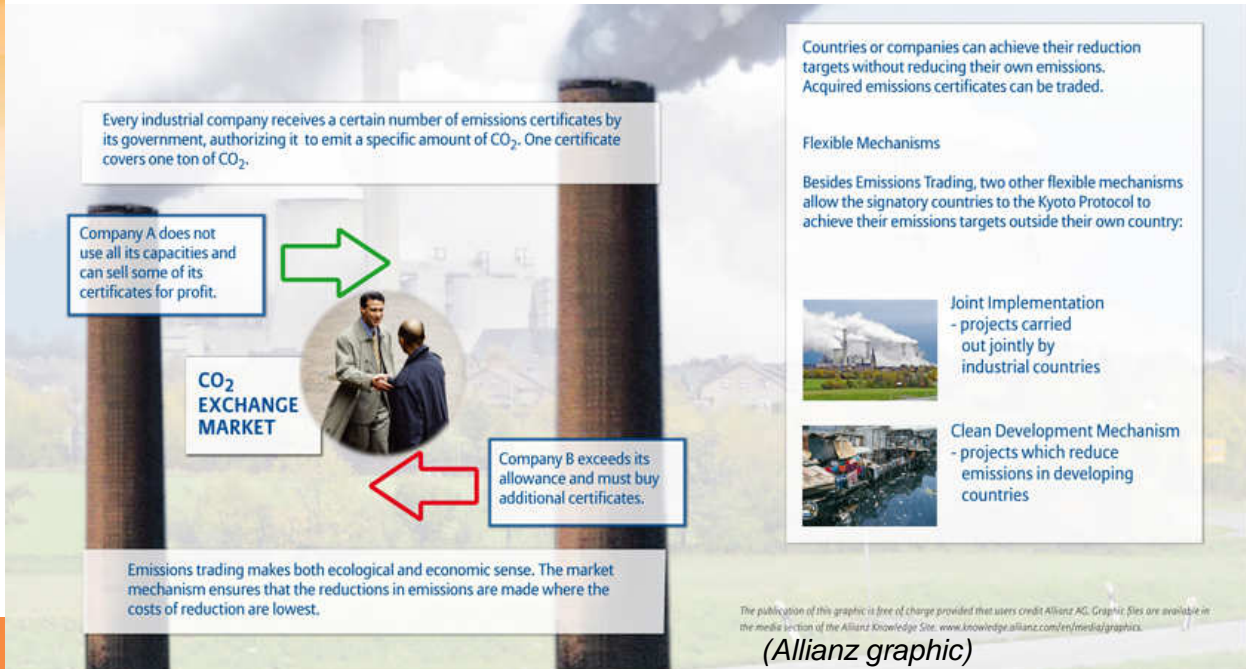
Designing tradeable Market-Based Instruments

- Trading markets require
 - Tradeable fungible commodity
 - permits, allowances (cap and trade); certificates, credits (baseline and credit) of commodity (eg. tCO₂-e)
 - Buyers
 - Government (eg. tenders), mandated parties (eg. emissions trading), voluntary (eg. green consumers)
 - Sellers
 - Voluntary participants motivated by profitable opportunities ('baseline and credit')
 - Governments (eg. permit auctions) or obliged buyers with excess

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Key emissions trading options in Kyoto Protocol

- Emissions trading possible between countries with targets (Article 17)
- Carbon trading based flexibility mechanisms
- Growing regional / national carbon markets to achieve Kyoto targets and beyond



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Accounting framework for Kyoto Protocol

- **Stationary energy:** primarily CO₂ from combustion of fossil fuels for electricity generation; from energy production in the petroleum refining, manufacturing, construction and commercial industries; and for domestic heating
- **Transport:** primarily CO₂ from combustion of liquid fuels for road and rail transport, domestic aviation and shipping production, processing, transport, storage and distribution of coal, oil and gas
- **Industrial processes:** primarily CO₂ from chemical reactions associated with manufacturing processes, mineral processing, and chemicals and metal production
- **Agriculture:** primarily CH₄ and NO_x from livestock and cropping
- **Waste:** primarily CH₄ and NO_x from solid waste sent to landfill, from treatment of domestic, commercial and industrial waste water, and from solvent and clinical waste incineration
- **Land use, land-use change and forestry:** only emissions from land-use change activities—reforestation and deforestation
 - reforestation—primarily sequestration of CO₂ through conversion of land used for other purposes to forested land
 - deforestation—primarily CO₂ from conversion of forested land to alternate uses.

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Current market status

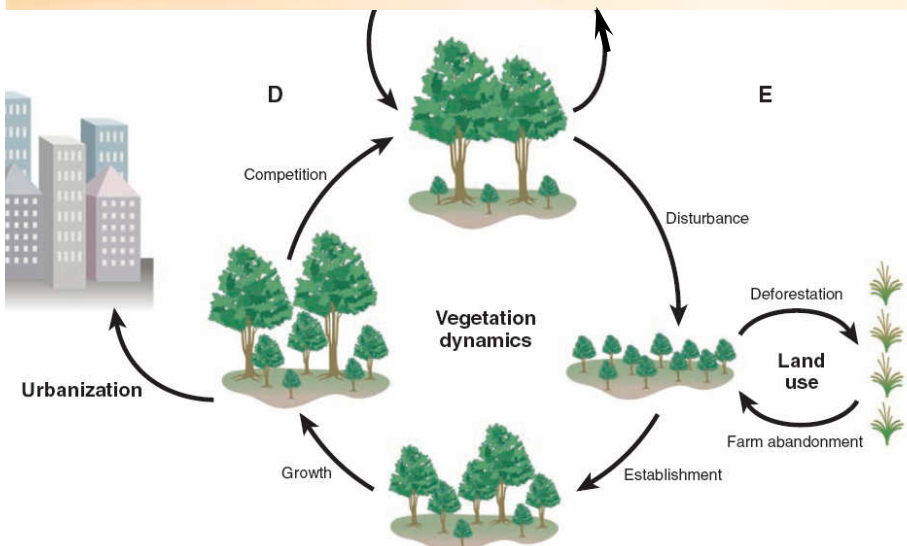
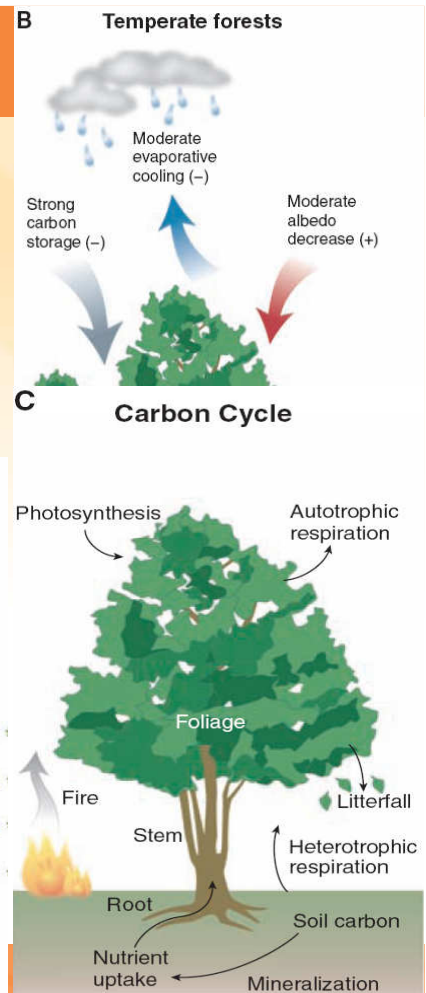
(Ecosystem Market Place and New Carbon Finance, 2010)

Table 1: Transaction Volumes and Values, Global Carbon Market, 2008 and 2009				
Markets	Volume (MtCO ₂ e)		Value (US\$ million)	
	2008	2009	2008	2009
Voluntary OTC	57	51	420	326
CCX	69	41	307	50
Other Exchanges	0.2	2	2	12
Total Voluntary Markets	127	94	728	387
EU ETS	3,093	6,326	100,526	118,474
Primary CDM	404	211	6,511	2,678
Secondary CDM	1,072	1,055	26,277	17,543
Joint Implementation	25	26	367	354
Kyoto [AAU]	23	155	276	2,003
New South Wales	31	34	183	117
RGGI	62	813	241	2,667
Alberta's SGER	3	5	34	61
Total Regulated Markets	4,713	8,625	134,415	143,897
Total Global Markets	4,840	8,719	135,143	144,284

Forest and carbon complexities

- Wider climate services of forests
- Complex carbon cycle
- Complex human/natural dynamics

(Science, Future of Forests, 2008)



Carbon markets and Land-use

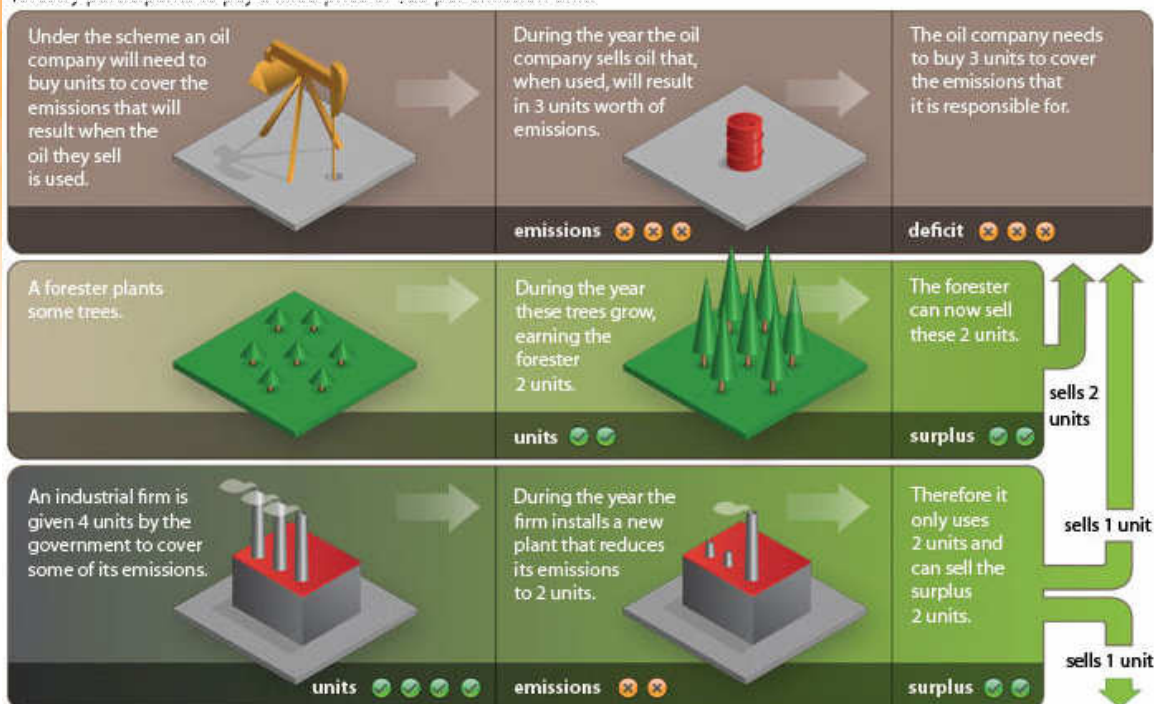
- Agriculture, Forestry and Other Land Use (AFOLU)
 - ~ 30% of global GHG emissions & cost effective reduction options
- Complex challenges and opportunities
 - Deforestation ~20% of emissions
 - Response of ecosystems to climate change
 - Potential renewable energy sources offsetting fossil-fuel use
 - Potential low-emission materials
 - Significant opportunities for carbon sequestration
 - Many related issues in land-use: water, biodiversity, livelihoods
- Key issues for MBI approaches – integrity and credibility
 - Verifiability: measurement, monitoring and enforcement
 - Project additionality: inevitably counter-factual
 - Leakage: of emissions via shifted projects, products via alternatives
 - Permanence: sequestration impacts by human or natural occurrence
 - Timing of sequestration

Adapted from (CRS, Report to Congress, 2008)

New Zealand's Emissions Trading Scheme (ETS)

The NZ ETS is based on units, which must be obtained to cover emissions. These units can be bought and sold. No amount of emissions can be traded without a corresponding amount of units. The scheme is intended to be an end-use market, where units are used to cover emissions. The units will be implemented through: requiring stationary energy, industrial processes and liquid fossil fuel participants to surrender only one emission unit for every two tonnes of carbon dioxide equivalent emissions emitted; an option for SEIP, LFF and forestry participants to pay a fixed price of \$25 per emission unit.

Possible ETS with land-use activities



(New Zealand Govt, Proposed ETS Design, 2010)



Forestry in some key carbon markets

- Regulatory
 - Kyoto Protocol
 - Developed countries required to include deforestation, reforestation and afforestation (Article 3.3), can include other changes in land-based carbon stocks (Article 3.4)
 - Flexibility mechanisms: CDM afforestation & reforestation
 - EU ETS
 - Domestic forestry outside cap, no international forestry credits
 - RGGI
 - Domestic forest conservation & reforestation
 - NSW Greenhouse Gas Reduction Scheme
 - Australian forest afforestation & reforestation
 - Forthcoming Australian National CPRS
- Voluntary
 - Chicago Climate Exchange (CCX)
 - Voluntary Retail Carbon Markets eg. Voluntary Carbon Standard (VCS)

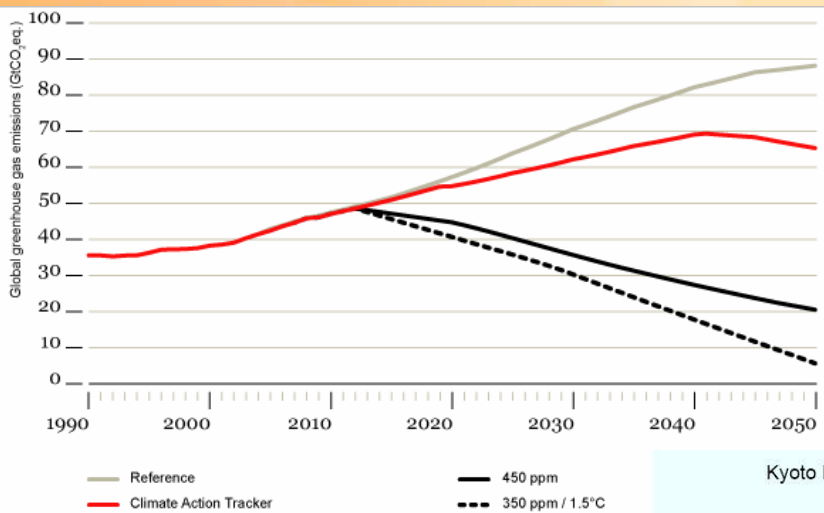


What next for carbon markets - GFC & Copenhagen

*(Australian Government, Presentation at
CEEM 2010 Conference)*

- The Copenhagen Accord
 - Part of a set of conference decisions: Other decisions extended UNFCCC working groups
 - High level political undertaking
 - not binding under international law
 - between leaders –with personal engagement
- Key points
 - Hold temperature increase below 2°C
 - Commitment to action:
 - Targets for developed countries
 - Actions by developing countries
 - A transparent system to track progress
 - Monitoring reporting and verification
 - Reporting every two years
 - Financial support for developing countries
 - approaching USD30 billion from 2010 to 2012
 - a goal of USD100 billion per annum by 2020
 - Mechanisms for REDD and technology

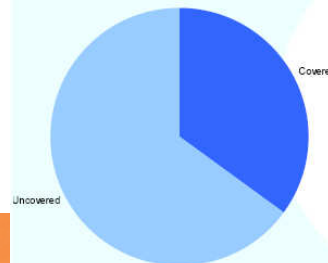
What Copenhagen might mean?



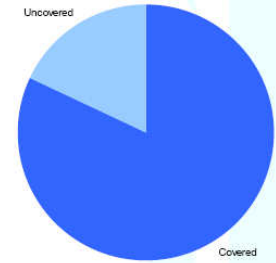
- Accord now includes commitments from more countries, however, current commitments far less than what seems required to protect the climate

(The Climate Institute, Presentation at CEEM 2010 Conference)

Kyoto Protocol



Copenhagen Accord

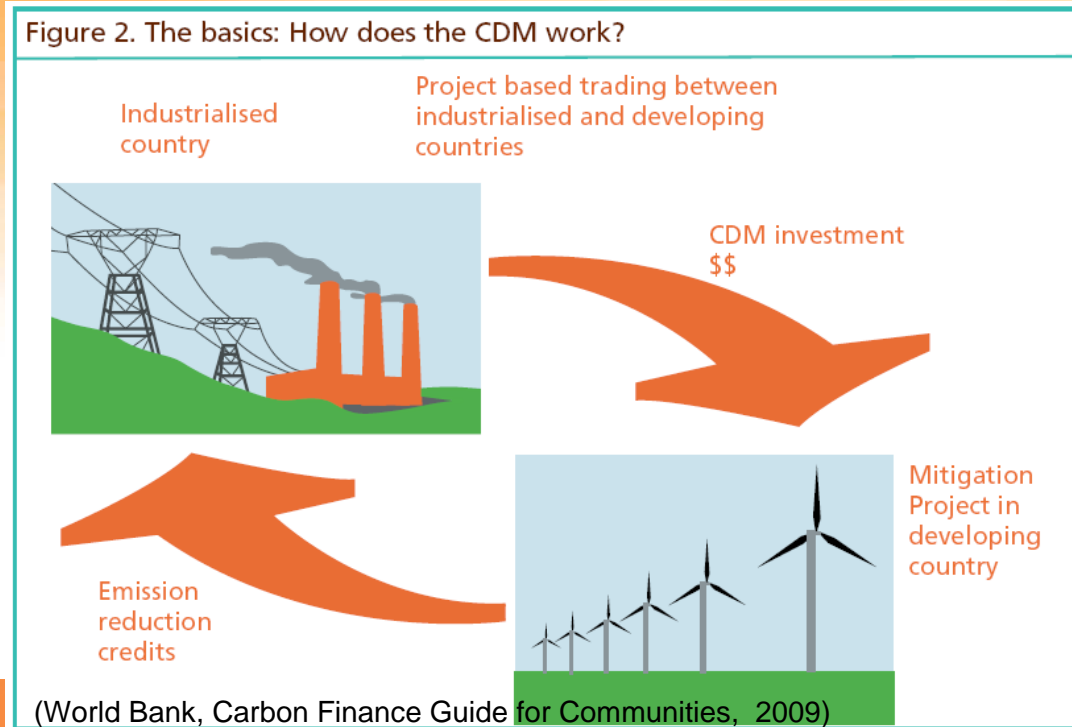


Forestry in some key carbon markets

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CDM moves emission reductions from countries with caps to developing countries with reduction opportunities

Figure 2. The basics: How does the CDM work?



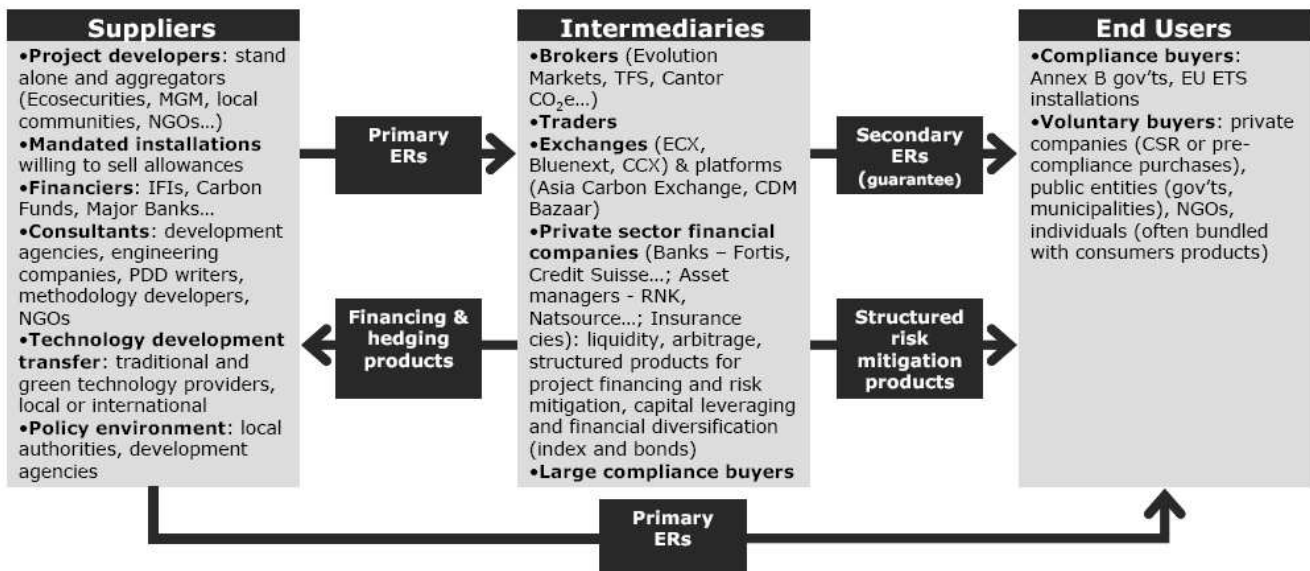
Clean Development Mechanism

Regulation

Legal framework: UNFCCC, EU Commission, voluntary standard sponsors (CCX or Gold Standard...)

Regulatory bodies: UNFCCC Secretariat, CDM EB, JISC, Compliance Committee, National Agencies (DNAs...), NGOs

(World Bank, *State of the Carbon Market*, 2008)



Total Projects found: 15

Registered	Title	Host Parties	Other Parties	Methodology *	Reductions **	Ref
10 Nov 06	Facilitating Reforestation for Guangxi Watershed Management in Pearl River Basin	China	Italy Spain	AR-AM0001 ver. 2	25795	0547
30 Jan 09	Moldova Soil Conservation Project	Republic of Moldova	Sweden Netherlands	AR-AM0002 ver. 1	179242	1948
23 Mar 09	Small Scale Cooperative Afforestation CDM Pilot Project Activity on Private Lands Affected by Shifting Sand Dunes in Sirsa, Haryana	India		AR-AMS0001 ver. 4	11596	2345
28 Apr 09	Cao Phong Reforestation Project	Viet Nam		AR-AMS0001 ver. 4	2665	2363
05 Jun 09	Reforestation of severely degraded landmass in Khammam District of Andhra Pradesh, India under ITC Social Forestry Project	India		AR-AM0001 ver. 2	57792	2241
11 Jun 09	CARBON SEQUESTRATION THROUGH REFORESTATION IN THE BOLIVIAN TROPICS BY SMALLHOLDERS OF "The Federación de Comunidades Agropecuarias de Rurrenabaque (FECAR)"	Bolivia	Belgium	AR-AMS0001 ver. 4	4341	2510

(UNFCCC, CDM Project Registry, 2010)

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21 Aug 09	Uganda Nile Basin Reforestation Project No.3	Uganda	Italy	AR-AMS0001 ver. 5	5564	1578
06 Sep 09	Reforestation of croplands and grasslands in low income communities of Paraguari Department, Paraguay	Paraguay	Japan	AR-AMS0001 ver. 4	1523	2694
Under Review	Reforestation as Renewable Source of Wood Supplies for Industrial Use in Brazil	Brazil	Netherlands	AR-AM0005 ver. 2	75783	2569
16 Nov 09	Afforestation and Reforestation on Degraded Lands in Northwest Sichuan, China	China		AR-AM0003 ver. 3	23030	2700
16 Nov 09	"Reforestation, sustainable production and carbon sequestration project in José Ignacio Távara's dry forest, Piura, Peru"	Peru		AR-AM0003 ver. 4	48689	2715
07 Dec 09	Humbo Ethiopia Assisted Natural Regeneration Project	Ethiopia	Canada	AR-AM0003 ver. 4	29343	2712
02 Jan 10	Assisted Natural Regeneration of Degraded Lands in Albania	Albania	Italy	AR-AM0003 ver. 4	22964	2714
15 Jan 10	The International Small Group and Tree Planting Program (TIST), Tamil Nadu, India	India	United Kingdom of Great Britain and Northern Ireland	AR-AMS0001 ver. 5	3594	3000
Requesting Registration	Forestry Project for the Basin of the Chinchiná River, an Environmental and Productive Alternative for the City and the Region	Colombia		AR-AM0004 ver. 3	37783	2996

* AM - Large scale, ACM - Consolidated Methodologies, AMS - Small scale

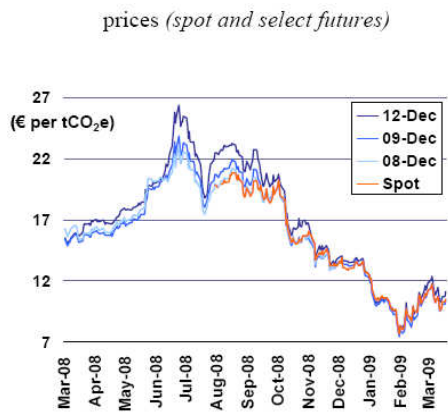
** Estimated emission reductions in metric tonnes of CO2 equivalent per annum (as stated by the project participants)

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Forestry in CDM

- Limited activity
 - 27 CDM afforestation/reforestation projects at various stages of development (10/08) out of 4000 total
 - No CERs yet issued, likely soon.
 - 2 A/R projects registered with CDM EB
 - Expected <1% of CDM projects & CERs to 2012
- Reasons
 - Complexity of rules - only finalised in 2006 & project methodologies needed to address extra risks & verification requirements
 - A/R CERs not permanent, with complex set of rules surrounding crediting periods and re-verification
- *Post 2012?*

(China Sustainable Industrial Development Network, 2008-10-9)



(World Bank, *State of the Carbon Market*, 2009)

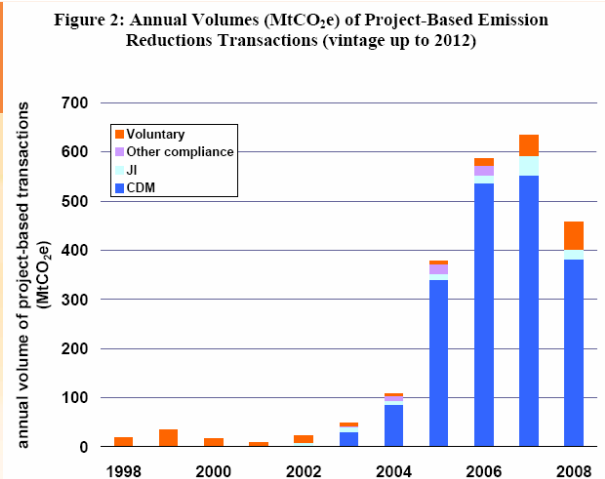
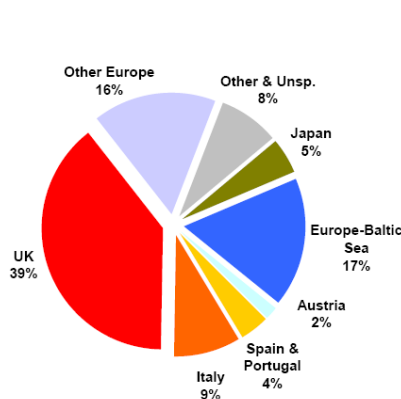
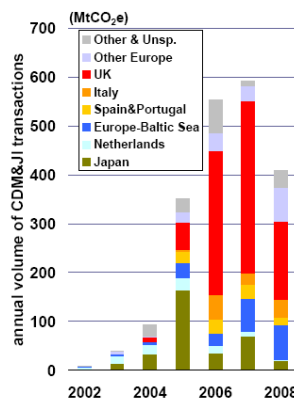


Figure 3: Primary CDM&JI Buyers (as shares of volumes purchased, vintages up to 2012)⁶⁵

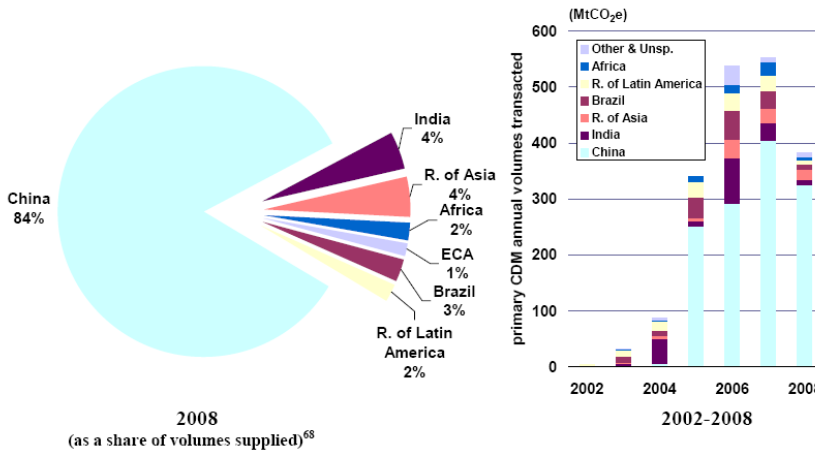


2008
Overall volume 409 MtCO₂e



2002-08

Figure 4: Location of CDM Projects



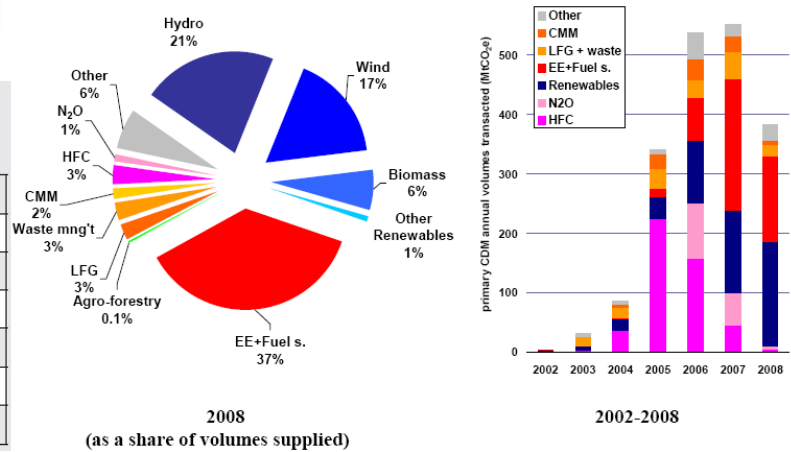
(World Bank, *State of the Carbon Market*, 2009)

Figure 6: CDM Project Types

(Point Carbon, *CDM Market Report*, 2010)

The state of the CDM

Project stage	Total	New ¹
Projects submitted for EB registration ²	379	17
Projects registered	2090	19
Meths - total ³	588	2
Meths - approved (A) ⁴	149	0
Meths under revision (B) ⁵	0	0
Meths not approved (C) ⁶	205	3



Centre for Energy and Environmental Markets



Forestry in NZ ETS

- Forestry entered the Emissions Trading Scheme (ETS) on 1 January 2008. It was the first sector to enter, because of the importance of forestry to New Zealand's ability to meet its international obligations for greenhouse gas emissions.
- How is forestry affected by the ETS?**
- The ETS classifies forests differently depending on whether they were first established **after 1989** or **before 1990** (largely mirroring the rules under the Kyoto Protocol).
- Owners of post-1989 forest land:
 - can **choose** to enter the scheme and earn New Zealand Units (NZUs) as their forests grow, and
 - do not receive allocations of NZUs because they don't face any mandatory obligations.
- Owners of pre-1990 forest land:
 - face obligations under the scheme if they deforest, and
 - receive a one-off allocation of NZUs to help offset the decrease in land value due to decreased land-use flexibility.
- Old-growth indigenous forest that remains in forest is not subject to the rules of the ETS.

Chicago Climate Exchange® (CCX®)

Chicago Climate Futures Exchange® (CCFE®)
The world's first environmental derivatives exchange

Montréal Climate Exchange™ (MCEX™)

Joint venture with Montréal Bourse to host Canadian GHG trading and other environmental markets

European Climate Exchange® (ECX®)

FSA-regulated futures market for European CO₂ Allowances; accounts for 80-90% of total exchange traded volume in the EU ETS

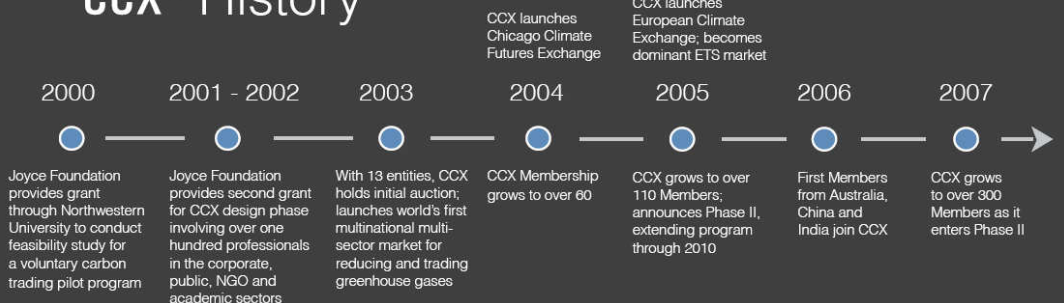


Chicago Climate Exchange

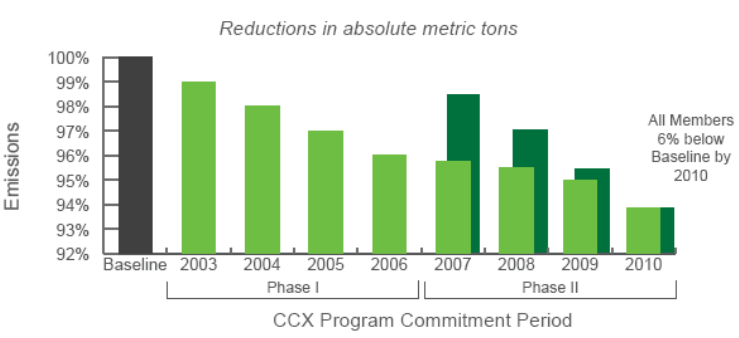
• CCX Members and projects are global and to date include entities based in Australia, Brazil, Canada, Chile, China, Costa Rica, India and New Zealand

(CCX, Website, 2010)

CCX® History



■ Reduction Schedule for Members of Phase I and II
■ Reduction Schedule for Members of Phase II only



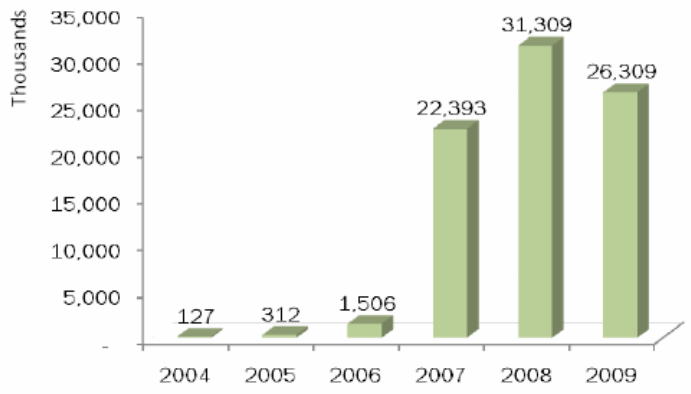
Phase I Baseline: average of annual emissions from 1998-2001

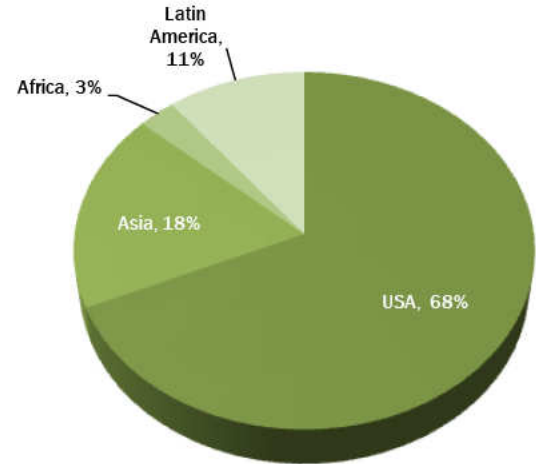
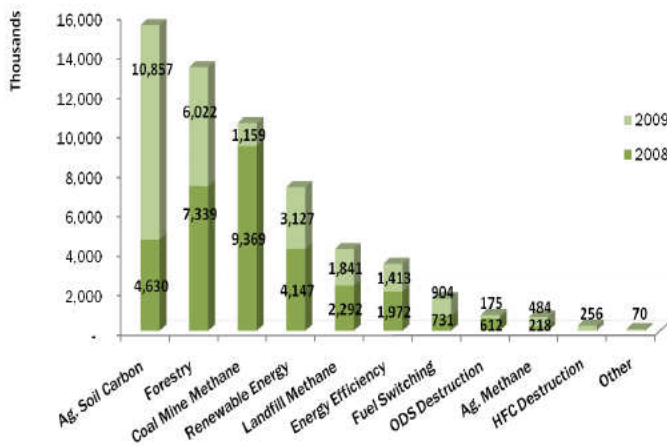
Phase II Baseline: average of annual emissions from 1998-2001 or the single year 2000

(CCX, 2010)

Offsets Registered (MT CO₂e) by Year

Graph





CCX Exchange Offsets Bilateral Trades

Price & Volume by Type (September - December 2009)

Chart 1

	USA Ag. Soil Carbon	USA Forestry	USA Ag. Methane	USA Landfill Methane	USA Coal Mine Methane	Indian Ren. Energy - Wind	Other
Price per Mt CO ₂ e	\$0.30 - \$2.00	\$0.20 - \$2.00	\$0.65 - \$0.80	\$0.50 - \$1.00	\$2.70	\$2.00	\$0.25 - \$1.00
Volume CFI*	14,995	4,158	1,105	714	12	8	15

* 1 CFI = 100 Mt CO₂e

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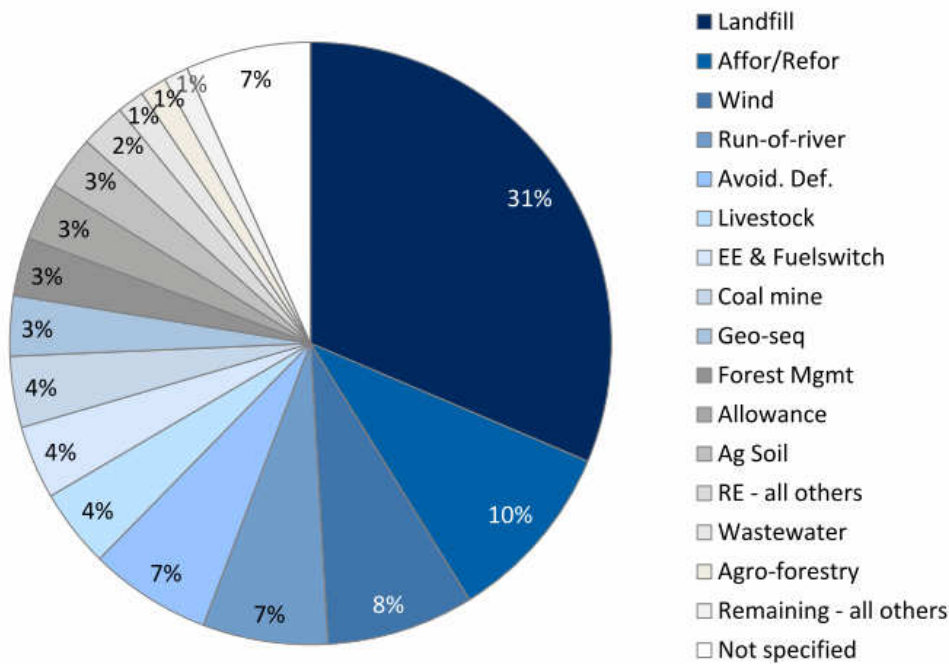


Voluntary Carbon Markets eg. VCS

- Covered AFOLU activities
 - Afforestation, Reforestation and Revegetation (ARR)
 - Agricultural Land Management (ALM)
 - Improved cropland management
 - Improved grassland management
 - Improved Forest Management (IFM)
 - Conversion from conventional logging to reduced impact logging
 - Conversion of logged forests to protected forests
 - Extending rotation age of evenly aged managed forests
 - Conversion of low-productive forests to productive forests
 - Reducing Emissions from Deforestation (RED)
- Process
 - Verification
 - Validation of methodologies
 - Approval of Tools
 - Community and/or environmental impacts
 - *Non-permanence risk analysis & buffers*

Voluntary markets

Figure 2: Transaction Volume by Project Type, OTC 2009



(Ecosystem Marketplace/NCF, *State of the Voluntary Carbon Market*, 2010)

CCB and forestry in China

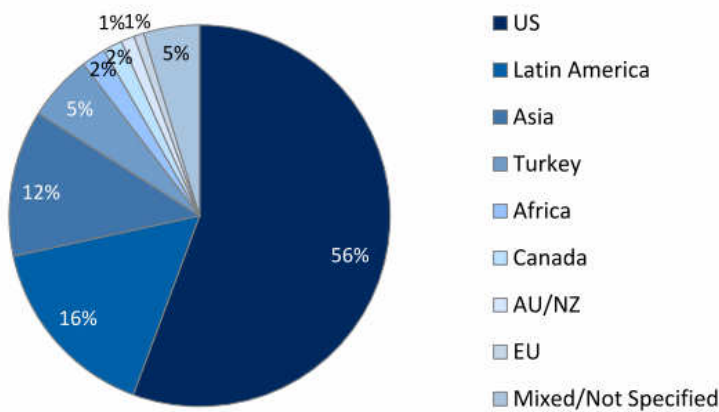
- Small-scale Reforestation for Landscape Restoration
 - Tengchong, Yunnan, China
 - Validation Approved - CCB Standards First Edition Gold Level (Jan 30, 07)
- Afforestation and Reforestation on Degraded Lands in Northwest Sichuan
 - Northwest Sichuan, China
 - Undergoing validation
- Multiple-purposes Reforestation on Degraded Lands in Longyang Yunnan, P.R. China
 - Yunnan, China
 - Undergoing validation
- Reforestation on Degraded Lands in Northwest Guangxi
 - Guangxi, China
 - Undergoing validation
- Multiple Reforestation on Degraded Lands in Maanshan Nature Reserve, Sichuan, P.R. China
 - Sichuan, China Undergoing validation

VCS and forestry

- **Project Name:** Reforestation of degraded grasslands in Uchindile & Mapanda, Tanzania
- **Project Description:** The FSC certified UFP & MFP plant trees on grasslands in the poverty stricken south-west region. The total area covers 18,379 ha with 10,800 ha plantable. The area has been degraded grassland due to frequent anthropogenic-led wildfires that have plagued the area resulting over time in the trees dying leaving only grassland. Objectives are to: 1) establish a sustainable source of timber and wood taking the pressure off natural forests 2) sequester CO₂ generating high-quality emission reductions 3) promote environmental conservation: soil, water and bio-diversity through the management of indigenous habitats(CCBA) 4. support development in communities through employment, health, education and infra-structure 5) generate income through carbon revenues as 10% goes to communities and the remainder is reinvested in Tanzania 6) provide seedlings for the villages to establish woodlots There are 104 permanent employees and appr. 500 casual workers, employed 200 days per year
- **Project Status:** Validated
- **GHG Origination Program:** Voluntary Carbon Standard
- **Primary Project Type:** Forestry
- **Additional Project Types:** N/A
- **Additional Project Certification(s):** FSC
- **Estimated Annual VCUs (Tonnes of CO₂e Reductions):** 25000
- **Project Proponent:** GREEN RESOURCES
- **Project Validator:** Tuev Sued Industrie Service GmbH (Tuev Sued)
- **Project Methodology:** AR-AM0005

(VCS, Project Registry, 2010)

Figure 4: Transaction Volume by Project Location, OTC 2009



Source: Ecosystem Market

Figure 6: Third-Party Standard Utilization, OTC 2009

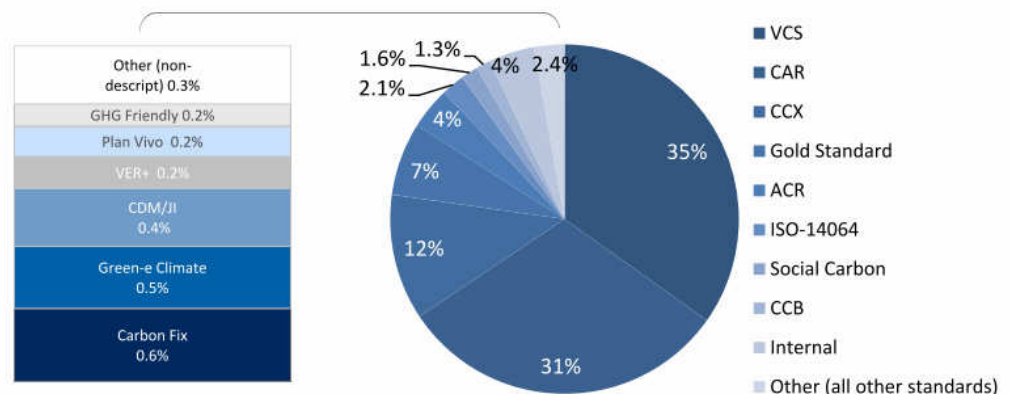
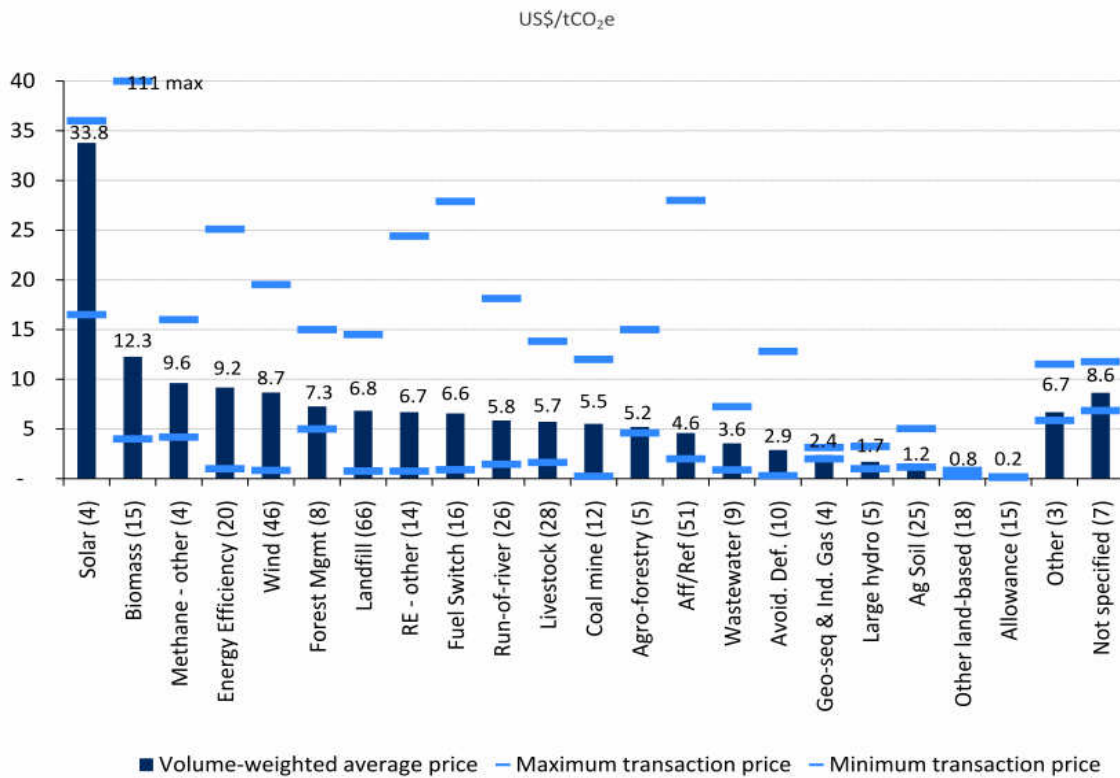




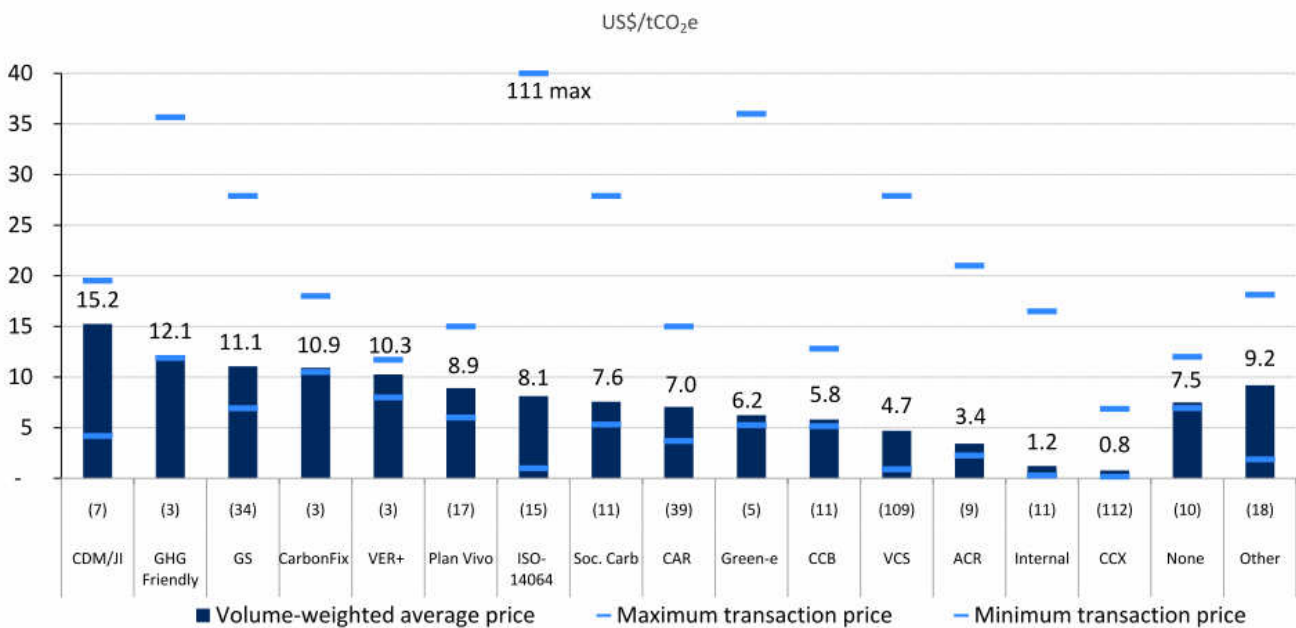
Figure 3: Average Credit Price and Price Range by Project Type, OTC 2009



(Ecosystem Marketplace/NCF, *State of the Voluntary Carbon Market, 2009*)



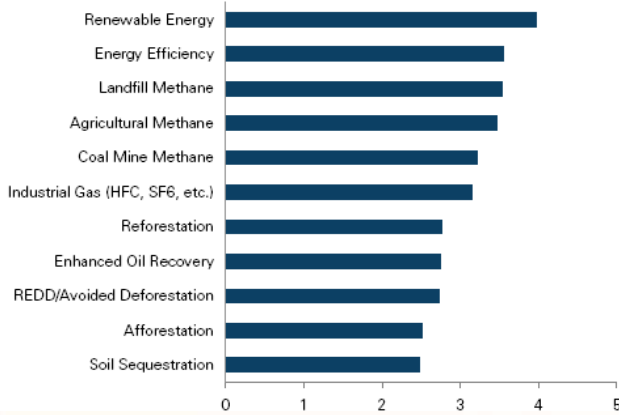
Figure 7: Average Price by Standard, OTC 2009



(Ecosystem Marketplace/NCF, *State of the Voluntary Carbon Market, 2009*)

Figure 3.19: Grading projects

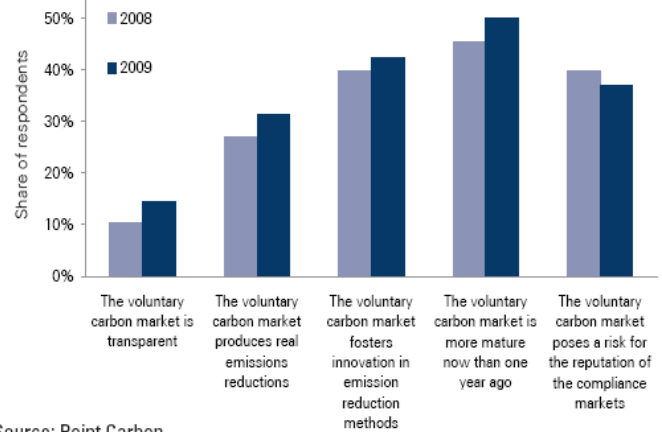
"In the voluntary market, grade each of the following project types on a 1 to 5 scale in terms of value they are able to fetch in the market, all else being equal." Question to companies with emissions regulated under RGGI or offset project developer/aggregator in North American market. N=63.



(Point Carbon, *US offset markets*, 2010)

Figure 3.20: Assessing the voluntary carbon market.

Share of respondents agreeing with the given statements (options 4 and 5). N=2853 (2009)



Source: Point Carbon



Chart 1: Supply of US-based offset reductions, Vintage years 2005 to 2010

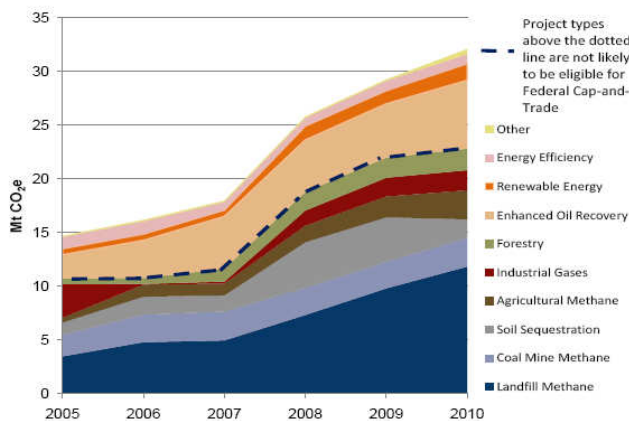


Table 6: Over-the-counter US offset prices throughout 2009

Prices are for US based projects. Price ranges are aggregated from transaction information provided by buyers, sellers, brokers, and traders of offsets in the US, reported on a monthly basis. These prices reflect a primary market price, meaning that the offsets are sold directly from the project. Point Carbon uses a mid-market price here.

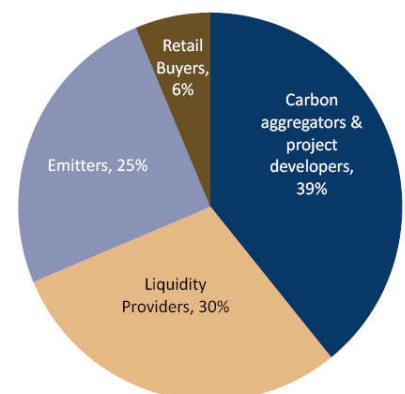
		OTC spot market \$/t (vintage 2008 and earlier)		OTC forward market \$/t (2009 vintage CAR credits)			
		CAR	VCS	Landfill methane	Livestock methane	California livestock methane	California forestry
Average mid-market price	1Q09	\$7.3	\$5.0	\$6.3	\$6.7	\$7.5	-
	2Q09	\$6.0	\$4.6	\$6.4	\$6.7	\$7.3	-
	3Q09	\$5.1	\$3.9	\$6.6	\$7.1	\$8.0	\$8.3
	4Q09	\$5.2	\$2.8	\$7.2	\$7.4	\$7.5	\$7.8

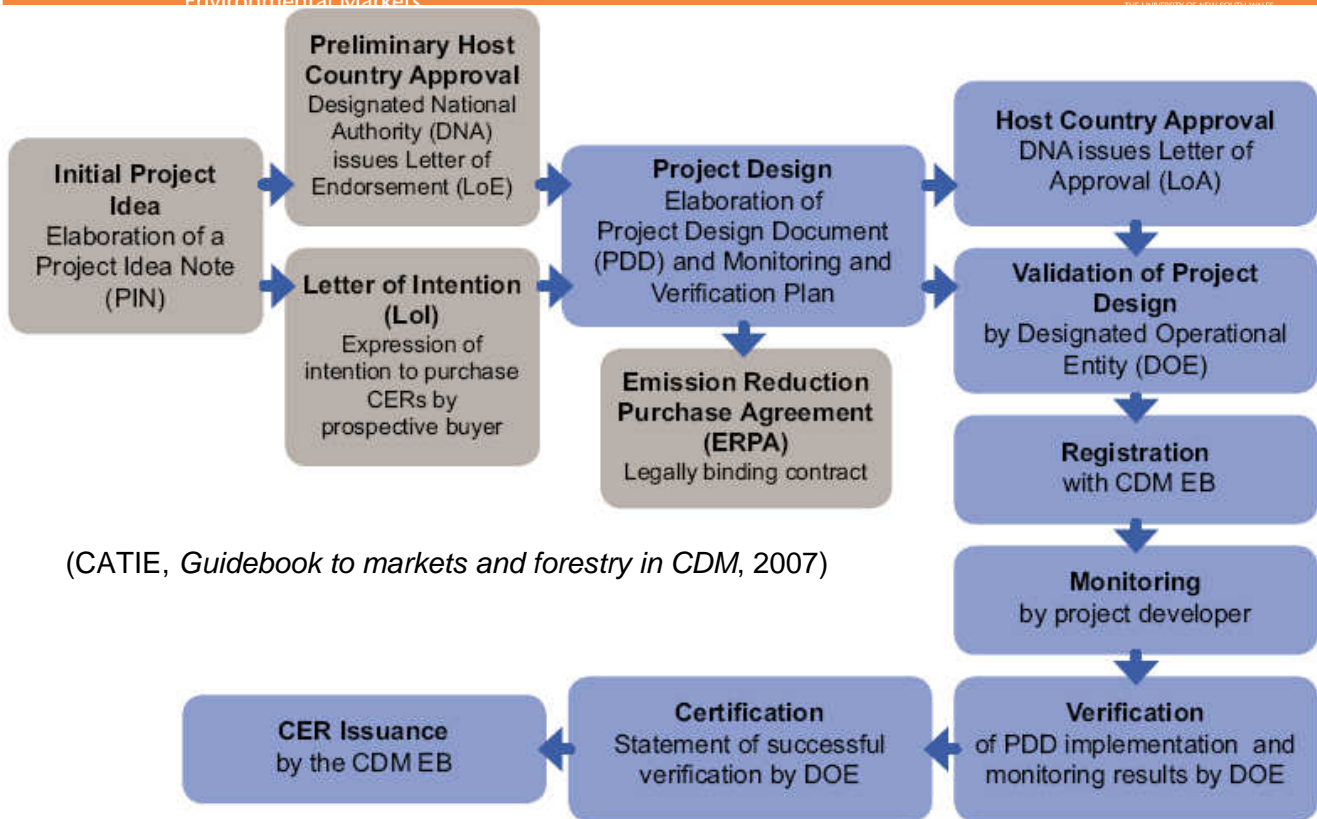
Table 2: Prominent offset standards in the US

	Gold Standard	Voluntary Carbon Standard	Climate Action Reserve	Chicago Climate Exchange	American Carbon Registry	Climate, Community & Biodiversity
Accounting Methodology	CDM methodologies	CDM methodologies	10 CAR specific project protocols, 1 forthcoming	10 CCX specific project protocols	ACR, CDM, VCS, EPA Climate Leaders protocols	17 Criteria
Registry	Administered by APX	Administered by APX, Markit Environmental, Caisse des Dépôts	Administered by APX	Not available to public	Administered by ACR	Administered by CCBA
Credits issued for 2008 Reductions in US (Mt) (as of 2/22/10)	0	0.7	1.4	5.3	7.9	Does not issue credits
Credits issued for 2009 Reductions in US (Mt) (as of 2/22/10)	0	1.3	0.5	1.9	2.9	Does not issue credits

Sources: Carbon Project Manager North America, APX, Markit Environmental, Caisse des Dépôts, CCBA, Gold Standard, VCS, CCX, ACR

Chart 4: Who were the primary market buyers in 2009?





(CATIE, *Guidebook to markets and forestry in CDM*, 2007)

Figure 1: Overview of the CDM forestry project cycle. Blue boxes are officially required steps, and grey boxes correspond to common, but not mandatory activities.

CDM Process and Components

(World Bank Carbon Finance Guide for Communities, 2009)

- Checklist of steps
 - 1. Identify a suitable project.
 - 2. Find a suitable partner.
 - 3. Do a preliminary assessment and prepare Project Identification Note (PIN).
 - 4. Prepare a Project Design Document (PDD).
 - 5. Submission of the PDD for registration.
 - 6. Project implementation and issuance of carbon credits.
- The PDD – basic components
 - 1. Project description.
 - 2. Methodology for determining the baseline – what emissions would be without the project.
 - 3. Duration of the project and the emission reductions.
 - 4. Additionality – why the project needs carbon finance to proceed.
 - 5. Plan for monitoring emissions once the project is up and running.
 - 6. Calculation of the emission reductions.
 - 7. Environmental impacts.
 - 8. Stakeholder comments.



Figure 3. Tools for assessing sustainable development contribution

Does your project: (World Bank Carbon Finance Guide for Communities, 2009)

ECONOMIC INDICATORS	YES	Neutral	NO
1. Increase investment in a priority sector of your economy?			
2. Introduce cleaner and cost-effective technologies?			
3. Generate local employment opportunities?			
4. Improve the local economy?			
SOCIAL INDICATORS			
1. Improve access to energy?			
2. Build capacity or transfer technical skills?			
3. Reduce wealth disparities?			
ENVIRONMENTAL INDICATORS			
1. Reduce air pollution?			
2. Reduce water pollution?			
3. Conserve biodiversity?			
4. Reduce soil erosion caused by deforestation?			
5. Improve other local environmental conditions?			

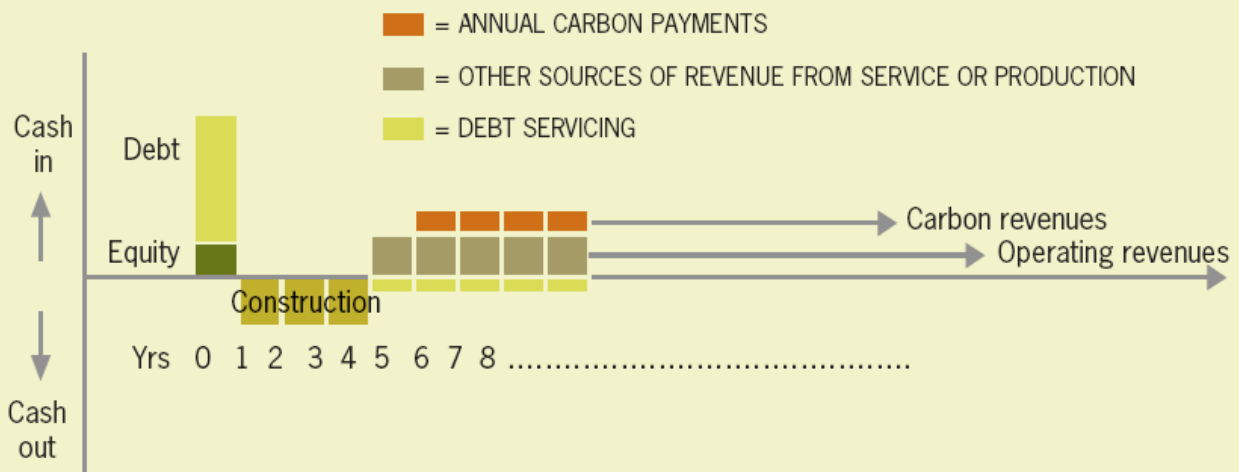
If the answer to each of these questions is **yes**, your project will most likely fulfill the requirements set by most country DNAs.

If your project scores highly under the social and economic indicators, it will most probably satisfy the requirements of the Gold Standard and be of interest to buyers who are looking for carbon projects with development benefits.



Cashflow

FIGURE 3 Illustration of project financing with carbon revenues





An expensive and time-consuming process

FIGURE 8 Length of CDM project registration process (from start of validation)

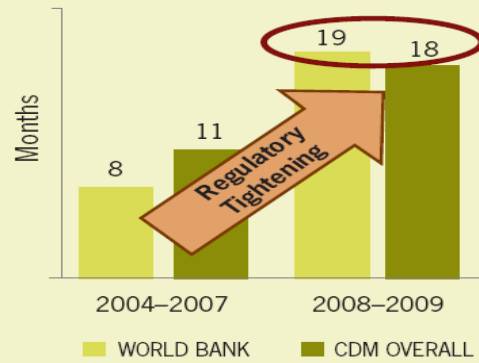


FIGURE 6 Prices of CDM validation (World Bank portfolio, PoAs excluded)*



FIGURE 7 Prices of CDM verifications (World Bank portfolio)*

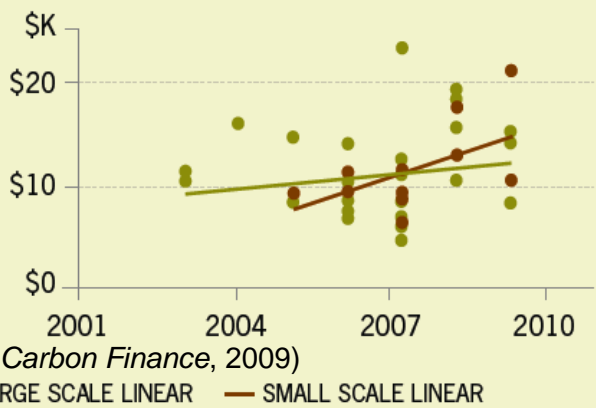
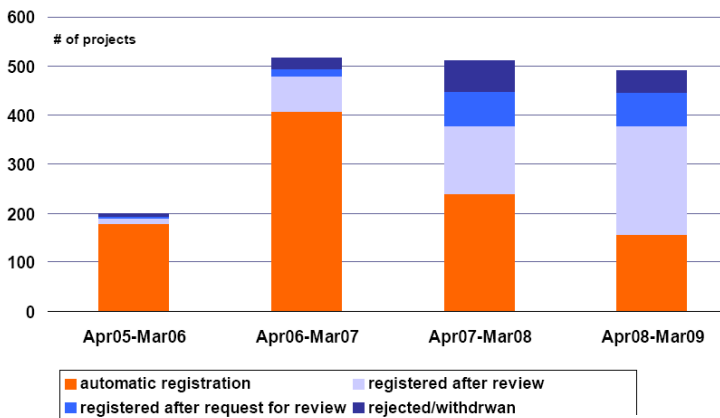


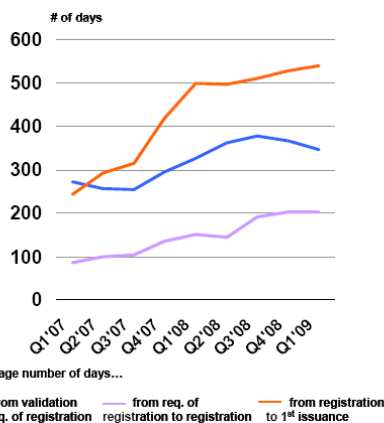
Figure 8: Increased Scrutiny by the CDM EB at Registration



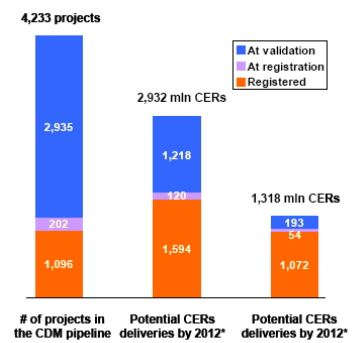
(World Bank, State of the Carbon Market, 2009)

Figure 7: Long Delays Halve the Prospects of 2012 CER Deliveries

Growing timelags at each step of the CDM project cycle



More than 50% of CERs deliveries evaporate, notably due to delays





CCB Methodology

- The Standards comprise fourteen required criteria and three optional "Gold Level" criteria. Once a project has been designed, a third-party evaluator will use indicators to determine if individual criteria are satisfied. Gold status is awarded to projects that satisfy one of the optional criteria by providing exceptional benefits including explicit design for adaptation to climate change, benefits for globally poorer communities, or conservation of biodiversity at sites of global conservation significance.
- **Project Developers** can use the CCB Standards to develop projects that deliver a suite of environmental and community benefits and garner new investments from multiple funders and supporters.

Project Investors can use the CCB Standards to identify exceptional initiatives and minimize risks. Projects using the Standards are unlikely to become tied up with controversy and roadblocks. Multiple-benefit projects generate valuable goodwill for investors.

- **Governments** hosting projects can use the Standards to ensure that projects contribute to national sustainable development goals. Donor governments can use the Standards to pinpoint official development aid projects that satisfy multiple international obligations.

(VCS, *VCS Website*, 2010)

General Section		
G1	Original Conditions in the Project Area	Required
G2	Baseline Projections	Required
G3	Project Design and Goals	Required
G4	Management Capacity and Best Practices	Required
G5	Legal Status and Property Rights	Required
Climate Section		
CL1	Net Positive Climate Impacts	Required
CL2	Offsite Climate Impacts ("Leakage")	Required
CL3	Climate Impact Monitoring	Required
Community Section		
CM1	Net Positive Community Impacts	Required
CM2	Offsite Stakeholder Impacts	Required
CM3	Community Impact Monitoring	Required
Biodiversity Section		
B1	Net Positive Biodiversity Impacts	Required
B2	Offsite Biodiversity Impacts	Required
B3	Biodiversity Impact Monitoring	Required
Gold Level Section		
GL1	Climate Change Adaptation Benefits	Optional
GL2	Exceptional Community Benefits	Optional
GL3	Exceptional Biodiversity Benefits	Optional
Total Project Points		

CCB Standards Validation Levels

APPROVED All requirements met
GOLD All requirements and also at least one optional Gold Level criterion met



Challenges for forestry projects

- **High upfront investment:** Most projects need to raise upfront finance for implementation (i.e. for securing lands and for planting trees). Land-use project developers, however, have limited access to finance, seed capital, international exposure or technical capacity, credit rating, insurance, to develop a project.
- **Delayed returns of investment:** The high upfront investment into forestry projects only delivers returns after a long delay. Projects generate the first substantial income when harvesting commences, and it is only then that cash flow becomes positive. Depending on the species, the ecological region and the management plan the delay can amount to more than a decade.
- **Low rates of return:** When comparing investment into forestry to investment into some other industry sectors, rates of return are comparably low. Investments into forestry projects that are designed to deliver environmental and socio-economic co-benefits (as the CDM requires) will be even less profitable.
- **High perceived risks:** The success of forestry businesses depend on the surrounding ecological conditions, as well as on the markets for their products and on interaction with a series of project stakeholders and local population. These uncertainty factors that influence projects constitute risks.
- **Investment decisions for reasons beyond business:** Some forestry activities as well as the corresponding investment decisions not only follow business reasoning, but both public and private sector sometimes engage into forestry for reasons beyond business. Public sector forestry activities very often aim to contribute to foster environmental services and improve livelihoods of local population.

(CATIE, *Guidebook to markets and forestry in CDM*, 2007)



TYPE OF INSTRUMENT	EXAMPLE	PRIME PURPOSE
Motivational instruments	Prize for best land manager	Encourage innovation and demonstration of opportunity to others
Information instruments	Extension program involving field days and dissemination of brochures	To speed adoption of new practices and prevent adoption of counter-productive practices
Duty-based instruments	Legislative requirement not to harm biodiversity values associated with remnant vegetation	Attain environmental outcomes most efficiently achieved, at least in part, by stating a high level goal rather than stating what must be done
Financial instruments	Market-based instruments used to select people offering to deliver services over and above those required of all land managers	To speed change and support work over and above that required
Property Right instruments	Tradeable salinity offset	Ensure that regional environmental outcomes are maintained
Regulatory instruments	Requirements to obtain permission to clear native vegetation	Stop actions known in most circumstances to not be in the public interest

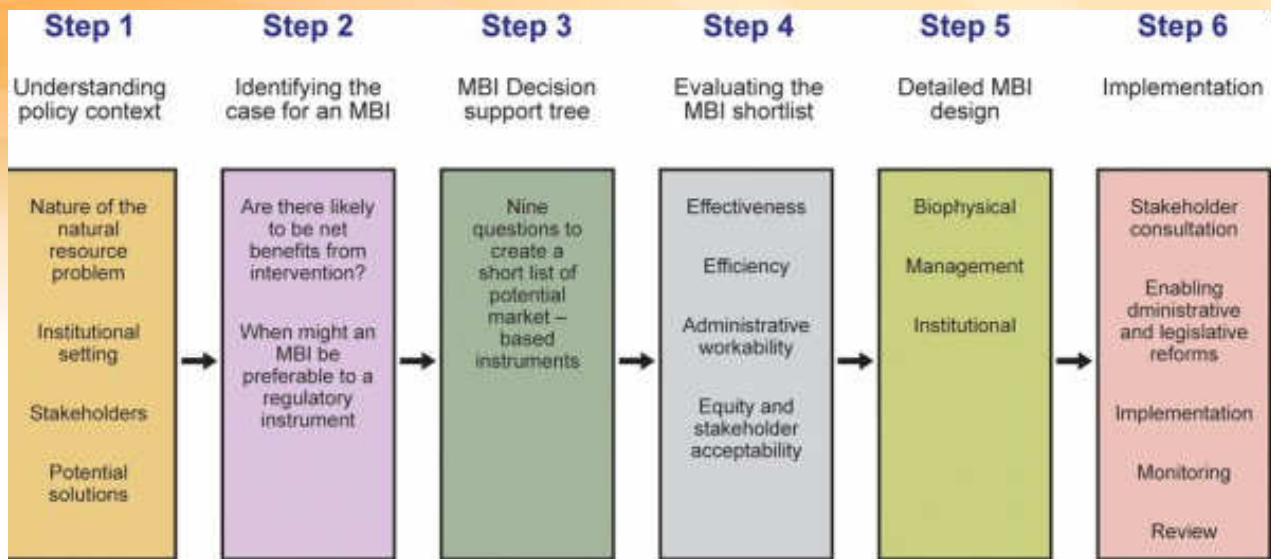
Young M, Shi T, Crosthwaite J. (2003) Duty of Care: An instrument for Increasing the Effectiveness of Catchment Management. Department of Sustainability and Environment, Melbourne.



Challenges for MBI Design

- Novel 'Designer' markets
 - abstractions & design choices have major impact on scheme effectiveness, efficiency
- Appropriate baselines
 - required in 'baseline and credit' schemes to ensure additionality
- Broad reach of market-based tools
 - increases potential for adverse interactions with other policy objectives
- 'market for lemons' risks
 - where measurement, verification and additionality difficulties; 'poor quality' low-cost projects crowd out 'high quality' activities
- Creating transparent, liquid markets
 - that allow efficient price discovery and risk management by participants
- *Particularly challenging for*
 - *Baseline and credit schemes*
 - *NRM and Climate Services*

Possible design process for MBI in NRM



(BDA, 2008)

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Australian examples of MBIs in NRM

- Price
 - assign price to environmental impacts within existing markets through positive (e.g. competitive grants via tenders) or negative (e.g. charges)
 - Generally understood costs but uncertain environmental outcomes
 - *Examples: Victorian Government BushTender, EcoTender*
- Quantity
 - restrict total level of activity, allocate rights to undertake then allow trade (eg. Offsets, Carbon markets)
 - Achieve desired environmental outcome but uncertain costs
 - *Examples: NSW Greenhouse Gas Reduction Scheme (GGAS), forthcoming National Carbon Pollution Reduction Scheme (CPRS), NSW Bio-banking, Victorian BushBroker*
- Market Friction
 - Help existing markets work better through information, accreditation..
 - *Examples: Greening Australia Pilot Land Innovation Fund, Federal Govt accredited voluntary Greenhouse Friendly program*

(Adapted from BDA, 2008)

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Price MBI – Victorian EcoTender

- Targets multiple environmental outcomes
 - habitat for native animals, protection of ecosystems, biodiversity, water quality, salinity, carbon sequestration
 - Design challenge
 - estimate quality & quantity of multiple environmental outcomes that result from individual landholder actions
 - reveal landholders who can provide low cost high quality env. outcomes
 - Ensure landholders undertake agreed land management actions despite difficulty monitoring individual actions
 - ensure any negative environmental impacts are accounted for
 - Tools
 - Victorian habitat hectare methodology to estimate biodiversity impacts
 - Catchment Modelling Framework (CMF) to estimate water quantity and quality impacts, carbon and saline land.
- => determine Environmental Benefit Index (EBI) for each bid
Carbon benefits kept separate

(Adapted from www.marketbasedinstruments.gov.au)¹⁹

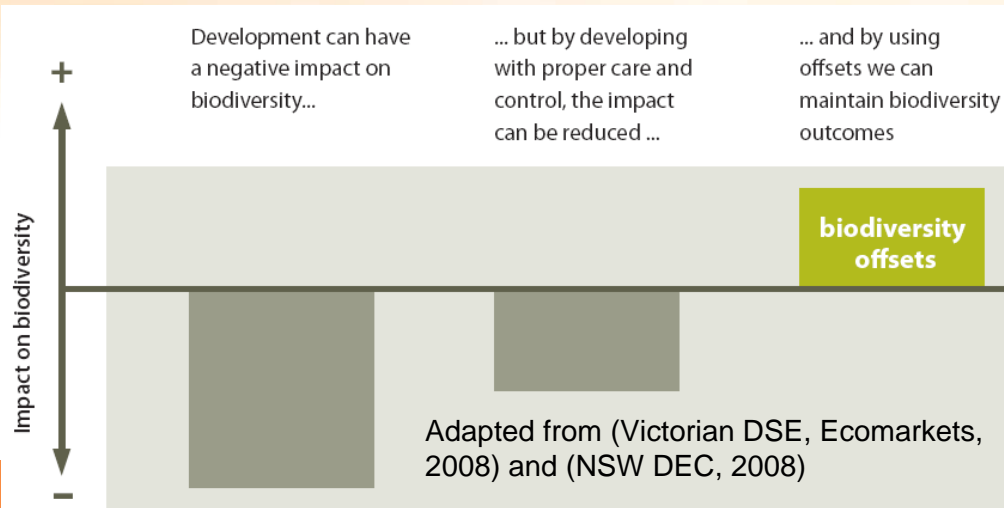


EcoTender methodology & outcomes to date

- Expressions of interest by land managers
 - Site assessments by Field officers
 - Development of management plans by landowners & field officers
 - Submission of bids - management plans and bid price
 - Bid assessment wrt highest EBI/\$
 - Management agreements. formal contracts
 - Payments and reporting against agreement
- Outcomes to date in Pilot
 - Requires significant scientific & modelling capability to inform process
 - Potential synergies in developing multiple-objective tenders.
 - Tender process incentivises landholders to reveal true costs of actions
 - 62% of bids successful, 97% of these had multiple env. outcomes
 - \$ price for carbon offsets can reduce cost to govt. of achieving other environmental outcomes

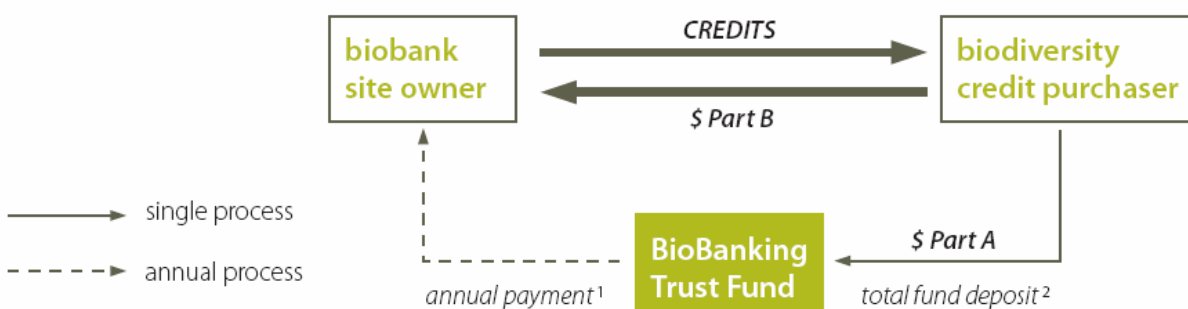
VIC BushBroker / NSW BioBanking

- **BushBroker**
 - system to establish, register and trade native vegetation credits
- **BioBank**
 - system to rule-based, transparent market in biodiversity credits
 - use for conservation goals, offset adverse impacts of developments



BushBroker / BioBanking performance

- Only limited experience to date but promising opportunities
- Possible challenges
 - Fungibility of biodiversity, native vegetation across different sites
 - Certification and verification processes to ensure additionality
 - Ensuring longer-term maintenance of offsets
 - Perverse incentives? eg. allow proposed development sites to degrade?



¹ Annual payment as per schedule in biobanking agreement

² Based on present value of estimated management cost

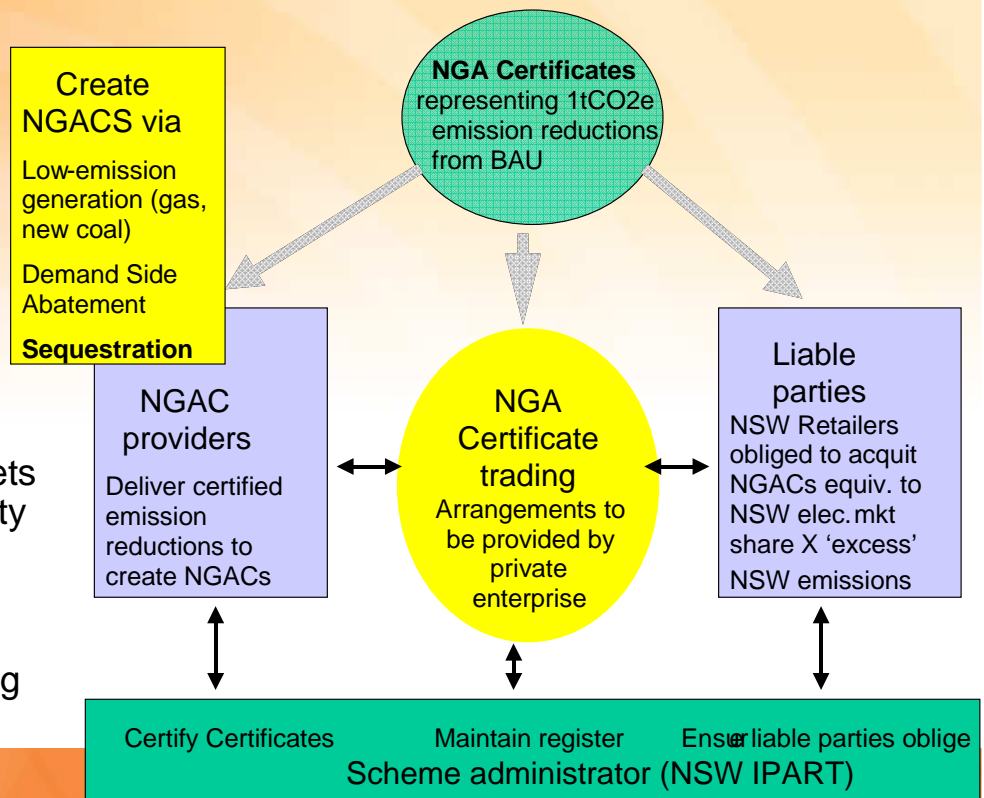
NSW Scheme – a ‘designer’ market

Policy intent

“reduce GHG emissions associated with the production and use of electricity...”

Implementation

State per-capita greenhouse targets for NSW Electricity Industry
Baseline+credit ‘emissions reductions’ trading



Forestry in NSW GGAS

- Eligibility criteria
 - capability of organisation to do carbon accounting & maintain long-term commitments involved
 - eligibility of forest (consistent with Kyoto Protocol)
 - ownership or control of registered carbon sequestration rights on land title
- Creation of certificates
 - only permitted once assessed for given period, no forward trading
- Activities
 - conservation-style forestry, commercial, rotational harvest forestry.
- Models
 - include National Carbon Accounting Toolbox (NCAT)
- Standards
 - Interim Australia Standard AS4978.1(Int.)2002 – *Carbon Accounting for Greenhouse Sinks Part 1: Afforestation & Reforestation*



Forestry GGAS Outcomes

- Challenges for participation due to documentation, legal requirements
 - 6 accredited providers
- Modest abatement to date c.f. other options

Table 6.1 Certificates created to date

Vintage	Generation	Demand Side Abatement	Carbon Sequestration	Large user	Total
2003	6,317,835	345,141	0	0	6,662,976
2004	6,744,232	742,233	166,005	0	7,652,470
2005	7,879,171	1,509,199	538,471	94,277	10,021,118
2006	9,548,179	8,934,236	587,853	790,460	19,860,728
2007	12,827,675	9,975,356	698,765	1,288,383	24,790,179
Total	43,317,092	21,506,165	1,991,094	2,173,120	68,987,471

Figure 4.1 Plant-grow-harvest carbon storage

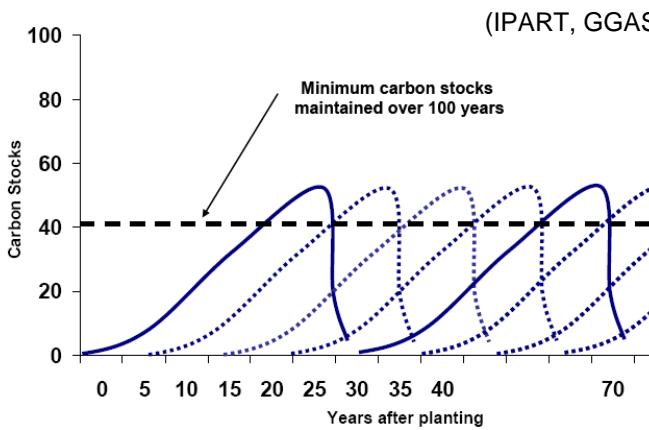
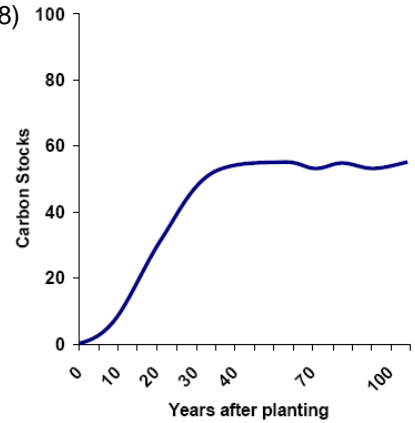


Figure 4.2 Permanent forest carbon storage



Thank you... and questions

Many of our publications are available at:

www.ceem.unsw.edu.au