

Carbon Markets Workshop: Introduction to Cap-and-Trade

Mexico City, Mexico
August 20, 2009
Justin Felt

PointCarbon

Providing critical insights into energy and environmental markets

www.pointcarbon.com

Point Carbon: Global Information Provider

- News, Conferences & Training courses
- Research & Trading Analytics:
 - Carbon
 - Power
 - Gas
- Offset projects databases
- Advisory services

The screenshot displays the Point Carbon website with the following elements:

- Navigation Menu:** Research, Trading analytics, Advisory, Events, About us, Search.
- EU ETS Section:**
 - Article: "Carbon's bear trend continues" dated 15 Jun 2009 12:52 EST. Text: "Carbon fell sharply on Monday as a weaker energy complex added to bearish sentiment." Includes a "Read more..." link.
 - Article: "Austria to spend €5bn on EUAs" dated 15 Jun 2009 11:04 EST. Text: "Austria will buy 2 million EU allowances (EUAs) for installations joining the EU ETS this year." Includes a "Read more..." link.
 - Article: "ADB should stop funding fossil fuel projects: NGO" dated 15 Jun 2009 11:40 EST. Text: "The Asian Development Bank should stop funding fossil fuel projects, a survey of the bank's lending..." Includes a "Read more..." link.
- Publications:** Carbon Market Daily 15 June, Carbon Market Europe 12 June, CDM & J Monitor 10 June, Carbon Market North America 12 June, Carbon Market Australia-New Zealand 5 June.
- Prices:** Point Carbon EUA OTC assessment (EUR/t) showing a price of €12.50 with a change of -0.50. Includes a "Last 30 days" line chart and a "Methodology" dropdown menu.
- CTTL search:** Updated to include reported 2008 verified emissions.
- Subscription:** "Subscribe NOW!" button with a "Click Here!" arrow.
- Footer:** PointCarbon logo, tagline "Providing critical insights into energy and environmental markets", and website URL "www.pointcarbon.com".

Introduction and Market Structure

PointCarbon

Providing critical insights into energy and environmental markets



www.pointcarbon.com

Climate change



- **What we know**
 - Greenhouse gases (mainly CO₂) trap heat in the atmosphere
 - Atmospheric CO₂ content has risen from <300ppm in pre-industrial times to >390ppm now and is rising ever faster
 - Human activity is the main driver: burning fossil fuels releases GHGs, and pre-industrial CO₂ levels never rose this fast

 - **What we don't know**
 - Future atmospheric concentrations
 - Future temperature increases
 - Local effects
 - Damages and costs (IPPC)
- Practical conclusion: major emission reduction efforts are needed
- Climate change is a global problem requiring international agreements

PointCarbon

Providing critical insights into energy and environmental markets



www.pointcarbon.com

Emitters will choose least cost option of:

1. Internal abatement (reduce emissions)
(scale back output, relocate, alter mode of operation, fuel switching, new technology/investments)
2. Buy surplus emission allowances
3. Buy verified reductions = offsets
4. Pay penalty for non-compliance
5. Other compliance mechanism
(technology fund in Alberta)



PointCarbon

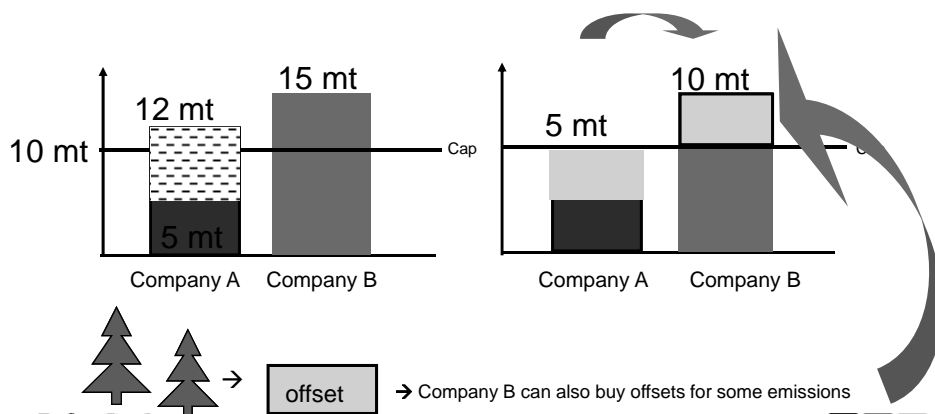
Providing critical insights into energy and environmental markets

www.pointcarbon.com

How it works

Company A has lower emission abatement costs

Company B purchases excess allowances from Company A

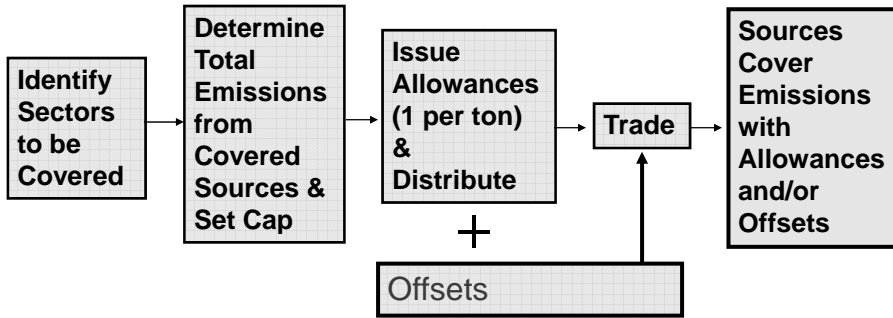


PointCarbon

Providing critical insights into energy and environmental markets

www.pointcarbon.com

Designing a Cap-and-Trade Program



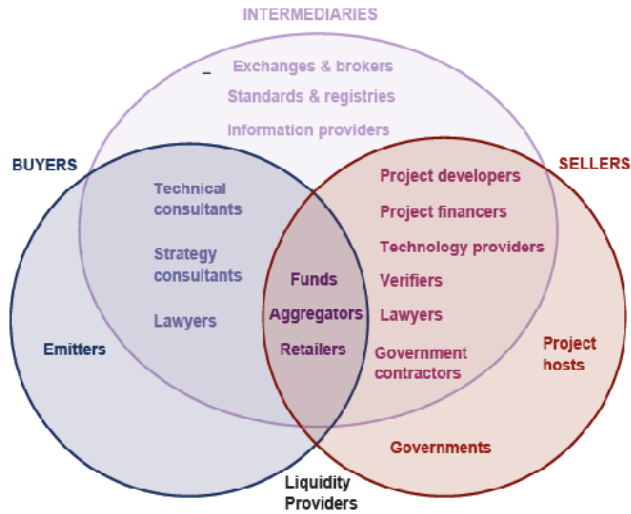
PointCarbon

Providing critical insights into energy and environmental markets



www.pointcarbon.com

Cap-and-Trade: Who's Involved?

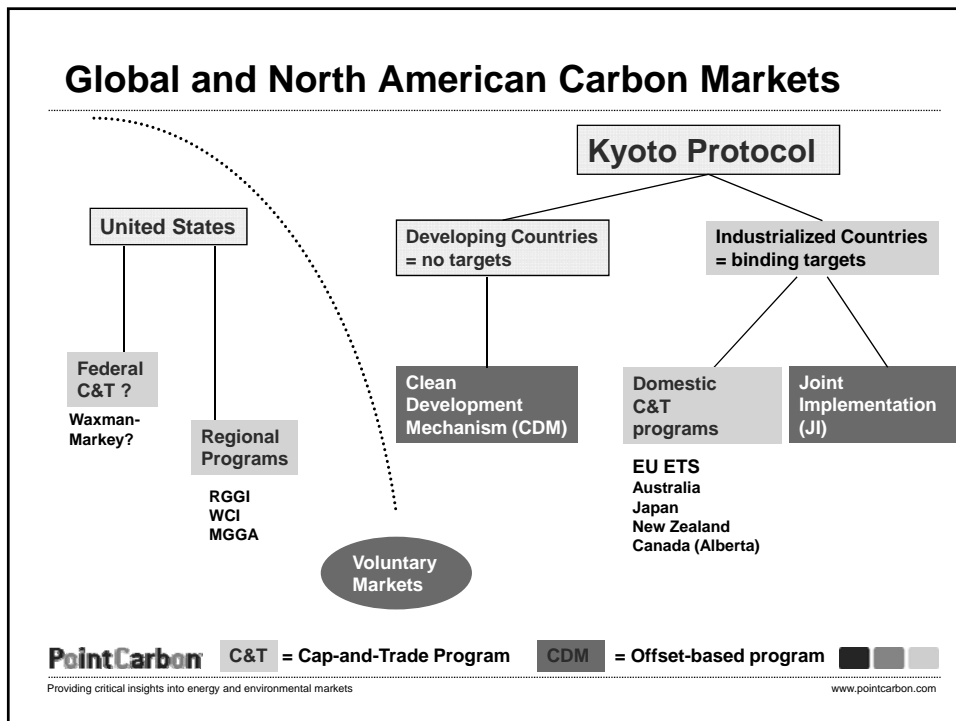
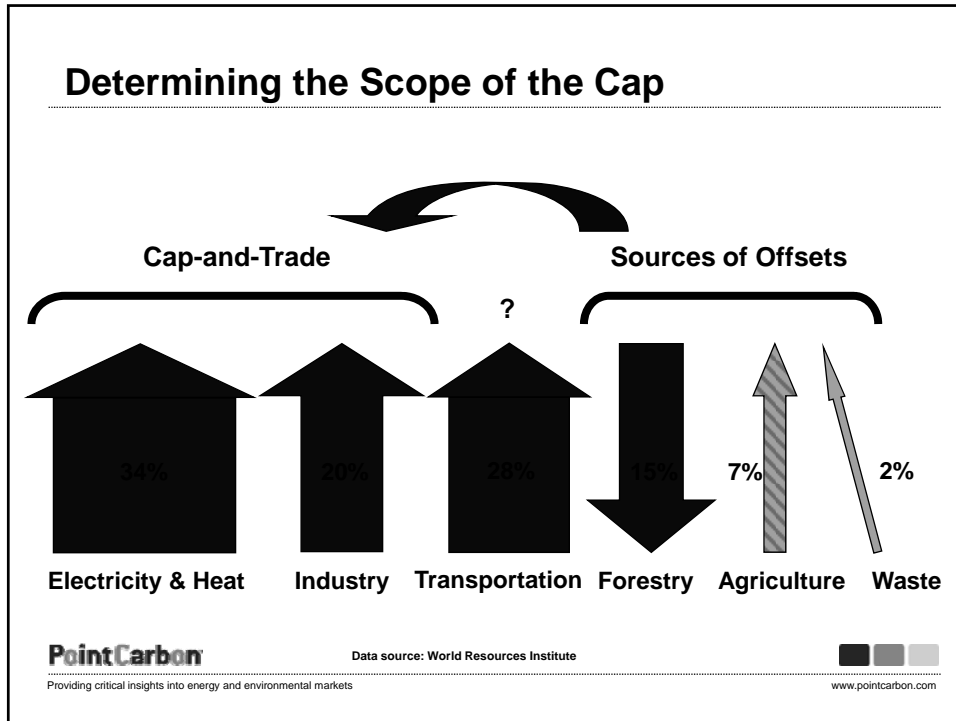


PointCarbon

Providing critical insights into energy and environmental markets



www.pointcarbon.com



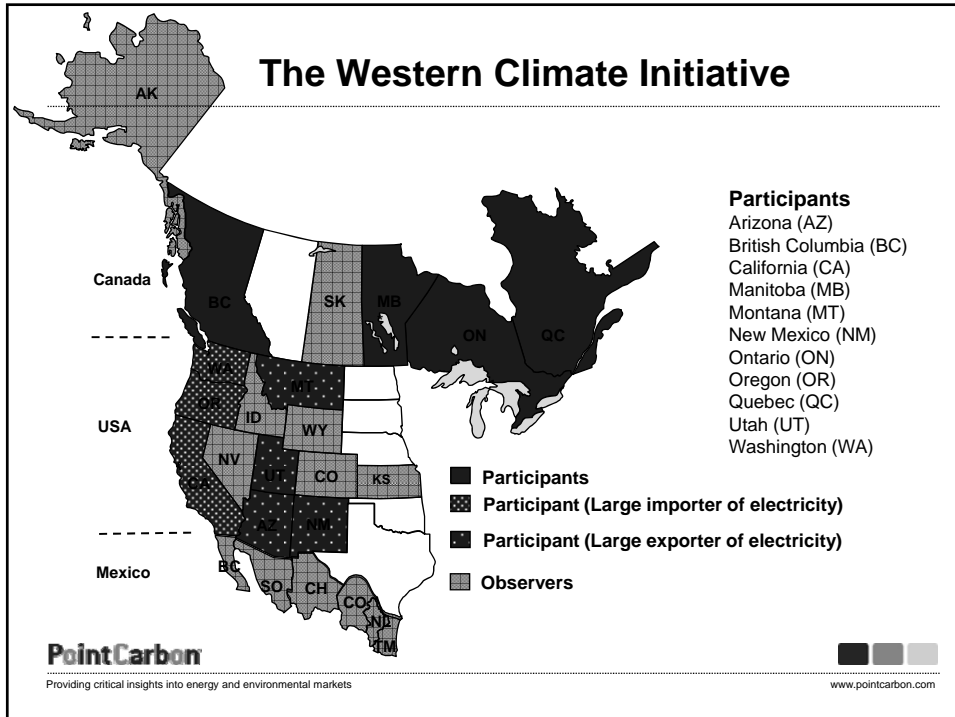
The Western Climate Initiative

PointCarbon

Providing critical insights into energy and environmental markets



www.pointcarbon.com



The Western Climate Initiative

- Common GHG reduction goal set in August 2007:
15% absolute reductions below 2005 levels by 2020
- Program to start on Jan 1, 2012
- Objective: “regional market-based multi-sector mechanism”
- New member jurisdiction must:
 - Have Climate Action Plan and state/provincial target
 - Adopt CA vehicle tailpipe standards (court case)
 - Join The Climate Registry

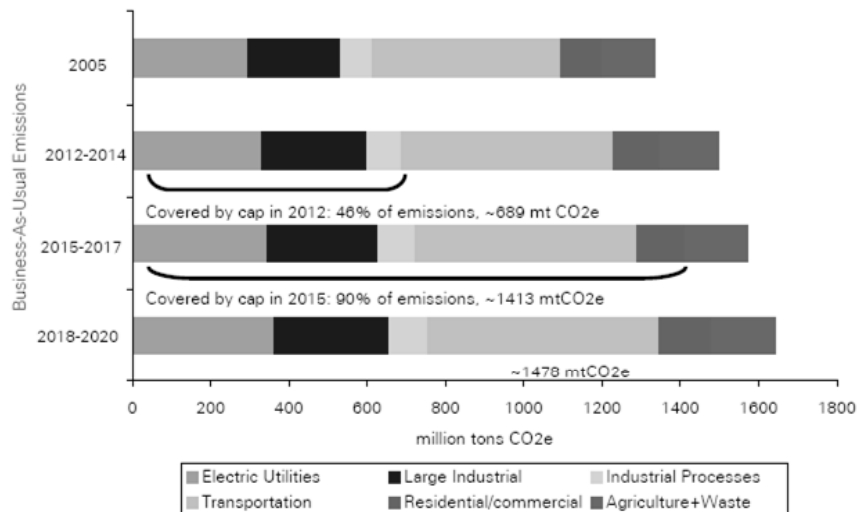
PointCarbon

Providing critical insights into energy and environmental markets



www.pointcarbon.com

Key Design Feature: Scope doubles in 2015



PointCarbon

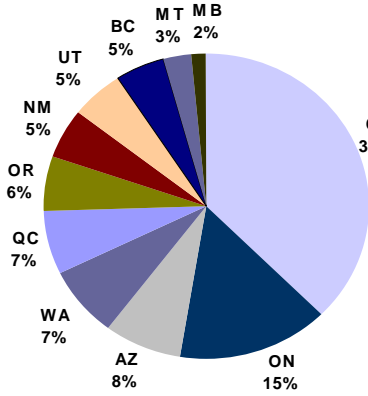
Providing critical insights into energy and environmental markets



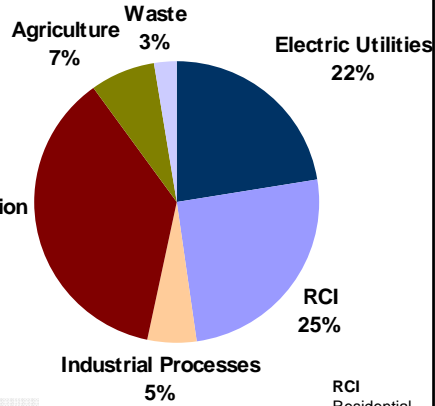
www.pointcarbon.com

A Western Trading Program: Emission Profile

Emissions by jurisdiction



Emissions by sector



Total emissions: 1.33 billion tCo2e

2005 data, state inventories

PointCarbon

Providing critical insights into energy and environmental markets

RCI
Residential
Commercial
Industrial



www.pointcarbon.com

Key design features: offsets

- Domestic and international (CERs, not ERUs) offsets allowed
- Limit: 49% of total emissions reductions from 2012-2020 may come from offsets and allowances from other trading systems (RGAs, EUAs, etc.)
- Regulation-induced carbon cuts (state and provincial programs) may lower demand for offsets

PointCarbon

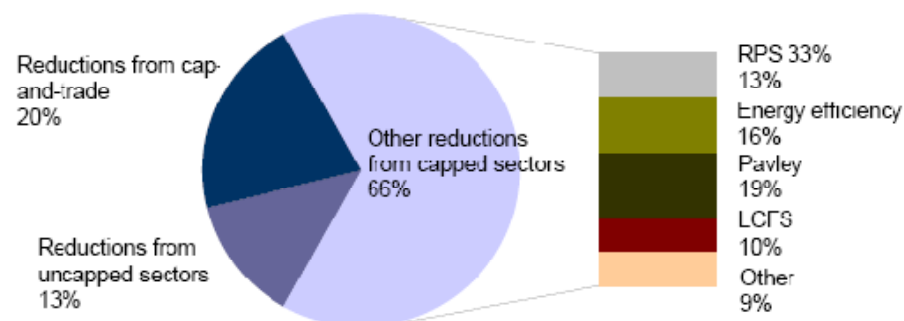
Providing critical insights into energy and environmental markets



www.pointcarbon.com

Influence of local regulations: WCI's biggest member

California scoping plan proposed reductions
(total reductions from business-as-usual in 2020 = 169 mtCO₂e)



PointCarbon

Providing critical insights into energy and environmental markets

www.pointcarbon.com

Role of Mexico in WCI

- There are six Mexican border states that are Observers in WCI
 - Baja California
 - Sonora
 - Chihuahua
 - Coahuila
 - Nuevo Leon
 - Tamaulipas
- Climate Action Reserve (an offset standard and registry)
 - Mexican landfill and livestock methane project are now eligible
- Opens door for Mexico to play strong role in US cap-and-trade, as well as a North American regime

PointCarbon

Providing critical insights into energy and environmental markets

www.pointcarbon.com

Mexican Leadership in Int'l Carbon Arena

- Calderon is gaining support plan for Green Fund
 - Rich and poor countries pay into a fund to help poor countries to cut emissions and adapt to climate change
 - Gaining support in developed countries
 - Latin American countries have also shown support
- Calderon has announced Mexico will reduce its emissions
 - Reduction of output by 50% below 2000 by 2050
 - Pecc (Programme on Climate Change) will put in a number of measures to achieve, including a cap-and-trade regime
 - Announcement to replaced household appliances (refrigerators, light bulbs, air conditioners)
 - Increase in budget for forestry

PointCarbon

Providing critical insights into energy and environmental markets



www.pointcarbon.com

The Regional Greenhouse Gas Initiative Northeast US

PointCarbon

Providing critical insights into energy and environmental markets



www.pointcarbon.com

RGGI: Scope, Targets and Participants



- Market-based emissions trading system, began 1. Jan 2009
- Cap: 188 m s/t (~9% of EU ETS)
- Goals:
 - Stabilize absolute emissions 2009 - 2014
 - 10% below 2005 by 2019 (-2.5%/year)
- Emissions measured in short tons (st) = (.9 metric ton)
- Observers: PA, DC, and Eastern Canadian Provinces

PointCarbon

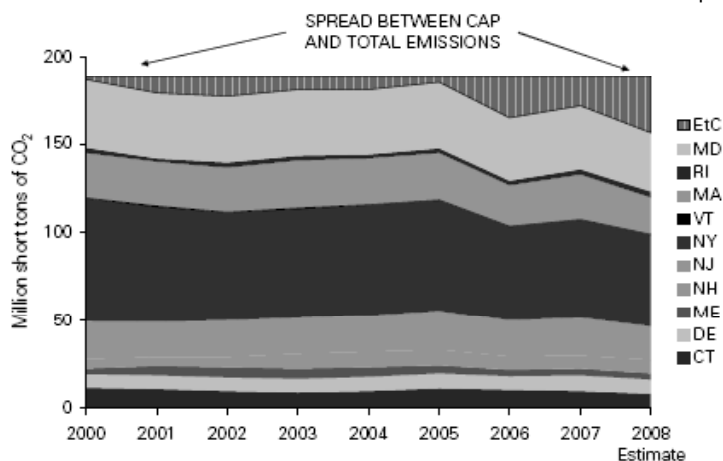
Providing critical insights into energy and environmental markets

www.pointcarbon.com

RGGI starts over-allocated

Historical emissions 2000-2008

Q1 2009 emissions stable compared to 2008



PointCarbon

Data source: RGGI, Inc. and EPA Clean Air Markets Division

Providing critical insights into energy and environmental markets

www.pointcarbon.com

US Federal Policy Overview and Status

- First actions from the new administration
 - The Waxman-Markey bill

PointCarbon

Providing critical insights into energy and environmental markets


www.pointcarbon.com

Waxman-Markey bill: targets and scope

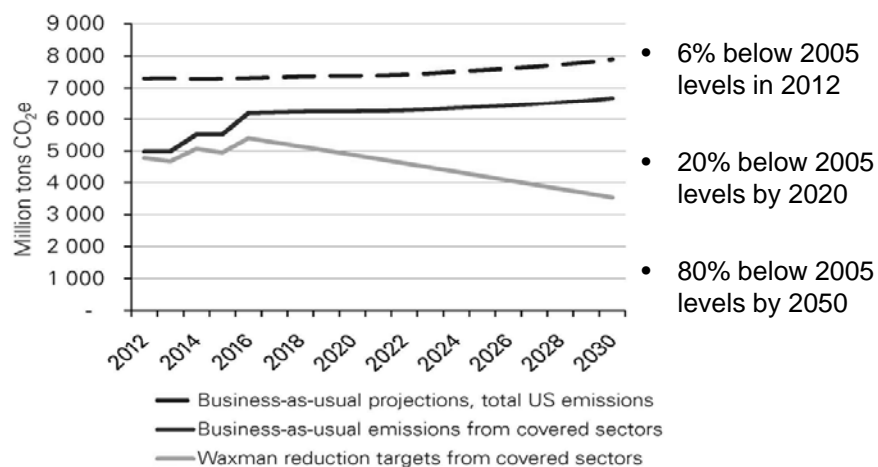
- Economy-wide cap: 85% US emissions covered
 - everything except emissions from agriculture, some waste, small emitters
- Reduction requirement:
 - 17% from 2005 levels by 2020 (for covered sectors – national goal 20%)
 - 83% from 2005 levels by 2050
- Covers Kyoto Six gases + 1
 - CO₂, CH₄, N₂O, SF₆, PFCs, HFCs...and N₃
- sectors phased in gradually:
 - Power, transportation (refineries) in 2012
 - All energy-intensive industrial sectors in 2014
 - Commercial/residential heat (via Local Distribution Companies) in 2016

PointCarbon

Providing critical insights into energy and environmental markets


www.pointcarbon.com

Emission-to-Cap in Waxman-Markey



PointCarbon

Providing critical insights into energy and environmental markets

www.pointcarbon.com

House Vote—onward to the Senate

- Bill passed the House of Representatives June 26th
 - Passes with a narrow 219-212 margin
 - 44 Democrats voting “Nay” and 8 Republicans voted “Aye”
- Bill still needs to go through Senate in the fall
 - Democrats have 60 seats but not all will support the bill
 - Would some Republicans vote in favor of the bill?
- Bill will probably need to go through a conference to reconcile the two versions of the bill
 - Obama has asked the bill be on his desk by the end of the year
- Copenhagen negotiations in Dec 2009
 - US would be in stronger position if a bill was passed at home
 - Vote on bill may still be pushed back to early 2010
 - If bill is not passed by summer 2010, then nothing will happen before 2011 because of the mid-term elections

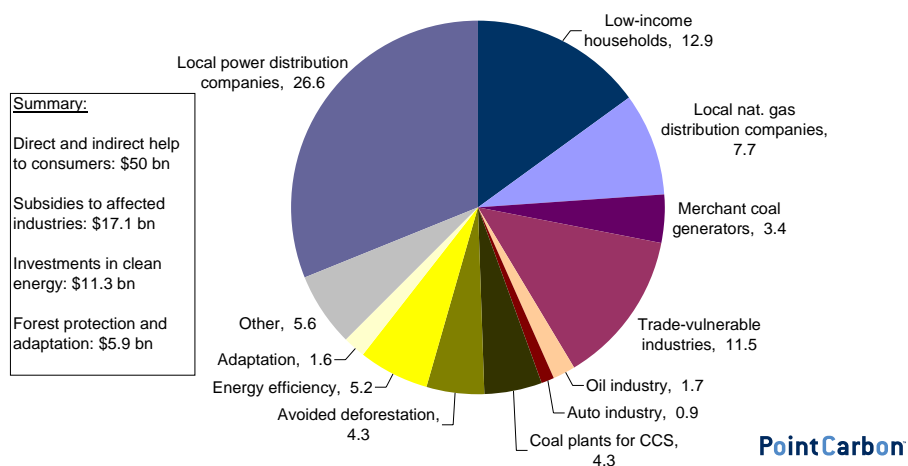
PointCarbon

Providing critical insights into energy and environmental markets

www.pointcarbon.com

Estimated value of allocation in 2020

Assumption: \$17/ton based on EPA's modeling of the bill, April 2009



Offsets: overview

- EPA in charge of all offset mechanisms, eligible project types decided by "Offsets Integrity Advisory Board"
- 50/50 domestic/international
- Each offset worth 1 allowance...BUT:
 - starting 2019, you need 5 international offsets for 4 allowances
- Maximum percentage of compliance that can be covered through offsets in each year:

$$2 \text{ billion} / (2 \text{ billion}) + (\text{previous year's cap})$$

$$= 30\text{-}35\% \text{ of cap in } 2012\text{-}2030, \text{ up to } 63\% \text{ of cap by } 2050!$$
- US Department of Agriculture will approve/register agricultural offset projects

PointCarbon

Providing critical insights into energy and environmental markets

www.pointcarbon.com

Offsets: international

- Only from developing countries
 - Of those, only from countries with which US has bilateral or multilateral agreement
 - Allows offsets from sector-based reductions
 - Allows credits from reduced tropical deforestation
- } CERs from CDM:
all host countries party to UNFCCC
- } These don't exist yet;
See our upcoming reports!

PointCarbon

Providing critical insights into energy and environmental markets



www.pointcarbon.com

North America: “Three Amigos” for Cap

- Obama, Calderon, Harper sign agreement Aug 8th, 2009
- Three nations pledge to support to prevent rise of temperature of 2 degrees C and reduce global emissions by 50% by 2050
- Measures include:
 - Cooperation on approaches to measuring, reporting, and verifying reductions
 - Building a smart grid
 - Phasing down HFCs under the Montreal protocol
 - Reducing emissions from transportation, aviation, and refining
 - Framework to align energy efficiency in three countries

PointCarbon

Providing critical insights into energy and environmental markets



www.pointcarbon.com

The Voluntary Market

PointCarbon

Providing critical insights into energy and environmental markets



www.pointcarbon.com

Compliance v. Voluntary Markets

Compliance markets

- Reduction targets are imposed by public authorities
- Entities need to surrender allowances equal to their emissions
- Third-party certification required
- High penalties for non-compliance
- Quantity and types of offsets allowed strictly regulated

→ Kyoto, EU ETS, RGGI, WCI

Voluntary markets

- Reductions targets are chosen by entity
- OR
- Entity chooses to comply to predetermined target
 - Third-party certification optional
 - No or little penalty if the targets are not reached
 - No or little regulation of quantity and quality of offsets

→ CCX (regulated but voluntary opt-in), companies going "carbon neutral"

PointCarbon

Providing critical insights into energy and environmental markets



www.pointcarbon.com

Some voluntary offset standards

Program		Tradable unit	
CCX	Chicago Climate Exchange	CFI	Carbon Financial Instrument
CAR	Climate Action Reserve	CRT	Climate Reserve Tonnes
VCS	Voluntary Carbon Standard	VCU	Voluntary Carbon Unit
VER+	Verified Emission Reduction +	VER+	Verified Emission Reduction +
GS	Gold Standard	GS CDM / GS VER	
CCB	Climate Community & Biodiversity Standard	VER	Verified Emission Reduction

Certification standards differ by project type methodologies and additionality test

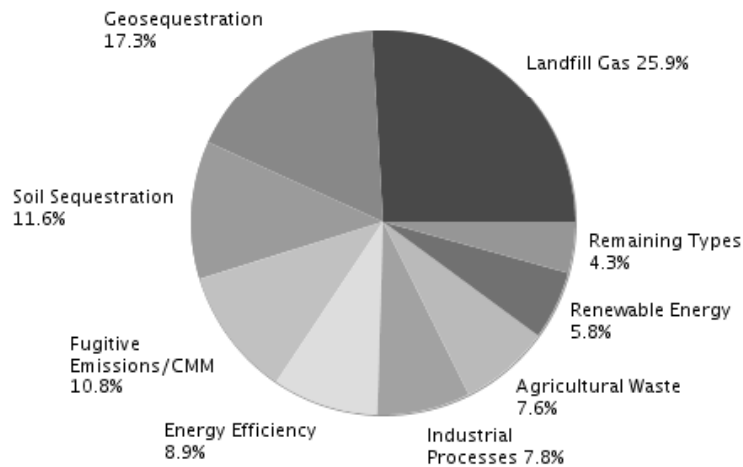


Providing critical insights into energy and environmental markets



www.pointcarbon.com

Planned 2009 Volumes by Project Type



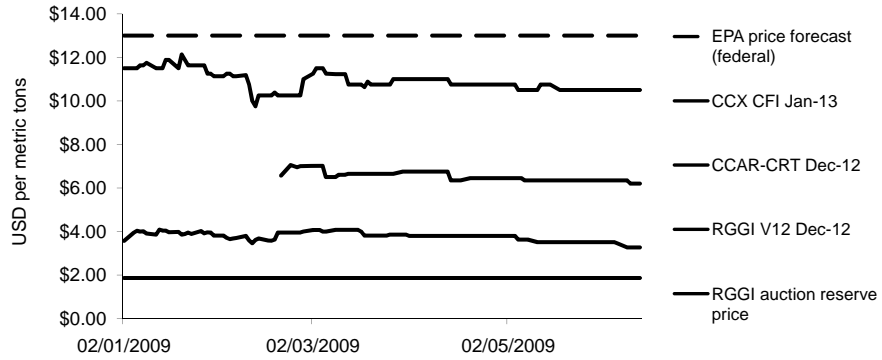
Source: Point Carbon Project Manager North America

Providing critical insights into energy and environmental markets



www.pointcarbon.com

Prices Vary Depending on Risk and Market



PointCarbon

Source: Point Carbon Project Manager North America

Providing critical insights into energy and environmental markets



www.pointcarbon.com

The International Framework

Kyoto protocol and CDM, JI

PointCarbon

Providing critical insights into energy and environmental markets



www.pointcarbon.com

Kyoto protocol

- Kyoto protocol
 - treaty under the UNFCCC of 11 December 1997
 - came into force on 16 February 2005
 - 184 countries have ratified
 - Annex I countries (those with binding commitments to reduce GHGs) account for 64% of global emissions: EU plus 37 others
- Goal: collectively reduce emissions of greenhouse gases at least 5 percent in 2008-2012 compared to the baseline year 1990
- 3 flexible mechanisms:
 - International emissions trading
 - Clean Development Mechanism
 - Joint Implementation

PointCarbon

Providing critical insights into energy and environmental markets



www.pointcarbon.com

International Emission Trading

- Each Annex B country is assigned emission allowances (AAUs) equivalent to its target emissions for 2008-2012
- Annex B states can introduce domestic reduction measures and/or
- Purchase AAUs from other Annex B states or
- Invest in reduction projects in other signatory states (CDM/JI)

A state which reduces emissions below its target will have surplus AAUs available to assist other states to reach their targets

PointCarbon

Providing critical insights into energy and environmental markets



www.pointcarbon.com

Targets and timelines

EU-27 (EU "bubble") formerly EU-15	- 8%
USA	- 7%
Canada, Japan, Poland, Hungary	- 6%
Croatia	- 5%
New Zealand, Russia, Ukraine	0%
Norway	+ 1%
Australia	+ 8%
Iceland	+ 10%

- Overall 5.2% reduction below 1990 (2008-2012)
- Nations granted AAUs in accordance with targets
- USA = proposed target, not adopted

PointCarbon

Providing critical insights into energy and environmental markets



www.pointcarbon.com

"Hot air"

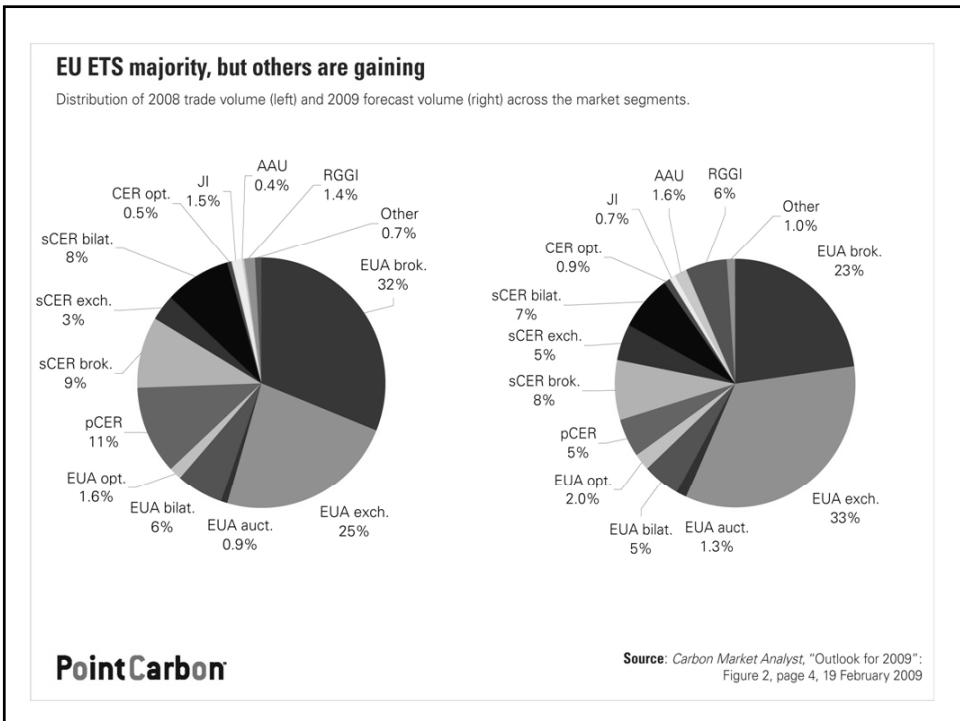
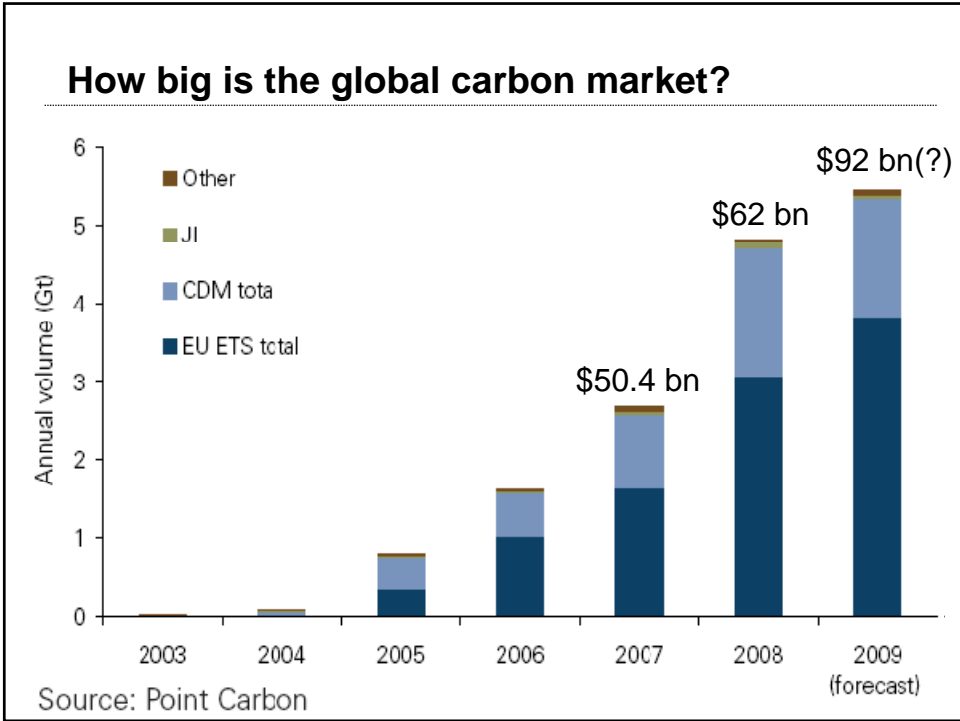
- Potential supply of AAUs is around 7-8 GtCO₂e
(mostly from Russia and Ukraine)
- Most countries try not to buy those AAUs, but nations who are exceeding their Kyoto targets...
- AAU purchases expected through 2012: 85 mt total
Biggest buyer: Japan, ~ 70 mt
Frequent seller countries so far: Slovakia, Hungary, Latvia
- Price range so far: €6-16 (\$8-20)
- Increasingly popular: Green Investment Schemes (GIS)
Soft vs. hard GIS

PointCarbon

Providing critical insights into energy and environmental markets



www.pointcarbon.com



International Offsets

CDM & JI

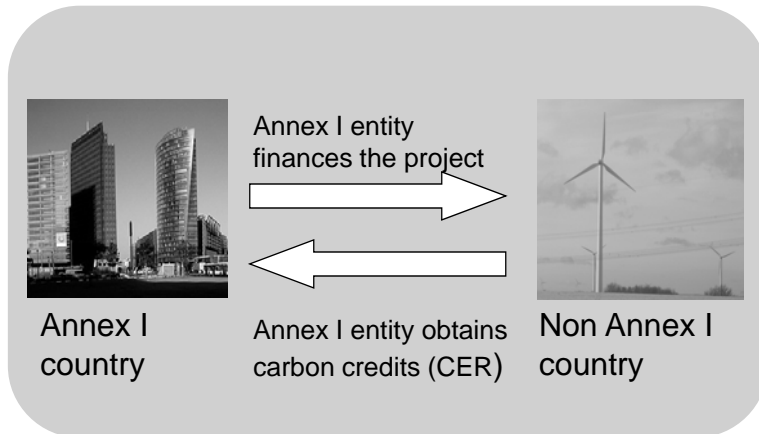
PointCarbon

Providing critical insights into energy and environmental markets



www.pointcarbon.com

The Clean Development Mechanism (CDM)



PointCarbon

Providing critical insights into energy and environmental markets



www.pointcarbon.com

Project types (examples)

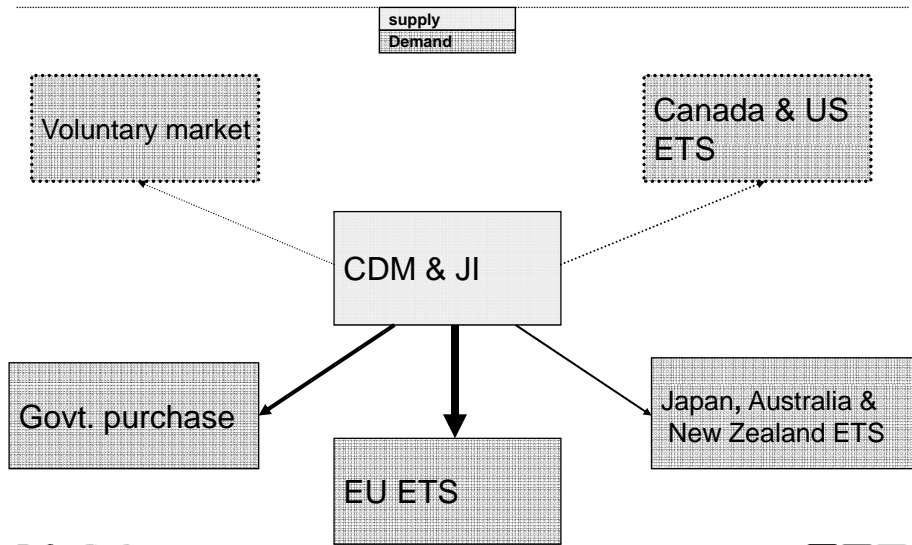


PointCarbon

Providing critical insights into energy and environmental markets

www.pointcarbon.com

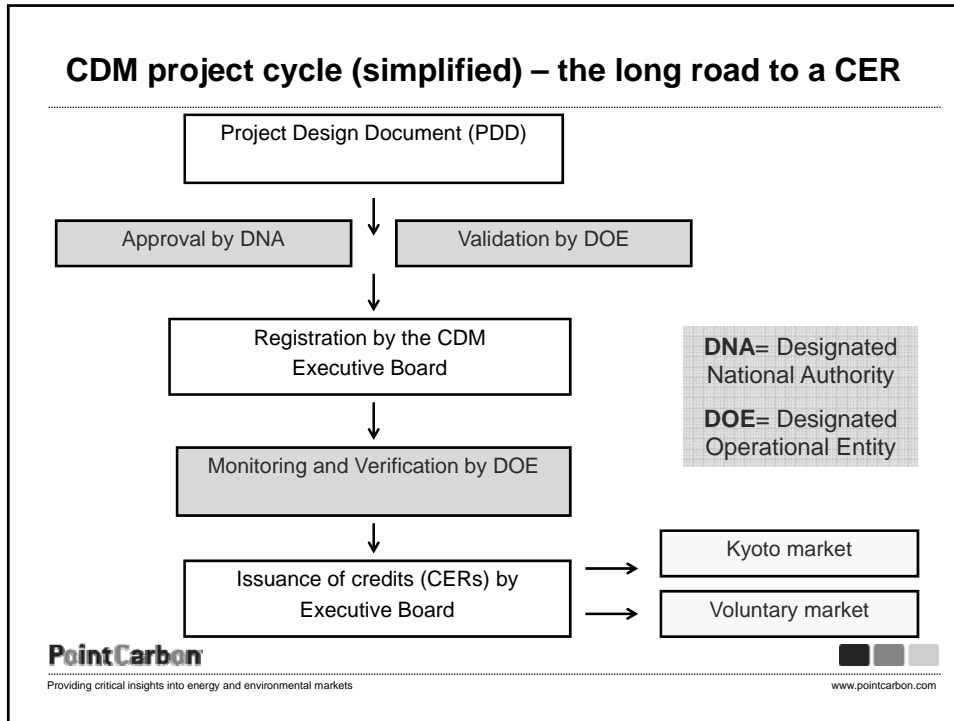
The global flow of project-based credits



PointCarbon

Providing critical insights into energy and environmental markets

www.pointcarbon.com



CDM Project pipeline

Project data	# projects	volume -2012 (Mt)
In total	7 624	4 917
PDD level and beyond	5 566	3 543
Validation and beyond	5 227	3 177
Registered and beyond	1 769	1 716
CER/ERUs issued	540	1 014

Development Benefits?

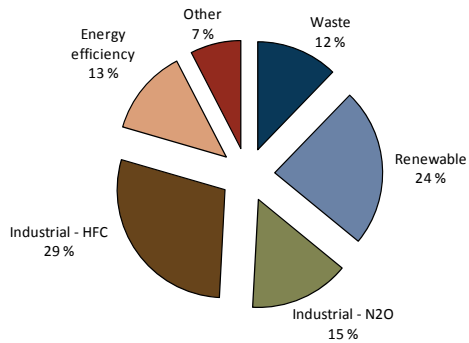
Host countries	100+
Risk adjusted volume from reductions (Point Carbon estimate) 2008 – 2012	1.3 billion tons
Leveraged investments (World Bank estimate)	95 bn\$

Source Carbon Project Manager as of Aug 19th,2009

PointCarbon
 Providing critical insights into energy and environmental markets
 www.pointcarbon.com

CDM projects (registered projects) per type

[% of total volume]



Volume from registered CDM projects per project type through 2012

Total:
1571 registered projects
1,6 Gt CO2e through 2012

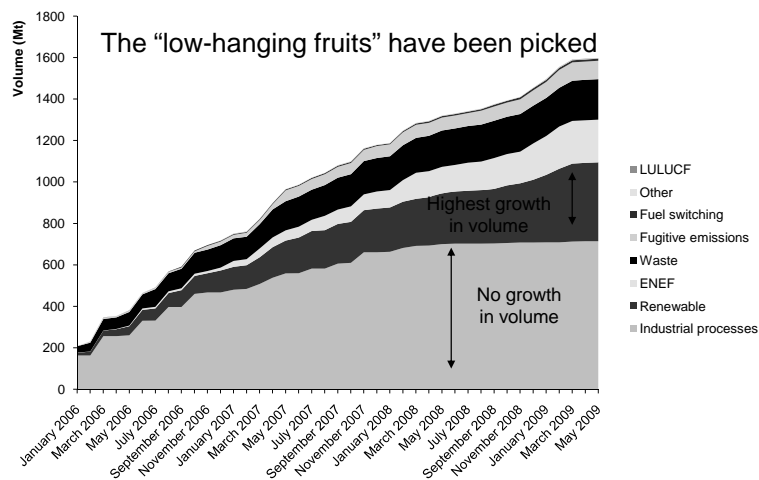
Source Carbon Project Manager as of 2 June 09

PointCarbon

Providing critical insights into energy and environmental markets

www.pointcarbon.com

Volumes of registered projects per project type



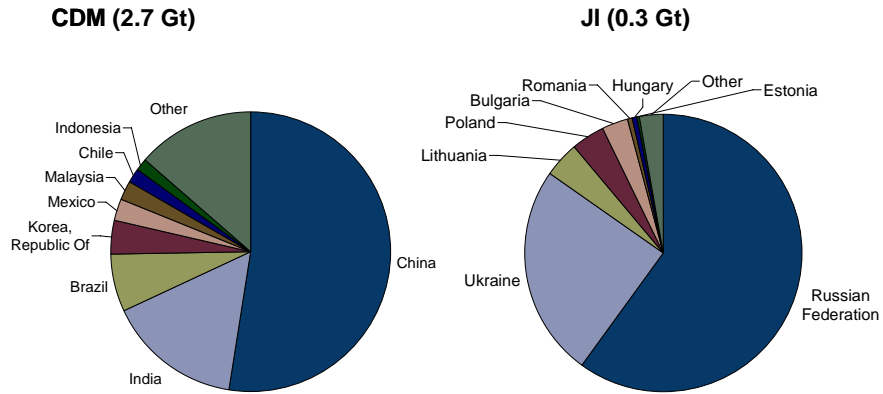
PointCarbon

Providing critical insights into energy and environmental markets

Source Carbon Project Manager as of 2 June 09

www.pointcarbon.com

CDM and JI Countries, planned reductions → 2012



Planned reductions, public validation stage and above - non risk-adjusted volume

PointCarbon

Providing critical insights into energy and environmental markets

www.pointcarbon.com

How some project developers see it...



PointC

Providing critical insights into energy and environmental markets

www.pointcarbon.com

The European Union's Emissions Trading Scheme

PointCarbon

Providing critical insights into energy and environmental markets



www.pointcarbon.com

What is the EU ETS?

- Started Jan 1, 2005
- Covers all 27 Member States of the European Union, Norway linked
- Cap is now at 2.1 bn tCO₂/year
Covers 46% of EU CO₂ emissions
- Sectors covered:
 - Power and heat,
 - refineries,
 - metals,
 - minerals,
 - pulp and paper
- 12,000 facilities covered, about 4,000 companies



➤ **By far the largest cap-and-trade program in existence**

PointCarbon

Providing critical insights into energy and environmental markets



www.pointcarbon.com

What's really going on:

- EU ETS started with a **pilot phase** from 2005-2007:
over-allocated: more allowances than actual emissions
- Corrected in Phase 2 (2008-2012):
ETS now short on allowances overall
- Phase 3 (2013-2020) will be even stricter

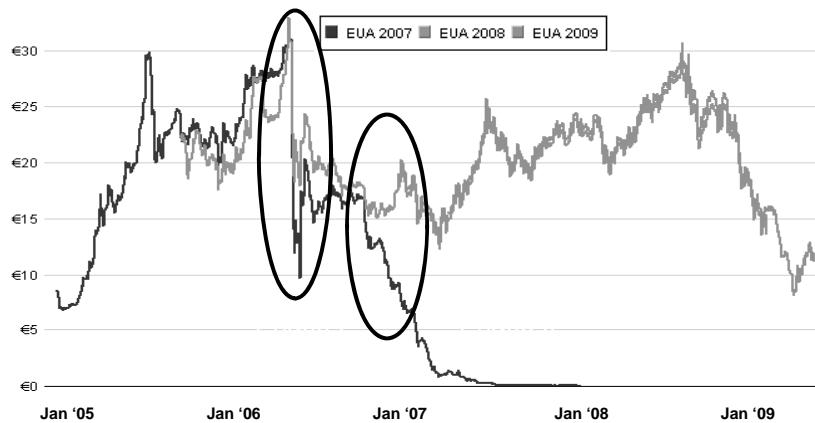
	Compliance years	Reduction Targets	Average annual cap
Phase 1	2005-07	No effect	2.3 bn. tCO ₂
Phase 2	2008-12	-6.5%	2.1 bn. tCO ₂
Phase 3	2013-20	-21%	1.85 bn. tCO ₂

PointCarbon

Providing critical insights into energy and environmental markets

www.pointcarbon.com

EU ETS Phase 1 and Phase 2 prices



PointCarbon

Providing critical insights into energy and environmental markets

EUA = European Union Allowance, the unit traded in the EU ETS

www.pointcarbon.com

EU Allowance Price Factors

EUA prices correspond to market fundamentals:

- **WEATHER**
Extreme cold or heat = higher emissions for power generation → more demand for allowances → higher EUA prices
- **FUEL PRICES**
If low-emitting gas is cheap compared to high-emitting coal, more plants run on gas → lower emissions → lower demand for allowances → lower EUA prices
- **POLICY SIGNALS**
If regulators indicate that caps may become tighter in the future, more companies want allowances to bank → higher demand for allowances → higher EUA prices

PointCarbon

Providing critical insights into energy and environmental markets



www.pointcarbon.com

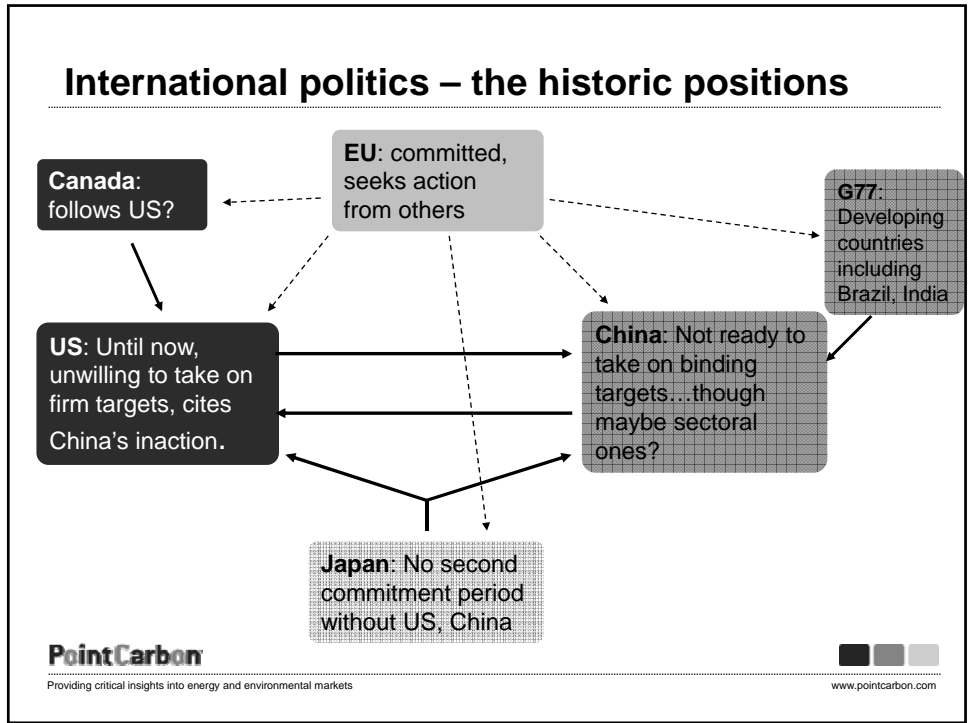
Post 2012

PointCarbon

Providing critical insights into energy and environmental markets



www.pointcarbon.com



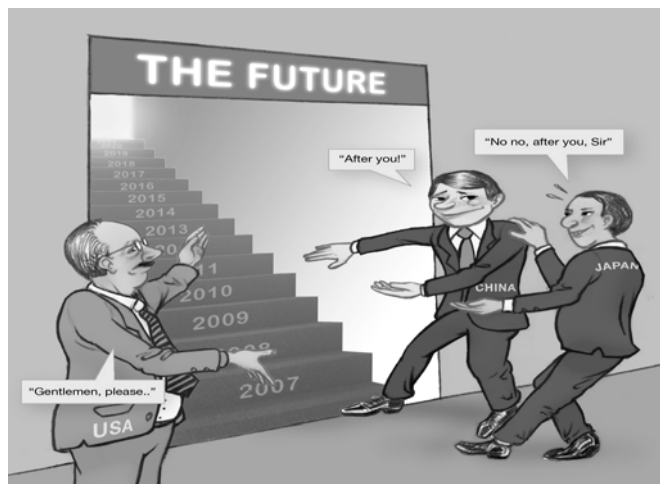
Pre-Copenhagen UN talks in Bonn: national positions

Country	For developed countries 2020	For developing countries 2020
EU	Cut emissions 30% below 1990	Low carbon development strategies; NAMA register. Sectoral crediting and sectoral trading
US	Quantitative targets "in conformity with national law"	NAMAs for all; quantified NAMAs and future targets for countries with "greater responsibility and capability". Submit low carbon strategy 2050
China	At least 40% below 1990	NAMAs as determined by each developing country
India	No percentage, but relative to 1990	Voluntary NAMA register
Japan	Not yet set. Multiple baselines (1990, 2000, 2005, 2007)	Intensity targets for advanced developing countries
Australia	No percentage or reference year	Sectoral or other types of commitments

PointCarbon **NAMA: "Nationally appropriate mitigation action"**
Providing critical insights into energy and environmental markets

www.pointcarbon.com

For now, though:



PointCarbon

Providing critical insights into energy and environmental markets

www.pointcarbon.com

Crunch Issues in Copenhagen "package"

- Binding targets
 - When should global emissions peak?
 - Which countries will have to take on commitments?
 - What should be the level and nature (absolute/intensity) of targets?
- Sectoral approaches
 - Instead of whole country, as a basis for emissions trading
 - Instead of projects, as a basis for crediting under CDM
- Reduced Emissions from Deforestation Degradation (REDD)
 - New mechanisms and funding
- Financing
 - Adaptation
 - Auctioning

PointCarbon

Providing critical insights into energy and environmental markets

www.pointcarbon.com

DISCLAIMER

- The information contained in Point Carbon's analyses, newsletters and on its website has been obtained from sources believed to be reliable. However, Point Carbon disclaims all warranties as to the accuracy, completeness or adequacy of such information.

Product and distribution:

- Redistribution of all or part of the Product(s) in any form is illegal. The Buyer cannot use all or parts of the Products or in any way communicate the contents and or results presented in the Products as part of a service or product offered to any third party that is competing with any service offered by the Seller. The data, information, analysis, calculations, models, forecasts and systems contained in the Product(s) is the property of the Seller and all rights in such material are reserved and may not without the prior written consent of the Seller be reproduced published or summarized for distribution or incorporation into a report or other document or otherwise relayed or distributed in any form or by any means whether internally or externally to third parties or persons who have not paid for the Product(s).

PointCarbon

Providing critical insights into energy and environmental markets



www.pointcarbon.com

Thanks for listening!
Here's my contact info:

jf@pointcarbon.com

Tel: 202 289 3930

PointCarbon

Providing critical insights into energy and environmental markets



www.pointcarbon.com