INTERNATIONAL CONFERENCE ON
MOUNTAINS AND CLIMATE CHANGE

The carbon credits mechanism

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Summary

- Climate change
- Background
- Kyoto mechanisms
- Emission Trading System
- Carbon markets in the world
- ETS exchange platforms
- Beijing carbon credits exchange
- Voluntary actions
- Sustainable mountain development: a project idea

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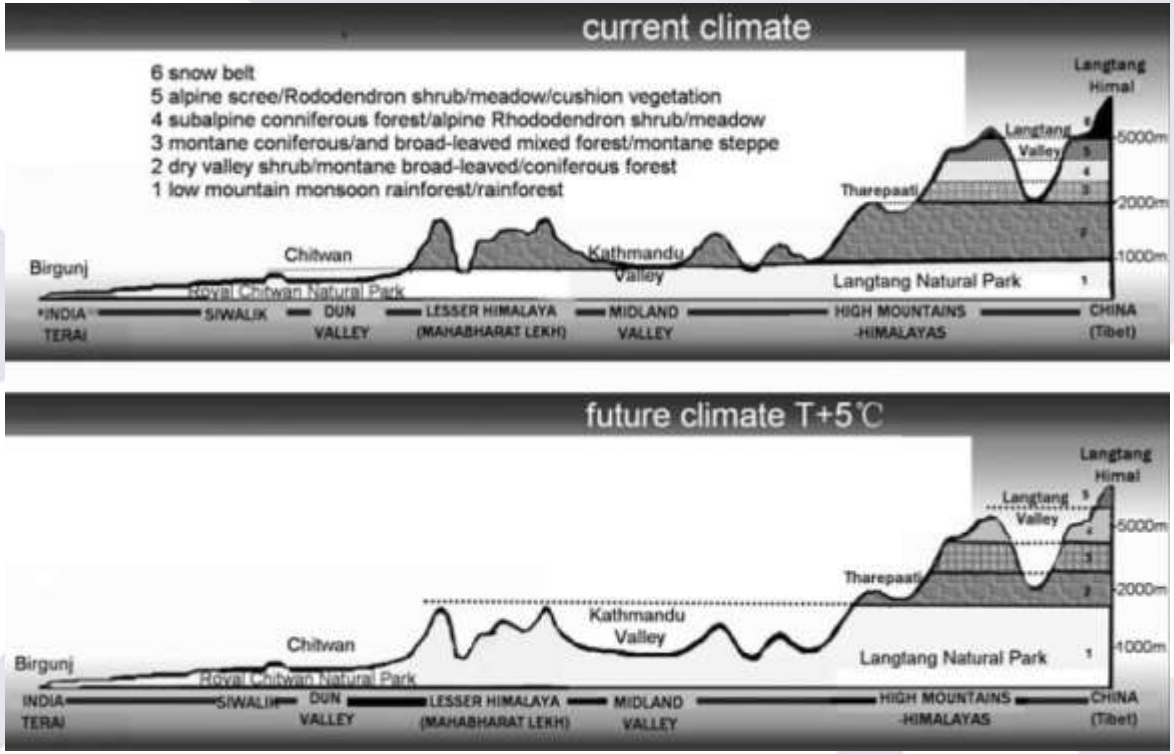
Climate change

Mountains and climate change

Climate change is widely acknowledged to be having a profound effect on the biosphere with many and diverse impacts on global resources.

Mountain ecosystems in particular are highly sensitive to climate change.



The current elevational distribution of life zones in the Himalayas and their distribution with a 5 ◦C temperature rise

Carbon credits mechanism is one of the tools to fight global warming by reducing emissions. It can contribute to a sustainable mountain development.

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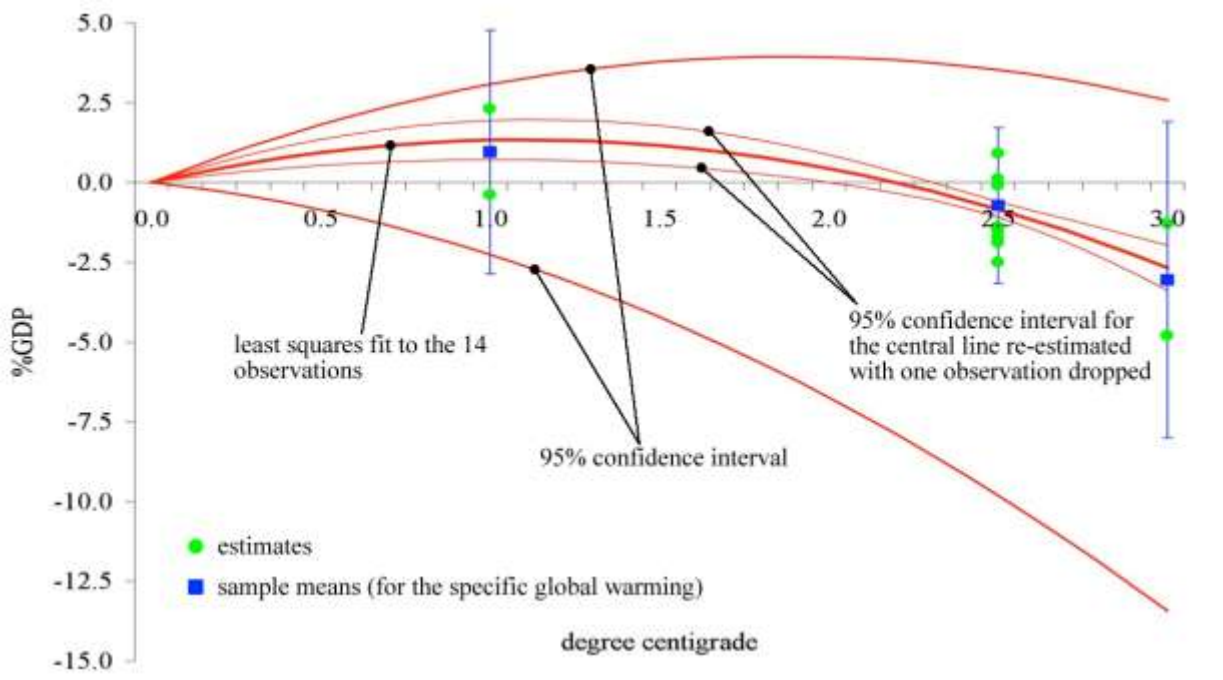
Climate change

- Economic impact of climate change

  The rise of temperature, on the long term, it has a negative effect even on the economy.



Estimates of the global economic impact of climate change, expressed as the welfare-equivalent income loss, as a functions of the increase in global mean temperature relative to today.

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BACKGROUND

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Background

Cap and trade

The efficiency of what later was to be called the "cap-and-trade" approach to air pollution abatement was first demonstrated in a series of micro-economic computer simulation studies between 1967 and 1970 for the U.S. National Air Pollution Control Administration by **Ellison Burton** and **William Sanjour**.

In the United States, the "acid rain"-related emission trading system was principally conceived by **C. Boyden Gray**, a G.H.W. Bush administration attorney. Gray worked with the Environmental Defense Fund (EDF), who worked with the EPA to write the bill that became law as part of the **Clean Air Act** of 1990. The new **emissions cap on NO_X and SO_2 gases** took effect in **1995**, and according to Smithsonian magazine, those acid rain emissions dropped 3 million tons that year.

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Background

Cap and trade

The development of emissions trading over the course of its history can be divided into four phases:

Gestation: Theoretical articulation of the instrument and, independent of the former, tinkering with "**flexible regulation**" at the US Environmental Protection Agency.

Proof of Principle: First developments towards trading of emission certificates based on the "**offset-mechanism**" taken up in **Clean Air Act** in 1977.

Prototype: Launching of a first "cap-and-trade" system as part of the **US Acid Rain Program** in Title IV of the 1990 Clean Air Act, officially announced as a paradigm shift in environmental policy, as prepared by "**Project 88**", a network-building effort to bring together environmental and industrial interests in the US.

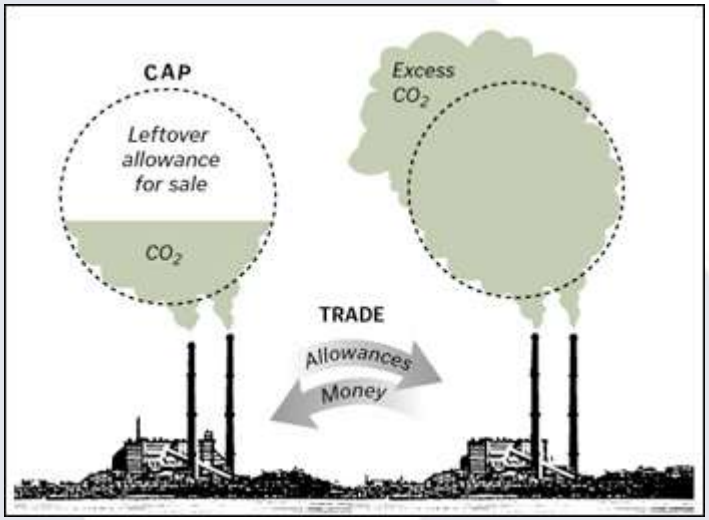
Regime formation: branching out from the US clean air policy to global climate policy, and from there to the European Union, along with the expectation of an emerging **global carbon market** and the formation of the "**carbon industry**".

Background

Cap and trade

Emissions trading or **cap and trade** is a **market-based approach** used to control pollution by providing economic incentives for achieving reductions in the emissions of pollutants.

A central authority (usually a governmental body) sets a limit or **cap** on the amount of a pollutant that may be emitted. The limit or cap is allocated or sold to firms in the form of **emissions permits** which represent the right to emit or discharge a specific volume of the specified pollutant.



Firms are required to hold a number of permits (or allowances or carbon credits) equivalent to their emissions.

The total number of permits cannot exceed the cap, limiting total emissions to that level. Firms that need to increase their volume of emissions must buy permits from those who require fewer permits.

The transfer of permits is referred to as a **trade**.

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KYOTO MECHANISMS

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Kyoto mechanisms

- United Nations Framework Convention on Climate Change
  UNFCCC - Rio de Janeiro, 1992

- Kyoto Protocol, 1997
  Regulatory economic-based approach becomes an integral part of the strategies for reducing climate changing emissions

The Kyoto mechanisms are:
- **Emissions Trading System**
- **The Clean Development Mechanism (CDM)**
- **Joint Implementation (JI) Clean Development**


The Japan Times

Conference adopts Kyoto Protocol

Greenhouse gas emissions to be cut by average of 5.2%

KYOTO COP3

Kyoto convention's success open to debate

Gist of Kyoto Protocol

EU-ETS 2011:
8.33 billion tCO_2
76 billion €

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Kyoto mechanisms

- The Kyoto mechanisms:
  - Stimulate sustainable development through technology transfer and investment
  - Help countries with Kyoto commitments to meet their targets by reducing emissions or removing carbon from the atmosphere in other countries in a cost-effective way
  - Encourage the private sector and developing countries to contribute to emission reduction efforts

enable industrialized countries to carry out joint implementation projects with other developed countries

JI

involve investment in sustainable development projects that reduce emissions in developing countries

CDM

CARBON MARKET
is a key tool for reducing emissions worldwide

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Kyoto mechanisms

- The Kyoto mechanisms:

  All three mechanisms under the Kyoto Protocol are based on the Protocol's system for the accounting of targets. Under this system, the amount to which an Annex I Party (with a commitment inscribed in Annex B of the Kyoto Protocol) must reduce its emissions over the five year commitment period (known as its "**assigned amount**") is divided into units each equal to **one tonne of carbon dioxide equivalent**. These assigned **allowances amount units** (**AAUs**) contribute the basis for the Kyoto mechanisms by providing for a Party to gain credit from action taken in other Parties that may be counted towards it own emissions target.

  The other units which may be transferred under the scheme are:

  - A **removal unit** (**RMU**) on the basis of land use, land-use change and forestry (**LULUCF**) activities such as reforestation
  - An **emission reduction unit** (**ERU**) generated by a **joint implementation** project
  - A **certified emission reduction** (**CER**) generated from a clean development mechanism project activity

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Kyoto mechanisms

- Eligibility requirements :

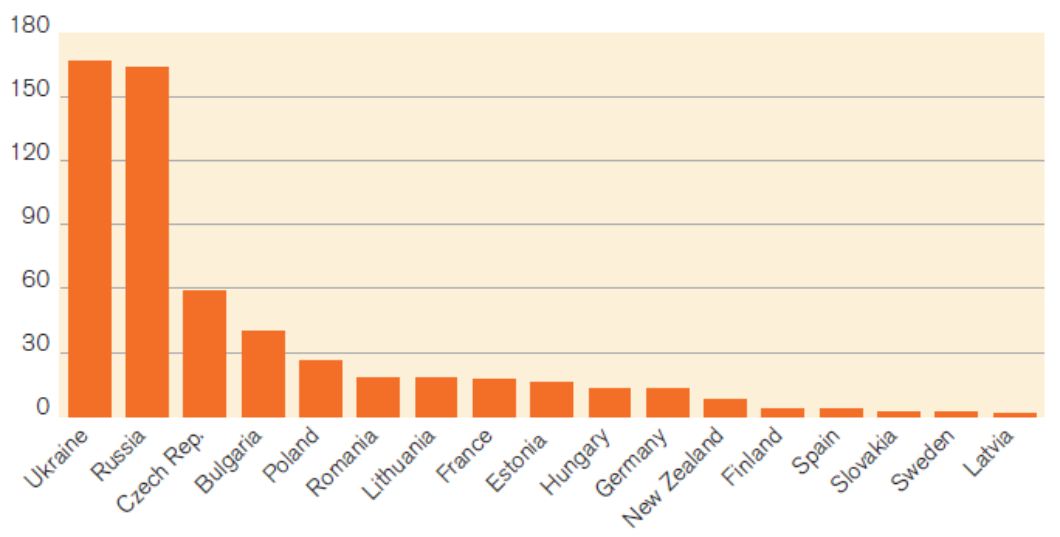
  To participate in the mechanisms, Annex I Parties must meet, among others, the following eligibility requirements:

  - They must have ratified the Kyoto Protocol.
  - They must have calculated their assigned amount in terms of tonnes of CO_2-equivalent emissions.
  - They must have in place a national system for estimating emissions and removals of greenhouse gases within their territory.
  - They must have in place a national registry to record and track the creation and movement of ERUs, CERs, AAUs and RMUs and must annually report such information to the secretariat.
  - They must annually report information on emissions and removals to the secretariat.

Kyoto mechanisms

- Joint Implementation (JI)

  Under JI, an Annex I Party (with a commitment inscribed in Annex B of the Kyoto Protocol) may implement an emission-reducing project or a project that enhances removals by sinks in the territory of another Annex I Party (with a commitment inscribed in Annex B of the Kyoto Protocol) and count the resulting emission reduction units (**ERUs**) towards meeting its own Kyoto target.



Number of existing projects in the JI pipeline per country

Source: "State and trends of the carbon market 2012" - World Bank

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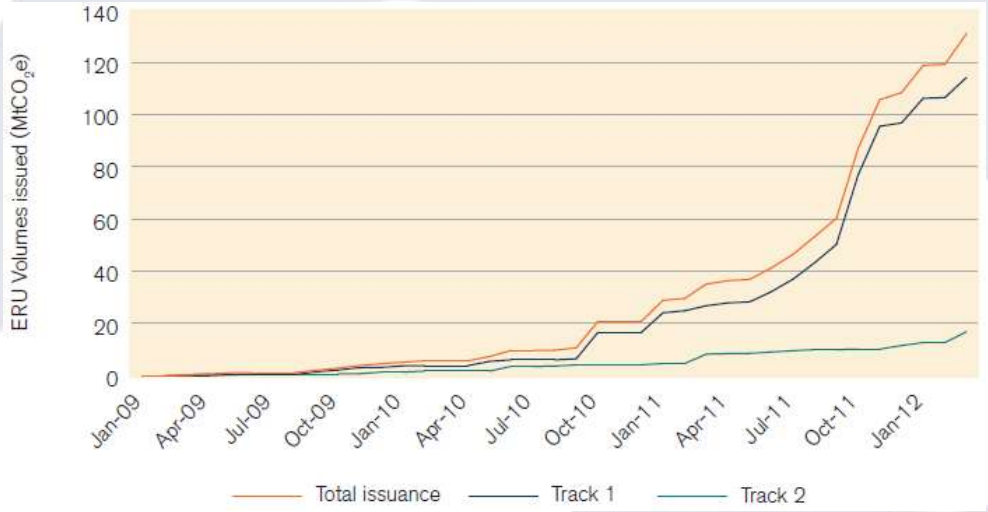
Kyoto mechanisms

- Joint Implementation (JI)

  JI is now responsible for over one third of all offset credits issued under the Kyoto Protocol JI has two different tracks: **Track 2** has a governance structure somewhat similar to the CDM where projects are overseen by the **JI Supervisory Committee**.

  Track 1 allows countries that host JI projects to set their own rules, approve projects, verify emission reductions and issue credits.



Cumulative ERU issuance per track Q1 2009 – Q1 2012 ($MtCO_2e$)

Source: "State and trends of the carbon market 2012" - World Bank

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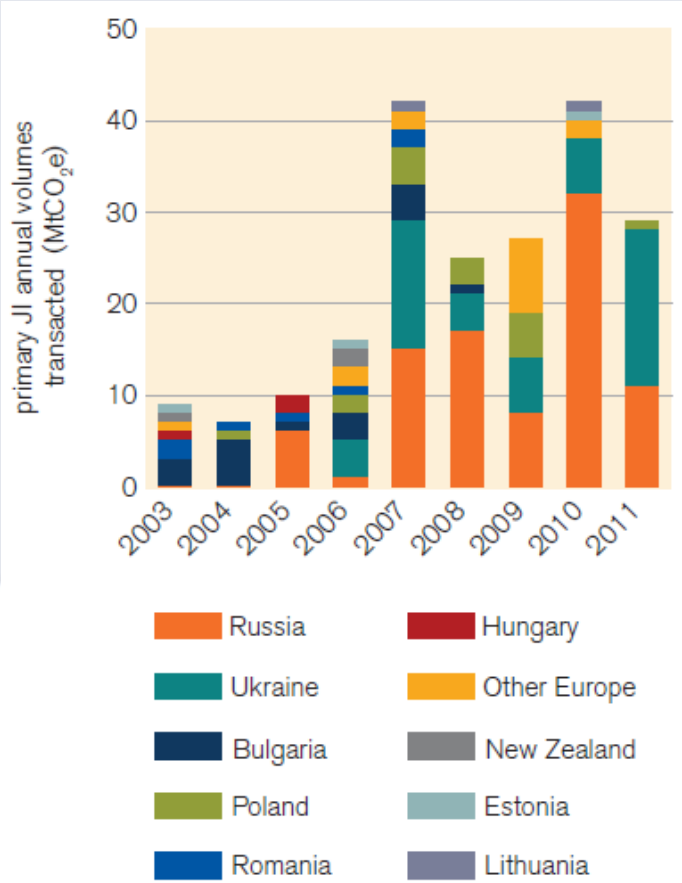
Kyoto mechanisms

- Joint Implementation (JI)



2010		2011	
Volume ($MtCO_2e$)	Value (US$ million)	Volume ($MtCO_2e$)	Value (US$ million)
41	530	28	339

Volumes and value for JI transactions, 2010-2011

Source: "State and trends of the carbon market 2012" - World Bank

Annual ERUs volumes transacted per seller

Source: "State and trends of the carbon market 2012" - World Bank

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Kyoto mechanisms

- Clean Development Mechanism (CDM)

  Provides for Annex I Parties to implement projects that reduce emissions in non-Annex I Parties, or absorb carbon through afforestation or reforestation activities, in return for certified emission reductions (**CERs**, **tCERs** and **lCERs**) and assist the host Parties in achieving sustainable development and contributing to the ultimate objective of the Convention. The CDM is supervised by the **CDM Executive Board**.

CERs Certified Emission Reductions can be used by Annex 1 countries to comply with their emission limitation targets or by operators of installations covered by the European Union Emission Trading Scheme (EU ETS) in order to comply with their obligations to surrender EU Allowances.

CERs can be purchased from the primary market (purchased from original party that makes the reduction) or secondary market (resold from a marketplace).

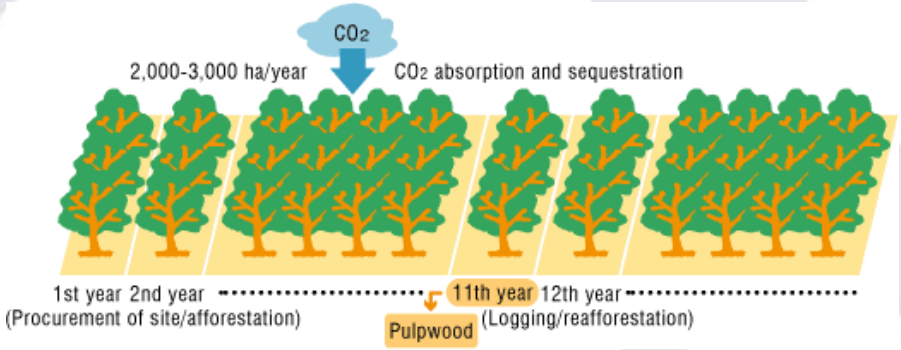
Kyoto mechanisms

Clean Development Mechanism (CDM)

Temporary CERs and Long CERs are special types of CERs issued for forestry projects. They are two ways of accounting for non-permanence in forestry CDM project activities.

tCERs Temporary CER or tCER is a CER issued for an afforestation or reforestation project activity under the CDM which expires at the end of the commitment period following the one during which it was issued.

lCERs Long-term CER or lCER is a CER issued for an afforestation or reforestation project activity which expires at the end of its crediting period.



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Kyoto mechanisms

- Clean Development Mechanism (CDM)

Projects and issuance of certified emission reductions

Source: "CDM - Executive Board Annual Report 2012" - UNFCCC

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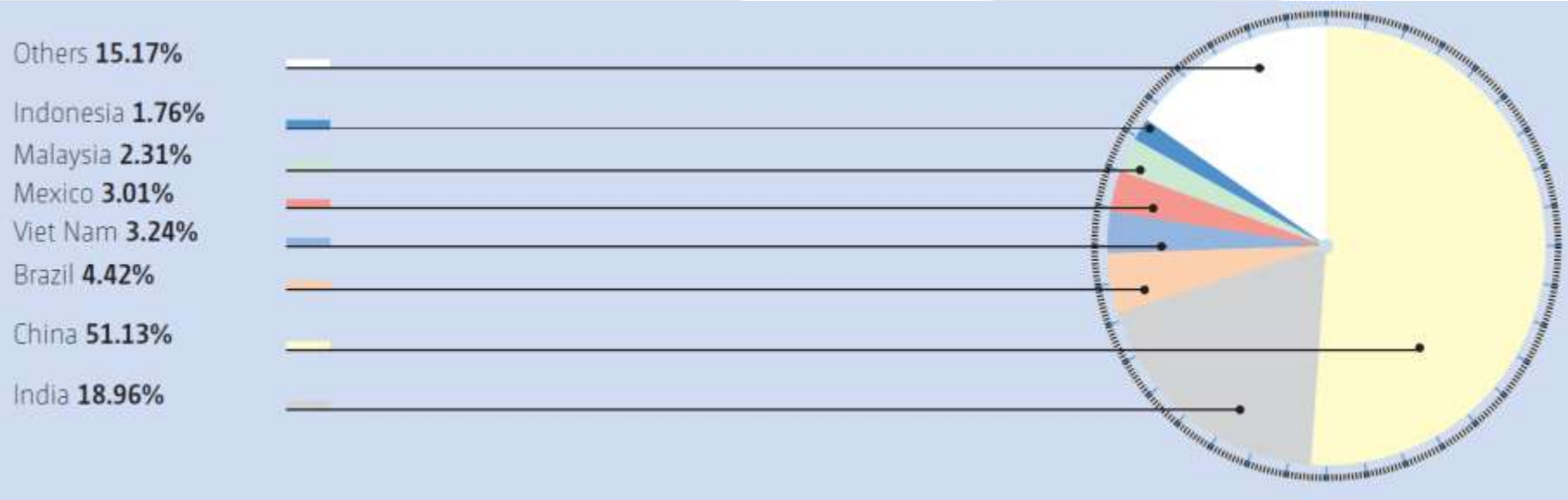
Kyoto mechanisms

- Clean Development Mechanism (CDM)

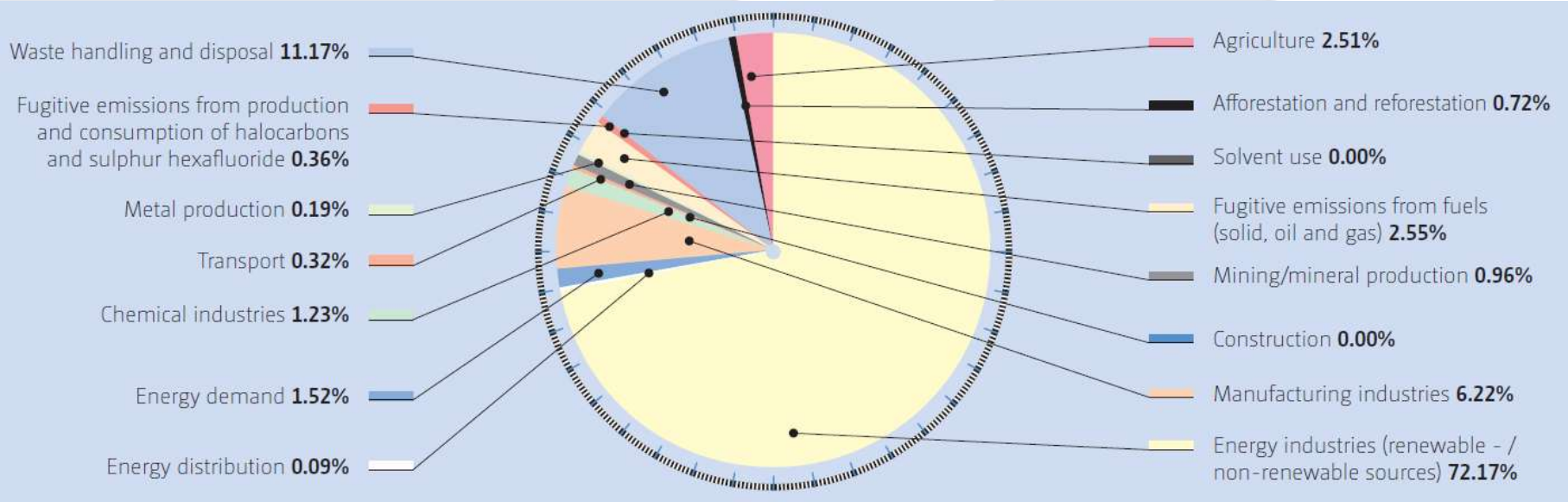


Registered project activities by host party. Total: 4.884

Source: "CDM - Executive Board Annual Report 2012" - UNFCCC

Kyoto mechanisms

- Clean Development Mechanism (CDM)



Distribution of registered project activities by scope

Source: "CDM - Executive Board Annual Report 2012" - UNFCCC

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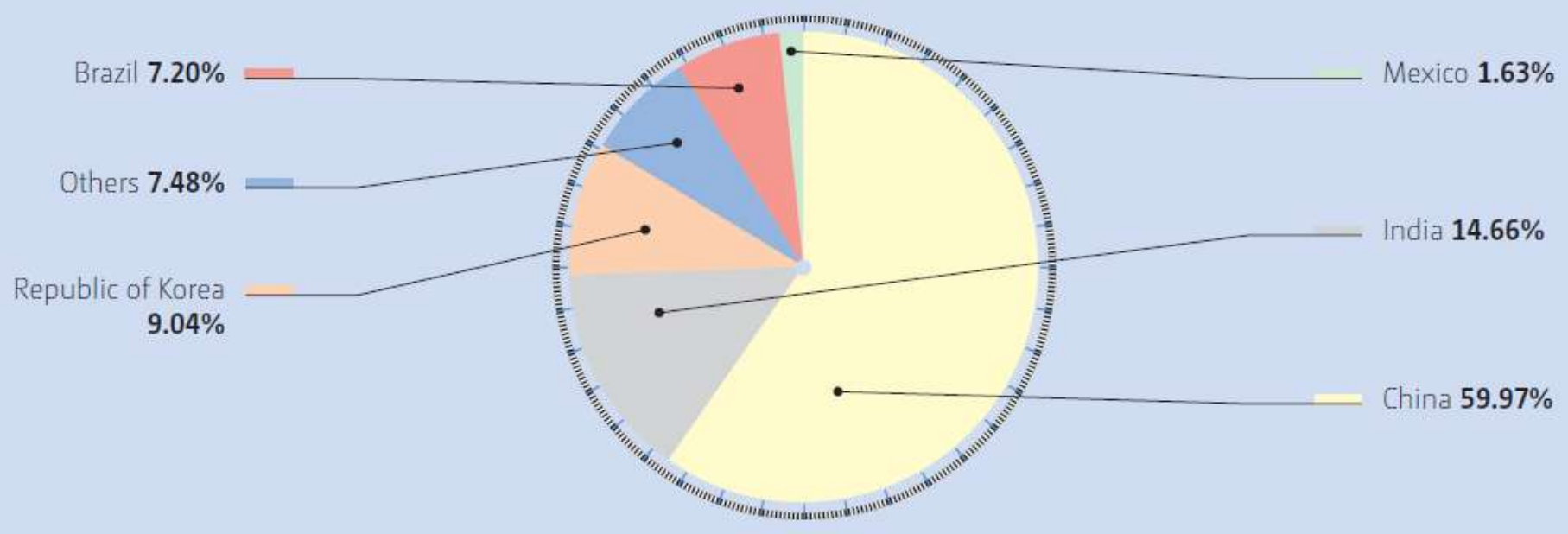
Kyoto mechanisms

- Clean Development Mechanism (CDM)

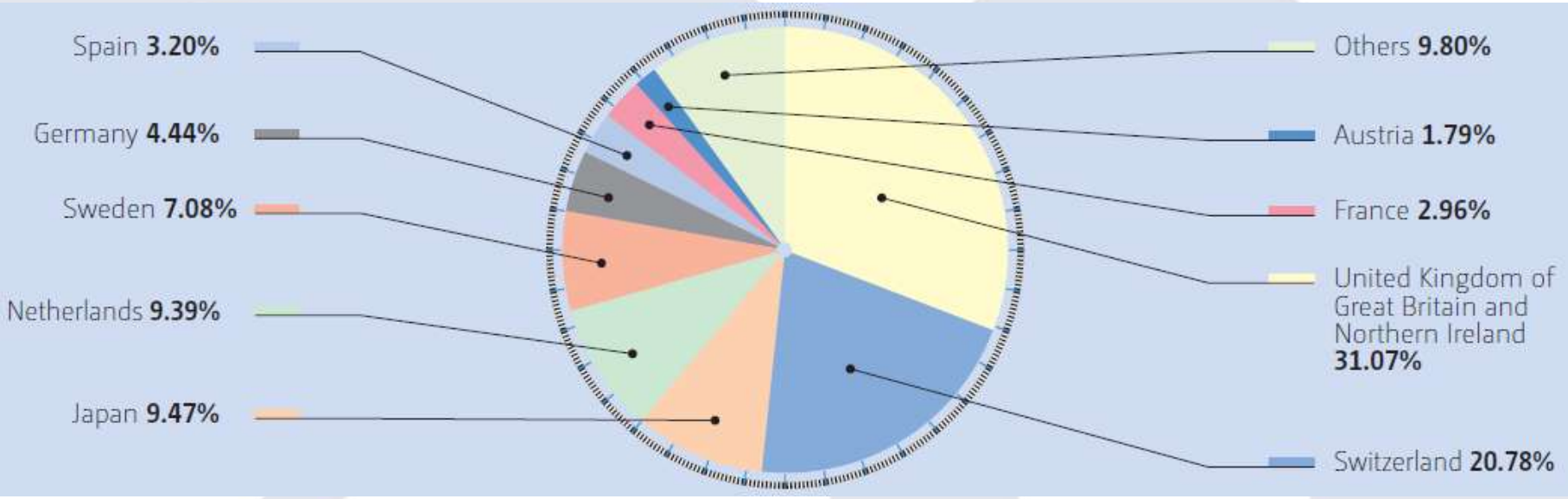


Certified emission reductions issued, by host Party. Total: 1.030.436.008

Source: "CDM - Executive Board Annual Report 2012" - UNFCCC

Kyoto mechanisms

- Clean Development Mechanism (CDM)



Investor parties

Source: "CDM - Executive Board Annual Report 2012" - UNFCCC

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EMISSION TRADING SYSTEM

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Emission Trading System

- Emission Trading System (ETS)

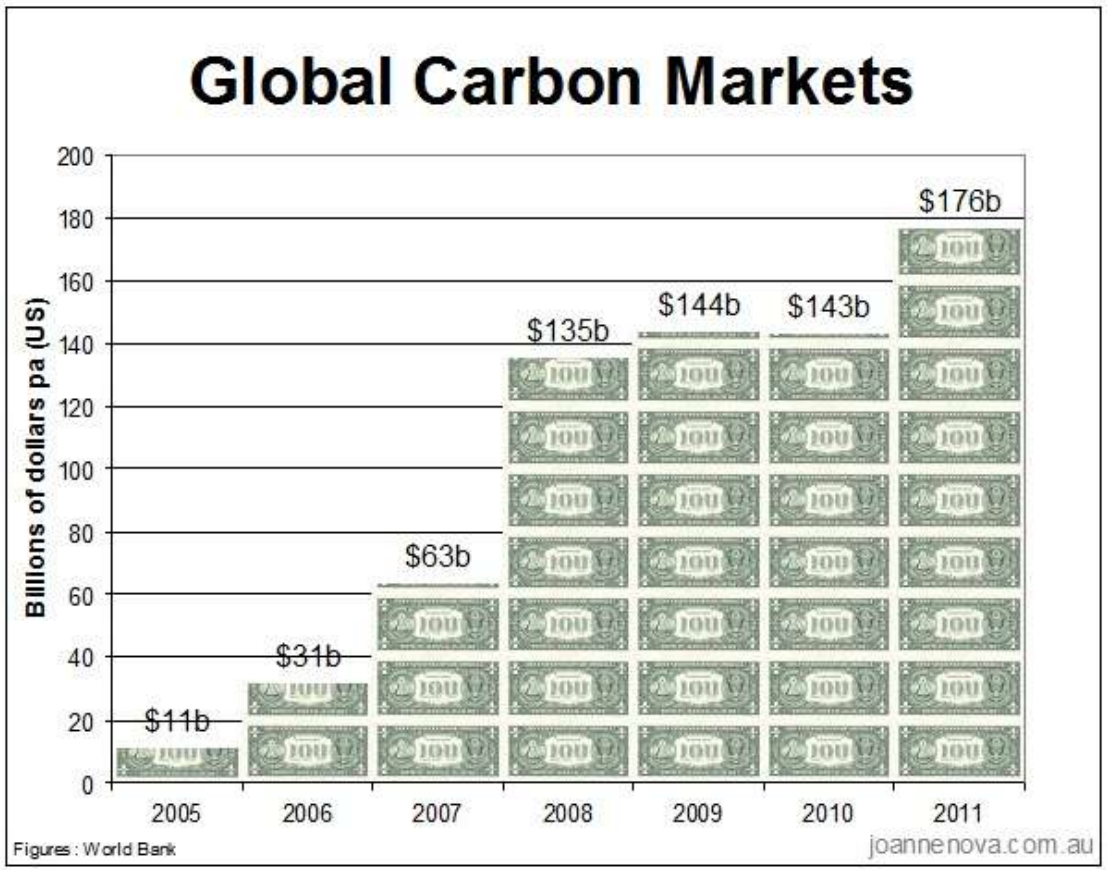
  Emissions trading, as set out in Article 17 of the Kyoto Protocol, allows countries that have emission units to spare - emissions permitted them but not "used" - to sell this excess capacity to countries that are over their targets. These units may be in the form of **AAUs**, **RMUs**, **ERUs**, **CERs**, **tCERs** and **lCERs**.

  The emission trading allow allowances to be transferred between countries. Each international transfer is validated by the **United Nations Framework Convention on Climate Change** (**UNFCCC**). Each transfer of ownership within the European Union is additionally validated by the European Commission.

  Thus, a new commodity was created in the form of emission reductions or removals. Since carbon dioxide is the principal greenhouse gas, people speak simply of trading in carbon. Carbon is now tracked and traded like any other commodity. This is known as the "**carbon market**".

Emission Trading System

- The carbon market
  is now a key tool for reducing emissions worldwide



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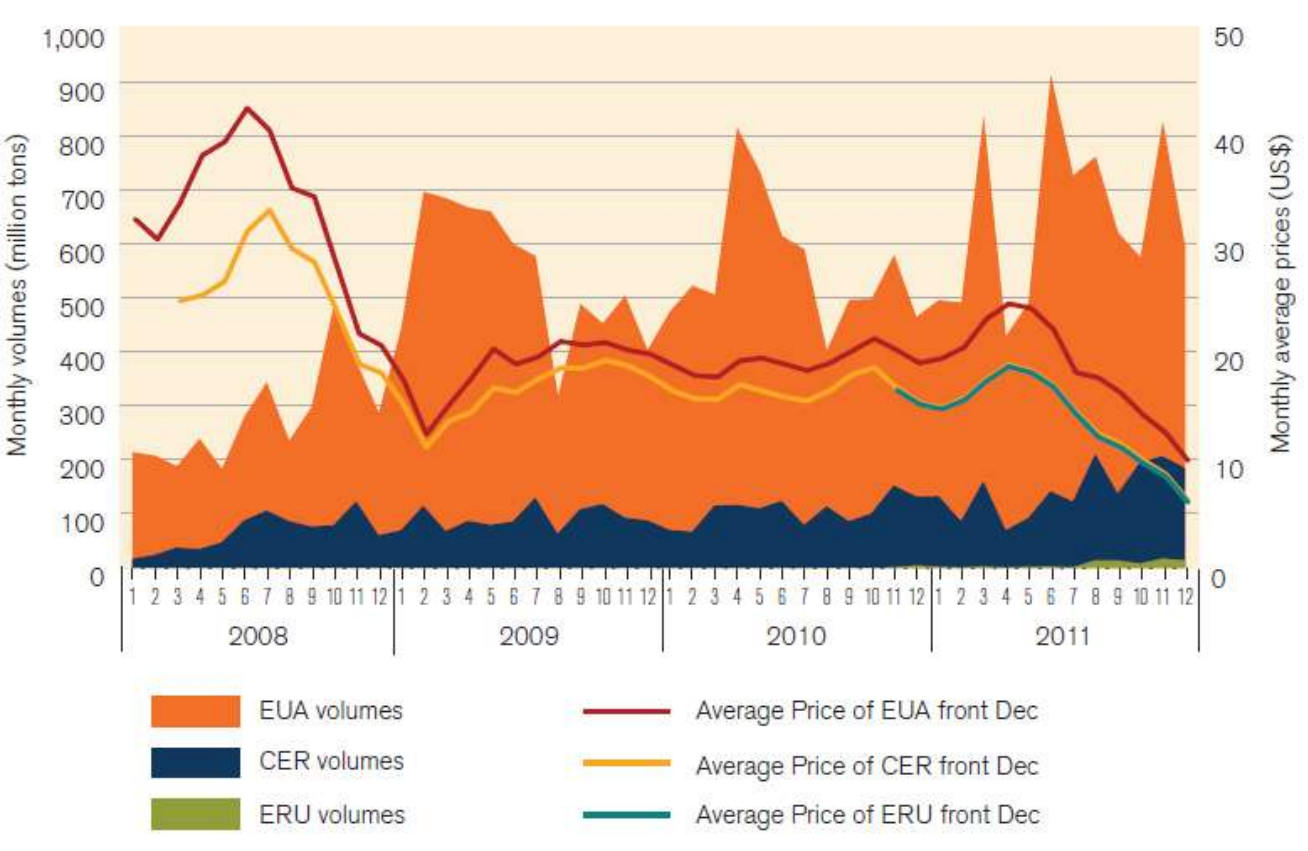
Emission Trading System

- The carbon market



Prices and volumes for EUAs, CERs and ERUs in the secondary market, 2008-2011

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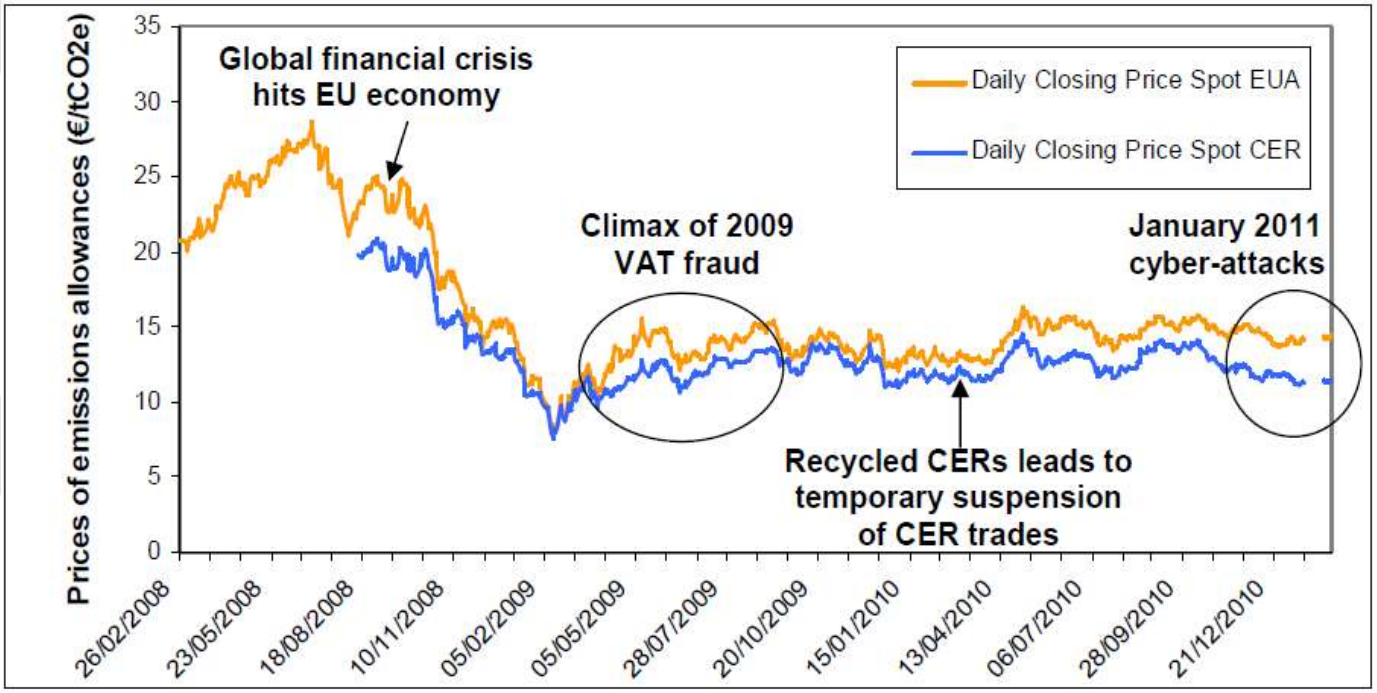
Emission Trading System

- The carbon market



Trend of prices related to significant events

Source: BlueNext, as at 14/02/2011

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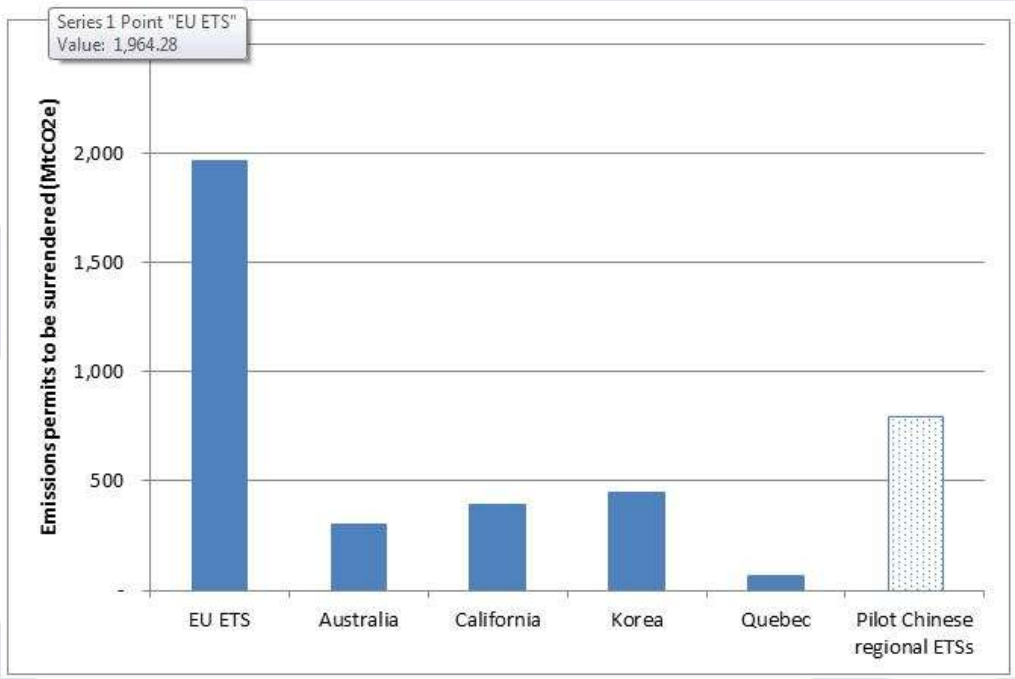
Emission Trading System

- the European Union Emissions Trading Scheme (EU ETS)

The European Union Emissions Trading System (EU ETS), also known as the **European Union Emissions Trading Scheme**, was the first large emissions trading scheme in the world, and remains the biggest.



Estimated total liability for participants under selected existing emissions trading schemes, 2015 (MtCO2e)

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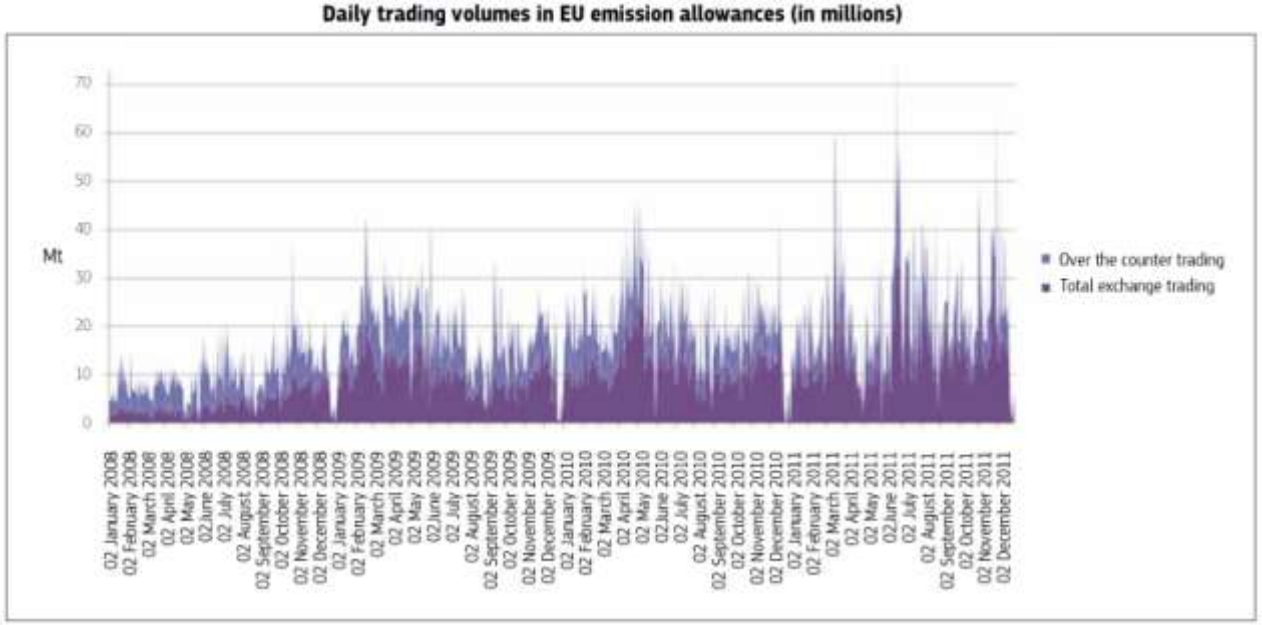
Emission Trading System

- the European Union Emissions Trading Scheme (EU ETS)

It was launched in 2005 to combat climate change and is a major pillar of EU climate policy. As of 2013, the EU ETS covers more than 11,000 factories, power stations, and other installations with a net heat excess of 20 MW in 31 countries (all 28 EU member states plus Iceland, Norway, and Liechtenstein).

The installations regulated by the EU ETS are collectively responsible for close to half of the EU's emissions of CO_2 and 40% of its total greenhouse gas emissions.



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Emission Trading System

- EU ETS: Development in phases

2005-2007: 1st trading period used for 'learning by doing.' EU ETS successfully established as the world's biggest carbon market. However, the number of allowances, based on estimated needs, turns out to be excessive; consequently the price of first period allowances falls to zero in 2007.

2008-2012: 2nd trading period. Iceland, Norway and Liechtenstein join (1.1.2008). The number of allowances is reduced by 6.5% for the period, but the economic downturn cuts emissions, and thus demand, by even more. This leads to a surplus of unused allowances and credits which weighs on the carbon price. Aviation brought into the system (1.1.2012).

2013-2020: 3rd trading period. Major reform takes effect (1.1.2013). Biggest changes are the introduction of an Euwide cap on emissions (reduced by 1.74% each year) and a progressive shift towards auctioning of allowances in place of cost-free allocation. Croatia joins (1.1.2013).

2021-2028: 4th trading period.

CARBON MARKET IN THE WORLD

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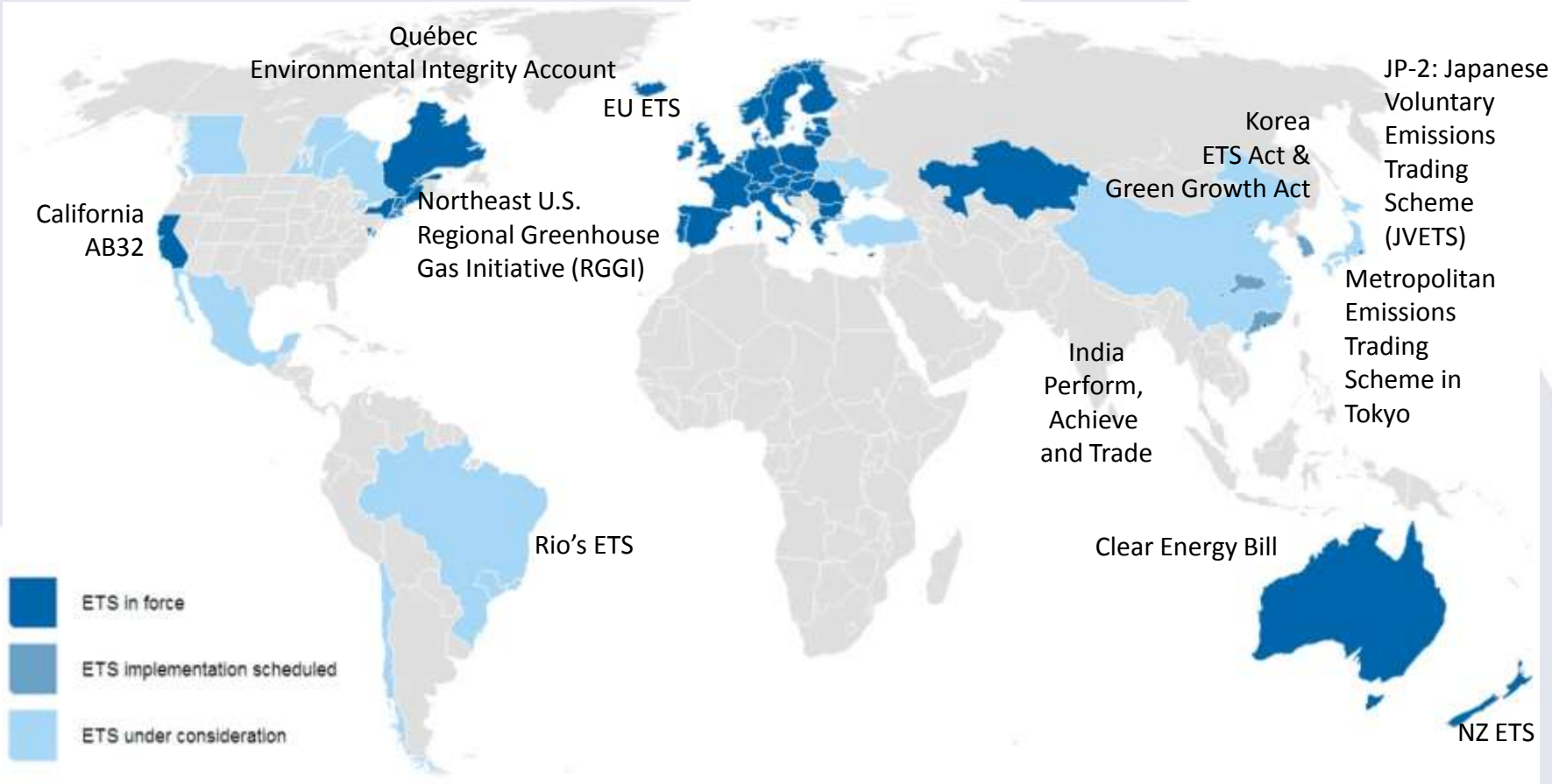
Carbon market in the world

- Global ETS development



Around the world, policymakers are facing the challenge of finding the most efficient systems to limit global warming pollution. To do so, following the example of EU ETS, are born different types of carbon markets and other are currently in development.

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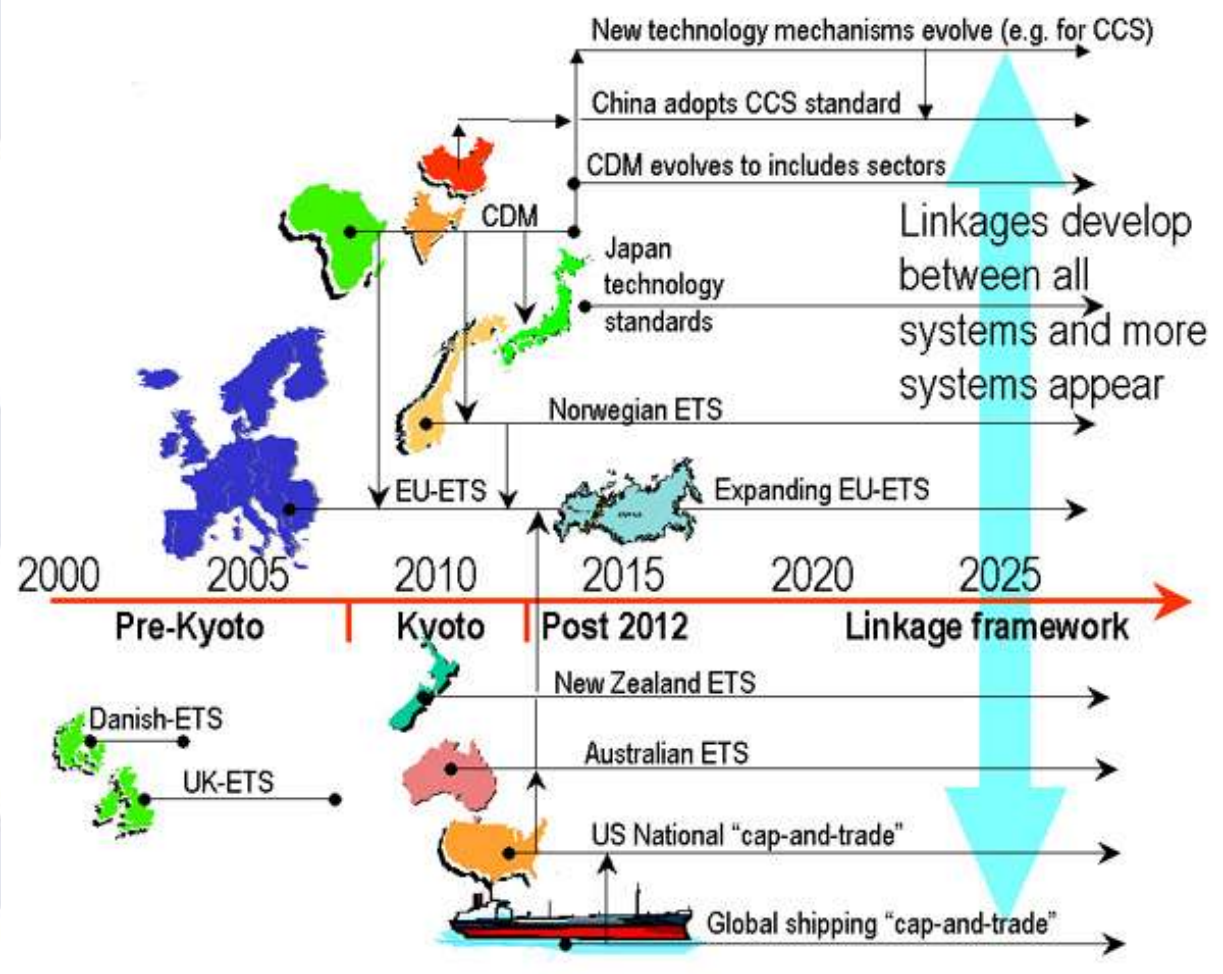
Carbon market in the world

- Global ETS development



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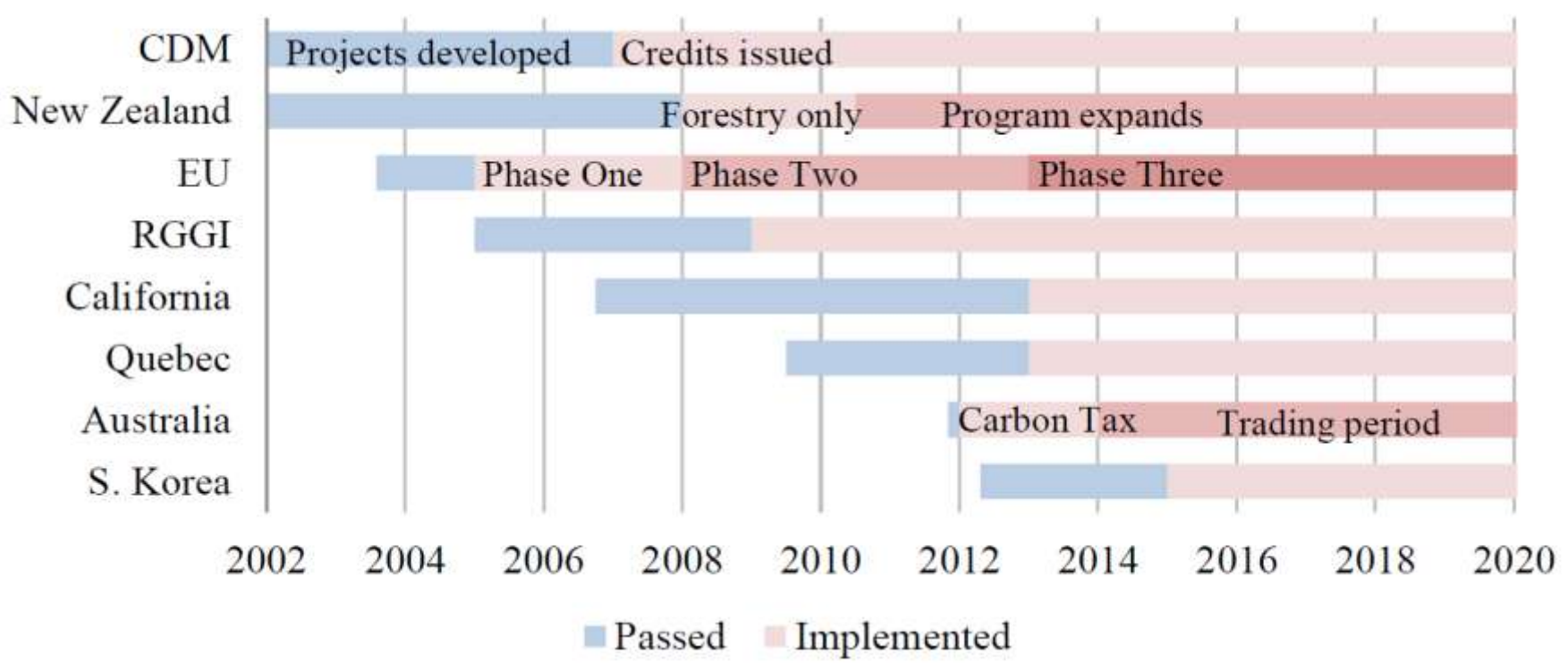
Carbon market in the world

- Global ETS development



Timeline for Selected GHG Emissions Trading Programs

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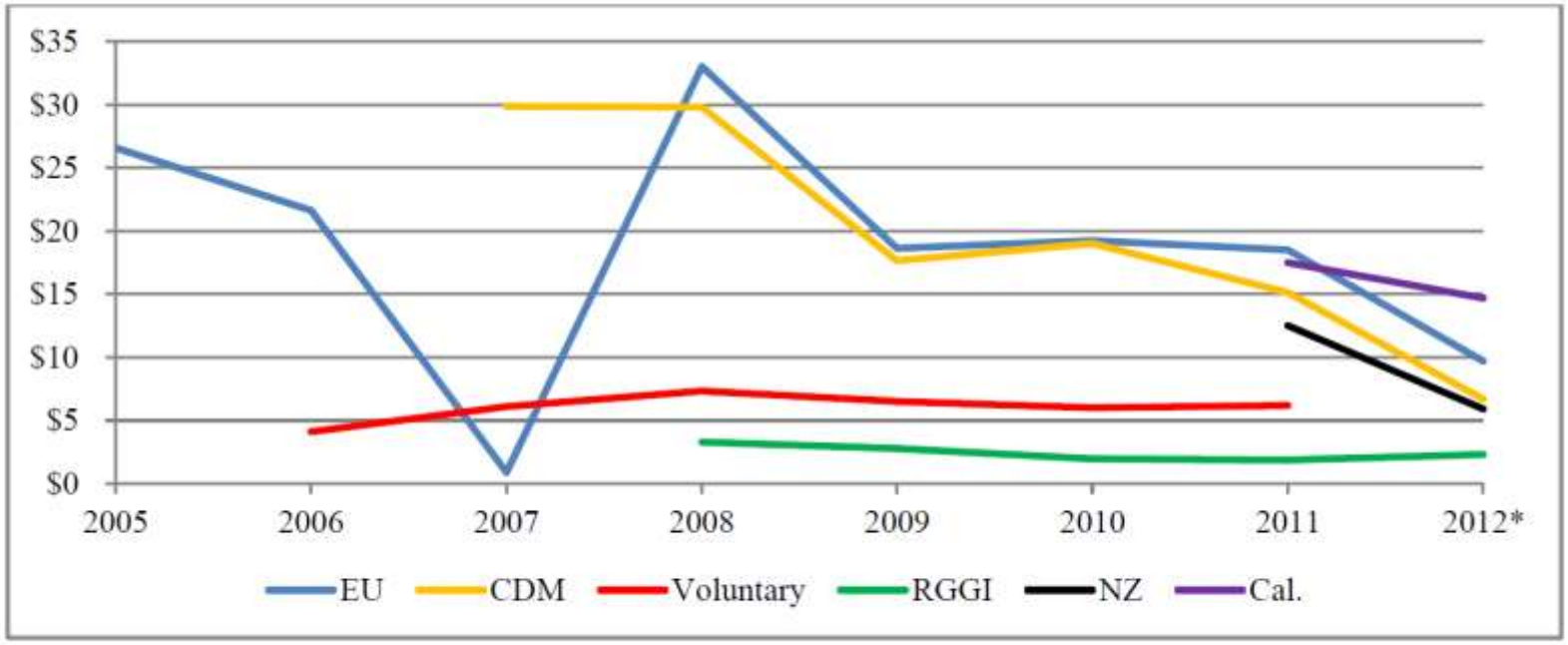
Carbon market in the world

- Global ETS development



Note: Exchange-traded prices are through June 30, 2012 as reported by the following sources: Point Carbon, RGGI COATS, and Ecosystem Marketplace/Bloomberg New Energy Finance.

CO_2 Prices (Annual Average Price Per Metric ton CO_2, Nominal US$)

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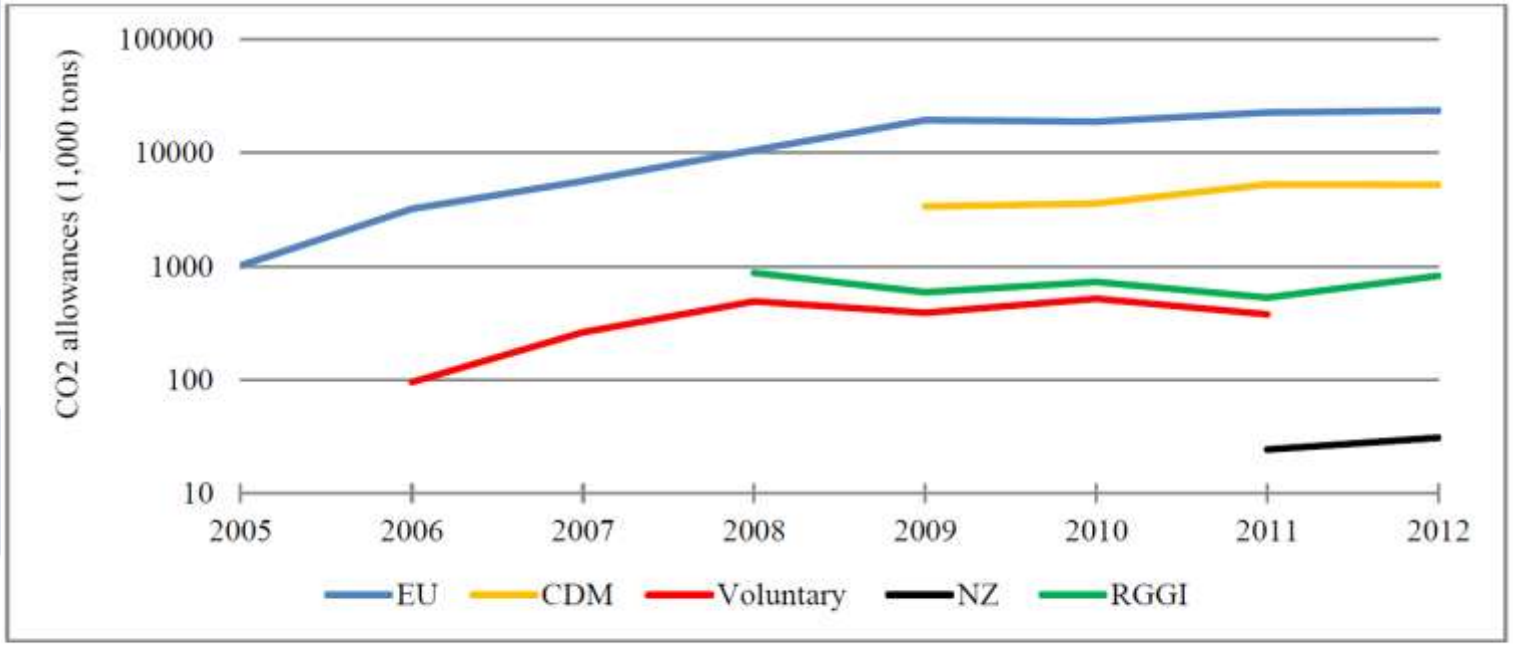
Carbon market in the world

- Global ETS development



Note: Exchange-traded volumes are through June 30, 2012 as reported by the following sources: Point Carbon, RGGI COATS, and Ecosystem Marketplace/Bloomberg New Energy Finance.

Volume of CO_2 Allowance Trades (Daily Average)

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Carbon market in the world

- ETS in the world

COUNTRY	SCHEME	ALLOWANCE TYPE	VOLUME (Mt CO_{2e}/y)	VALUE (M$/y)
European Union	EU ETS	EUA	7.853	147.848
		CER	1.734	22.333
		ERU	76	780
Northeast U.S.	RGGI	RGGI Allowances	120	249
California	Western Climate Initiative (WCI)	CCA Allowances	4	63
Australia	Carbon Pricing Mechanism	AU Allowances	47	318
New Zealand	NZ ETS	NZ ETS Allowances	27	351

Comparison between Emission Trading Schemes in the world (2011)

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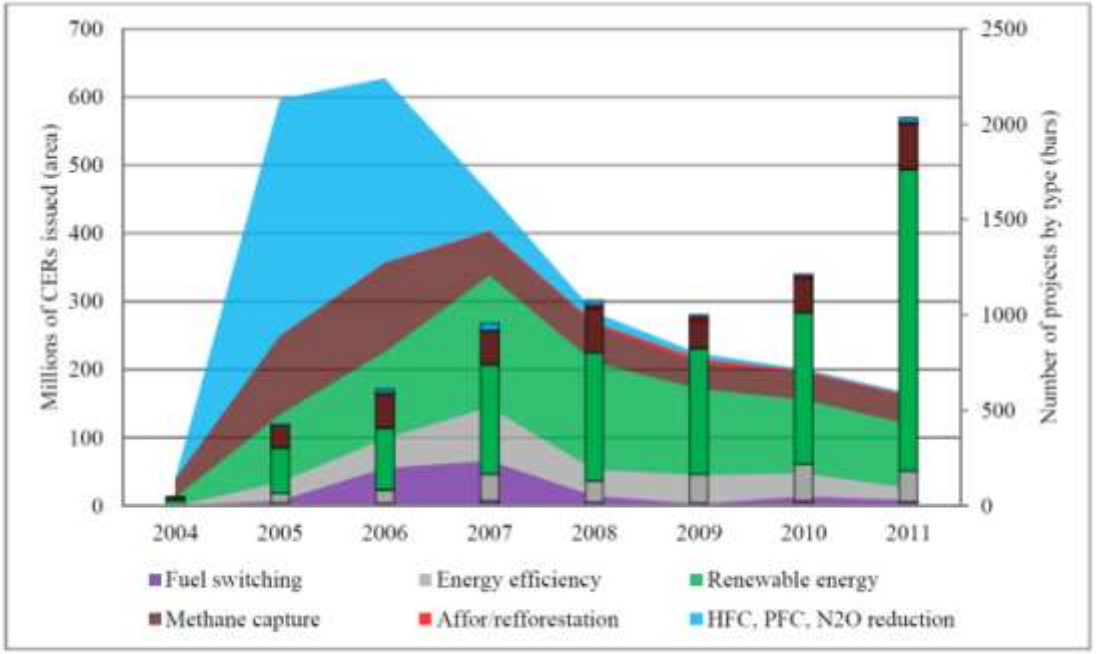
Carbon market in the world

- Global market lessons
  - Positive prices imply emissions abatement, but how much is unclear.
  - Despite some rough patches, markets have generally matured and operated effectively.
  - An emerging question is exactly how much banking an emissions trading system can (and should) support.
  - Allowance allocation can involve large revenues and distributional impacts.
  - Significant competitiveness impacts and emissions leakage are not inevitable.
  - Offsets can work, but they are complex.

Carbon market in the world

Global market lessons

The number of proposed and implemented CDM projects has grown substantially, led by renewable energy such as wind, solar, or biomass. Still, **overall issuance of CDM credits has decreased steadily since 2007**. This trend likely reflects **stricter rules** established by the CDM Executive Board, as well as the fact that many planned renewable projects have not yet begun receiving offset credits.



Note: Data are from Fenhann (2012). Up to 3 percent of 2011 projects may be pending validation.

Number of CDM Projects (Bars) and Credits Issued (Area), by Project Type

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Carbon market in the world

- Nationally Appropriate Mitigation Actions (NAMAs)

NAMAs are a set of policies and actions through which provide commitments to reduce greenhouse gas emissions through effective action at national level based on the **principle of fairness and shared responsibility** in accordance with their capabilities and capacities.

NAMA was first used in the Bali Action Plan as part of the Bali Road Map agreed at the United Nations Climate Change Conference in Bali in December 2007, and also formed part of the Copenhagen Accord issued following the United Nations Climate Change Conference in Copenhagen (COP 15) in December 2009.

Carbon market in the world

Nationally Appropriate Mitigation Actions (NAMAs)

What is meant by Nationally Appropriate Mitigation Action?

- Different countries, different nationally appropriate action on the basis of **equity** and in accordance with **common but differentiated responsibilities** and respective capabilities.
- Developing countries will effectively implement national action depends on the effective implementation of the commitments by developed countries in provision of financial resources and transfer of technology.
- The priorities of developing countries are **economic and social development** and **poverty eradication**.

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Carbon market in the world

- Nationally Appropriate Mitigation Actions (NAMAs)

As of September 2012, about **50 countries** have submitted information of their NAMA to the UNFCCC. The detailed contents of their submissions vary greatly on each country, ranging from their intention to be associated with the Copenhagen Accord, target sectors, specific actions to be taken, to GHG emissions reduction targets.

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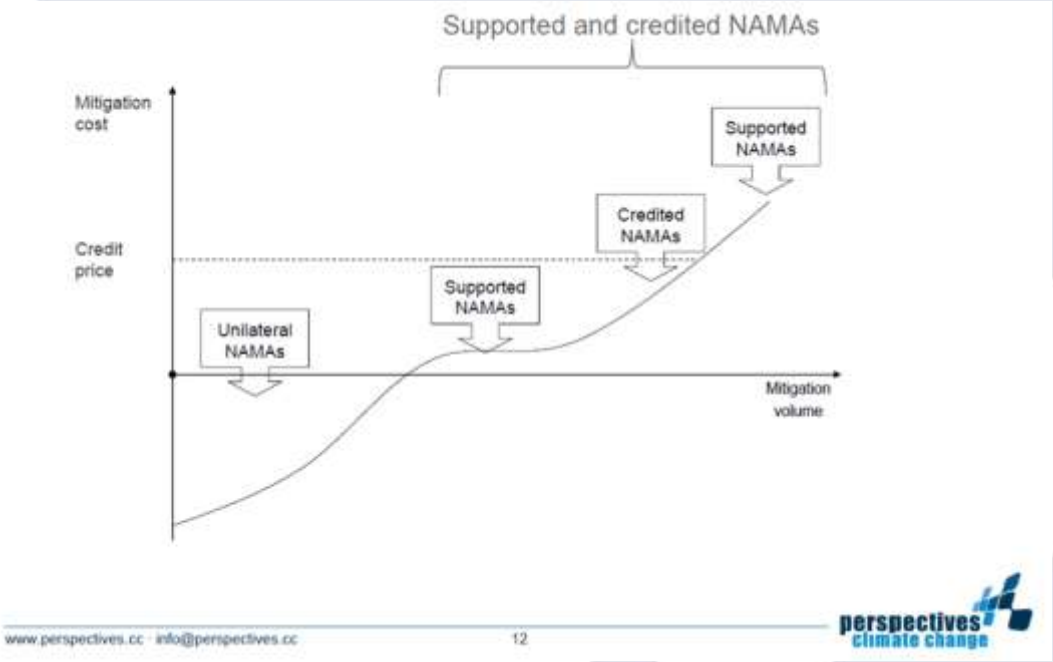
Carbon market in the world

- Financing methods of NAMA projects
  - "**Unilateral NAMAs**": financed by the host country
  - "**Supported NAMAs**": financed by the international community through the Official Development Assistance (ODA) or the Green Climate Fund (GCF).
  - "**Credited NAMAs**": financed by the generation of Certified Emission Reductions (CERs) or other types of carbon certificates in national or international markets.



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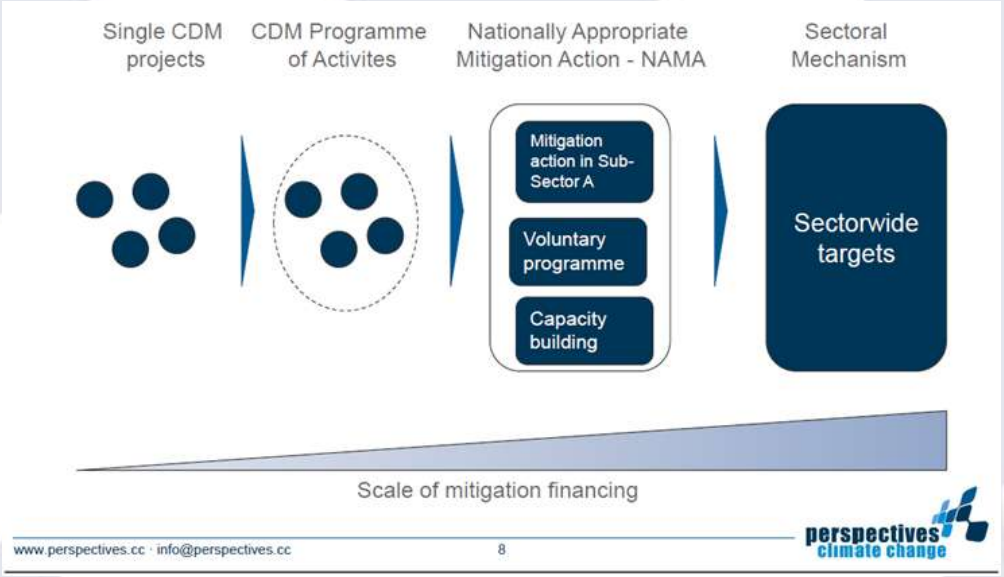
Carbon market in the world

NAMA and CDM

National Appropriate Mitigation Action (NAMA)

Appropriate mitigation actions at the national level by developing countries in the context of sustainable development, supported and enabled by technology, financing and capacity-building in a measurable, reportable and verifiable way (Bali Action Plan)



Clean Development Mechanism (CDM)

Flexible mechanism that allows companies in the industrialized countries with emission constraints to implement projects aimed at reducing greenhouse gas emissions in developing countries without emission constraints (Kyoto Protocol, art. 12) through the realization of the Program of Activities (PoAs).

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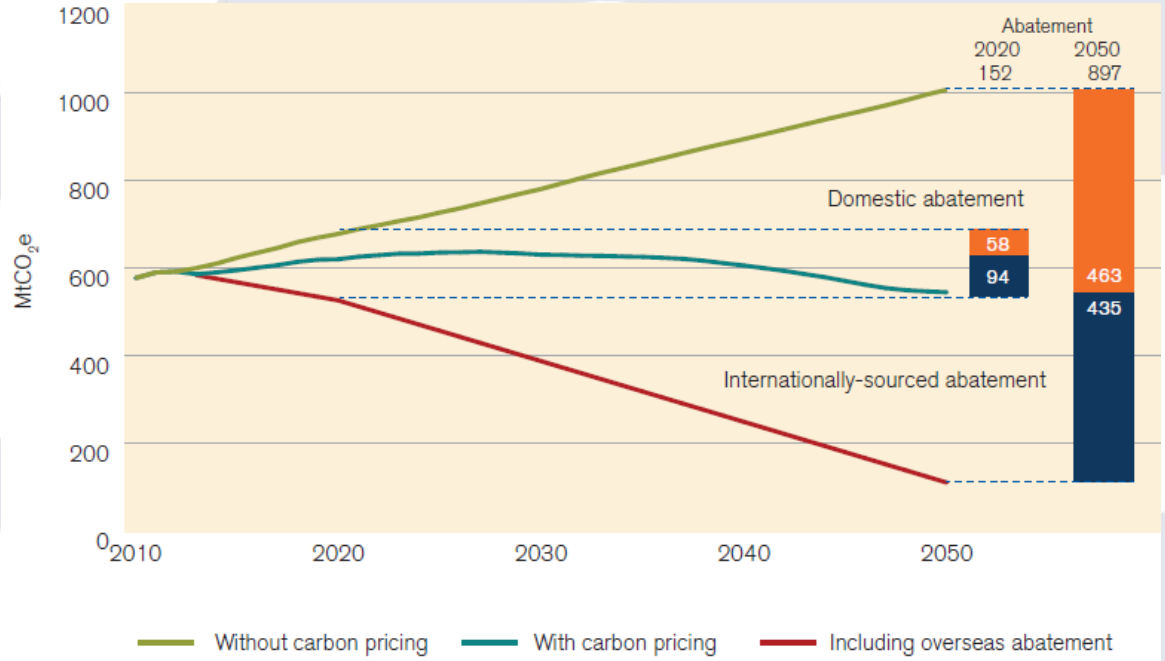
Carbon market in the world

ETS in the world

National ETS development in the world.

Australia

Australia's trading scheme will be linked with the EU ETS from 2015, and the EU "hopes to link up the ETS with compatible systems around the world to form the backbone of a global carbon market".



China Australian GHG emissions and abatement forecasts

Source: "State and trends of the carbon market 2012" - World Bank

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Carbon market in the world

ETS in the world

National ETS development in the world.

New Zealand

The **New Zealand (NZ) ETS** began in 2008 as a scheme covering only the forestry sector. In July 2010, it was amended and expanded to cover also stationary energy, fishing, industrial processes and the liquid fossil fuels sectors. The NZ Government had planned for its ETS to cover all sectors of the economy by 2015.

Switzerland

Swiss companies with installed energy capacities above 20MW or greenhouse gas emissions above 25.000 tonnes per year are required to participate in the **Swiss ETS**. Medium-sized firms can choose between paying a carbon tax and participating in the ETS. Both the carbon tax and the voluntary ETS were introduced in 2008. The ETS became mandatory for large firms on 28 February 2013.

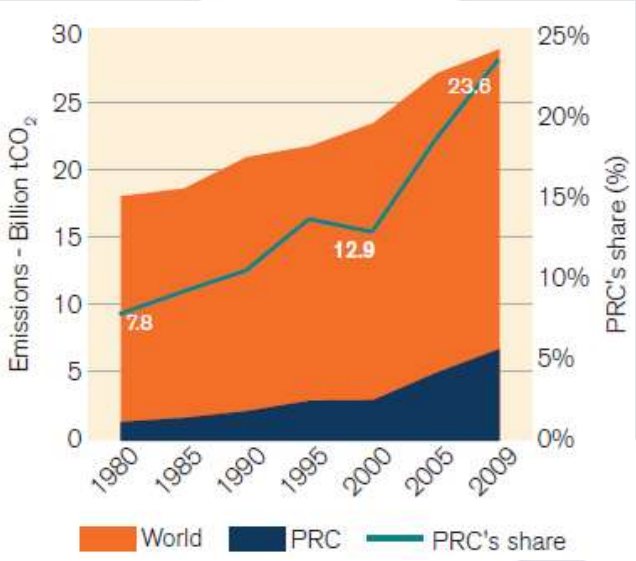
Carbon market in the world

ETS in the world

National ETS development in the world.

China

China's 12th Five Year Plan (2011-2014) establishes pilot ETSs in **seven provinces** and cities: **Beijing**, **Shanghai**, **Tianjin**, **Shenzhen**, **Chongqing**, **Guangdong** and **Hubei**. Each region is charged with designing its own scheme with a planned start date of 2013. These pilot schemes are expected to provide invaluable information and testing grounds for a national ETS.



China in world's energy-related CO_2 emissions

Source: "State and trends of the carbon market 2012" - World Bank

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Carbon market in the world

ETS in the world

National ETS development in the world.

India

In 2008, India announced a **National Action Plan on Climate Change** (NAPCC). The plan prioritizes energy efficiency gains and an increased substitution of conventional fuels with renewable energy as key milestones to achieving sustainable economic growth and climate change co-benefits. Two market-based mechanisms were introduced to address these goals: **Renewable Energy Certificate (REC)** schemes and the **Perform Achieve and Trade (PAT)**.

Renewable Energy Certificates: traded volumes and clearing prices

Source: "State and trends of the carbon market 2012" - World Bank

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Carbon market in the world

ETS in the world

National ETS development in the world.

South Korea

In 2009, the Korean Government announced its intention to reduce national emissions by 30 per cent on business-as-usual projected levels by 2020. In November 2012 South Korea's cabinet approved and adopted rules for a mandatory ETS. The planned start date of the ETS is **1 January 2015**. Participation is mandatory if an entity's annual emissions exceed **25.000 tonnes of CO_2e**.

Kazakhstan

The Republic of Kazakhstan mandated a national ETS on 1 January 2013. The scheme covers plants in the manufacturing, energy, mining, metallurgy, chemicals, agriculture and transport industries which emit more than **20.000 tons of CO_2 per year**. This scheme covers 178 participants and about 80 per cent of national emissions. The first year is considered a pilot stage, rolling into full implementation and compliance in **2014**.

Carbon market in the world

ETS in the world

National ETS development in the world.

Mexico

In April 2012, Mexico's Congress passed a **General Law on Climate Change** to support its target of reducing greenhouse gas (GHG) emissions by 30% below business-as-usual levels by 2020.
The law provides the federal government with the authority to create programs, policies, and actions to mitigate emissions, including an **emissions trading scheme (ETS)**.

Brazil

An emissions trading scheme (ETS) for the **State of Rio de Janeiro** will have its first legally binding period for private companies starting in 2013. Another activity is a partnership between the state and the city of Rio de Janeiro to create the **BVRio**, the **Rio de Janeiro Environmental Asset Exchange**. BVRio will provide a carbon market platform for companies to negotiate and trade environmental assets in the form of allowances, offsets, and other carbon-linked financial products.

Carbon market in the world

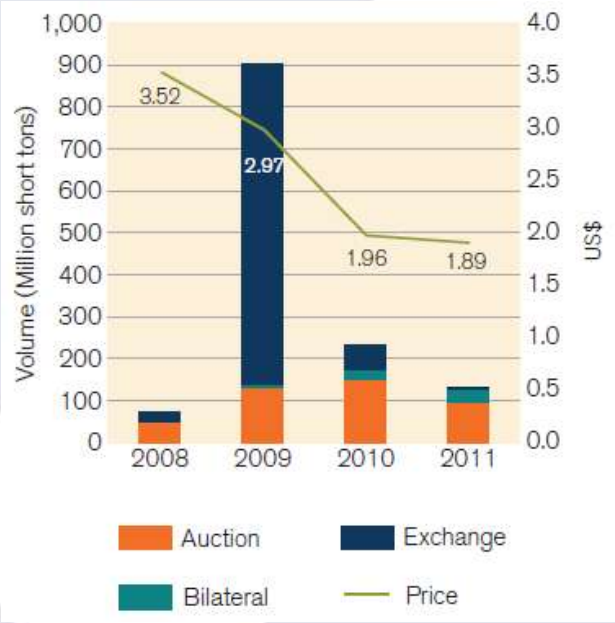
ETS in the world

Regional ETS development in the world.

Regional Greenhouse Gas Initiative (RGGI)

USA

The RGGI commenced operations in 2009 as the first mandatory CO_2 cap-and-trade program in the US. It brings together nine states (**Connecticut**, **Delaware**, **Maine**, **Maryland**, **Massachusetts**, **New Hampshire**, **New York**, **Rhode Island**, and **Vermont**) that are committed to reducing carbon dioxide emissions from the power sector by 10 per cent before 2018, based on 2009 levels. There were originally 10 participating states but New Jersey withdrew from the agreement in 2011.



Market volumes and prices on the RGGI, 2008-2011

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Carbon market in the world

ETS in the world

Regional ETS development in the world.

Western Climate Initiative (WCI)

USA

Canada

In February 2007, the Governors of five states signed an 'agreement directing their respective states to develop a regional target for reducing greenhouse gas emissions, participate in a multi-state registry to track and manage greenhouse gas emissions in the region, and develop a market-based program to reach the target.

After 2007, two more US states and four Canadian provinces joined the WCI, and at one stage a total of 11 US Canadian jurisdictions were involved. Today, only five of these are still WCI partners (**California**, **British Columbia**, **Manitoba**, **Ontario** and **Quebec**) and of those only California and Quebec have passed relevant legislation. Both schemes started in 2012 a trial or transitionary phase, with compliance only from the official start date of **1 January 2013**.

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Carbon market in the world

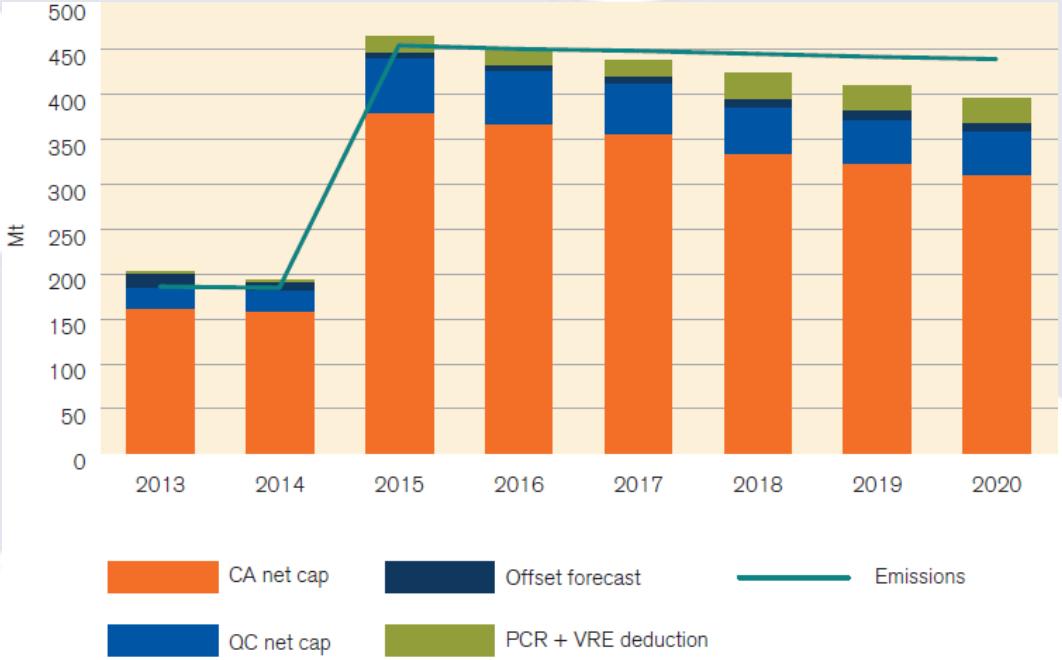
- ETS in the world

Regional ETS development in the world.

Western Climate Initiative (WCI)

USA

Canada



WCI annual market balance through 2020

Source: "State and trends of the carbon market 2012" - World Bank

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Carbon market in the world

ETS in the world

Regional ETS development in the world.

Californian cap-and-trade scheme

California

The **Californian Global Warming Solutions Act** of 2006 (A.B. 32) requires the state of California to reduce its greenhouse gas emissions to 1990 levels by 2020. To comply with this, the California Air Resources Board (CARB) has established an ETS. The Californian cap-and-trade scheme has a 2013 emissions cap set at 2 per cent below 2012 levels. The cap then reduces by 2 per cent again for 2014, and 3 per cent every year after that until 2020.
The scheme includes the 360 Californian businesses (600 facilities) with emissions above **25.000 tonnes of CO_2e per year**.

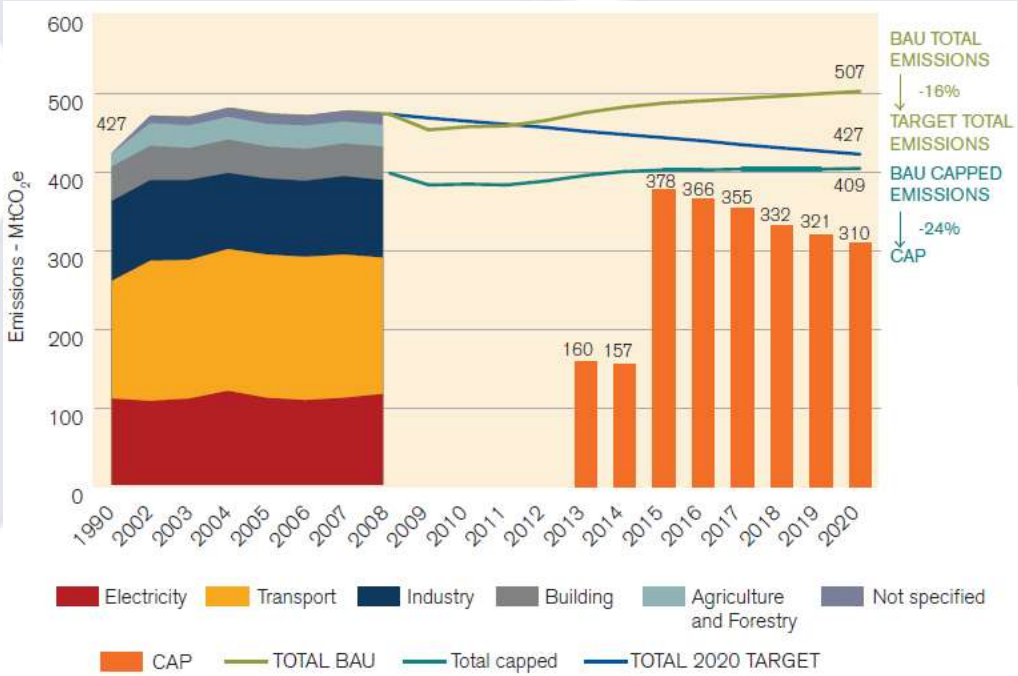
Carbon market in the world

- ETS in the world

Regional ETS development in the world.

Californian cap-and-trade scheme

California



California's historical GHG emissions, projections, and reduction targets

Source: "State and trends of the carbon market 2012" - World Bank

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Carbon market in the world

ETS in the world

Regional ETS development in the world.

Quebec's cap-and-trade system

Quebec

Quebec's 2013–2020 Climate Change Action Plan, which was released in June 2012, includes an emissions reduction target of 20 per cent by 2020 on 1990 levels.

To achieve its emissions reduction goal, the Quebec government has enacted regulations for an ETS. As with the Californian scheme, it began in 2013 and applies to those operators in the industrial and electricity sector emitting in excess of **25.000 tonnes of CO_2e per year**.

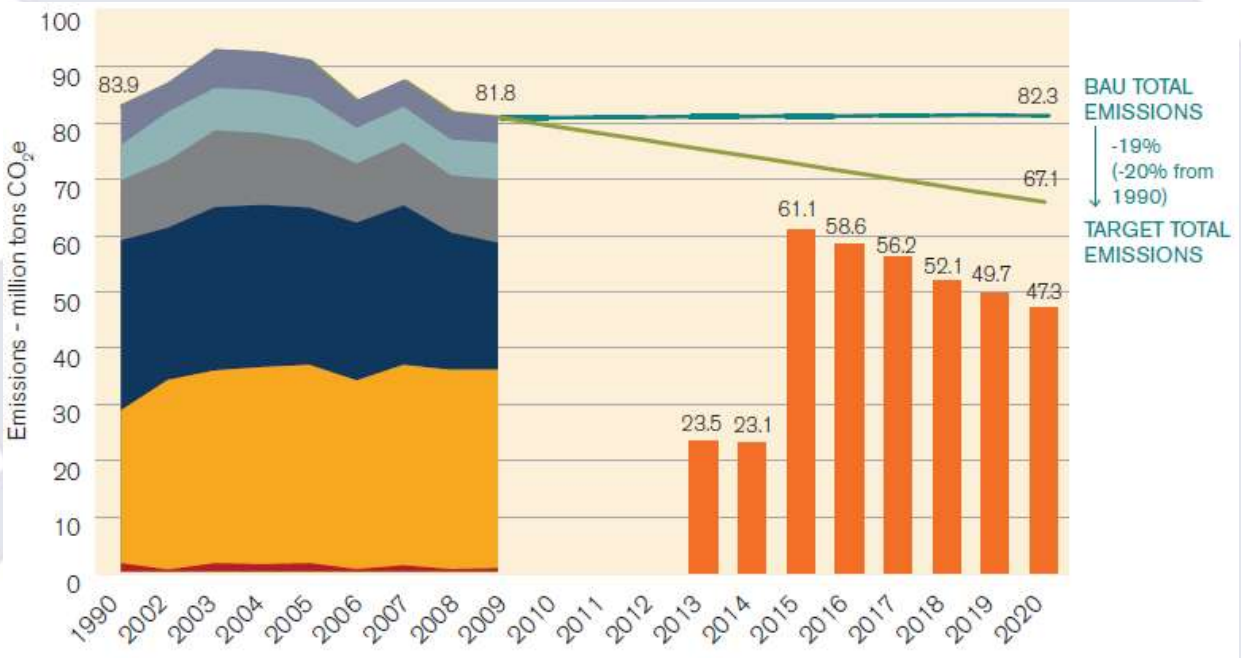
Carbon market in the world

- ETS in the world

Regional ETS development in the world.

Quebec's cap-and-trade system

Quebec



Quebec's historical GHG emissions, projections, and reduction targets

Source: "State and trends of the carbon market 2012" - World Bank

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Carbon market in the world

ETS in the world

Regional ETS development in the world.

Japan

On the national level, the Japan **Voluntary Emissions Trading Scheme** (**JVETS**) was launched in FY 2005 by the Ministry of the Environment.

Japanese cap-and-trade schemes

Tokyo

The **Tokyo metropolitan cap-and-trade scheme** was launched in April 2010. The mandatory scheme covers those companies that use fuels, heat and electricity in excess of **1500 kilolitres of crude oil equivalent per year**. The caps will represent a six per cent reduction in greenhouse gas emissions between 2010 and 2014 and a 17 per cent reduction from 2015 to 2019.

Saitama

One year after the Tokyo scheme was launched the region of **Saitama**, Japan's fifth most populous prefecture, unveiled its own ETS. The scheme uses the same compliance periods, emissions baseline and threshold for inclusion as the Tokyo ETS.

ETS EXCHANGE PLATFORMS

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ETS exchange platforms

- Main international platforms

European Energy Exchange AG (EEX)

European Energy Exchange AG, Germany's energy exchange, is the leading energy exchange in Central Europe. EEX operates market platforms for trading in electric energy, natural gas, CO_2 emission allowances and coal.

NASDAQ OMX

The NASDAQ OMX Group is an American multinational financial services corporation that owns and operates the NASDAQ stock market and eight European stock exchanges in the Nordic and Baltic regions and Armenia under the NASDAQ OMX banner.

ETS exchange platforms

Main international platforms

ICE - Intercontinental Exchange

The European Climate Exchange (ECX) manages the product development and marketing for ECX Carbon Financial Instruments (ECX CFIs), listed and admitted for trading on the ICE Futures Europe electronic platform.

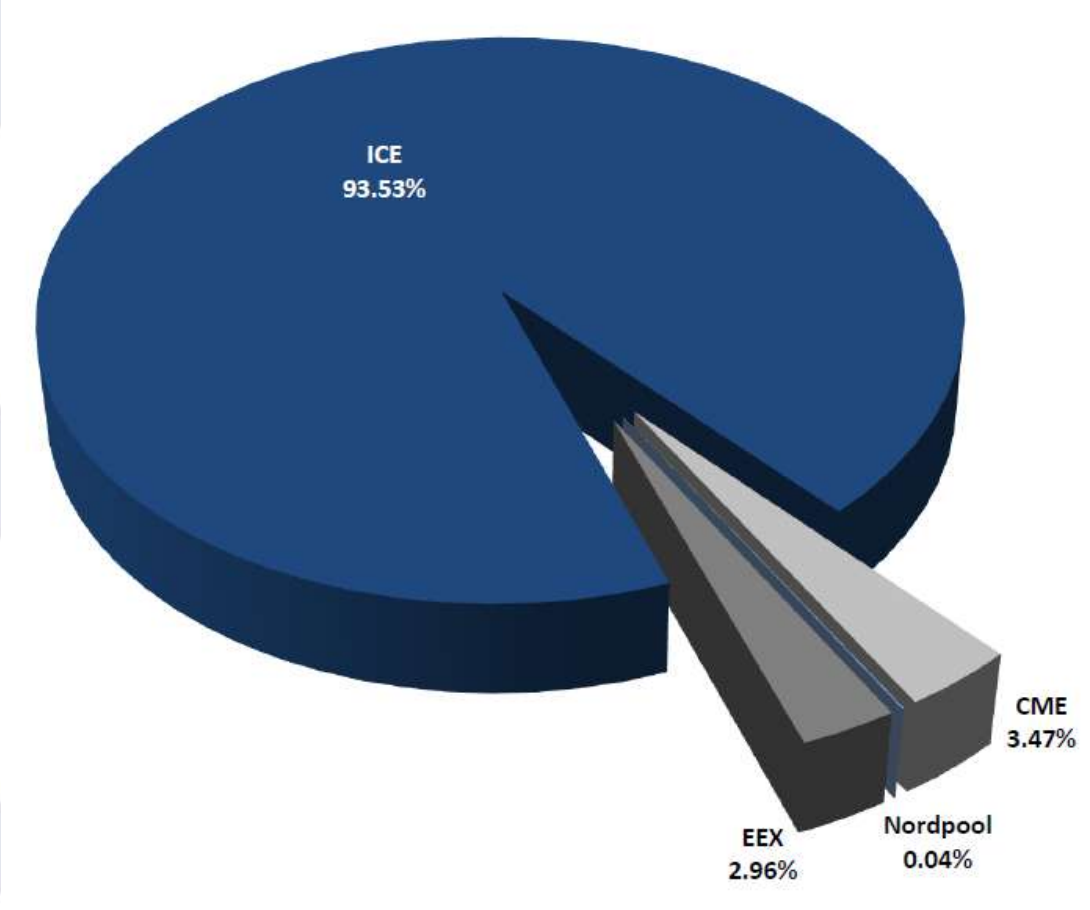
ECX / ICE Futures is the most liquid, **pan-European platform for carbon emissions trading**, with its futures contract based on the underlying EU Allowances (EUAs) and Certified Emissions Allowances (CERs) attracting over 80% of the exchange-traded volume in the European market. ECX contracts (EUA and CER Futures, options and spot contracts) are standardised exchange-traded products and all trades are cleared by ICE Clear Europe.

BlueNext

BlueNext was a European environmental trading exchange, considered the largest CO2 permit spot market, with headquarters in Paris, France. On October 26th, 2012 BlueNext announced that it would **close permanently** its spot and derivatives trading operations as **from December 5, 2012**.

ETS exchange platforms

- Main international platforms



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BEIJING CARBON CREDITS EXCHANGE

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Beijing carbon credits exchange

- A new experience: China Beijing Environment Exchange (CBEEX)

Overall assessment of the state of development of carbon markets in China

Despite the efforts of exchanges and other stakeholders, **China lacks the capacity to implement carbon trading on a large scale**.

An example of a successful recent knowledge-sharing venture is the collaboration between CBEEX and BlueNext, which developed a voluntary offset standard together, known as the **Panda Standard**.

After much expectation, in November 2011 the NDRC ordered **seven Chinese cities and provinces to set up pilot carbon trading systems**, including Beijing, Shanghai, Tian-jing, Chongqin, Shenzhen (the five cities) and Guangdong and Hubei provinces.

Three main lessons learned have been identified.

- **Accurate emission measurement** is the foundation, and the current situation in China is far from satisfactory.
- Lack of **legal support** in two specific areas, accountability and permit allocation.
- Lack of **administrative capacity**, particularly in terms of the cross-level and cross-sectoral coordination.

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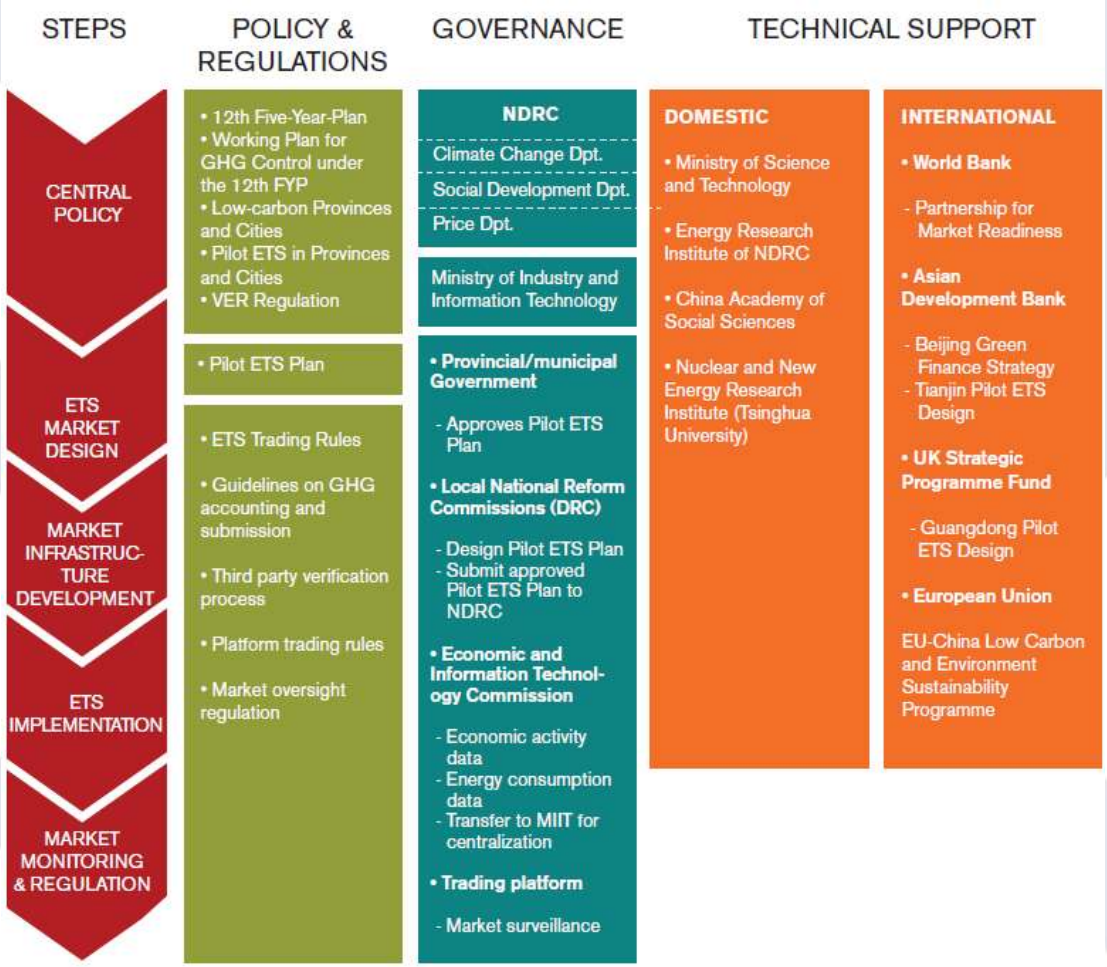
Beijing carbon credits exchange

- A new experience: China Beijing Environment Exchange (CBEEX)

Pilot emissions trading schemes in China



Building pilot emissions trading schemes in China

Source: "State and trends of the carbon market 2012" - World Bank

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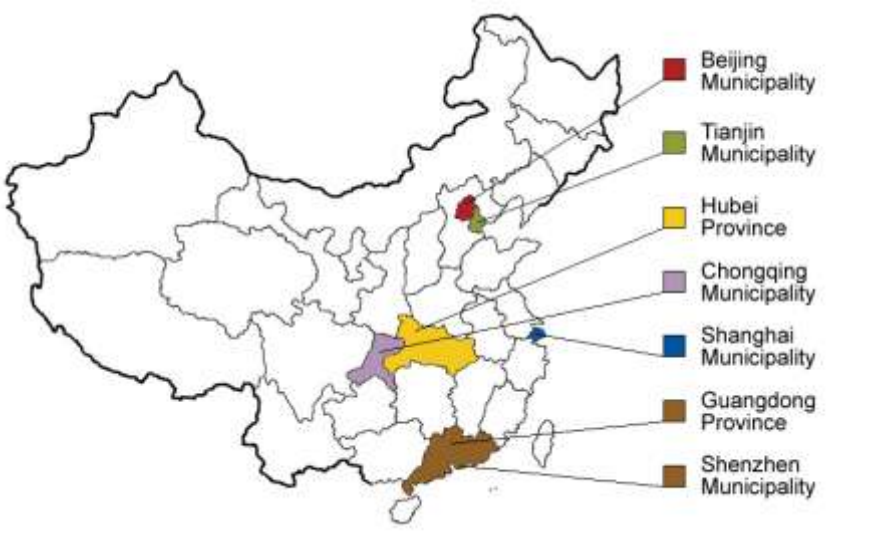
Beijing carbon credits exchange

- A new experience: China Beijing Environment Exchange (CBEEX)

Pilot emissions trading schemes in China

Jurisdiction	Population 2010 (Mln)	GDP 2010 (Bln US$)[PPP]	YOY Change (%)	GDP per capita 2010 (US$)	YOY Change (%)	GDP by sector I/ II/III 2010 (%)	2015 energy int. target (% 2010)	2015 carbon int. target (% 2010)	ETS status (as of April 2012)
Beijing Municipality	20	208	+10.3	11.2	+7.8	0.9 / 24.0 / 75.1	17	18	-Pilot ETS Plan approved. -Release of the design discussion draft in March 2012.
Tianjin Municipality	13	136	+17.4	10.8	+16.7	1.8 / 52.4 / 46.0	18	19	-Pilot ETS Plan approved. -Market design study to start in June 2012.
Shanghai Municipality	23	254	+10.3	11.2	+10.0	0.7 / 42.1 / 57.2	18	19	Pilot ETS Plan approved.
Hubei Province	57	236	+14.8	4.1	+23.1	13.4 / 48.7 / 37.9	16	17	Pilot ETS Plan approved.
Chongqing Municipality	29	117	+17.1	4.1	+20.4	8.6 / 55.0 / 36.4	16	17	Pilot ETS Plan approved.
Guangdong Province	104	680	+12.4	6.6	+8.7	5.0 / 50.0 / 45.0	18	19.5	-Pilot ETS Plan approved -Kick-off meeting on market design held in September 2011.
Shenzhen Municipality[PPP]	9	141	+12.0	13.9	+7.60	0.1 / 47.5 / 52.4	19.5	21	Pilot ETS Plan approved.
PRC's central government	1,341	5,926	+10.3	4.4	+9.90	10.1 / 46.8 / 43.1	-16	-17	Early stage. NDRC requested the World Bank's PMR to provide support to the design of the national ETS and carry out feasibility studies on some sectors.



China: pilot jurisdictions and current ETS status

Source: "State and trends of the carbon market 2012" - World Bank

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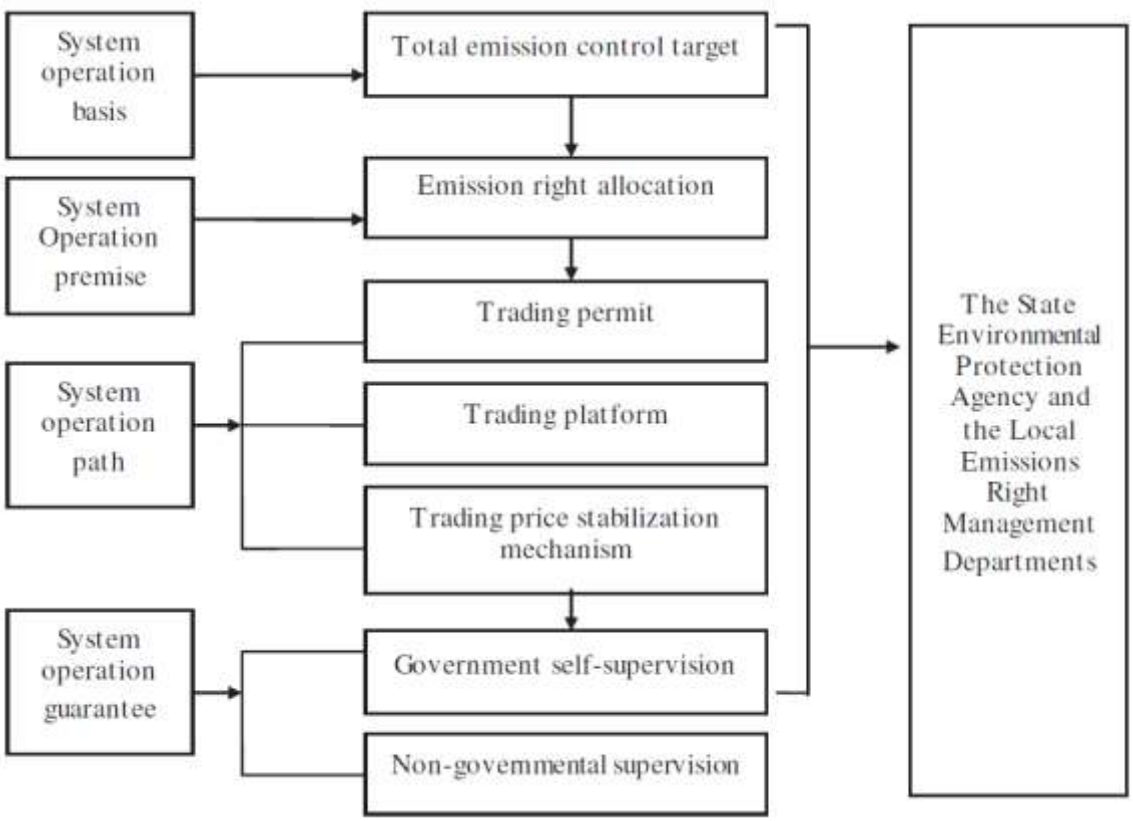
Beijing carbon credits exchange

- CBEEX: how to build a new ETS platform

The specific construction of China's carbon emissions trading system

Today the basic characteristics of carbon emissions trading system in the world is cap-and-trade mechanism, such as the UN Kyoto mechanism, the US SO_2 emissions trading system, and the EU emissions trading mechanism.



The framework of constructing China's carbon emissions trading system

Beijing carbon credits exchange

- CBEEX: how to build a new ETS platform

The issue of security

The security is a key issue in ETS. Since the 2008, the EU ETS had been targeted by criminal activity.

- VAT crime
- CER/VER recycling – double counting
- Cyber-theft of emissions allowances

There are three factors which have made the EU ETS too easy a target for fraud during its first years of operation:

- A high-value, highly-liquid, international market needs proper protections
- Inappropriate/insufficient implementation of policies across Member States
- Limitations of the EU ETS' governance model

Beijing carbon credits exchange

- CBEEX: how to build a new ETS platform

The issue of security

The Agency China Beijing Environment Exchange (CBEEX), supported by Asian Development Bank (ADB), has started the implementation of a project concerning the safety:
"**Study on risk control and security framework of environment exchange adapted to Beijing ETS**".
The project is carried out by an international team of experts:

Dr. Stefania Proietti	Dr. Zhou Jian	Yang Jin
TREE srl	*Tsinghua University*	*SinoCarbon*


Carbon Credits Transaction Certificate

碳减排量交易证明书

兹此证明，方兴地产（中国）有限公司于2011年3月29日通过北京环境交易所购买16,800吨产自云南西双版纳竹林碳汇项目的熊猫标准自愿减排量。

This is to certify that on March 29th 2011,Franshion Properties (China) Limited has purchased, through China Beijing Environment Exchange, 16,800 tonnes of Panda Standard VERs from Yunnan Xishuangbanna Bamboo Reforestation Project.

China Beijing Environment Exchange

Security measures

- Security measures in the main carbon exchanges platforms

European Energy Exchange AG (EEX)

- Non-display of serial numbers.
- Transactions in EU emission allowances shall only become effective with a delay of 24 hours

BlueNext – Safe Harbor Initiative

- accepted credits that can be traced back to their source.
- unbroken chain of legal transactions

International Negotiations

- Creation of model rules

NASDAQ OMX NORDIC

- monitoring that the participants adhere to the applicable rules and regulations
- enforcing the rules in order to ensure a level playing field for the market participants
- responsibility for the formal process in connection with the listing of financial instruments
- taking specific action during the listing of new instruments
- providing training as regards the exchanges' rules
- providing qualified service to issuers, members and advisors through a high degree of expertise and constant accessibility
- develop the rules and regulations regarding issuers

VOLUNTARY ACTIONS

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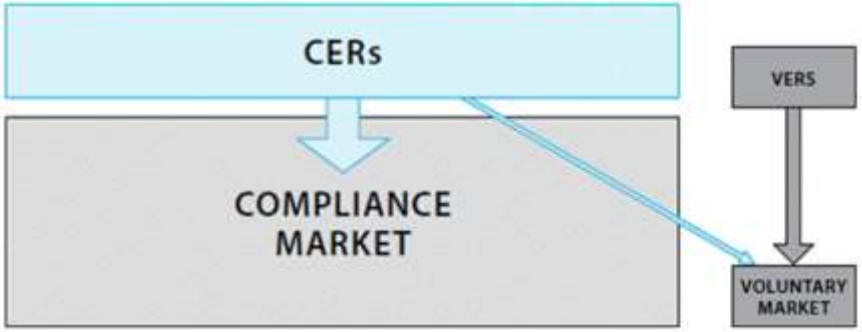
LECCO 2013

Voluntary actions

Voluntary carbon markets

The voluntary carbon markets functions outside of the compliance market.
They **enable businesses, governments, NGOs, and individuals to offset their emissions by purchasing offsets** that were created either through the CDM or in the voluntary market .
The latter are called **VERs** (Verified or Voluntary Emissions Reductions). Compared to the compliance market, **trading volumes in the voluntary market are much smaller** because demand is created only by voluntary buyers (corporations, institutions and individuals) to buy offsets whereas in a compliance market, demand is created by a regulatory instrument. Because there is lower demand and because **VERs cannot be used in compliance markets**, VERs tend to be cheaper than those credits sold in the compliance market (e.g. CERs).



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Voluntary actions

Voluntary carbon markets

Unlike under CDM, **there are no established rules and regulations for the voluntary carbon market**. On the positive side, voluntary markets can serve as a **testing field for new procedures**, methodologies and technologies that may later be included in regulatory schemes. Voluntary markets allow for experimentation and innovation because projects can be implemented with fewer transaction costs than CDM or other compliance market projects. Voluntary markets also serve a niche for **micro projects** that are too small to warrant the administrative burden of CDM or for projects currently not covered under compliance schemes. On the negative side, the lack of quality control has led to the production of some **low quality VERs**, such as those generated from projects that appear likely to have happened anyway.

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Voluntary actions

Profit and non-profit organizations, local governments and even individuals, interested in **reducing and offsetting the emissions** they are responsible for.

Proficiently and transparently

A number of agencies and companies deals with carbon credit services all over the world. Sometimes they are not completely transparent, easily understandable and verifiable by the "customer".

Green Washing

Compensation and neutralization processes in the voluntary market:

- Additionality
- Permanence in time
- Leakage
- Double Counting

Communication:

- Regulation
- Transparency

Voluntary Market

VERs: 34,600 (2009) → 244,000 (2011)

Average price 6 $/t$CO_2$

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Voluntary actions

- Voluntary carbon markets

Project Host

Companies or governments implement GHG abating projects involving:
- Renewable energy
- Energy efficiency
- Methane capture
- Reforestation
- Etc.

Project activities create emission reductions (ERs)

Project hosts sell ERs to help finance the project activities

$$$$

ERs

Emission Reduction Buyer

Gov't, companies, or others buy ERs from project activities

Some buy ERs to help satisfy mandatory obligations

Others buy ERs to apply toward voluntary commitments

Voluntary actions

- Voluntary carbon markets

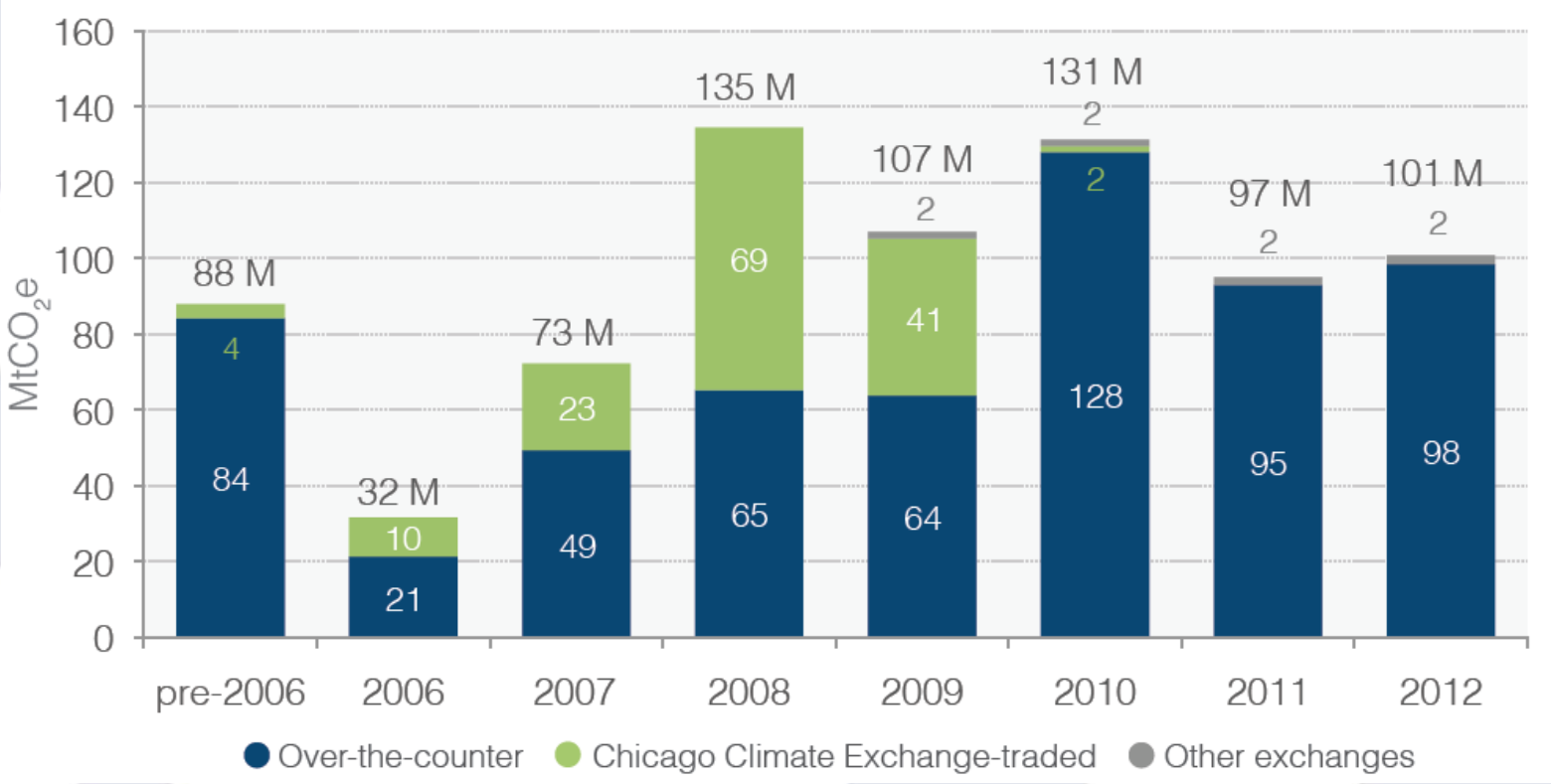
	Clean Development Mechanism			Voluntary Carbon Offsets		
	Volume ($MtCO_2e$)	Value ($ Million)	Avg. Price ($/$tCO_2e$)	Volume ($MtCO_2e$)	Value ($ Million)	Avg. Price ($/$tCO_2e$)
Primary Markets	339 Mt	$1,047 M	$3.1/t	20 Mt	$86 M	$5/t
Secondary Markets	1,686 Mt	$5,451 M	$3.2/t	22 Mt	$87 M	$4.2/t
TOTAL 2012	2,025 Mt	$6,498 M	$3.2/t	42 Mt	$172 M	$4.5/t
Rulemaking Body	UNFCCC/ Executive Board (CDM EB)			Independent third-party standards guide projects; no central regulatory body		
Geographic Scope	Non-Annex I Countries			Global		
Trading Platform	Exchange or Over-the-Counter			Over-the-Counter		
Price Setter(s)	Kyoto Compliance Markets			Voluntary Buyers		

Historical Transacted Volume, Market Value and Average Price
Clean Development Mechanism Vs. Voluntary Carbon Offset Types, 2012

Source: "State of the Voluntary Carbon Markets 2013" - Forest Trends' Ecosystem Marketplace

Voluntary actions

- Voluntary carbon markets



Historical Offset Demand by Transacted Volume, All Voluntary Carbon Markets

Source: "State of the Voluntary Carbon Markets 2013" - Forest Trends' Ecosystem Marketplace

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Voluntary actions

- Voluntary carbon markets

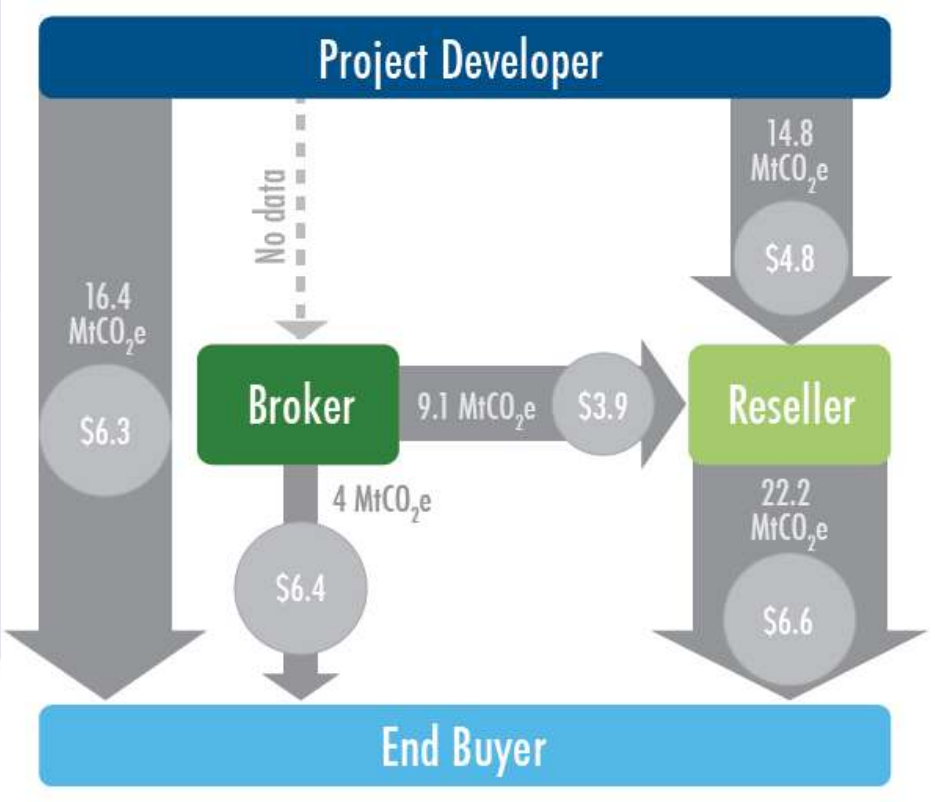
	Volume ($MtCO_2e$)		Value ($ Million)		Average Price (Volume-Weighted $/$tCO_2e$)	
	2011	2012	2011	2012	2011	2012
Voluntary Offsets Contracted Over-the-Counter	93	98.5	$572	$515.7	$6.2/t	$5.9/t
Voluntary Offsets Traded on an Exchange	2	2.3	$4.2	$6.3	–	–
Historical Transactions Tracked and Added in 2012	1.8	–	$10.9	–	–	–
Voluntary Carbon Markets Total	97	101	$586.5	$523	$6.2/t	$5.9/t

Historical Transaction Volumes, All Voluntary Carbon Markets

Source: "State of the Voluntary Carbon Markets 2013" - Forest Trends' Ecosystem Marketplace

Voluntary actions

- Voluntary carbon markets



Transacted Volume and Average Price by Buyer and Seller Types, OTC 2012

Source: "State of the Voluntary Carbon Markets 2013" - Forest Trends' Ecosystem Marketplace

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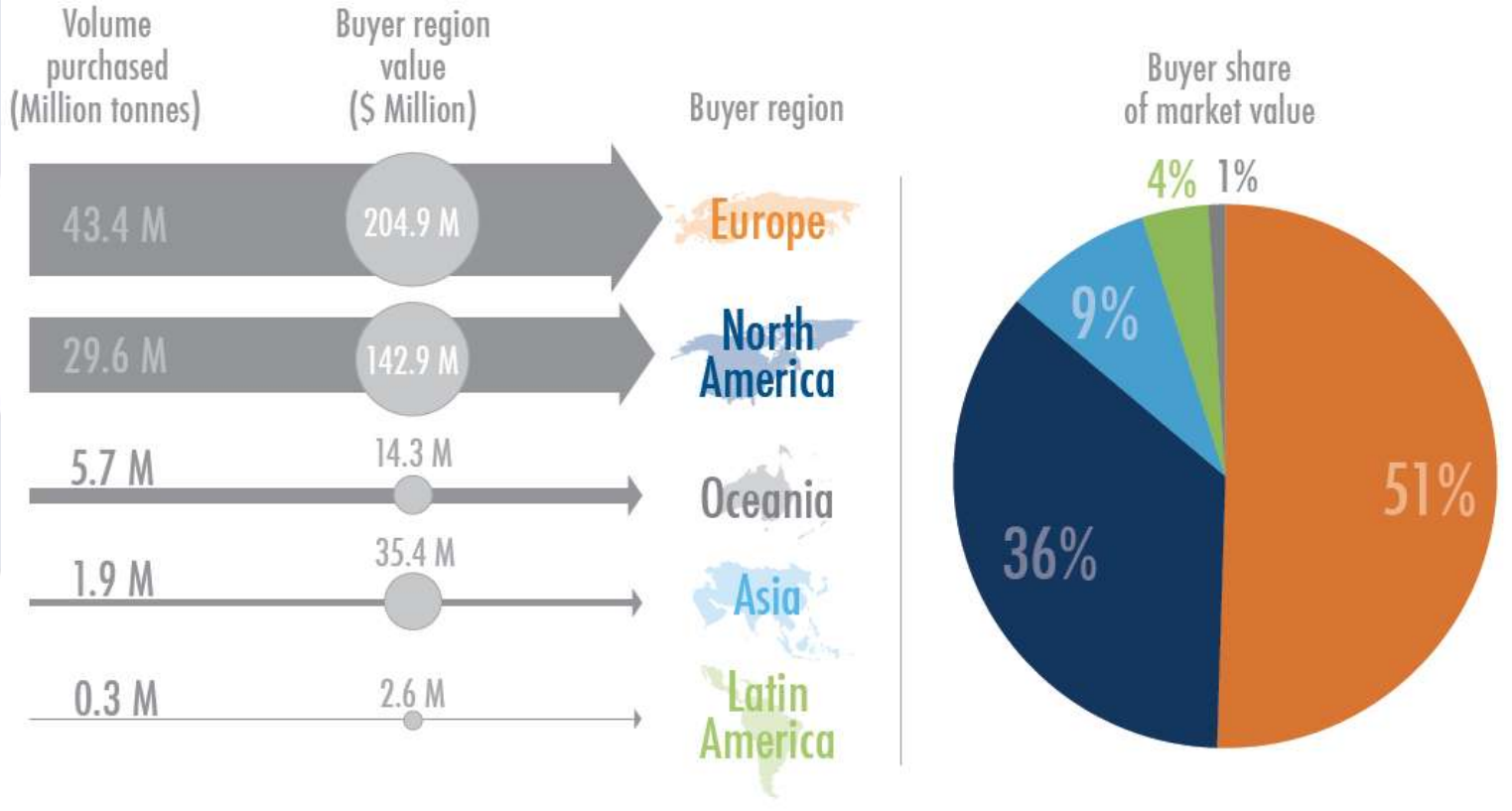
Voluntary actions

- Voluntary carbon markets

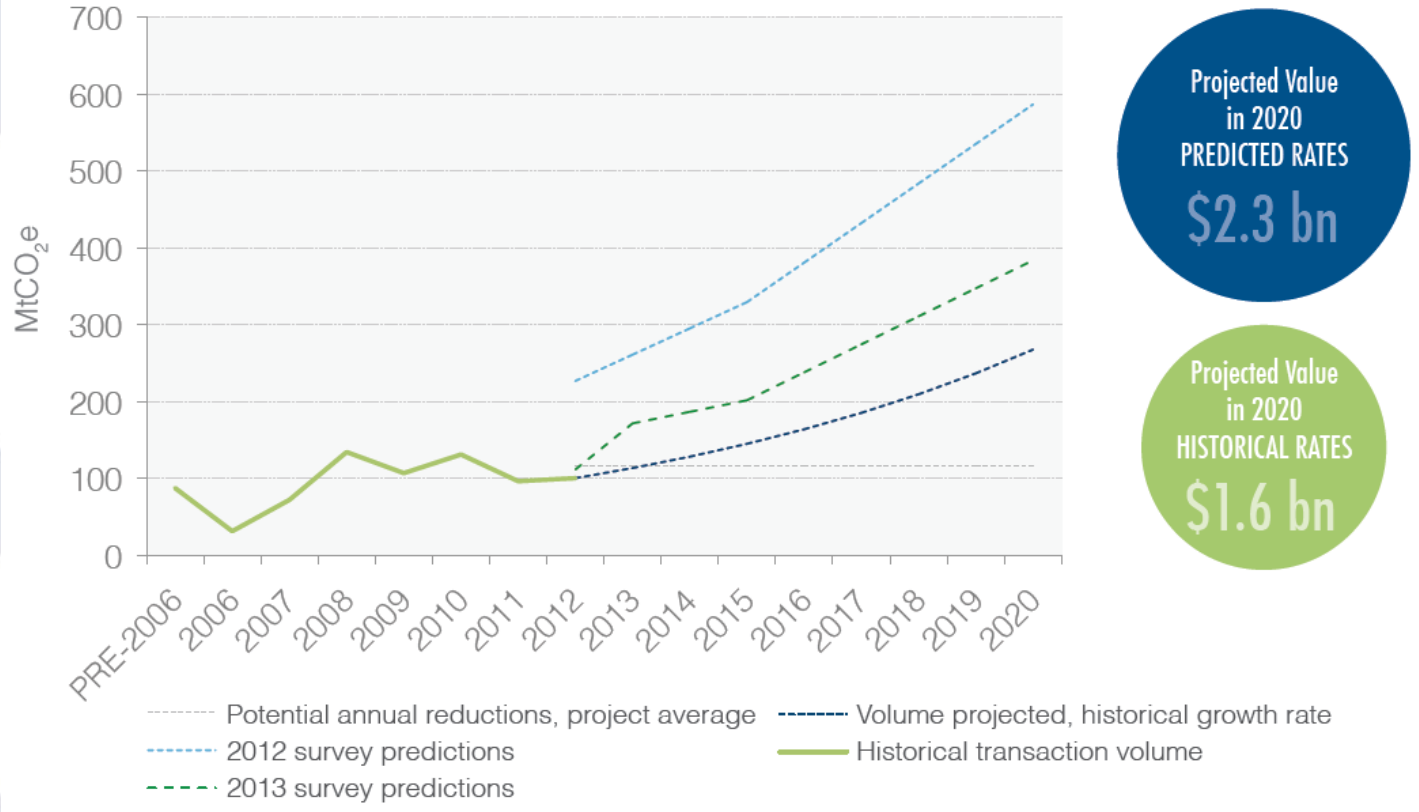


Transacted Volume, Value, and Average Price by Buyer Region, OTC 2012

Source: "State of the Voluntary Carbon Markets 2013" - Forest Trends' Ecosystem Marketplace

Voluntary actions

- Voluntary carbon markets



Market Projections, Historical Data and Supplier Predictions

Source: "State of the Voluntary Carbon Markets 2013" - Forest Trends' Ecosystem Marketplace

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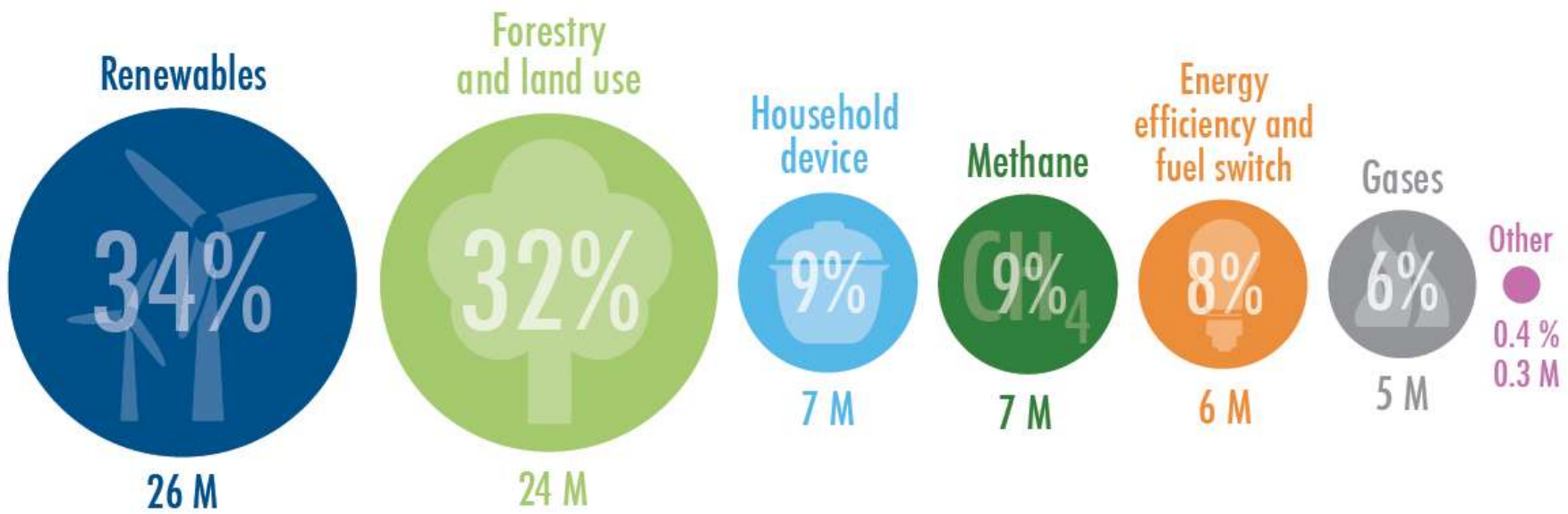
Voluntary actions

- Voluntary carbon markets

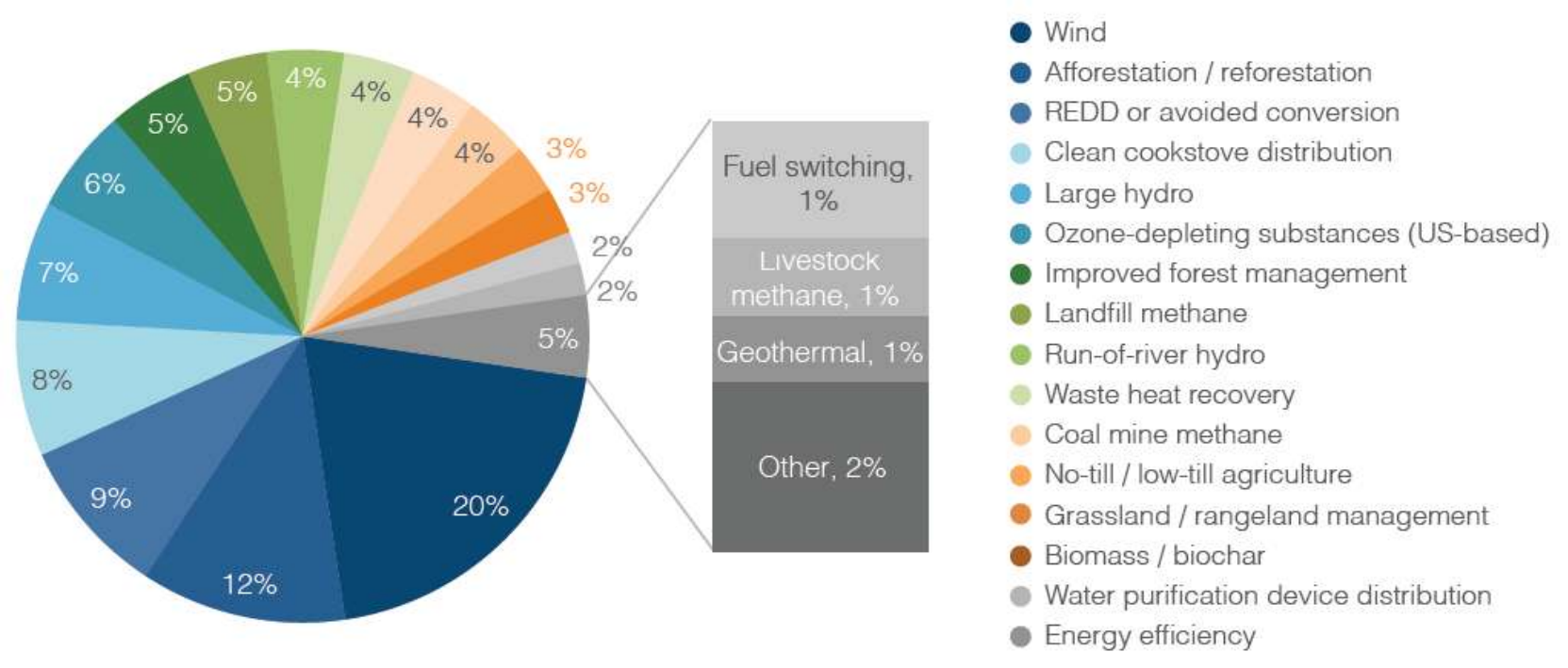


Transacted Volume by Project Category, OTC 2012 ($MtCO_2e$ and % Share)

Source: "State of the Voluntary Carbon Markets 2013" - Forest Trends' Ecosystem Marketplace

Voluntary actions

- Voluntary carbon markets



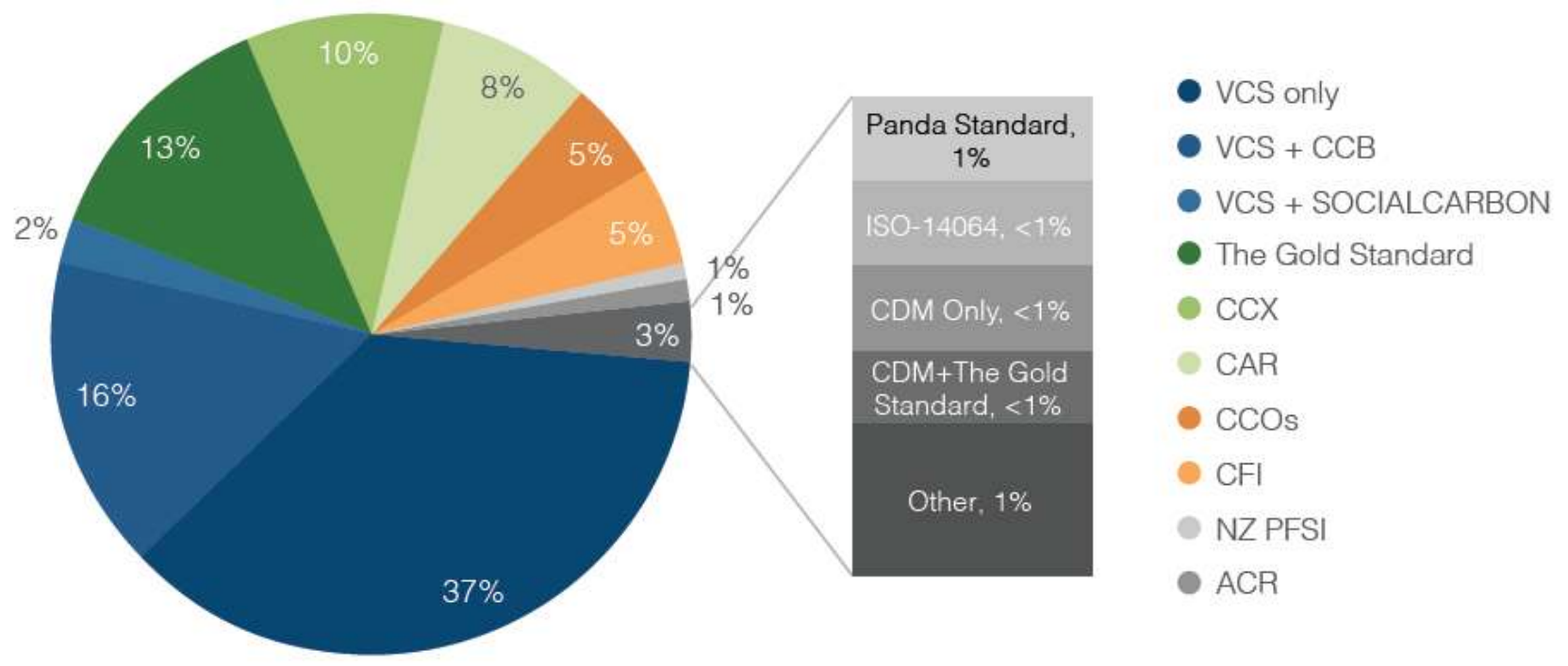
Market Share by Project Type, OTC 2012

Source: "State of the Voluntary Carbon Markets 2013" - Forest Trends' Ecosystem Marketplace

High Summit LECCO 2013

Voluntary actions

- Voluntary carbon markets



Market Share by Project Standard, OTC 2012

Source: "State of the Voluntary Carbon Markets 2013" - Forest Trends' Ecosystem Marketplace

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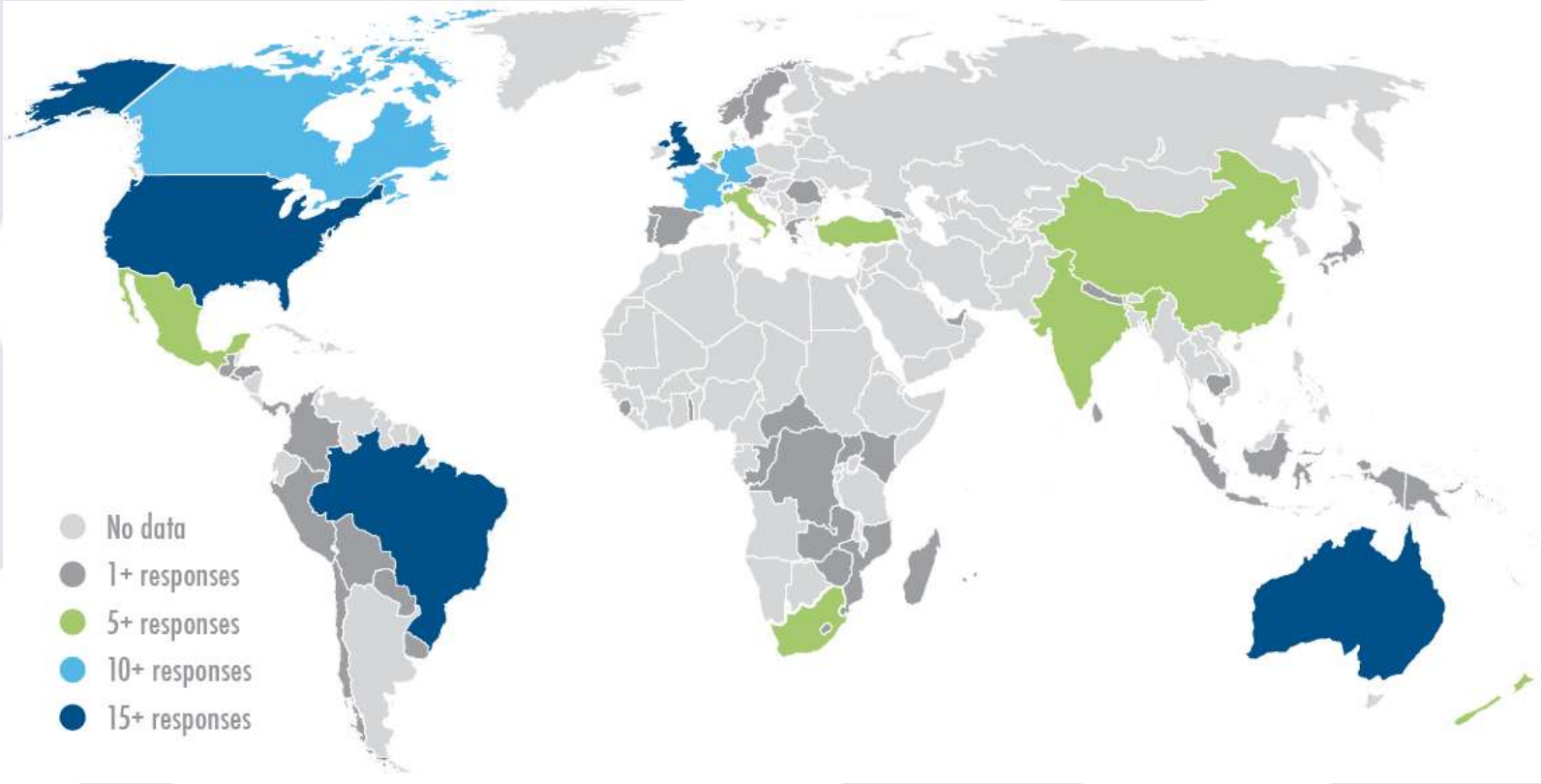
Voluntary actions

- Global voluntary carbon markets



Response Rate Distribution by Offset Supplier Country Location, 2012

Source: "State of the Voluntary Carbon Markets 2013" - Forest Trends' Ecosystem Marketplace

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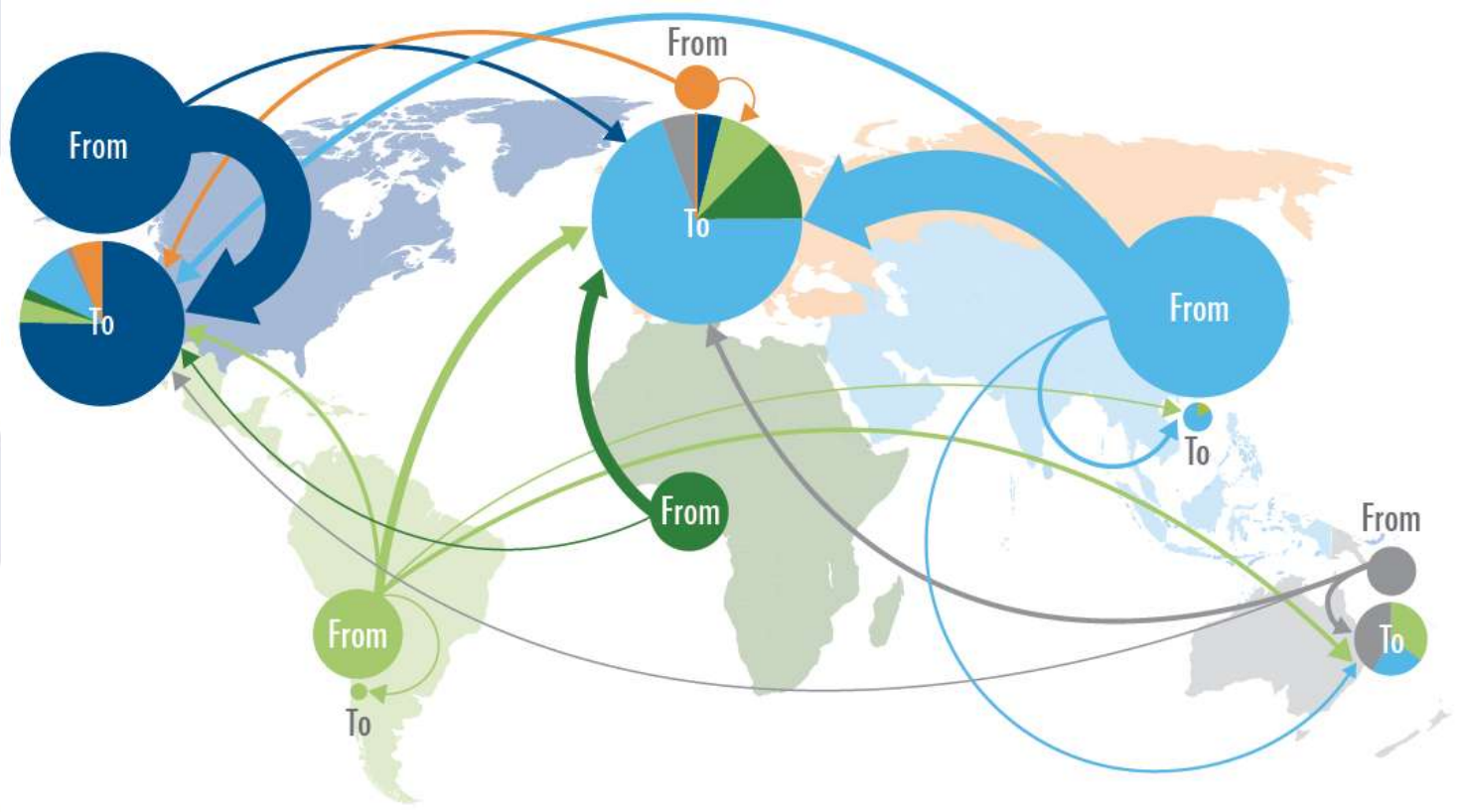

Flow of Transacted Volumes by Offset Supplier and Buyer Region, OTC 2012

Source: "State of the Voluntary Carbon Markets 2013" - Forest Trends' Ecosystem Marketplace

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W O R L D W I D E

Carbon Project Accounting Standards

- American Carbon Registry - ACR Standard (Version 2.1, 2010)
- CarbonFix Standard – CarbonFix (Version 3.2, 2011)
- Chicago Climate Exchange – CCX (Several publications 2003 - 2012)
- The Gold Standard – GS (Version 2.2, 2012)
- VER+ (Version 2.0, 2008)
- Verified Carbon Standard – VCS (Version 3, 2011)

Project Co-Benefits Programs

- Climate, Community & Biodiversity Standards – CCB Standards (2nd edition, 2008)
- SOCIALCARBON Standard (Version 5.0, 2013)

Voluntary actions

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Domestic (Country- or Region-Specific) Programs

USA MEX

- Climate Action Reserve – CAR (Program Manual, 2011)

DEVELOPING COUNTRIES

- Plan Vivo Standard – Plan Vivo (Second Edition, 2008)

AUS

- Carbon Farming Initiative – CFI (2011)

JPN

- Japan Verified Emissions Reduction Scheme – J-VER (2008)

KOR

- Korea Verified Emissions Reduction Program – K-VER (2005)

NZL

- NZ Permanent Forest Sink Initiative – PFSI (Forests Act 1949, Part 3B, 2006)

BRITISH COLUMBIA

- Pacific Carbon Standard – PCS (Version 1, 2011)

GBR

- Woodland Carbon Code – WCC (Version 1.1, 2012)

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Standards to Watch

BRA	Brasil Mata Viva – Plano de Deselvolvimento Sustentável Brasil Mata Viva (2011)
USA (CAL.)	California Air Resources Board Protocols – ARB Protocols (2011)
DEU	Global Conservation Standard – GCS (Version 1.2, 2011)
CHN	Panda Standard (Version 1, 2009)
AMAZON BASIN	The Rainforest Standard (2012)
CH	Swiss Charter Standard – Swiss Charter (Climate Protection by Recycling, 2009)
WEST. CHN	Three Rivers Standard – Three Rivers (Version 0.1, 2011)
THA	The Women's Carbon Standard – WCS (2013)

Voluntary actions

Agriculture, forestry and other land uses

- AFOLU

  $CO_{2\text{-eq}}$ stocks and emissions.
  A number of complex and different biological, physical and chemical processes, highly variable over space and time.
  Natural and anthropogenic factors influencing emissions and removals.

  → *Inventorying and monitoring GHGs in the **A**griculture, **Fo**restry and **L**and **U**ses sector seem to be extremely complex, especially in comparison to other.*

- Removal Units

  Despite the potential positive role of policies for climate change mitigation in agricultural, several Countries decided not to account this sector.
  Italy: forest management measures were included to meet Kyoto commitments, with a limit of accountability set to 10.2 $MtCO_{2\text{-eq}}$ per year.

  → *The **Removal Units (RMUs)**, i.e. credits related to land use and generated by investments on primary sector, **are excluded from European Emission Trading Scheme – EU ETS***

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SUSTAINABLE MOUNTAIN DEVELOPMENT: A PROJECT IDEA

In the framework of policies for climate change adaptation and for promotion of an integrated sustainable development, the voluntary market for the offsetting of CO_2 emissions introduces interesting opportunities for the primary sector

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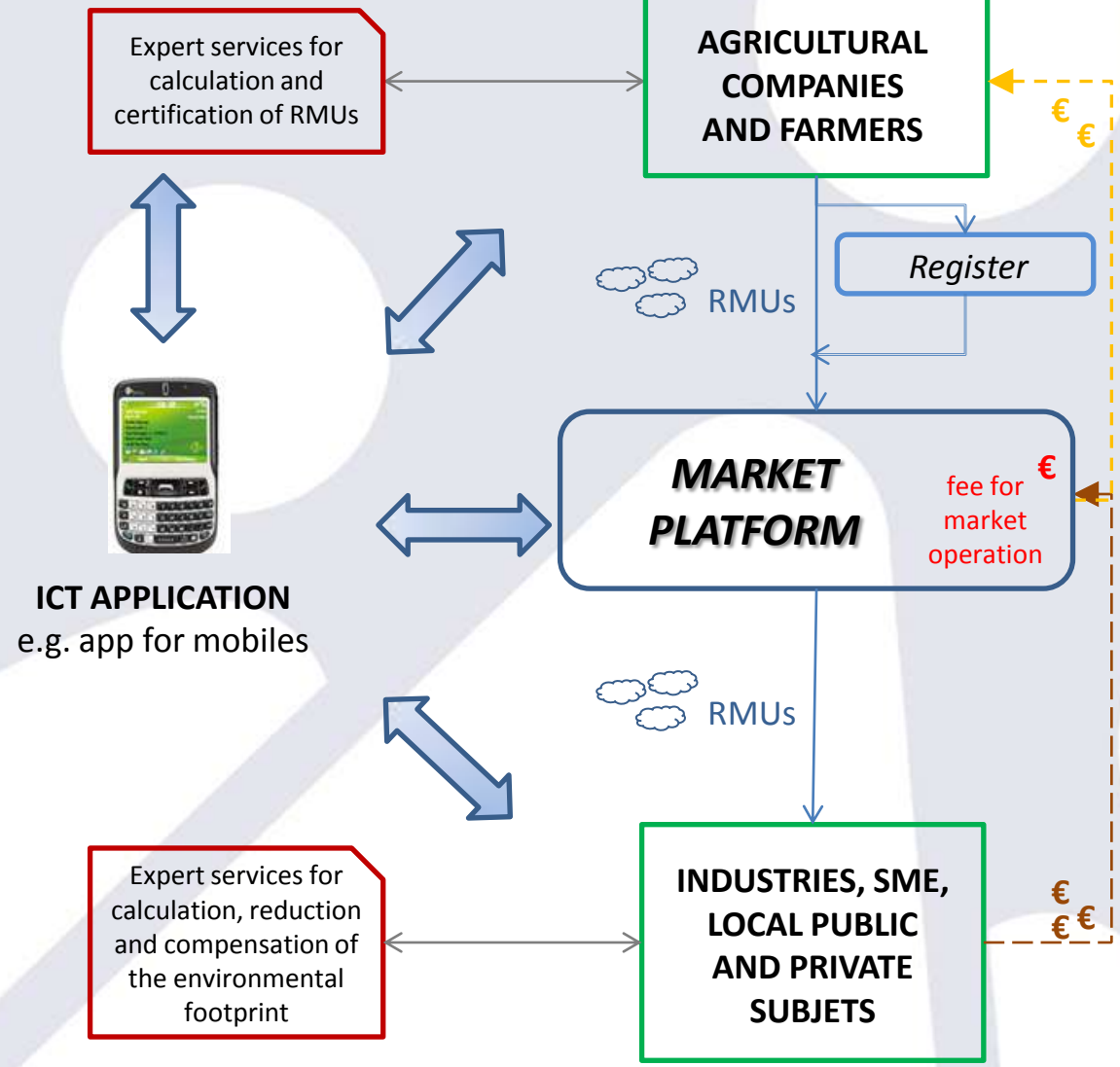
Project idea

A local voluntary market



Definition of a **local voluntary market of carbon credits**, with the creation of a **trading platform** and the definition of agreements designed to reduce/offset the emissions through the purchase of credits related to **agriculture and forestry** sector.

Carbon credits enhanced through the recognition in a specific **Register of agro-forestry Carbon Sinks**

IT platform
User friendly, open source

Operators directly connected by a dedicated **ICT application**

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Thanks for your attention!

For further information:

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