

CO₂ markets and the current status of international climate negotiations

The emission of greenhouse gases (GHGs) to the atmosphere is causing climatic disturbances of increasing severity, representing risks for the entire planet. Existing GHG emissions reduction policies mainly focus on setting up cap and trade systems (carbon markets) geared to achieving such reductions. The Kyoto Protocol, an international treaty established under the auspices of the United Nations, sets forth the guiding principles, objectives and legally binding targets imposed on the parties concerned until 2012. The purpose of the international negotiations underway is to set up a new regulatory framework for the post-2012 period.

A global issue...

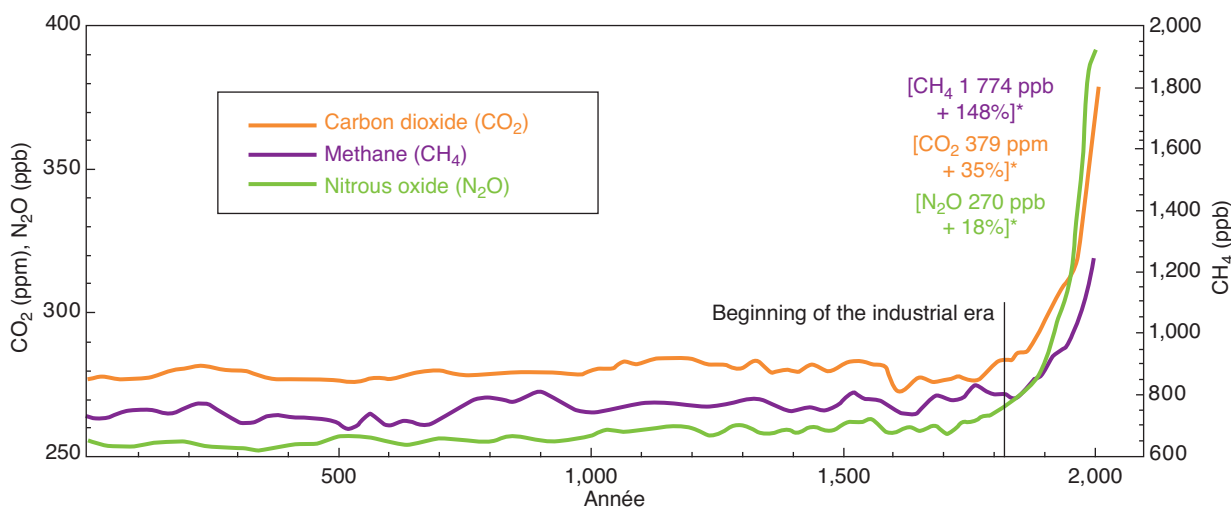
An uptrend in the atmospheric concentrations of CO₂

Since the end of the 20th century, the average global temperature of the Earth has gone up by more than 0.7°C. This increase has coincided with that of the carbon content in the atmosphere. Constant until the Industrial Revolution, the CO₂ content has shown strong

growth since 1750 as a result of the intensification of human activities that emit GHGs (Figure 1). In 2008, the atmospheric carbon content reached 385 ppm (parts per million), which is 38% higher than its preindustrial level (source: World Meteorological Organization, 2009).

Stabilizing the atmospheric CO₂ concentration between 450 and 550 ppm by 2050 would, according to the scientists from the Intergovernmental Panel for Climate Change (IPCC), allow limiting the negative impacts of climate

Fig. 1 - Atmospheric concentration from Year 0 to 2005

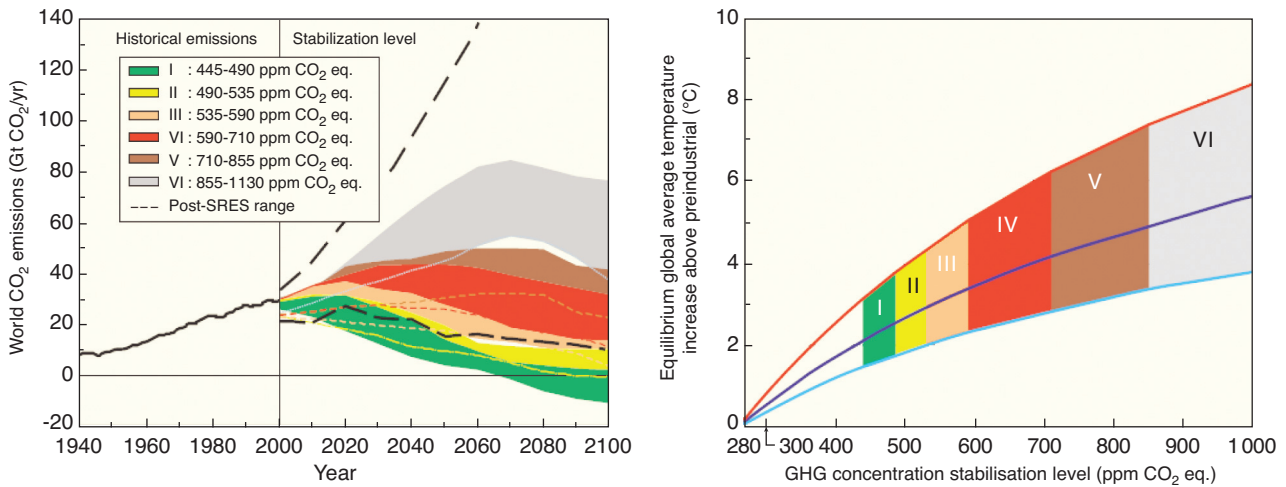


* The figure in brackets indicates the atmospheric concentration of GHG in 2005 and their percentage of growth since 1750

Source: IPCC, 4th assessment report (2007)

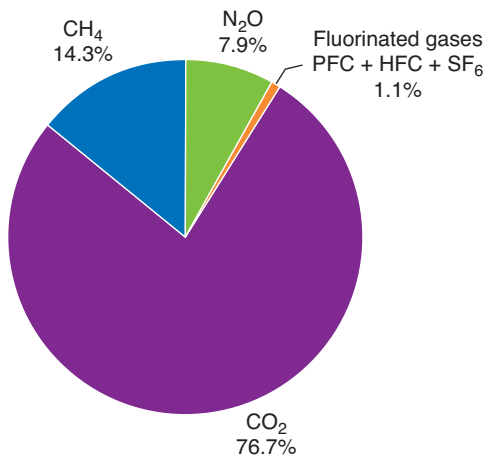
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Fig. 2 - CO₂ emissions and equilibrium temperature increases for a range of stabilization levels



Source: IPCC, 4th assessment report (2007)

Fig. 3 - Global GHG emissions by gas in 2004 (including LULUCF¹)



Source: IPCC, working group III contribution to the 4th assessment report

change. To curb the increase in the average temperature of the Earth to less than 2°C compared to preindustrial levels, the IPCC recommends that the industrialized countries reduce their emissions by between 25 and 40% by 2020 and by 80 to 95% by 2050. Figure 2 presents various trend scenarios for CO₂ emissions and their necessary stabilization.

Overview

The anthropic emissions of six greenhouse gases have increased by 70% since 1970 and by 24% since 1990, reaching 49 Gt CO₂ eq. in 2004. According to Figure 3,

(1) Land Use, Land Use Change and Forestry

CO₂ emissions in 2004 represented three-quarters of global emissions expressed in GWP (Global Warming Potential) values and showed an increase of 28% since 1990.

If we look at GHG emissions per economic sector, we note that the most significant increase since 1990 was obtained for land use, i.e. changes in land occupancy and deforestation (+48%), followed by the energy sector (+37%), and transport (+32%). The rise in emissions from agriculture and industry since 1990 comes to 9%, three times more than emissions generated by buildings and the waste sector (+3%).

It is also interesting to map emissions geographically by country, as a function of their level of development. Figure 4 shows that the industrialized countries (annex I countries under the UNFCCC²) represented 20% of the world population, 57% of world GDP and emitted 46% of the total GHG output in 2004. In these same countries, average per capita GHG emissions amounted to 16.1 t CO₂ eq., which is about four times higher than for non-annex I countries. Measured in 2000 dollars based on purchasing power parities (PPP), the production of one unit of wealth in annex I countries generated GHG emissions that were 35% lower on average than for non-annex I countries.

... which requires a global response: international negotiations

The impact of each ton of carbon on global warming is the same, irrespective of the country or region of origin.

(2) United Nations framework Convention on Climate Change. See next section for further details

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It does not matter whether emission reductions come from the United States, the European Union, Russia or some other entity. All that counts is the total volume of emissions. This concept permits a global approach to the reduction of GHG emissions: national commitments to cap emissions as well as emissions trading systems to distribute the effort at lowest economic cost.

These mechanisms came into being more than 15 years ago when international climate negotiations got underway at the Earth Summit in Rio de Janeiro (Figure 5).

United Nations Framework Convention on Climate Change (UNFCCC)

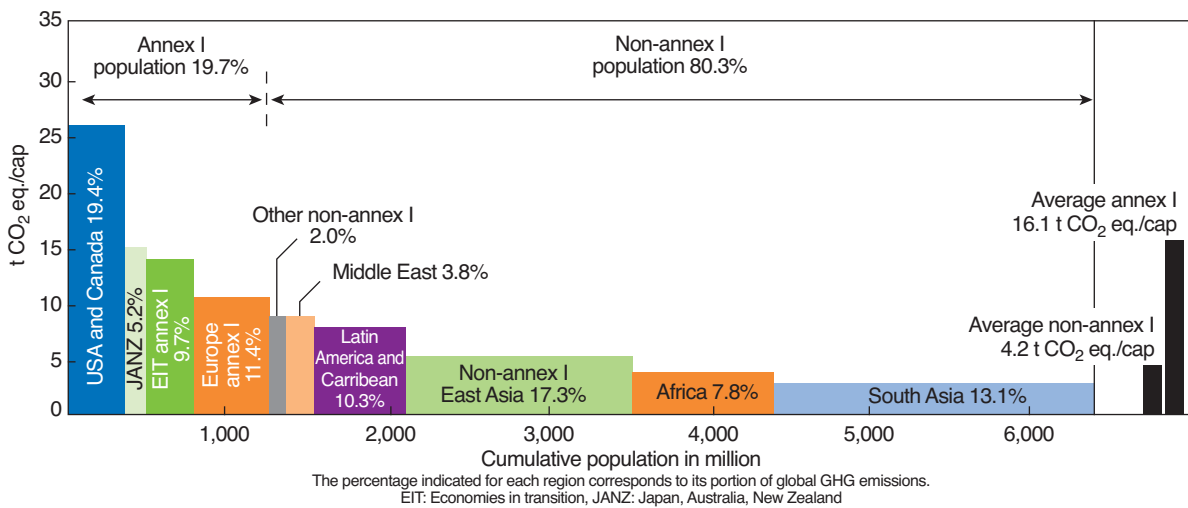
The UNFCCC, adopted in 1992 in Rio de Janeiro, was the first international treaty that set out to address the

problem of climate change by working to prevent anthropic emissions that contribute to climate disturbances. The Convention on Climate Change classifies states in two groups: the annex I countries (considered to be developed in 1990 or in transition towards a market economy) and non-annex I countries (considered to be developing countries in 1990).

The treaty recognizes three principles:

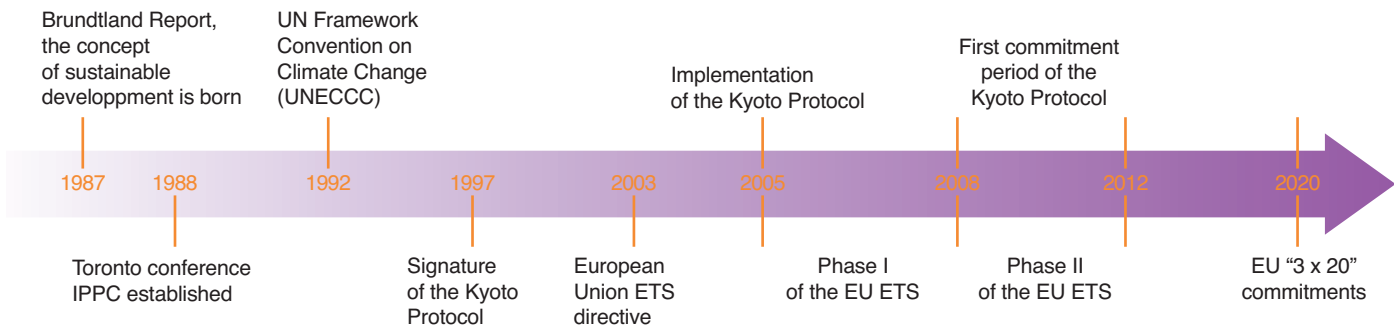
- the precautionary principle: scientific uncertainty about the exact impact of climate change does not justify putting off the measures that need to be taken,
- the principle of common but differentiated responsibilities: each signatory country recognizes the impact of its own GHG emissions on global warming. The most industrialized countries bear a greater historical responsibility because, in the early stages of their

Fig. 4 - Regional distribution of per capita GHG emissions



Source: IPCC, working group III contribution to the 4th assessment report

Fig. 5 - Key dates of international climate change negotiations



Source: Climate Task Force, Caisse des dépôts

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development, they generated large amounts of GHG emissions,

- the principle of the right to development: the necessary actions will be taken while upholding the right of each country to economic development.

Each year, the states having ratified the Rio Convention attend a Conference of Parties (CoP). The first took place in Berlin in March 1995. The Third Conference of the Parties to the United Nations Framework for Climate Change (CoP 3) convened in Kyoto, Japan, in 1997. The Protocol adopted in Kyoto set binding emission reduction targets for the developed countries: a 5.2% reduction by 2012 compared to 1990 levels. A specific national target was established for each country. In 2009, the objective for the CoP in Copenhagen was to establish an international regulatory framework for the fight against climate change for the post-2012 era.

The Kyoto Protocol

Adopted in 1997, the Protocol sets targets and provides ways and means to implement the UNFCCC treaty. It legally binds the 38 most industrialized countries (listed in annex I of the Protocol) to meet emission reduction targets by cutting their total emissions for six greenhouse gases (CO₂, CH₄, N₂O, HFC, PFC, SF₆) by at least 5% from 1990 levels³. No commitments were specified for non-annex I countries. These reductions must be effected during the period 2008-2012.

Every signatory state had to be ratified by its national institutions for the Protocol to become legal binding. Australia was the last country to do so, in December 2007. Having signed but not ratified the treaty, the United States is not under obligation to meet an emission reduction target for the period 2008-2012.

According to the Protocol, the commitments would not be legally binding until the amount of emissions of "the Parties included in annex I" having ratified the Protocol "accounted in total for at least 55% of the total carbon dioxide emissions for 1990 of the Parties included in annex I." This quorum was reached in September 2004 after Russia ratified the Protocol.

Three mechanisms were to help annex I countries meet their commitments:

- an international emissions trading system for annex I countries. The Protocol set a GHG emissions reduction target for each country, expressed in terms of "assigned amount units" (AAU) that could be sold to other countries,

- the Clean Development Mechanism (CDM),
- Joint Implementation (JI), which allows annex I Parties to invest in emission-saving projects in other annex I countries and receive carbon credits for the emissions saved.

For annex I countries to meet their commitment, the total of their AAUs and carbon credits would have to equal their real emissions between 2008 and 2012. The accounting for this system is handled by the UNFCCC secretariat using the International Transaction Log (ITL). Each annex I country is under obligation to implement a national registry and link it to ITL.

The Copenhagen Conference: the negotiations left unfinished business

At the end of 2007, the Conference of Parties in Bali established a timetable for reaching a climate agreement to succeed the Kyoto Protocol, which will no longer be in effect after 31 December 2012. Following a two-year cycle of negotiations, the fifteenth Conference of the United Nations Framework Convention on Climate Change took place in Copenhagen from 7 to 18 December 2009. The outcome was thought to be a "bare-minimum agreement" by some and a failure by others. The overall dissatisfaction with the Copenhagen Agreement comes from the high level of international community's expectations for the summit. Before summarizing the main points of the Accord, we might examine these expectations.

Expectations raised by Copenhagen

For the outcome at Copenhagen to be deemed a success, the 192 Parties would have had to agree on six points:

- commit to the objective of limiting global warming to +2°C compared to the preindustrial era, as stated in the IPCC 4th assessment report,
- "translate" this objective in terms of GHG reduction. The IPCC advocates a global GHG emission reduction of 50% by 2050,
- define how this effort will be distributed between industrialized and other country. Under the principle of common but differentiated responsibilities, the IPCC recommends that the industrialized countries bear the greater share of the effort to reduce emissions⁴. However, these countries would like to see the developing countries, especially China, bring their emissions down, too,

[3] For annex I countries, the objective of reducing overall GHG emissions by at least 5% compared to the 1990 level is distributed among them according to their economic situation and growth potential. This is referred to as "burden sharing"

[4] As we recalled previously, the IPCC recommends that industrialized countries reduce their GHG emissions by between 80 and 95% by 2050, with an interim target of a 25-40% reduction by 2020. The reference year is the one used in the Kyoto Protocol, i.e. 1990

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- settle the matter of financial aid for the most disadvantaged countries. Financial aid would help these countries adapt to global warming and reduce their GHG emissions,
- come up with an agreement to take the place of the Kyoto Protocol, which will no longer be in effect as of 31 December 2012. Many countries maintain that a binding agreement is the only way to ensure that the ambitious GHG emission reduction targets advocated by the IPCC will be met,
- ensure the verification of GHG emissions. This raises the matter of their verification by an independent entity.

The expectations raised by the Copenhagen summit were many and ambitious compared to the outcome of the Copenhagen Agreement.

The Copenhagen Agreement: a political agreement

Thirty industrialized and emerging countries⁵ negotiated the document known as the "Copenhagen Agreement". The UNFCCC agreed to "take note" of the agreement instead of formally approving it. To date, 120 of the 192 Parties to the UNFCCC have said that they planned to sign it. China and India were not among them, although they were among the countries that drafted the agreement.

The agreement bears on the following key points:

- objective: prevent the earth's temperature from rising by more than 2°C: the accord recognizes the scientific view that the increase in global temperature should be limited to 2°C, but does not provide a target,
- adaptation: the text declares that adaptation to the adverse effects of climate change and "response measures" is a challenge faced by all countries. At the same time, it notes the particular vulnerability of certain countries, especially least developed countries, Small Island developing States and Africa. Finally, it states that developed countries shall provide adequate, predictable and sustainable resources (including financial) to support the implementation of adaptation.
- mitigation actions:
 - the developed countries must submit quantified emissions reduction targets for 2020, by 31 January 2010. Once they have done so, they will be obliged to deliver the promised reductions,
 - for the developing countries, there are two innovations compared to the Kyoto Protocol. First of all, they may propose to implement emissions reduction policies, in which case they are responsible for delivering their best efforts. Secondly, although the Accord is basically structured to differentiate between

(5) Including the United States, China, India, Brazil and South Africa as well as the European countries

the developed and developing countries, for the first time it makes distinctions within the developing countries. It says that the least developed countries and small developing island States may undertake actions voluntarily, implying that it might be otherwise for the other states,

- nationally supported measures will be subject to domestic measurement, reporting and verification. Those seeking international support will be recorded in a registry and subject to international measurement, reporting and verification under clearly defined guidelines that will ensure that national sovereignty is respected,
- the text recognizes the need to enhance the cost-effectiveness of emissions reduction actions and the complementarity of various approaches, including opportunities to use markets,
- funding: the text promises "additional" resources approaching USD 30 billion for the period 2010-2012. Funding for adaptation will be prioritized for the least developed countries, Small Island developing States and Africa. The developed countries commit to a goal of mobilizing USD 100 billion dollars a year for adaptation by 2020 from various sources (e.g. public, private, bilateral and multilateral). A significant portion of these resources should flow through a new financial mechanism (the Copenhagen Green Climate Fund), yet to be established,
- reducing emissions from deforestation and forest degradation ("REDD-Plus"). Developing countries will have to identify the determining factors involved in deforestation and the actions required to reduce it. They will also have to establish a mechanism of measurement, reporting and verification applicable to forestry so that the associated emissions with it can reliably be estimated. To do this, it proposes the immediate establishment of a mechanism including REDD-plus,
- the Accord calls for an assessment of its implementation to be completed by 2015.

Negotiations within the framework of the Kyoto Protocol and the UNFCCC

About 20 decisions of a technical nature were approved. Some of them bore on two Kyoto mechanisms:

- decisions relative to the CDM were taken to simplify procedures and methodologies and improve the geographical distribution of CDM projects. No decision was made with respect to the inclusion of carbon capture and storage in CDM,
- decisions relative to JI were made to streamline project validation and verification. The JI Supervisory

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Committee was asked to provide feedback at the next CoP so that the mechanism might be improved in future.

What did the Copenhagen summit accomplish? According to first impressions

These are the key points, in a summarized version, to which many heads and representatives of State agreed. If one compares these points to the list of expectations, one notes that only two of the six items enumerated (the first and the fourth) figure explicitly in the Copenhagen Agreement.

A failure...

At first glance, the contents of this agreement do not appear to be even close to the expectations raised by the Conference.

First of all, many observers pointed out that the commitments undertaken by the key players in the negotiations would not limit the increase in average temperature of the Earth to less than 2°C compared to preindustrial levels. It is difficult to compare the proposals of China, the United States and Europe because they do not use the same units of measurement and do not all use the same reference year. When one “converts” these proposals to be consistent with the Kyoto Protocol (global GHG emission reduction between 1990 and 2020), one obtains estimates that are very different, depending on the country. China would see emissions increase fourfold compared to the 1990 level⁶, whereas the US goal of reducing its GHG emissions by 17% by 2020 from 2005 would be equivalent to a decrease of between -3% and -5% from 1990 (due to the strong growth in U.S. emissions between 1990 and today). We might recall that the objective for Europe, specified in the Energy and Climate Change Package, is to reduce GHG emissions by 20% by 2020 from 1990.

According to some experts, if one adds up the reductions promised by the three largest contributors to global warming, global emissions will continue to follow an unsustainable trajectory that could lead to a temperature increase of 3°C⁷.

In second place, the text only refers to the Kyoto Protocol to identify which industrialized countries (i.e. the “annex I parties”) must submit their GHG reduction targets by 31 January 2010. There is no mention of

extending the Kyoto Protocol after 2012. This omission is very important: the Kyoto Protocol is the only text that legally binds Parties to make reductions in their GHG emissions. We might also observe that no progress has been made in regulating GHG emissions in the international maritime and air transport sectors, which were not covered by the Kyoto Protocol.

... that needs to be put into perspective

It would be inaccurate to conclude that the Copenhagen conference was a total failure.

Although many think the Copenhagen agreement is not perfect, at least it has the merit of existing and has been signed, which was far from being a certainty at the beginning of the conference.

Moreover, the Copenhagen agreement covers a larger number of countries than the Kyoto Protocol. The fact that it is not legally binding is certainly why certain countries, which had previously refused to undertake commitments, were willing to agree to GHG emission reduction targets. From this standpoint, the Copenhagen summit can even be deemed a success: it seems to prefigure a new international agreement that would include commitments – albeit voluntary – by the United States and the new emerging powers like China, India and Brazil.

Finally, the Accord states that the global temperature increase should be held to below 2°C compared to the preindustrial era. The import of this statement should not be underestimated. Implicitly, it recognizes the importance of the work carried out by the IPCC as well as the anthropic nature of global warming.

Regional actions: the implementation of carbon markets

After the Kyoto Protocol was signed in 1997 and the Marrakesh accords were adopted in 2001, certain industrialized countries or regions of the world decided to implement carbon markets at industrial level to help reach the Kyoto targets. Figure 6 reviews how these markets work. The term “carbon markets” designates systems for trading GHG emissions allowances and credits representing avoided emissions. These are articulated tools with regulations implemented by states or with voluntary arrangements between actors. Allowances and credits are expressed in terms of tons of CO₂. The EU Emissions Trading Scheme was the world’s first carbon market. In 2008, it represented nearly 73% of world transactions and more than 80% in value terms.

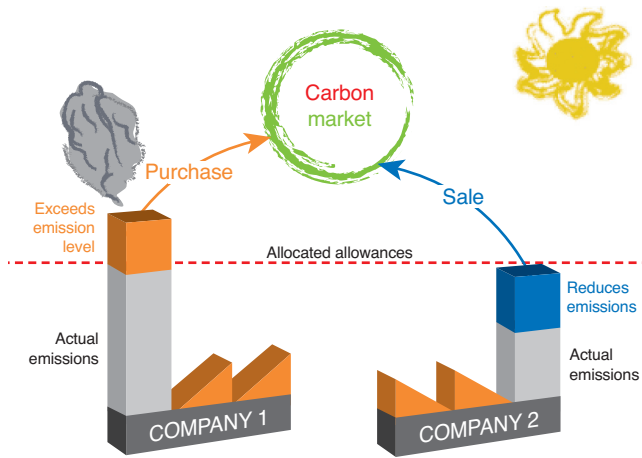
(6) It is not easy to compare the targets set by China with those of other countries.

Wishing to pursue its objective of economic growth, China prefers to talk about reducing its “carbon intensity” (GHG emissions per point of GDP). Its avowed objective is to attain an abatement of between -40% and -45% between 2005 and 2020

(7) Calculation by the UNFCCC Secretariat, in an internal memo dated 15 December 2009. This computation also accounts for targets set by emerging countries

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Fig. 6 - How carbon markets work



Source: Caisse des dépôts

The EU emissions trading scheme

The EU-15 distributed its total Kyoto commitment (an 8% decrease in emissions) among its member States. Since then, the EU has undergone enlargement, gaining 12 more member States, all of which (except Cyprus and Malta) had undertaken Kyoto commitments. The European climate policy basically relies on a cap-and-trade approach.

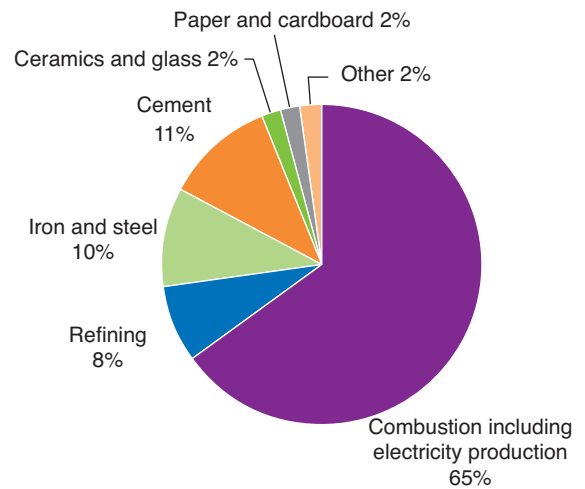
Since 2005, the European union emissions trading scheme (EU ETS) has capped total emissions from about 11,400 industrial installations in the most carbon-intensive industrial sectors. The latter – the production of energy, mineral industries (cement, lime, glass and ceramics), metallurgy (steel, iron) and paper – account for nearly 50% of the CO₂ emitted in the European Union (Figure 7).

During the first two stages of the EU ETS, the test phase (2005-2007) and the Kyoto commitment period (2008-2012), the installations covered by the scheme receive an annual allocation, free in most cases, set by the National quota allocation plan of each country under the supervision of the European commission. In parallel, each year, the installations must return the same allowance of tons of CO₂ as the one verified the previous year (1 allowance = 1 ton of CO₂). Between 2008 and 2012, the installations are also authorized to use a limited amount of Kyoto credits (CERs or ERUs).

Announced by the European Council in March 2007, the European climate policy for the post-2012 era contains the three “3 x 20” climate targets for 2020. The latter aim to:

- increase the proportion of renewables in the energies consumed to 20%,
- improve energy efficiency by 20%,

Fig. 7 - Allocations per sector in 2009 in the EU-27



Source: European Commission

- reduce GHG emissions by 20% from 1990. In the event that a satisfactory international climate agreement is concluded, the target would be revised to -30%.

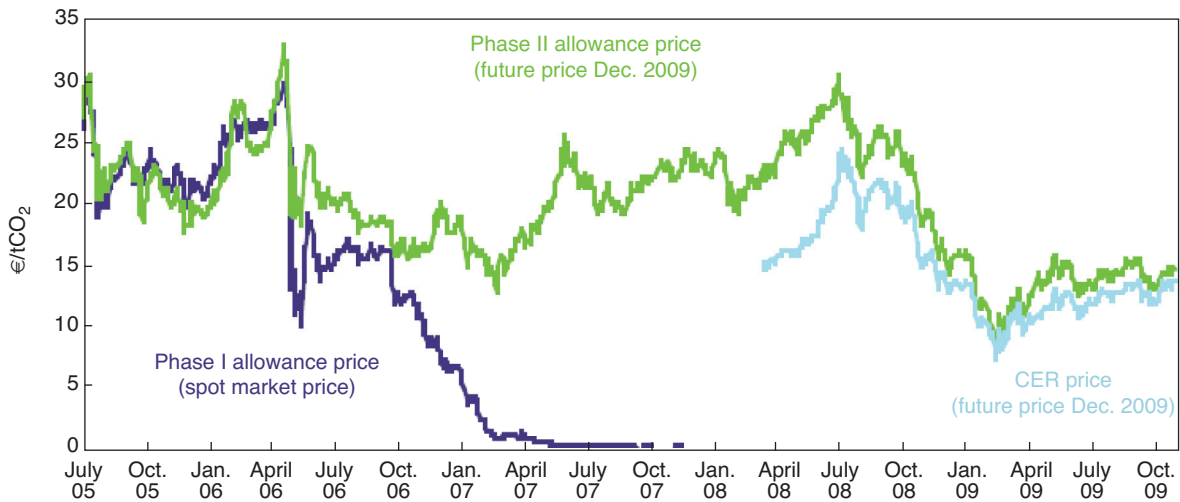
The Energy and Climate Change Package adopted in April 2009, composed of four texts, established more precise ways and means to reach these objectives and distributed them among member States, which were then free to adopt more restrictive regulations. The drive to reach these targets will rely heavily on the EU emissions trading system, extended to 2013-2020. The emissions target for sectors covered by the scheme has been set at -21% for the period 2005-2020 (i.e. an annual reduction of -1.74%), which could be increased if a satisfactory international agreement is concluded.

Starting in 2013, the bulk of allowance allocation, free until now, will no longer be free. The proportion of allowances to be auctioned will rise from 0.13% in Phase I and 3.6% in Phase II to at least 50% by 2013, increasing to 75% by 2027. No free allocations will be made with respect to the electricity production sector. For other sectors would be granted 80% free allocation in 2013 (decreasing to 30% free allocation in 2020, with a view to reaching no free allocation in 2027), except for sectors subject to international competition, to be granted 100% free allocation based on benchmark emissions factors. The revenues from auctioning, to be managed by the States, are expected to total at least 15 to 20 billion euros per year starting in 2013.

The other regional carbon markets

Several schemes for developing emissions trading markets have been approved or are still under study in

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Source: BlueNext, ECX

The price of emissions allowances

The spot price covers immediate delivery of assigned allowances or CERs while the future price is the current price of allowances or CERs delivered at a subsequent date. Between 2005 and 2007, the amount of allowances allocated exceeded the total emissions given off by the installation. Since allowances could not be banked for use in phase II, the phase-one allowance price fell, converging on zero. Once phase II started in 2008, this constraint was a thing of the past. The effects of the economic crisis in late 2008 and early 2009 did not drive down the price of second-phase allowances, because free allocation will decrease during phase III (2013-2020).

several industrialized countries. In late November 2009, New Zealand validated the implementation of a carbon market, effective 2012, whereas the Australian Senate has rejected a draft bill proposing the creation of a carbon market. Today, all eyes are on the United States.

The United States is preparing to implement a federal emissions trading scheme that would cap GHG emissions for a number of industrial sectors that represent 85% of US emissions. The Waxman-Markey Bill will be put to the vote in the US Senate in March 2010⁸. The operating principles would be much like those used in Europe. The emission reduction target for these sectors is 17% by 2020 compared to 2005 levels (20% for the economy as a whole) and 83% by 2050. Relatively ambitious, the legislative package was passed in the US House of Representatives and now must be approved by the Senate. About twenty senators from industrial Northern states, whose votes are needed to pass the bill, remain undecided; their reluctance is likely to mean that the emissions reduction targets will be revised down.

The adoption of an emissions trading system by the United States will be important, especially following the

negotiations in Copenhagen. The US negotiators are not likely to agree to international caps unless they can come to the table with a domestic ETS agreement in hand. The latter would allow industrial market players in the US to rely heavily on flexible mechanisms, such as international and domestic credits that, in the latter case, would come from the sectors of the economy not covered by the trading scheme. Getting the United States to play the game seems to be a prerequisite for any major step forward.

Conclusion

The international climate negotiations will continue in 2010, aiming to produce a regulatory framework for curbing the GHG emissions in the post-2012 era. Negotiations will be pursued in Bonn (31 May-11 June 2010) to lay the groundwork for the 16th session of the Conference of the Parties (CoP 16) to be held in Mexico City in December 2010. The Copenhagen Conference was only able to produce a minimum agreement, an indication that the next international agreement will not be structured like its predecessor, the Kyoto Protocol.

The fact that we must be content with the Copenhagen Agreement, which is no more than a political statement

⁽⁸⁾ Some observers say June 2010, after the vote on the health care bill, still a key priority for the Obama administration

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of agreement, does not mean the end of international climate policy. Let us recall that although the Kyoto Protocol, signed in 1997, did represent a major step forward, it was ultimately a twenty-page political agreement. It came into operation in 2001 at the Marrakesh Conference. However, the Copenhagen Agreement would have to be deployed on the ground in a much shorter time frame, because not even the most skilled negotiators can make the 1st January 2013 deadline go away. The countdown is likely to continue – at an even faster pace – until the December 2010 conference in Mexico City

In the short and medium term, the development of carbon finance will rely more on the implementation of regional or national policies than on the evolution of the international framework under UN support. The process of negotiations has shown the difficulty of achieving this framework.

The European Union has already set an emissions reduction target of 20% by 2020 from 1990. The EU European Trading System will continue to be the mainstay of its policy. It should be noted that the EU has

rejected the revision of the unilateral target to 30% by 2020; Germany was categorically opposed to the idea, given the status of international climate negotiations after the Copenhagen Agreement.

At international level, the development of carbon finance will depend on whether cap and trade systems are established as announced in the United States, Australia, New Zealand and in South-East Asia (Japan, South Korea and Taiwan).

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Final draft submitted in December 2009