International Climate Policy & Carbon Markets

N°05 November 2009

BI-MONTHLY REPORT

ALICE FAVERO E CATERINA CRUCIANI

International Climate Policy and Carbon Markets is a bi-monthly report aimed to provide a clear analysis of the worldwide evolution of the carbon market, and the international and domestic climate policies.

The report is drafted in four sections focused on i) international negotiations and national policies, ii) European and international energy policy, iii) flexible mechanisms and developing countries, and finally, iv) the valuation of the carbon price in the European and global market.

The information and data presented in each section are not only an update of recent events but also an extrapolation of the **quantitative implications** of recent events, based on a detailed analysis of academic papers and recently published reports (i.e. how will the carbon price be impacted by changes in the demand or supply side, etc). Every two months for each section we will briefly introduce and analyse the most important policies (proposed or applied) and actions. Each article will include boxes, figures and graphs in order to provide in-depth examinations and data exemplifications; all papers and reports used for the analysis will be cited in the final reference section.

CONTENTS

INTERNATIONAL NEGOTIATIONS AND NATIONAL POLICIES

US Senate: Kerry-Boxer Bill

What will happen in Copenhagen mainly depends on what the **United States** will bring to the table.

Among developed countries, the US is the only one which has not formally adopted or proposed emission targets for 2020; however, this is understandable taking into account the **status** of the proposed bills. In fact, in a way it would be useless to put forward targets without the assurance that the **Congress** would support them.

So far, two important bills could represent the starting-point for the US domestic climate policy: the House-passed **Waxman-Markey** bill and the Chairman's Mark of **The Clean Energy Jobs and American Power Act** (S. 1733) known as **Kerry-Boxer** bill proposed in the Senate on **October 23**, **2009**.

While the House bill is a comprehensive clean energy and climate bill, the Kerry-Boxer **focuses** primarily on reducing US greenhouse gas emissions (**Box 1**).

BOX 1 KEY ASPECTS OF KERRY-BOXER BILL

1. SCOPE OF COVERAGE
   - **Gases** covered: carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and nitrogen trifluoride (the **same** identified by the Waxman-Markey).
   - **Entities** covered: large stationary sources emitting greater than 25,000 tons per year of GHGs, producers and importers of petroleum fuels, distributors of natural gas, producers of hydrofluorocarbon gases, and other specified large sources.
   - Approximately **85%** of national greenhouse gas emissions are covered under the cap.
2. TARGETS
   - **20%** reduction target from 2005 levels in **2020** (higher than the 17% reduction proposed in the Waxman-Markey bill).
   - **3%** reduction from 2005 levels in **2012**; **42%** reduction in **2030**; and **83%** reduction in **2050** (the same as Waxman-Markey)
3. DISTRIBUTION OF ALLOWANCES
   - Allowances are allocated to electricity and natural gas local distribution companies and to states for home heating oil and propane users expressly for the purposes of benefiting residential, commercial and industrial consumers.
   - **Free allocation** of allowance value is also provided to refineries and to energy-intensive, trade-exposed industries to prevent "**carbon leakage**".
   - It calls for initially **auctioning 10%** of allowances annually (increasing to **25%** by 2040).
4. COST CONTAINMENT: it provides for a two-year rolling compliance period, unlimited **banking** of unused allowances, and limited **borrowing**.
5. OFFSETS
   - it allows for the use of **2 billion tons** of qualified offsets annually: three quarters allowable from **domestic** sources (**1.5 billion**) and one-quarter (**500 million**) from **international** sources.
   - If domestic supplies of offsets prove **inadequate**, an additional **750 million** tons from international sources can be used to reach the total of 2 billion tons annually.
5. PRICE COLLAR: In order to preserve market stability the reserve auction price is set at **$28** (in 2005 constant dollars), this would increase each year by a certain percentage (**5%** through **2017** and **7%** thereafter) over the previous year's reserve auction price plus inflation.
6. CAP-AND-TRADE: The bill envisages as the Waxman-Markey a **GHG cap-and-trade system** under which the government would put limits on the amount of carbon pollution from stationary sources; thus, companies would need an annual permit for every ton of carbon pollution released into the atmosphere. It includes a **6-year moratorium** (2012 through 2017) on states imposing their own GHG cap-and-trade programs.

Kyoto targets within reach for the European Union

According to a report released by the European Commission on November 12, 2009 the **European Union is on track to meet its Kyoto obligations**, thanks to the decrease in greenhouse gas emissions recorded in 2007. In fact, according to the inventories the EU-15 - committed to an 8% reduction under the Kyoto Protocol - managed to reduce GHG emissions by **5%** to **1990** emission levels, despite a **44%** increase in **EU-15 GDP** compared to the same year. The decoupling between economic growth and emissions is confirmed also looking at **EU-27** data, which show a **9%** decrease in GHG emission with a **45%** increase in GDP in 2007 compared to 1990.

TAB. 1 SECTORAL CONTRIBUTIONS TO GHG EMISSION LEVEL IN 2007

SECTOR	VARIATION IN 2007
energy	-7% wrt 1990 levels
transport	+24% wrt 1990 levels
Industrial processes	-11% wrt 1990 levels
agriculture	-11% wrt 1990 levels
waste	-39% wrt 1990 levels

Source: EC (2009)

There is a significant **variability** in the performances of different member states, which span from the -53.4% of Latvia to +52.6% of Spain. The overall reduction in EU-15 emissions is driven mainly by the very **good performances** of **Germany** and the **UK**, which together represent about a third of European emissions and reduced GHG emissions respectively by 21% and 17% in 2007 compared to 1990 levels. Looking at pollution sources, the **transport sectors** is the only sector measuring a marked increase in emissions in 2007 (**Tab. 1**). Projections of future progress in achieving the Kyoto target show that, with current measures the **EU-15** could reduce its emissions by up to **15%** from 1990 levels, while the **EU-27** by **12.8%**, thanks also to a marked reduction in **EU-12** emissions (-29.8%).

However, in order to achieve the ambitious objective put forward by the EU of a **20%** reduction in GHGs from 1990 levels by 2020, existing measures will **not be sufficient** according to the emission projections. Thus, Member States will have to ensure not only the timely delivery of emission reduction of current policies but also the acceleration of the development and implementation of additional policies and measures, currently proposed but not yet in force. These projections are subject to some uncertainty as they are based on Member States computations in which the effects of the adoption of the Climate and Energy package are not fully accounted for (**Tab. 2**).

TAB. 2 PROJECTED EMISSION SCENARIOS -EU-15 AND EU-27

	1990 emissions (Mt CO2eq)	Projections with			
		Existing measures	Kyoto mechanisms use by govts	Carbon sinks	Additional measures
EU-15	4265.5	-6.9%	-9%	-10%	-13.1%
EU-27	5767.3	-12.8%	-14.2%	-15%	-16.5%

Source: EC (2009)

ENERGY POLICY

Investments in green growth energy sector

The **energy sector** is a key-player in the achievement the transition to a low-carbon world. In the special excerpt released in advance of the full *World Energy Outlook 2009*, published on 10th November, International Energy Agency sets out a detailing "**green growth**" pathway for the energy sector in the **450 ppm CO2-equivalent Scenario**, in line with an increase in global temperature of around 2 degrees Celsius.

Focusing on the energy-related investments, they are neither geographically nor distributionally equal. Indeed, the 450 Scenario will increase **cumulative investment** over the period 2010-2030 by **$10.5 trillion** of which $4.7 trillion for transport, $ 2.5 trillion in building, $ 1.7 trillion for power sector and $ 1.1 trillion in industry. **Fossil fuels** will still have a role in this scenario, even if their consumption would peak by around 2020 and then decline; this would imply that more than three quarters of additional investment is needed in the last decade because most of the emission reductions occur **after 2020**. In addition, about half of the additional investment is needed in **OEDC+** countries (OECD countries + EU member states no OECD) (**Tab. 3**).

TAB. 3 ENERGY-RELATED INVESTMENTS FOR ACHIEVING 450 PPM CO2-E TARGET

Level	**additional annual investment** needs in low-carbon technologies and energy efficiency relative to Reference Scenario to meet 450 Scenario in **2020**	**total investment** in the 450 scenario in low-carbon power generation over **2010-2030**	incremental investment cost in **GDP terms**
World	$430 bln	almost $ 6600 bln (72% renewable, 19% nuclear, 9% CCS)	2020: 0.5% of GDP 2030: 1.1% of GDP
OECD+	$220 bln	almost $ 3100 bln (65% renewable, 20% nuclear, 15% CCS)	2020: 0.4% of GDP 2030: 0.8% of GDP
US	$ 90 bln	almost $ 1100 bln (53% renewable, 27% CCS, 19% nuclear)	2020: 0.5% of GDP 2030: 1% of GDP
EU	$ 70 bln	almost $ 1300 bln (77% renewable, 7% CCS, 16% nuclear)	2020: 0.3% of GDP 2030: 0.6% of GDP
Japan	$ 17 bln	almost $ 200 bln (50% renewable, 4% CCS, 46% nuclear)	2020: 0.3% of GDP 2030: 0.6% of GDP
China	$ 80 bln	almost $ 1500 bln (73% renewable, 5% CCS, 22% nuclear)	2020: 0.8% of GDP 2030: 1.5% of GDP
India	$ 25 bln	almost $ 550 bln (83% renewable, 2% CCS, 16% nuclear)	2020: 0.9% of GDP 2030: 1.4% of GDP
Russia	$ 8 bln	almost $ 220 bln (58% renewable, 12% CCS, 30% nuclear)	2020: 0.3% of GDP 2030: 1% of GDP

CCS: so far, too far!

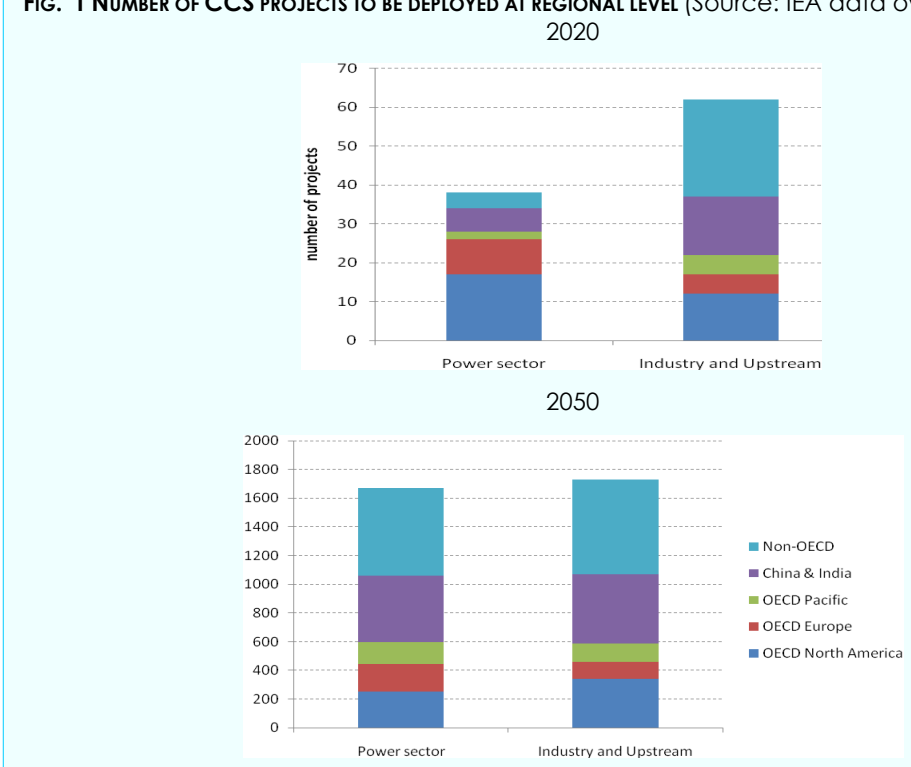
Carbon Capture and Storage is the only currently available technology that allows deep cut in CO2 emissions from fossil fuels. However at the present there are only **five** fully integrated commercial-scale CCS projects in operation (**Box 2**).

BOX 2 CURRENT CCS PROJECTS IN OPERATION

1.**Sleipner** (Norway) for CO2 from natural gas
2. **Snøhvit** (Norway) for CO2 from natural gas
3. **In Salah** (Algeria) for CO2 from natural gas
4. **Rangely** (North America) for CO2 from natural gas
5. **Weyburn-Midale** (North America) for CO2 from a coal-based synfuels plant

According to IEA Roadmap (2009) the implementation of **100** CCS projects globally by **2020** and **3400** by **2050** is required, in order to reduce annual CO2 emissions to half of 2005 levels by 2050 (so called Blue Map Scenario target). These projects should be distributed as showed in **Figure 1**. This would allow to capture over **10 gigatonnes** of CO2 emissions in 2050, although the **investment** associated will be significant: from 2010 to 2050 is estimated to be around USD 5 tn, representing an average value of USD 125 bn invested per year from 2010 to 2050.

FIG. 1 NUMBER OF CCS PROJECTS TO BE DEPLOYED AT REGIONAL LEVEL (Source: IEA data own calculation)



BOX 3 GOVERNMENTS ANNOUNCEMENTS AND FUNDING ALLOCATIONS FOR CCS PROJECTS

Australia	AUD 2 bn (USD 1.65 bn) for funding large-scale CCS demonstrations in Australia
	AUD 100 m a year for three years for the development of the Global CCS Institute
Canada	CAD 1.3 bn (USD 1.2 bn) financial support for R&D, mapping and demonstration project support
	the Province of Alberta has assigned CAD 2 bn (USD 1.8 bn) to support CCS deployment
European Union	the revenue from the auctioning of 300 m credits within ETS to support CCS and renewable energy
	allocated EUR 1.05 bn from economic recovery energy programme for the support of 7 CCS projects
Japan	JPY 10.8 bn (USD 116 m) for study on largescale CCS demonstration since fiscal year 2008
Norway	announced the allocation of NOK 1.2 bn (USD 205 m) for CCS projects
UK	funding for up to 4 CCS projects
US	The Economic Recovery Act includes USD 3.4 bn in funding for clean coal and CCS development
	USD 1.0 bn allocated for developing and testing new ways to produce energy from coal
	USD 1.52 bn will fund industrial CO2 capture projects, including a small allocation for the beneficial reuse of CO2
	USD 800 m will augment funds for the Clean Coal Power Initiative with a focus on carbon capture

Source: IEA Roadmap (2009).

Even if the benefits of reducing emissions through CCS are not yet enough to stimulate its deployment, some **governments** are already tackling the demonstration funding gap (**Box 3**).

Sectoral approaches: new instrument for developing countries?

by Marinella Davide

During the last negotiations of the post-Kyoto agreement under the United Nation Framework Convention on Climate Change (UNFCCC), **sectoral approaches** emerged as a feasible measure to support mitigation actions in developing countries. Indeed, some industrialized countries, as the US, Japan and the EU propose to **introduce** - through sectoral approaches - developing countries into emission mitigation actions.

On this regard, in *Sectoral Approaches and the Carbon Market* authors provide an interesting analysis on (i) the aspects of sectoral approaches in the **carbon market** in order to reduce greenhouse gas (GHG) emissions in developing countries; (ii) the implication of moving from the current single project approach, as Clean Development Mechanisms (CDM), to a multi-plant, sector-wide carbon market mechanisms.

There are different ways to include sectoral approaches in the future climate agreement as described in **Box 4**.

BOX 4 SECTORAL APPROACHES OPTIONS

OPTION	DESCRIPTION	BASELINE
Sectoral Crediting Mechanism (SCM)	Generates emission reduction credits in a sector against an agreed "no-lose" baseline, according to which a developing country could generate credits if its emissions were below the baseline, without the application of penalties. In this case credits are issued ex *post,* as in the CDM.	The baseline could be set on: (i) an intensity basis, calculating the tCO2 eq. emissions per unit of output; (ii) a fixed quantity of emission, calculating the tCO2 eq. emissions for a particular sector in a given time period.
Sectoral trading	There is a sectoral cap, allowances can be traded nationally and internationally, and the country is responsible if is not in compliance. In this case credits are allocated ex *ante*.	Fixed emission targets
Technology-based sectoral objective	Allows a country to implement a technology diffusion approach domestically as its primary goal is to reach a sectoral emission baseline.	The baseline consists on an agreed technology goal. It could take various forms such as the increasing capacity of a particular technology by a specified amount or rate, or a share of the physical capacity for a sector to be fitted with a certain technology by a specific date.

The choice of the target is very important for the effectiveness of the market mechanism. In **Box 5** advantages and disadvantages of three different targets are analysed.

BOX 5: PROS AND CONS OF POSSIBLE SECTORAL TARGETS

BASELINE	PROS	CONS
Intensity target	- flexibility with respect to the growth of the sector; - precision in the definition of the target.	- need of more precise information on production methods, possible improvements and costs; - difficulty in the monitoring process (more data on emissions and indicators of output); - possibility of perverse effect in some sectors.
Fixed target	- certainty on the maximum level of allowable emissions; - easy monitoring process; - easy devolution to actors responsible for the emissions.	- lack of flexibility; - risk of overestimating the target.
Technology based goal	- visibility for possible donors; - flexibility in the definition of a specific technology target; - easy monitoring process.	- difficulty to establish a pre-agreed methodology of calculating GHG mitigation; - uncertainty on estimating GHG mitigation impacts.

Since the **environmental effectiveness** of CDM has been sometimes criticised, authors also underline the need to go beyond the offsetting nature of the existing project mechanisms, proposing some options to increase the contribution of crediting in the emission reduction (**Box 6**).

BOX 6 OPTIONS TO INCREASE THE CONTRIBUTION OF CREDITING IN THE EMISSION REDUCTIONS

On the **supply side**:

- setting ambitious baselines, below BAU;
- discounting emission credits issued by the various crediting (i.e. to issue less than one credit for each tCO2 eq. below the baseline);
- restricting the eligibility of sector and activities for crediting, encouraging other mitigation activities.

On the **demand side**:

- discounting emission credits as they are used for compliance (i.e. to surrender more than one credit for each tCO2 eq. being offset);
- acquiring and cancelling a portion of credits;
- recognizing rules of international credits in domestic carbon markets.

In conclusion the current negotiating process should identify incentives for developing countries to adhere to sectoral approaches. According to the authors, introducing this option in developing countries could expand the carbon price signal, and remunerate investment in clean technologies. For an economic perspective, this evolution in the carbon market is welcome. Even if uncertainty on scope, acceptability and timing for the possible introduction of these new instruments remains, the carbon market will continue to be very effective in driving mitigation investment.

When it is not (only) about money: an institutional view on climate finance

Just a few months away from the UN Conference of parties in Copenhagen the **World Resources Institute** published a new report on climate finance entitled *Power, responsibility and accountability: re-thinking the legitimacy of institutions for climate finance* focussed on the institutional features that could make it a success. As members to the UNFCCC struggle to agree on the specific design of a Kyoto successor and avoid any commitment to a precise financing schedule for developing countries, this report addresses the problem of institutional legitimacy - the key to making climate change mitigation and adaptation activities acceptable to both donors and recipients.

BOX 7 INSTITUTIONAL LEGITIMACY IN CLIMATE FINANCE
- **POWER** → formal and informal distribution of the capacity to determine outcomes
- **RESPONSIBILITY** → the exercise of power for the intended purpose
- **ACCOUNTABILITY** → standards and systems that ensure that power is exercised responsibly

BOX 8 FUNDS REVIEWED (SOURCE WRI)
1. **Global Environment Facility** → Since 1994, the interim financial mechanism of the UNFCCC
2. **Montreal Protocol Fund** → Since 1990, the Multilateral Fund to eliminate Ozone Depleting Substances
3. **Adaptation Fund** → Since 2008, under the Kyoto Protocol, financed by a 2% levy on Clean Development Mechanism transactions
4. **Forest Carbon Partnership Facility** → Since 2007, World Bank carbon financing pilot for forest emissions
5. **Climate Investment Funds** → Since 2008, World Bank and MDB pilot funds
   - Clean Technology Fund: finance clean technology deployment to reduce GHGs
   - Pilot Program on Climate Resilience: funding for adaptation to climate change
   - Forest Investment Program: financing to address the role of forests in climate change
6. **Brazil Amazon Fund** → Since 2008, Brazilian National Development Bank fund to reduce deforestation
7. **Bangladesh Multi-Donor Trust Fund** → Since 2008 National World Bank administered climate change fund
8. **Indonesia Climate Change Trust Fund** → Since 2009, Planning Ministry (Bappenas) fund administered by UNDP

The report focuses on three aspects of **institutional legitimacy** (**Box 7**) and analyses ten international and national **finance institutions** (**Box 8**), drawing several conclusions on the opportunities to improve carbon finance institutional setting.

The report concludes that **legitimacy** can be increased giving greater voice to developing country recipients, for instance by de-linking the source of finance from the exercise of informal power by donors, by adopting new levies, such as the levy on Clean Development Mechanism (CDM) projects.

Several **good-governance** suggestions are also drawn in the report: for example, transparency and accountability in climate-finance recipient countries must be further pursued, along with technical capacities a clear articulation of responsibilities and the ability to engage stakeholders and potential beneficiaries. On the other hand, the agencies implementing the finance project should rely more on national institutions rather than on external consultants.

THE CARBON PRICE

The structure of the analysis

This section is dedicated to the presentation of the most recent carbon price estimations both for the European carbon market, represented by the EU ETS (European Emission Trading Scheme) and for the International market. These evaluations are divided into two tables according to the time horizon. The first one includes the evaluations in the short term (within 2020) usually published by consultancies and focused on the EU ETS with estimations for the second phase (2008-2012) and for the third phase (2013-2020).

The **Table 4** presents the long-term estimations (after 2020) as calculated through economic models. For each evaluation collected we will define the source (AUTHORS) and the publication year (YEAR).

For both sub-sessions (short and long-term analysis) information will be provided on the **scenario** assumed in the models, which may be useful in order to understand the achieved results (assumptions on the policy, allowed use of flexible mechanisms, geographic area reference, etc), and on the **variability** observed in the group of models analysed monthly, in particular in terms of **mean** and **variance** , showed at the bottom of the tables.

For what concerns **Tab. 4**, the stabilization scenario at **450** parts per million (ppm) of CO2 in the atmosphere will involve higher carbon prices compared to less ambitious stabilization scenarios such as the 550 ppm CO2. Taking into account that the present CO2 concentration is around 380 ppm, it is easy to understand that in order to keep the concentration under a certain level such as 450 ppm (this is the level needed in order to avoid a 2°C temperature increase by the end of the century according to many authoritative sources) a strict policy with a high CO2 price is required.

Finally, the **new average** and **variance** will be included in the last rows of each table below the average and the standard deviation of **previous estimations**, which are computed taking into account all estimations from previous reports, in order to reach an increasingly reliable price value.

For this number no new short term price scenario has been published; hence, we analyse only the long term estimations.

TAB. 4 ECONOMICS MODELS FOR THE LONG-TERM CARBON PRICE EVALUATION

MODEL	AUTHOR	YEAR	SCENARIO	CO2 PRICE ESTIMATION (€/tCO2)			
				2020	2030	2050	2100
WITCH[1] IMACLIM REMIND	Recipe Project	2009	Immediate and global collaborative action on climate change and a broad portfolio of mitigation options are assumed for a stabilization target of 550 CO2-only Global cap-and-trade stabilization target by 2100	**16.52 189.31 8.57**	**58.28 273.45 17.50**	**376.32 241.47 70.58**	**1011.94 320.56 70.14**
E3MG	The Climate Group	2009	LIMITED ACTION a) EU–only action → -30% 1990 level by 2020 b) US–only action → - 30% 1990 level by 2020 c) EU and US joint action → - 30% 1990 level by 2020 d) All Annex I Countries → - 30% 1990 level by 2020 CHINA INCLUDED IN MITIGATION EFFORT e) Annex I + China (2010) → Annex I: - 30% 1990 level + China: return to 2010 levels by 2020 f) Annex I and China (2015) → Annex I: - 30% 1990 level + China: return to 2015 levels by 2020 GLOBAL CLIMATE AGREEMENT g) World (Developing 2010) → Annex I: - 30% 1990 level + Non-Annex I: return to 2010 levels by 2020 h) World (Developing 2015) → Annex I: - 30% 1990 level + Non-Annex I: return to 2015	a) 59.38 b) 40.20 c) 25.58 d) 19.18 e) 11.88 f) 3.65 g) 7.31 h) 3.65	*n.d.*	*n.d.*	*n.d.*

[1] The WITCH model results have already been included in the N.1 of March of International Climate Policy and Carbon Markets.

			levels by 2020				
REMIND-R	Luken M. et al.	2009	Four climate policy scenarios with different assumptions on the availability of technologies: i. DEFAULT → The full portfolio of low-carbon technologies is available ii. NUCLFIX → The use of nuclear power is restricted to levels in the reference scenario. iii. RENEWFIX → The use of renewable energy sources (wind, solar, hydro and geothermal energy) is restricted to the respective levels in the reference scenario. Biomass use is not restricted. iv. CCSMIN → The use of carbon capture and storage (CCS) is limited to a total cumulated amount of 100 GtC.	*n.d.*	*n.d.*	*n.d.*	i. 925.51 ii. 1177.92 iii. 1009.65 iv. 3281.35
AVERAGE OF MODELS ANALYSED THIS MONTH Stabilization at **450** or 550 ppm				**36.87** --	**145.47** --	**156.03** --	**1130.85** --
STANDARD DEVIATION OF MODELS ANALYSED THIS MONTH Stabilization at **450** or 550 ppm				**56.47** --	**180.98** --	**120.84** --	**1137.13** --
AVERAGE OF PREVIOUS ESTIMATION Stabilization at **450** or 550 ppm				**44.03** 17.66	**72.18** 22.97	**214.94** 41.78	**1039.53** 108.84
STANDARD DEVIATION OF PREVIOUS ESTIMATION Stabilization at **450** or 550 ppm				**30.38** 9.18	**30.40** 11.22	**130.96** 25.62	**657.78** 85.59
NEW AVERAGE ESTIMATION Stabilization at **450** or 550 ppm				**42.60** 17.66	**76.15** 22.97	**211.66** 41.78	**1059.83** 108.84
NEW STANDARD DEVIATION Stabilization at **450** or 550 ppm				**36.45** 9.18	**45.44** 11.22	**129.52** 25.62	**763.54** 85.59

REFERENCES

"The Clean Energy Jobs and American Power Act (S. 1733)- Kerry-Boxer Bill." At http://kerry.senate.gov/cleanenergyjobsandamericanpower/pdf/bill.pdf

Ballesteros A., S. Nakhooda, J. Werksman, K. Hurlburt and S. Kumar (2009). "Power, responsibility and accountability: re-thinking the legitimacy of institutions for climate finance, WRI Working Paper. World Resources Institute October 2009. At http://pdf.wri.org/working_papers/power_responsibility_accountability.pdf

Baron, R., B. Buchner and J. Ellis (2009). "Sectoral Approaches and the Carbon Market." OECD/IEA, May 2009. At http://www.oecd.org/dataoecd/8/7/42875080.pdf

Edenhofer, O., C. Carraro, J.-C. Hourcade, K. Neuhoff, G. Luderer, C. Flachsland, M. Jakob, A. Popp, J. Steckel, J. Strohschein, N. Bauer, S. Brunner, M. Leimbach, H. Lotze-Campen, V. Bosetti, E. de Cian, M. Tavoni, O. Sassi, H. Waisman, R. Crassous-Doerfler, S. Monjon, S. Dröge, H. van Essen, P. del Río, A. Türk (2009). "RECIPE - The Economics of Decarbonization." Synthesis Report, Nov 2009. At http://www.pik-potsdam.de/research/research-domains/sustainable-solutions/research-act-intl-climate-pol/recipe-groupspace/working-papers/recipe-synthesis-report/

European Commission (COM(2009) 630). "Report on the progress towards achieving the Kyoto objectives." November 2009. At http://ec.europa.eu/environment/climat/pdf/gge/com_2009_630.pdf

European Commission (SEC(2009)1581). "Staff working paper of the Report on the progress towards achieving the Kyoto objectives." November 2009. At http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=SEC:2009:1581:FIN:EN:PDF

IEA (2009). "How the energy sector can deliver on a climate agreement in Copenhagen." International Energy Agency, October 2009. At http://www.iea.org/weo/docs/weo2009/climate_change_excerpt.pdf

IEA (2009). "Technology Roadmap Carbon capture and storage." International Energy Agency, October 2009.

Luken M., N. Bauer, B. Knopf, M. Leimbach, G. Luderer, O. Edenhofer (2009). "The Role of Technological Flexibility for the Distributive Impacts of Climate Change Mitigation Policy." Published at the International Energy Workshop, May 2009.

Pew Center (2009)."At a Glance. Clean Energy Jobs and American Power Act Passed by Committee on November 5, 2009." At http://www.pewclimate.org/docUploads/short-summary-kerry-boxer-epw-committee-11-05-09.pdf

The Climate Group (2009). "Breaking the Climate Deadlock. Cutting the Cost. The Economic Benefits of Collaborative Climate Action." September 2009