
Climate Strategies

Research Prospectus
2010

Draft

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Climate Strategies aims to assist government in solving the collective action problem of climate change. It is a “not for profit” membership organisation, Companies House Number 05796323 in the UK. Funders include governments and foundations. All our research is published in the public domain.



www.climatestrategies.org

Climate Strategies

Climate Strategies is a not for profit, academic membership organization, hosted at Cambridge University.

Who we are

Climate Strategies is an international network of leading academic specialists on economic and policy issues concerning climate change. We provide a bridge between research and international policy challenges. Our aim is to help government decision makers manage the complexities both of assessing the options, and of securing stakeholder and public consensus around them. We convene international teams of leading researchers focused on specific projects. Our reports and publications have a record of impact in the public and private sectors.

What we do

Our mission is to assist governments in solving the collective action problem of climate change. We achieve this by convening international groups of experts to provide rigorous, fact-based and independent assessment on international climate change policy, and connecting this capacity to the policy process and public debate.

To effectively communicate insights into climate change policy, we work with decision-makers in governments and business, particularly, but not restricted to, the countries of the European Union and EU institutions. In 2010 we are increasing our reach, and will be actively communicating insights in North America and conducting research in the Asia Pacific region.

Funding

Our research programme depends upon funding from a wide range of governments, foundations and business sponsors. Our strategy is to build a relatively small core of high-level funders from both public and potentially private sectors, that are seeking to foster a consensus view drawing upon leading-edge research, and to access the core capacities of the Climate Strategies network to assist their own work. Whilst we have transited to a portfolio funding arrangement over the last year, we still receive some public sector project funding.

We are grateful for funding from the government of Australia, Agence de l'environnement et de la maîtrise de l'énergie (ADEME) in France, Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) in Germany, Ministry of Foreign Affairs (MFA) in Norway, Swedish Energy Agency (SEA) Sweden, Department for Environment, Food and Rural Affairs (DEFRA), the Office of Climate Change (OCC), Department of Energy and Climate Change (DECC), Department for International Development (DFID) in the UK, The Carbon Trust, Nordic COP15 Group, Corus Steel, Center for International Public Policy Studies (CIPPS) in Japan, European Climate Foundation (ECF) in The Netherlands, and the German Marshall Fund of the United States.

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Summary of 2010 Research Projects

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Agreed projects

1. Interpreting and comparing post-Copenhagen mitigation targets and mechanisms

Status	<i>In progress</i>
Project leader	Prof. Michael Grubb, Chair of Climate Strategies
Contributors	Antonia Baker, Ministry of Environment and Tourism, Republic of Namibia; Alex Bowen, LSE; Jean-Charles Hourcade, CIRED; Sophia Parker; Thomas Brewer, Climate Strategies; HongXing Xie, University of Cambridge; Hitomi Kimura, Institute of Global Environmental Strategies; Anna Korppoo, Institute of International Affairs, Finland; Andrew Macintosh, Frank Jotzo, The Australian National University; Devin McDaniels, Climate Strategies; Thomas Spencer, GermanWatch; Tim Laing, EPRG, University of Cambridge
Project description	<p>This project builds upon the findings of the Climate Strategies study that resulted in the paper <i>'Comparability of effort by Annex I Parties: an overview of issues'</i>. That study has:</p> <ul style="list-style-type: none"> • Shown the complexity of even establishing different declared emission targets on a like for like basis with respect to eg. carbon sinks, coverage, offsets • Confirmed a high degree of variation in economic modelling results, the untangling of which (getting models even to model the same question) is clearly a very large task • Confirmed the importance of the economic recession, not just as a short-term blip but as an enduring factor in growth forecasts • Introduced an indicator that implies a closer linkage between "comparability in 2020" and "time consistency to 2050" – and an implication, with the recession therefore factoring in both directly to 2020 and to the wider debate about time- and-climate consistent patterns of economic recovery <p>Negotiations in the aftermath of Copenhagen – on confirming or refining emission targets – may well continue through at least first half of next year with a deadline for formal proposals on 31. January.</p> <p>This proposal builds on the initial paper with the following areas of work:</p> <ol style="list-style-type: none"> 1. Interpreting emission pledges: the need for common accounting framework 2. Emission trends and commitments to 2020-30: the impact of financial crisis and business cycles 3. Implications of a post-Copenhagen agreement for emission offset supply 4. Integrated assessment of the implications of post-Copenhagen targets and mechanisms
Work packages	<p>The research project consists of three papers, a synthesis report and an –optional– educative seminar.</p>

WP1: Interpreting emission pledges: the need for Common Accounting Framework

Lead author: Antonia Baker, with experts from key countries

Context: Interpreting the US offer under Waxman-Markey remains somewhat opaque, with most roads leading back to the WRI analysis. Issues are particularly complex with respect to carbon sinks and offset provisions, though other complexities exist and may become more marked, particularly if Copenhagen does not agree a common accounting framework. The difficulties may be just as big with respect to emission targets from the emerging EIT group of Russia, Ukraine, Kazakhstan and Belarus, where sinks and baseline variations, and perhaps methane, may also play a bigger role. Indeed, most of the declared targets have some features which complicate their comparison on a "like for like" basis. The recent addition of a Chinese intensity target further amplifies the need for a broader ranging assessment.

Motivation: It will be helpful for negotiations to have an independent assessment, placed in the public domain, that explains the variations and tries to illustrate national offers on a "like for like" basis. The research will also assess ways of country targets if they have different emissions coverage.

Climate Strategies thus proposes to clarify the numbers on a 'like for like' basis with

explanation of the complexities and uncertainties, on a timescale relevant to both Copenhagen itself and the follow-up process. Following the networked nature of the organisation, we would draw upon independent expertise within most of the countries.

The paper contains discussion of each country target, describing what is actually known about their proposed target, any differentiation of emissions coverage from the Kyoto gas basket, the role of domestic carbon sinks and estimates of their potential contribution, and the provisions relating to international offsets, and any REDD-related crediting provisions.

WP2: Emission trends and commitments to 2020-30: the impact of financial crisis and business cycles

Lead author: Alex Bowen, with experts from key countries

This paper will provide both an in-depth exposition of the nature of recession impacts and business cycles more generally, and an application of these insights to emission prospects in six key countries/regions to 2020. It will also outline the relationship of these macroeconomic factors to the underlying economics of emissions abatement to 2020 and beyond to 2030, in the context of mid-century decarbonisation goals and the wider literature on optimal abatement paths and the 'trajectory indicator' outlined in the paper *Comparability of effort by Annex I Parties: an overview of issues*.

- Part I Economic growth, the recession and the links between GHG emissions and economic development
Part I will survey what is known about the relationship of economic growth to emissions at different stages of development, the impact of business cycles along with other determinants of emission trajectories, and the most up-to-date specific assessments of the impact of the financial crisis on recent emissions, debt, investment and consequent economic growth forecasts.
- Part II: National and regional applications
Part II will present six national/regional studies, corresponding to the six countries examined in the previous paper on *Interpreting Emission Pledges*. These will cover all the major industrial countries, with brief discussion of how the insights might also translate to other industrial countries (e.g. USA to Canada; Russia to Ukraine; Australia to New Zealand; China to India). The studies would engage national / regional experts to survey domestic projections of country/region-specific BAU emissions trajectories, and explore briefly how these relate to the overall macroeconomic analysis laid out in Part I, using some sensitivity analysis where possible. The studies would also indicate briefly how national macroeconomic and resource circumstances might influence the economics of domestic abatement targets in the context of ambitions for mid-century.

WP3: Offset supply in the light of a post-Copenhagen agreement

Climate Strategies is in discussion with IGES in Japan regarding a detailed scenario-based analysis of the possible implications of text options for likely supply of offsets (CDM credits, other credits, fungible REDD supply) into the international carbon market.

WP4: Integrated analysis of a post-Copenhagen package on emission targets and offsets

The final deliverable would be able to present an integrated understanding of the targets that draws upon the existing paper on *Comparability of Effort*, including their relationship to offset supply. In the absence of the offset supply analysis, deliverable 4 would still present an integrated analysis of the targets, fully interpreted, compared to the analysis of "baseline" implications of the recession and low-carbon recovery pathways.

WP5: Optional: Educative Seminar

There are various options for format of a possible Educative Seminar, probably associated with presentation of the final report that we would like to discuss with funders.

Time line

Dec 2009 – June 2010

2. Carbon pricing for low carbon investment

Status	<i>In progress</i>
Project leader	Dr Karsten Neuhoff, Climate Policy Initiative (CPI) DIW Berlin – German Institute for Economic Research
Contributors	Proposed – to be agreed: Benoît Leguet (Mission Climat of Caisse des Dépôts); Michael Liebreich (New Energy Finance); Axel Michaelowa (University of Zurich); Lambert Schneider (Institute for Applied Ecology); Roland Ismer (University of Erlangen); Hansjörg Ziesing (DIW Berlin); Ralf Martin (LSE); Jean-Charles Hourcade (CIRED); Felix Matthes (Institute for Applied Ecology); Anne Neumann (DIW Berlin); Karolin Rogge (ISI Fraunhofer); Julien Chevallier (University Paris Dauphine); Barbara Buchner (CPI Venice); Camilla Bausch (Ecologic); Michel Colombier (IDDRI)
Project description	<p>The carbon price is a key component of the climate policy mix. This project will use a quantitative framework to assess the impacts of possible policy developments on low-carbon investment:</p> <ul style="list-style-type: none"> • Timing and volume schedule for auctions for post 2012 allowances • Shape of reduction trajectory, e.g. as EU moves to 30 % emission reduction target • Design on post 2012 auction (reserve price?) • Which sectors should be covered by EU ETS versus Carbon tax • Which sectors require complementing regulatory measures, e.g. standards • How to design / time the CCS bank <p>This also creates the opportunity to collate evidence on the role of banking under EU ETS so as to inform the policy discussions in other regions on the shape of the emission reductions trajectory.</p>
Work packages	<p>WP 1. Quantifying supply-demand balance</p> <p>The discussions on the role of CDM supply for the EU ETS allowance prices have illustrated the need for a comprehensive understanding of the supply-demand balance and associated uncertainties. While the detailed modeling work is outside of the scope of this project, we anticipate using strategic partnerships with other research and commercial organizations to create a robust framework on the following for components:</p> <ul style="list-style-type: none"> • Demand projections for the sectors covered under EU ETS. We will attempt to capture uncertainties and responsiveness to carbon price development by assessing different scenarios that are projected and outcomes from different models. • Supply projections as outlined in the Directive, but also including potential developments if EU ETS targets should be tightened after Copenhagen. • Linking: In particular the use of CDM and JI credits can provide additional supply. Some approximation of the international supply-demand balance with judgments on the development in other regions will be necessary. • Banking of CO₂ allowances, as hedging instrument, speculative instrument or strategic action can create additional scarcity and increase or decrease price volatility. A better understanding of the capacity and requirements of different actors to pursue such banking is essential, and will be pursued in close integration with WP 2. <p>The broader framework will also allow assessing the sensitivity of the demand-supply balance to policy developments and in particular the role of expectations of different actors.</p> <p>WP 2. Impact on investment</p> <p>Most of the emission reductions of industry sectors covered by emission trading are expected to result from changes to investment choices, including the use of more energy and carbon efficient technologies and the shift towards more energy and carbon efficient processes, products and services.</p> <p>The purpose of this work-package is to enhance the understanding of investors' responses across the different sectors to carbon pricing, so as to inform the design of the carbon</p>

pricing regime, to identify communication challenges and opportunities to investor and finance actors to enhance the effectiveness of the regulatory instruments, and to assess the benefits and challenges of complementing policy instruments (direct regulation, standards).

For the analysis we can categorize decision makers according to their respective sector, or according to their role in low-carbon developments:

- independent or corporate project developers assessing individual investment options
- financial institutions providing loans to finance individual projects
- corporate decision makers, deciding on long-term product and production strategies
- financial institutions, pension funds and private actors allocating capital in equity markets
- financial institutions, hedge funds and private actors investing in carbon credits

The objective of this project is to engage with the different actors so as to understand how carbon pricing schemes and broader climate policy frameworks are reflected in their decisions.

We expect to observe the most direct impact when assessing the investment choices into CO₂ allowances, e.g. the role of banking. A key mechanism for the success of the US SO₂ trading scheme was the ability of market participants to bank SO₂ allowances over time. Thus early emission reductions were rewarded and allowances retained significant value, even with overall emissions significantly below the emission targets of the initial years. Under EU ETS the regulatory constraint on banking between phase I and phase II was widely assessed, but so far empirical assessments on the role of banking in the absence of such constraints are limited to regressions of spot prices on forward prices. The research will require the identification of main actors and their incentives to pursue banking (hedging, speculative, investment). This will determine the volumes of banking that can be expected as function of the expected volatility and future price path of carbon prices. This work can be informed by discussions with investors in other commodity markets, so as to understand the role of long-term financial contracts for investment and operation decisions.

Similar assessments will have to be performed for the other actors, in particular with regard to their response to

- Expected carbon price
- Expected volatility of carbon price
- Expected emission target

Financial contracts might allow investors to hedge exposure of individual projects to uncertain future carbon prices. We will characterize a few basic contracts that might emerge (e.g. contract for difference), and discuss whether a private sector counter party for such contracts exists (counter party risk, diversification opportunity, hedging opportunities)

Methodologically this will require some further developments, and it is currently not clear what will be the most suitable segmentation of actors. For example we could also differentiate between:

- Strategic investors
- Project investors
- Innovative tech companies
- Banks other providers of finance

WP 3. Assessing policy design choices

The empirical evidence from work package 1 and 2 provides the basis for detailed assessments of upcoming policy questions.

- The role of public policy to facilitate banking: Can specific tax treatments affect the interest and capacity of actors to participate in long-term banking – and how would it influence price stability?
- Suitable timing and volumes of auctions for post 2012 allowances, considering the hedging demand and banking capacity of market participants.
- The role of auction design to define a price floor: What is the credibility of public

policy in defining reserve prices in auctions and the level of such price that would be necessary to materially influence investment decisions.

- The influence of policy statements on expectations and thus investment and banking decisions of different actors. How would public and private communication have to improve to enhance visibility and understanding, facilitate coordination, provide regulatory commitment for private sector investors.
- How can a transition to a 30% emission reduction target be formulated so as to deliver maximum benefit in terms of shifting investment choices to low-carbon technologies and sectors and enhancing regulatory credibility.
- The different options of limiting the use of CDM credits, and the implications both towards European investors and project and policy continuity in developing countries.

Time line

Dec 2009 – Dec 2010

3. International industry competitiveness, carbon leakage, and approaches to carbon pricing – an analysis of the key sectors

Status	<i>Initial work package and a tender are in progress.</i>
Project leader	Susanne Dröge, Senior Researcher, SWP - German Institute for International and Security Affairs, Berlin
Contributors	Nick Rowley, Kinesis (Initial WP Project Leader); Andreas Türk, Joanneum Institute; Misato Sato, LSE; Simone Cooper, Climate Strategies
Project description	<p>Carbon leakage and international competitiveness issues are becoming increasingly salient for governments and businesses because of the continuing and largely uncoordinated development of cap and trade systems in many countries around the world. In addition to this dynamic government policy environment, industries are also coping with the ongoing global recession that is affecting the structure of individual industries in many countries. As a result of these regulatory and economic changes, the nature, extent and implications of the carbon leakage and international competitiveness issues associated with the existence of multiple cap and trade systems remain amongst the key issues in international climate policy.</p> <p>Much of the research that has already been done by Climate Strategies and others on leakage and competitiveness issues remains valid and useful. Those studies have helped to clarify key concepts, produce empirical and modeling results on the implications for specific industries, identify policy tools available to governments and begin to assess the associated trade-offs for governments and business. It has been well established, for instance, that leakage and competitiveness are less of a significant macro-economic issue; rather they are issues for a few specific industries and of course for the design and implementation of cap and trade systems. That recognition underlies the emphasis of this proposed study on industry-level issues.</p> <p>There are three ways in which the work undertaken to date is not adequate for the current and prospective needs of government policymakers, business decision-makers and other stakeholders. First, there needs to be more detailed and data-based analysis for an additional few key industries beyond the core sectors already identified as being at risk (steel, cement, aluminium). Second, the oft cited claim that industries are becoming footloose and migrating to pollution havens where climate policy is absent or less stringent needs a rigorous, in-depth academic assessment. Third, the analysis needs to take into account explicitly and thoroughly the implications of the current and anticipated changes in the climate and economic policy environment both in the domestic and international arena. A deeper review of the data and modeling work in addition to the three core sectors already identified in existing literature would potentially be very useful for climate stakeholders. Refineries, chemicals (to be further determined), and for some regions pulp&paper and glass would be of most relevance for this deep-dive analysis. This part of the project could involve the application of the leakage potential analysis, which was introduced in Climate Strategies' initial project on leakage (<i>Tackling leakage in a world of unequal carbon prices</i>, 2009). Analysis could include: determinants of cost pass-through, trade relations, market structure etc.</p> <p>In addition to this a deeper analysis of investment strategies, options, and determinants is needed for all sectors (cement, steel, aluminium, plus the "new" ones). Carbon costs interact with other production and location costs and the triggering of new investment abroad based on the carbon cost argument hinges on the cost structures including transportation to and from a the EU or any other country with carbon pricing.</p> <p>The project will also explore the political issues and options surrounding competitiveness and leakage in light of current and anticipated short-term international and domestic climate policy agendas of the countries under investigation (eg. EU, US, AUS, Japan). Given the slow progress of climate policy development at the international level, although a leveling of the carbon costs across the major trading regions for the EU, but also for the US and other countries considering to increase carbon costs is needed. However, it seems to be out of reach in the short to mid-term. An integration of carbon markets following a linking of schemes will not always deliver the desired alignment of costs – as pointed out by previous</p>

Climate Strategies work (*Linking of Emissions Trading Schemes*, 2009) in all sectors of the economy. Instead the policy solutions could differ depending on the sectoral characteristics of those regions covered by carbon pricing. More in-depth analysis should allow for the development of recommendations for policy makers - both at the national and international level – on how to deliver both a reliable carbon price signal and a transparent business environment. In particular, free allocation and border adjustment are ranked highly as potential remedial policy options in regions covered by carbon pricing. Both these policy tools have a mixed performance with regards to their climate and competitiveness effects that would need to be explored further for sectors identified.

**Initial Work
Package**

Comparative competitiveness issues – Case Study: Mid Western States, USA; Japan; Poland; Australia

Concerns about the loss of industrial competitiveness and leakage of CO₂ emissions remain one of the major barriers to placing more robust CO₂ mitigation obligations on industrial sectors. Assumptions regarding the economic implications of pricing and regulation have a conservative effect on domestic policy. Existing literature has defined concepts, established the analytics, and offered some quantitative insights on the impacts of profitability, production and market-share of emissions reduction.

There is consensus in the literature that most sectors have the theoretical potential to make short-term profits from the existing structure of the EU ETS, if they receive CO₂ allowances for free, and pass opportunity costs of CO₂ through to product prices. However, for manufacturing sectors of internationally mobile products, their ability to pass through CO₂ costs it is constrained by:

- the potential loss of exports, and displacement of domestic production by imports from existing facilities in response to the resulting price differentials;
- the extent to which sectors do face cost increases that are not matched by allowances (principally through electricity price effects);
- possible impacts of CO₂ price differentials on location decisions for new production facilities.

This short Initial Work Package aims to take the analysis of competitiveness issues further by a more robust and comprehensive analysis of data in Poland, US, Australia and Japan. An analysis will be conducted and recommendations will be drawn for each region on the impacts of emissions trading on competitiveness and GDP.

The principal questions of the Initial Work Package are:

- To what extent are the industries in each country exposed to international competitiveness issues as a result of the combination of their energy intensity and trade intensity?
- How important are the impacts for the national economy?

**Work
packages**

WP I - **What is the nature and extent of the potential competitiveness and leakage impact** of cap and trade systems on energy-intensive industries given (a) the slow international climate policy coordination/cooperation, (b) the implications from the economic downturn? (see also the *Initial work package on comparative competitiveness issues*)

- Ia – Deepening existing knowledge on steel, cement, and aluminium. Including: overall cost structures and investment decisions, in particular the location costs within the EU and in major EU trade partner countries (see also current CS project *International sectoral approaches and agreements: focus on the steel sector*)
- Ib - Broadening the knowledge on competitiveness and leakage for (i) refining, (ii) subsectors of the chemical industry; to be identified (iii) pulp and paper, (iv) glass. Analysis on this will include: the extent to which these industries can pass-through additional costs resulting from cap and trade systems; their international trade exposures and transportation cost; and their location decisions (as in Ia for the three core sectors).

WP II - **How can policy makers** in the EU and in the US, Australia, Japan and other regions introducing cap and trade or carbon taxes (a) **safeguard the carbon price signal** given international trade and capital flows? And (b) **limit the negative side effects** from national policies addressing leakage on the international climate policy agenda, and on

international competition?

- IIa - Do approaches tailored to industries' characteristic deliver the desired effects, what are the trade-offs? Can any of the identified tools be useful for progressing toward a globally integrated cap and trade system? (What are the potentials and limitations of linkage as a solution to the leakage and competitiveness problems?)

Many of these questions require empirical data about patterns and trends in individual industries, such as country-specific production, consumption, trade and investment data. Moreover, the long-standing work on "pollution havens" should be revisited in order to identify the new challenges that industries around the globe face from fragmented carbon pricing policies – direct and indirect (e.g. ETS, taxes, export taxes, energy taxes, fees and regulation etc.), the focus, however, should remain on the explicit carbon price (allowances and taxes). Such data can be used to create maps of the international locations of economic activities in those industries, thereby literally mapping the structure and evolution of each industry.

This work can build on existing empirical and forecasting studies but adapt their results by taking into account new international policy environment and economic circumstances.

Challenge of the European carbon market (ETCLIP)	A jointly won tender between WIFO Austrian Institute of Economic Research and Climate Strategies deals with the open topics concerning the EU Emission Trading Scheme's design for the third trading period starting in 2013. A special focus is laid on the impacts on Austrian sectors and enterprises regulated by the EU ETS. The results aim at supporting the decision process in the Austrian climate policy as well as the national contribution on the European level.
The Risk of Carbon Leakage in the light of an International Agreement on Climate Change	A jointly won tender between Climate Strategies, Cambridge Econometrics and ENTEC for the UK Department of Energy and Climate Change. The project will use economic, econometric and political insights to assess sectors in the EU and UK that are at significant risk of leakage and to what extent. The project will use different modelling scenarios to reflect possible international climate policy outcomes and assess how each in turn would affect a sector's vulnerability to competitiveness impacts. In addition, the project will undertake an extensive review of climate change policies in the UK, EU and major economies outside of the EU which are additional to the EU ETS and assess whether or not these two would have any impact on a sector's cost schedule.
Time line	Aug 2009 – Dec 2010

4. Decarbonisation of the power sector

Status *In design phase*

Project leader Peter Kaderjak, REKK - Regional Centre for Energy Policy Research, Budapest, Hungary

Contributors Sophie Gallharet, IDDRI; Gabriella Szajko, Andras Kiss, Andras Mezosi, Zsuzsanna Pato, REKK; Kiriakos Vlahos

Expert Fred Dinning

Advisers

Project description

How to design new regulations to stimulate transition towards low carbon electricity systems in Member-states' electricity systems? Despite European scenarios describing economical pathways to reach the 2020 objectives of the 20/20/20, many studies of the EU power sector suggest that momentum will not deliver sufficient emissions reduction from the electricity sector, the main emitting industry, to make reachable the official targets. A step change in regulation, institutions and behaviors is necessary. Each delay in the next decade will make more and more difficult to reach the 60/80% reduction objective in 2050.

Besides prospective exercises dealt by different bodies (Eurelectric, European Commission, consulting groups) on decarbonisation pathways, there is a need to identify regulatory and institutional conditions to reach decarbonisation targets. Indeed scenarios defined from energy modeling exercises consider carbon price signal as sufficient to orient the choices of private actors (for instance an increase to 500 €/tCO₂ in 2050). But few is said about the variety of policies and regulations to be developed to reach member states' emissions reduction targets while the carbon price uncertainty, inherent to complex cap and trade systems, does not help decisions of radical technology and behavior change from producers and electricity consumers.

Reflections on stringent policies and measures which trigger low carbon technologies deployment in centralized and decentralized power generation as well as efficient technologies, remain limited whereas they are more than ever necessary.

Moreover in the set of non-carbon policies and measures, opportunities can be created by Europeanisation of policies. Three fields are concerned.

First, state-members could aim joint development of large scale renewables projects between private players located in countries benefiting from very different RES resource endowments. Such a European optimization pathway of RES-E development raises the issue of institutional and technical conditions, both by harmonisation of RES-E policies (for instance aiming to develop a unique green certificates system) and by promoting development of large transmission lines dedicated to transport of large non carbon electricity bulks between countries.

Second, present "politization" of nuclear technologies do not invite to draw a parallel scenario for this non carbon, despite the difference of industrial capacity between countries, but on a time horizon of forty years, social acceptance could evolve in some resistant countries, and nuclear power could become a stake of trade to the benefits of European Union's climate policy.

A third field of policy Europeanisation could be the joint development of CO₂ trunk lines network and giant storage capacities, eventually by pooling such capacities between member states.

Time line 2010-2011

5. International sectoral approaches and agreements: focus on the steel sector

Status	<i>In progress</i>
Project leaders	Developing countries: Joyashree Roy, Jadavpur University, Calcutta, India Industrialised countries: Peter Wooders, International Institute for Sustainable Development, IISD (Geneva Office)
Contributors	Japan: Hitomi Kimura, Institute for Global Environment Strategies, IGES; Greg Cook, Paul Zakkour, Carbon Counts; Mike Harfoot; Seton Siebert, EnviroEconomics
Expert Advisers	Chris Beauman, Richard Baron, John Newman
Project description	<p>There has been much interest and some research on the potential role of sectoral agreements in further development of the international climate regime. There has been interest in transnational sectoral agreements that could be integrated into a larger international climate change regime, and there has been interest in autonomous national and/or regional arrangements. However, the analytic approach taken to date has been typically top-down from a UNFCCC perspective, rather than from a bottom-up industry perspective. To date, analyses have not addressed the disparate implications of the various types of arrangements; nor has there been analysis based on much tangible evidence about specific industries (except the cement industry); nor has the consideration of the potential type, boundaries and design elements of sectoral agreements been focused on specific tangible features and how those would interact with other features of the international climate regime. Finally, the details needed for successful implementation – both practical and political – have been largely missing.</p> <p>The overall objective of this project, therefore, is to make an original contribution to the dialogue on the role of sectoral agreements in the post-2012 international climate regime by addressing the following questions:</p> <ul style="list-style-type: none"> • What types of sectoral agreements should be seriously considered? • What are the key issues and options for the design elements of sectoral agreements? • What would be the features of a transnational agreement compared with other types? • How can sectoral agreements and cap-and-trade systems effectively co-exist? • How can a steel agreement be successfully integrated into the international climate regime? • Can a steel agreement be a prototype for other sectoral agreements? • What are the key implementation issues involved in developing a steel sector agreement?
Work packages	<p>WP1: Industry structure and technology</p> <ul style="list-style-type: none"> • Patterns and trends in the worldwide steel industry: structure, location, comparative advantages, technologies, costs, abatement costs • Relationship to other industries • Industrial policies and subsidies • How trading patterns affect the future of the industry <p>WP2: Sectoral approaches under serious consideration</p> <ul style="list-style-type: none"> • Sector boundaries: upstream and downstream • Definition of the approaches under consideration • How implementation of new technologies can be optimized: comparative analysis of sectoral agreements, CDM, ETS • Measurement: the need for installation-level data and other issues, MRV • The possibilities and problems of using the WBCSD methodological approach for the cement sector <p>WP3: Relationship of sectoral approaches to emissions trading and project mechanisms</p> <ul style="list-style-type: none"> • Context: the role of sectoral approaches on the path to deep emissions cuts • Transnational sectoral agreements: options for integrating sectoral agreements

into the UNFCCC institutional architecture

- Co-existence of emissions trading and sectoral agreements
- Europe's Emissions Trading Scheme and the Asia Pacific Partnership countries' sectoral agreements
- Technology transfer in sectoral agreements compared with other mechanisms
- Sectoral agreements outside the UNFCCC framework

WP4: Implementing sectoral approaches: country case study of China

- How sectoral approaches impact costs, production, trade and GHG emissions
- Implementation issues: practical and political
- How do sectoral approaches compare to ETS?

WP5: Implementing sectoral approaches: country case studies of India

- How sectoral approaches impact costs, production, trade and GHG emissions
- Implementation Issues: practical and political
- How do sectoral approaches compare to ETS?

WP6: Implementing sectoral approaches: country case studies of Japan

- How sectoral approaches impact costs, production, trade and GHG emissions
- Implementation Issues: practical and political
- How do sectoral approaches compare to ETS?

WP7: Synthesis - country/region issues and options for business and governments

- Differences between global top-down and industry bottom-up approaches
- Differences between global-level and country-level agreements
- Comparisons of results for China, India and Japan: how sectoral approaches impact costs, production, trade and GHG emissions; implementation issues: practical and political; how sectoral approaches relate to emissions trading
- Overall conclusions and implications – including answers to seven questions posed

Time line June 2009 - Dec 2010

6. Climate innovation centres (CIC)

Status *In progress*

Project leader Professor Ambuj Sagar, Indian Institute of Technology, Delhi

Contributors Proposed – to be agreed: Andrew Higham, UNFCCCC; Prof. Ann Florini, National University of Singapore; Prof. N. Clark, Open University, UK and Emeritus Professor, University of Strathclyde; Dr. Laura Diaz Anadon, Harvard Kennedy School; Prof. Carl Dahlman, Georgetown University

Possible collaborators New Energy Finance; UNIDO; UNFCCC

Project description The project on CICs aims to develop more fully the concept of a network of climate technology innovation centres and analyse tangible implementation issues. In that context, it will be centered around two research questions:

- What design features of CICs will be key to the implementation and effectiveness of these centers?
- What might be appropriate choices (or algorithms for making these choices), given our experience with domestic and transnational innovation for developing countries?

Research questions

Thus the project will explore a number of relevant questions such as:

- What might such centres look like in terms of their organization, activities, and priorities? What particular features of the centres – individually and as a network – would enhance their effectiveness?
- How would the centres be funded?
- How would the centres be governed?
- In what ways would the centres need to be adapted to specific regional and country circumstances (needs and constraints) – and to what extent would they have common policies and programmes?
- How would the centres – individually and collectively – interact with existing and potential future national and international programs/activities with similar goals? How could they link to and help strengthen existing capacity and institutions within the country?
- What role, if any, would the private sector as well as other local institutions play in the centres?
- What would be the value added of such a network of centres beyond the existing array of multilateral, regional and bilateral technology development and diffusion programmes?

In order to do so, the project will involve a number of inter-related analyses that will shed light on these questions based on institutional experiences in clean technology, institutional experiences in public (or public-private) transnational innovation, as well as broader technology innovation lessons from developing countries. We will also carry out a survey of climate negotiators on the kinds of questions listed above.

Work packages

The research project would be in two phases – with a total of six work packages:

The first phase will pull together a small cohort of researchers from different countries to begin an initial assessment of the issues that might need resolution regarding the implementation of this concept. These might include scale and scope of activities (paying particular attention to the needs of various regions/countries), governance options, and intellectual property rights, drawing in part on the experience of research center networks such as CGIAR. Researchers involved in this phase would provide input into the workshop but, equally importantly; participate in order to better understand the questions and issues regarding the elements of this concept.

WP1: Scoping workshop

- Further specification of issues to be addressed
- Integration into the project of experiences of other international R&D networks in project implementation
- Scope of activities and countries to be included in study

The second, and major, phase will draw upon, be shaped by, and be responsive to the workshop discussions in order to have maximum utility. Once the key issues that have

been identified in discussion with workshop participants, we will recruit other participants from the North and South who have the particular expertise to explore the relevant facet of the Center design. We will commission a series of papers on the key topics and bring together the authors for a workshop discussion to prepare input for the next round of negotiations in Copenhagen.

WP 2: Better understanding the experience of CGIAR

The Consultative Group On International Agricultural Research (CGIAR) remains the most prominent and successful example of a network of regional research centers that have focused both on the development of 'technology' tailored to local needs (in this case, high-yielding varieties of crops) and its widespread diffusion.

Thus we need an examination of the linkage between design features of CGIAR (such as its organization, governance, scale and scope of activities, relationships between various CGIAR centers, relationship of the CGIAR to other public and private organizations, flexibility and evolution over time) and its success/failure in delivering innovations to meet local needs. We then also need to translate these lessons into the climate innovation arena.

Approach: Commission paper(s) by appropriate expert(s) on CGIAR or Climate Innovation

Potential author(s): Prof. Ann Florini, National University of Singapore and Prof. N. Clark, Open University, UK and Emeritus Professor, University of Strathclyde

WP 3: Analyzing institutional efforts in clean technology, especially in developing countries

A number of institutional efforts have been established to promote cleantech innovation in industrialized and developing countries. These include UNIDO's Cleaner Production Centers, members of the SEF Alliance under the UNEP Sustainable Energy Finance Initiative, as well as local activities such as Indian National Science Technology Entrepreneurship Development Board. A synthesis of the lessons learned from these activities will be very helpful in shedding light of design considerations for the CICs.

Approach: Commission paper(s) by appropriate expert(s) who can synthesize experience across various institutions

Potential author: Dr. Laura Diaz Anadon, Harvard Kennedy School (with Prof. Ambuj Sagar)

Possible collaborators: New Energy Finance; UNIDO; UNFCCC

WP 4: Lessons from developing-country innovation experiences

Developing countries have had mixed success in promoting and managing innovation. It is important to understand the differences between the innovation systems (actors, infrastructure, policies, etc.) of key countries and how these influence the innovation trajectory of these countries. A nuanced understanding of this context will serve to advance our thinking about how CICs might be best embedded in these national innovation systems, both complementing and supplementing existing capabilities.

Approach: Commission paper by appropriate expert who can highlight key aspects of innovation systems in different countries and develop a framework that could help inform the approach to CICs' implementation

Potential author: Prof. Carl Dahlman, Georgetown University

WP 5: Survey of climate negotiators and experts on CICs and technology cooperation

Given that there is a plurality of perspectives on technology transfer and cooperation among the Parties as well as experts, it will be useful to develop and carry out a survey that elicits the views of these participants in the process.

Potential team: Andrew Higham, UNFCCC (with Prof. Ambuj Sagar, IIT Delhi)

WP 6: Dissemination workshop

As a side-event to a post-Copenhagen UNFCCC meeting since the main target group/audience would be negotiators.

Time line

September 2009 – April 2010

7. Compliance with COP16 Agreements

Status	The scope of the project is being developed with the potential project leader and international team spanning experts in US, EU and Australia.
Project leader	To be confirmed
Contributors	Michael Grubb, Climate Strategies; To be confirmed: Harro von Asselt, IVN; Farhana Yamin, IDS; Sebastian Oberthur, IES; Hitomi Kimura; Dan Bodansky, University of Georgia Law; Michael Mehling, Ecologic Institute, Berlin/US; Claire Stockwell; Clarisse Kehler Siebert, SEI
Project description	<p>This project will consider countries' compliance with treaties such as the Kyoto Protocol and the Copenhagen Accord in the context of international law. It will consider countries' commitments post-Copenhagen and consider the range of mechanisms for encouraging compliance.</p> <p>This will include consideration of new mechanisms that leverage involvement of the private sector and the use of domestic contractual law as a means of enhancing compliance with intergovernmental commitments.</p> <p>The main focus will be on emissions commitments but may also consider mechanisms for increasing assurance around financial commitments as well.</p>
Time line	2010

Projects under consideration

1. Institutional framework for the global carbon market: options and implications

Status	<i>Under consideration</i>
Project leader	To be confirmed: Michael Mehling, Ecologic Institute, Berlin/US
Contributors	Erik Haites, Margaree Consultants, Canada; Andreas Tuerk, Joanneum Institute, Austria; Institute of Energy Economics in Japan (tbc)
Project description	This project will analyse the global carbon market beyond 2012 that may be far more complex than those currently in existence. Furthermore, a larger carbon market integrating more countries and having several mechanisms in place needs an adequate institutional structure to function. This project will analyse the regulatory and institutional options for improved governance of linked carbon markets. Based on an assessment of the regulatory and institutional requirements for an integrated post-2012 carbon market and a gap-analysis vis-à-vis existing institutions, different options for institutional governance, will be assessed, as will the legal requirements and implications of their implementation.
Work packages	<p>WP1: Role and mandate of an institutional framework for the global carbon market</p> <ul style="list-style-type: none"> • Pathways to a global carbon market • Institutional requirements for the post 2012 carbon market • Taking stock of existing institutions: A gap analysis • Institutional options for improved governance of the global carbon market <p>WP2: Lessons from the existing markets and integration processes for the carbon market</p> <ul style="list-style-type: none"> • Can the WTO be a model? • Can financial institutions be a model? • Lessons for the institutional setup or cooperation modes between national institutions
Time line	March 2010 – April 2011

2. EU 20 to 30% cuts by 2020 in greenhouse gas emissions

Status	<i>Under consideration</i>
Project leader	IDDDRI (To be confirmed)
Project description	<p>This project will assess the EU's announced policy of unilaterally reducing its greenhouse gas emissions by 20% by 2020 compared with 1990 levels. This policy target, which has been approved by the Parliament and Council as well as the Commission, has accompanied by a commitment to increase the use of renewable energy to 20% of total energy consumption and to increase the use of biofuels to 10% of transport fuels by the same date. In addition to these unilateral policies, the EU has also indicated a willingness to reduce its greenhouse gas reductions by 30% by 2020 over 1990 levels as part of a new global agreement on emission reductions. These pronouncements, furthermore, have spawned a series of policy and programme initiatives in energy and technology policies. But there has been much controversy among diverse stakeholders about the feasibility and desirability of the policies and programmes.</p> <p>The principal questions of the project are:</p> <ul style="list-style-type: none"> • What is the basis of the criticisms about the feasibility and desirability of the 20% GHG reduction target and the related renewable and biofuels targets? • To what extent are the criticisms based on empirical evidence? • What policy changes, if any, are warranted by the criticisms? • Is the 30% reduction offer likely to be effective in the international negotiating process? • If not, how could the policy be changed to achieve global reductions? • What is the added value of getting the EU to 30%?
Work packages	<p>WP1: COP15 assessment How the outcomes of COP15 negotiations would influence EU ambitions? High-level implications for 20%/30% implementation. How would this affect other regions? What would the outcomes mean for the specific targets?</p> <p>If there is an agreement reached at COP15 the following work packages would look at the impacts of the 30% reduction target:</p> <p>WP2: 30% GHG emission reduction target as part of global emission reduction deal How to move from 20% to 30%? Legal issues, responsibilities</p> <p>WP3: Effort sharing within the EU How would the strengthened target of 30% be shared between EU member states? East/West involvement.</p> <p>WP4: Sector implications How would the strengthened target of 30% impact specific sectors?</p>
Time line	Jan – June 2010

Cross-cutting collaborative projects

1. Coping with complexity in the evolving international climate policy institutional architecture (ICPIA)

Collaborating Organisation WIFO Austrian Institute of Economic Research
Project Leader: Angela Köppl

Project description This jointly won tender between WIFO and Climate Strategies will deliver a contribution by analysing the issues related to the implementation and effects of a complex climate policy framework. Given the uncertainty of the future development of global climate policy and its expected complexity the project aims at providing conceptual foundations for decision makers on possible options regarding designs/architectures and their impacts on countries (like Austria) and major industrial sectors, that will face the necessity to restructure.

Work packages

WP1. Building the foundations

- Creating an internationally-comparable database for analysis of “effort sharing” in a wide range of new climate policy agreements
- Indicators for national or sectoral effort sharing will be developed
- Conclusions will be drawn on differences between Phase 1 (2005 – 2007) and Phase 2 (2008 – 2011) and the impacts of the economic slow-down on GHG emissions of installations, sectors and countries.

WP2. Sectoral dimensions and trade issues

- In-depth analyses for the main energy/emission intensive sectors,
- Sector-specific issues concerning international competitiveness and carbon leakage

WP3. Regional dimensions and inequality issues

- Evaluating how new climate agreements could take into account “horizontal” East-West relations (‘effort-sharing’ issues between Eastern and Western industrialised countries), as well as the more familiar “vertical” North-South issues.

WP4. Institutional dimensions and incentive issues

- Policy coherence, i.e. to what extent there are synergies between climate policy and other policy instruments.
- Institutional settings to ensure the credibility of carbon markets and the incentives for abatement measures.

WP5. Searching for a global architecture

- reunite, deepen and geographically expand industrialised country commitments so as to establish a tougher and more stable carbon market, based on deeper national cutbacks: this will give a strong and credible platform from which to drive widespread energy efficiency and largely decarbonise in particular the power sector by the mid 2020s;
- engage developing countries across a far wider range of instruments including sectoral targets/caps, enhanced CDM, and forestry: this will help to avoid lock-in, enable better matching of commitments to capabilities of different countries, and provide a ladder for the evolution of diverse countries towards more broad-based quantified commitments;
- integrate these strands and provide and govern sufficient financial resources to facilitate the global deal and finance both adaptation, and mitigation actions outside the scope of core commitments, including a new regime for innovation and technology transfer, and the regulation of international bunker fuels.

Time line Jan 2010 – Dec 2010

Insights and Briefing Papers

Short policy analyses derived from Climate Strategies research projects and published on a fast-track basis.

New topics for 2010 include:

- **Role of Auctions – US Market Version**

With increased experience and understanding of the adverse effects of free-allocation in the EU ETS, interest has rapidly increased in allocation by auction, as a part of solutions for energy intensive sectors. Our previous work stream has explored modes of conducting auctioning, likely responses, and possible coordination of auctions between those Member States conducting auctions. A new study will adapt the issue to US audiences.

- **COP15 assessment**

High profile cross-cutting brief on the outcomes of COP15 negotiations. Implications for 20%/30% implementation; influence on EU ambitions; impact on other regions; specific targets.

- **Post-Copenhagen institutional dimensions**

Analysing the institutional dimensions of differentiated carbon markets, fragmented (national) agreements and sectoral commitments. Discussing potential interactions of various policy instruments (e.g. climate policy and renewable energy regulations).

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