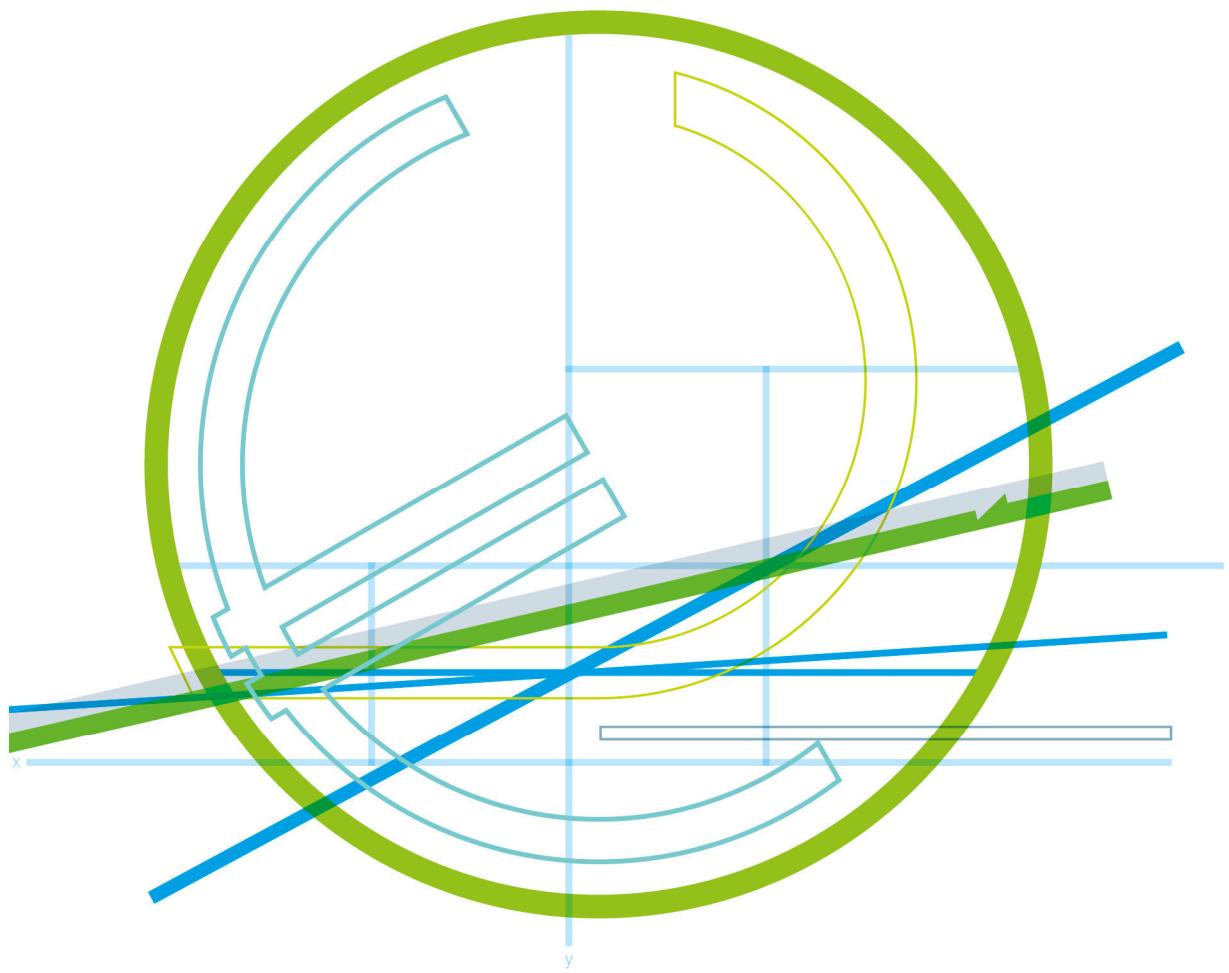


## Coping with Complexity in the Evolving International Climate Policy Institutional Architecture



## PREFACE

The **BLUE GLOBE REPORT** shows the competence and variety of approaches chosen by Austrian industry and research in striving to come up with solutions for the central tasks of the future. The Climate and Energy Fund has made it its strategy to provide specific impulses through long-term subsidy programs, programs to create an excellent starting position for Austrian companies and institutions in international competition.

Each year the Climate and Energy Fund has a budget of up to 150 million euros for promoting sustainable energy and transport projects in line with the climate protection goals. These funds are used to support ideas, concepts and projects in the areas of research, mobility, and market penetration.

The Climate and Energy Fund's **BLUE GLOBE REPORT** informs about project results thus supporting the application of innovation in practice. In addition to technological innovations in energy and transport it also discusses social topics and the scientific base for political planning processes. The **BLUE GLOBE REPORT** is made available to the interested public via the [www.klimafonds.gv.at](http://www.klimafonds.gv.at) website and invites readers to a critical discussion.

The current report documents the results of a project from the „ACRP“ research program with the goal of providing the scientific basis for increasingly important decisions on climate adjustment measures and as such constituting a solid basis on which stakeholders can base their decisions.

We are the right partner for whoever decides to take a sustainable part in the future. The Climate and Energy Fund promotes innovative solutions for the future!



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## B) Project Overview

### 1 Executive Summary

#### Executive Summary - English

The overall objective of the project was to analyse a variety of aspects concerning the international climate policy institutional architecture. The research question has been addressed in five work packages: 1. conceptual and empirical foundations concerning effort sharing; analysis of EU ETS; 2. sectoral dimensions and trade issues in energy-intensive sectors such as steel, cement and paper and pulp; 3. regional dimensions and inequality issues focussing on old and new members of the EU; 4. institutional dimensions and incentive issues including questions about policy coherence and stabilisation of carbon markets; and 5. synthesis of work package findings and the search for a credible and stable global architecture.

The ICPIA project analyses issues related to the interaction of existing EU (climate) policies and the complex international climate policy framework. The central outputs of the ICPIA project are:

- Comparable data sets to assess countries' potentials and effort to curb greenhouse gas emissions by a set of model-based structural indicators (see Köppl and Schleicher, 2012).
- Assessment of the sectoral and trade dimensions of diverse climate policy agreements focussing on the energy-intensive sectors steel, cement and paper and pulp (see Wooders et al., 2011).
- Evaluation of the regional dimensions of EU climate policy with particular attention to the diverse starting points of the EU 15 compared to the New Member States (see Spencer et al., 2011).
- Discussion of horizontal climate policy integration in the EU – e.g. climate policy and energy regulations (see Kettner et al., 2011b).
- Empirical analysis of the EU Emission Trading Scheme (ETS) and discussion of price stabilisation on the carbon market (see Kettner et al., 2011a, 2012).
- Proposal of an evaluation matrix for a qualitative appraisal of differentiated international climate agreements; application to country proposals (see Mehling, 2011, and Türk et al., 2011a).
- Integration of research findings of work packages and analyses of central issues for a future global architecture for climate policy (see Türk et al., 2011b).

The ICPIA project brought together experts from different disciplines as well as different countries. Both aspects, the international integration and multi disciplinary perspective, generated additional benefits for the researchers involved.

On the issue of effort sharing a comprehensive and coherent international database is provided. This includes economic data as well as information on energy and GHG emissions. Based on the data set structural indicators serve to illustrate effort sharing on the level of countries or sectors in different climate policy regimes. The policy frameworks considered include more fragmented, diversified approaches that comprise new rules and elements. The ICPIA findings with respect to competitiveness and leakage from the EU ETS have shown that these do not constitute problems for the EU now, however they could be in the future. The threat of them may be sufficient to affect investment and production decisions within energy-intensive industries. In the opinion of certain industries within the EU, such decisions are already being made. Wooders (2011) offers a solution for near neighbours of the EU: Russia, Turkey and Ukraine. Similar to Japan's plans for bilateral

agreements the EU could install a bilateral scheme or equivalent with its neighbour countries. The EU ETS allows linking to other carbon regimes judged similarly stringent. The EU has also chosen to impose constraints on the provenance (geographic and by type of project) of allowances (CERs) generated under the CDM. An EU bilateral scheme could be focused on near neighbours and energy-intensive sectors. The major benefit of a sectoral approach may be the leverage it generates to bring countries towards accession to the EU, and to its ETS.

Another conclusion of the ICPIA project is that there is a need to balance comprehensive criteria for effort sharing with simplicity and transparency. In this regard, a comparison between the allocation of Kyoto targets within the EU bubble and effort-sharing in the 2008 Energy and Climate Package is instructive. The efficacy of the latter approach is witnessed perhaps by the speed with which the European Energy and Climate Package was adopted. Comprehensive, simple and transparent criteria that balance interests of different parties will also be crucial for the success of international effort sharing. Currently widely accepted criteria to compare pledges do not exist.

Furthermore the European experience with the first Kyoto phase shows that differentiated targets may contribute to, but by no means guarantee, successful implementation. Indeed, it can be argued that a normative process of policy transfer can supplant the development of intrinsic domestic interests in environmental policy. The external, negotiated imposition of environmental policy perhaps needs to be complemented by a more two-way process to take into account the domestic interests of participants. Accommodating domestic interests of countries will also be of major importance for any new international climate treaty. Cooperation on implementation and the nurturing of domestic interests in climate policy may be just as important as negotiating agreed targets for the long-term stability of the policy coalition.

The experience with the EU ETS so far shows a mixed record. The EU ETS has no mechanism to prevent over allocation in case of unexpected events, such as the financial crisis or excess price volatility. The analyses of the ICPIA project shows a higher overall stringency of the 2008 allocation caps compared to the first trading period reflecting the stronger role of the European Commission. In 2009, however, the effects of the economic crisis became visible: Emissions plumped and hence the cap was not binding. While in the first trading phase regional differences in the stringency of the cap prevailed – i.e. New Member States generally exhibited higher net long positions than the EU-15 – the analysis does not confirm this for the second trading phase. This again can be attributed to the stronger caps ensured by the EC. Regarding price volatility the evidence on EUA prices shows so far high variability since the introduction of the EU ETS that gives a cause for concern: On the one hand market prices may lose their credibility in terms of providing signals for long-term decisions. On the other hand this may lead to wrong investment decisions – in some cases with long term consequences – which create excessive costs. One option discussed within the ICPIA project was the introduction of a regulatory authority that can intervene in the market. As reaction to the experiences the EU made with price volatility, other emerging schemes plan to introduce price control mechanism. The Australian scheme, set to start in 2013, for example will introduce a price floor and a price cap.

The Durban climate conference paves the way for legal flexibility in the short term, a few countries could sign up to a second Kyoto Protocol commitment period while the most will adopt a variety of other approaches than binding targets and timetables. As Keohane (2010)<sup>1</sup> argues comprehensive regimes lead to institutional monopolies that may lead, such as in the case of the UN, to inflexibility and inaction, while a variety of institutional approaches may have the advantages of greater flexibility and adaptability, in part, from decision-making structures offering more effective

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<sup>1</sup> Keohane, R.O., Victor, D.G., (2010), The Regime Complex for Climate Change. Discussion Paper 2010-33. Cambridge, MA: Harvard Project on International Climate Agreements.

regulation when compared with comprehensive regimes. If an international agreement is well designed different institutional venues could act in a synergistic way. A broader institutional setting may be an opportunity to achieve more coherence between different policy areas of strategic importance for countries such as energy security. It is evident that there is a close link between energy policy and climate policy as fossil energy use determines to a large extent the amount of GHG emissions. The ICPIA project showed that even within the EU there is still room for improving the coherence of energy and climate policies. On the international level questions of coherence of climate policies with other policies will be of great importance for the participation of countries in a new climate agreement and thus the effectiveness of any new climate regime.

### **Executive Summary - German**

Das Projektziel von ICPIA war die Analyse unterschiedlicher Aspekte internationaler Klimapolitik. Diese Forschungsfrage wurde in fünf Arbeitspaketen bearbeitet: 1. Konzeptionelle und empirische Grundlagen von (globalem) Effort Sharing; Analyse des EU Emissionshandels; 2. Sektorale Dimensionen und Wettbewerbsaspekte von Klimapolitik in den österreichischen emissionsintensiven Sektoren Stahl, Zement und Papier und Pappe; 3. Regionale Dimensionen und Ungleichheiten von alten und neuen EU Mitgliedsstaaten; 4. Institutionelle Dimensionen und Anreizstrukturen, wie Politikkohärenz und Stabilisierung der Carbon Märkte; und 5. Synthese der Teilergebnisse und Diskussion unterschiedlicher Aspekte einer internationalen Klimapolitik.

Das ICPIA Projekt analysiert Fragestellungen im Bereich der Interaktion bestehender EU (Klima-)Politiken und den komplexen internationalen klimapolitischen Rahmenbedingungen. Die zentralen Ergebnisse des Projekts umfassen:

- WIFO hat eine vergleichbare Datenbasis für alle Weltregionen erstellt; diese stellt die Grundlage für die Analyse von regionalen Emissionsreduktionspotentialen mithilfe von modellbasierten Strukturindikatoren dar (Köppl and Schleicher, 2012).
- Sektorale Dimensionen und Wettbewerbsaspekte von Klimapolitik wurden für die österreichischen emissionsintensiven Sektoren Stahl, Zement und Papier und Pappe analysiert. SAAMs werden als geeignetes Instrument zur Vermeidung potentieller künftiger negativer Wettbewerbseffekte angesehen (Wooders et al., 2011).
- Regionale Dimensionen der EU Klimapolitik wurden mit Fokus auf die unterschiedliche Ausgangssituation in alten und neuen Mitgliedsstaaten untersucht. Zudem wurde eine empirische Analyse des EU Emissionshandels durchgeführt und Preisstabilisierungsmaßnahmen für den Carbon Markt diskutiert (Spencer et al., 2011; Kettner et al., 2011a; Kettner et al., 2012).
- Aspekte der horizontalen Integration von Klimapolitik mit anderen Politikbereichen z.B. Energiepolitik wurden analysiert (Kettner et al., 2011b).
- Darüber hinaus entwickelte das ICPIA Team eine Evaluierungsmatrix für die qualitative Bewertung internationaler Klimapolitikabkommen und wandte sie auf unterschiedliche Klimapolitikdesigns an. Abschließend wurden die ICPIA Forschungsergebnisse für eine umfassende Diskussion zukünftiger Klimapolitikszenarien verwendet (Mehling, 2011, Türk et al., 2011a, Türk et al., 2011b).

Im ICPIA Projekt arbeiteten Wissenschaftler aus unterschiedlichen Disziplinen und Ländern zusammen. Beide Aspekte, die internationale Zusammenarbeit im Projektteam und die multidisziplinäre Perspektive, stellten eine fruchtbare Grundlage für die Forschung dar.

Zum Themenbereich Effort Sharing wurde eine umfassende und konsistente internationale Datenbasis erstellt, die sowohl ökonomische Daten als auch Daten zu Energie und Treibhausgasemissionen zusammenführt. Ausgehend von diesem Datensatz wurden

Strukturindikatoren entwickelt, die es ermöglichen Effort Sharing im Rahmen von verschiedenen Klimapolitikszenarien zu analysieren.

Die ICPIA Ergebnisse zum Thema Wettbewerbsfähigkeit und Carbon Leakage zeigen, dass bislang Carbon Leakage kein Problem für die Unternehmen im EU Emissionshandel darstellt. Hingegen ist nicht auszuschließen, dass in Zukunft Investitionsentscheidungen energieintensiver Unternehmen von dieser Fragestellung beeinflusst werden. Die Untersuchung schlägt für EU Nachbarländer vor ein bilaterales Emissionshandelsabkommen oder andere gleichwertige Maßnahmen zu treffen. Ein bilaterales EU Abkommen könnte auf ausgewählte emissionsintensive Sektoren fokussieren. Dies könnte eine Vorstufe für die zukünftige Aufnahme weiterer Staaten in die EU und somit in das EU Emissionshandelssystem sein.

Ein weiteres Resultat des ICPIA Projekts bezieht sich auf die Notwendigkeit umfassende Kriterien für Effort Sharing mit den Kriterien Einfachheit und Transparenz abzuwägen. In diesem Zusammenhang erweist sich die Analyse der unterschiedlichen Zugangsweise bei der Festlegung der Kyoto Ziele und der EU 20-20 Ziele als besonders aufschlussreich. Die Vorzüge der Entscheidungsfindung für die 20-20 Ziele zeigen sich etwa in der Geschwindigkeit, mit der das Klima- und Energiepaket angenommen wurde. Eine ausgewogene Berücksichtigung unterschiedlicher Interessen der betroffenen Parteien ist ein weiteres Kriterium für den Erfolg bei der Aufteilung von Klimazielen.

Die europäischen Erfahrungen mit Kyoto zeigen, dass differenzierte Ziele keinesfalls die erfolgreiche Umsetzung eines Klimapolitikabkommens garantieren. Es kann argumentiert werden, dass eine normative Politikfestlegung intrinsische nationale Interessen für Umweltpolitik verdrängt. Extern verhandelte Klimapolitik sollte daher durch einen Prozess ergänzt werden, in dem nationale Interessen berücksichtigt werden. Eine Kooperation bei der Umsetzung von Klimapolitik und die Berücksichtigung nationaler Interessen werden für zukünftige internationale Klimapolitikabkommen von ebensolcher Bedeutung sein wie eine Übereinkunft über die langfristig zu erreichenden Klimaziele.

Im Bereich des Emissionshandels zeigen die europäischen Erfahrungen bislang ein differenziertes Bild. Das Europäische Emissionshandelssystem verfügt derzeit über keinen Mechanismus zur Bekämpfung einer Überallokation von Zertifikaten, die durch unerwartete Ereignisse wie die Finanzkrise ausgelöst wird, oder zur Bekämpfung von überdurchschnittlichen Preisschwankungen. Die Analysen im Rahmen des ICPIA Projekts zeigen eine stringenter Emissionsobergrenze für die Kyoto Verpflichtungsperiode im Vergleich zur ersten Handelsperiode, die die stärkere Rolle der Europäischen Kommission reflektiert. Im Jahr 2009 dominierten hingegen die Effekte der Wirtschafts- und Finanzkrise, die in einem starken Rückgang der Emissionen mündete und zu einem hohen Überschuss an Zertifikaten führte. Preise für die Emissionszertifikate weisen seit der Einführung des EU ETS eine hohe Volatilität auf. Dies ist aus zwei Gründen problematisch: Einerseits verlieren Marktpreise ihre Glaubwürdigkeit als Investitionssignale. Andererseits können durch hohe Preisvolatilität falsche Investitionsentscheidungen angereizt werden, die langfristig mit hohen Kosten verbunden sein können. Im Rahmen des ICPIA Projekts wurde als eine Option zur Preisstabilisierung die Einführung einer Regulierungsbehörde diskutiert, die in den Carbon Markt eingreifen kann.

Die Durban Klimakonferenz ebnet den Weg für höhere kurzfristige Flexibilität in der internationalen Klimapolitik. Einige Länder könnten sich zu einer Weiterführung von Kyoto bekennen, während viele andere Länder Ansätze als bindende Ziele wählen. Wenn ein internationales Abkommen gut durchdacht umgesetzt wird, könnten unterschiedliche institutionelle Ansätze synergistisch zusammenwirken. Ein breiterer institutioneller Ansatz könnte eine Chance für eine bessere Klimapolitikkohärenz mit unterschiedlichen Politikbereichen, wie z.B. Energiesicherheit, darstellen. Das ICPIA Projekt zeigt auf, dass auch innerhalb der EU Potential für eine bessere Integration der Klimapolitik mit anderen Politikbereichen besteht. Auf der internationalen Ebene kommt der Frage

der Politikkohärenz große Bedeutung für die Bereitschaft von Ländern, an einem Klimapolitikabkommen zu partizipieren, zu.

## 2 Background and objectives of the project

There is evidence that the post-2012 international climate policy architecture will be more complex than the current commitment under the Kyoto Protocol. Given this expectation, the European Union and its Member States need to adapt to a more complex and more diversified political framework to limit climate change. The difficulty to reach a global binding climate agreement is again reflected in the latest international climate conferences, COP16 in Cancun, Mexico, and COP17 in Durban, South Africa.

Any effective approach to combat climate change needs global effort. However, countries like the United States, China and India are for different reasons looking for structures other than the current Kyoto-type agreement, and the problem clearly cannot be solved without greater differentiation of developing country actions. The outcome of the latest UNFCCC conference in Durban showed that in the short term an internationally binding agreement is out of reach.

The ICPIA project analyses issues related to the interaction of existing EU (climate) policies and the complex international climate policy framework. The central contributions of the ICPIA project address the following:

- Comparable data sets to assess countries' potentials and effort to curb greenhouse gas emissions by a set of model-based structural indicators (see Köppl and Schleicher, 2012).
- Assessment of the sectoral and trade dimensions of diverse climate policy agreements focussing on the energy-intensive sectors steel, cement and paper and pulp (see Wooders et al., 2011).
- Evaluation of the regional dimensions of EU climate policy with particular attention to the diverse starting points of the EU 15 compared to the New Member States (see Spencer et al., 2011).
- Discussion of horizontal climate policy integration in the EU – e.g. climate policy and energy regulations (see Kettner et al., 2011b).
- Empirical analysis of the EU Emission Trading Scheme (ETS) and discussion of price stabilisation on the carbon market (see Kettner et al., 2011a, 2012).
- Proposal of an evaluation matrix for a qualitative appraisal of differentiated international climate agreements; application to country proposals (see Mehling, 2011, and Türk et al., 2011a).
- Integration of research findings of work packages and analyses of central issues for a future global architecture for climate policy (see Türk et al., 2011b).

Some innovative aspects and the improvements compared to existing analyses can be summarised as follows: In a first step a comprehensive and coherent international database is provided for effort sharing. This includes economic data as well as information on energy and GHG emissions. Based on the data set structural indicators serve to illustrate effort sharing on the level of countries or sectors in different climate policy regimes. The policy frameworks considered include more fragmented, diversified approaches that comprise new rules and elements.

Furthermore requirements for (climate) policy are discussed that result from current circumstances and developments in (international) climate policy. This comprises aspects of policy coherence and interactions/interdependencies of climate policy with other policy areas. Thus, the objective is to identify elements and measures of climate policy that ensure its stability and credibility in the light of unexpected events and crises, e.g. price stabilisation mechanisms and policy coordination. Given the uncertainty of the future development of global climate policy and its expected complexity the project provides conceptual foundations for decision makers on possible options regarding designs/architectures.

In addition to combining national and international expertise in climate policy research and environmental economics, the project gives special emphasis to communication with policy makers and stakeholders in industry. Two workshops and presentations at conferences with international participation were held to foster the outreach of the project and dissemination of results.

### 3 Contents and results of the project

In this section of the report for each work package of the ICPIA project the accomplished work as well as the results are described. The structure of the project calls for an inclusion of the description of methods used in this section, as methods are work package specific.

#### WP1: Building the foundations

One task of WP1 was the creation of an internationally comparable database for the analysis of "effort sharing". The database includes information on economic activity and population development as well as data on energy and greenhouse gas emissions. Based on this data set and using a structural model, indicators for national or sectoral effort sharing are developed. The second main task was to update and extend the database on the EU Emission Trading Scheme (EU ETS). In previous projects WIFO collected data from the Community Independent Transaction Log (CITL) on verified emissions and allocations for the installations participating in the EU ETS for the years 2005 to 2007. Data for the subsequent years were added continuously in the ICPIA project in order to allow an analysis of the scheme's performance (e.g. stringency of the cap). Furthermore the database was extended with data on cross border trading.

For each of the main topics a working paper has been written (Kettner et al., 2011a; Köppl and Schleicher, 2012). In the following we present the methodological approach as well as the main results of the two working papers.

#### ***Working Paper: The EU Emission Trading Scheme: National Allocation Patterns and Trading Flows***

This working paper analyses the stringency of emission caps on the EU and member states level and complements these results with an assessment of cross border trading.

Installations covered by the EU ETS need to have an account at their national registries, which record the allocation and verified emissions per installation and transfer them to the CITL. Since April 2011, data on verified emissions and allocated allowances for the EU ETS pilot phase (2005 - 2007) and the first three years of the second trading period (2008 - 2010) are available at the CITL on installation level. The CITL also contains data on the allowances surrendered by an installation for compliance including information on the originating country of the allowances.

The analysis of allocation patterns is based on the indicators developed by Kettner et al. (2008)<sup>2</sup>. With the four indicators gross long, gross short, net short and net long the differences between allocated allowances and actual emissions – the allocation discrepancies – are assessed on EU and Member State level.

In the preparations of the second trading period the European Commission (EC) played a stronger role compared to the first trading period. National Allocation Plans (NAPs) had to be adjusted according to the EC's demands in order to ensure that the overall Kyoto target of the EU, a GHG reduction of 8% by 2012 compared to 1990, stays in reach.

The analysis shows a higher overall stringency of the 2008 allocation caps compared to the first trading period reflecting the stronger role of the EC. In 2009, however, the effects of the economic crisis became visible: Emissions plumped and hence the cap was not binding. While in regional differences in the stringency of the cap prevailed in Phase 1 – i.e. New Member States generally exhibited higher net long positions than the EU-15 – the analysis does not confirm this for Phase 2. This again can be attributed to the stronger caps ensured by the EC.

Within ICPIA the WIFO analysis is extended by cross border trade flows of EUAs. For each installation data on the allowances surrendered in the period 2005 to 2010 by originating country are compiled in the WIFO database. These include the number of EUAs surrendered in the first and the second trading period as well as the number of project based credits surrendered for compliance in the second trading period.

The allowances surrendered are then aggregated on country level by summing up the installation results. Based on these data, the share of imported EUAs as well as of CERs and ERUs in surrendered allowances on country level is analysed. Furthermore, the exports of EUAs, CERs and ERUs exports surrendered by another country are assessed.

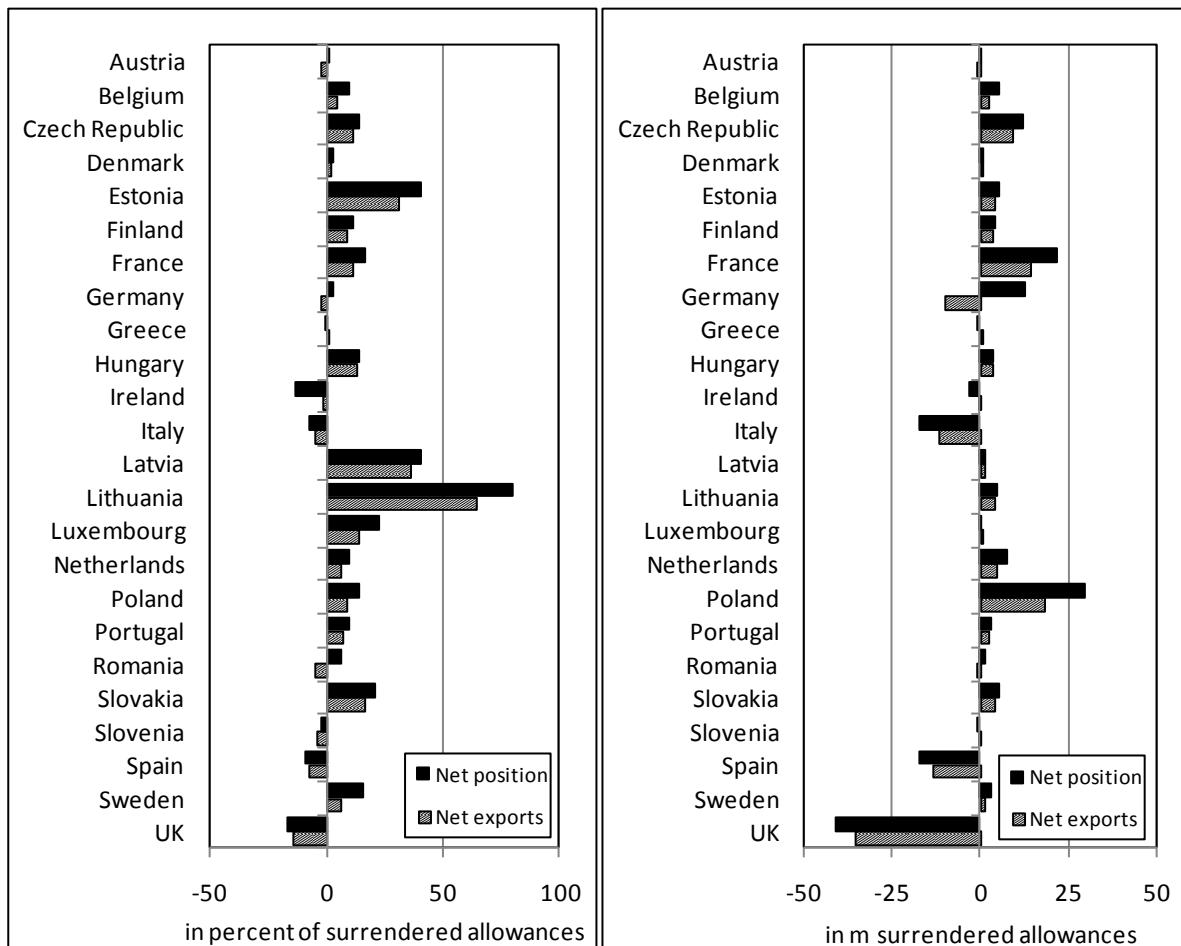
Based on the data and the qualifications described in the paper the following preliminary evidence on cross border EU allowance trading in the period 2005 to 2010 shows. On average over the first trading period 120 million of EUAs originating from another registry were used for compliance every year. The use of foreign EUAs continuously increased over the first trading period suggesting an increase in trading activity as agents accustomed to the new market. In the second trading period 157 million of EUAs originating from another registry were used for compliance every year.

For the first, completed, trading period one can compare the countries' net positions and net exports of EUAs. As expected, countries in a net short position have generally been net importing countries of EUAs (see Figure 1). Except for five countries (Greece, Ireland, Italy, Spain and the UK) where no conclusions can be drawn due to data restrictions, the results show that net positions rather pronouncedly exceed net exports in all countries. These surpluses can be attributed to the over-supply of allowances in Phase 1 due to 'generous' allocation in the NAPs.

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<sup>2</sup> Kettner, C., A. Köppl, S. Schleicher and G. Thenius (2008) Stringency and distribution in the EU Emissions Trading Scheme: First Evidence. Climate Policy 8 (1): 41-61

Figure 1. Net positions and EUA net exports in the first trading phase in percent of surrendered allowances (left) and in million (right)



Notably, Austria, Germany and Romania have been net importers of EUAs despite their net long position. The limited correlation between net exports of EUAs and the net long and short positions in these three countries may have three reasons: First, the spread of net long and short positions within countries, i.e. not all installations with surplus allowances might have sold them on the market and thus imports of allowances might have been necessary for compliance. Second, installations that are part of an international company and were facing a shortage of allowances may have received transfers from an associate company with a surplus of allowances located in another Member State. Third, installations may have imported more EUAs than they actually needed. This could reflect an expected higher growth of emissions at the time the allowances were acquired. Other underlying factors could be strategic behaviour or price expectations for EUAs.

The EU ETS is a central instrument in the governance of EU climate policy. Considerable changes between Phase 1 and 2 e.g. with respect to the revisions of the national emission caps by the EC have taken place in order to ensure a stronger scarcity of emission allowances and consequently a positive CO<sub>2</sub> price and incentive for emission abatement. Economic development in view of the economic crisis however again loosened the ex ante set cap. This issue is also taken up in WP4 where a discussion on institutional provisions for price stabilisation is performed.

### ***Working Paper: Scanning for Global Greenhouse Gas Emission Reduction Targets and their Distributions***

If dangerous and irreversible climatic events are to be avoided, global average temperature should not increase by more than 2 °C above pre-industrial levels. In order to achieve such a global target, a mitigation pathway has to limit global emissions to about 50 percent below 1990 levels by 2050. The paper investigates the radical change of the energy system that would be needed for entering the pathway for halving emission levels by applying a global analytical tool. A comprehensive database with a global coverage including socio-economic data as well as data on energy and emissions has been set up. By dividing the world into six countries and regions (EU27, China, India, Japan, USA, Russia) which account for two thirds of global emissions and a region for the rest of the world the paper investigates in an analytical framework the key drivers and parameters of the energy system which refer to population dynamics, economic activity, energy and carbon intensity. Based on assumptions about the diffusion and convergence of these key parameters implications for long-term emission reduction targets are derived.

In several respects the results obtained from the applied procedure for identifying global emission targets and their distributions among countries and regions seem to be surprising and sobering.

First, despite rather strong assumptions about the reduction of energy and carbon intensities global CO<sub>2</sub> emissions might decline only around 2030 and not before 2020 as recommended with respect to a 2 °C global warming target.

Second, the future dynamics of CO<sub>2</sub> emissions will greatly vary. Rest of the World, but above all India, might still strongly expand their emissions. China's emissions might start declining soon and the industrialized countries need to contribute with deep emission cuts in order to stabilize global emissions.

Third, the main drivers for rising CO<sub>2</sub> emissions remain population growth in India and the Rest of the World and the increase of economic activity in the poorer regions of the world.

Fourth, these results were obtained by postulating rather ambitious technological changes with respect to energy and carbon intensities, thus indicating the need for a rapid dissemination, diffusion and implementation of the corresponding technologies.

### **WP2: Sectoral Dimensions and Trade Issues**

Sector-specific issues concerning international competitiveness and carbon leakage are analysed in WP2. Two major sub-tasks are followed: An analysis of energy-intensive sectors in Austria and a discussion of Sectoral Approaches Agreements and Measures (SAAMs) as a means to reduce the potential of carbon leakage. For WP2 a report has been prepared (Wooders et al., 2011) for which the main findings are summarised below.

### ***Work package report: Multi-Country Sectoral Approaches: Potential for reducing Competitiveness and Leakage impacts in Austria's energy-intensive industries***

Energy-intensive sectors remain a key blockage, and perhaps also an opportunity, to reducing GHG emissions across the world. The characteristics of Austrian energy-intensive sectors have much generic application in developed world: they are mature; have long supply chains; feature large numbers of employees at concentrated sites; and, closure costs would be high to the wider economy.

This report is an attempt to move the debate on these sectors forward by analyzing them in detail, within a single country. The analysis starts with reference to the cost and decision-making drivers, and then considers how climate change policies and measures could affect these relative to other drivers faced by the industries.

The report focuses on answering five main questions:

1. Has the EU ETS already had an impact on competitiveness and leakage?
2. Would one expect larger impacts in the future?
3. Could SAAMs implemented in a multi-country framework mitigate some or all of these competitiveness and leakage impacts?
4. Could SAAMs be implemented, in the short- to medium-term?
5. Based on these considerations, the paper then asks which of the SAAM options considered Austria might favour and consider supporting.

Based on a literature review and the compilation and analysis of sector specific data the report analyses the economically most important energy-intensive sectors in Austria: pulp and paper, cement and iron and steel. The base case for all analyses is the assumption that the EU's existing policies and measures, including the EU ETS, will continue as planned. A full description of the scheme and its impacts to date is given in Kettner et al. (2011a) and Kettner et al. (2012).

Electricity generation is also a major cause of GHG emissions but raises different issues. Differences in electricity prices are an important cause of competitiveness differences, and the EU ETS and Renewables Directive have added further drivers of differences between countries within and without the EU. Analysis of electricity price differences is included as an input to the three energy-intensive industries considered rather than electricity generation being a separate sector for individual analysis.

The possible typology of SAAMs is interpreted in a wide sense but the focus is on those which have the highest chance of implementation.

Evidence so far shows that European climate policy and in particular the EU ETS have not induced carbon leakage in the analysed sectors. This mirrors a central characteristic of the current EU ETS, namely grandfathering of emission allowances (and oversupply of allowances). Even if competitiveness and leakage are not problems now, they could be in the future. The threat of them may be sufficient to affect investment and production decisions within energy-intensive industries. SAAMs could be one instrument to reduce competitiveness and leakage concerns.

Three types of SAAMs are discussed in the report: technological agreements, standards and labels and JI and other offsets. Only standards and labels, and particularly standards, are likely to have any significant impact on competitiveness and leakage concerns. The implementation issues with standards are significant, but this is not different from any other SAAM. One of the key factors that has held SAAMs in general back has been the 'devil being in the detail' required if we are to go beyond a concept and into a scheme which can be discussed and negotiated around.

The SAAMs discussed could help move countries contemplating membership of the EU to improve their performance in anticipation of the closer union and policies this would bring. Perhaps this should also be seen as one of their main purposes: SAAMs developed with partners outside the EU's borders would help generate trust and joint activities which would be mutually beneficial.

None of the options presented would be easy to implement, there is no momentum behind any of them at the present time and there may be strong political and legal challenges to their implementation. It is difficult to imagine any of the options being implemented in the short-term. The analysis does not give a clear 'winner' i.e. one option which should be pursued more strongly than the others. In the opinion of the authors, two options show a good balance between utility, impacts and implementability:

1. "Made under the EU ETS" label, perhaps to be promoted by consumers of energy-intensive products within the EU;

2. joint international RDD&D aimed at new technologies and techniques, to develop the breakthrough technologies and/or carbon capture and storage needed for energy-intensive industries to take their place in a low carbon future.

### WP3: Regional dimensions and inequality issues

Approaches to redistribute the costs of climate policy (effort sharing) have been central to EU climate change policy since its inception in the early 1990s. This is both due to the nature of the problem, which inherently involves (re)distributing costs between sectors, jurisdictions and generations, and the nature of the EU. A paper discussing the broader context of effort sharing and differentiated positions of "old" and "new" EU Member States was prepared including lessons learned for other jurisdictions.

#### ***Work package report: East-West Regional Dimensions in European Climate Policy***

The paper surveys the effort sharing approaches taken over the course of EU climate policy, since its early efforts to agree to the distribution of a common EU Kyoto target among Member States to the 2008 Climate and Energy Package. Integrating this issue in a broader context of differences in economic performance as well as differences in the energy systems between Old and New EU Member States provides a more comprehensive picture on the challenges for a common EU climate policy.

The 2004 and 2007 enlargements of the EU were unprecedented in their size and the diversity of countries they brought into the EU. The successful inclusion of ten former Socialist countries in the EU is rightly seen as one of the EU's proudest achievements. Likewise, the transfer of environmental and climate change policy to the New Member States of the EU (NMS) is another significant achievement. The Europeanization of environmental policy in NMS was accompanied by ambivalent attitudes on both sides.

Regarding climate change, several circumstances could imply a lower level of engagement in NMS compared to the EU15. First and foremost, lower GDP may entail in a lower social valuation of environmental quality, and a lower perceived responsibility to act under the UNFCCC principle of common but differentiated responsibilities and respective capabilities. Secondly, the reduction of GHG emissions from 1990, the base year of the UNFCCC and the Kyoto Protocol, meant that Kyoto emissions targets could be met with no additional effort. Moreover, it engendered the perception that NMS had already done their bit for the climate. Thirdly, the structural nature of the energy mix and economy in the NMS, with high shares of coal and energy intensive industry, may create large, and powerful, consistencies that could oppose climate policy.

In this context, a number of commentators raised concern regarding the impact of accession on EU environmental/climate policy, suggesting that it could lead to policy dilution by laggards, and poorer implementation due to lower capacities. A preliminary analysis by Skaerseth and Wettested (2007)<sup>3</sup> suggested that the accession process has not led to a breakdown of EU environmental policy, although enlargement may have weakened EU climate policy development. At the same time, commentators note the need to shape future EU climate policy in response to NMS interests, rather than approaching the issue the other way round<sup>4</sup>.

The working paper addresses the following two research questions:

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<sup>3</sup> Skaerseth, J. and J. Wettested, (2007), "Is EU enlargement bad for environmental policy: confronting gloomy expectations with evidence", International Environmental Agreements, 2007/3, pp. 263-280.

<sup>4</sup> Spencer, T. and A. Korppoo (2009) Tools for Building EU Climate Change Consensus: Bringing the CEE Member States on Board, Helsinki: The Finnish Institute of International Affairs, Briefing Paper 61, 2010.

1. What are the means by which the EU has sought to integrate NMS into its climate policy, in particular via the distribution of climate policy costs (effort sharing)?
2. What are the lessons learned for other jurisdictions as they develop their own climate policies?

In order to place this assessment into context, some of the key systemic differences between the EU15 and NMS, with a particular focus on the energy sector and economic divergences are presented. A key contention here is that it is necessary to understand the economic/energy sector divergences between Member States in order to assess the rationale and effectiveness of effort sharing approaches. The paper then qualitatively assesses the process of effort sharing in the Kyoto target negotiation phase; in Phase 2 of the EU ETS (2008-2012), and in the Climate and Energy Package (2013-2020).

The paper comes to several central conclusions. Firstly, climate policy negotiation in the EU takes place within an enormously complex web of other policies and interests, allowing space for (implicit) bargaining that is unlikely to exist in other international settings. Secondly, a central difficulty over the history of EU effort sharing has been the harmonization of climate policy across multiple, overlapping climate regimes, including the Kyoto Protocol; the Burden Sharing Agreement between the EU15; and the European ETS. This overlap led to linkages and disharmonies that proved difficult to reconcile. Thirdly, the EU's climate policy has moved gradually towards more centralized modes of governance; this has facilitated the harmonization and effectiveness of ambitious climate policies, but at the cost of derogations, which have potentially weakened harmonized instruments such as the ETS. Overall, the balance appears positive, however, as EU effort sharing approaches have allowed Member States to go further than they would in a purely domestic context. Ultimately, the EU's effort sharing policies need to be seen in the difficult context of shared competences between the EU and Member States in the energy sector, and conflicting EU principles of the internal market and solidarity, which implies a differentiated approach to fundamental economic reform.

It can be questioned to what extent the EU experience with negotiating and redistributing targets internally can be transferred to the international negotiations under the UNFCCC, or indeed to other multilateral forums on climate change. Generally speaking, complex redistributive arrangements in environmental agreements require two pre-conditions: i) a small number of parties; ii) close and repeated diplomatic, economic and cultural interactions between the parties. The literature on the transfer of environmental policy to EU accession countries indicates the importance of these conditions<sup>5</sup>. In particular, two factors seem most relevant:

The enormous opportunity of joining the EU, in terms of economic and geopolitical security, was a crucial driver of the willingness to adopt stringent environmental policy, including climate policy. Adopting the EU's climate policy was seen as an "acceptable price" to pay for the benefits of acceding to the union. In this context, the EU experience of effort sharing in climate policy is somewhat unique internationally. It provides anecdotal support for the hypothesis advanced by scholars of international relations that small, like-minded "clubs" of countries may be more successful at distributing the costs and benefits of climate policy than larger groups of heterogeneous nations, and therefore at maintaining a more ambitious policy than each country would commit to alone.<sup>6</sup> However, it should also be underscored the extent to which EU policy has

<sup>5</sup> see e.g. Massai, L. (2007) "EU enlargement and climate policy", in P. Harris (ed.), Europe and global climate change: politics, foreign policy and regional cooperation, Cheltenham, UK: Edward Elgar Publishing, 2007; Boda, Z. et al. (2000) "Understanding Hungary's environmental foreign policy: the cases of the climate change and biodiversity regimes", in P. Harris (ed.), Climate change and foreign policy: Case Studies from East to West, Palgrave MacMillan, 2000.

<sup>6</sup> see Victor, D. (2011) Global Warming Gridlock: Creating More Effective Strategies for Protecting the Planet, Cambridge: Cambridge University Press, 2011.

both responded and shaped the multilateral negotiations on climate change. The interaction of both levels of governance – the quasi-federalist level in the EU and the international level – points to a more complicated relationship than either the “multi-lateralist” or “mini-lateralist” schools of international climate policy are able to capture.

#### **WP4: Institutional Dimensions and Incentive Issues**

The challenge to integrate climate policy issues and other policy areas faces often the problem of different time dimensions: Climate policy needs to have a long term perspective including the appropriate instruments and measures. In contrast policy makers tend to focus on short term issues or adopt a sector specific perspective that may have adverse effects on climate policy (e.g. support of emission intensive industries in the course of the economic crisis). In other cases there will be synergies (e.g. support for renewable energy). These synergies and conflicts are highlighted and reported in a working paper attached to this report (Kettner et al., 2012).

Another aspect dealt with in this work package concerns options to stabilise carbon markets. Institutional settings as a carbon authority are discussed that could contribute to stabilising the carbon price and ensure the price incentives for abatement generated by carbon markets. Furthermore a closer look is taken at the concept of marginal abatement cost curves in the context of GHG emission reduction (Kettner et al., 2011b).

#### ***Working Paper: Carbon Authority as Price Stabilising Institution in the EU ETS***

Prior to the introduction of the EU ETS a number of papers addressed theoretically and empirically the issue of cost effectiveness and economic efficiency of emission trading systems. These arguments were re-emphasised as advantages of the market-based instrument by the EC and economists when the EU ETS came into force: Once the emission cap is determined, market forces will set the allowance price and achieve the desired reduction target at least cost. Several years of experience with the EU ETS and various adaptations of the regulatory framework – especially with respect to the upcoming trading phase 2013 - 2020 – still leave some unease with respect to a too strong reliance in market forces. The need for provisions to stabilise carbon markets and the setting of institutional flexibility with respect to market intervention measures have been discussed previously to the start of the EU ETS.<sup>7</sup>

The trade-off between longer term emission reduction commitment and lack of flexibility in order to respond to a strong variability in allowance prices e.g. due to an over-allocation as experienced in the pilot phase of the EU ETS (2005 - 2007) or unexpected events as e.g. pronounced changes in economic development were also discussed intensively during the negotiations of the EU Climate and Energy Package. Several Member States took up the issue of price fluctuations. Carbon price developments and their effects on the efficiency of emissions trading schemes are also discussed in economic theory<sup>8</sup> as well as provisions for some regulatory flexibility in order to strengthen the role of carbon prices as investment and innovation signal.<sup>9</sup>

The working paper discusses imperfections in market forces – contrary to theoretical assumptions – especially with respect to the implications of the use of marginal abatement cost curves as well as the role of stable price signals for investment decisions.

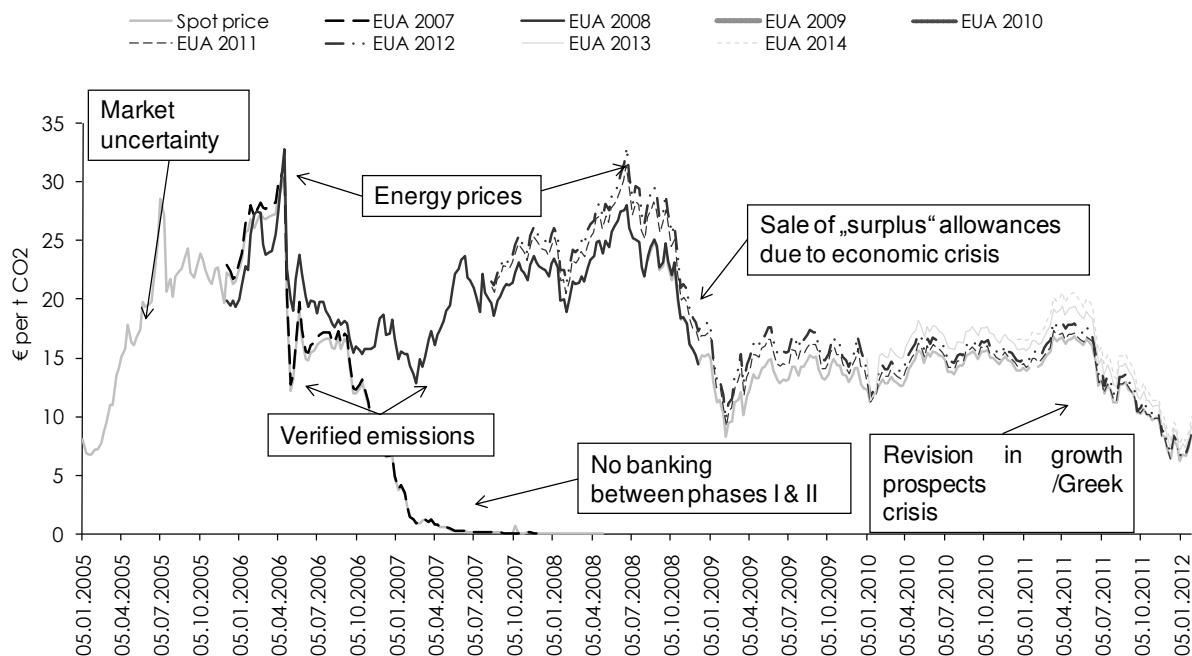
<sup>7</sup> e.g. Helm, D., C. Hepburn and R. Mash (2003) Credible Carbon Policy, Oxford Review of Economic Policy, Vol. 19(3), pp.438-450.

<sup>8</sup> see e.g. Philibert, C. (2009) Assessing the value of price caps and floors, Climate Policy 9 (2009), pp.612-633; Pizer, W.A., (2002), Combining price and quantity controls to mitigate global climate change, Journal of Public Economics 85 (2002), pp. 409-434.

<sup>9</sup> see e.g. Frankhauser, S. and C. Hepburn (2010) Designing carbon markets. Part I:Carbon markets in time, Energy Policy 38(2010), pp.4363-4370;

Experience in the EU ETS shows a high variability in the price for EUAs (see Figure 2) in particular in the first trading phase. Various drivers for these price fluctuations can be distinguished and have been analysed in a number of papers.<sup>10</sup>

Figure 2: Development of OTC closing prices in the EU ETS (2005 – 2011)



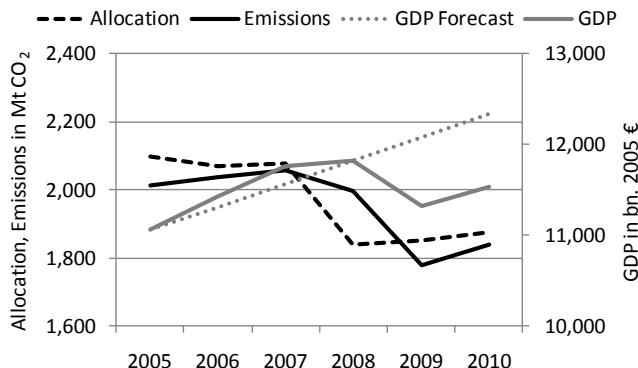
In Phase 2 of the EU ETS it became once more obvious that the ex-ante perceptions of the stringency of the cap and ex-post outcomes deviate from each other. As illustrated in Figure 3, when emission caps were determined for Phase 2 average annual GDP growth rates of 2.2%<sup>11</sup> were assumed for the second trading phase. Under these presumptions and the stronger intervention of the EU Commission in National Allocation Plans the cap was set well below the cap of the pilot phase, in a way – it was thought – that would guarantee scarcity of emission certificates in the second trading period. However instead of positive GDP growth, negative average annual GDP growth rates of -1.3% in the period 2008 - 2010 were realised because of the financial and economic crisis. The economic downturn has been particularly pronounced in lower manufacturing output as well as in the development of (EU ETS) emissions.<sup>12</sup> A drop in EUA prices was the consequence (see Figure 2 above). This illustrates that exogenous shocks that lead to a change in fundamentals like economic growth have a considerable impact on the stringency of the (ex ante set) cap and hence on price development.

<sup>10</sup> see e.g. Kettner, C., D. Kletzan-Slamanig, A. Köppl, T. Schinko and A. Türk (2011) Price volatility in carbon markets – Why it matters and how it can be managed. WIFO Working Papers, 409/2011.

<sup>11</sup> Average annual GDP growth rates assumed in the PRIMES reference scenario (DG TREN, 2007).

<sup>12</sup> Kettner C., D. Kletzan-Slamanig and A. Köppl (2011) The EU Emission Trading Scheme – Sectoral allocation patterns and the effects of the economic crisis. WIFO Working Papers, 408/2011.

Figure 3: GDP forecast and development of GDP, allocation and emissions (2005 - 2010)



Starting point for an understanding of the mechanisms of the carbon market is the assumption in environmental economics that a quantity cap and abatement costs determine the market price for emission allowances. The theory on emission trading, however, rests on a number of rather strong assumptions as e.g. all actors in the market (regulator and regulated entities) know the marginal abatement costs and there are no barriers with respect to the necessary abatement investments and price adjustments.

The divergence between the ideal theoretical setting for an emission trading system on the one hand and the experience from real world development on the other, initiated the debate on supplementary institutions within the EU ETS. One idea put forward in literature and policy is the establishment of a Carbon Central Bank or a Carbon Authority in order to provide an institutional setting to intervene in the carbon market and to influence the expectations of economic actors.

The call for an independent carbon authority reflects that the theoretical assumptions on emissions trading are not matched by a real world setting. This weakens the potential role of carbon prices for investment decisions. In order to improve the functioning of the EU ETS the paper reiterates the arguments put forward in literature for a carbon authority and extends them by the argument that the concept of abatement curves is only of limited value in the context of CO<sub>2</sub> emission reductions where marginal abatement costs often are ambiguous and time variant.

If the observed carbon price does not reflect the long-run fundamentals this might be at least for two reasons a cause for concern:

- Market prices may lose their credibility in terms of providing signals for long-term decisions. This has a particular bearing for investment decisions that have an impact on the supply and use of energy and may lead to technological carbon lock-in.
- As a consequence this may lead to wrong investment decisions – in some cases with long term consequences – which create excessive costs.

These arguments underpin the discussion in research and policy to look for opportunities to empower the carbon market against these potential market inefficiencies from price variability.

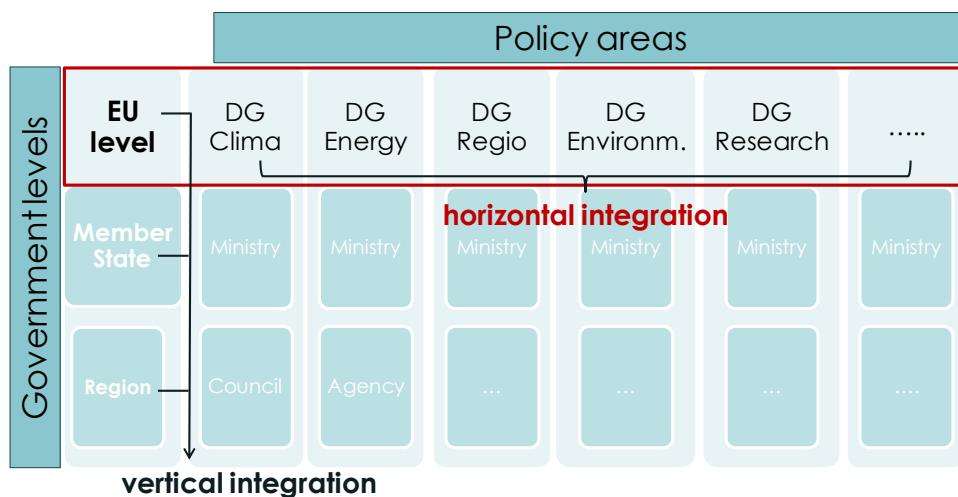
#### **Working Paper: Climate Policy Integration – Evidence on Coherence in EU Policies**

In order to successfully tackle the challenge of limiting climate change it has to be recognised that climate policy is a cross-sectoral issue and needs to be firmly integrated into general and sector-specific policy areas that frame economic activity and societal development. Experience however shows that there is a divide between the need of addressing climate policy as cross-sectional issue and short term policy decisions that imply a low hierarchical rank for climate policy versus other

policy areas. Still a big step is necessary to depart from climate policy as add-on policy area towards comprehensive integration.

Policy integration can be analysed from different points of view, i.e. within or across government levels (see Figure 4). Horizontal policy integration focuses on mainstreaming climate policy objectives into other sectoral policy areas on one level of government (e.g. Directorates-General on EU level, federal ministries). Vertical policy integration in contrast takes a top-down approach and focuses on mainstreaming throughout multiple levels of government and policy making (e.g. from EU directives to national implementation to local or regional implementation).

*Figure 4: Horizontal and vertical policy integration*



The working paper discusses the topic of climate policy integration and focuses on horizontal policy integration at the EU level with respect to general strategic policy papers, energy policy and the EU's Multi-annual Financial Framework.

The paper assesses horizontal policy integration in the EU along four criteria (see Table 1). The qualitative appraisal confirms that while there is a high general commitment to climate change action on EU level, evidence on climate policy integration into specific policies analysed in the paper is not clear cut: While recent energy policy documents generally refer to climate change as a central guideline within energy policy, the EU budget does not mention climate change as a budgetary priority. The importance of a stronger consideration of environmental and climate issues in the EU budget was however stressed in the EU budget review. The integration of climate change concerns in the EU budget would imply a positive impact as the EU budget entails multiplier effects in the member states. Evidence on expenditure in one important budget area, the cohesion funding, shows that e.g. the allocation of funds for transport with a potential climate relevant impact has a bias towards road transport.

It is evident that there is a close link between energy policy and climate policy as fossil energy use determines to a large extent the amount of GHG emissions. Within energy policy documents the consistency and synergetic character of climate policy integration shows some ambiguity. In the specific policy documents climate policy objectives are largely supported, whereas in the basic strategic documents some inconsistencies or conflicts prevail.

The scoping of some EU documents with respect to climate change integration indicates that in the recent past climate change issues are recognised in a number of strategic EU documents and is even addressed in the Lisbon Treaty. From the examples chosen in this paper one cannot conclude that

climate policy is widely acknowledged as a cross cutting issue along all horizontal policy areas within the EU. However this paper only addresses a snapshot of the wide range of EU policies. The research on climate policy integration in the EU thus needs to put further emphasis on a comprehensive analysis of policy integration on the horizontal as well as vertical level.

Table 1: Climate policy integration in EU policies

	<b>Basic Energy Policy</b>	<b>Specific Energy Policy</b>	<b>Multi-annual Financial Framework (MFF) and cohesion funding</b>
<b>Political Commitment</b>			
General	High – sustainability and climate change are included as core targets in various strategic energy policy documents.	High – the specific documents considered in this paper (renewables directive, SET Plan, proposal for energy efficiency directive, proposal for the amendment of the energy tax directive) explicitly address climate change as central motivation.	Low - The current EU budget does not explicitly address climate change. Overall little reference is made to environmental issues. Recommendations for the next MFF include a stronger focus on the targets of the EU 2020 Strategy which also recognises the challenge of climate change. In cohesion funding monetary resources for environmental investment are provided for.
Consistency	Medium – the targets of energy security and provision of affordable energy at least partly contradict emission reduction targets.	Medium to high – all specific policy areas aim at lower or less carbon intensive energy use. Interactions between specific policies however are not addressed. The SET Plan shows a strong focus on energy supply.	Given the recognition of the challenge of climate change in basic EU documents consistency with budget policy is currently missing. With respect to cohesion funding, only a small portion of the overall budget is currently allocated to areas promoting climate change (i.e. energy efficiency and RES); in contrast a high share of funding accrues to investment in road transport.
<b>Nature of interdependencies</b>			
Direct/indirect	High – clear direct linkage as fossil energy use accounts for large part of GHG emissions; Infrastructure investment shape energy structures for several decades and thus may lead to lock-in in carbon intensive technologies.	High direct interdependencies	Medium – Indirect linkages as the EU budget generates multiplier effects as a source of co-financing for programmes implemented in member states, but little reference is made to environmental issues or climate change.
Synergetic / conflictual	Strategic objectives of technological shift and improvement in energy efficiency support climate policy. A conflictual potential could arise from the objectives affordable energy and energy security	Synergetic interdependencies dominate, but stronger focus on consistency of multiple targets would be desirable.	On the general level potentially conflicting as climate change issues are no requirement for budgetary funding. For cohesion funding synergies can be found with respect to funding for RES, energy efficiency and rail infrastructure; funding of road transport may entail conflicts with emission reduction targets
<b>Weighting and resources</b>			
Balance of targets	The strategic policy documents do not suggest a weighting of targets. Decision making in conflictual situations cannot be assessed from the documents	Each policy document has own target without referring to other policy targets. Mitigation can be seen as superordinate objective	Not applicable
Provision of resources	No reference to resources	Provision of resources to a large extent on member state level (vertical policy integration). Funding of the SET Plan not clearly specified	No explicit resources for climate change issues in MFF. In cohesion funding in the current MFF period only 9 bn. € have been allocated to energy efficiency and 32 bn. € to climate friendly transport; in contrast 41 bn. € were allocated to road transport. Cohesion funding is co-financed by member states.

## WP5: Searching for a global architecture

WP5 evaluates and integrates elements of proposed climate regime architectures in the context of the broad agenda within the UNFCCC as well as proposals emerging in other contexts. The work package reviews diverse proposals for global institutional architecture in the post-2012 period and develops an evaluation matrix for their appraisal.

Furthermore a synthesis of the research results of the previous work packages is performed. Together with the above described analysis of internationally proposed climate architectures options for a follow on process of international climate policy are discussed. Three working papers have been prepared in this work package (Mehling, 2011; Türk et al., 2011a; Türk et al., 2011b).

### ***Working Paper: Climate Policy Integration – Evidence on Coherence in EU Policies***

The paper provides a conceptual framework for the systematic analysis of different regime architectures. These criteria can be applied for a first comparison and tentative assessment of different cooperation proposals along a uniform set of qualitative criteria that seeks to capture principal conditions and characteristics of any international effort to address the challenge of climate change. The evaluation criteria are:

- **Level of Ambition**  
Understood as the ambition of objectives set out under a cooperative framework vis-à-vis accepted mitigation and adaptation imperatives, such as the decision endorsed by the international community in Cancún to hold the increase in global average temperature below 2 °C above preindustrial levels.
- **Compliance Facilitation and Control**  
An assessment of the overall clarity and determinacy of commitments, the robustness of incentives for compliance, the mechanisms – whether facilitative or coercive – to address non-compliance, as well as the provisions set out to ensure sufficient transparency of efforts undertaken by participants.
- **Institutional Capacity**  
Defined as the provision of mechanisms to perform procedural functions and facilitate the operation of regime elements, for instance through an infrastructure with proprietary resources and staff, technical knowledge, an institutional memory, and professional routines.
- **Participation and Inclusiveness**  
Measured in terms of geographic scope and breadth of sectoral and stakeholder participation in cooperative efforts to address climate change.
- **Systemic Coherence**  
Ability to address conflicts or tensions between different cooperative efforts, including measures to improve coordination between institutions, for instance through clear mandates and responsibilities, or through conflict clauses and procedures that address potential overlaps.
- **Political and Economic Feasibility**  
A criterion integrating aspects of equity and fairness, expected economic burden and the distribution of costs and benefits as benchmarks for the acceptance of and adherence to a cooperative governance framework.

Different proposals for climate policy regimes or a climate policy architecture can be qualitatively assessed with the proposed criteria, which can show the values "High", "Medium" or "Low". This

presentation in matrix form (see Table 2) improves the comparability of strengths and weaknesses of different international climate regimes.

*Table 2: Assessment Matrix for the Evaluation of International Climate Cooperation Frameworks*

Level of Ambition	<i>High</i>	<i>Medium</i>	<i>Low</i>
Compliance Facilitation and Control	<i>Strong</i>	<i>Medium</i>	<i>Weak</i>
Institutional Capacity	<i>High</i>	<i>Medium</i>	<i>Low</i>
Participation and Inclusiveness	<i>High</i>	<i>Medium</i>	<i>Low</i>
Systemic Coherence	<i>High</i>	<i>Medium</i>	<i>Low</i>
Political and Economic Feasibility	<i>High</i>	<i>Medium</i>	<i>Low</i>

The paper applies this systematic to case studies representing different climate policy proposals and is the basis for a second working paper in WP5 (see the following).

#### ***Working Paper: Alternative Frameworks for International Climate Cooperation: Country Positions in the Run Up to Durban***

The working paper builds on the above described conceptual framework for the systematic analysis of different climate regime architectures and applies the criteria defined therein to the proposals submitted by central actors in the current negotiations. It is strictly limited to political proposals formulated by formal participants in the international climate negotiations, namely sovereign nations, negotiating blocs composed of a group of states with similar interests, and regional organizations of economic integration. While only heuristic in stringency, the criteria allow for a first comparison and tentative assessment of different cooperation proposals along a uniform set of qualitative criteria that seeks to capture principal conditions and characteristics of any international effort to address the challenge of climate change.

There is emerging consensus on some of the building blocks of a future climate agreement, such as the institutional setting of the Green Climate Fund or the Technology Fund. However, there has been far less consensus on the overall shape of the future post-2012 global architecture. The most controversial issues are the timing and the legal status of a new climate agreement and its components, and the level of ambition of its targets. Proposals range from an international treaty under the convention – possibly accompanied by a second Kyoto Protocol commitment period – to a set of decisions under the convention. From the broad set of conceivable post-2012 options, however, only a few outcomes are realistic in Durban. The proposals and negotiating texts show that the discussions for a post-2012 agreement are moving to a climate agreement with in principle a far higher geographical inclusiveness than under the Kyoto Protocol, but internationally binding targets (legally or politically) only for a small group of countries in the short term. The reduction targets proposed so far by developed countries fall short of the numbers requested by science. Most

countries would, at least during a transition phase, face no internationally binding targets. The UN would remain the main forum for decision making, possibly accompanied by fora outside the UN.

As analysed in the working paper a COP-decision in Durban could continue the Cancun process and could additionally include some of the Kyoto rules. Such a transitional regime under the COP, as for instance proposed by Australia, would not be based on a near-term legal agreement, but on a political understanding that may evolve over time into a legally binding regime. The dynamic of the Copenhagen and Cancun processes would be extended with a high geographical inclusiveness, but also with only moderately ambitious targets for Annex-I countries. A COP decision in Durban setting out a roadmap for the next few years could help identify common ground on accounting rules and new market mechanisms. While such a transitional regime is likely to be politically feasible, pronounced differences in the views on the overall climate architecture will likely not be resolved. The compliance facilitation and control framework would potentially be strong for those countries that sign up to a second commitment period, but low for other countries, who would potentially face a review process for their voluntary targets without sanctions for non-compliance. At the same time, however, such a transitional regime could continue the broad participation seen since Copenhagen.

The design of a post 2017/2020 regime would be based on a 2013-2015 review process of the reduction targets. The next IPCC assessment report to be published in 2014 would provide a scientific basis for the discussion of future reduction targets. Based on the strengths of the current regime and harnessing some of the features of post-2012 proposals, such as a high level of participation and inclusiveness and political feasibility, the international community may yet be able to design a more comprehensive and ambitious international climate regime.

### ***Working Paper: Searching for a Global Architecture***

This working paper gives a resume of the research conducted in the various work packages of the ICPIA project and integrates it into a broader analysis of possible pathways for an international climate policy architecture.

The outcome of the Durban Climate Conference in December 2011 will lead to a more fragmented Climate regime after 2012. While a few countries may continue with the Kyoto Protocol, its governance and its rules, the majority of countries will proceed with the bottom-up approach of voluntarily proposing and reviewing reduction targets at least until 2020 when a new global treaty may come into force. Designing this transition period will be a major challenge. This ICPIA synthesis paper includes lessons from different ICPIA work packages in order to draw conclusions for improving the design of the climate regime for the time after 2012 and after 2020. The paper concludes that finding a common ground on important design features, such as accounting or new market mechanisms, in the short term will impact the ability to create a comprehensive agreement on the long term.

## **4 Conclusions and recommendations**

### **4.1 Conclusions**

The ICPIA project brought together experts from different disciplines as well as different countries. Both aspects, the international integration and multi disciplinary perspective, generated additional benefits for the researchers involved.

On the issue of effort sharing a comprehensive and coherent international database is provided. This includes economic data as well as information on energy and GHG emissions. Based on the data set structural indicators serve to illustrate effort sharing on the level of countries or sectors in different

climate policy regimes. The policy frameworks considered include more fragmented, diversified approaches that comprise new rules and elements.

The ICPIA findings with respect to competitiveness and leakage from the EU ETS have shown that these do not constitute problems for the EU now, however they could be in the future. The threat of them may be sufficient to affect investment and production decisions within energy-intensive industries. In the opinion of certain industries within the EU, such decisions are already being made. Wooders (2011) offers a solution for near neighbours of the EU: Russia, Turkey and Ukraine. Similar to Japan's plans for bilateral agreements the EU could install a bilateral scheme or equivalent with its neighbour countries. The EU ETS allows linking to other carbon regimes judged similarly stringent. The EU has also chosen to impose constraints on the provenance (geographic and by type of project) of allowances (CERs) generated under the CDM. An EU bilateral scheme could be focused on near neighbours and energy-intensive sectors. The major benefit of a sectoral approach may be the leverage it generates to bring countries towards Accession to the EU, and to its ETS (Wooders et al., 2011).

Another conclusion of the ICPIA project is that there is a need to balance comprehensive criteria for effort sharing with simplicity and transparency. In this regard, a comparison between the allocation of Kyoto targets within the EU bubble and effort-sharing in the 2008 Energy and Climate Package is instructive. In the former, a sectoral approach was adopted. In the latter, an instrument-based approach is adopted, with the contribution of each instrument (non-ETS target, RES target etc) aggregated and presented numerically using a suite of econometric models. The efficacy of the latter approach is witnessed perhaps by the speed with which the European Energy and Climate Package was adopted. Comprehensive, simple and transparent criteria that balance interests of different parties will also be crucial for the success of international effort sharing. Currently widely accepted criteria to compare pledges do not exist (see Mehling, 2011).

Furthermore the European experience with the first Kyoto phase shows that differentiated targets may contribute to, but by no means guarantee, successful implementation (Spencer et al., 2011). Indeed, it can be argued that a normative process of policy transfer can supplant the development of intrinsic domestic interests in environmental policy. The external, negotiated imposition of environmental policy perhaps needs to be complemented by a more two-way process to take into account the domestic interests of participants. Accommodating domestic interests of countries will also be of major importance for any new international climate treaty. Cooperation on implementation and the nurturing of domestic interests in climate policy may be just as important as negotiating agreed targets for the long-term stability of the policy coalition.

The experience with the EU ETS so far shows a mixed record (see Kettner et al., 2011a). The EU ETS has no mechanism to prevent over allocation in case of unexpected events, such as the financial crisis or excess price volatility. The analyses of the ICPIA project shows a higher overall stringency of the 2008 allocation caps compared to the first trading period reflecting the stronger role of the European Commission. In 2009, however, the effects of the economic crisis became visible: Emissions plumped and hence the cap was not binding. While in the first trading phase regional differences in the stringency of the cap prevailed – i.e. New Member States generally exhibited higher net long positions than the EU-15 – the analysis does not confirm this for the second trading phase. This again can be attributed to the stronger caps ensured by the EC. Regarding price volatility the evidence on EUA prices shows so far high variability since the introduction of the EU ETS that gives a cause for concern: On the one hand market prices may lose their credibility in terms of providing signals for long-term decisions. On the other hand this may lead to wrong investment decisions – in some cases with long term consequences – which create excessive costs. One option discussed within the ICPIA project was the introduction of a regulatory authority that can intervene in the market (Kettner et al., 2012). As reaction to the experiences the EU made with price volatility, other emerging schemes

plan to introduce price control mechanism. The Australian scheme, set to start in 2013, for example will introduce a price floor and a price cap.

The Durban climate conference paves the way for legal flexibility in the short term, a few countries will sign up to a second Kyoto Protocol commitment period while the most will adopt a variety of other approaches than binding targets and timetables (see Türk et al., 2011a, b). As Keohane (2010)<sup>13</sup> argues comprehensive regimes lead to institutional monopolies that may lead, such as in the case of the UN, to inflexibility and inaction, while a variety of institutional approaches may have the advantages of greater flexibility and adaptability, in part, from decision-making structures offering more effective regulation when compared with comprehensive regimes. If an international agreement is well designed different institutional venues could act in a synergistic way. A broader institutional setting may be an opportunity to achieve more coherence between different policy areas of strategic importance for countries such as energy security. It is evident that there is a close link between energy policy and climate policy as fossil energy use determines to a large extent the amount of GHG emissions. The ICPIA project showed that even within the EU there is still room for improving the coherence of energy and climate policies (see Kettner et al., 2011b). On the international level questions of coherence of climate policies with other policies will be of great importance for the participation of countries in a new climate agreement and thus the effectiveness of any new climate regime.

## 4.2 Outlook and Recommendations

International climate policy is increasingly characterised by high complexity and difficulties in achieving a comprehensive international climate agreement. The project ICPIA contributes in highlighting and advancing some of the diverse aspects of climate policy on the EU and international level. The ongoing dynamics in international climate negotiations requires continuous research efforts on institutional and economic dimensions of climate policy.

The results of the ICPIA project adds to this discussion and are disseminated at the ICPIA homepage (<http://icpia-project.wifo.ac.at>) as well as at international conferences and provide a basis for submissions to peer reviewed journals.

The interplay between goal setting, international co-operation and the implementation of effective instruments for mitigation and adaptation measures will need continuous research on and monitoring of progress and failure.

The energy and climate policy goals of the EU will be of special interest as the EU remains so far a first mover in climate policy. The EU ETS as central instrument of climate policy on the EU level is a field where economic analysis is needed in order to gain insight on the effectiveness of this system, but also to learn more about (strategic) behaviour of the regulated economic actors. Further research is needed on the question of climate policy mainstreaming. Climate change, mitigation of climate change and adaptation to climate change are long term research issues that should also be integrated in other research agendas.

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<sup>13</sup> Keohane, R.O., Victor, D.G., (2010), The Regime Complex for Climate Change. Discussion Paper 2010-33. Cambridge, MA: Harvard Project on International Climate Agreements.

## C) Project details

### 5 Methods

Within the ICPIA project each work package addressed a specific thematic aspect relevant for the international climate policy architecture.

The project ICPIA is structured in five work packages:

- WP1: Building the foundations
- WP2: Sectoral dimensions and trade issues
- WP3: Regional dimensions and inequality issues
- WP4: Institutional dimensions and incentive issues
- WP5: Searching for a global architecture

The output of the project is documented in a series of working papers. For each working paper the method chosen reflects the underlying research question. Nevertheless some common methodological and quality aspects provide the basis for all papers. These include a thorough knowledge of the research in this area reflected in the papers as well as the relevant policy documents. The methodological approaches applied are:

- Data mining for WP1 on effort sharing and the EU ETS and for WP2 on competitiveness issues.
- Statistical analysis of the EU ETS (WP1) and of key indicators of emission intensive sectors in Austria (WP2); analysis of the differences of the economic and the energy systems between Old and New EU member states (WP3).
- Quantitative effort sharing approach derived from a structural model (WP1).
- Analysis of literature and policy documents with respect to climate policy integration (WP4).
- Compilation of evaluation criteria for international climate policy regimes and application to policy proposals (WP5).

The work package specific methodology is described together with the extensive documentation of the contents and results in section 3 of this report. The project addresses a variety of aspects of international climate policy architecture with a corresponding variety of methodological approaches used in the working papers produced for ICPIA. A comprehensive and common description and reasoning for the selection of method is therefore of limited feasibility.

## 6 Work and time plan

Table 3. ICPIA GANTT Chart

Work packages	Description	Project month																								
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
WP1	<b>Building the foundations</b>																									
	Collection and processing of data																									
	Development of indicators for effort sharing																									
	Analysis of the EU ETS																									
	Reporting																									
WP2	<b>Sectoral Dimensions and Trade Issues</b>																									
	Analysis of energy-intensive sectors in Austria																									
	Case Studies																									
	Final Report and Presentation of the Report																									
WP3	<b>Regional dimensions and inequality issues</b>																									
	Exploring East-West issues within EU package																									
	Discussion of East-West policies and processes																									
	Analysis of base year question and EU's assimilation of hot air																									
	Formulate lessons for the US and other countries																									
WP4	<b>Institutional dimensions and incentive issues</b>																									
	Survey of scientific literature																									
	Survey of policy documents																									
	Discussion of policy coherence and institutional settings for stable carbon markets																									
	Reporting																									
WP5	<b>Searching for a global architecture</b>																									
	Investigation of global climate policy architecture																									
	Analysis of portfolio of agreements, incentives and interactions																									
	Linkages with data-base work (WP1)																									
	Reporting																									
WP6	<b>Project management and dissemination</b>																									
	Kick-off meeting																									
	Planning of work and milestones																									
	Workshops																									
	Project webpage																									
	Documentation and dissemination																									
	Project management and coordination																									

The overall duration of the project was extended by one month until December 2011. We applied for the prolongation via e-mail to kpc and received the approval from kpc on 13 October 2011.

The second workshop was originally planned in project month 16 and took place in project month 17 due to organisational reasons. The last stakeholder workshop was held in September and not as planned in the last project month in order to still get some input from relevant experts.

## 7 Publications and Dissemination

### 7.1 Publications

All ICPIA working papers and reports as well as workshop presentations are available on the ICPIA website, <http://icpia-project.wifo.at>.

Kettner, C., A. Köppl and S. Schleicher (2012) Carbon authority as price stabilising institution in the EU ETS, ICPIA Working Paper.

- Kettner, C., D. Kletzan-Slamanig and A. Köppl (2011a) The EU Emission Trading Scheme – Allocation Patterns and Trading Flows, ICPIA Working Paper.
- Kettner, C., D. Kletzan-Slamanig and A. Köppl (2011b) Climate policy integration – Evidence on coherence in EU policies, ICPIA Working Paper.
- Köppl, A. and S. Schleicher (2012) Scanning for Global Greenhouse Gas Emission Reduction Targets and their Distributions, ICPIA Working Paper.
- Mehling, M. (2011) Alternative Frameworks for International Climate Cooperation: Towards a Systematic Assessment Matrix, ICPIA Working Paper.
- Spencer, T., D. Fazekas, T. Laing and S. Cooper (2011) East-West regional dimensions in European climate policy, ICPIA Project Report.
- Türk, A., M. Mehling and A. Baker (2011a) Alternative Frameworks for International Climate Cooperation: Country Positions in the Run Up to Durban, ICPIA Working Paper.
- Türk, A., M. Mehling, C. Kettner and A. Köppl (2011b) Synthesis: Searching for a Global Architecture, ICPIA Working Paper.
- Wooders, P., M. Keller, B. Anzinger and T. Moerenhout (2011) Multi-Country Sectoral Approaches: Potential for reducing Competitiveness and Leakage impacts in Austria's energy-intensive industries ICPIA Project Report.

## 7.2 Dissemination

### Project workshops

Within the ICPIA project two project workshops were held at the Austrian Institute of Economic Research (WIFO) in Vienna – an expert workshop (with involvement of Austrian stakeholders) and a stakeholder workshop. The presentations of both workshops can be downloaded from the ICPIA project website (<http://icpia-project.wifo.at/>).

#### Expert workshop

On 8 April 2011 an expert workshop was held at WIFO. The aim of this half-day workshop was to receive project inputs from distinguished international experts and to discuss the ICPIA research questions with Austrian stakeholders.

Three presentations were made that were embedded in a vital discussion on developments in international climate policy:

Antto Vihma, Finnish Institute of International Affairs (FIIA), The North/South Politics of Climate Change: State of Play. (Discussant: Andreas Türk)

Christian Flachsland, PIK Potsdam, After Copenhagen and Cancun: How can cooperation be improved? (Discussant: Stefan Schleicher)

Michael Mehling, Between unilateral and multilateral climate policy: Priorities for a future climate policy architecture. (Discussant: Thomas Spencer)

#### Stakeholder workshop

On 28 September 2011 a stakeholder workshop was held at WIFO. The objective of this workshop was to discuss the results of the ICPIA project with Austrian stakeholders and international experts. In addition to presentations on the work package results by the project team, in the second part of the workshop two internationally recognised experts, Barbara Buchner from Climate Policy Initiative Venice and Christina Hood from IEA, presented their research on issues that are of high relevance for

the ICPIA project: options for post-2012 international greenhouse gas accounting and the state of international climate negotiations.

The list of presentations made at the ICPIA stakeholder workshop is given below.

*First part of the workshop: Project results*

Claudia Kettner, WIFO, The EU Emission Trading Scheme: Allocation Patterns and Trading Flows.

Stefan Schleicher, WIFO, Emission targets and their distributions: Modeling consistency and convergence by an extended Kaya approach.

Peter Wooders, IISD, Multi-country sectoral approaches: potential for reducing competitiveness and leakage impacts in Austria's energy-intensive industries.

Andreas Türk, Climate Strategies, East-West dimensions of European climate policy.

Angela Köppl, WIFO, Aspects of climate policy integration in the EU.

Andreas Türk, Climate Strategies, Searching for a Global Architecture: Post-2012 Scenarios after Cancun.

*Second part of the workshop: Presentations by international experts*

Barbara Buchner, Climate Policy Initiative, The international negotiations on climate policy: top-down versus bottom-up.

Christina Hood, IEA, Tracking and trading: options for international greenhouse gas accounting after 2012.

**Conference presentations**

In addition to the presentation at project workshops results of the ICPIA project have been presented at several international conferences. At these conferences valuable inputs for the ICPIA project were received during the discussions with external experts.

The WP1 paper "The EU Emission Trading Scheme: Allocation patterns and trading flows" was presented at the following conferences:

- International Conference of the European Society for Ecological Economics (ESEE), Istanbul, 15 – 17 June 2011.
- International Energy Workshop (IEW), Stanford, 6 – 8 July 2011.
- Österreichischer Klimatag, Vienna, 21 – 22 September 2011.
- Global Conference on Environmental Taxation (GCET), Madrid, 20 – 21 October 2011.
- Forum Econogy, Linz, 9 November 2011.

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