



Outreach Workshop

Background for Discussion Paper

Agenda

- Project Overview
- Economics of leakage
- Leakage provisions in current and proposed
Carbon Pricing Mechanisms (CPM)
- International climate change regime
- Evolution and current situation
- Leakage options

Project overview (1)

• Objectives:

- 1) To prepare options that can be used to address concerns regarding carbon leakage for:
 - EU internal discussions
 - International negotiations
 - Bilateral discussions

- 2) To engage in a series of Outreach Workshops which will use the two papers produced by this project in order to stimulate a well-informed, and active debate, on this topic in the EU.

Project overview (2)

• Deliverables

- Carbon Leakage: An Overview paper
Background for Discussion paper (this paper).
- Carbon Leakage: Options Paper - which will outline: Options to address leakage, and Criteria to evaluate these options.
- A number of workshops, some of them to Review the two papers produced, others that have an Outreach objective.

Project overview (3)

- Both papers are:
 - Intended to be “briefs for policy makers”.
 - Not intended to determine if there is leakage, or to what extend.
 - Intended to provide a menu for policy makers to help them determine what leakage provisions are most effective and make choices.

Economics of Leakage: Definitions

- IPCC: *“The increase in CO2 emissions outside the countries taking domestic mitigation action divided by the reduction in the emissions of these countries”*
- DG Clima: *“the term often used to describe the situation that may occur if, for reasons of costs related to climate policies, business were to transfer production to other countries which have laxer constraints on GHG emissions. This could lead to an increase in their total emissions. The risk of carbon leakage may be higher in certain energy-intensive sectors.”*

Economics of Leakage: Definitions (2)

- OECD: *“Carbon leakage can be defined as the ratio of emissions increase from a specific sector outside the country (as a result of a policy affecting that sector in the country) over the emission reductions in the sector (again, as the result of the environmental policy)”*
(Reinaud, 2008)

Impacts of carbon leakage

- Environmental and socio-economic impacts
 - Environmental impacts: Reinaud (2008): *The ratio of emissions increases from a specific sector outside the country (as a result of a policy affecting that sector in the country) over the emission reductions in the sector (again, as a result of the environmental policy).*
 - Economic impacts include investment reallocation or avoidance, shifting of production (including impacts on value chain)
 - Social impacts, closely linked to the economic impacts, are due to job-losses and resulting changes to livelihoods and communities

Forms of carbon leakage

- Internal leakage
 - Within EU (example district heating in Poland)
 - In the case of sub-national climate policies
(example electricity imported in California)
- External leakage

Channels for carbon leakage

- **Short-term competitiveness;** differences in cost structure between GHG activities in GHG constrained jurisdictions and less or differently GHG constrained jurisdictions.
- **Investment leakage;** the expected loss of competitiveness caused by climate policies is high enough to shift investment to jurisdictions that have not taken similar measures.
- A third avenue for carbon leakage is through changes **in global fossil-fuel prices**. While this is recognized in this study, it will not be the focus of this project.

What causes carbon leakage?

- Changes in relative competitiveness lead to changes in trade and investment patterns
- Carbon pricing is just one of a myriad of factors, both in and beyond climate policies
 - Other factors that will weigh heavily are: labour, energy, regulation, etc.
- Competitiveness can be defined at either a national or a sectoral level.
 - The sectoral level is more relevant for carbon leakage
 - Industry and product characteristics are highly relevant when discussing the weight various factors have on sectoral competitiveness

What causes carbon leakage? (2)

Asymmetrical climate policies:

- Policies that impose a price for carbon in one jurisdiction, while another jurisdiction has no, or less stringent, climate policies and constraints.
- Asymmetrical climate policies has its roots in the UNFCCC and the concept of common but differentiated responsibilities (CBDR), which in its current interpretation, resulted in the Kyoto Protocol (KP).
- The world of emissions and GDP was different when KP was adopted.
- At the same time as trade flows increased, production capacity of many energy intensive industries in developing countries has also increased significantly.

What causes carbon leakage? (3)

Carbon prices: Visible vs. Shadow

- Policies without a visible carbon price will impose a “shadow” price for carbon
 - Renewable Energy Directive and the Energy Efficiency Directive (EU)
 - Low Carbon Fuel Standard (California)
 - Mandating of certain types of technologies in the Chinese coal sector
 - Taxes on energy
 - Regulatory standards (proposed “Carbon Pollution Standard for New Power Plants”)

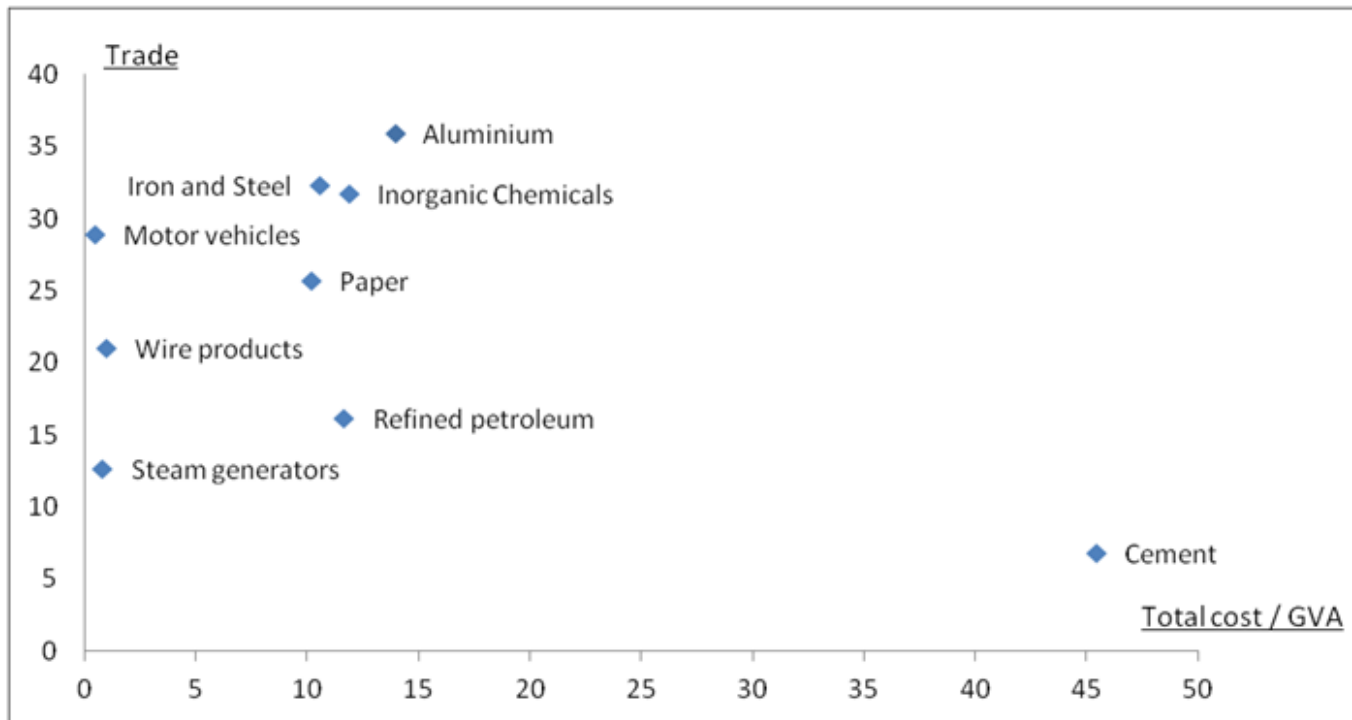
What causes carbon leakage? (4)

- Asymmetrical climate policies and carbon pricing do not necessarily result in carbon leakage. Criteria that need to be considered when examining if a sector is at risk for carbon leakage include:
 - Direct CO₂ intensity from process or energy use.
 - Use of energy that internalize CO₂ costs – electricity intensive industries.
 - Trade intensity.
 - Importance of the cost of carbon relative to other variables.
 - Ability to pass costs through.

Elements that effect passing through of costs

- Exposure to international competition
- Market concentration
- Product differentiation
- Available substitutes that are less emissions intensive or energy intensive product
- Transport cost relative to CO2 cost
- Exchange rate risks
- Customer reaction to a price increase, based on: vertical integration of industry, quality issues, long term contracting
- Legal and political environment
- Global pricing mechanism

EU ETS Quantitative Criteria



Source: Authors elaboration on Annex II of the Impact Assessment accompanying the initial EU ETS Carbon Leakage List

Leakage provisions in current and proposed carbon pricing mechanisms

- Leakage list and free allocation
- Compensation and support measures
- Offsets
- Linking
- Predictability and stability of measures (post 2020)
- Accompanying and complementary measures
- Reason for establishing carbon pricing mechanism

International Climate Change Regime

- Parties to the UNFCCC:
 - New international climate change agreement
 - ❖ To be completed by 2015
 - ❖ Will enter into force by 2020
- Carbon leakage and competitiveness
 - Not items negotiated under UNFCCC
 - But important to identify those aspects of the global agreement that may translate into CL concerns.
- Evolution of Carbon market globally post-2020 will also impact the discussions on carbon leakage.

Leakage issues in the International Agreement

- Two issues in the international agreement are likely to impact the stance of countries will take with respect to CL:
 - clarity on commitments
 - the instruments that are being used to meet those commitments.
- Lack of clarity (KP had a clear base year and budgets increases suspicions over comparability of effort.
 - The current agreement: could be more heterogeneous, with everyone making some commitment in its own way.
- Fragmented and heterogeneous market is developing
 - Many mitigation units produced nationally
 - According to national protocols
 - Unknown mitigation value for international commitments.

Leakage issues in the International Agreement (2)

- Decentralized the system leads to uncertainty on the level of effort that individual companies and installations have to undertake.
- From an EU perspective, to eliminate or reduce concerns related to carbon leakage, a 2015 international agreement would ideally have provisions for:
 - Global participation by all countries
 - Some link between the EU and the general level of ambition
 - Some link between the EU and the level of ambition of key trading partners

Evolution and current situation

- Carbon leakage: a significant topic of debate in all jurisdictions where a carbon pricing mechanism was introduced
- Carbon pricing has a special impact on society and economy
 - Different from its role model: SO₂ pricing in the US through cap and trade
- US Discussion: Lieberman/Warner America's Climate Security Act and other proposed federal regulation
- EU Discussion

EU Discussion: Phase 1 and Phase 2

- **CL not significant during the first trading period (2005-2007):**
 - All allocation was free
 - Based on historical emissions
 - Limited provision for auctioning (max 5%)
- Cost containment was also addressed through the Linking Directive that was introduced in 2004.
- **In the second trading period (2008-2012):**
 - Little changed
 - The cap for auctioning was raised to 10%
 - Access to “cheap” international offsets if the cap was set tight.
- Financial crisis unfolded and recession started to bite, emissions from capped installations declined, and with them the price of carbon

EU Discussion and Carbon Leakage List

- EU ETS review (2008-2009)
 - Third trading period
 - Brought the discussion over CL again into focus.
 - Competitiveness and CL elements of the review debate.
 - Changes in Phase 3 EU ETS
 - ❖ significant increases in auctioning
 - ❖ the introduction of benchmarking as an allocation method for industry
 - ❖ a decreasing cap
- Initial proposal (EC):
 - Qualitative criteria to be included on the leakage list
 - No quantitative criteria included in the original EC proposal.

EU Discussion and Carbon Leakage List (2)

- Co-decision process: Member States and especially the EU presidency held by France asked for a more quantitative methodology (less political latitude)
- Qualitative criteria could introduce more flexibility for a more thorough means of evaluating risk (it can look at abatement potential, market characteristics, etc.)
- The carbon leakage list (CLL):
 - Central to the anti-leakage provisions in the EU ETS.
 - Considered dimensions for: CLL are carbon intensity and trade intensity

EU Discussion and Carbon Leakage List (3)

- One key number: a carbon price of 30 Euros (Impact Assessment for the EU's 20-20-20 targets).
- At that time, sounded like a very reasonable forecast, maybe even conservative.
- The combined 5% (CO₂ cost) and 10% (trade exposure): internal EC study:
- The 30% for carbon cost (as stand alone test):
 - A more political choice
 - Ensure that certain sensitive industrial sectors with a high cost of CO₂ were included.
- The additional 30% test for trade intensity:
 - To some degree to ensure symmetry with carbon costs
 - Might have been an overreach

US Discussion: evolution of the Lieberman-Warner Bill

Provisions	2007 (S 2191)2	2008 (S 3036)
Emission Reduction Target	15% below 2005 by 2020	Same
Free allowances	73% of allowances free in 1st year (majority going to large stationary sources). Gradual removal of free allocation to full auctioning by 2031.	Same
Banking and borrowing	Carbon Market Efficiency Board can ease restrictions on borrowing	Reserve of portion of future allowances that would be released in 2nd auction if prices rise above expected levels. Floor price set by EPA of \$22-30 in 2012 and rises at a real rate of 5% each year
Offsets	Board can increase amount of offsets allowed. 15% from domestic offsets (agr. and forestry) 15% from linkage with Emissions Trading Systems in EU etc.	10% allowed for international forestry credits 5% for international project-based credits 15% for domestic offsets
BCA	International allowances required for importers from 2020	Brought forward to start from 2014

US Discussion: evolution of the Lieberman,- Warner Bill (2)

- Number of provisions designed to address competitiveness concerns (emerging economies are strong economic competitors, and would not have to face similar carbon related costs).
 - Cost containment mechanisms, such as free allocation of allowances, the ability to bank and borrow allowances, provisions for the use of offsets and price caps on allowances on the market.
 - Trade measures: mechanism that address trade disadvantages, border carbon adjustment (BCA)
- Key component: Carbon Market Efficiency Board

Current Debate

- In 2013, CL and the CLL have again become central, given the confluence of issues over carbon pricing and climate change that are currently being debated in Brussels. They include:
 - Back-loading
 - EU ETS structural reform
 - 2030 Energy and Climate Framework
 - Review of the CL list by 2014
 - 2015 international agreement
 - Linking to Australia

Current Debate (2)

Two streams are being discussed (to some degree disconnected)

1. “fix” the EU ETS
 - Maybe short-term fix, such as back loading
 - or longer term more structural measures.
 - In common is the perception among stakeholders that final aim is to lift carbon prices in the EU ETS.
2. Review of the carbon leakage list (to be completed by the end 2014)
 - Mandated review of the data and assumptions being on the carbon leakage list (and receiving free allowances)
 - Could be modifying certain parameters
 - ❖ Maybe removing a significant number of sectors and products from the carbon leakage list.
 - The criteria themselves will remain the same.

Current Debate (3)

- Possible perception of both streams:
 - Both of these streams as potentially working in the same direction
 - Disadvantaging industry, which is already concerned with competitiveness.
 - It must also be recognized that some level of stress exists between:
 - ❖ Wish to keep a low carbon price
 - ❖ Maintaining the same carbon leakage list devised for a 30 Euros price level.
- The relation and importance, for the industrial base, between carbon price and carbon costs, and how these two strands interact, does not seem as well appreciated and understood as it should be.

Current Debate (4)

Discussion also driven by two other aspects:

- Oversupply in Phase 2 (due to external conditions) , perceptions this created has increased pressure for a stricter review
- Emerging systems all have leakage-provisions
 - But: impossible to judge their effectiveness due to
 - ❖ Limited time of operation
 - ❖ Resulting lack of data
 - ❖ External conditions
 - ❖ Free allocation in EU ETS

Ex-post results

- Limited empirical data to perform ex-post analysis
 - As yet little evidence found
 - Reliance is on ex-ante models to assess the impact of EU ETS on carbon leakage in different sectors
- A number of empirical studies are now emerging
 - Some: the indirect impact of the ETS carbon price on electricity prices
 - Others that refer directly to the impact of the EU ETS on products such as cement, steel, and primary aluminum.

Ex-post results (2)

Study	Ex-ante/ Ex-post	Sectors/geography coverage	Estimated carbon leakage rates from EU to non-EU (%)
Grubb and Counsell, 2010	Ex-ante	Electricity, steel, cement and aluminium/UK, US Poland and the EU	0-39
Demailly and Quirion, 2008	Ex-ante	Cement/Global	0-50
Ponssard and Walker, 2008	Ex-ante	Cement/Western European	70-73
Ritz, 2009	Ex-ante	Steel/EU ETS	9-75
Chan, Li and Zhang, 2012	Ex-post	Power, cement, iron and steel/EU ETS	For cement, iron and steel; no evidence of carbon leakage
Ellerman, Convery and Perthuis	Ex-post	Oil refining, aluminium, iron and steel, cement	No observed impact in the oil refining, cement, aluminium or steel
Sartor, 2012	Ex-post	Aluminium	No strong evidence for leakage

Ex-post results (2)

- Ex-post studies have generally concluded that there was no leakage
- The factors that have been put forward to explain this discrepancy are the following ones:
 - The high level of free allocations
 - Strategic barriers to trade
 - Large fluctuations in the level of CO2 prices and/or low CO2 prices
- Recent CEPS work in this area:
 - Aluminium: impact of EU ETS costs on primary aluminium are significant (though strong fluctuations due to EUA prices and economic cycles)
 - Steel: smaller impacts
- Conclusion: Energy plays a larger role in cost structure than carbon

What does the future hold?

- Continued uncertainty and lack of clarity on:
 - the 2015 International Agreement
 - whether other national jurisdictions will also impose a comparable carbon cost on industries that compete globally.
- Expected increase in the interest on how carbon leakage will be addressed in the EU to 2020, and beyond.
- EU ETS directive is silent on the fate of the current anti-leakage measures post-2020.

What does the future hold? (2)

- Current debate in the EU over CL is also being influenced by:
 - What has been learned from other jurisdictions
 - The thinking in other influential multilateral institutions, such as the OECD that recently released report that emphasizes:
 - ❖ the importance of visible carbon prices and
 - ❖ the inefficiencies emerging from shadow carbon pricing
- The EU cannot be indifferent on how carbon pricing and leakage are addressed by competitors:
 - Changing and globalized world
 - IPCC has again signalled urgency through its Fifth Assessment

What does the future hold? (3)

- Different approaches and priorities in other jurisdictions
 - Priority to address climate change (leading with energy or climate policies).
 - Addressing interaction between ETS and other policies and measures
 - Decision on the role that carbon pricing plays in climate policy.
- Carbon pricing is, and must be seen, as a tool for price discovery, but cannot be expected to do everything.
- Concerns regarding carbon leakage are not about the past, but about the future
 - Current data does not seem to indicate that leakage has been a decisive or even influential factor
 - Ex-post analysis is under way and information is emerging

What does the future hold? (4)

- To what extent the future will be a reflection of the past?
 - Changes in variables during P2
 - EU ETS in P3, and beyond, may look very different.
- The EU ETS P1 and P2:
 - important and useful test
 - way to understand the impact of carbon pricing on the economy, trade flows, carbon leakage, etc.
- The largest experiment with carbon pricing, the EU ETS, was run with dramatically changed external conditions in terms of key parameters, including:
 - Change in global GHG emission patterns
 - Change in global economic order
 - Departure from key assumptions on energy price data

What does the future hold? (5)

- Provisions must be available to address CL in a flexible way, which will work under different scenarios.
- Many issues may change in the future such as:
 - More stringent caps
 - Shrinking amount of free allowances
 - Higher price for carbon in the EU and internationally
 - Economic recovery and growth
 - A new international climate change regime (contributions from all)
 - Carbon pricing at the domestic level in different jurisdictions
 - Evolution and prices in energy markets.
 - ❖ The EU has a certain structure for energy markets and energy prices are very much aligned with that model.
 - ❖ In many jurisdictions energy prices are negotiated and not the result of market forces which have also a significant influence on competitiveness.

What does the future hold? (6)

- Current Debate
- It is time to understand what are the options for the future as safety measures for carbon leakage.
- The key questions are:
 - **What are the options?**
 - **What are the criteria to judge those options?**
 - **How does each option stack up against these criteria?**

Carbon Leakage: Options paper

- **Possible anti-leakage provisions**

- Free allowances (grandfathering-based, benchmark-based, output-based or not),
- State-aid for electro-intensive industries,
- Sectoral agreements,
- Developing local/domestic energy sources while reducing import
- Border adjustments

Carbon Leakage: Options paper (2)

• Possible criteria to assess anti-leakage provisions

- Effectiveness in preventing carbon leakage
- Political feasibility
- Impact on the effectiveness of the price signal (i.e., free allocations in Europe have diluted the price signal)
- Effectiveness in encouraging third countries to adopt climate policies applicable to leakage-exposed sectors
- Cost for governments (e.g., free allowances reduce auction revenues for States)
- Distortion of competition (e.g., state aid is decided at MS level and induces distortion of competition in the internal market)
- Future-proof: can it easily be adapted as additional countries adopt carbon policies applicable to leakage-exposed sectors or linking is decided between different markets
- Legal robustness (to WTO challenge)

Carbon Leakage: Options paper (3)

- **Possible objectives for anti-leakage provisions:**
 - How best to design EU ETS carbon market leakage provisions in view of the post-2020 energy and carbon framework in Europe?
 - How can the 2015 international agreement best minimize the potential risk of carbon leakage?

Leakage provisions in current and proposed carbon pricing mechanisms

- Provisions can be split into two groups:
 - Actions that can be implemented unilaterally
 - Purely domestic (for example free allocation)
 - With international implications (border-tax adjustment, aviation in EU ETS, maritime emissions, ...)
 - Actions that require significant international cooperation

- Provisions also differ in
 - Sector-based (EU ETS Leakage list)
 - Economy-wide or general cost-mitigation
 - Even wider (such as linking CPMs)
 - Predictability and stability of the measures
 - Level of transparency and flexibility of decisions.

Overview of Carbon Pricing Mechanisms

- Many common features, but also significant differences.
- The reasons for establishing CPMs:
 - The EU ETS is seen by some as a tool for encouraging transition to a low-carbon economy, which requires highly visible carbon prices. Leakage has therefore been an important element in the discussions
 - In California, the cap-and-trade mechanism is seen as a residual mechanism for complementary measures, and seems to have set a low visible price for carbon as an objective.
 - The New Zealand ETS: set up to ensure that the country reached its Kyoto commitments in a cost-effective manner.
- The perspective of time.
 - As more is known, and as carbon prices play a more significant role in competitiveness, provisions to address the threat of carbon leakage seem to bubble up to the top.

Leakage lists and free allocation

- There are significant differences between the reviewed carbon pricing mechanisms with respect to how activities or sectors that are at risk of carbon leakage are identified
- The EU ETS, California C-T, Australia CPM, Korea ETS and Waxman-Markey Bill all use criteria based on trade exposure and energy or emissions intensity (EITE)
- Those sectors found to be at risk receive proportionally more free allocation.

Leakage lists and free allocation (2)

- Quantitative thresholds: based on trade exposure and emissions intensity
- Korea ETS and EU ETS
 - Production costs increased by 5% AND trade intensity is over 10% OR
 - Production costs increased by 30% OR
 - Trade intensity is over 30%.
 - Differences in how 'increased production costs' are defined.
 - The EU Leakage List: both indirect and direct costs
 - the Korean ETS: direct costs: annual emissions of the sector times the price of allowances.
- California C-T: *Low, Medium or High Leakage Risk*
- Australian CPM: *Highly or Moderately emissions-intensive activities, based on tons of emissions over revenue (in millions of AUD) or tons of emissions over value added (in millions of AUD)*
- Only the EU ETS combines quantitative criteria with qualitative ones

Compensation and support measures

- Who compensates and for what?
- EU ETS:
 - Member States can compensate their domestic industry for indirect ETS costs.
 - Potentially lead to a fragmentation of compensation measures, and put a strain on the internal market
- Australia and Korea:
 - sectoral-driven approach.
 - Direct funding or support for innovation and development is provided to specific sectors deemed at risk of leakage.
- Waxman-Markey Bill and the California C-T: indirect costs
 - Waxman-Markey Bill: support electricity and natural gas distributors directly (prevent indirect costs)
 - California C-T: compensates consumers for indirect costs.

Offsets

- Offsets are included in all the schemes as a cost containment mechanism
- Implementation varies significantly between schemes
 - types or protocols
 - quantities of offsets allowed.
- Every scheme analyzed in this paper uses both quantitative and qualitative restrictions for offsets.
- Clear trend of allowing progressively more offsets into the system as time passes.
 - The EU is the one exception to this trend.
 - In Phase 3 (2013-2020) fewer international credits will be accepted for compliance. In terms of credits for post 2012 project, only those originating from Least Developed Countries are eligible.

Offsets (2)

- Qualitative restrictions have two dimensions:
 - Geographical
 - Environmental.
- Geographical: domestic offsets allowed in greater quantities and earlier
 - The EU has provisions for domestic offsets, but not yet operationalized that provision.
 - Only system that does not have domestic offsets, except as it may be provided under JI.
- RGGI model and the China pilots: only domestic credits are accepted
- Korea ETS and Australia CPM: no international offsets in their first periods, but open up to international credits later on.
- Restrictions used in terms of accepted protocols.
 - Each mechanism has a list of accepted offset-protocols
 - Clear mechanism to review and possibly accept new protocols

Linking

- OECD study quantifies and models the potential advantages of linking between schemes
- The results show that linking can address some, but not all of the competitiveness issues arising from carbon pricing.
- Different levels of linking lead to different results.
- Competitiveness and leakage effects from climate policies can be reduced in three ways:
 - More countries act and/or link
 - More emission sources are covered
 - Climate mitigation policy is harmonised across countries (via linking for example)

Linking (2)

- Three facets of linking are interesting.
 - it provides a cost containment strategy for jurisdictions with high mitigation costs, for example in Australia.
 - it allows a bottom-up movement towards an international or even global carbon market.
 - if two mechanisms are fully linked, the issue of carbon leakage between those two mechanisms disappears.
- OECD Environmental Outlook to 2050:
 - Macroeconomic and sectoral impacts of mitigation efforts are the largest when carbon pricing mechanisms are not linked.

Proposed links

- California and Quebec should link in 2014
 - No political hurdles remain for this full link
 - The first joint auction is proposed for January 2014.
- Phase-by-phase linking between Australia and the EU
 - Set to start mid-2015
 - Now uncertain due to the new government in Australia
 - Draft legislation was released on the 15th of October to scrap the Carbon Pricing Mechanism altogether.

Post-2020 Leakage provisions

- A common denominator; the lack of certainty towards the future
 - Could be an important issue for investment decisions and hence investment leakage.
- Leakage lists in California and EU run up to 2020
- Australia and New Zealand initially have a fixed rate of 1.3% yearly decrease in free allocation (in New Zealand this rate was put on indefinite hold)