

Review of Proposed Options for Addressing Industrial Competitiveness Impacts

Policy, Proposal or Analysis	
<p>“Addressing Competitiveness in U.S. Climate Change Policy.” Pew Center Congressional Policy Brief. 2008. Available at http://www.pewclimate.org/DDCF-Briefs/Competitiveness.</p>	
Goals	
<p>Explore the options for minimizing competitiveness impacts to energy-intensive, trade-exposed industries (heavy energy users whose goods are traded globally, such as steel, aluminum, cement, paper, and glass).</p>	
Metrics/Methods for Assessing Competitiveness Impacts and Defining Vulnerability	Options for Addressing Competitiveness Impacts
<p>Energy-intensive industries defined as those whose energy costs are 4 percent or more of shipped value.</p> <p>The brief notes need to distinguish the “competitiveness” effect of climate policy from its broader economic impact; the competitiveness impact is the portion of the total impact resulting from an imbalance between carbon constraints in one region and the lack of such constraints in other regions.</p> <p>Assessing direct (compliance) costs: the cost of purchasing allowances needed to cover direct emissions regulated under the cap</p> <p>Assessing indirect costs: includes higher electricity and natural gas prices</p> <p>For most energy-intensive industries, the largest potential cost of carbon constraints is higher energy prices.</p>	<p>Options include:</p> <ol style="list-style-type: none"> 1. Compensating firms for the costs of GHG regulation through allowance allocation or tax rebates. <ul style="list-style-type: none"> • Need to consider the scope, form, and means of how this compensation would be calculated, and whether (or if) it gets phased out over time. • Could include generous grandfathering of allowance allocations (to help mitigate direct costs), and additional allowances to compensate for indirect costs. Free allocation of allowances does not necessarily help guard against emissions leakage or job losses, as firms could maximize profits by selling their allowances and reducing production. • Compensation could also be “output-based,” meaning it is based on actual production levels and/or energy consumption. Firms could be fully compensated, or an output-based approach might apply a performance standard (i.e. energy or emissions per unit of production) that rewards or encourages lower-GHG intensive production. • Another option would be to provide tax credits or rebates, perhaps using proceeds from the auction of emission allowances. A tax rebate would be a direct payment to compensate a firm for GHG regulatory costs; a tax credit could alternatively offset those costs by reducing other taxes (such as corporate or payroll taxes) or healthcare or retirement costs. • Phasing out compensation over time can provide an additional incentive for firms to improve their GHG emission performance. 2. Transition assistance to help firms adopt lower-GHG technologies, and to help workers and communities adjust to changing labor markets <ul style="list-style-type: none"> • For firms, this might include tax incentives, such as accelerated depreciation to encourage the retirement of inefficient technologies, or tax credits for the development or adoption of lower-GHG alternatives.

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	<p>Firms could also be incentivized to switch to low carbon energy sources by providing subsidies to purchase or generate low-carbon electricity</p> <ol style="list-style-type: none"> 3. Border measures such as taxes on energy-intensive imports from countries or regions lacking GHG controls (raises interstate commerce clause considerations for WCI or other states) 4. Exempting potentially vulnerable firms from the cap-and-trade system (e.g., excluding coverage of process emissions for energy-intensive industries) <ul style="list-style-type: none"> • Exclusions could relieve trade-exposed industries of direct regulatory costs (they would still face indirect costs from higher energy prices) • However, exclusions would also undermine the goal of economy-wide GHG reductions and make the overall program less efficient
Policy, Proposal or Analysis	
<p>Inslee-Doyle Carbon Leakage Prevention Act (H.R. 7146). Available at http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=110_cong_bills&docid=f:h7146ih.txt.pdf.</p>	
Goals	
<p>Aims to avoid leakage of GHG emissions to countries outside the United States.</p> <p>Also seeks to compensate the owners and operators of entities in eligible domestic industrial sectors and subsectors for carbon emission control costs.</p>	
Metrics/Methods for Assessing Competitiveness Impacts and Defining Vulnerability	Options for Addressing Competitiveness Impacts
	<p>Approach now incorporated into Waxman-Markey ACESA (with some modification); see below</p> <p>Allocates allowances to compensate for both direct and indirect costs based on a facility’s level of output, adjusted by an “efficiency factor” set at 85 percent of emissions/energy use per unit of production within the sector</p> <ul style="list-style-type: none"> • Eligible energy-intensive industries covered by the cap receive allowances for direct emissions based on a facility’s level of production in the previous two years multiplied by 85 percent of average GHG emission per unit of production across the sector • Both covered and non-covered facilities receive allowances for indirect emissions based on their level of production multiplied by 85 percent of the average amount of electricity per unit of production for all facilities in the sector or subsector (adjusted by the average GHG emissions per kilowatt hour of electricity purchased by the facility)

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	<ul style="list-style-type: none"> Facilities whose GHG performance is at the sector average would be reimbursed for 85 percent of their costs, while those performing above or below average would be compensated for a greater or lesser of their costs, respectively Provides firms an incentive to switch to lower-GHG processes and energy sources, while providing compensation and lowering risks of emissions leakage and competitiveness impacts. Total allowances to eligible facilities in any year not to exceed 15% of total allowances available in the first year
Policy, Proposal or Analysis	
<p>American Clean Energy and Security Act of 2009 – June 2009. Available at http://energycommerce.house.gov/Press_111/20090701/hr2454_house.pdf.</p>	
Goals	
<p>Aims to promote a strong global effort to reduce GHG emissions and avoid dangerous climate change.</p> <p>Aims to avoid leakage of GHG emissions to countries outside the United States as a result of direct, indirect compliance costs.</p> <p>Would also compensate (“rebate”) the owners and operators of entities in eligible domestic industrial sectors and subsectors for GHG emission control costs, but not for costs resulting from other market dynamics. Compensation would be sufficient to prevent carbon leakage while still rewarding innovation and facility-level energy efficiency improvements.</p> <p>Would eliminate or reduce assistance when it is no longer necessary.</p> <p>Notes importance of international negotiation in mitigating leakage and threats to industrial competitiveness; pledges that US will work towards an agreement that includes binding agreements, including sectoral agreements, committing all major emitters to equitable contributions to GHG reductions (recognizing that this is the most effective way to meet the purposes outline in the bill).</p>	
Metrics/Methods for Assessing Competitiveness Impacts and Defining Vulnerability	Options for Addressing Competitiveness Impacts
<p>Owners of qualifying industrial facilities would receive annual emission allowance rebates (free allowances) to help compensate them for compliance costs and prevent carbon leakage. The total number of allowances distributed under these provisions cannot exceed a maximum limit established by the program.</p> <p>Qualifying industrial sectors are determined on the following basis:</p> <ol style="list-style-type: none"> Must have a 6-digit classification under NAICS The sector or subsector must have an energy intensity of at least 5 percent, calculated by dividing the cost of purchased electricity and fuel costs of the sector or subsector by the value of the shipments or the sector or subsector, or a greenhouse gas intensity of at least 5 percent, calculated by dividing the number 20, multiplied by the CO₂e emissions (including direct emissions from fuel combustion, process emissions, and indirect 	<p>Rebates are provided in the form of free emission allowances. The quantity of emission allowances rebates provided to a covered and eligible industrial entity would be equal to the sum of the covered entity’s direct carbon factor and its indirect carbon factor (for non-covered, eligible entities, the rebates would be based on an entity’s indirect carbon factor only). However, in years 2012 and 2013, allowance distribution will be based only on entities’ indirect carbon factor (described below).</p> <ul style="list-style-type: none"> The direct carbon factor is calculated by multiplying the average output of the covered entity for the two years preceding the rebate distribution year by the average direct greenhouse gas emissions (in CO₂e) per unit of output for all covered entities in the sector. The indirect carbon factor for an entity is the product of its average output (for the two years preceding the rebate distribution year) multiplied by both its electricity emissions intensity factor (the emissions intensity of each facility’s

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emissions from the generation of electricity used to produce the output of a sector or subsector) by the value of the shipments of the sector or subsector.

3. The sector or subsector must also have a trade intensity of at least 15 percent, calculated by dividing the value of the total imports and exports of such sector/subsector by the value of the shipments plus the value of imports or the sector/subsector.
4. Sectors are also eligible if they have an energy intensity of 20 percent (regardless of trade intensity).

Provision is made for administrative determination of additional eligible sectors or subsectors. Any person may petition the program administrator to grant rebates to a given sector/subsector, provided the petitioner can demonstrate that the sector/subsector is subject to carbon leakage comparable to that of sectors or subsectors that already meet the criteria for determination laid out in the bill.

electric power supplier) and the electricity efficiency factor (the sector average electricity use per unit of output).

- The electricity emissions intensity factor (in tons of CO₂e/kWh) is determined by dividing 1) the annual sum of the hourly product of the electricity purchased by an entity, multiplied by the cost the seller of the electricity passes to the entity per ton of CO₂e per kWh, by 2) the total kWh of electricity purchased by the entity from that seller in that year.
- The electricity efficiency factor is the average amount of electricity (in kWh) used per unit of output for all entities in the relevant sector/subsector.

Direct and indirect carbon factors for eligible facilities are calculated using average output data for the two years preceding the year of distribution, and the most recent sectoral emissions intensity data (GHG per unit of production). Average direct GHG emissions per unit of output, for all covered entities in each eligible sector, are calculated every four years using the most recent two years of data.

- The average direct GHG emissions per unit of output for a sector will never be greater than it was in a previous calculation
- When recalculated, the electric emissions intensity factor will not be greater than it was in a previous year

There is a maximum limit on the number of allowances available for these purposes. In years 2012 and 2013, up to 2 percent of the total allowances available in those years could be used for industrial assistance. Starting in 2014, 15 percent of total allowances are available for industrial assistance; this percentage declines based on the percent reductions in the emissions cap. Starting in 2026, this decline is accelerated as the number of allowances distributed under this section will be reduced by a further 10 percent/year (phasing out completely in 2035) unless the President alters the phase-out schedule (the President must make a determination as to whether a given sector still requires assistance). For a year in which the total emission allowance rebates calculated under this section exceed the number allocated for these purposes in a given year, the Administrator shall reduce each entity's distribution on a pro rata basis so that the total distribution equals the number of allowances available for this distribution in a given year.

Unless a binding international agreement requires all major emitters to contribute equitably to reducing GHGs and addresses imbalances in competitiveness, beginning in 2020 the bill requires emission allowances (called international reserve allowances) for the import of products in energy-intensive, trade-exposed sectors. The reserve program would be established automatically in all eligible sectors unless the President determines that it is not in the national interest and

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	Congress concurs. It would not apply if at least 85 percent of imports in a given sector are from countries that: have emission targets as stringent as the United States'; are parties to a sectoral agreement; or have energy or GHG intensities in that sector no higher than in the US. International reserve allowances could not be used by domestic entities for compliance purposes.
Policy, Proposal or Analysis	
Australia's Carbon Pollution Reduction Scheme: Proposed Cap and Trade System (NOTE: This is subject to change as negotiations continue over the design details of the system). Information on latest proposals available at http://www.climatechange.gov.au/emissionstrading/index.html .	
Goals	
Two goals to address competitiveness concerns: <ul style="list-style-type: none"> • Avoid leakage associated with carbon pricing • Address transitional challenges faced by emissions-intensive, trade-exposed industries 	
Metrics/Methods for Assessing Competitiveness Impacts and Defining Vulnerability	Options for Addressing Competitiveness Impacts
<p>Measuring the impacts. Trade exposure assessed through quantitative and qualitative tests:</p> <p>Step 1: Define exposed sources based on activity</p> <ul style="list-style-type: none"> • Activities defined through stakeholder process <p>Step 2: Assess emissions intensity</p> <ul style="list-style-type: none"> • To derive emissions intensity, direct and indirect emissions are evaluated relative to employment, revenue or value added. • Emissions intensity sectoral assessment based on average emissions per million dollars of revenue or emissions per million dollars of value-added (uses 2006-2007, 2007-2008 for emissions data) <p>Step 3: Assess competition from lower cost products and ability to pass-through costs (trade exposure)</p> <ul style="list-style-type: none"> • Responsiveness of customers to price changes (price elasticity) • Parity of import and export prices • Share of trade in the market • Potential for international competition 	<p>Output-based allocation of allowances (based on a facility's previous year's level of production). The Australian government expects this will account for about 25 percent of all allowances initially, increasing to around 45 percent of all allowances available in 2020</p> <ul style="list-style-type: none"> • Covers both direct and indirect costs • Applies to existing and new facilities (allows for continued industry growth) • If a facility closes, it must relinquish permits for production that did not occur in that year • Initial rates of assistance: 90 percent to sectors with emissions intensity of at least 2000t of CO₂e per million dollars of revenue or 6000t of CO₂e per million dollars value-added; 60 percent to sectors with emissions intensity between 1000t and 1999t CO₂e per million dollars of revenue, OR between 3000t and 5999t CO₂e per million dollars value-added (see below for recent amendments) • Initial rates of assistance will be reduced by a carbon productivity contribution of 1.3 percent per year <p>In addition, in May 2009 the Australian government announced changes to its cap and trade system, due in part to the global recession. Changes relevant to industrial competitiveness include:</p> <ul style="list-style-type: none"> • A more stringent target; Australia's government will commit to reduce emissions by 25 per cent of 2000 levels by 2020 (the original target was 5-15 percent below 2000

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	<p>levels by 2020) if a global agreement can be reached that will stabilize levels of CO₂ equivalent in the atmosphere at 450 parts per million or less by 2050.</p> <ul style="list-style-type: none"> • A delay in the start date of the Carbon Pollution Reduction Scheme of one year (from 2010 to 2011). • A one year fixed price period, during which allowances will cost \$10 per tonne of carbon in 2011-12, with the transition to full market trading from 1 July 2012. • A new Global Recession Buffer will be provided as part of the assistance package for emissions intensive trade exposed industries. Industries eligible for 60 per cent assistance will receive a 10 percent buffer, while industries eligible for 90 per cent assistance will receive a 5 per cent buffer (see above for assistance thresholds). In practice, the buffer means that where particular industries were before eligible for 60 percent assistance, they will now receive up to 70 percent, and industries that were eligible for 90 percent assistance will receive up to 95 percent. • Eligible businesses will receive funding to undertake energy efficiency measures from 1 July 2009.
Policy, Proposal or Analysis	
Lieberman-Warner Climate Security Act of 2008 (S. 3036). Available at http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=110_cong_bills&docid=f:s3036pcs.txt.pdf	
Goals	
Avoid carbon leakage to regions/countries outside the U.S., and help firms transition to lower-carbon practices	
Metrics/Methods for Assessing Competitiveness Impacts and Defining Vulnerability	Options for Addressing Competitiveness Impacts
Energy-intensive industries defined as iron, steel, aluminum, pulp, paper, cement, and chemicals	<p>Process emissions of many energy-intensive industries are exempt from the cap; only process and combustion emissions from use of coal (more than 5000 tons/year per facility) are covered.</p> <p>Energy-intensive industries initially receive 11 percent of total allowances for any covered process emissions and to compensate for higher energy costs, declining to 1 percent of total allowances in 2030. Allowances allocated based on sectors' relative energy intensity and facilities' level of employment.</p>

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<p>AB 32 Global Warming Solutions Act and supporting public consultation material, California Air Resources Board (CARB). Legislative text available at http://www.leginfo.ca.gov/pub/05-06/bill/asm/ab_0001-0050/ab_32_bill_20060927_chaptered.pdf. Updates on implementation and other materials at http://www.arb.ca.gov/cc/cc.htm.</p>	
Goals	
<p>Two key indicators of leakage risk:</p> <ul style="list-style-type: none"> Assess potential cost increases due to program compliance costs. Increased costs associated with compliance could result either from the costs of actions taken to reduce emissions at the facility, and/or costs of acquiring emission allowances to cover remaining emissions after all actions to reduce emissions are taken at the facility. Assess the ability of industries to pass compliance costs on to their customers. If industries have limited ability to pass on costs because their competitors are not subject to similar emission reduction requirements or compliance costs, then the risk of leakage may be heightened. Existing producers may lose market share, and new investment may shift to regions that do not have similar program requirements. 	
Metrics/Methods for Assessing Competitiveness Impacts and Defining Vulnerability	Options for Addressing Competitiveness Impacts
<p>Identify potentially affected industries</p> <ul style="list-style-type: none"> Industries that compete in global markets that are not able to pass on the costs of the GHG emissions reduction program. Industries in this category may include non-ferrous metals smelting, iron and steel-making, cement, and other energy and/or emissions intensive activities. <p>Evaluate possible impacts</p> <ul style="list-style-type: none"> These industries may face significant compliance costs from carbon intensive combustion processes and fuel use. <ul style="list-style-type: none"> Limited ability to reduce costs due to fewer opportunities for emission reductions. Inability to pass through costs to consumers. <ul style="list-style-type: none"> Competition from those without similar compliance requirements (trade exposure). <p>Reviewing EU ETS, Australia CPRS, Waxman-Markey discussion draft and other relevant materials and reporting back with a proposal in summer 2009.</p> <p>Incorporate appropriate features in the program design (on-going).</p>	<p>Start stakeholder process in Fall 2009 to discuss different options to address the risk of leakage.</p>

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EU ETS Phase III (final directive and materials available at http://ec.europa.eu/environment/climat/emission/ets_post2012_en.htm)															
Goals															
A potential concern with competitiveness in energy-intensive industries, with some “exposed to a significant risk of carbon leakage” Defined as meaning that they could be forced by international competitive pressures to relocate production to countries outside the EU that did not impose comparable constraints on emissions.															
Metrics/Methods for Assessing Competitiveness Impacts and Defining Vulnerability		Options for Addressing Competitiveness Impacts													
<p>Eligible industries criteria:</p> <p>“A sector or sub-sector is deemed to be at a significant risk of carbon leakage if the sum of direct and indirect additional costs induced by the implementation of the Directive would lead to an increase in production costs exceeding 5% of Gross Value Added and if the total value of its exports and imports divided by the total value of its turnover and imports exceeds 10%.</p> <ul style="list-style-type: none"> • Those experiencing more than a 5 percent cost impact as a result of carbon constraints • Those with a greater than 10 percent trade exposure (defined as [total imports + exports]/[total production + imports]) <p>By way of derogation, a sector or sub-sector is also deemed to be exposed to a significant risk of carbon leakage if the sum of the direct and indirect additional costs induced by the implementation of the Directive would lead to an increase in production costs exceeding 30% of its Gross Value Added or if the total value of its exports and imports divided by the total value of its turnover and imports exceeds 30%.”</p> <p>Further sectors or subsectors deemed to be exposed to a significant risk of carbon leakage may be added after the completion of a qualitative assessment, “taking into account, when the relevant data are available, the following criteria:</p> <ul style="list-style-type: none"> • the extent to which it is possible for individual installations in the sector and/or subsector concerned to reduce emission levels or electricity consumption, including, as appropriate, the increase in costs of production that related investment may entail, for instance on the basis of the most efficient techniques; • market characteristics (current and projected), including when trade exposure or direct and indirect cost increase rates are close to one of the thresholds mentioned [the threshold that non-EU Trade intensity is above 10%]; • profit margins as potential indicator of long-run investment and/or relocation decisions. 		<table border="1"> <thead> <tr> <th>Sector Allocation</th> <th>EC Proposal, 23 January 2008</th> <th>Final Directive, April 2009</th> </tr> </thead> <tbody> <tr> <td>Electricity Generation, Carbon Capture and Storage</td> <td>100% auctioning from 2013**</td> <td>100% from 2013 in electricity generation but with a derogation of at least 30%, rising linearly to 100% in 2020, for certain Member States*** 100% auctioning for CCS</td> </tr> <tr> <td>Sectors “at significant risk of carbon leakage”*</td> <td>Will receive up to 100% of their allowances for free in 2013-2020</td> <td>100% free allowances “to the extent that they use the most efficient technology” (based on the average of the top 10 percent most efficient facilities in the EU)</td> </tr> <tr> <td>Sectors not “at significant risk of carbon leakage”*</td> <td>20% auctioning 2013, linear increase to 100% in 2020</td> <td>20% auctioning 2013, linear increase to 70% in 2020 with a view to reaching 100% by 2027</td> </tr> </tbody> </table> <p>*Defined as meaning that they could be forced by international competitive pressures to relocate production to countries outside the EU that did not impose comparable constraints on emissions. This would simply increase global emissions without any environmental benefit. **Takes account of the sectors ability to pass on the increased cost of emission allowances. ***Member States who, “fulfil conditions relating to their interconnectivity or their share of fossil fuels in electricity production and GDP per capita in relation to the EU-27 average, have the option to temporarily deviate from this rule with respect to existing power plants”. The provision refers to new Member States in the east of the European Union. They are required to submit national plans showing how the value of</p>		Sector Allocation	EC Proposal, 23 January 2008	Final Directive, April 2009	Electricity Generation, Carbon Capture and Storage	100% auctioning from 2013**	100% from 2013 in electricity generation but with a derogation of at least 30%, rising linearly to 100% in 2020, for certain Member States*** 100% auctioning for CCS	Sectors “at significant risk of carbon leakage”*	Will receive up to 100% of their allowances for free in 2013-2020	100% free allowances “to the extent that they use the most efficient technology” (based on the average of the top 10 percent most efficient facilities in the EU)	Sectors not “at significant risk of carbon leakage”*	20% auctioning 2013, linear increase to 100% in 2020	20% auctioning 2013, linear increase to 70% in 2020 with a view to reaching 100% by 2027
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	<p>their free allocations will be spent on retrofitting and upgrading infrastructure and clean technologies (submitting an annual report detailing investments) and diversifying their energy mix.</p> <p>Free allocation of allowances based on an efficiency benchmark multiplied by historical production multiplied by an exposed or non-exposed factor (trade-exposed industries have a factor of 100 percent);</p> <ul style="list-style-type: none"> • Benchmark is based on average emissions per unit of production, using data from the top 10 percent most efficient facilities within a given industrial sector in the EU (based on 2007-2008 data). This is what is meant by “best available technology.” Benchmark level remains the same through 2020 (this provides planning certainty; sources know exactly how many allowances will be available through 2020). • Total allowances available for free to industry in a given year is based on the average share of industrial emissions from covered industries for baseline years 2005-2007, multiplied by the overall cap in that year (e.g., if industrial emissions accounted for 15 percent of total EU average emissions in for 2005-2007, then in 2013 the total number of allowances available to industry would be 15 percent of the 2013 cap). Added to this are average annual emissions for 2005-2007 for installations that were not part of the EU-ETS in those years (but have since joined) reduced by an annual reduction factor. <p>The list of sectors or subsectors exposed to a significant risk of carbon leakage shall be determined after taking into account, <i>“the extent to which third countries, representing a decisive share of world production of products in sectors deemed to be at risk of carbon leakage, firmly commit to reducing GHG emissions ... and the extent to which carbon efficiency of installations located in these countries is comparable to that of the EU</i></p> <p>Evaluations of exposure are scheduled to be on-going:</p> <ul style="list-style-type: none"> • no later than December 31, 2009 and every 5 years thereafter; • no later than June 30 2010 (for decisions relating to the outcome of international agreements). <p>Three further conditions relate to the outcome of international agreements:</p> <ol style="list-style-type: none"> 1. that the Commission will study the possibility of granting additional allowances free of charge to industrial sectors exposed to a significant risk of carbon leakage; 2. <i>“In its impact assessment of the negotiations of an international climate change agreement, the Commission will take account of the impact of carbon leakage on</i>
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	<p><i>Member States' energy security, in particular where the electricity connections with the rest of the European Union are insufficient and where there are electricity connections with third countries. The Commission may take appropriate measures in this regard";</i></p> <p>3. The option of applying border measures was added to the possible actions for redress (which were previously the granting of free allowances and including product importers within the ETS).</p> <p>In common with allocation, the net effect of these conditions is to add some uncertainty to the questions of which (sub-)sectors will receive free allocations and how the quantity they receive may change with time.</p> <p>The revised Directive, Article 10a6 also provides for the possibility for Member States to compensate the most electro-intensive sectors for increases in electricity costs resulting from the ETS through national state aid schemes. Therefore, the Commission will correspondingly modify the Environmental State Aid Guidelines by 31 December 2010.</p>
Policy, Proposal or Analysis	
RGGI (Model Rule and other documents available at http://rggi.org/home).	
Goals	
<p>Concern over production leakage, with shifting production to higher emitting sources not covered by RGGI.</p> <p>Implicit in this concept is the notion of causality; specifically that a cost increase due to a carbon cap could drive geographic changes in the operation of the electric power system. This is distinct from a shift in the geographic distribution of electric generation resulting from other market variables and the dynamic nature of the electric power market.</p> <p>Only applicable with no operating national system (i.e. transitional):</p> <p>The implementation of a national CO2 cap-and-trade program for the electric power sector that is equivalent to RGGI, or a scenario where RGGI sunsets once a national program is implemented, would obviate any potential for emissions leakage.¹</p>	
Metrics/Methods for Assessing Competitiveness Impacts and Defining Vulnerability	Options for Addressing Competitiveness Impacts
Ongoing measurement of leakage using electricity market information (regional market data). Changes relative to a historical baseline used to identify impacts.	Participating states have agreed to prioritize leakage mitigation measures that have demonstrated effectiveness and that can be implemented quickly, and do not seek to implement a relative to more complex measures that would require greater implementation lead times and pose significant implementation challenges that may limit their effectiveness. ²

¹ Potential Emissions Leakage and the Regional Greenhouse Gas Initiative (RGGI): Evaluating Market Dynamics, Monitoring Options, and Possible Mitigation Mechanisms (Initial Report)

² Potential Emissions Leakage and the Regional Greenhouse Gas Initiative (RGGI) <http://rggi.org/docs/20080331leakage.pdf>

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Policy, Proposal or Analysis	
Achieving 2050: A Carbon Pricing Policy For Canada, 2009. National Roundtable on Environment and Economy. Available at http://www.nrtee-trnee.com/eng/publications/carbon-pricing/carbon-pricing-advisory-note/carbon-pricing-advisory-note-eng.pdf .	
Goals	
Transitional support to trade and carbon exposed sectors who can demonstrate hardship impacts with carbon pricing As more jurisdictions increase carbon price, exposure reduces and transitional support is phased-out	
Metrics/Methods for Assessing Competitiveness Impacts and Defining Vulnerability	Options for Addressing Competitiveness Impacts
Firms must be trade and energy exposed, and have demonstrate hardship relative for baseline firm profits.	<p>Output-based allocations (gratis) transitioning to an increasing share of auction as risks mitigate.</p> <p>Other measures such as border carbon adjustments and income tax relief (tax shifting from allowances) are viable options, but secondary strategies beyond OBA.</p> <p>Safety value in place to address rising concerns over misalignment with trading partners.</p> <p>A new governance structure monitors relative carbon prices and competitiveness risks, and adjusts policy accordingly on five year increments.</p>
Policy, Proposal or Analysis	
Aldy, Joseph E. and William A. Pizer. <i>The Competitiveness Impacts of Climate Change Mitigation Policies</i> . Pew Center on Global Climate Change, 2009. Available at http://www.pewclimate.org/international/CompetitivenessImpacts .	
Goals	
Quantify the potential competitiveness effect of domestic greenhouse gas regulation on U.S. manufacturing industries, and outline range of policy options for addressing these impacts	
Metrics/Methods for Assessing Competitiveness Impacts and Defining Vulnerability	Options for Addressing Competitiveness Impacts
<p>The competitiveness effect is the economic impact on a firm arising from the fact that it faces a carbon price while its competitor in another state or country faces no or a lesser carbon price.</p> <p>It is important to distinguish the “competitiveness” effect from the broader economic impact on a given industry or firm. Mandatory climate policy will present costs for firms regardless of what action is taken by other countries or regions. In the case of energy-intensive industries, one potential impact of pricing carbon could be a decline in demand for their products as consumers substitute less GHG-intensive products. This is distinct, however, from the international or inter-regional “competitiveness” impact of GHG regulation</p> <p>The Pew report analyzes 20 years of data in order to discern the</p>	<p>A number of targeted measures can be pursued within a cap and trade program</p> <ul style="list-style-type: none"> • Allowances revenue could be used to provide targeted relief through lower taxes on capital for affected energy-intensive firms, or lower payroll taxes on workers. • Free allocation of allowances could be scaled to offset output losses resulting from competitiveness impacts due to climate policy (e.g., if a plant’s production drops by 10 percent – 7 percent from a shift in consumption and 3 percent due to competitiveness impacts, then free allowances could be granted equal in value to 3 percent loss in output). • Emissions allowances can also be freely allocated in a manner that subsidizes production (similar to output based

Review of Proposed Options for Addressing Industrial Competitiveness Impacts

historical relationship between electricity prices and production and consumption in more than 400 U.S. manufacturing industries. On that basis, the analysis then projects the potential competitiveness impacts of a U.S. carbon price, assuming no comparable action in other countries.

The analysis assumes a CO₂ price of \$15 per ton. (The U.S. Energy Information Administration's core case analysis of the Lieberman-Warner cap-and-trade bill estimated a 2012 allowance price of \$16.88 per ton CO₂). The analysis finds an average production decline of 1.3 percent across U.S. manufacturing, but a 0.6 percent decline in consumption, suggesting a competitiveness effect of 0.7 percent.

For energy-intensive industries (those whose energy costs exceed 10 percent of shipment value), the analysis projects that average U.S. output declines about 4 percent. However, consumption declines 3 percent, so that only a 1 percent decline in production (or one-fourth of the total decline) can be attributed to an increase in imports, or a loss of competitiveness. For specific energy-intensive industries, including chemicals, paper, iron and steel, aluminum, cement, and bulk glass, the analysis projects a competitiveness impact ranging from 0.6 percent to 0.9 percent, although within certain subsectors, the impact could be higher.

The analysis demonstrates very clearly that most of the projected decline in production stems from a reduction in domestic demand, not an increase in imports. Most of the projected economic impact on energy-intensive industries reflects a move toward less emissions-intensive products. At the price level studied, the projected competitiveness impacts, as well as the broader economic effects on energy-intensive industries, were fairly modest.

allocation of Inslee-Doyle and Waxman-Markey approaches, above).