APPENDIX K.
LEAKAGE ANALYSIS

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Introduction

The Global Warming Solutions Act of 2006 (AB 32) calls for California to reduce greenhouse gas (GHG) emissions to 1990 levels by 2020. The AB 32 Scoping Plan – the document that lays out California's strategy for achieving the AB 32 goals – includes, as a key measure, a California cap-and-trade program that can link with other regional partner jurisdictions in the Western Climate Initiative (WCI) to create a regional market system.[1] As adopted in the Scoping Plan, the cap-and-trade program would ensure cost-effective emissions reductions by establishing a cap covering approximately 85 percent of the State's GHG emissions and a system of tradable emissions permits (allowances).

In addition to achieving cost-effective emissions reductions, the California cap-and-trade program will be designed so as to not unduly disadvantage California industry. Introducing an environmental regulation in one jurisdiction can cause production costs and prices in that jurisdiction to increase relative to costs in jurisdictions that do not introduce comparable regulations. This can precipitate a shift in demand away from goods produced in the implementing jurisdiction toward goods produced elsewhere. As a result, the reduction in production and emissions in the implementing jurisdiction is offset by increased production and emissions elsewhere. The offsetting increase in emissions is called *emissions leakage.*[2] AB 32 directs the Air Resources Board (ARB) to design all GHG regulations to minimize leakage to the extent feasible.[3]

To comply with this stated goal of AB 32, ARB staff has developed a methodology for identifying industries at risk of emissions leakage, and a mechanism to minimize leakage risk.[4] The preferred methodology was developed through careful deliberation and analysis of three alternative methodologies, each of which relies on its own variations of emissions intensity and trade share as the two central measures for evaluating an industry's risk of emissions leakage. A detailed discussion of the methodologies, tradeoffs and implications for each industrial sector is included below.

[1] The AB 32 Scoping Plan (ARB, 2008) can be accessed at: http://www.arb.ca.gov/cc/scopingplan/document/scopingplandocument.htm.
[2] AB 32 defines emissions leakage as "a reduction in GHG emissions within the state that is offset by an increase in GHG emissions outside the state" (Section 38505(J)).
[3] Assembly Bill 32, Section 38562(B)(8).
[4] A discussion of the alternatives for addressing leakage is discussed in attachment D at the end of this document. The allocation methods chosen for sectors determined to be at risk of emissions leakage is described in Appendix J – Allowance Allocation.

Methodology to Identify Sectors at Risk of Emissions Leakage

In order to establish a methodology to identify the sectors that are exposed to the risk of emissions leakage, ARB staff reviewed the provisions in the European Union's Emission Trading Scheme (EU ETS),[5] the American Clean Energy and Security Act of 2009 (ACES or H.R. 2454),[6] and Australia's Carbon Pollution Reduction Scheme (CPRS).[7] All three programs take a similar approach in identifying the sectors at risk of emissions leakage:

1) define a sector or a set of manufacturing activities for which leakage risk is assessed,
2) establish metrics to quantify emissions intensity and exposure to international trade,
3) set a threshold for each metric to identify emissions intensive and trade exposed sectors, respectively, and
4) make a determination whether or not a sector is exposed to leakage using the combination of emissions intensity and trade exposure identified in steps 2) and 3).

While unified in their basic framework the EU ETS, ACES and CPRS differ in the measures they use to evaluate emissions intensity and trade exposure. ARB staff followed the basic framework and steps as shown above and compared the measures employed by each program to understand the implications in the context of the California program.[8] In some cases, which measure was used had a significant effect on which sectors were determined to be emissions intensive or trade exposed. Based on the results of this evaluation, staff has developed a methodology to assess leakage risk under a California cap-and-trade program. The tradeoffs of using each of the measures and the details of staff's choice are discussed in the results section below.

Define Sectors

For this analysis, a sector is an aggregation of industrial entities that produce reasonably homogeneous goods by reasonably homogenous processes. ACES uses

[5] For further information on the European Union Emissions Trading Scheme (European Commission, 2010), see http://ec.europa.eu/environment/climat/emission/index_en.htm

[6] For further information on the American Clean Energy and Security Act of 2009 (Waxman & Markey, 2009), see http://energycommerce.house.gov/index.php?option=com_content&view=article&id=1633&catid=155&Itemid=55

[7] For further information on the Australia Carbon Pollution Reduction Scheme (Australia Commonwealth Department of Climate Change and Energy Efficiency, 2010), see http://www.climatechange.gov.au/government/initiatives/cprs.aspx

[8] Wherever possible, actual California data were used for the analysis. In some cases California data were not publicly available. When California data were not available, staff substituted regional and national data published by the federal government. The data sources used for each calculation are documented in the table notes and text.

the North American Industrial Classification System (NAICS) at the 6 digit level to group industrial activities. The NAICS 6 digit level is the most disaggregated classification for manufacturing facilities that is widely used. Staff believes that NAICS is an appropriate classification tool for our leakage assessment because it groups reasonably homogenous manufacturing activities and because the various data required to support the assessment are publicly available. Staff proposes to define industrial activity boundaries aggregated to the NAICS 6 digit level for most sectors.

Staff used data reported under the California Mandatory Reporting Requirements (MRR) for the 2008 reporting year to assign covered facilities to industrial classifications. Under the MRR each facility is required to report its NAICS code. Staff relied on self-reported facility NAICS codes for most facilities. However, for some groups of facilities the reported NAICS code did not match their current productive activity. In order to better match emissions data with trade and production data, staff reclassified those facilities based on the 6 digit NAICS code corresponding to their current productive activity. The reclassified facilities and their corresponding NAICS codes are shown in Table K-1.

Table K-1: Facility operation and corresponding NAICS code

Activities associated with reported emissions	Reported NAICS	ARB classification	Corresponding NAICS
Lime manufacturing	212312	Lime manufacturing	327410
Boron production	212391	Other inorganic chemical mfg	325188
Juice processing	312130	Fruit and vegetable canning	311421
Sulfur recovery plant	325188	Petroleum product manufacturing	324199
Slab conversion	331111	Rolled steel shape manufacturing	331221

For some sectors, we aggregate similar manufacturing activities. In the cases of food manufacturing and secondary steel and aluminum processing, multiple combustion sources, with reasonably similar outputs (products), reported different 6 digit level NAICS codes. These facilities are grouped.

Petroleum refining and its associated processes are grouped. Petroleum refining is a very complex process involving various distinct activities. In some cases one facility houses various processes and in other cases different activities are conducted in adjacent facilities, operating under NAICS codes which, at a 6 digit level, are different from refining. These plants and activities include hydrogen plants, asphalt manufacturing, carbon plants and sulfur recovery plants. Staff grouped those facilities with refining in order to best estimate the emissions and production generated by the refining sector.

Staff used a NAICS 4 digit level code to classify an apparel facility. The code was the self-reported NAICS code. Staff did not see the benefit of further disaggregating this sector. Table K-2 details the industrial classification partition for this analysis.

Table K-2: Sector Classification for Emissions Leakage Analysis

	ARB Classification	NAICS	Description	# of facilities*
1	Oil and gas extraction	211111	Crude petroleum and natural gas extraction	38
		211112	Natural gas extraction	1
2	Soda ash mining and mfg	212391	Soda ash mining and mfg	1
3	Food manufacturing**	311	Food manufacturing	34
		This classification includes subsectors listed below.		
		(311221)	Wet corn milling	(1)
		(311230)	Breakfast Cereal Manufacturing	(1)
		(311313)	Beet Sugar Manufacturing	(2)
		(311421)	Fruit and Vegetable Canning	(16)
		(311423)	Dried and Dehydrated Food Manufacturing	(2)
		(311512)	Dairy Product Manufacturing	(1)
		(311513)	Cheese Manufacturing	(3)
		(311514)	Milk, concentrated, condensed, dried, evaporated, and powdered, manufacturing	(4)
		(311615)	Poultry processing	(1)
		(311919)	Other Snack Food Manufacturing	(1)
		(311999)	All Other Miscellaneous Food Manufacturing	(1)
4	Breweries	312120	Breweries	3
5	Cut and sew apparel mfg	3152	Cut and sew apparel mfg	1
6	Sawmills	322121	Sawmills	9
7	Reconstituted wood product mfg	321219	Reconstituted wood product mfg	1
8	Paper manufacturing	322121	Paper (except Newsprint) Mills	3
9	Paperboard manufacturing	322130	Paperboard mills	2
10	Petroleum products mfg**	324	Petroleum and Coal Products Manufacturing	32
		This classification includes subsectors listed below,		
		(324110)	(Petroleum refining)	(20)
		(324191)	(Petroleum lubricating oil and grease mfg)	(2)
		(325120)	(Industrial gas / hydrogen plant)	(6)
		(324121)	Asphalt paving mixture and block mfg	(1)
		(324199)	(All Other Petroleum and Coal Products Manufacturing)	(3)
11	All other basic inorganic chemical manufacturing	325188	All other basic inorganic chemical manufacturing (excluding sulfur recovery plant)	4
12	Pesticide and Agricultural Chemical manufacturing	325320	Pesticide and Agricultural Chemical manufacturing	
13	Pharmaceutical and Medicine Manufacturing	325412	Pharmaceutical and Medicine Manufacturing	2
14	Polystyrene Foam Product Manufacturing	326410	Polystyrene Foam Product Manufacturing	1
15	Flat glass manufacturing	327211	Flat glass manufacturing	3
16	Glass container manufacturing	327213	Glass container manufacturing	5
17	Cement manufacturing	327310	Cement manufacturing	11
18	Lime manufacturing	327410	Lime manufacturing	1
19	Gypsum Product Manufacturing	327420	Gypsum Product Manufacturing	3
20	Mineral wool manufacturing	327993	Mineral wool manufacturing	3
21	Iron and steel mills	331111	Iron and steel mills	1
22	Steel and aluminum processing**	331X	Steel and aluminum processing	6
		This classification includes the subsectors listed below.		
		(331221)	Rolled Steel Shape Manufacturing	(2)

		(331314)	Secondary Smelting and Alloying of Aluminum	(1)
		(331492)	Secondary Smelting, Refining, and Alloying of Nonferrous Metal (except Copper and Aluminum)	(1)
		(331511)	Iron Foundries	(2)
23	Turbine and Turbine Generator Set Units Manufacturing	333611	Turbine and Turbine Generator Set Units Manufacturing	1
24	Aircraft Manufacturing	336411	Aircraft Manufacturing	2
	Further information needed for classification***	212399	Diatomaceous earth mining	2
		32712	Clay Building Material and Refractories Manufacturing	1

*Number of facilities includes the facilities that did not exceed the applicability threshold (annual emission over 25,000 ton of CO_2e) in the reporting year 2008
**Aggregated sectors
*** ARB staff does not have enough information to classify these sectors. Staff will work with stakeholders to classify them appropriately.

Assess emissions intensity

For the assessment of emissions intensity staff evaluated the implications of using the existing emissions intensity metrics, using MRR and national emissions data, and chose a preferred emissions intensity metric. Once a preferred metric was chosen, staff created a partition for categorizing industries by their relative emissions intensity. Below is a discussion of this analysis and the preferred approach.

Emissions metrics

Staff calculated emissions intensity using the Australian CPRS and EU ETS metrics. Emissions intensity calculations performed in the Interagency Report by US EPA for the ACES legislation are also reported.[9] The methods for calculating emissions intensity and the thresholds for categorizing the sectors are shown in Box K-1.

[9] The Environmental Protection Agency (US EPA), in coordination with other federal agencies, conducted an analysis of how ACES may affect industrial sectors' competitiveness and may or may not trigger emissions leakage. The Interagency Report, published in December 2009, performed the analysis using historical data at a national level to determine each manufacturing sector's emissions intensity and trade exposure, based on the approach proposed by ACES. Staff relied on the results of the Interagency Report when ARB did not have data for specific sectors. In other cases staff used the Interagency Report results to confirm our own state level calculations. The Interagency Report can be accessed at: http://www.epa.gov/climatechange/economics/pdfs/InteragencyReport_Competitiveness-EmissionLeakage.pdf

BOX K-1: Metrics proposed by other Cap-and-trade programs
<ASSESSING EMISSIONS INTENSITY>

EU ETS

- Direct and indirect additional costs by the EU ETS are greater than 5% of Gross Value Added, expressed as
  $\frac{(\text{Direct emission } tCO_2 + \text{Indirect emission } tCO_2) * 30\ €/tCO_2}{\text{Gross value added at factor cost}} > 5\%$

The American Clean Energy and Security Act of 2009 (ACES)

- Energy intensity (the cost of electricity and fuel costs divided by shipment) is greater than 5%, or,
- The greenhouse gas intensity ($20 allowance price multiplied by CO_2e tons of GHG emissions divided by shipment) is greater than 5%. GHG emissions are the sum of direct combustion, process emissions and indirect emissions from upstream electricity generation.

Australia CPRS

- A sector is highly emissions intensive if the weighted average emissions per million dollars of revenue is greater than 2,000 tons CO_2e (tCO_2e) (Weighted emissions are measured as process emissions + fuel combustion + electricity + natural gas and its components used as feedstock)
- If value added is used in place of revenue, the threshold is 6,000tCO_2e
- A sector is moderately emissions intensive if the weighted average emissions per million dollars of revenue is greater than 1,000 tons CO_2e (tCO_2e) (Weighted emissions are measured as process emissions + fuel combustion + electricity + natural gas and its components used as feedstock)
- If value added is used in place of revenue, the threshold is 3,000tCO_2e

The EU ETS and ACES emissions intensity metrics attempt to estimate the potential compliance cost as a share of productive value by multiplying emissions by an assumed allowance price and dividing the product by gross value added and shipments, respectively.[10] [11] The EU ETS and ACES set estimated compliance costs of greater than or equal to 5% as the threshold for identifying emissions intensive sectors. For their calculation the EU ETS assumed an allowance price of €30 per ton (approximately $40 using the historical exchange rate) while ACES assumed an allowance price of $20 per ton.

In the CPRS approach emissions are measured in tons of CO_2e and then divided by millions of dollars of value added. When value added is not available the value of

[10] Another metric proposed in ACES, the energy intensity metric, is designed to compare the energy cost to the total value of shipment. This metric does not reflect the effect of direct cost increases to comply with a cap-and-trade program, but it does acknowledge that certain sectors will primarily face indirect costs as a result of the program.

[11] Value added is derived by subtracting the cost of materials, supplies, containers, fuel, purchased electricity, and contract work from the value of shipments (products manufactured plus receipts for services rendered, approximately revenue). A more detailed definition can found in Attachment B of this document.

shipment is used as a denominator. When setting the threshold for classifying emissions intensive sectors the CPRS used 3,000 tons of CO_2e per million Australian dollars of value added to identify moderately emissions intensive sectors and 6,000 tons of CO_2e per million Australian dollars of value added to identify highly emissions intensive sectors.

Emissions Data

To analyze the implications of using the CPRS and EU ETS metrics for California industries ARB used MRR data for the year 2008. To populate the metrics staff aggregated emissions (direct + indirect emissions) from reporting facilities at the NAICS 6 level and divided them by imputed value added data for the same NAICS code.[12]

Value added data were taken from the Annual Survey of Manufacturers and the US Economic Census.[13] The Annual Survey of Manufacturers publishes national level value added data at the 6 digit level, but does not disaggregate to the state level. The US Economic Census publishes state level valued added data disaggregated to the NAICS 6 digit level, but the US Economic Census is only conducted every 5 years. The US Economic Census was most recently conducted in 2007. This data mismatch between the MMR reporting and US Economic Census years presented a technical challenge to accurately estimating state level value added data for 2008. Staff imputed values for the 2008 state level value added data using the 2007-2008 growth rates in value added, at the national level, and the 2007 state level value added data. Estimates of California value added in 2008 were generated using the formula below:

$$\text{Estimated CA Value Added (2008)} = \text{Actual CA Value Added (2007)} * \frac{\text{Actual US Value Added (2008)}}{\text{Actual US Value Added (2007)}}$$

In performing the calculations staff observed some additional data limitations:

1. When there are limited numbers of establishments in a state, the US Economic Census does not publish value added data, due to confidentiality concerns.
2. When a fraction of facilities in a sector are subject to the MRR, it is unclear if reported GHG emissions reasonably approximate sector-wide emissions as compared with sector-wide value added.
3. Some sector's process emissions were not part of the MRR for the reported year 2008 and 2009. Under a proposed revision to the ARB MRR, process emissions will be quantified for those sectors and assigned a compliance obligation under the cap.
4. GHG emissions reported for the year 2008 are being revised for some facilities. In some cases these issues led staff to determine that the calculation was either not possible or it did not return appropriate results. When the calculations were

[12] Indirect emissions are derived by aggregating electricity consumption converted to GHG emissions using an emissions factor for electricity of 1,100 lbs CO_2e per MWh.

[13] For further information on the US Economic Census (United States Census Bureau, 2010), see: http://www.census.gov/econ/census07/

found questionable or MMR data were unavailable staff used national-level emissions data, from the Interagency Report, and value added at a national level.[14] For the glass sector ARB's 2009 industry survey data were used because 1) ARB MRR did not require the sector report process emissions for the 2008 reporting year, 2) one fiber glass operator did not report its emission through the MRR, because it was below the reporting threshold, and 3) ARB staff found that the methodology is consistent with MRR 2008 and the quality of the data was reliable.

Staff then used these data to perform calculations for the Australian CPRS and EU ETS metrics. Staff used California data to the extent the data were reliable or disclosable. National data in the Interagency Report were used when California data were not used. For the EU ETS metric analysis staff used allowance prices of $20 and $40 per ton. Staff relied on results from the Interagency Report for the ACES metric. Table K-3 reports the results of these calculations. More detailed results and descriptions can be found in Attachment E.

Table K-3: Emissions Intensity Classification Using Metrics by Other Cap-and-Trade Programs

ARB Classification	NAICS	Metric	Australia CPRS		EU ETS			ACES	
		Scope	CA (US)	AU	EU	CA (US)		US	
		Calcula-tion by	ARB	AU govt	EU ETS (€30)	ARB ($40)	ARB ($20)	EPA (GHG intensity)	EPA (Energy Intensity)
Oil and gas extraction	211111, 2		3,352		1.0%	13.4%	6.7%	NA	NA
Soda ash/Borate mining	212391		3,248		5%<x <30%	13.0%	6.5%	NA	NA
Food manufacturing	311		608		---	2.4%	1.2%	---	---
Breweries	312120		324		0.7%	1.3%	0.6%	0.4%	2.0%
Cut and Sew Apparel Mfg	3152		93		---	0.4%	0.2%	0.1%	1.0%
Sawmills	321113		600		1.6%	2.4%	1.2%	0.6%	3.0%
Reconstituted Wood Product Mfg	321219		1,762		4.0%	7.0%	3.5%	1.7%	7.0%
Paper manufacturing	322121		1,663		11.9%	6.7%	3.3%	1.9%	8.0%
Paperboard manufacturing	322130		3,111	6600~ 6900	11.9%	12.4%	6.2%	2.9%	12.0%
Petroleum products manufacturing	324		2,720		15.2%	10.9%	5.4%	---	---
All Other Basic Inorganic Chemical Mfg	325188		2,636		13.9%	10.5%	5.3%	2.9%	8.0%
Pesticide and other ag chemical mfg	325320		232		2.0%	0.9%	0.5%	0.3%	1.0%
Pharmaceutical and Medicine Mfg	325412		64		---	0.3%	0.1%	0.1%	1.0%
Polystyrene Foam Product Mfg	326140		814		---	3.3%	1.6%	0.7%	3.0%
Flat glass manufacturing	327211		3,444	6100~ 6597	10.1%	13.8%	6.9%	2.5%	16.0%
Glass container manufacturing	327213		1,708	3600~ 3897	8.8%	6.8%	3.4%	2.4%	14.0%
Cement manufacturing	327310		13,744		59.2%	55.0%	27.5%	15.9%	15.0%

[14] The Interagency Report compiled sector-wide emissions (direct + indirect) at NAICS 6 digit level.

Lime manufacturing	327410		29,398		85.9%	117.6%	58.8%	33.0%	23.0%
Gypsum Product Manufacturing	327420		1,487		5%<x <30%	5.9%	3.0%	1.4%	10.0%
Mineral wool manufacturing	327993		1,102		4.1%	4.4%	2.2%	1.5%	8.0%
Iron and steel mill	331111		4,148		12.7%	16.6%	8.3%	---	---
Steel and aluminum processing	331X		645		---	2.6%	1.3%	---	---
Turbine and Turbine Generator Set Units Manufacturing	333611		307		0.7%	1.2%	0.6%	0.3%	1.0%
Aircraft Manufacturing	336411		37		0.3%	0.1%	0.1%	0.1%	0.0%

* The actual results used by Australia CPRS was 2100~2199 ton of CO_2e per $M revenue for flat glass, 1200~1299 CO_2e per $M revenue for container glass, and 2200~2300 ton of CO_2e per $M revenue for paperboard. Per the guideline by the CPRS staff multiplied the results by 3 to convert per $M revenue to per $M value added.

Discussion

The results show a similar ordering of sectors across each of the three metrics. Lime and cement were among the highest in emissions intensity in all metrics, followed by glass, paper or refining. Apparel, pharmaceuticals or aircraft manufacturing were among the lowest under each metric. However, the absolute levels of emissions intensity differed across the metrics. These differences were significant for some sectors and insignificant for others. Staff observed that this could be due to a combination of five potential issues: differences in sector classification methods, differences in GHG emission quantification methods, differences in regional manufacturing practices, differences in assumed compliance costs and differences in emissions intensity measures. These sources of variation and their implications are discussed in greater detail below.

- Sector classification

The EU ETS used the EU's own industrial classification system NACE. It is similar to NAICS, which was used by US EPA and ARB, but does not perfectly correspond. Australia developed a partition of manufacturing activities especially for the CPRS. Their classification was geared toward identifying distinct manufacturing processes, with specific GHG emissions patterns, and is similar to both NAICS and NACE . While largely similar, their differences had a large impact for some sectors, such as paper and steel, which consist of chains of production activities, starting from raw material processing. In these sectors outputs include both intermediate and finished products. An integrated facility may operate from raw material processing to finishing, and a specialized facility may conduct only certain parts of the process chain.

Staff observed that some sectors at NAICS 6 digit level such as 325188 (other inorganic basic chemicals) and 331111 (steel mills) may be associated with varied activities with significantly different GHG emission patterns. [15] For example, there is one facility in California reported under steel mills which is not engaged in iron ore processing using blast oxygen furnaces; instead it processes scrapped iron

[15] In California staff identified a sulfur recovery plant, boron production facility and other chemical production facilities under this classification. Sulfur recovery plant was reclassified with refinery sector.

and steel using electric arc furnaces. Although the emissions from blast oxygen and electric arc furnaces are significantly different the facilities are not differentiated by 6 digit NAICS code. Federal GHG mandatory reporting requirements (Federal MRR) could potentially solve this issue by enabling ARB to group facility-level emissions by production processes.

- GHG emissions quantification method

There are two types GHG emissions quantification approaches: top-down and bottom-up. Top-down is used when overall emission or energy consumption is known but data at an individual facility level are not available. When a GHG emissions reporting system is in place the bottom-up approach can be used and facility-level emissions can be aggregated to generate total emissions from a given sector. ARB and the EU ETS primarily relied on the mandatory reporting result (bottom-up), and the values were almost always smaller than the results of the Interagency Report, which was based on sector-wide energy consumption (top-down).

- Differences in manufacturing practices in different regions

Staff noticed that the emission intensity results derived by the Australian CPRS were significantly higher than the EU or US results for sectors such as glass and paper. Staff notes this difference may be attributable to differences in production processes; quality and type of goods produced; or fuel inputs across the various regions.

- Assumptions about compliance costs

Another difference that needs to be considered among different metrics is the assumed allowance prices that are used to derive potential compliance cost impacts. ACES used $20 and EU ETS used €30 which is equivalent to $40 using the historical exchange rate. Under ACES and the EU ETS assumed allowance prices introduce an additional source of potential uncertainty. The CPRS does not incorporate an assumed allowance price, so the emissions intensity metric is not directly subject to this source of uncertainty.[16]

- Differences in measures of emissions intensity

ACES used the value of shipment as a denominator while the EU ETS and CPRS used value added. This makes the threshold (5%) substantially lower for the EU ETS and CPRS relative to ACES. Because shipments are inherently larger than value added, sectors with the same emissions, shipments and value added would have greater emissions intensity under the EU ETS and CPRS than ACES.

[16] Staff believes that this source of uncertainty may have been less significant for the EU ETS, while the EU ETS had a reasonable foundation to set a projected allowance price – the EU ETS had historical carbon market data dating back to the program launch in 2005. However, the CPRS approach does not completely avoid the uncertainty associated with estimating an allowance price. While the CPRS does not explicitly incorporate an assumed allowance price into the metric of emissions intensity, regulators must consider the implied compliance costs associated with each level of emissions intensity when setting the emissions intensity thresholds.

- Mining sector

The mining sector (NAICS 21) is not included in the Annual Survey of Manufacturers and has a different data release schedule than does the manufacturing sector (NAICS 31). For this reason, 2002 data were used for value added. The oil and gas extraction sector showed large differences between emissions intensity calculated by EU ETS and ARB. ARB staff may review the calculation once value added data for 2007 is published.

California Approach

Recognizing the inherent risk in using a projected allowance price for the calculation to identify sectors as emissions intensive (as shown in Table 2), staff used the CPRS metric to classify sectors by emissions intensity. The metric was chosen for its transparency and relative certainty.

Thresholds for emissions intensity

In establishing thresholds to identify sectors as emissions intensive, staff considered the role that emissions intensity plays in estimating leakage risk. Emissions intensity is meant to serve as a proxy for compliance costs. That is, staff assumes that sectors with higher emissions intensities are likely to face higher compliance costs under cap-and-trade.

Staff considered the factors that are unique to the California program. While EU ETS, CPRS and ACES are national or multinational programs, the California cap-and-trade program is a state-level program for which domestic competition is also a source of concern.[17] Domestic competitors may have easier access to California markets as compared to foreign suppliers, due to logistical complexity and import requirements. This means that sectors with lower emissions intensities may also be susceptible to some risk of emissions leakage, due to domestic competition. Staff determined that the thresholds for classifying sectors as emissions intensive should be somewhat lower than those used by the CPRS, in order to account for the greater potential cost sensitivity associated with uncapped domestic competition.

Staff observed that the establishment of emissions thresholds may not be perfectly consistent with the nature of the leakage risk. That is, while leakage risk is likely to be continuously increasing in emissions intensity, allocation will necessarily be a function of where each sector resides relative to the emissions intensity thresholds. Due to the excess administrative burden and technical difficulties allowances could not be distributed as a continuous function of emissions intensity. With this in mind, staff

[17] The Western Climate Initiative (WCI) is a collaboration of independent jurisdictions (7 U.S. states and 4 Canadian provinces) working together to tackle climate change at a regional level. WCI Partner jurisdictions have been evaluating regionally linked GHG cap-and-trade system, and some jurisdictions including California are preparing to start the program in 2012. Staff believes that the risk of emissions leakage will be minimized among the WCI partner jurisdictions that implement cap-and-trade in a harmonized manner. Therefore, domestic competition in this paper refers to the competition with non-WCI states that will not have similar GHG reduction program starting in 2012. For further information about the WCI, see: http://www.westernclimateinitiative.org/

looked for natural break points where significant differences in emissions intensities would exist between the sectors immediately above and below the threshold. That way, the differences in allocation imposed by the thresholds may better approximate the real differences in leakage risk.

Staff classified sectors into four levels of emissions intensity. Sectors with emissions intensity greater than 5,000 were classified as high emissions intensity. Sectors with emissions intensities between 4,999 and 1,000 were classified as medium emissions intensity. Sectors with emissions intensities of between 999 and 100 were classified as low emissions intensity. Sectors with emissions intensities below 100 were classified as very low, not emissions intensive. Staff believes the partition properly accounts for the added risk of leakage posed by domestic competition and, where possible, makes use of natural break points in emissions intensity. The results are reported in Table K-4.

Table K-4: Proposed Emissions Intensity Classification

Emission Intensity Classification	ARB Sector Classification	NAICS	Emissions Intensity (CO_2e/ $M Value added)
High	Lime manufacturing	327410	29,398
	Cement manufacturing	327310	13,744
Medium	Iron and steel mill	331111	4,148
	Flat glass manufacturing	327211	3,444
	Oil and gas extraction	211111	3,352
	Soda ash mining and mfg	212391	3,248
	Paperboard manufacturing	322130	3,111
	Petroleum products manufacturing	324	2,720
	All Other Basic Inorganic Chemical Manufacturing	325188	2,636
	Reconstituted Wood Product Manufacturing	321219	1,762
	Paper manufacturing	322121	1,663
	Glass container manufacturing	327213	1,708
	Gypsum Product Manufacturing	327420	1,487
	Mineral wool manufacturing	327993	1,102
Low	Steel and aluminum processing	331X	645
	Polystyrene Foam Product Manufacturing	326140	814
	Food manufacturing	311	608
	Sawmills	321113	600
	Breweries	312120	324
	Turbine and Turbine Generator Set Units Manufacturing	333611	307
	Pesticide and other agricultural chemical mfg	325320	232
Very low	Cut and Sew Apparel Mfg	3152	93
	Pharmaceutical and Medicine Manufacturing	325412	64
	Aircraft Manufacturing	336411	37

Assess cost pass-through ability (trade exposure)

This section discusses the alternative trade share metrics, the difficulties in attempting to make inferences based on the available trade data, and the preferred approach to assigning sectors a trade exposure classification.

Trade exposure metrics

The ability to pass through compliance costs from a cap-and-trade program may be affected by various factors. The Congressional Research Service identifies three main factors that contribute to a sector's cost pass-through ability: 1) the price-responsiveness of demand for the product; (2) market structure and dynamics, including the number of competitors, amount of regulation and state-ownership and; (3) the geographic scope of the competition, particularly with respect to differentiated carbon policies. [18] Ideally, staff would evaluate each of these factors when assessing each sector's risk of emissions leakage. Unfortunately, those factors are difficult to measure and almost constantly in flux. Therefore, it is very challenging to accurately quantify each sector's cost pass-through ability. Faced with this difficult task, staff looked to how other programs have proposed to assess leakage risk.

The CPRS discussed several different methodologies to evaluate a sector's cost pass-through ability in its White Paper[19]:

- Measurement of responsiveness to price changes (price elasticities)
- Examination of import and export price parity
- Examination of trade shares
- Qualitative assessment of actual or potential for international competition

While the White Paper identifies demand and price responsiveness as the 'ideal' metrics for estimating cost pass-through ability, it also recognizes that they could be difficult to analyze, because price responsiveness may change over time and may also change at different price levels. The paper also notes that assessing import-export price parity may be difficult due to the lack of public information. Given the fact that approaches involving price analysis are associated with technical difficulties, the White Paper chose trade share as the preferred metric.[20] Though the White Paper states that trade share may provide some information about a sector's cost pass-through potential, it also recognizes that trade share may not accurately reflect an individual sector's cost pass-through ability, because trade share may not be associated with market power. The Paper states that:

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[18] The CRS Report for Congress "'Carbon leakage' and Trade: Issues and Approaches" may be accessed at: http://www.fas.org/sgp/crs/misc/R40100.pdf

[19] The Australian Government released the White Paper in December 2008 that outlines the final design of the Carbon Pollution Reduction Scheme. Chapter 12 discusses the assistance for emissions-intensive trade-exposed industries. Chapter 12 of the White Paper may be accessed at: http://www.climatechange.gov.au/publications/cprs/white-paper/~/media/publications/white-paper/V2012Chapter-pdf.ashx

[20] Generally, trade share is the ratio of the imported and exported quantity of a product divided by the sum of domestic production and imports. The CPRS defines trade share as the sum of imports and exports divided by domestic production. The CPRS approach may overstate trade share in sectors with high levels of imports.

> "While trade shares may provide a broad indication of carbon-cost pass through potential, in some cases current trade shares may not accurately reflect this. A product that has a low trade share, for example, may not necessarily face barriers to trade or have the capacity to pass through costs, since the imposition of a significant cost could lead to a change in trade patterns. On the other hand, a high trade share may not mean an industry is at a greater risk of carbon leakage. Some Australian industries have some market power in export markets and may have an ability to influence prices. In other situations, favorable market conditions, quite independent of trade shares, might provide some scope for entities conducting an activity to absorb cost increases."

The Paper emphasizes the importance of supplemental qualitative analyses when trade share is used due to the uncertain indication of cost pass-through ability.

The EU ETS and ACES also employ variations of trade share to assess a sector's cost pass-through ability. Box K-2 shows the trade share metrics that were proposed by each program.

BOX K-2: Metrics proposed by other Cap-and-trade programs
<ASSESSING INTERNATIONAL TRADE INTENSITY>

EU ETS
- (imports + exports) / (total value of turnover + imports) >10%

ACES
- (imports + exports) / (total value of shipments + imports) > 15%

Australia CPRS
- (imports + exports) / (domestic production) > 10%

ARB staff agrees that it is prohibitively difficult to obtain the requisite data to conduct an analysis of price responsiveness. Therefore, staff proposes to use trade share as a primary tool to identify the sectors that are exposed to trade and have limited ability to pass-through the compliance cost resulting from a California cap-and-trade program. However, since the trade share metric is not an ideal tool, ARB staff has attempted to identify the issues that arise from relying only on trade share, so that future analyses may address these shortcomings. This discussion is found in the next section.

Evaluation of trade share metric

- Choosing an import value

In order to understand the implication of using the trade share metric to assess cost pass-through ability, staff first reviewed the import data that could be used to populate the trade share metric; ARB staff chose from three alternative measures to perform the trade share analysis.

- Customs value – Customs value is the value actually paid or payable for merchandise.
- CIF Import Value – The CIF (cost, insurance, and freight) value includes customs value plus cost, insurance and freight associated with import.
- Landed Duty-Paid Value – Landed Duty-Paid Value is the sum of the CIF value plus calculated import duties.

Custom value is the price an importer must pay to the exporting producer for a good. CIF is the Custom value plus the cost of importing the good (freight and insurance). Landed duty-paid value is the sum of custom value, transport costs and import duties (taxes levied by the destination country), and is the total cost that an importer has to pay to import a good from overseas.

The main determinate of international competition is the price differential between domestically produced goods and goods supplied by foreign producers. If the price offered by domestic producers is higher than the landed duty-paid value then importers have a strong incentive to import the good. Alternatively, if transportation cost (or C.I.F) is high relative to the value of a good, total cost to import that good can become higher than the cost of domestically produced goods.[21]

Custom value, freight and insurance, and import duties are aggregated at a sector-level by federal agencies and made public. While the public availability of this data makes trade share an attractive metric, the way the data are reported presents a critical problem for our analysis. Instead of reporting imports and domestic production in terms of per unit price and quantity, federal agencies report them in terms of total value, the product of per unit price and quantity. Since per unit prices of domestic and foreign goods is not known, it is impossible to evaluate price differences between foreign and domestic firms or trade share as a ratio of quantities.

In the absence of per unit price information staff must choose a measure to calculate trade share as a ratio of total monetary values. The implication of using one measure versus another is clear. Adding freight, insurance and import duties to the value of imports inflates the trade share. Because price parity is the primary determinate of trade exposure, a perverse relationship between price parity and trade share may exist. As the costs of freight, insurance and duties rise, trade exposure declines while trade share, as measured by CIF or landed duty-paid value rises. Because the unit

[21] The US EPA report (The Interagency Report) is an analysis of ACES on EITE industries. This report describes the relationship between production costs and transportation costs as follows: "Because of transportation costs, industries that produce products with a relatively low value per unit of weight, such as cement, would be less affected by a given increase in domestic production costs than would those that produce products with a relatively high value per unit of weight, such as steel. Likewise, because of transportation costs, even within an industry there may be geographic variation in the susceptibility of firms to international competition, with firms that serve markets near major ports being more susceptible to international competition than those that serve markets further inland." The Interagency Report, entitled "The Effects of H.R. 2454 on International Competitiveness and Emission Leakage in Energy-Intensive Trade-Exposed Industries", is available at http://www.epa.gov/climatechange/economics/pdfs/InteragencyReport_Competitiveness-EmissionLeakage.pdf

price of domestic goods is unknown it is impossible to know the extent of the domestic to foreign price difference resulting from freight, insurance and duties. At issue is which measure best approximates the per unit price of domestically produced goods.

- Staff used customs value in the preliminary trade share analysis presented at ARB's workshop on May 17th. After the workshop ARB received stakeholder comment that landed duty-paid value should be used instead of customs value. The stakeholder argued that since landed duty-paid value is the value that an importer has to pay to import that good, it is likely that domestic producers would price at landed duty-paid value in order to maintain competitiveness and capture profit. Staff agrees that in addition to customs value it may make sense to compare the domestic value of shipments against landed duty-paid value of imports. However, if domestic producers price below landed duty-paid value, then, as stated above, using landed duty-paid value may overstate trade share (and by extension leakage risk) for sectors that do not face competitive pressure. As better data becomes available staff will continue to analyze both customs value and landed duty-paid value in order to make the best use of the information embodied in the each version of the trade share metric.

- Aggregate trade trends (at a national level)

Staff conducted an historical analysis of recent trade trends in order to better understand how the trade share metric behaves and has changed over time. Staff used customs data on the value of total imports and exports at the national level, compiled by the US Census Bureau's Foreign Trade Division, between 2002 and 2009.[22] These data show that imports increased from 2002 to 2008 and then declined rapidly in 2009. This pattern reflects the robustness of the US economy from 2002 through 2007 followed by the deep recession beginning in late 2008. During the period when the economy was robust, both imports and exports grew. Imports grew at a faster pace because the growth of the US economy was faster than its trading partners and because US demand for consumer and intermediate goods grew faster than domestic production capacity.[23] This trend is shown in Figure K-1. When domestic demand outstrips domestic supply imports increase to meet the demand. Likewise, if foreign demand is strong US exports can increase. In such cases the change in imports and exports may not necessarily imply a change in the competitive position of domestic producers.[24] Staff observes that this fact is not at all captured by trade share metrics.

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[22] A subscription is needed to access the data at: http://www.usatradeonline.gov/. Equivalent data are also publically available through U.S. International Trade Commission at http://dataweb.usitc.gov/

[23] For example, the Economic Report of the President (annual report written by the Chairman of the Council of Economic Advisors) in 2005 states in the page 36 that: "The trade deficit expanded during 2004. Real exports increased 4 percent, as economic growth strengthened among our major trading partners, but real imports increased even faster (at a 9.2 percent rate), partly due to the more robust recovery in the United States than abroad…The rapid increases in real imports were widespread and included capital goods and industrial supplies, petroleum, and consumer goods.
The rapid growth of imports relative to exports largely reflects faster growth in the United States than among our trading partners, as U.S. demand for imports increases faster than foreigners' demand for our exports." The report may be accessed at: http://www.gpoaccess.gov/eop/2005/2005_erp.pdf

[24] A conceptual discussion of the effect of changes in domestic demand on domestic producers and price is found in Attachment B.

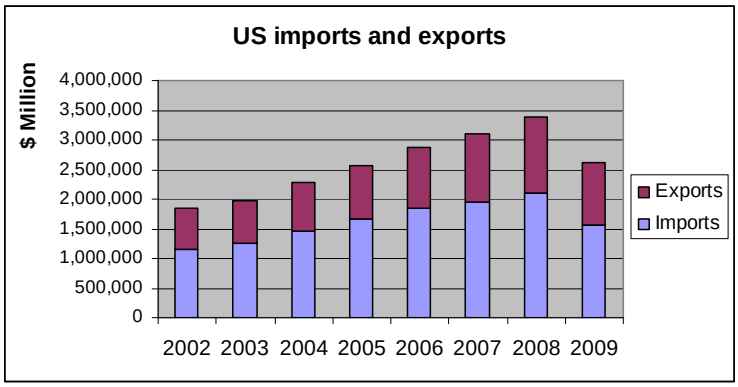

Figure K-1: Trend in Imports/Exports in US

Applying the Trade Share Metric

To evaluate the trade share metric staff chose the ACES approach. Staff chose the ACES approach because it most accurately describes the ratio of trade flows to total productive activity and because of the data required to populate the ACES metric were most available. The formula for the ACES trade share metric is below:

$$\text{ACES Trade Share} = \frac{\text{Imports} + \text{Exports}}{\text{Shipments} + \text{Imports}}$$

Trade Data

State level import data do not exist. To compensate for the lack of state level import data staff compared national and regional trade data to evaluate if national data reasonably represent the trade patterns for California.

To calculate trade share at the national level the sums of imports and exports for all US ports at NAICS 6 digit level were divided by the values of shipments plus imports for all domestic firms. [25] Staff used both "general customs value" and "land duty-paid value" for imports and "domestic export value" for exports. The Interagency Report used landed duty-paid value for imports and domestic export value for exports.

At a regional level, the sum of imports and exports through California port districts (San Francisco, Los Angeles and San Diego) were compared to the value of shipments plus imports from California establishments for the years 2005-2008. Since the value of shipments at the state level is only available for the NAICS 4 digit level, the regional calculation has been done at the NAICS 4 digit level. While the regional calculation represents a better approximation of the California market than do national

[25] The data for the value of shipments were taken from Annual Manufacturing Survey complied by US Census Bureau. The data (US Census Bureau, 2010) may be accessed at: http://www.census.gov/manufacturing/asm/index.html

data, the regional calculation is limited. At the NAICS 4 digit level there are other subsectors that would not be included under the cap-and-trade program which can affect the results. In addition, California ports serve wider markets than California. That is, imports to California ports are not necessarily destined for the California market and exports from California ports are not necessarily from California-based manufacturers.

The same trade data do not exist for the mining and resource sectors. Staff relied on Energy Information Administration data for oil and gas extraction and USGS Minerals Yearbook data for soda ash. For both sectors volume or weight (barrel or ton) was used instead of dollar value, because dollar value was not available. See Attachment D for details.

Table K-5 shows the result of the analysis.

Table K-5: Trade Intensity at National and Regional Level

ARB Classification	NAICS	Import %*	Region**	Import***	2003	2004	2005	2006	2007	2008	Average
Food manufacturing	311	50%	N	LDPV	10%	10%	11%	12%	12%	13%	12%
				Customs	10%	10%	10%	11%	12%	13%	11%
			R	LDPV	22%	19%	20%	21%	22%	24%	22%
				Customs	20%	18%	19%	20%	21%	22%	21%
Breweries	312120	85%	N	LDPV	13%	14%	15%	17%	18%	22%	17%
				Customs	13%	13%	14%	16%	17%	21%	16%
			R	LDPV			NA	NA	NA	NA	NA
				Customs			NA	NA	NA	NA	NA
Cut and sew apparel mfg	3152	97%	N	LDPV	73%	77%	79%	80%	83%	86%	80%
				Customs	71%	75%	77%	78%	81%	84%	77%
			R	LDPV	62%	68%	72%	72%	77%	82%	73%
				Customs	58%	64%	68%	69%	74%	79%	69%
Sawmill	321113	78%	N	LDPV	26%	30%	29%	29%	28%	25%	28%
				Customs	25%	29%	28%	28%	27%	24%	27%
			R	LDPV	21%	21%	22%	26%	33%	35%	25%
				Customs	20%	19%	20%	25%	32%	34%	24%
Reconstituted wood product mfg	321219	90%	N	LDPV	36%	40%	38%	36%	31%	27%	35%
				Customs	35%	38%	37%	34%	30%	26%	34%
			R	LDPV	31%	40%	43%	49%	52%	54%	45%
				Customs	29%	36%	40%	45%	49%	52%	42%
Paper	322121	53%	N	LDPV	20%	22%	23%	24%	23%	24%	25%
				Customs	19%	21%	23%	23%	23%	23%	24%
			R	LDPV	72%	49%	48%	43%	50%	50%	50%
				Customs	71%	47%	46%	41%	48%	48%	48%
Paperboard	322130		N	LDPV							25%
				Customs							
			R	LDPV	72%	49%	48%	43%	50%	50%	50%
				Customs	71%	47%	46%	41%	48%	48%	48%
Refinery	324110	76%	N	LDPV	19%	19%	19%	20%	20%	22%	20%
				Customs	18%	19%	19%	20%	19%	22%	20%
			R	LDPV	12%	13%	11%	13%	15%	14%	13%
				Customs	11%	12%	11%	12%	14%	14%	13%
All other basic inorganic chemical mfg	325188	54%	N	LDPV	51%	53%	55%	59%	59%	61%	57%
				Customs	51%	52%	54%	58%	58%	61%	56%
			R	LDPV	135%	151%	139%	141%	140%	147%	142%
				Customs	137%	153%	140%	142%	141%	148%	144%

Pesticide and other agricultural chemical mfg	325320	28%	N	LDPV	21%	21%	16%	18%	24%	23%	20%
				Customs	20%	20%	16%	18%	24%	23%	20%
			R	LDPV	45%	46%	44%	48%	47%	60%	50%
				Customs	43%	44%	42%	46%	45%	59%	48%
Pharmaceutical and Medicine Manufacturing	325412	50%	N	LDPV	26%	29%	29%	32%	34%	36%	31%
				Customs	26%	29%	29%	32%	34%	36%	31%
			R	LDPV	25%	20%	22%	21%	25%	24%	23%
				Customs	25%	20%	22%	21%	25%	24%	23%
Polystyrene foam product mfg	3261	56%	N	LDPV	16%	17%	17%	18%	19%	20%	18%
				Customs	15%	16%	17%	17%	18%	19%	17%
			R	LDPV	26%	29%	30%	31%	34%	36%	31%
				Customs	25%	28%	29%	30%	32%	35%	30%
Flat glass mfg	327211	43%	N	LDPV	42%	41%	42%	49%	53%	49%	46%
				Customs	42%	41%	41%	48%	52%	49%	46%
			R	LDPV	50%	46%	44%	48%	49%	49%	48%
				Customs	48%	44%	41%	46%	46%	47%	45%
Container glass	327213	80%	N	LDPV	16%	18%	19%	20%	21%	22%	19%
				Customs	15%	17%	18%	18%	20%	20%	18%
			R	LDPV	50%	46%	44%	48%	49%	49%	48%
				Customs	48%	44%	41%	46%	46%	47%	45%
Cement manufacturing	327310	94%	N	LDPV	14%	16%	19%	20%	15%	11%	16%
				Customs	12%	12%	14%	16%	12%	9%	13%
			R	LDPV	8%	10%	10%	10%	8%	6%	9%
				Customs	7%	8%	8%	8%	6%	5%	7%
Lime manufacturing	327410	67%	N	LDPV	3%	3%	3%	3%	4%	3%	3%
				Customs	3%	3%	3%	3%	4%	3%	3%
			R	LDPV	2%	4%	4%	5%	5%	4%	4%
				Customs	2%	4%	4%	5%	5%	4%	4%
Gypsum Product Manufacturing	327420	45%	N	LDPV	4%	4%	4%	5%	5%	6%	5%
				Customs	3%	4%	4%	5%	5%	6%	5%
			R	LDPV	2%	4%	4%	5%	5%	4%	4%
				Customs	2%	4%	4%	5%	5%	4%	4%
Mineral wool mfg	327993	45%	N	LDPV	15%	16%	17%	17%	18%	22%	18%
				Customs	15%	16%	16%	17%	18%	21%	17%
			R	LDPV	49%	54%	55%	56%	55%	56%	54%
				Customs	46%	51%	52%	54%	52%	54%	52%
Iron and steel	331	69%	N	LDPV	31%	33%	35%	40%	39%	41%	37%
				Customs	30%	33%	34%	39%	39%	40%	37%

			R	LDPV	48%	57%	61%	67%	68%	67%	63%
				Customs	47%	56%	60%	67%	67%	66%	62%
Turbine and turbine generator set unit mfg	333611	36%	N	LDPV	36%	86%	86%	89%	90%	93%	78%
				Customs	36%	86%	86%	89%	90%	92%	77%
			R	LDPV	74%	89%	96%	96%	96%	95%	92%
				Customs	74%	89%	96%	96%	96%	95%	92%
Aircraft	336411	27%	N	LDPV	50%	51%	55%	68%	63%	58%	61%
				Customs	50%	51%	55%	68%	63%	58%	61%
			R	LDPV	33%	33%	28%	36%	37%	37%	34%
				Customs	33%	33%	28%	36%	37%	37%	34%
Oil and gas extraction****	211111	99.7%	N	Barrel	63%	65%	66%	67%	67%	67%	65%
Soda ash****	212391	0.4%	N	Ton		67%	66%	63%	58%	62%	63%

*"Import share" (Import %) column shows the sector's share of imports relative to total trade at a national level. If the % is high, that sector is import-oriented. If the % is low, that sector is export-oriented. Import % = Import / (Import + Export)
** "Region" column shows the regional scope of the calculation. "N" means national data for shipment and trade at the NAICS 6 digit level were used. "R" means shipment data for California and trade data for California port districts (San Francisco, Los Angeles and San Diego) were used.
*** "Import" column shows what type of import value was used for calculation. "LDPV" means land duty-paid value was used. "Customs" means customs value was used.
**** For mining sectors (oil and gas extraction and soda ash mining), shipment data are not available for every year. Staff used crude oil production, import/export data available at Energy Information Administration website. Units are in barrels. Staff used soda ash production, import/export data available at US Geological Survey. Units are in tons.

Note: Details of how the data were compiled are found in Attachment E.

Discussion

- Variations in trade share

The results of the trade share calculations ranged from 3% to 80%. Staff observed that some sectors' trade is dominated by imports (apparel) or exports (soda ash), while others display high levels of both imports and exports (flat glass). Although the trade share metric treats the impact of imports and exports equally (it assumes that trade share composed of imports implies the same trade exposure as an equivalent trade share composed of exports), staff does not have a basis to determine whether or not the cap-and-trade program will affect importers and exporters symmetrically.

- Regional and national data

Even with the limitations of the regional calculations, staff observes that analyses using national and regional data generated reasonably similar results, especially for sectors with high and low trade shares. For example, the apparel, wood products, paper, glass, steel and aluminum processing sectors showed high trade intensity at both the national and regional levels.[26] Gypsum and lime manufacturing showed low trade intensity at both the national and regional levels. On the other hand, the trade share for the refining sector at a national level was greater than 15% (the ACES threshold for identifying a sectors as trade exposed) while regional data suggest that the Western trade share was less than 15%. The only other sector that showed this attribute was the cement sector.

Staff notes that these differences in regional and national data may be due in part to the classification of sectors by 4 and 6 digit NAICS codes, respectively. The 4 digit NAICS code which includes cement manufacturing also includes concrete manufacturing, an industry which is significantly larger than cement manufacturing and is highly unlikely to be the source of any imports or exports.[27] Therefore, it is likely that trade share at the NAICS 4 digit level may significantly underestimate trade share for the California cement sector. Refining, on the other hand, represents nearly all of the activity at the NAICS 4 digit level (Petroleum & coal products mfg). Staff notes that the significant difference between trade at the regional and national levels likely implies that using national data for the refining sector would overstate the exposure of the refining sector to competitive pressure.

To further analyze the refining sector staff reviewed information provided by the Energy Information Administration (EIA) to better understand the regional differences in trade for the refining sector. EIA data show that imports have been especially high for the East Coast (PADD 1), which imported about 55% of the total US imports over the last 6 years, while the imports on the West Coast (PADD 5) were only about 8% of

[26] The values for regional calculation are significantly higher for some sectors such as steel or mineral wool. This may be attributed to the fact that California is not a major manufacturing location for those goods and that the imported/exported goods are destined for wider regions, including California. If this is the case, California producers may be more exposed to trade compared to the national average.

[27] Concrete is a wet mix of cement and aggregate. Because of weight and the low value added of water and aggregate concrete is not transported over significant distances.

the total imports. The EIA explains these regional differences are real and due to differences in productive capacity[28]:

> "There are significant differences between different parts of the United States in terms of their involvement in and dependence on international trade. Most of these differences are the direct result of the uneven distribution of both production and refining across the United States. Thus, the East Coast imports over half of all the products that come to the United States, because it is the largest consuming area in the United States but, for historical reasons, it has only enough capacity to meet around 1/3 of those needs from its own refining."

Therefore, staff concluded that regional data using the NAICS 4 digit level, rather than national data using NAICS 6 digit level, best reflects trade patterns for the refining sector.

- Landed duty-paid value and customs as import value

For most sectors, landed duty-paid value and customs value were not substantially different. This implies that the cost of insurance and freight are not a significant part of the imported value especially for the goods whose transportation cost relative to product value is not substantial. However, cement is the lone exception where the difference between customs value and land duty-paid value is large due to the weight of the product relative to product value.

- Mining sector and trade trends

In California there are oil, natural gas and some mineral reserves. Mining sectors are different from manufacturing sectors in that they have to be located where the reserve is. Thus, the risk for leakage may be different from the manufacturing sector. For example, the oil reserves in California are limited and the production has been declining steadily as the yield diminishes. Therefore, California refineries have been relying more heavily on imported crude oil: the share of imports including Alaska crude oil was about 40% in 1986 and has been gradually increasing as California field production decreases[29]. While it is difficult to know what fraction of the increase in crude oil imports is due to increased competition versus diminishing domestic production, it is clear that trade share may be driven by changes to or limitations on domestic productive capacity as opposed to changes in international competitiveness.

California also has soda ash reserves. The US is the second largest natural soda ash producer and a significant amount of the product produced in the US is exported. It is difficult to know how the competition in the market for this type of product compares to manufactured products. At this point there is no alternative methodology developed

[28] This discussion may be found on the EIA Trade page (2010) which may be accessed at: http://www.eia.doe.gov/pub/oil_gas/petroleum/analysis_publications/oil_market_basics/trade_text.htm
[29] California Crude Oil Production and Imports, California Energy Commission, 2006 http://www.energy.ca.gov/2006publications/CEC-600-2006-006/CEC-600-2006-006.PDF

specifically for the mining and minerals sectors that is capable of taking into consideration the distribution of demand and supply.

California approach

As discussed above staff has chosen to use the ACES trade share metric. Staff has concluded that while the trade share metric may provide us with an approximate relative order of potential competition across the various sectors, it may not be sufficient to accurately quantify the degree of exposure to competition for many sectors. In light of this uncertainty, staff will continue to develop techniques to evaluate the trade exposure of various industries.

Threshold for trade Intensity

The ACES analysis used a 15% threshold to identify trade exposed industries. There does not appear to be any theoretical or practical justification for why the 15% threshold was established. Staff notes that as with emissions intensity, trade exposure may also contribute to the risk of emissions leakage in a continuous, rather than stepwise, manner. Therefore, there is also not a compelling argument for why there should be only one threshold for classifying industries as trade exposed.

Staff notes that trade share for different sectors varies from 3% to 80%, suggesting that there is likely a real difference in trade exposure across sectors. Staff observed that the high degree of variation implies that some sectors, using either regional or national data, should clearly be classified as above or below any reasonable threshold or set of thresholds for differentiating sectors by trade share.

However, other sectors are clustered around the ACES threshold of 15%. Staff observed that, for these sectors clustered around 15%, the same sector could be above or below the threshold depending on the chosen year or whether regional or national data are used. The measure chosen to estimate trade share may also play a role in determining whether these sectors are above or below the ACES threshold. The cement sector is above the threshold using land duty-paid value and below threshold using customs value.

To address the issue of sectors with trade shares clustered around 15% staff determined to establish three classifications for trade share; High for industries with trade shares above 19%; medium for sectors with trade shares between 19% and 10%; and low for industries with trade shares below 10%. Staff believes that this partition properly identifies industries with a high level of trade share, makes use of a natural break in trade share at the bottom of the distribution and does not unduly differentiate between sectors that are clustered around the ACES threshold. Staff proposes to continue to analyze sectors that fall into the medium category to better evaluate their ability to pass-through compliance cost.[30] The results of the classification are reported in Table K-6.

[30] In order to overcome the uncertainty relying only on trade share metric to classify the sectors based on cost pass-through ability, staff started to explore other indicators to supplement the principal analysis. Staff is beginning to look at other economic indicators that may help to further classify the sectors whose trade share could fall in the moderate range, or whose trade share was uncertain when relying

Table K-6: Proposed Trade Exposure Classification

Trade Exposure Classification	ARB Sector Classification	NAICS	Import %	Trade Share*
High	Cut and sew apparel mfg	3152	97%	80%
	Turbine and turbine generator set units manufacturing	333611	36%	78%
	Oil and gas extraction	211111 211112	100%	65%
	Soda ash mining and mfg	212391	0%	63%
	Aircraft manufacturing	336411	27%	61%
	All other basic inorganic chemical manufacturing	325188	54%	57%
	Flat glass manufacturing	327211	43%	46%
	Steel and aluminum processing	331111	69%	37%
	Metal processing	331X	69%	37%
	Reconstituted wood product manufacturing	321219	90%	35%
	Pharmaceutical and medicine manufacturing	325412	50%	31%
	Sawmills	321113	78%	28%
	Paper manufacturing	322121	53%	25%
	Paperboard manufacturing	322130	NA	25%
	Pesticide and other agricultural chemical mfg	325320	28%	20%
	Glass container manufacturing	327213	80%	19.4%
Medium	Polystyrene foam product manufacturing	326140	56%	18%
	Mineral wool manufacturing	327993	45%	18%
	Breweries	312120	85%	17%
	Petroleum products manufacturing**	324110	76%	13%
	Cement manufacturing	327310	94%	16%
	Food manufacturing	311	50%	12%
Low	Gypsum product manufacturing	327420	45%	5%
	Lime manufacturing	327410	67%	3%

NOTE: Import % is equal to (import) / (import + export), and is included to indicate whether a sector is import or export oriented.
* Trade share is at national level except for petroleum products manufacturing.
**Since the regional data for this sector was 13% staff proposes to classify in medium category.

Classify sectors by risk of emissions leakage

As previously discussed, staff evaluated sectors' emissions intensity and trade share and classified them into four categories for emissions intensity (high, medium, low and very low) and three categories for trade share (high, medium and low). In evaluating those two criteria staff observed that emissions intensity and trade share are not

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only on the ACES metric for analysis. Staff attempted to collect information on the prices offered by domestic producers and by foreign suppliers for some sectors with moderate trade shares. However, as was previously discussed, domestic and international per unit pricing information is not publicly available. As a solution staff is exploring other indirect measures of international competitiveness. To this end attachment E presents an analysis of how the Producer Price Index may be used in the future to better quantify trade exposure.

necessarily correlated. Very high emissions intensity was not necessarily associated with very high trade share (lime or cement) nor did sectors with very high trade share usually have low emissions intensities. For this reason staff believes that careful consideration is needed when combining these two criteria to derive a classification for risk of emissions leakage.

Box K-3 reports how other programs have combined the emissions intensity and trade share metrics to classify sectors as leakage exposed.

BOX K-3: Metrics proposed by other Cap-and-trade programs
<DETERMINING LEAKAGE RISK>

EU ETS

A sector is deemed exposed to carbon leakage if:

- Emissions intensity > 5% and Trade share > 10%, or
- Emissions intensity > 30%, or
- Trade share > 30%

ACES

A sector is eligible for compensation if

- Emissions intensity or GHG intensity is >5% and trade share >15%, or
- Emissions intensity or GHG intensity is >20%

Australia CPRS

A sector is highly emissions-intensive if:

- Emissions intensity is >6,000 CO_2e/$M value added and trade share is >10%

A sector is moderately emissions-intensive if:

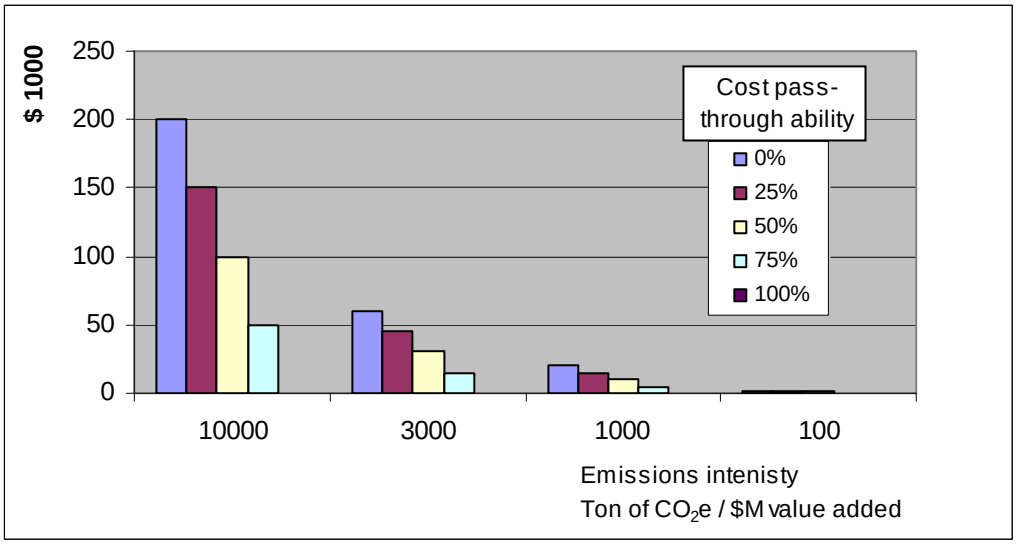
- Emissions intensity is >3,000 CO_2e/$M value added and trade share is >10%

Staff notes that the EU ETS and ACES have only two categories: sectors are either at leakage risk or they are not. The CPRS uses three categories: high, moderate and not at leakage risk. Unfortunately, there is no natural cut off-line to differentiate the sectors with leakage risk and the sectors with no leakage risk. Rather, each sector has a different level of leakage risk, depending on its emissions intensity and cost pass-through ability. Therefore, staff prefers the CPRS approach, which creates three leakage risk categories, rather than having only two categories as do the EU ETS and ACES. However, it is not clear how sectors should be categorized, or how much weight should be awarded to each metric when determining whether a sector is at a high, medium or low risk of leakage.

In order to better understand the implications of assigning sectors a leakage classification staff performed a sensitivity analysis. The analysis charts the relationship between emissions intensity and a hypothetical level of cost pass-through ability, the measure estimated by trade share. Figure K-4 reports the value of assistance required to address leakage the risk for different emissions intensities and cost pass-through abilities.[31]

[31] Staff assumed an allowance price of $20 to calculate compliance cost.

Figure K-4: Conceptual calculation of needed compensation for leakage exposed sectors



The figure shows that the effect of cost pass-through ability is amplified as emissions intensity rises. That is, industries with higher emissions intensities are more sensitive to the effects of cost pass-through ability than industries with low or medium emissions intensities. This result implies that emissions intensity should be given greater weight in the leakage classification, especially when there is uncertainty in the level of cost pass-through ability.

When assigning sectors a leakage risk category staff gave greater weight to emissions intensity. Sectors with high or medium emissions intensity and high trade share were classified as at high leakage risk. Sectors with medium emissions intensity and medium or lower trade share were classified as at medium risk of leakage, as were sectors with low emissions intensity and at least medium trade share. Sectors with very low emissions intensity were classified as at low risk of leakage. The leakage risk classification is reported in table K-7.

Table K-7: Preliminary classification of sectors' exposure to emissions leakage risk

Leakage Risk	ARB Classification	NAICS code	Emissions Intensity	TE
High	Oil and gas extraction	211111 211112	Medium	High
	Soda ash and mining mfg	212391	Medium	High
	Reconstituted wood product mfg	321219	Medium	High
	Paper manufacturing	322121	Medium	High
	Paperboard manufacturing	322130	Medium	High
	All other basic inorganic chemical mfg	325188	Medium	High
	Flat glass manufacturing	327211	Medium	High
	Container glass manufacturing	327213	Medium	High
	Cement manufacturing	327310	High	Medium
	Lime manufacturing	327410	Very high	Low
	Iron and steel mill	331111	Medium	High
Medium	Food manufacturing	311	Low	Medium
	Breweries	312120	Low	Medium
	Cut and saw apparel mfg	3151	Very low	Very high
	Sawmills	321113	Low	High
	Petroleum product manufacturing	324	Medium	Medium
	Pesticide and agricultural chemical mfg	325230	Low	High
	Polystyrene foam product mfg	326140	Low	Medium
	Gypsum product manufacturing	327420	Medium	Low
	Mineral wool manufacturing	327993	Medium	Medium
	Metal processing	331X	Low	High
	Turbine and turbine generator set units mfg	333611	Low	High
Low	Pharmaceutical and medicine mfg	325412	Very low	High
	Aircraft manufacturing	336411	Very low	High

Stakeholder Comments

After ARB's workshop on allocation on May 17th Staff received comments on the approach presented at the workshop from various stakeholders and also received reports, data/information demonstrating different sectors' exposure to leakage. Staff reviewed all the information provided to ARB. Below are the summary of the issues.

- Staff received data/information compiled by the stakeholders based on the metrics discussed in this paper (such as ACES). Although the data mostly matched ARB's own analysis in this Appendix, regional and state-level trade data were hardly obtained. Since it is difficult to collect NAICS 6 digit level regional/state level trade data, staff would like to keep working with stakeholders to understand the regional nature of trade on a sector-by-sector basis.
- Staff believes that the overall assessment framework has to be uniform and applicable to all the sectors covered under the program in order to make sure the assessment process is fair and equitable. However many stakeholders expressed the "uniqueness" of different sectors in terms of competition and

trade exposure. As a first step staff attempted to apply the metrics that are applicable to all the sectors to establish a common framework. However if the "uniqueness" of each sector has to be taken into account, more qualitative, sector-by-sector analysis will be needed.

- Several comments were raised on the producer price index (PPI) discussed at May 17th workshop. After taking into those comments staff decided not to incorporate it into the metrics at this point. However, staff is still looking into the possibility of using price information as part of the analysis. The detailed discussion is found in Attachment D.

Monitoring Emissions Leakage

So far staff discussed the uncertain nature of assessing emissions leakage risk due to the complexity of market dynamics and competition. It may therefore be beneficial to monitor how the market responds once the cap-and-trade program is implemented in 2012. The results of this monitoring will be used to assess if the assistance provided to the industrial sectors based on staff's leakage risk analysis is appropriate. Continuous monitoring will also be useful because the climate policy in other regions can change over time; if more regions implement GHG regulations or take voluntary actions to drive GHG reductions the risk of emission leakage will be reduced.

Monitoring can occur in two ways: 1) covered entities or representatives of covered industrial sectors (such as trade organizations) report certain economic indicators to ARB through ARB MRR or through other means, or 2) ARB conduct an assessment on a regular basis using defined criteria. Alternately, ARB could contract a third party that has expertise or databases for financial indicators for US businesses and the markets that they engage in.
The focal point of the monitoring will be 1) whether or not a sector increased its product price in response to compliance cost, and 2) whether or not the price increase (or inability to increase price) led to a change in competition between domestic producers and the suppliers from outside California.

Considering the fact that the information pertaining to competition could potentially be confidential, staff continues to solicit stakeholder suggestions as to the appropriate monitoring method, criteria and the information collected and used in the analysis.

ATTACHMENT A: Mechanisms for Addressing Emissions Leakage

In its recommendations to ARB, EAAC identified two mechanisms to mitigate emissions leakage – border adjustments and output-based free allocation. Border adjustments are fees on imports and rebates to exports that are meant to create a level playing field when regulations vary across jurisdictions. Under a cap-and-trade program border adjustments should be designed to attach the same compliance obligation to emissions associated with imported and domestically produced goods.[32] EAAC recommended that, if border adjustments were not feasible, ARB should consider the use of benchmarked output-based updated free allocation for sectors at risk of emissions leakage. Under this allocation system, facilities would receive free allowances according to their output in the previous year(s) multiplied by an emissions benchmark, with the benchmark determined based on consideration of the industries' range of emissions per unit of output. This method of free allocation has a similar effect to border adjustments: it levels the playing field between regulated and unregulated facilities by mitigating the compliance costs to regulated facilities.

When they can be implemented, border adjustments are preferable to output-based free allocation. Under a cap-and-trade program border adjustments maintain the integrity of the carbon price while output-based free allocation weakens the price signal on goods. Unfortunately, the use of border adjustments is associated with potentially significant legal and technical challenges. The application of border adjustments to interstate and international trade may be prohibited under the commerce clause.[33] Emissions occurring in foreign countries pose additional difficulties because any regulation must treat domestic and foreign producers equally in light of the World Trade Organization (WTO) principles. These principles may mean that a California cap-and-trade program must have the capacity to assign or verify emissions associated with the goods produced in California and in foreign countries in exactly the same manner.

While assigning emissions to imported goods could be a challenging task, border adjustments have been increasingly discussed in the context of international trade and there is an increasing level of consensus amongst the international community that border adjustments may be implemented in a manner compatible with WTO requirements. Therefore staff believes that the legal concern regarding international trade principles may be overcome in the near future. However, since border adjustments are still associated with significant uncertainty, staff proposes to use

[32]The preliminary draft regulation for a California cap-and-trade program that was issued for comment in November, 2009, discussed a first jurisdictional deliverer (FJD) approach to account for GHG emissions associated with electricity generation, which is a form of border adjustment. Under the FJD in-state electricity generators and importers of electricity generated outside of California would be responsible for holding allowances for the GHG emissions associated with electricity they deliver onto the California grid, regardless of its origin.

[33] The Commerce Clause is an enumerated power listed in the United States Constitution (Article I, Section 8, Clause 3). The clause states that the United States Congress shall have power "to regulate commerce with foreign nations, and among the several States, and with the Indian Tribes".

benchmarked output-based updated free allocation to mitigate the risk of emissions leakage.

ATTACHMENT B: Definition of import/export terms

Term	Description
Imports for Consumption	This represents foreign goods that immediately enter U.S. consumption channels. Goods being held in bonded warehouses or U.S. Foreign Trade Zones are not included until they are withdrawn for consumption.
General Imports	This represents goods that arrive in the United States from foreign countries, whether such goods enter consumption channels immediately or are entered into bonded warehouses or Foreign Trade Zones under Customs custody.
Domestic Exports	This represents goods that are grown, mined, produced, or manufactured in the United States and sent to foreign countries. Domestic exports include goods from U.S. Foreign Trade Zones that have been enhanced in value.
Total Exports	This represents both domestic and foreign exports. Foreign exports, also referred to as re-exports, are goods that have entered the United States, but are exported as substantially the same product.
Landed Duty-Paid Value	Landed Duty-Paid Value is the sum of the CIF value plus calculated duties.
General CIF Value	The general c.i.f. (cost, insurance, and freight) value represents the landed value of the merchandise. It is computed by adding "Import Charges" to the "Customs Value" and excludes U.S. import duties.
Calculated Duties	The "Calculated duty" represents the estimated import duties collected. Estimated duties are calculated based on the applicable rate(s) of duty as shown in the Harmonized Tariff Schedule.
Customs Value	The Customs value is the value of imports as appraised by the U.S. Customs Service. This value is defined as the price actually paid or payable for merchandise, excluding U.S. import duties, freight, insurance, and other charges.
FAS Export Value	The f.a.s. (free alongside ship) value is the value of exports at the U.S. port, based on the transaction price, including inland freight, insurance, and other charges. The value excludes the cost of loading the merchandise aboard the carrier and also excludes any further costs.

Source: International Trade Commission
http://dataweb.usitc.gov/scripts/user_set.asp
Definitions for the terms are viewable by clicking a button labeled "View Data Field Descriptions" in the query page.

ATTACHMENT C: Conceptual presentation of the effect of imports to the price of domestically produced goods

This attachment describes potential behaviors of product price in reaction to the change in domestic demand or competition from imports.
Figure K-5 offers an example of a sector facing competition from imports that have price advantage. If the suppliers of imports can offer the same class of goods at a lower price (S'), domestic producers will have to adjust their price offering accordingly (P to P') because there will be less demand for their products with the existing price. Price adjustment will especially be necessary if domestic demand does not grow.

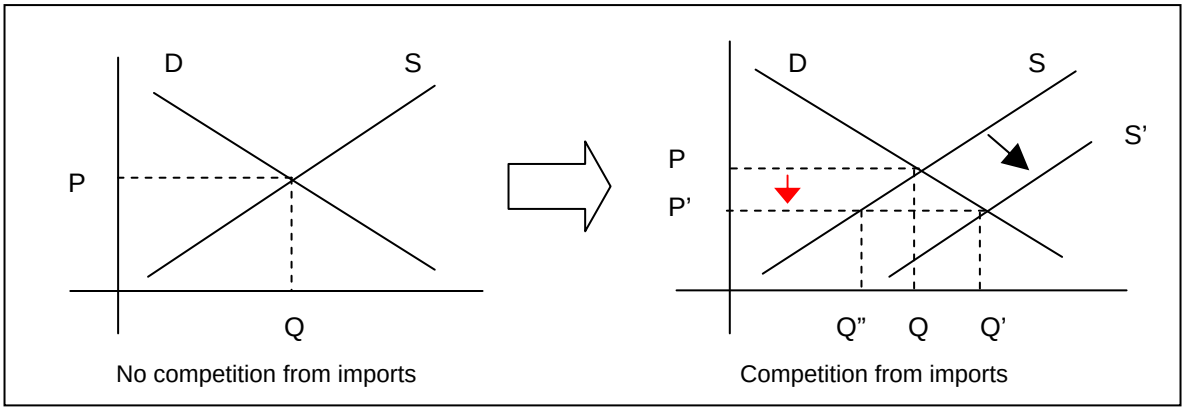


Figure K-5: Relationship of Increased Competition from Imports and Product Price

On the other hand, when there is an increase in domestic demand import increases may not necessarily mean increased competition. As shown in Figure K-6, if buyers are willing to pay higher prices, both domestic producers and foreign suppliers may sell at a higher price where Q' meets P'. In this case domestic producers' existing revenue (Q x P) is not affected due to imports.

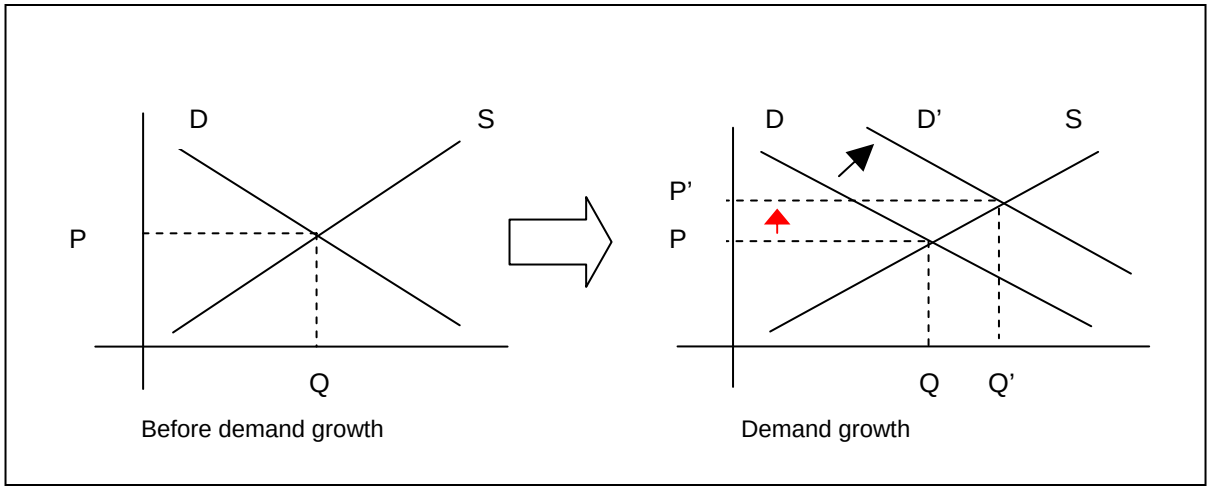


Figure K-6: Effect of Increased Demand on Product Price

ATTACHMENT D: Further Analysis to Supplement Trade Share Metric

Exploring the PPI

Since the sales prices received by domestic producers and importers are not, in most cases, publically available, staff examined the Producer Price Index (PPI), at the sector-level, published by the US Bureau of Labor Statistics, as a sales price surrogate. The PPI measures the average annual change in the selling prices received by domestic producers of goods and services (imports are not taken into account). Staff may be able to use the PPI to indirectly reveal the competitive pressure facing domestic producers.

Theoretically, in perfectly competitive markets the price of a good is set at the variable cost (labor and inputs) of producing that good (with no profit). In less competitive markets, where firms posses market power, the price is set above the variable cost, in order to maximize profit. Understanding this, staff may be able to make inferences about the competitiveness of a sector by analyzing how the price of goods in that sector is affected by changes in the cost of inputs. That is, if costs in a sector were to rise and the price of goods in that sector were to rise by an equivalent margin, that would be evidence that the sector is highly competitive.[34] If, on the other hand, costs were to rise in a sector and prices in that sector were to rise by a greater margin, that would be evidence of market power. In general, sectors with market power are thought to have ability to pass-through costs and not be at risk of emissions leakage.

Recognizing the competitiveness of the market could be inferred by the relationship of the change in the PPI and the change in underlying cost, staff considered what additional information, apart from the PPI, would be required to conduct this analysis. Staff identified the change in input costs and sector production functions as critical to performing such an analysis. Input prices are required to identify when and to what degree sectors experience cost changes. The sector's production function is required to understand how changing input prices affect the production costs of a sector. Unfortunately, cost and production information for different sectors is not publically available, because it is proprietary. In the absence of cost and production information, staff believes that the PPI may be limited in its capacity to reveal sectors' competitiveness. Acknowledging this limitation, staff also believes that, if cost information were to ever become available, the PPI could be a powerful indicator of market competitiveness.

As a thought experiment, staff assumed that nominal inflation was the only cost change faced by each of the regulated sectors. Given this highly uncertain assumption, staff set out to evaluate to what degree each sector passed on the nominal cost of

[34] Not that this example of a sector passing costs through is distinct from cost pass-through-ability, as described above. In this example the costs of all firms in the sector rise equally, leaving the competitive situation unchanged. In the case of cost pass-through-ability, some of the firms in a sector experience cost increases while others do not. It is this differential cost increase that changes the competitive situation and may lead to emissions leakage.

inflation.[35] Staff then compared the degree of cost pass-through with our previous trade share results, hypothesizing that sectors with higher trade shares would be more competitive and have lower degrees of pass-through. Somewhat surprisingly, Table K-8 appears to suggest a correlation between pass-through, the change in the PPI, and trade share. In general, the sectors with high trade intensity (greater than 20%) exhibited sluggish growth in the PPI, while the sectors with low trade intensity showed stronger growth in the PPI.[36] The sectors with columns colored pink are with high trade share (above about 20%). They almost always showed low level PPI with only 2 exceptions. The sectors with columns colored blue are with medium trade share (10% < x < 20%). The results were mixed; 2 sectors showed relatively high PPI and 3 sectors showed low levels of PPI. The sectors with columns colored green have low trade shares. Both sectors showed high levels of PPI.

Table K-8: Producer Price Index for 2002-2009

NAICS	Sector	Import %	Trade share	2002	2003	2004	2005	2006	2007	2008	2009	Base Year
3152	Cut and sew apparel mfg	97%	80%	NA	100	100	100	101	102	102	104	Dec-03
336411	Aircraft mfg	27%	61%	158.8	164	171	181	189	194	202	205	Dec-85
325188	Basic inorganic chemicals	54%	57%	142	145	150	169	211	230	308	341	Dec-82
327211	Flat glass	43%	46%	95	96	94	96	97	96	99	95	Dec-80
331111	Steel mill	69%	37%	100	104	136	146	162	172	203	147	Jun-82
321219	Reconstituted wood product mfg	90%	35%	112	139	168	162	153	138	147	141	Jun-91
321113	Sawmill	78%	28%	139	141	163	162	158	152	144	125	Dec-80
322121	Paper mill	53%	25%	144	146	151	161	168	171	185	184	Jun-81
325320	Pesticide and ag chemical mfg	28%	20%	138	138	139	141	144	147	159	173	Jun-82
327213	Container glass mfg	80%	19%	133	138	142	144	150	159	170	177	Jun-82
324110	Petroleum refining	76%	20%-13%*	96	121	152	205	241	267	338	217	Jun-85
326410	Polystyrene foam product mfg	56%	18%	NA	NA	105	117	121	126	136	136	Dec-03
327993	Mineral wool mfg	45%	18%	132	132	141	147	155	150	145	146	Dec-81
327310	Cement	94%	16%	151	151	155	175	198	208	208	205	Jun-82
312120	Breweries	85%	17%	143	146	152	158	158	156	163	172	Jun-82
327420	Gypsum	45%	5%	157	159	183	210	248	211	190	189	Jun-81
327410	Lime	67%	3%	126	128	133	145	157	166	176	208	Dec-85

* Trade share 20% is at national level and 13% is at regional level.

[35] Nominal inflation is, in the absence of any sector specific information, a reasonable approximation of input price changes. However, there is significant variation across sectors and, in any given year, it is unlikely that nominal inflation accurately predicts the cost changes faced by any sector. This is primarily because input prices and technological change vary widely from sector to sector and across time.

[36] For most sectors one of the years during 1980-1984 was chosen as a base year (base year index value is expressed as 100). If a 2% annual inflation rate is applied to the PPI, the value in 2008-9 will be about 180. The average PPI in November 2009 for manufacturing sectors (NAICS 31) was 170.7 (base year: 1984/12). Since those numbers are reasonably close, staff assumes that on average the prices of products manufactured in the US increased approximately 2% per year from 1980 to 2009.

While far from conclusive, staff observes that this thought experiment offers evidence that the PPI may be a useful tool to supplement the trade share analysis. However, since ARB does not, at this point, have access to the underlying cost information, staff chose not to include the PPI in the assessment of trade exposure. Instead, staff will solicit further stakeholder comment on how ARB can best asses cost pass-through potential, with an emphasis on how to treat or further evaluate sectors tentatively classified as moderately trade-exposed.

ATTACHMENT E: Emissions Leakage Data Book

This attachment describes how the data were collected and how the calculations were performed.

Assessing Emissions Intensity

- GHG emission data were taken from ARB Mandatory Reporting Requirement (MRR) for the reporting year 2008 (Last accessed June 2010). As shown in Table 5 staff aggregated facility-based reported emissions by NAICS code for each ARB classified sectors. GHG emissions are the sum of direct indirect emissions. Direct emission is non-biomass GHG emissions from reported facilities. Indirect emissions is electricity consumption converted to CO_2e by using an emissions factor of 1,100 lbs/MWh. Publicly available MRR data is found at: http://www.arb.ca.gov/cc/reporting/ghg-rep/ghg-reports.htm
  When MRR results were not used because 1) there was limited number of facilities in a sector in California, 2) process emissions were not included, or 3) the data are being revised, staff used GHG emissions data used in the Interagency Report at a national level,[37] as shown in Table K-10.
  For glass sector staff used ARB's industry survey conducted in 2009 for years 2005 to 2007. The details of the survey is available at: http://www.arb.ca.gov/cc/glass/docs/glasssurveys.pdf
- Value added data for California establishments were taken from US Economic Census for the years 2002 and 2007. To match the data to GHG emissions in 2008 (except for glass sector), value added in 2008 was estimated by using the formula below:

$$\text{Estimated CA Value Added (2008)} = \text{Actual CA Value Added (2007)} * \frac{\text{Actual US Value Added (2008)}}{\text{Actual US Value Added (2007)}}$$

Results of this calculation are available in tables K-11 and K-12.

For the sectors for which GHG emission data from Interagency Report were used the value added is the average of 2004-6, as shown in table K-13.

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The data for 2002 and 2007 are found at: http://www.census.gov/econ/census02/ and http://www.census.gov/econ/census07/, respectively.
US Census Bureau defines value added as below.

[37] The Interagency Report collected GHG emission data for NAICS 6 digit level manufacturing sectors at a national level. It is included in the file "InteragencyReport_EITE_Eligibility&EmissionsData_022310" that is available through the link "Data Annex to Interagency Report on Competitiveness and Emission Leakage". It can be accessed via: http://www.epa.gov/climatechange/economics/economicanalyses.html#interagency

"Value added is derived by subtracting the cost of materials, supplies, containers, fuel, purchased electricity, and contract work from the value of shipments (products manufactured plus receipts for services rendered). The result of this calculation is adjusted by the addition of value added by merchandising operations (i.e., the difference between the sales value and the cost of merchandise sold without further manufacture, processing, or assembly) plus the net change in finished goods and work-in-process between the beginning and end of year inventories."

- Staff used carbon leakage assessment results conducted by EU ETS to compare ARB's emissions intensity assessment. NACE code was converted to NAICS for comparison to the extent it was straightforward, as shown in table K-14. The results of EU ETS assessment are available at: http://ec.europa.eu/environment/climat/emission/pdf/20090701_list_sectors.pdf

- Staff used the results of emission intensity calculation conducted by Australian Government as part of emissions-intensive trade-exposed industry assistance for Australia's proposed Carbon Pollution Reduction Scheme. The results of the assessment are available at : http://www.climatechange.gov.au/government/initiatives/cprs/eite.aspx

Table K-9: GHG Emissions from ARB MRR (Reporting year 2008)

ARB Classification	NAICS	Description	# facility	Direct	Indirect	Total
Oil and gas extraction	211111,2	Oil and gas extraction	39	10,455,049	833,198	11,288,247
Soda ash/Borate mining	212391	Potash, Soda, and Borate Mineral Mining	1	1,677,173	ND	ND
Food manufacturing	311	Food manufacturing	34	1,562,301	544,224	2,106,526
	311221	Wet corn milling	1	20,586	ND	
	311230	Breakfast Cereal Manufacturing	1	26,465	ND	
	311313	Beet Sugar Manufacturing	2	100,426	ND	
	311421	Fruit and Vegetable Canning	16	777,425	172,980	
	311423	Dried and Dehydrated Food Manufacturing	2	74,101	ND	
	311512	Dairy Product Manufacturing	1	71,767	ND	
	311513	Cheese Manufacturing	3	163,168	ND	
	311514	Milk, concentrated, condensed, dried, evaporated, and powdered, manufacturing	4	138,312	ND	
	311615	Poultry processing	1	42,318	ND	
	311919	Other Snack Food Manufacturing	1	51,900	ND	
	311999	All Other Miscellaneous Food Manufacturing	1	95,833	ND	
Breweries	312120	Breweries	3	134,863	ND	ND
Cut and Sew Apparel Mfg	3152	Cut and Sew Apparel Mfg	1	27,031	ND	ND
Sawmills	321113	Sawmills	9	372,005	1,137	373,143
Reconstituted Wood Product Manufacturing	321219	Reconstituted Wood Product Manufacturing	1	30,059	ND	ND
Paper manufacturing	322121	Paper (except Newsprint) Mills	3	484,115	ND	ND
Paperboard manufacturing	322130	Paperboard mills	2	338,594	ND	ND
Petroleum products manufacturing	324	Petroleum products manufacturing	32	37,145,670	1,625,659	38,771,329
	324110	Petroleum refining	20	34,333,522	1,455,517	35,789,039
	324121	Asphalt paving mixture and block mfg	1	16,266	ND	ND
	325120	Industrial gas / hydrogen plant	6	2,224,777	115,759	2,340,537
	324191	Petroleum Lubricating Oil and Grease Manufacturing	2	39,429	ND	ND
	324199	All Other Petroleum and Coal Products Manufacturing	3	531,675	ND	ND
All Other Basic Inorganic Chemical Mfg	325188	All Other Basic Inorganic Chemical Manufacturing	4	456,811	ND	ND
Pesticide and other agricultural chemical mfg	325320	Pesticide and other agricultural chemical mfg				
Pharmaceutical and Medicine Manufacturing	325412	Pharmaceutical and Medicine Manufacturing	2	75,402	ND	ND
Polystyrene Foam Product Manufacturing	326140	Polystyrene Foam Product Manufacturing	1	26,320	ND	ND
Flat glass manufacturing	327211	Flat glass manufacturing	3	306,000	ND	ND
Glass container manufacturing	327213	Glass container manufacturing	5	470,000	276,918	746,918
Cement manufacturing	327310	Cement manufacturing	11	8,651,408	693,125	9,344,533
Lime manufacturing	327410	Lime manufacturing	1	27,115	ND	ND
Gypsum Product Manufacturing	327420	Gypsum Product Manufacturing	3	136,919	ND	ND
Mineral wool manufacturing	327993	Mineral wool manufacturing	3	148,000	ND	ND

Iron and steel mill	331111	Iron and steel mill	1	42,005	ND	ND
Steel and aluminum processing	331X	Steel and aluminum processing	6	317,288	308,177	625,465
	331221	Rolled Steel Shape Manufacturing	2	221,688	ND	ND
	331314	Secondary Smelting and Alloying of Aluminum	1	23,129	ND	ND
	331492	Secondary Smelting, Refining, and Alloying of Nonferrous Metal (except Copper and Aluminum)	1	23,710	ND	ND
	331511	Iron Foundries	2	48,761	ND	ND
Turbine and Turbine Generator Set Units Manufacturing	333611	Turbine and Turbine Generator Set Units Manufacturing	1	39,558	ND	ND
Aircraft Manufacturing	336411	Aircraft Manufacturing	2	35,519	ND	ND

NOTE:

1. GHG emissions are in Metric tons of CO_2e
2. Indirect emissions were calculated by electricity consumption in MWh X 1100 lbs CO_2e
3. For glass sector (flat glass, glass container and mineral wool (fiber glass)) ARB 2009 survey data were used in lieu of 2008 MRR data.
4. Process emissions are not reported for lime manufacturing and iron and steel mill.
5. Indirect emission is not disclosed for the sectors that have limited number of facilities in California.
6. ND refers to data that were not disclosed.

Table K-10: Interagency Report GHG Emissions and Emission Intensity Classification

ARB classification	2002 NAICS Code	2002 NAICS Title	Value of Shipments ($1,000)	Value added ($1,000)**	Purchased fuels & Elec ($1,000)	Energy Intensity	Total Emission	GHG Intensity at $20	EI (ARB) **
Food manufacturing	311221	Wet Corn Milling	12,117,145	3,840,104	1,101,604	10%	16.4	3.3%	
	311230	Breakfast Cereal Manufacturing	9,684,167	7,595,953	162,041	1%	2.4	0.5%	
	311313	Beet Sugar Manufacturing	3,264,943	1,175,087	210,030	6%	2.9	2.0%	
	311421	Fruit and Vegetable Canning*	21,358,654	15,772,589	462,303	2%	5.9	0.6%	
	311423	Dried and Dehydrated Food Mfg*	5,503,984		161,720	3%	2.2	0.8%	
	311512	Creamery Butter Manufacturing*	2,176,349	10,046,788	15,032	1%	0.2	0.2%	
	311513	Cheese Manufacturing*	33,112,152		449,982	1%	4.9	0.4%	
	311514	Dry, Condensed, and Evaporated Dairy Product Mfg*	13,199,897		298,591	2%	3.2	0.6%	
	311615	Poultry Processing*	49,827,709	26,093,190	756,956	1%	9.0	0.4%	
	311919	Other Snack Food Manufacturing*	17,191,516	13,229,193	246,255	1%	3.4	0.4%	
	311999	All Other Miscellaneous Food Manufacturing*	10,855,791	9,231,759	195,555	2%	2.4	0.5%	
		Food manufacturing total	178,292,307	86,984,661	4,060,069		52.9		608
Breweries	312120	Breweries	21,193,061	13,593,720	343,842	2%	4.4	0.4%	324
Cut and saw apparel mfg	315211	Men's and Boys' Cut and Sew Apparel	995,414		10,644	1%	0.1	0.2%	
	315212	Women's, Girls', and Infants' Cut and Sew Apparel Contractors	4,185,671		38,856	1%	0.4	0.2%	
	315221	Men's and Boys' Cut and Sew Underwear and Nightwear Mfg	56,914		216	0%	0.0	0.1%	
	315222	Men's and Boys' Cut and Sew Suit, Coat, and Overcoat Manufacturing	896,827		6,764	1%	0.1	0.2%	
	315223	Men's and Boys' Cut and Sew Shirt (except Work Shirt) Manufacturing	754,092		3,254	0%	0.0	0.1%	
	315224	Men's and Boys' Cut and Sew Trouser, Slack, and Jean Manufacturing	351,730		2,764	1%	0.0	0.2%	
	315225	Men's and Boys' Cut and Sew Work Clothing Manufacturing	795,506		8,242	1%	0.1	0.2%	
	315228	Men's and Boys' Cut and Sew Other Outerwear Manufacturing	406,421		2,998	1%	0.0	0.1%	
	315231	Women's and Girls' Cut and Sew Lingerie, Loungewear, and Nightwear	628,582		2,338	0%	0.0	0.1%	
	315232	Women's and Girls' Cut and Sew Blouse and Shirt Manufacturing	3,239,312		8,439	0%	0.1	0.1%	
	315233	Women's and Girls' Cut and Sew Dress Manufacturing	2,241,498		12,087	1%	0.1	0.1%	
	315234	Women's and Girls' Cut and Sew Suit, Coat, Tailored Jacket, and Skirt	490,587		1,686	0%	0.0	0.1%	
	315239	Women's and Girls' Cut and Sew Other Outerwear Manufacturing	3,251,871		15,895	0%	0.2	0.1%	
	315291	Infants' Cut and Sew Apparel Manufacturing	40,480		200	0%	0.0	0.1%	

	315292	Fur and Leather Apparel Manufacturing	108,414		793	1%	0.0	0.1%	
	315299	All Other Cut and Sew Apparel Mfg	1,191,106		8,400	1%	0.1	0.1%	
		Cut and saw apparel mfg	19,634,425	12,905,350	123,576		1.2		93
Sawmills	321113	Sawmills	22,040,005	10,494,458	657,035	3%	6.3	0.6%	600
Reconstituted Wood Product Manufacturing	321219	Reconstituted Wood Product Mfg	6,896,468	3,858,353	578,463	7%	6.8	1.7%	1,762
Paper (except Newsprint) Mills	322121	Paper (except Newsprint) Mills	46,291,440	26,457,577	3,668,168	8%	44.0	1.9%	1,663
Paperboard Mills	322130	Paperboard Mills	25,354,745	10,704,177	2,969,180	12%	33.3	2.9%	3,111
Petroleum products mfg	324110	Petroleum Refineries	571,313,475	89,353,013	10,977,539	2%	237.5	0.9%	2,658
	324121	Asphalt Paving Mixture and Block Mfg	12,301,206	3,351,881	638,281	7%	8.6	1.5%	2,566
	324191	Petroleum Lubricating Oil and Grease Mfg	10,846,559	4,764,020	105,702	1%	1.3	0.2%	273
	324199	All Other Petroleum and Coal Products Mfg	2,963,179	779,153	85,213	3%	7.6	6.2%	9,754
	325120	Industrial Gas Manufacturing	9,543,443	4,523,142	1,137,356	14%	28.1	6.4%	6,212
		Petroleum products mfg	606,967,862	102,771,208	12,944,091		283.1		2,755
All Other Basic Inorganic Chemical Manufacturing	325188	All Other Basic Inorganic Chemical Manufacturing	22,828,592	10,546,882	1,825,257	8%	27.8	2.9%	2,636
Pesticide and Other Agricultural Chemical	325320	Pesticide and Other Agricultural Chemical Manufacturing	13,408,412	8,627,703	149,491	1%	2.0	0.3%	232
Pharmaceutical Preparation Manufacturing	325412	Pharmaceutical Preparation Manufacturing	140,539,685	104,643,184	786,354	1%	6.7	0.1%	64
Polystyrene Foam Product Manufacturing	326140	Polystyrene Foam Product Manufacturing	8,112,338	3,685,867	262,734	3%	3.0	0.7%	814
Flat Glass Manufacturing	327211	Flat Glass Manufacturing	3,420,860	1,903,658	573,152	16%	4.2	2.5%	2,206
Glass Container Manufacturing	327213	Glass Container Manufacturing	4,899,025	2,538,932	669,968	14%	5.3	2.4%	2,087
Cement Manufacturing	327310	Cement Manufacturing	10,619,945	6,306,496	1,677,538	15%	85.3	15.9%	13,526
Lime Manufacturing	327410	Lime Manufacturing	1,875,567	898,017	427,353	23%	26.4	33.0%	29,398
Gypsum Product Mfg	327420	Gypsum Product Manufacturing	5,724,920	3,631,370	717,975	10%	5.4	1.4%	1,487
Mineral Wool Mfg	327993	Mineral Wool Manufacturing	6,147,076	3,704,640	499,202	8%	4.8	1.5%	1,296
Iron and Steel Mills	331111	Iron and Steel Mills	102,186,442	32,328,399	6,426,219	6%	134.1	2.6%	4,148
Steel/aluminum processing	331221	Rolled Steel Shape Manufacturing*	6,564,479	3,947,266	119,493	2%	1.7	0.5%	431
	331314	Secondary Smelting and Alloying of Aluminum*	8,718,257	4,256,062	508,626	5%	1.4	0.4%	329
	331492	Secondary Smelting, Refining, and Alloying of Nonferrous Metal (except Copper and Aluminum)	7,923,433	4,790,721	160,827	2%	2.4	0.6%	501
	331511	Iron Foundries*	11,795,934	10,096,763	667,451	6%	9.4	1.6%	931
		Steel and aluminum processing	35,002,103	23,090,812	1,456,397		14.9		645
Turbine and Turbine Generator Set Units Manufacturing	333611	Turbine and Turbine Generator Set Units Manufacturing	8,641,059	2,935,370	79,087	1%	0.9	0.3%	307
Aircraft Manufacturing	336411	Aircraft Manufacturing	83,859,242	32,041,370	266,932	0%	2.7	0.1%	84

* Value added data are the aggregate of some NAICS 6 digit sectors expressed as XXXXXM or XXXXXN.

** Data added or calculated by ARB staff.

Table K-11: Value Added for California Sectors

ARB Classification	NAICS	2002 ($1,000)	2007 ($1,000)	% change	Estimated 2008 value ($1,000)
Petroleum products manufacturing	324	4,936,580	19,092,552	75%	14,251,836
Cement manufacturing	327310	586,308	835,345	81%	679,888
Flat glass manufacturing	327211	167,626	111,454	---	---
Glass container manufacturing	327213	435,422	437,324	---	---
Mineral wool manufacturing	327993	300,425	344,529	---	---
Oil and gas extraction	211111 211112	3,367,553	NA	NA	NA
Soda ash mining and manufacturing	212391*	516,820	NA	NA	NA

* Value added for NAICS 21239 was used because the data was not disclosed for NAICS 212391.

Table K-12: Value added at National Level for 2007 and 2008

NAICS-based code	Description	2007 ($1,000)	2008 ($1,000)	% change
324110	Petroleum Refineries	111,429,378	79,092,586	71.0%
324121	Asphalt Paving Mixture and Block Manufacturing	4,897,364	4,111,067	83.9%
324122	Asphalt Shingle and Coating Materials Manufacturing	3,458,555	3,067,961	88.7%
324191	Petroleum Lubricating Oil and Grease Manufacturing	5,133,715	3,755,425	73.2%
324199	All Other Petroleum and Coal Products Manufacturing	1,037,150	1,531,837	147.7%
325120	Industrial Gas Manufacturing	5,904,974	6,870,257	116.3%
	Petroleum products manufacturing sector total	131,861,136	98,429,133	74.6%
327310	Cement Manufacturing	6,702,569	5,455,224	81.4%

Table K-13: Average Value Added for 2004-6 at National Level

NAICS-based code	Description	2004 ($1,000)	2005 ($1,000)	2006 ($1,000)	Average ($1,000)
311221	Wet Corn Milling	3,523,362	3,888,172	4,108,777	3,840,104
311230	Breakfast Cereal Manufacturing	8,636,475	7,537,772	6,613,611	7,595,953
311313	Beet Sugar Manufacturing	1,043,846	1,141,127	1,340,287	1,175,087
31142M	Fruit and Vegetable Canning*	16,428,376	15,365,750	15,523,640	15,772,589
31151N	Dairy product mfg	9,831,687	10,359,453	9,949,223	10,046,788
31161N	Animal slaughtering & processing	24,887,465	26,424,332	26,967,773	26,093,190
31191M	Snack food mfg	12,220,917	13,506,005	13,960,657	13,229,193
31199M	All other food mfg	8,945,879	9,308,900	9,440,498	9,231,759
Total		85,518,007	87,531,511	87,904,466	86,984,661
312120	Breweries	13,349,286	13,417,275	13,770,165	13,512,242
31521M	Cut & saw apparel mfg	2,383,008	3,082,477	4,062,891	3,176,125
31522M	Cut & saw apparel mfg	4,738,614	3,433,292	2,500,155	3,557,354
31523M	Cut & saw apparel mfg	5,523,401	5,175,907	5,210,601	5,303,303
31529M	Cut & saw apparel mfg	850,921	833,889	920,893	868,568
Total		13,495,944	12,525,565	12,694,540	12,905,350
32111M	Sawmill	10,861,499	10,834,533	9,787,343	10,494,458
321219	Reconstituted Wood Product Manufacturing	4,109,939	3,966,983	3,498,136	3,858,353
32212M	Paper (except Newsprint) Mills	24,817,281	26,575,783	27,979,668	26,457,577
322130	Paperboard Mills	10,339,835	9,987,647	11,785,048	10,704,177
324110	Petroleum products mfg	51,643,699	105,227,427	111,187,914	89,353,013
324121	Asphalt Paving Mixture and Block	2,684,113	2,985,834	4,385,695	3,351,881
324191	Petroleum Lubricating Oil and Grease mfg	3,551,165	5,135,817	5,605,077	4,764,020
324199	All Other Petroleum and Coal Products	613,009	927,598	796,851	779,153
325120	Industrial Gas Manufacturing	3,769,493	4,668,837	5,131,095	4,523,142
325188	All Other Basic Inorganic Chemical Mfg	9,267,638	10,861,246	11,511,763	10,546,882
325320	Pesticide and Other Agricultural Chemical	7,481,744	9,455,239	8,946,127	8,627,703
325412	Pharmaceutical Preparation Manufacturing	99,418,875	105,298,303	109,212,373	104,643,184
326140	Polystyrene Foam Product Manufacturing	3,636,189	3,773,459	3,647,952	3,685,867
327211	Flat Glass Manufacturing	1,961,723	1,919,084	1,830,166	1,903,658
327213	Glass Container Manufacturing	2,608,322	2,426,885	2,581,588	2,538,932
327310	Cement Manufacturing	5,382,906	6,410,914	7,125,668	6,306,496
327410	Lime Manufacturing	777,566	905,690	1,010,796	898,017
327420	Gypsum Product Manufacturing	2,641,972	3,665,040	4,587,098	3,631,370
327993	Mineral Wool Manufacturing	3,433,234	3,659,075	4,021,611	3,704,640
33111M	Iron and Steel Mills	31,444,750	31,173,335	34,367,111	32,328,399
33122M	Rolling and drawing of purchased steel	4,149,381	3,915,067	3,777,350	3,947,266
33131N	Alumina and aluminum production and processing	3,641,521	4,314,509	4,812,156	4,256,062
33149M	Non-Ferrous Metal (except Copper and Aluminum) Rolling, Drawing, Extruding and Alloying	3,693,970	4,791,131	5,887,061	4,790,721
33151M	Ferrous metal foundries	9,192,484	10,250,346	10,847,459	10,096,763
333611	Turbine and Turbine Generator set unit mfg	3,067,238	2,903,339	2,835,533	2,935,370
336411	Aircraft Manufacturing	30,195,766	32,487,842	33,440,503	32,041,370

Table K-14: Carbon Leakage Assessment Results by EU ETS and NACE – NAICS Conversion

NACE4	NACE Description	NAICS	NAICS Description	Direct Costs/ Gva %	Indirect Costs/ Gva %	Total CO2 Costs/ Gva%	Trade %
11.10	Extraction of crude petroleum and natural gas	2111	Oil and gas extraction	0.9	0.1	1.0	60.2
14.30	Mining of chemical and fertilizer minerals	21239	Other Nonmetallic Mineral Mining and	5%<x<30%	6.6	5%<x<30%	61.1
15.96	Manufacture of beer	312120	Breweries	0.3	0.4	0.7	7.2
20.10	Sawmilling and planing of wood; impregnation of	321111	Sawmill	0.0	1.6	1.6	30.8
20.20	Manufacture of veneer sheets; manufacture of plywood, laminboard, particle board, fibre board and other panels and boards	32121	Veneer, plywood, and engineered wood product manufacturing	1.5	2.6	4.0	23.8
21.12	Manufacture of paper and paperboard	3221	Pulp, Paper, and Paperboard Mills	7.1	4.8	11.9	25.7
23.20	Manufacture of refined petroleum products	3241	Petroleum and Coal Products Manufacturing	14.0	1.2	15.2	16.1
24.13	Manufacture of other inorganic basic chemicals	32518	Other Basic Inorganic Chemical Manufacturing	6.4	6.0	13.9	31.7
24.20	Manufacture of pesticides and other agro-chemical	325320	Pesticide and other agricultural chemical mfg	1.6	0.4	2.0	41.1
26.11	Manufacture of flat glass	3272	Glass and Glass Product Manufacturing	8.3	1.8	10.1	21.0
26.13	Manufacture of hollow glass	3272	Glass and Glass Product Manufacturing	6.3	2.6	8.8	24.3
26.51	Manufacture of cement	3273	Cement and Concrete Product Manufacturing	54.9	4.4	59.2	6.8
26.52	Manufacture of lime	3274	Lime and Gypsum Product Manufacturing	83.9	2.8	85.9	2.6
26.53	Manufacture of plaster	3274	Lime and Gypsum Product Manufacturing	5%<x<30%	3.1	5%<x<30%	6.5
26.14	Manufacture of glass fibres	3272	Glass and Glass Product Manufacturing	2.0	2.1	4.1	23.4
27.10	Manufacture of basic iron and steel and of ferro-alloys (ECSC)20)	3311	Iron and Steel Mills and Ferroalloy Manufacturing	8.7	4.1	12.7	32.3
29.11	Manufacture of engines and turbines, except aircraft, vehicle and cycle engines	3336	Engine, Turbine, and Power Transmission Equipment Manufacturing	0.4	0.3	0.7	51.0
35.30	Manufacture of aircraft and spacecraft	3364	Aerospace Product and Parts Manufacturing	0.0	0.2	0.3	79.7

* GVA stands for gross value added.

Assessing Trade Exposure

- Imports and exports

Imports and exports at NAICS 6 digit level were taken from International Trade Commission Tariff and Trade Dataweb. (http://dataweb.usitc.gov/)

- Value of shipments

The value of shipments at the NAICS 6 digit level for national data and NAICS 4 digit level for state data were taken from the US Census Bureau's Annual Manufacturing Survey. The US Census Bureau defines value of shipments as:
"Value of shipments includes the received or receivable net selling values, 'Free on Board' (FOB) plant (exclusive of freight and taxes), of all products shipped, both primary and secondary, as well as all miscellaneous receipts, such as receipts for contract work performed for others, installation and repair, sales of scrap, and sales of products bought and sold without further processing.

- Calculation methodology for trade share
  (Import + Export) / (Shipment + Import)

Table 45: Trade Share Sector-by-sector (shipment and import/export figures expressed in million dollars)

ARB Classification	NAICS	Import %	Region	Indicator	2003	2004	2005	2006	2007	2008	2009	Avr
Food manufacturing	311	50%	N	Shipment	488,517	512,340	532,402	536,939	589,859	649,656		
				LDPV	25,695	29,966	32,205	34,314	37,362	42,637	38,460	
				Customs	23,769	27,740	29,759	31,802	34,720	39,982	36,144	
				Export	26,795	25,902	28,849	32,201	38,746	48,494	43,906	
				TS (LDPV)	10%	10%	11%	12%	12%	13%		12%
				TS (Customs)	10%	10%	10%	11%	12%	13%		11%
			R	Shipment	47,820	50,261	53,293	55,792	61,399	66,505		
				LDPV	4,093	4,748	5,176	5,605	6,103	6,794	6,319	
				Customs	3,685	4,283	4,670	5,090	5,569	6,250	5,867	
				Export	7,255	5,815	6,376	7,312	8,921	11,069	10,366	
				TS (LDPV)	22%	19%	20%	21%	22%	24%		22%
				TS (Customs)	20%	18%	19%	20%	21%	22%		21%
ARB Classification	NAICS	Import %	Region	Indicator	2003	2004	2005	2006	2007	2008	2009	Avr
Breweries	312120	85%	N	Shipment	20,407	20,235	20,795	21,575	21,194	19,480		
				LDPV	2,888	3,002	3,349	3,887	3,940	3,954	3,582	
				Customs	2,692	2,781	3,107	3,595	3,651	3,686	3,369	
				Export	257	264	318	376	645	1,261	1,279	
				TS (LDPV)	13%	14%	15%	17%	18%	22%		17%
				TS (Customs)	13%	13%	14%	16%	17%	21%		16%
			R	Shipment	14,906	15,139	D	D	D	D	D	
				LDPV								
				Customs								
				Export								
				TS (LDPV)			NA	NA	NA	NA	NA	NA
				TS (Customs)			NA	NA	NA	NA	NA	NA
ARB Classification	NAICS	Import %	Region	Indicator	2003	2004	2005	2006	2007	2008	2009	Avr
Cut and sew apparel mfg	3152	97%	N	Shipment	30,837	25,958	24,337	23,610	19,480	15,608		
				LDPV	71,470	75,092	79,597	82,720	84,985	81,628	71,120	
				Customs	61,625	64,870	68,515	70,916	72,768	69,813	60,947	
				Export	3,655	3,114	2,833	2,566	2,018	1,994	1,849	
				TS (LDPV)	73%	77%	79%	80%	83%	86%		80%
				TS (Customs)	71%	75%	77%	78%	81%	84%		77%
			R	Shipment	11,530	9,320	9,055	9,945	8,927	7,140		
				LDPV	17,244	18,143	21,210	24,130	27,247	27,885	25,687	
				Customs	14,440	15,256	17,740	20,211	22,810	23,345	21,567	
				Export	562	491	556	559	617	693	611	
				TS (LDPV)	62%	68%	72%	72%	77%	82%		73%
				TS (Customs)	58%	64%	68%	69%	74%	79%		69%

ARB Classification	NAICS	Import %	Region	Indicator	2003	2004	2005	2006	2007	2008	2009	Avr
Sawmill	321113	78%	N	Shipment	26,822	30,530	32,643	32,153	27,898	24,272		
				LDPV	6,851	9,847	10,203	9,523	7,486	5,176	3,171	
				Customs	6,384	9,261	9,516	8,868	6,974	4,807	2,912	
				Export	1,899	2,098	2,204	2,442	2,316	2,103	1,677	
				TS (LDPV)	26%	30%	29%	29%	28%	25%		28%
				TS (Customs)	25%	29%	28%	28%	27%	24%		27%
			R	Shipment	1,428	1,882	1,842	1,776	1,152	906		
				LDPV	196	287	258	284	219	178	111	
				Customs	171	254	227	254	196	158	100	
				Export	143	160	194	253	234	199	153	
				TS (LDPV)	21%	21%	22%	26%	33%	35%		25%
				TS (Customs)	20%	19%	20%	25%	32%	34%		24%
ARB Classification	NAICS	Import %	Region	Indicator	2003	2004	2005	2006	2007	2008	2009	Avr
Reconstituted wood product mfg	321219	90%	N	Shipment	6,686	7,854	8341.2	7868.7	6719.1	6275.6		
				LDPV	3,263	4,621	4,620	3,750	2,481	1,718	1,434	
				Customs	3,104	4,395	4,343	3,512	2,314	1,612	1,335	
				Export	275	318	331	411	417	463	337	
				TS (LDPV)	36%	40%	38%	36%	31%	27%		35%
				TS (Customs)	35%	38%	37%	34%	30%	26%		34%
			R	Shipment	1,026	1,160	1,210	1,154	996	734		
				LDPV	296	548	720	876	847	670	508	
				Customs	254	463	611	754	742	592	453	
				Export	119	127	118	111	108	95	72	
				TS (LDPV)	31%	40%	43%	49%	52%	54%		45%
				TS (Customs)	29%	36%	40%	45%	49%	52%		42%
ARB Classification	NAICS	Import %	Region	Indicator	2003	2004	2005	2006	2007	2008	2009	Avr
Paper	322121	53%	N	Shipment			46,184	48,441	50,933	51,687		
				LDPV			6,911	7,355	6,813	6,751	5,315	
				Customs			6,476	6,866	6,369	6,316	4,979	
				Export			5,416	5,855	6,588	7,118	6,210	
				TS (LDPV)	20%	22%	23%	24%	23%	24%		25%
				TS (Customs)	19%	21%	23%	23%	23%	23%		24%
			R	Shipment	846	1,720	1,779	2,525	2,080	2,074		
				LDPV	677	736	808	1011	998	892	756	
				Customs	601	654	723	900	886	792	674	
				Export	422	470	425	496	541	596	490	
				TS (LDPV)	72%	49%	48%	43%	50%	50%		50%
				TS (Customs)	71%	47%	46%	41%	48%	48%		48%
ARB Classification	NAICS	Import %	Region	Indicator	2003	2004	2005	2006	2007	2008	2009	Avr

			N	Shipment	20,803	21,056	20,854	23,241	25,358	25,331		
				Import (C.I.F.	84	109	89	126	130	135	917	
				Imports	82	106	86	122	126	129	862	
				Export	40	57	79	75	75	111	2,391	
				LDPV								25%
				Customs								
Paperboard	322130			Shipment	846	1,720	1,779	2,525	2,080	2,074		
				LDPV	677	736	808	1011	998	892	756	
				Customs	601	654	723	900	886	792	674	
			R	Export	422	470	425	496	541	596	490	
				TS (LDPV)	72%	49%	48%	43%	50%	50%		50%
				TS (Customs)	71%	47%	46%	41%	48%	48%		48%
ARB Classification	NAICS	Import %	Region	Indicator	2003	2004	2005	2006	2007	2008	2009	Avr
				Shipment	223,700	305,331	445,642	512,143	580,181	732,728		
				LDPV	41,581	57,942	85,685	96,988	106,206	135,518	78,199	
			N	Customs	39,034	54,399	81,228	92,735	101,964	130,610	75,005	
				Export	9,162	12,337	17,506	25,630	30,484	57,762	41,183	
				TS (LDPV)	19%	19%	19%	20%	20%	22%		20%
				TS (Customs)	18%	19%	19%	20%	19%	22%		20%
Refinery	324110	76%		Shipment	26,300	36,661	59,378	68,746	77,323	100,573		
				LDPV	2,523	4,260	5,854	7,840	10,409	9,652	6,836	
				Customs	2,298	3,908	5,440	7,360	9,828	9,169	6,448	
			R	Export	892	1,068	1,643	1,923	2,483	5,796	3,176	
				TS (LDPV)	12%	13%	11%	13%	15%	14%		13%
				TS (Customs)	11%	12%	11%	12%	14%	14%		13%
ARB Classification	NAICS	Import %	Region	Indicator	2003	2004	2005	2006	2007	2008	2009	Avr
				Shipment	15,761	16,085	17,666	19,192	22,496	23,790		
				LDPV	6,099	6,403	7,390	8,699	10,487	12,138	8,903	
			N	Customs	5,881	6,152	7,122	8,406	10,191	11,772	8,673	
				Export	5,080	5,502	6,351	7,619	8,922	9,889	8,040	
				TS (LDPV)	51%	53%	55%	59%	59%	61%		57%
All other basic inorganic chemical mfg	325188	54%		TS (Customs)	51%	52%	54%	58%	58%	61%		56%
				Shipment	2,359	2,086	2,294	2,659	3,190	3,347		
				LDPV	1,744	2,015	2,399	2,845	2,782	3,103	2,465	
			R	Customs	1,584	1,874	2,249	2,639	2,609	2,914	2,323	
				Export	3,812	4,197	4,102	4,889	5,564	6,382	5,147	
				TS (LDPV)	135%	151%	139%	141%	140%	147%		142%
				TS (Customs)	137%	153%	140%	142%	141%	148%		144%
ARB Classification	NAICS	Import %	Region	Indicator	2003	2004	2005	2006	2007	2008	2009	Avr

Pesticide and other agricultural chemical mfg	325320	28%	N	Shipment	9,962	11,353	14,013	14,014	11,559	13,800		
				LDPV	709	785	747	669	750	873	781	
				Customs	669	740	704	634	718	831	743	
				Export	1,491	1,739	1,635	1,962	2,230	2,480	2,205	
				TS (LDPV)	21%	21%	16%	18%	24%	23%		20%
				TS (Customs)	20%	20%	16%	18%	24%	23%		20%
			R	Shipment	648	726	882	840	1,156	1,129		
				LDPV	196	260	316	284	427	607	256	
				Customs	164	224	274	246	372	551	232	
				Export	182	194	216	255	321	442	258	
				TS (LDPV)	45%	46%	44%	48%	47%	60%		50%
				TS (Customs)	43%	44%	42%	46%	45%	59%		48%
ARB Classification	NAICS	Import %	Region	Indicator	2003	2004	2005	2006	2007	2008	2009	Avr
Pharmaceutical and Medicine Manufacturing	325412	50%	N	Shipment	123,032	126,763	133,668	143,793	143,320	149,178		
				LDPV	25,991	29,650	32,043	38,459	43,541	46,974	49,506	
				Customs	25,822	29,473	31,853	38,244	43,301	46,689	49,266	
				Export	13,192	15,470	16,746	19,312	20,512	23,085	25,850	
				TS (LDPV)	26%	29%	29%	32%	34%	36%		31%
				TS (Customs)	26%	29%	29%	32%	34%	36%		31%
			R	Shipment	14,157	17,179	20,330	23,075	26,900	30,748		
				LDPV	1,170	919	1,749	2,022	3,648	3,770	3,353	
				Customs	1,160	907	1,736	2,008	3,632	3,753	3,336	
				Export	2,601	2,715	3,017	3,238	3,894	4,398	3,689	
				TS (LDPV)	25%	20%	22%	21%	25%	24%		23%
				TS (Customs)	25%	20%	22%	21%	25%	24%		23%
ARB Classification	NAICS	Import %	Region	Indicator	2003	2004	2005	2006	2007	2008	2009	Avr
Polystyrene foam product mfg	3261	56%	N	Shipment	144,972	149,625	163,927	174,143	171,307	167,423		
				LDPV	13,741	16,030	18,295	19,692	20,211	20,720	17,595	
				Customs	12,568	14,637	16,753	18,047	18,489	19,022	16,278	
				Export	11,203	12,319	13,376	14,643	15,513	16,250	13,987	
				TS (LDPV)	16%	17%	17%	18%	19%	20%		18%
				TS (Customs)	15%	16%	17%	17%	18%	19%		17%
			R	Shipment	13,672	13,476	14,265	15,041	14,179	13,580		
				LDPV	2,788	3,353	3,724	4,070	4,223	4,239	3,794	
				Customs	2,485	2,981	3,322	3,649	3,797	3,826	3,478	
				Export	1,482	1,606	1,754	1,891	2,037	2,181	1,881	
				TS (LDPV)	26%	29%	30%	31%	34%	36%		31%
				TS (Customs)	25%	28%	29%	30%	32%	35%		30%
ARB Classification	NAICS	Import %	Region	Indicator	2003	2004	2005	2006	2007	2008	2009	Avr
Flat glass mfg	327211	43%	N	Shipment	2,856	3,248	3,462	3,374	3,304	3,507		

				LDPV	660	781	812	888	884	825	678	
				Customs	629	744	769	841	838	780	645	
				Export	826	880	965	1,184	1,316	1,317	939	
				TS (LDPV)	42%	41%	42%	49%	53%	49%		46%
				TS (Customs)	42%	41%	41%	48%	52%	49%		46%
			R	Shipment	1,790	2,022	2,080	2,166	2,213	2,292		
				LDPV	994	1,111	1,104	1,191	1,223	1,254	1,039	
				Customs	865	970	953	1,036	1,054	1,087	924	
				Export	406	343	304	427	462	494	365	
				TS (LDPV)	50%	46%	44%	48%	49%	49%		48%
				TS (Customs)	48%	44%	41%	46%	46%	47%		45%
ARB Classification	NAICS	Import %	Region	Indicator	2003	2004	2005	2006	2007	2008	2009	Avr
Container glass	327213	80%	N	Shipment	4,361	4,323	4,242	4,474	4,844	5,088		
				LDPV	663	714	763	874	997	1,077	872	
				Customs	607	659	700	794	902	970	792	
				Export	161	185	180	180	237	262	298	
				TS (LDPV)	16%	18%	19%	20%	21%	22%		19%
				TS (Customs)	15%	17%	18%	18%	20%	20%		18%
			R	Shipment	1,790	2,022	2,080	2,166	2,213	2,292		
				LDPV	994	1,111	1,104	1,191	1,223	1,254	1,039	
				Customs	865	970	953	1,036	1,054	1,087	924	
				Export	406	343	304	427	462	494	365	
				TS (LDPV)	50%	46%	44%	48%	49%	49%		48%
				TS (Customs)	48%	44%	41%	46%	46%	47%		45%
ARB Classification	NAICS	Import %	Region	Indicator	2003	2004	2005	2006	2007	2008	2009	Avr
Cement manufacturing	327310	94%	N	Shipment	7,779	8,720	9,754	10,762	10,669	9,378		
				LDPV	1,210	1,576	2,237	2,554	1,776	1,014	614	
				Customs	941	1,140	1,563	1,843	1,325	789	511	
				Export	63	64	69	115	128	107	111	
				TS (LDPV)	14%	16%	19%	20%	15%	11%		16%
				TS (Customs)	12%	12%	14%	16%	12%	9%		13%
			R	Shipment	5,524	5,871	7,020	7,947	7,651	6,606		
				LDPV	455	612	762	834	641	367	232	
				Customs	372	453	565	630	496	308	213	
				Export	26	26	30	37	32	37	24	
				TS (LDPV)	8%	10%	10%	10%	8%	6%		9%
				TS (Customs)	7%	8%	8%	8%	6%	5%		7%
ARB Classification	NAICS	Import %	Region	Indicator	2003	2004	2005	2006	2007	2008	2009	Avr
Lime manufacturing	327410	67%	N	Shipment	1,009	1,285	1,448	1,604	1,866	1,924		
				LDPV	22	25	33	36	48	39	53	

				Customs	20	24	31	33	45	37	50	
				Export	12	13	17	19	23	26	17	
				TS (LDPV)	3%	3%	3%	3%	4%	3%		3%
				TS (Customs)	3%	3%	3%	3%	4%	3%		3%
			R	Shipment	592	426	487	535	666	619		
				LDPV	2	1	2	3	4	3	1	
				Customs	1	1	1	3	3	3	1	
				Export	10	14	18	22	27	22	14	
				TS (LDPV)	2%	4%	4%	5%	5%	4%		4%
				TS (Customs)	2%	4%	4%	5%	5%	4%		4%
ARB Classification	NAICS	Import %	Region	Indicator	2003	2004	2005	2006	2007	2008	2009	Avr
Gypsum Product Manufacturing	327420	45%	N	Shipment	4,435	5,082	6,459	7,500	5,748	4,655		
				LDPV	82	111	159	264	117	77	58	
				Customs	70	96	141	233	105	67	51	
				Export	87	103	118	137	184	225	202	
				TS (LDPV)	4%	4%	4%	5%	5%	6%		5%
				TS (Customs)	3%	4%	4%	5%	5%	6%		5%
			R	Shipment	591	426	487	535	666	619		
				LDPV	2	1	2	3	4	3	1	
				Customs	1	1	1	3	3	3	1	
				Export	10	14	18	22	27	22	14	
				TS (LDPV)	2%	4%	4%	5%	5%	4%		4%
				TS (Customs)	2%	4%	4%	5%	5%	4%		4%
ARB Classification	NAICS	Import %	Region	Indicator	2003	2004	2005	2006	2007	2008	2009	Avr
Mineral wool mfg	327993	45%	N	Shipment	4,937	5,441	5,897	6,382	6,168	5,679		
				LDPV	380	474	540	615	520	533	422	
				Customs	359	449	510	578	489	506	403	
				Export	414	480	545	594	686	812	761	
				TS (LDPV)	15%	16%	17%	17%	18%	22%		18%
				TS (Customs)	15%	16%	16%	17%	18%	21%		17%
			R	Shipment	1,242	1,351	1,516	1,590	1,720	1,588		
				LDPV	766	991	1,218	1,354	1,372	1,174	796	
				Customs	667	857	1,048	1,177	1,206	1,043	719	
				Export	211	265	296	309	321	367	370	
				TS (LDPV)	49%	54%	55%	56%	55%	56%		54%
				TS (Customs)	46%	51%	52%	54%	52%	54%		52%
ARB Classification	NAICS	Import %	Region	Indicator	2003	2004	2005	2006	2007	2008	2009	Avr
Iron and steel	331	69%	N	Shipment	138,271	181,602	203,263	234,384	257,277	282,141		
				LDPV	35,739	59,077	67,319	91,937	91,939	102,848	56,966	
				Customs	34,065	56,498	64,642	88,615	88,866	99,404	55,359	

				Export	17,877	21,092	27,423	37,079	44,592	54,733	38,228	
				TS (LDPV)	31%	33%	35%	40%	39%	41%		37%
				TS (Customs)	30%	33%	34%	39%	39%	40%		37%
			R	Shipment	5,277	6,381	6,497	7,322	7,853	8,953		
				LDPV	2,176	4,317	4,311	6,330	6,034	6,356	3,000	
				Customs	2,006	4,053	4,052	5,932	5,670	5,996	2,832	
				Export	1,422	1,757	2,268	2,884	3,393	3,918	3,300	
				TS (LDPV)	48%	57%	61%	67%	68%	67%		63%
				TS (Customs)	47%	56%	60%	67%	67%	66%		62%
ARB Classification	NAICS	Import %	Region	Indicator	2003	2004	2005	2006	2007	2008	2009	Avr
Turbine and turbine generator set unit mfg	333611	36%	N	Shipment	13,631	6,255	6,825	6,566	8,989	9,771		
				LDPV	2,340	1,971	2,285	3,239	4,796	5,956	5,369	
				Customs	2,239	1,897	2,190	3,129	4,621	5,689	5,129	
				Export	3,423	5,126	5,558	5,474	7,663	8,599	10,106	
				TS (LDPV)	36%	86%	86%	89%	90%	93%		78%
				TS (Customs)	36%	86%	86%	89%	90%	92%		77%
			R	Shipment	1,952	1,759	1,774	1,999	2,402	2,731		
				LDPV	961	1,255	1,413	1,694	1,975	1,936	1,442	
				Customs	915	1,205	1,359	1,633	1,908	1,854	1,392	
				Export	1,207	1,424	1,635	1,858	2,225	2,485	1,903	
				TS (LDPV)	74%	89%	96%	96%	96%	95%		92%
				TS (Customs)	74%	89%	96%	96%	96%	95%		92%
ARB Classification	NAICS	Import %	Region	Indicator	2003	2004	2005	2006	2007	2008	2009	Avr
Aircraft	336411	27%	N	Shipment	58,767	59,971	64,624	69,203	89,895	89,301		
				LDPV	12,347	11,669	10,902	10,785	13,327	12,491	9,308	
				Customs	12,334	11,655	10,891	10,774	13,307	12,480	9,299	
				Export	23,428	24,857	30,496	43,925	51,902	46,942	2,329	
				TS (LDPV)	50%	51%	55%	68%	63%	58%		61%
				TS (Customs)	50%	51%	55%	68%	63%	58%		61%
			R	Shipment	19,855	19,122	27,084	21,889	22,139	23,692		
				LDPV	873	923	794	639	886	979	823	
				Customs	865	917	785	632	877	970	817	
				Export	5,889	5,705	7,074	7,537	7,724	8,168	7,389	
				TS (LDPV)	33%	33%	28%	36%	37%	37%		34%
				TS (Customs)	33%	33%	28%	36%	37%	37%		34%
ARB Classification	NAICS	Import %	Region	Indicator	2003	2004	2005	2006	2007	2008	2009	Avr
Oil and gas extraction	211111	99.7%	N	Domestic	2,073,453	1,983,302	1,890,106	1,862,259	1,848,450	1,811,817	1,956,596	
				Import	3,527,696	3,692,063	3,695,971	3,693,081	3,661,404	3,580,694	3,289,675	
				Export	4,538	9,783	11,619	8,999	10,006	10,464	15,985	
				TS	63%	65%	66%	67%	67%	67%	63%	65%

ARB Classification	NAICS	Import %	Region	Indicator	2003	2004	2005	2006	2007	2008	2009	Avr
Soda ash	212391	0.4%	N	Domestic		770,000	968,000	1,170,000	1,260,000	1,520,000		
				Import		1,880	2,460	2,290	2,760	3,820		
				Export		514,000	640,000	736,000	734,000	939,000		
						67%	66%	63%	58%	62%		63%

* Import % was calculated at national level.

ATTACHMENT F: Emissions Leakage Data Source

Value added and shipment

US Economic Census / US Census Bureau
http://factfinder.census.gov/servlet/DatasetMainPageServlet?_program=ECN&_tabId=ECN2&_submenuId=datasets_4&_lang=en&_ts=246366739615
Annual Manufacturing Survey / US Census Bureau
http://www.census.gov/manufacturing/asm/index.html

Import/export

USA Trade Online / US Census Bureau, US Department of Commerce
http://www.usatradeonline.gov/
Interactive Tariff and Trade Database / US International Trade Commission
http://dataweb.usitc.gov/

Import/export for petroleum and soda ash

Energy Information Administration / Petroleum
http://www.eia.doe.gov/oil_gas/petroleum/info_glance/petroleum.html
US Geological Survey / Minerals Year Book Soda Ash
http://minerals.usgs.gov/minerals/pubs/commodity/soda_ash/index.html#myb

Producer Price Index

Producer Price Index / US Labor Statistics
http://www.bls.gov/ppi/

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