

Border Carbon Adjustments: What risk for South African exporters?

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Introduction

This policy brief is based on a longer paper prepared by the IISD for South African Renewable Initiative.¹ It summarizes an analysis that attempts to identify the extent to which South Africa's exports are vulnerable to potential border carbon adjustment (BCA). Estimates of the trade impacts of such measures are derived using plausible assumptions as to the form of a BCA.

The Global Context for Border Carbon Adjustments

Are Border Carbon Adjustments Likely to be Implemented?

BCAs have been featured in every climate bill to come before the U.S. Congress to date, and featured as part of the House of Representatives bill, the *America Clean Energy and Security Act* (ACESA, also known as the Waxman-Markey Bill), passed in 2009. In Washington, it is taken as fact that no U.S. climate legislation can pass without a BCA regime.

Some analysts argue that the measures will be passed into law and then never used—that they are just there as a “back pocket” threat, or as a sop to domestic interests. But this ignores the fact that, in the House of Representatives drafting process, the flexibility of the administration was whittled down to practically nothing. It also ignores the history of law in areas such as trade remedy, which took on a life of its own once on the books.

¹ See <http://sarenewablesinitiative.files.wordpress.com/2011/03/sari-working-paper-trade-vulnerability.pdf> for the full paper. Thanks to Ingrid Jegou of the ICTSD for helpful comments on the analysis. Samantha Derksen and Ingrid Jegou of ICTSD were kind enough to provide concordance tables for some of the EU goods described in this study. Lucy Kitson of IISD was instrumental in producing this brief based on the longer analysis.



**TRADE INVESTMENT
& CLIMATE CHANGE**

If the U.S. did put such a regime into place (and it is an open question whether the U.S. is capable of passing climate legislation in the foreseeable future), then there would be pressure from other industrialized countries to do likewise. Canada would almost certainly follow suit. Australia has faced pressures from the same lobbies that forced BCA into U.S. law, and EU and Japanese businesses would undoubtedly also do the math and lobby hard for such measures if they found them in their best interests, though not all would. The EC has recommended against the use of BCAs in the EU's third phase Emissions Trading System (ETS), but also recommended that they remain an option going forward. France in particular has pushed strongly for BCAs within the EU, and a number of analysts are advocating BCA as a way to enable the EU's ambition of raising cuts in greenhouse gas (GHG) emissions from 20 per cent to 30 per cent by 2020.

It seems to come down to the question, can the U.S. ever pass climate legislation? In the near term the prospects look poor, but eventually it must happen, as the science becomes clearer and as the occasional hot year and new natural disasters increasingly focus the public consciousness on the consequences of unchecked climate change. The ACESA legislation would not have taken effect until 2020, and there are good odds that, by that time, some sort of BCA regime will be in place.

What Might Border Carbon Adjustment Legislation Look Like?

Goods covered: This analysis assumes ACESA as the U.S. hypothetical regime, and the goods covered are explicitly spelled out in the Act. They must meet certain criteria for energy/GHG intensity and trade intensity. An Inter-Agency Report requested by Congress gives the 6-digit North American Industry Classification System (NAICS) product classifications that are likely to be covered. Our analysis simply accepts these classifications.

In the case of the EU, the hypothetical regime is more difficult to imagine since no draft legislation has been tabled. However, in preparing for the third phase ETS, the EU had to define those sectors that were most vulnerable to leakage, so as to be able to decide which sectors would be eligible for free allocation of allowances. This list is a good starting point, but is extremely broad. Like the U.S., the EU used trade intensity and energy/GHG intensity criteria. But one of the categories is simply trade intensity (30 per cent), with no requirement to demonstrate carbon intensity (the paragraph 16[b] goods). In fact, this criterion is responsible for the majority of the products/sectors listed. Our analysis assumed conservatively that the goods covered by any EU scheme would be those listed in all of the criteria *except* for the paragraph 16(b) goods.

Charges imposed: The ACESA leaves it to future administrators to elaborate details of the assessment, but does note that the imports should be assessed a carbon charge equal to the most recent auction price for allowances at the domestic level. The price assumed for such auctions in much of the U.S. analysis is US\$20/tonne of CO₂, and this is the price assumed in our analysis as well. That price is used for both the U.S. and EU calculations in this paper.

This is a reasonable assumption. Prices for similar allowances in the CDM and under the EU ETS range from US\$14 to \$19 as of this brief, but the market is experiencing a historically significant drop in prices precipitated by the lack of certainty about a post-2012 carbon market and the downgrading of the U.S. debt rating, among other things. Prices in U.S.-based voluntary markets are much lower, but these are not a sound basis for comparison. In the end, this is actually a conservative estimate, as most analyses of future carbon prices range much higher.

Effect of Border Carbon Adjustments on South Africa

Could South Africa be Exposed to BCAs?

The ACESA would apply BCA regimes to its covered sectors in all trading partners unless there is a successful post-2010 climate change treaty, or unless the partners meet one of several criteria:

- They are party to a multilateral climate change agreement to which the U.S. is also party, under which they take on economy-wide binding targets for emissions reduction at least as stringent as those taken on by the U.S.
- They are least-developed countries (LDCs)

Even if those country-level exemptions do not apply, the sectors in question would be able to gain exemption if:

- The trading partner in question has signed a bilateral or plurilateral sectoral emissions reduction agreement with the U.S.
- The sector in question has GHG emissions intensity lower than that of the U.S.
- The trading partner in question emits less than 0.5 per cent of global anthropogenic GHGs, and accounts for less than 5 per cent of U.S. imports in that sector

An analysis of all these conditions reveals that South Africa is vulnerable—if ACESA were implemented tomorrow, none of these exemptions would apply. An exemption could apply if South Africa entered into sectoral treaties with the U.S.; this idea is discussed further below.

The analysis described below assumes that the same conditions of exemption would apply in any hypothetical regime to be implemented in the EU. Clearly, in fact, the details would change, as they probably will in any future U.S. law, but the ACESA gives us a reasonable example of a politically feasible piece of legislation and a sound basis for analysis.

How Does this Analysis Quantify Exposure?

The analysis is based on quantifying exports of the covered goods as defined in the hypothetical U.S. and EU regimes described above. We calculate the GHG emissions associated with these exports. Based on these emissions, and on a carbon price of US\$20/tonne, we calculate a total charge payable by each sector.

For each of the sectors, we found the value of exports to the EU or U.S. in 2009. U.S. data, expressed in 6-digit NAICS, was obtained from the U.S. Department of Commerce and the U.S. International Trade Commission. The EU data, expressed as the more internationally known Harmonized Commodity Description and Coding System (HS 2007) (also 6-digits), was from EuroStat databases. This data had to be constructed through concordances, since EuroStat data is not available in HS format, but is rather expressed in NACE International format.²

² The concordance is difficult since NACE is essentially activity-based and HS is product-based. It went from NACE to ISIC rev. 3.1 to ISIC rev. 4 to CPC ver 2 to HS 2007. The work on concordance of the paragraph 15 & 16 goods was taken, with gratitude, from work carried out by the International Centre for Trade and Sustainable Development. The concordances for the goods listed under paragraphs 15, 16a, 17, and 15 & 16 beyond NACE 4-digit were done by the authors.

We then calculated the emissions of the various sectors using a South African Department of Mines and Energy energy balance sheet for 2006, which showed the amount of various energy inputs used to create output in the following sectors:

- **Iron and steel**
- **Chemical & petrochemical**
- **Wood and wood products**
- **Non-metallic minerals**
- **Mining and quarrying**
- **Food and tobacco**
- **Paper pulp and print**
- **Non-ferrous metals**
- **Textile and leather**

Each fuel type has an emissions coefficient (expressed in terms of GHG emissions per unit of energy) that shows how much CO₂ and other GHGs are emitted in the process of combustion under average conditions.³ Multiplying each sector's energy use by the coefficient and totalling gives us that sector's total GHG emissions for 2009, expressed in tonnes of CO₂ equivalent (tCO₂e).⁴

We then needed to find the sector's total economic output in 2009. First we identified in some detail those sectors covered under the headings used in the energy balance tables as follows:

Sector	ISIC	Notes	Source
Iron and steel	271, 2731	Unclear whether statsoline figures equate to ISIC iron and steel	* Basic iron and steel products
Chemical and petrochemical	24 (excl petrochemical feedstocks)		* Petroleum, chemical products, rubber and plastics
Non-ferrous metals	272, 2732	Unclear whether statsoline figures equate to ISIC non-ferrous metals	* Non-ferrous metal products
Non-metallic minerals	26	Unclear whether statsoline figures equate to ISIC non-metallic minerals	* Glass and non-metallic mineral products
Mining and quarrying	13, 14 (Mining excl fuels)	Unclear whether statsoline figures exclude fuels (as it should) or not	** Mining and quarrying
Food and tobacco	15, 16	Statsoline figures are missing value of tobacco sector	* Food and beverages
Paper, pulp and print	21, 22		* Paper and paper products
Wood and wood products	20		* Products of wood
Textile and leather	17, 18, 19		* Textiles, and Leather and leather products

* Figures from Statsoline tables: Sales of manufactured products; actual values by year, month and manufacturing divisions and major groups.

** Figures from Statsoline tables: Quarterly value added by industry and GDP at current prices by year, quarter and industry.

³ These coefficients were taken from tables 2.2 and 2.3 of the IPCC's 2006 Guidelines for National GHG Inventories.

⁴ The calculations for electricity are different from the other fuels. The energy balance table shows electricity as an input expressed in TJ. We converted this to MWh at 277.78 MWh/TJ and then derived electricity's GHG emissions by using Eskom's estimate of 1.03 tonnes of CO₂ per MWh. (See Eskom Annual Report 2009. Table 3, p. 227. Estimated as average emissions of all power sold.)

For each sector, the RSA statistics assume an equivalence under International Standard Industrial Classification (ISIC), as shown in the second column. The source of the industry total values are the tables described on pages 8-11, which give totals for the sector described in the column "source." The notes column explains where there may be discrepancies between the sector described in the first and the last columns. The ISIC detailed descriptions were used to help ensure as close a match as possible.

Tables 1 and 2 on pages 8-10, show the rest of the calculations. The value of exports for each 6-digit product type was divided into total sector sales to get the share of total sector value. It was assumed that this share was proportional to the share of total sector emissions. This assumption allowed us to estimate the total GHG emissions from the exports of each 6-digit level product type. We multiplied each total emission estimate by US\$20 to get a carbon charge, or total payment.

What are the Results of the Analysis?

For the EU, 71 product categories are covered, or some €5.4 billion in trade. If we assume that the price changes won't affect demand, which, in fact, they will of course, total amount payable annually by all 71 is about €380 million. This is the equivalent of an *ad valorem* tax of over 10 per cent in the iron and steel sector and the non-ferrous metals sector. Top payment comes from the iron and steel producers at €104 million, followed by gold (€89 million), platinum (€80 million) and coal (€68 million).

For the U.S., 13 product categories are covered, or some US\$2.4 billion in trade. Categories are broader in the U.S. classification. Again, assuming no price changes, the total amount payable annually by all 13 is US\$210 million. This is equivalent to an *ad valorem* tax reaching over 10 per cent for non-ferrous metals, and 9.7 per cent for the iron and steel sector. The highest payment of US\$159 million is made by the non-ferrous metals sector (primarily gold and platinum), followed by electrometallurgical ferroalloys (iron-rich alloys of steel) at US\$28 million, and basic iron and steel at US\$10 million.

Further analysis shows that, in several sectors, the goods covered represent a significant portion of total exports (see Table 3 on page 11). In non-ferrous metals it reaches 27 per cent, and in iron and steel it is 21 per cent. Other significant sectors include paper, pulp and print, and chemical and petrochemical sectors (both 12 per cent), and textile and leather (11 per cent).⁵

What Caveats and Assumptions are Worth Noting?

First and foremost, the analysis is based on the assumption that U.S. and EU will implement BCA measures. As noted above, any U.S. climate legislation will be impossible to pass without BCA, but it is not clear whether and when the U.S. will actually pass such legislation. The EU has decided for the moment not to implement BCA, but is keeping the door open.

From a methodological perspective, the key weakness in the analysis is the sectoral averaging. That is, a sectoral average GHG intensity may be much higher or lower than that of an individual product type. But data for emissions are unavailable at the 6-digit level. This aspect of the methodology could be improved with more in-depth analysis, but the work involved would be significant.

⁵ Data for total exports are from Comtrade's 2009 database.

The other weaknesses are related to the conversion from activity-based classification to product-based classifications. There is not an exact fit between the two, though every effort was made to find the best matches. This is an issue in two places. The first is in the designation of the covered products (expressed as activities) and the matching of these to their traded values (expressed as values of product export streams). The second is in the calculation of the full value of the sectoral production. The sectoral categories used are picked to correspond to the energy balance sheets, which are expressed as activities. But they must be correlated to product-based value streams, and there are inevitably mismatches. Undoubtedly, for example, non-ferrous metal products (the products) do not correspond exactly to the activity-based designation non-ferrous metals.

The assumption of a US\$20/tonne charge is obviously important. If prices go higher, so will values of BCA charges for South African exports.

The assumption that the EU would not cover products from its paragraph 16(b) list is important, but probably not significant. Those products have low carbon intensities by definition, and any GHG-based charges would probably not amount to much. Moreover, it is unrealistic to imagine that the EU would choose to apply a BCA regime to all but a smaller list of key products, to avoid the administrative and methodological costs inherent in a broader list.

The analysis is a static analysis; that is, it assumes that the charges imposed on South African exports and other covered products will not affect the quantity demanded. Moreover, it does not allow for demand and supply of other related goods to change in response to changes in price of covered goods. To get a full picture of the impacts of these charges, including the incidence of any charges as split between consumers and producers, a general equilibrium analysis would be required.

What Might South Africa Do to Avoid Being Targeted?

The results of the analysis suggest that the potential costs faced by South African exporters could be significant for a small number of important producers. It is important to ask what sorts of measures the government of South Africa might take to shield them from these charges.

Clearly, it is important to know whether BCAs would be consistent with World Trade Organization (WTO) law. Several potential target states have vowed to take BCA to WTO dispute settlement if it is ever put into practice. It is not possible to say with any certainty *ex ante* how a BCA regime would fare in a WTO dispute; it would depend fundamentally on the characteristics of the regime itself. A regime such as ACESA might face difficulties, but legal opinion seems to be divided on whether BCA in general would be saved by the General Agreement on Tariffs and Trade's (GATT) General Exception for preserving human, plant or animal life or health (Article XX[g]). At the end of the day, the most prudent course would be to be ready to pursue redress from the WTO, but to assume that this may not work. Even if it did work, a WTO dispute would take years to get any final result, and that would mean years of penalties for South African exporters.

If we assume that the WTO dispute settlement regime is not the silver bullet, and assume the ACESA as the hypothetical BCA, we can see one area of promise. If South Africa signs a suite of sectoral emissions reduction agreements with the U.S. outlining the actions it is taking to address emissions intensity in those sectors, it could be exempt. It is realistic to posit a similar mechanism for demonstrating good effort in any regime constructed by the EU as well, at least in part based on the precedent of similar provisions for coverage of foreign airlines under the third phase ETS.

We cannot say with certainty what actions would be considered acceptable in any such negotiated agreement, but it is safe to say that a cap-and-trade scheme, a carbon tax or sectoral caps would all probably fulfil the requirements. Similarly, any scheme that could lower the GHG intensity of production, particularly through costs imposed on industry, would be very likely acceptable. A green purchase obligation that linked exporters to the production of green power could certainly fit this bill if designed in such a way as to demonstrate a direct connection between the obligations charges and the production of greener energy.

Any such effort, if it were able to show that South African exporters were responsible for lowering GHG emissions of energy inputs, would undoubtedly get positive recognition from a principled international regime of BCA. Conversely, if it did not, this would certainly strengthen the case for finding such a regime in breach of the WTO obligations to avoid disguised restrictions on international trade.

Conclusion

Our analysis suggests that, based on current proposals in the EU and the U.S., South Africa is likely to be exposed to BCA charges should such regimes ever be implemented. Applying these proposals to 2009 exports suggests charges in the range of €380 million for exports to the EU and US\$210 million for exports to the U.S. The iron and steel sector and the non-ferrous metals sector are particularly exposed, with the goods covered representing a significant portion of total exports in those sectors. General equilibrium analysis would deliver a more accurate picture of final charges, but the present estimates are useful as indicators of magnitude.

While South Africa could seek to protect its exports by appeal to the WTO, such a process would take considerable time to complete and the outcome of any dispute settlement process remains uncertain. Another possible course of action would be recourse to provisions in the BCA regimes to demonstrate adequate domestic efforts, gaining exemption from coverage. There were provisions for this sort of recourse in the ACESA, and it is likely that there would be similar provisions in any EU regime.

In the absence of multilateral agreements on appropriate distribution of burdens in combating climate change, unilateral measures such as BCA are much more likely to materialize. This analysis seeks to give the discussions an empirical grounding with rough estimates of where the burdens might fall and how significant they might be.

TABLE 1: EU BCA CHARGES

EU products list, excluding paragraph 16(b) and value less than €500,000									
HS 2007	Product	Value (€ 2009)	Sector	Total sector sales 2009 (EUR)	Total sector emissions 2009 (tCO2e)	Share of sector value	Share of sector emissions (tCO2e)	Total tariff at US \$20/tonne	Ad valorem tax equiv.
4408	Sheets for veneering , not exceeding 6 mm	3,655,750	Wood and wood products	1,344,884,749	305,799	0.27%	831	12,863	0.4%
4412	Plywood, veneered panels & similar	1,418,192	Wood and wood products	1,344,884,749	305,799	0.11%	322	4,990	0.4%
7007	Safety glass, or laminated glass	32,701,441	Textile and leather	822,723,317	534,523	3.97%	21,246	328,779	1.0%
5105	Wool & fine or coarse animal hair, carded or combed	29,030,043	Textile and leather	822,723,317	534,523	3.53%	18,861	291,867	1.0%
62	Apparel & clothing accessories - knitted/crocheted	6,533,221	Textile and leather	822,723,317	534,523	0.79%	4,245	65,685	1.0%
61	Apparel & clothing accessories (except 6110, 6115)	3,309,506	Textile and leather	822,723,317	534,523	0.40%	2,150	33,274	1.0%
5101.30	Carbonized wool (not carded or combed)	2,630,015	Textile and leather	822,723,317	534,523	0.32%	1,709	26,442	1.0%
7005	Float glass & surface ground/polished glass, sheets	2,024,799	Textile and leather	822,723,317	534,523	0.25%	1,316	20,357	1.0%
5108	Yarn of fine animal hair, not retail	1,862,363	Textile and leather	822,723,317	534,523	0.23%	1,210	18,724	1.0%
5101.21	Shorn wool (degreased; not carbonized; not carded)	1,030,489	Textile and leather	822,723,317	534,523	0.13%	670	10,361	1.0%
7010	Containers of glass	927,389	Textile and leather	822,723,317	534,523	0.11%	603	9,324	1.0%
5103.10	Noils of wool or of fine animal hair	751,042	Textile and leather	822,723,317	534,523	0.09%	488	7,551	1.0%
4804	Uncoated kraft paper and paperboard, rolls/sheets	84,290,070	Paper, pulp and print	3,896,778,637	1,947,126	2.16%	42,118	651,763	0.8%
4802	Uncoated paper and paperboard, for writing, printing	31,961,402	Paper, pulp and print	3,896,778,637	1,947,126	0.82%	15,970	247,138	0.8%
4810	Paper and paperboard, clay coated	3,505,157	Paper, pulp and print	3,896,778,637	1,947,126	0.09%	1,751	27,103	0.8%
4805	Other uncoated paper and paperboard	1,326,009	Paper, pulp and print	3,896,778,637	1,947,126	0.03%	663	10,253	0.8%
2522	Quicklime, slaked lime and hydraulic lime	654,624	Non-metallic minerals	3,082,456,618	5,665,587	0.02%	1,203	18,619	2.8%
7108	Gold, unwrought or semi-manufactured	824,174,158	Non-ferrous metals	2,723,142,938	19,199,807	30.27%	5,810,927	89,922,933	10.9%
7110	Platinum, unwrought or semi-manufactured	734,345,075	Non-ferrous metals	2,723,142,938	19,199,807	26.97%	5,177,578	80,121,977	10.9%
7403	Refined copper and copper alloys, unwrought	57,480,863	Non-ferrous metals	2,723,142,938	19,199,807	2.11%	405,275	6,271,548	10.9%
7402	Unrefined copper; copper anodes	39,490,707	Non-ferrous metals	2,723,142,938	19,199,807	1.45%	278,433	4,308,701	10.9%
7606	Aluminum plates, sheets and strip, > 0.2 mm	38,289,819	Non-ferrous metals	2,723,142,938	19,199,807	1.41%	269,966	4,177,676	10.9%
7601	Unwrought Aluminum	30,455,278	Non-ferrous metals	2,723,142,938	19,199,807	1.12%	214,728	3,322,875	10.9%
7603	Aluminum powders and flakes	30,455,278	Non-ferrous metals	2,723,142,938	19,199,807	1.12%	214,728	3,322,875	10.9%
7608	Aluminum tubes and pipes	27,001,140	Non-ferrous metals	2,723,142,938	19,199,807	0.99%	190,374	2,946,006	10.9%
8111	Manganese and articles thereof, including waste	10,305,054	Non-ferrous metals	2,723,142,938	19,199,807	0.38%	72,657	1,124,351	10.9%
7502	Unwrought nickel	7,087,610	Non-ferrous metals	2,723,142,938	19,199,807	0.26%	49,972	773,306	10.9%
8105.20	Cobalt mattes, other intermediate/unwrought	6,926,348	Non-ferrous metals	2,723,142,938	19,199,807	0.25%	48,835	755,711	10.9%
7607	Aluminum foil exceeding 0.2 mm	5,171,403	Non-ferrous metals	2,723,142,938	19,199,807	0.19%	36,462	564,235	10.9%
7604	Aluminum bars, rods and profiles	1,898,837	Non-ferrous metals	2,723,142,938	19,199,807	0.07%	13,388	207,176	10.9%
7401	Copper mattes; cement copper (precipitated)	1,238,924	Non-ferrous metals	2,723,142,938	19,199,807	0.05%	8,735	135,175	10.9%
8113	Cermets and articles thereof, including waste	1,176,697	Non-ferrous metals	2,723,142,938	19,199,807	0.04%	8,296	128,386	10.9%
7407	Copper bars, rods and profiles	846,652	Non-ferrous metals	2,723,142,938	19,199,807	0.03%	5,969	92,375	10.9%
7411	Copper tubes and pipes	823,154	Non-ferrous metals	2,723,142,938	19,199,807	0.03%	5,804	89,812	10.9%
7609	Aluminum tube or pipe fittings	724,899	Non-ferrous metals	2,723,142,938	19,199,807	0.03%	5,111	79,091	10.9%
7409	Copper plates, sheets and strip, > 0.15 mm	665,476	Non-ferrous metals	2,723,142,938	19,199,807	0.02%	4,692	72,608	10.9%
8108.90	Titanium - Other	516,413	Non-ferrous metals	2,723,142,938	19,199,807	0.02%	3,641	56,344	10.9%
2701	Coal; solid coal fuels	1,998,449,388	Mining and quarrying	18,143,352,544	40,057,905	11.01%	4,412,288	68,279,274	3.4%
2530	Mineral substances NESOI	24,393,063	Mining and quarrying	18,143,352,544	40,057,905	0.13%	53,856	833,416	3.4%
2529.22	Fluorspar - > 97 % calcium fluoride	19,475,045	Mining and quarrying	18,143,352,544	40,057,905	0.11%	42,998	665,387	3.4%
2510	Natural and aluminum calcium phosphates	1,789,488	Mining and quarrying	18,143,352,544	40,057,905	0.01%	3,951	61,140	3.4%
3101	Animal or vegetable fertilizers	634,316	Mining and quarrying	18,143,352,544	40,057,905	0.00%	1,400	21,672	3.4%
72	Iron and steel (except 7204, 7217)	997,960,121	Iron and steel	6,625,714,547	44,723,366	15.06%	6,736,200	104,241,342	10.4%
7304	Tubes, pipes of iron or steel (seamless)	6,859,469	Iron and steel	6,625,714,547	44,723,366	0.10%	46,301	716,502	10.4%
7306	Other tubes, pipes of iron or steel	2,693,632	Iron and steel	6,625,714,547	44,723,366	0.04%	18,182	281,362	10.4%

TABLE 1: EU BCA CHARGES (CONTINUED)

EU products list, excluding paragraph 16(b) and value less than €500,000									
HS 2007	Product	Value (€ 2009)	Sector	Total sector sales 2009 (EUR)	Total sector emissions 2009 (tCO2e)	Share of sector value	Share of sector emissions (tCO2e)	Total tariff at US \$20/tonne	Ad valorem tax equiv.
7307	Tube or pipe fittings of iron or steel	837,202	Iron and steel	6,625,714,547	44,723,366	0.01%	5,651	87,449	10.4%
7305	Other tubes and pipes of iron or steel	590,874	Iron and steel	6,625,714,547	44,723,366	0.01%	3,988	61,719	10.4%
210210	Dry bakers' yeast	1,733,646	Food and tobacco	20,566,477,721	845,586	0.01%	71	1,103	0.1%
1701	Cane/beet sugar and chemically pure sucrose, solid	1,082,974	Food and tobacco	20,566,477,721	845,586	0.01%	45	689	0.1%
2207	Ethyl alcohol, various	831,068	Food and tobacco	20,566,477,721	845,586	0.00%	34	529	0.1%
2207.10	Undenatured ethyl alcohol > 80% alcohol	749,446	Food and tobacco	20,566,477,721	845,586	0.00%	31	477	0.1%
2901	Organic chemicals (excl. 2931, 2936-41)	193,620,716	Chemical and petrochemical	23,045,140,843	17,987,497	0.84%	151,127	2,338,666	1.2%
28	Inorganic chemicals; compounds of precious metals	104,526,995	Chemical and petrochemical	23,045,140,843	17,987,497	0.45%	81,587	1,262,539	1.2%
3902	Polymers of propylene/other olefins (primary)	18,466,864	Chemical and petrochemical	23,045,140,843	17,987,497	0.08%	14,414	223,054	1.2%
4402	Vegetable pitch; brewers' pitch and similar	14,770,218	Chemical and petrochemical	23,045,140,843	17,987,497	0.06%	11,529	178,403	1.2%
2710.19	Medium oils and preparations, petroleum/bituminous	13,453,455	Chemical and petrochemical	23,045,140,843	17,987,497	0.06%	10,501	162,499	1.2%
2710.11	Light oils and preparations	13,005,599	Chemical and petrochemical	23,045,140,843	17,987,497	0.06%	10,151	157,089	1.2%
4002	Synthetic rubber and factice derived from oils	8,779,488	Chemical and petrochemical	23,045,140,843	17,987,497	0.04%	6,853	106,044	1.2%
3823	Industrial fatty acids; acid oils; industrial fatty alcohols	8,291,038	Chemical and petrochemical	23,045,140,843	17,987,497	0.04%	6,471	100,144	1.2%
3907	Polyacetals, other polyethers and epoxide resins, etc.	6,304,481	Chemical and petrochemical	23,045,140,843	17,987,497	0.03%	4,921	76,149	1.2%
2708	Pitch and pitch coke, from coal tar/other mineral tars	4,714,573	Chemical and petrochemical	23,045,140,843	17,987,497	0.02%	3,680	56,945	1.2%
3201	Tanning extracts of vegetable origin; tannins; ethers, etc.	3,992,715	Chemical and petrochemical	23,045,140,843	17,987,497	0.02%	3,116	48,226	1.2%
3202	Synthetic organic tanning substances; etc.	3,074,670	Chemical and petrochemical	23,045,140,843	17,987,497	0.01%	2,400	37,138	1.2%
3102	Mineral or chemical fertilizers, nitrogenous	2,570,616	Chemical and petrochemical	23,045,140,843	17,987,497	0.01%	2,006	31,049	1.2%
3903	Polymers of styrene, in primary forms	1,377,850	Chemical and petrochemical	23,045,140,843	17,987,497	0.01%	1,075	16,642	1.2%
3901	Polymers of ethylene, in primary forms	1,120,091	Chemical and petrochemical	23,045,140,843	17,987,497	0.00%	874	13,529	1.2%
3206	Other colouring matter, preparations; luminophores	1,021,002	Chemical and petrochemical	23,045,140,843	17,987,497	0.00%	797	12,332	1.2%
3105	Mineral or chemical fertilizers	694,257	Chemical and petrochemical	23,045,140,843	17,987,497	0.00%	542	8,386	1.2%
3802	Activated carbon; activated natural mineral products; etc.	656,192	Chemical and petrochemical	23,045,140,843	17,987,497	0.00%	512	7,926	1.2%
3909	Amino-resins, phenolic resins/polyurethanes (primary)	627,876	Chemical and petrochemical	23,045,140,843	17,987,497	0.00%	490	7,584	1.2%
3204	Synthetic colouring matter, preparations; luminophores	514,108	Chemical and petrochemical	23,045,140,843	17,987,497	0.00%	401	6,210	1.2%
	TOTAL	5,486,347,833						380,360,871	

Source: Trade data for South African exports to the UN database

TABLE 2: U.S. BCA CHARGES

NAICS	Product	Import value (USD 2009)	Sector	Total sector sales 2009 (US\$)	Total sector emissions 2009 (tCO ₂ e)	Share of sector value	Share of sector emissions (tCO ₂ e)	Total tariff at US \$20/tonne	Ad valorem tax equiv.
325110	Petrochemicals	119,485,000	Chemical and petrochemical	31,957,603,485	17,987,497	0.37%	67,253	1,345,055	1.1%
325199	All other basic organic chemicals	109,956,000	Chemical and petrochemical	31,957,603,485	17,987,497	0.34%	61,889	1,237,786	1.1%
325188	All other basic inorganic chemicals	103,790,000	Chemical and petrochemical	31,957,603,485	17,987,497	0.32%	58,419	1,168,374	1.1%
325131	Inorganic dyes and pigments	22,209,000	Chemical and petrochemical	31,957,603,485	17,987,497	0.07%	12,500	250,009	1.1%
325212	Synthetic rubbers	11,202,000	Chemical and petrochemical	31,957,603,485	17,987,497	0.04%	6,305	126,102	1.1%
325192	Cyclic crude and intermediates	7,153,000	Chemical and petrochemical	31,957,603,485	17,987,497	0.02%	4,026	80,522	1.1%
331112	Electrometallurgical ferroalloy product	287,838,000	Iron and steel	9,188,139,041	44,723,366	3.13%	1,401,055	28,021,091	9.7%
331111	Iron and steel	103,871,000	Iron and steel	9,188,139,041	44,723,366	1.13%	505,593	10,111,864	9.7%
331511	Iron foundries	4,519,000	Iron and steel	9,188,139,041	44,723,366	0.05%	21,996	439,926	9.7%
212210	Iron ores	2,977,000	Iron and steel	9,188,139,041	44,723,366	0.03%	14,491	289,812	9.7%
331419	Primary smelting/refining of non-ferrous metals (except copper and aluminum)	1,561,375,000	Non-ferrous metals	3,776,289,451	19,199,807	41.35%	7,938,507	158,770,132	10.2%
331312	Primary aluminum	76,022,000	Non-ferrous metals	3,776,289,451	19,199,807	2.01%	386,519	7,730,381	10.2%
322110	Pulp mill products	19,983,000	Paper, pulp and print	5,403,816,249	1,947,126	0.37%	7,200	144,007	0.7%
313111	Yarns	1,256,000	Textile and leather	1,140,902,793	534,523	0.11%	588	11,769	0.9%
TOTAL		2,431,636,000						209,726,829	

Sources: Data on this site have been compiled from tariff and trade data from the U.S. Department of Commerce and the U.S. International Trade Commission. Explanation: These sectors are those from the RSA's exports to the U.S. that can be found on the U.S. Inter-Agency report's list of "presumptively eligible."

TABLE 3: VALUE OF TOTAL EXPORTS IN VULNERABLE SECTORS

		Vulnerable exports (€1,000)	Total exports (€1,000)	Percentage	HS codes assumed
Chemical and petrochemical	EU	401,583			
Chemical and petrochemical	U.S.	289,220			
Chemical and petrochemical	total	690,803	5,835,724	11.8%	28-39, 2709-2715
Food and tobacco	EU	4,397			
Food and tobacco	U.S.	-			
Food and tobacco	total	4,397	4,977,835	0.1%	7-12, 16-24
Iron and steel	EU	1,008,941			
Iron and steel	U.S.	308,881			
Iron and steel	total	1,317,822	6,182,088	21.3%	72, 72
Non-ferrous metals	EU	1,819,074			
Non-ferrous metals	U.S.	1,208,098			
Non-ferrous metals	total	3,027,172	11,075,040	27.3%	71, 74-83
Non-metallic minerals	EU	655			
Non-metallic minerals	U.S.	-			
Non-metallic minerals	total	655	10,240,561	0.0%	25-27 (excl 2709 – 2716)
Paper, pulp and print	EU	121,083			
Paper, pulp and print	U.S.	15,462			
Paper, pulp and print	total	136,544	1,133,546	12.0%	47-48
Textile and leather	EU	80,800			
Textile and leather	U.S.	972			
Textile and leather	total	81,772	731,995	11.2%	41-43, 50 – 63
Wood and wood products	EU	5,074			
Wood and wood products	U.S.				
Wood and wood products	total	5,074	309,163	1.6%	44-46

Source: Trade data from UN Comtrade tables, 2009

IISD's TRI-CC Program

This work is an output of IISD's Trade, Investment and Climate Change Program (TRI-CC). Related research will aim to deepen understanding of energy intensive industries, so as to better understand the effect of policies on these sectors. In particular, it forms part of an assessment of trade impacts of BCAs in developing countries, and will be followed by a complementary analysis of how BCAs affect exports from South Africa. Related research will aim to deepen understanding of energy intensive industries, so as to better understand the effect of policies on these sectors. Together, these analyses will inform research on the practical aspects of developing and implementing a BCA system.

Other similar areas of work in the TRI-CC Program include developing guidance for policy makers in elaborating and implementing BCAs, deepening understanding of climate policy for the steel and cement sectors, and work on emerging issues such as GHG-intensity standards and subsidies for green industrial development. Under TRI-CC's Investment and Climate Change theme, IISD will work with host country governments to develop policies that help catalyse flows of climate friendly investment.

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