



Environmental Health Strategies Inc. (EHS) provides scientific, technical and economic advice to government and private sector clients to assist decision-making in the area of protection of human health and the environment.

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GHG emissions – all steel mills are not made equal

In the May 2008 newsletter I observed that Canadian federal and provincial governments established challenging targets to reduce GHG emissions and while it is far from clear how these goals will be met with currently available and emerging technologies, I think that Canada is in as good position as any nation to achieve these goals given our innate ingenuity and high technical skills.

Meanwhile, our economy needs to compete in global markets as Canadians battle with other countries for manufacturing jobs. Our major Achilles' heel in this area is the high cost of labour, viz. this month's announcements about closure of more auto assembly plants. On the other hand, Canada could be more aggressive in positioning itself vis-à-vis other economies with respect to GHG emissions by taking advantage of its relatively more efficient manufacturing base. I will use the Canadian steel industry to illustrate my point.

Environment Canada published in April 2007 its annual submission to the UN Framework Convention on Climate Change entitled National Inventory Report, 1990-2005, Greenhouse Gas Sources and Sinks in Canada, www.ec.gc.ca/ghg-ges. The table below illustrates that while, Canada's GHG emissions rose by 25% between 1990 and 2006, direct GHG emissions from industrial processes declined slightly over the same time period by 0.4%. More dramatically, the GHG emissions from energy produced for Industrial processes declined by a full 16%.

Table 1. Canada's GHG emissions from four major economic sectors

Table with 4 columns: Sector, 1990 (ktes CO2 eq), 2006 (ktes CO2 eq), and change 1990-2006 (%). Rows include TOTAL Canada, Energy, Energy for ind'l processing, Ind'l processes, Agriculture, and Waste.

The steel sector represents more than 10% of GHG emissions from industrial processes, see Table 2 on page 2, and is therefore sufficiently important to represent an interesting case to illustrate my point.

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Table 2. Canada's GHG emissions from the steel sector

	1990	2006	change 1990-2006
	(ktes CO ₂ eq)		(%)
Steel manufacture	7,060	7,010	-0.7
Steel shipments, ktes	11,563	14,668	27
GHG intensity, tes CO ₂ eq/te steel	0.61	0.48	-22

Table 2 shows that while Canadian steel shipments grew by 27% between 1990 and 2006 (Industry Canada website), GHG emissions from steel industry in Canada declined slightly, by 0.1%. GHG emission intensity, calculated by dividing GHG emissions by number of tonnes of steel produced, is a measure of efficiency of Canadian steel industry. GHG intensity declined by 22%! A recent report entitled Environmental Aspects of Global Trade in Steel: The North American Steel Industry Perspective, submitted to The Steel Committee of the OECD by North American Steel Manufacturers, including The Canadian Steel Producers Association, came to similar conclusion.

It's instructive to compare the GHG intensity of Canadian steel producers with GHG intensity of the largest steel producing economy, China. Conveniently, this analysis was published in February 2008 in a study, Chatham House Sectoral Study on the Iron and Steel Industry by Yiping Zhu. In 2006, China produced 315 million tes of steel, more than 20 times Canada's production in the same year, and emitted 0.70 tes CO₂ eq/te steel, an emission intensity that is 46% more than Canada.

But that is just the tip of the iceberg of this analysis. There is an important added wrinkle that deals with GHG emissions from electricity that is needed for steel production. In 2006, Canadian steel producers consumed electricity that resulted in an additional 0.44 tes CO₂ eq of GHG emissions/te of steel. 75% of Canada's electric energy is produced from hydro and nuclear that do not contribute to GHG emissions; 25% of electrical energy is produced from coal, petroleum and natural gas. By contrast, only 7% of China's electricity is produced from hydro and nuclear energy (Promotion Of Renewable Energy, Energy Efficiency And Greenhouse Gas Abatement, People's Republic of China, Overview of Renewable Energy, Energy Efficiency and Technologies for Reducing GHG Emissions, A Country Report, March 2006) and 93% is produced from coal, petroleum products and natural gas. This suggests a GHG emission intensity for Chinese electric industry of 3.7 times that of Canada. Assuming that Chinese steel mills consume roughly the same amount of electric energy as efficient Canadian steel mills, we can estimate that Chinese steel industry contributes at least 1.63 tes CO₂ eq/te steel from consumption of electricity compared to 0.44 for Canada.

The total additional amount of GHG emitted by Chinese steel industry compared to Canadian industry is about 2.33 ktes CO₂ eq/te of steel compared to 0.92 for Canada; an additional 1.4 tes of CO₂ eq /te of steel! For every tonne of steel imported by Canada either as raw steel or in a product made from steel we cause an extra 1.4 tes CO₂ eq of GHG emissions. Yes steel from China is cheaper but there is a bunch more GHG emitted and we do not appear to be taking that information into our economic decision. The question is what to do with this information?

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