Prospects for a Low Carbon Society: The Case of Canada

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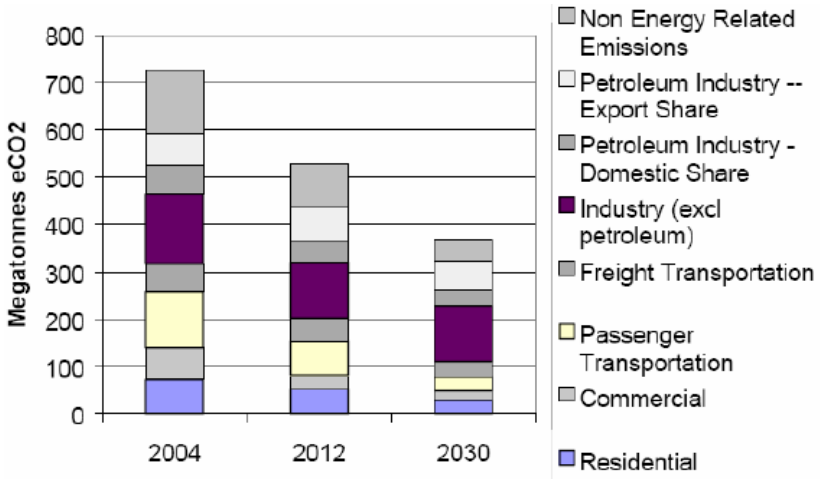
Low Emission Scenarios for Canada

The first low emission scenario for Canada was developed for the David Suzuki Foundation and focused on what it would take to cut Canada's greenhouse gas emissions by 50% by 2030, [1] as illustrated in Figure 1. Utilizing a standard, bottom-up, end use focused methodology; the analysis systematically evaluated the technological potential for reducing emissions in Canada with existing and economically feasible technologies. By far the most important conclusion from the study was that the key to achieving deep and sustainable reductions in greenhouse gas emissions is on the demand side of the energy economy, and it also introduced to the policy debate in Canada the idea the low emission future could bring with it significant economic benefits.

Figure 1. A Low Emission Scenario for Canada

(R. Torrie, et. a., "Kyoto and Beyond: The Low Emission Path to Innovation and Efficiency", 2002)



The National Round Table on the Environment and the Economy subsequently sponsored a more detailed "bottom-up" analysis of the technological potential for a deep emission reduction in Canada, this time for a 60% reduction from current levels by 2050.[2] The results were published in the form of a modified Socolow wedge, as shown in Figure 2. Based on this work, the National Round Table developed an advisory note for the government that began to set out the road map to a low emission future for Canada.[3] The key findings of the NRTEE Advisory began to shape the emerging policy for a low carbon society for Canada:

- A low emission future for Canada is possible with domestic solutions, but can be achieved only if energy is used more efficiently and if energy is emitted while

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[1] Ralph Torrie et. al., "Kyoto and Beyond: The Low Emission Path to Innovation and Efficiency", David Suzuki Foundation, Vancouver, October 2002. Available on line at www.torriesmith.com.

[2] Ralph Torrie et. al., "Energy-Related Greenhouse Gas Emissions in Canada in 2050: A Low Emission Scenario", ICF International for NRTEE, Ottawa, 2006.

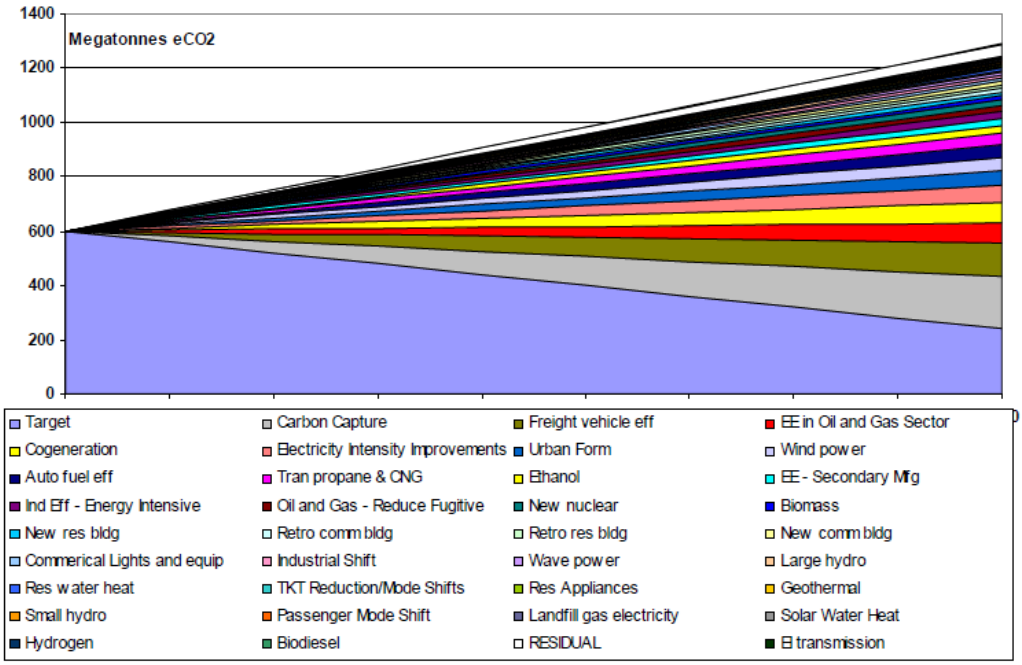
[3] National Round Table on Environment and the Economy, "Advice on a Long Term Strategy on Energy and Climate Change", Ottawa, June 2006.

emitting less carbon. Improvement in energy efficiency is key to the low emission future.

- Canada's growing oil and gas production sector could be compatible with a low emission future, but only if carbon capture and sequestration can be perfected.
- Increased deployment of cogeneration and renewable electricity will be needed to transform the power sector to a low emission regime, along with clean coal technology incorporating CCS.
- There is an urgent need for a long term policy signal to give the private sector the confidence it needs to bring GHG considerations into investment decisions.
- Air pollution and other co-benefits of GHG emission reduction measures are important to both the implementation and the acceptance of the low emission future.

Figure 2. GHG Reduction Wedges for Canada

(From Ralph Torrie et. al., "Energy Related Greenhouse Gas Emissions in Canada in 2050 – A Low Emission Scenario", prepared for the National Round Table on Environment and the Economy, Ottawa, 2006)



Work is continuing on refining our understanding of what a low emission future would like for Canada, and the policies and programs that would get us there. Recent work has coupled macroeconomic models with multi-sector energy and emissions models in order to evaluate the economic impacts of greenhouse gas reduction policies. While the policies typically subjected to such analysis fall short of those that would be required to achieve deep emission reductions, they do indicate that the net economic impacts of the portfolio of GHG reduction policies currently in vogue in North America (e.g. carbon cap-and-trade; efficiency standards for buildings, cars and appliances; renewable portfolio standards, etc) will have modest and possible net positive impacts on employment, net output and per capita disposable income, even without, even without valuing the environmental damage avoided by the lower emissions.

Conclusions and Strategic Directions

The roadmap to a low carbon society has begun to take shape in Canada, first in the form of an understanding of the changes in the way we use and produce energy that will have to take place, and more recently in the form of a debate over the policy responses to get there.

With regard to the technological shape of the low emission future, there are a number of key elements that must be achieved:

- ✓ New residential and commercial buildings constructed with best available energy design and technology
- ✓ Retrofit all existing buildings (except where technically not feasible) for 30-50% improvements in energy efficiency
- ✓ Double and redouble the fuel efficiency of passenger vehicles.
- ✓ Double or triple the fuel efficiency of trucks.
- ✓ Efficiency standards for office equipment, home appliances, motors, lighting to ensure rapid deployment of the new technologies
- ✓ Cogeneration of heat and power as standard practice going forward
- ✓ Continued rapid deployment of wind and other renewable electricity options
- ✓ Continued development of environmentally sustainable biofuels, commercialization of lignocellulosic ethanol technology
- ✓ Emission caps on energy-intensive industry to encourage innovation for more efficient production technologies
- ✓ More efficient utilization of industrial process heat
- ✓ Eliminate landfill methane emissions
- ✓ Alternative industrial processes for non-energy industrial GHG emission sources
- ✓ Low emission techniques and technologies for agriculture
- ✓ Reforestation and afforestation programs to alleviate net Canadian emissions on a 50 year time frame.
- ✓ Carbon capture and storage technology successfully deployed, especially in the oil and gas production industry.

There is a large variation in the types of barriers that stand in the way of more rapid and widespread deployment of the technologies and techniques we need to bring about the low carbon society, but in general these barriers are neither technological nor fundamentally economic. More often there weaknesses in the logistical or financial infrastructure needed. For example, a combination of front-end costs and a dearth of skilled and available labour hold back the acceleration of building retrofits, suggesting the need for financing and manpower training and

certification. The development of more fuel efficient trucks is held back by a risk-averse manufacturing sector with limited R, D&D resources, suggesting the need for market development policies. For technologies such as home appliances and office equipment, where the energy costs are a small contributor to the total cost of ownership and operation, well designed performance standards can be the most effective, and the most cost effective, policy approach.

The “geology of low emissions is complex” – for each of the key wedges needed to bring about low emission futures, a unique policy approach is needed that targets the particular barriers to deployment for that option.