YOU CAN'T GET THERE FROM HERE

By Robert Lyman | Energy Economist- Addressing Climate Change Targets | November 1, 2015

You Can't Get There from Here

Most young Canadians today believe that we can reduce global warming by doing things that would not greatly affect our lifestyle or cost of living. Mesmerized by the environmentalist chant that we are "saving the planet", young people simply refuse to believe that the changes entailed in meeting greenhouse gas emissions (GHG) reduction target are difficult.

To illustrate the size of the challenge we face in reducing emissions, let us examine one sector of the economy – transportation.

The following table shows Canadian GHG emissions by economic sector in selected years. The numbers show millions of tonnes of carbon dioxide equivalent ($MtCO_2e$).

Table 1

Canadian GHG Emissions by Economic Sector ($MtCO_2e$)

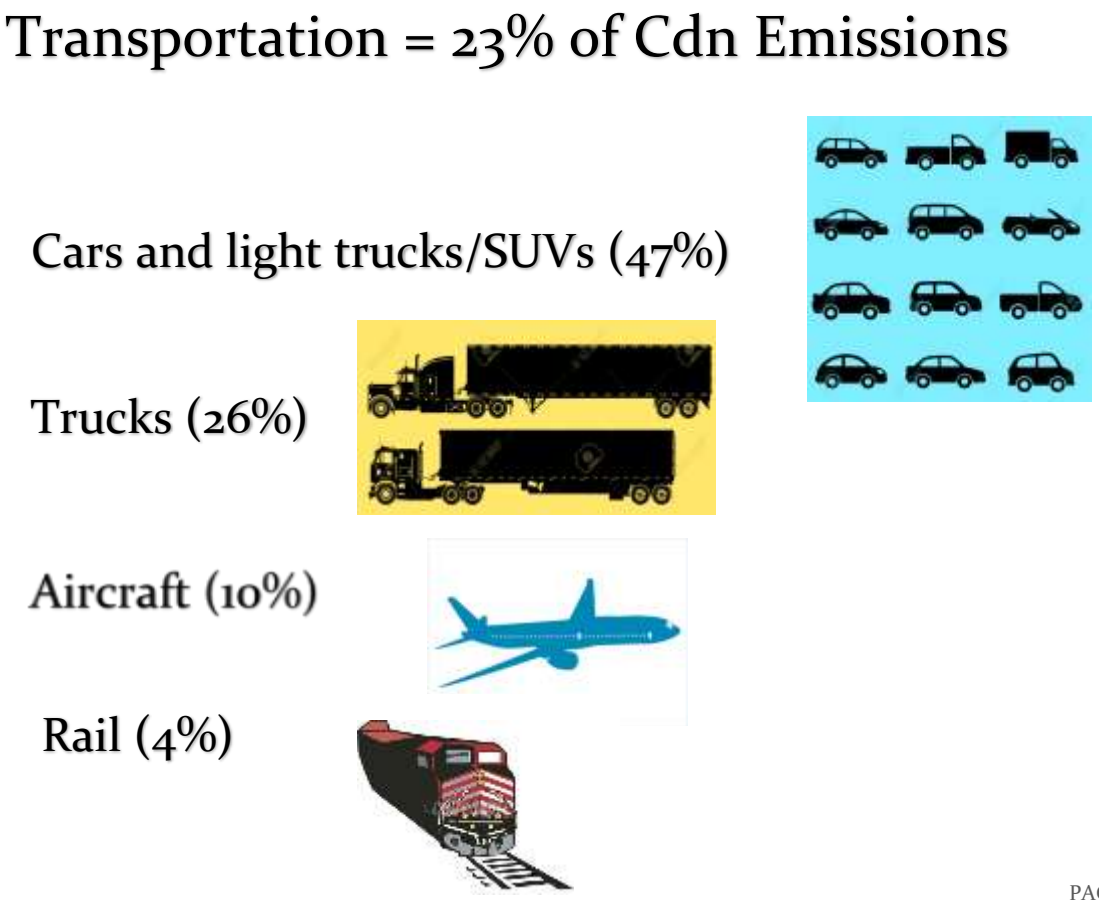
	2005	2010	2013	2020 (projected)
Transportation	168	169	170	167
Oil and Gas	162	160	179	204
Electricity	121	99	85	71
Buildings	84	82	86	98
Emissions Intensive Industries	87	75	76	90
Agriculture	68	70	75	70
Waste and Others	49	53	54	46
Totals	**737**	**707**	**726**	**746**

Source: Environment Canada

Canadian Government Goals on GHG Reductions

The current federal government goal is to reduce GHG emissions from 2005 levels by 17% by 2020. The Conservatives made a general (non-binding) commitment to reduce emissions by 65% below 2010 levels by 2050. At the recent G7 leaders' meeting, the now former Prime Minister Harper signed a statement committing in principle to reduce emissions by somewhere between 40 and 70 per cent below 2010 levels by 2050, conditional on getting an acceptable multilateral emissions reduction agreement. At the forthcoming COP 21 Conference in Paris in December 2015, countries like Canada will be asked to commit to reduce emissions by up to 80 per cent below 2010 levels by 2050 and to eliminate them completely before the end of the century.

As one can see from the previous table, transportation now represents about 23 percent of Canadian emissions. Transportation emissions are roughly divided among passenger cars and light trucks/SUVs (47%), trucks (26%), aircraft (10%), rail (4%) and others.



Can We Do it?

The first question to consider is whether Canada is likely to meet the 2020 target with respect to transportation, and what would be entailed in doing so. There are three main approaches usually considered: reducing emissions intensity (i.e. improving fuel efficiency); shifting from one transportation mode to others; and taxing users to get them to travel or transport less.

Environment Canada's most recent projections of GHG emissions from 2012 to 2020 show transportation emissions rising very slightly to 167 Mt. Emissions from cars, trucks and motorcycles are projected to decline from 85 Mt in 2012 to 78 Mt in 2020, while bus, rail and domestic aviation emissions are projected to rise from 8 Mt to 9 Mt. Emissions from heavy-duty freight trucks and rail are projected to increase from 54 Mt to 59 Mt, while those from recreational and commercial freight transportation are projected to rise from 11 Mt to 12 Mt. Environment Canada's projections can be found online here:

https://www.ec.gc.ca/ges-ghg/default.asp?lang=En&n=E0533893-1&offset=5&toc=show#toc52

Just won't do it.

Reducing Emissions Intensity

The reductions in emissions from passenger vehicles to 2020 are almost entirely due to the effects of regulation. In October 2010, Environment Canada released the *Passenger Automobile and Light Truck Greenhouse Gas Emission Regulations*, which prescribe progressively more stringent annual emission standards for new vehicles in model years 2011 to 2016. In 2014, Environment Canada introduced even more stringent standards for the 2017 to 2025 model years. Under both phases of light-duty regulation, spanning years 2011 to 2025, the fuel efficiency of new cars will increase by 41% compared to model year 2010 and the fuel efficiency of new passenger light trucks will increase by 37%.

The vehicle fuel efficiency standards are expected to reduce vehicle emissions by 11.9 Mt by 2020. In addition, new emissions standards for heavy-duty vehicles (buses and trucks) are expected to reduce Canada's emissions by about 2 Mt by 2020.

Environment Canada's projections take into account the department's estimate of the effect on new cars sales of hybrid electric (HEV) and all-electric (BEV) vehicles, although they do not publish precisely what this is.

Electric Vehicles can Save the Day….or Not.

There have been many glowing estimates published concerning future electric vehicles sales, mostly by the companies that make them. A 2010 report by J.D. Power and Associates, the foremost source of analysis on motor industry vehicle trends, provided a far more pessimistic estimate of likely future global sales of hybrid and all-electric vehicles than those typically published by the vehicle manufacturers and environmental groups. The J.D. Power and Associates study concluded that the combined global sales of HEVs and BEVs might total 5.2 million units in 2020, just 7.3% of the 70.9 million passenger vehicles to be sold worldwide in that year. While this is up from 2010 sales of 954,000 vehicles, or 2.2 % of the 44.7 million vehicles sold through the end of 2010, it is far below the extremely optimistic numbers the Obama Administration in the United States often quotes. Further, of the 5.2 million vehicles J.D. Power projects will be sold in 2020, 3.9 million units are expected to be hybrids powered both by gasoline and electrical energy and only 1.3 million are expected to be all-electric vehicles.

The J.D. Power and Associates report can be found online here:

http://businesscenter.jdpower.com/Corp/Store/DocumentDownload.aspx?PDFFile=10-All-DriveGreen2020-SR-sample.pdf

Where does electricity come from for an electric car?

Modal Shift – More Buses, Trains, Transit?

John Lawson, one of Canada's foremost transportation economists, has studied the potential for reducing GHG emissions from transportation, and specifically the possibility of reducing emissions through modal shift (i.e. encouraging passengers or freight movers to switch from high-emission modes of travel to lower emission modes). The results may be surprising.

- Doubling of intercity train passenger travel (1.43 billion passenger-kilometres) would actually increase emissions slightly, because of the low occupancy rates of trains
- Doubling of intercity bus passenger travel (10.43 billion passenger-kilometres) would reduce emissions, but only by half a megatonne, because traffic is so limited.
- Doubling of urban passenger travel by transit (a very ambitious goal) would divert 16.25 billion passenger-kilometres, but that would only save 2.53 megatonnes.

There are even more limited prospects for massive reductions in freight transportation through inter-modal shifts. Shifting 10% of freight from truck to rail is considered a significant goal, as businesses prefer trucks because of their flexibility; unlike rail, trucks can pick up and deliver freight to many destinations. If a 10% shift could be achieved from large trucks (23.36 billion tonne-kilometres) to rail, this would reduce emissions by 0.42 megatonnes.

John Lawson's analysis can be found here:

http://www.entrans.ca/documents/CTRF2012.pdf

Taxation – Everyone Loves that Idea. Will it work?

The National Round Table on the Environment and the Economy in 2012 published a report on how Canada could achieve the 2050 goal. It estimated that imposing a carbon tax of $300 per tonne on all fossil fuel combustion could do this. With respect to transportation, a $300 per tonne tax translates into a 69 cent per litre tax on gasoline.

Here's the problem with that. The NTREE used, as the basis of its estimate, a fairly high calculation for how much gasoline consumption would decline in response to higher pump prices. Their "elasticity of demand" was about .06. In fact, more recent studies show that demand elasticity is only about one third of that, or .02. That means even a 69 cent carbon tax will not come close to getting people out of their cars and SUVs. To greatly reduce gasoline and diesel fuel consumption, governments would have to place severe restrictions on who could own and operate a vehicle or when vehicles could be used. How popular would that be?

More realistically, perhaps, governments might impose carbon taxes of $100 per tonne, equal to about 24 cents per litre. Using traditional estimates of elasticity of demand, the result would be a reduction in emissions of 12 Mt by 2020; using the lower estimates based on recent research, the reductions would be about 6 Mt.

In summary, the ambitious and costly measures already taken plus those now contemplated to reduce transportation emissions through modal shifts, increased fuel efficiency and taxation would, in total and at best, reduce emissions by less than 30 Mt by 2020. Half of that is already reflected in Environment Canada's projection of 2020 emissions. The net 15 Mt reduction from the projected transportations emissions total of 167 Mt in 2020 would represent a 9% reduction from 2005, far below the 2020 target of a 17% reduction for the whole economy.

Even if No One Was Allowed to Drive…

Looking further into the future, reducing emissions by 70% by 2050 would mean cutting 495 Mt. That is more than the current emissions from transportation, oil and gas, electricity generation, and emissions intensive industry combined. Eliminating cars and trucks altogether seems almost unthinkable given the importance of mobility for commuting, freedom of movement and trade in goods. Yet that extraordinary action would only reduce Canadian emissions from 2010 levels by about 77 Mt.

Remarkably, we are being told by global warming activists that we must attain this target within 35 years.

The answer to that demand should be clear from the numbers.

You can't get there from here.

Robert Lyman is an Ottawa consultant and energy economist of 37 years' experience who contributed this report to Friends of Science Society.

About

Friends of Science Society has spent over a decade reviewing a broad spectrum of literature on climate change and have concluded the sun is the main driver of climate change, not carbon dioxide (CO_2). The core group of the Friends of Science is a growing group of earth, atmospheric and solar scientists, engineers and citizens.

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