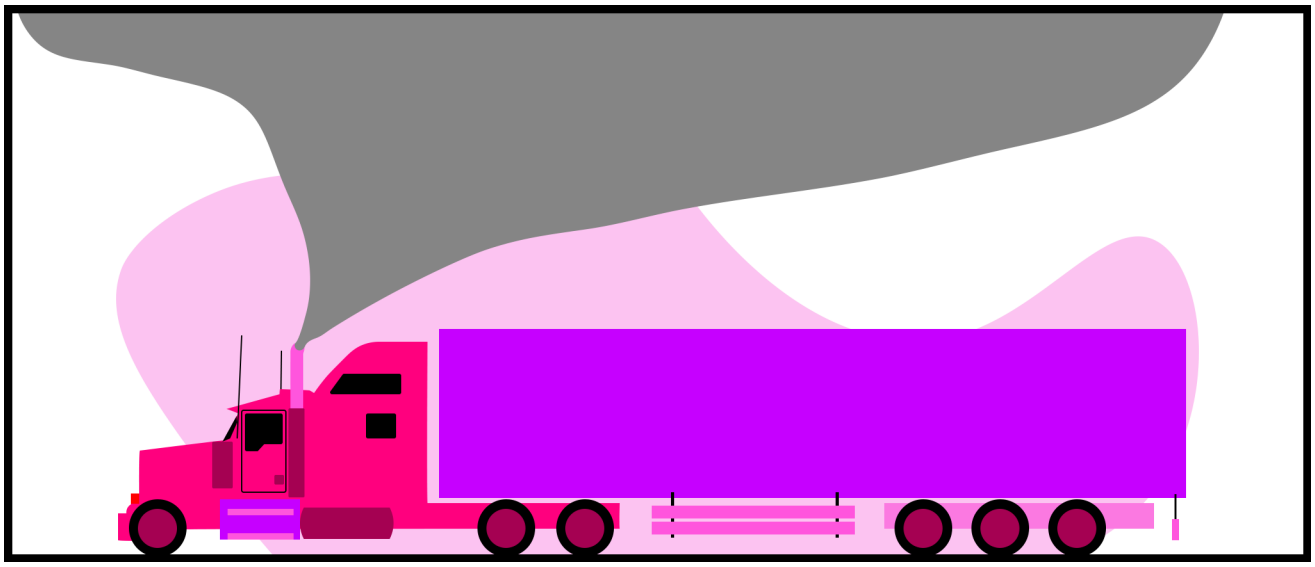

The Past, Present, and Future of Sustainable Trucking in Alberta

By Joshua Fuerbringer

Environmental Impact of Trucking

Compared to other methods of transport, overland trucking is notoriously inefficient. While advances in technology have allowed the modern train to go nearly 200 kilometres on one litre of fuel, efficiency of the internal combustion engine (ICE) in tractor trailers has not dramatically increased since the seventies. A diesel burning ICE gets less than 11 kilometres per litre, and this is only in the very newest of semi-trucks (Palmer, 2014). The environmental impact of using trucking as the main mode of transport for the majority of goods is profound. In 2020, using a weighted average annual daily traffic metric (WAADT) and multiplying by the average emissions for a diesel truck, we calculate that approximately 972,000 tonnes of CO_2 were released by diesel trucks travelling on Highway 2 between Calgary and Edmonton alone (NPRI, 2009).

This calculation only accounts for CO_2, diesel burning engines also create many other emissions; it can be reasoned millions of tonnes of GHGs like carbon monoxide, nitrogen oxide, complex hydrocarbons, and other particulate matter were also released along this route within this same time span (Reşitoğlu et al., 2014). It should be noted that due to the COVID-19 pandemic, road traffic has irregularly decreased and that emissions in a more regular year have been even higher than that in 2020.

Trucks are Ubiquitous

After learning about the gross inefficiency and environmental impact of trucking, one may reasonably ask: Why are trucks still utilized to transport goods? In Canada, the existing logistical infrastructure precludes the use of trucks as the chosen form of transportation for trade.

Compared to the United States, Canada is sparsely populated and has very few navigable rivers. For much of Canadian history, long distance travel had to be undertaken by portage, a time consuming and very risky form of transport that was good for fur trading and not much else. Even when rail became the preeminent form of transport in Canada, transporting goods away from towns with train stations was often done by horse and buggy, often leading to overly expensive goods and long supply chains (Marsh, 2021). The creation and widespread adoption of the ICE changed all of this. Starting in the early 1940s with the creation of Alberta Highway 97, a vitally important road and a component of the Alaska-Canada Highway that connects the continental United States to its far off state of Alaska, the process of building "interstates" in Canada started for the first time. Culminating in the landmark Trans-Canada Highway Act of 1949, it was decided that the entirety of Canada, from sea to sea, would be connected by a network of paved, multi-laned roads to facilitate transport via automobile (Trans-Canada Highway, 2020). The decision to undertake this expansive infrastructure project was obvious, linking major metropolitan areas via road would allow the transport for both goods and people at low costs never before seen. Automobiles are also incredibly versatile; trucks can fit on roads in even the tightest of city centers, and they can operate on long-haul routes taking goods with ease, regardless of the amount of distance. Soon after the implementation of the Trans-Canada Highway Act, transport utilizing ICE surpassed rail as the predominant form of transport in Canada. There are 35 million automobiles registered in Canada with over 90% of all goods transported by truck (Statistics Canada, 2020). Other, more efficient and eco-friendly alternatives exist, but it is simply easier to use trucks in the transport of goods. Canada has built a system that favours the use of tractor trailers as the preferred method of transport and as a result, Canadians have been continuously experiencing the environmental consequences of building this vast road network.

The Importance of Alberta Highway 2

Containing approximately 75% of the province's population, the Calgary-Edmonton Corridor is the cultural, economic, and population center of Alberta (Johnston, 2019). Acting as the logistical spine for this vital region, Alberta Highway 2 (Highway 2) links the different municipalities located in the corridor to one another. The most trafficked portion of this highway lies in between Edmonton and Calgary, however, the highway also composes part of the equally vital CANAMEX Trade Corridor that links Northern Canada and Alaska to Mexico (Thompson, 2005). The importance of this trunk road cannot be overstated. Millions of tonnes of goods flow through this trade route per year, using WAADT, over 1.2 million tractor trailers navigated the Highway 2 Corridor between Calgary and Edmonton in the year 2020 (Alberta Transportation, 2021).

The Future of Transport is Here

The good news is, due to incredible development in logistical technology, the future looks a lot more "green" for the trucking industry. The trucking industry in Canada is already worth approximately $26 billion, and there are a plethora of companies developing fully electric tractor trailers to raise this figure even further. Established brands like Volvo, Daimler, and Byd are joined by new market entrants like Rivian, Tesla, and Workhorse in this electric truck arms race (Vaughn, 2021). The new developments in trucking are not limited to the actual trucks either. eHighway is a new electrification infrastructure system by

Siemens that allows trucks, either fully electric or in an adapted hybrid system format, to be charged or operated completely on electricity while travelling on trunk roads similar to that of Highway 2. Siemens believes that not only will this system allow for more environmentally friendly trucking practices, but that it will also be profitable for the infrastructure owner, the truck operators, and power providers (Scott, 2021). Canada has set goals in its efforts to fight climate change. Canada desires that most, if not all, cars, regardless of size, to be zero emissions by the year 2040 (Transport Canada, 2021). To reach this metric, Canada will have to do more than just put limits on the kind of automobiles that can be sold. Implementation of transport supporting technologies like eHighway will be fundamental in reducing the national climate footprint. It will take capital, time, and even more technological development, but in addition to these aspects, a strong effort by governments and corporations to reduce the environmental impact of trucking will truly disrupt the logistics industry.

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