



# PRIMER ON VEHICLE FUEL EFFICIENCY AND EMISSIONS

## Executive Summary

The *Primer on Automobile Fuel Efficiency and Emissions* is a tool that can empower consumers to:

- 1) Make sense of environmental technologies and designs in the automobile market;
- 2) Participate in dialogue about the best ways governments can encourage sustainable mobility; and,
- 3) Employ eco-driving skills that will help them to save fuel while reducing their environmental footprint.

The primer explains how automobile fuel consumption can be reduced through the application of driving techniques and technologies that minimize weight, reduce drag, produce power more efficiently, and minimize energy losses in vehicle systems.

Experts estimate that using the technologies available today or expected in the near future, the average automobile could consume 30% less fuel with little or no loss in size, acceleration, safety, or comfort. With some degree of trade off against acceleration rates, these reductions could be as steep as 50% or more.<sup>1</sup>

Reductions in fuel usage also reduce greenhouse gases produced by passenger vehicles, which currently account for a sizeable proportion of Canada's total greenhouse emissions.

Looking into the not so distant future, the automotive industry has a significant opportunity to reduce greenhouse gas emissions in passenger vehicles using proven technologies (which are listed in the primer).<sup>2</sup>

Automakers and government regulation will play a crucial role in the coming years to reduce emissions from cars, but individual motorists can play a role as well, not only in the future, but right now.

A prevailing myth among drivers about reducing car emissions is that individuals can't make much of a difference – that we must wait for advanced technology to do the job. This primer shows that this is not true. There are many strategies that the average driver can use to reduce fuel usage. This helps the environment, and it saves money.

Below are some of the many strategies that the primer identifies for motorists to reduce emissions and fuel, including:

- ▶ **Avoid jackrabbit starts and hard braking** – This sort of driving burns up to 39% more fuel. Not only that, but research shows you'll only arrive at your destination 4% faster by driving in this manner.
- ▶ **Make small reductions in your driving speed** – As you increase your speed, more power is needed to push your car through the air. Tests have shown that most cars use about 20% less fuel driving at 90 km/h than at 110 km/h. Also, if possible, be sure to use cruise control on the highway, as it reduces fuel consumption by an additional 15-30%.
- ▶ **Avoid idling** – An idling engine can consume as much fuel as if it were turned off for 10 seconds and then on again. Remember, the worst fuel economy rating is zero, and that's what your fuel economy is while you're idling. So, if you are going to be stopped for more than 60 seconds, and you are not in traffic, you will save fuel and minimize emissions by simply turning your engine off. Note that hybrid-electric cars do this automatically!

<sup>1</sup> According to experts at Argonne National Laboratories in the U.S.

<sup>2</sup> According to a recent report from McKinsey & Company, a global management consulting firm

- ▶ **Consider engine size** – Extra engine cylinders may boost power, but you pay for it. In a mid-sized car, a 6-cylinder engine can burn up to 400 litres more fuel a year than a smaller 4-cylinder engine. If you rarely do any towing, it may be more cost efficient to rent (or borrow) a vehicle with a bigger engine for these occasions.
- ▶ **Consider technologies that boost fuel efficiency** – When purchasing a new vehicle, look for vehicles with technologies that reduce fuel consumption. By incorporating the following technologies into new vehicle designs, automakers can deliver significant fuel savings and emissions reductions:
  - Turbocharged engines (up to 7% fuel savings)
  - Electronically shifted manual transmission (up to 7% fuel savings)
  - Cylinder deactivation (up to 6% fuel savings)
  - Additional transmission gears (up to 3% fuel savings)
  - Aggressive shift logic (up to 2% fuel savings)
- ▶ **Use a block heater in colder weather** – During colder months, car engines and their emissions control systems take longer to warm up. Until a vehicle warms up, it can burn up to 50% more fuel, which is unnecessary if you have a block heater. A block heater provides the added benefit of instant heat when you start your car, which is often the main reason people start their engines and let them idle on cold winter mornings.
- ▶ **Avoid using roof racks when not required** – Roof racks have a major impact on fuel consumption due to the air resistance they add to your vehicle. If you must use a roof rack, always place the smallest items towards the front and the large items towards the back (like a slope), this improves airflow. As an example of how much of an impact roof racks have, if you drove at 80 km/h on one tank of gas, you would go:
  - 540 km with no rack;
  - 515 km with an empty rack;
  - 490 km with a well-packed rack; and,
  - 450 km with a poorly packed rack.
- ▶ **Avoid excessive weight in your vehicle** – Every 45 kilograms (approximately 100lbs) of extra weight in your vehicle can increase your fuel consumption 2%. If you have unneeded cargo in your trunk, remove it.
- ▶ **Minimize use of air conditioning** – Air conditioning consumes additional fuel. Using A/C in city driving conditions can increase fuel consumption by 10-25%. Leaving the windows open – even at highway speeds – consumes less fuel than turning on the A/C and keeping the windows closed. To stay cool while stretching your fuel economy, this is a technique you can use, but always keep safety in mind (an open window can be a distraction in heavy traffic, and objects can enter through it).
- ▶ **Keep your car properly maintained** – A well-maintained vehicle is an efficient one. Be sure to look for uneven wear on tires or embedded objects, check for fluids leaks, keep an eye on fluid levels (oil, coolant, transmission fluid, and power steering fluid), check for cracked or split spark plug wires, and check for problems with brakes and wheel alignment. If any of these items falls into disrepair, fuel consumption will rise. Keeping tires inflated at their proper level is also a simple and very effective technique for getting the most out of each drop of fuel.
- ▶ **Research new vehicle purchases** – When buying a new vehicle, research its fuel efficiency by looking for the EnerGuide label on its window. The EnerGuide label shows you the expected fuel efficiency of the vehicle and the annual estimate of fuel costs. You can compare the fuel efficiency of different vehicle models by consulting the Fuel Consumption Guide, in print or on-line at <http://oee.nrcan.gc.ca/transportation/tools/fuel-consumption-guide/fuel-consumption-guide.cfm>.