

POLICY BRIEF: The implications of keeping oil in the ground

Harley Sims | April 2020



Executive summary

The demands of certain environmental organizations to completely phase out oil and gas development and to “keep it in the ground” have been gaining in popularity. These demands are now reaching the ears of some politicians, whose decisions reflect a growing aversion to the use and development of petroleum and gas products.

SecondStreet.org decided to investigate how realistic it is for society, especially Canada, to operate in a world without oil and gas. Our research has determined that:

- Canadians, as with people in the rest of the developed and developing world, are vitally dependent on oil and gas in almost every area of life, including food, health, safety, education and transportation. This is true not only of the present day, but also for the foreseeable future.
- Countless goods and services involved in the COVID-19 fight depend on oil – from syringes and ventilators in our health care system to hand sanitizer and the delivery of food to our grocery stores.
- Alternatives to petroleum-based technologies and materials are either nonviable, do not exist, or are nowhere near the necessary levels of production for the foreseeable future. This includes electric vehicles, which depend on petroleum for their plastic parts, tires, wiper blades and even delivery to their dealerships.
- Canadians rely on plastics and other petrochemical products not simply for convenience, but to provide the necessities of life.

- Plastic alternatives, including bioplastics, are not ready and not viable when it comes to replacing even a fraction of existing plastics.
- While it’s almost impossible to live without petroleum products in our modern world, those who are concerned about using oil products could reduce their own personal demand by, for example, ceasing to fly, no longer using cars and buses, and giving up their cell phones and other discretionary products that are made in part with petroleum.



Introduction

Our civilization's reliance on oil and gas cannot be overstated. Petroleum-related products are used to provide electricity, heat our buildings, get us to work, deliver our goods and produce thousands of essential items we use every day. In fact, there are so many products and services that require petroleum products, we often fail to notice them. From the fertilizers that help grow much of our food to the sunglasses we wear at the beach and the aspirin we take when we get a headache, there are countless uses for petroleum products that we don't even think about. Building materials that are often hidden behind drywall and packing materials that have maximized our energy efficiency are a couple other good examples.

It is also true that when it comes to issues involving the environment, climate change, and renewable energy, there are plenty of moderate and reasonable perspectives on oil and gas. No one likes pollution, and all of us want to see a cleaner and more sustainable planet for our children. To this end, more people are buying electric vehicles than ever before, and are looking to free-market innovations to make the oil and gas we need last longer and burn more cleanly.

There is also a growing number of activist organizations that do not seem to recognize how deeply we (and even *they*) rely on oil and gas. In Canada, as well as across the western world, anti-oil protestors can be heard urging governments not simply to scale back the oil and gas sectors, but also to "keep oil in the ground." And it's more than simply a slogan. *Keep it in the Ground* is, in fact, a global anti-oil movement, backed by heavily-funded organizations such as Greenpeace, the Sierra Club, Friends of Earth, Earthjustice and Extinction Rebellion.¹

The demands of these organizations to end oil and gas development are influencing powerful decision-makers. When, for example, former US president Barack Obama rejected Canada's Keystone XL pipeline, he argued for a

need to "keep some fossil fuels in the ground."² Obama's comments are a bit more measured, noting that only "some" oil will need to be kept in the ground, but either way, the issue is an interesting public policy question worth examining: how would our lives be affected if governments do decide to "keep it in the ground"?

This policy brief will look at two big questions in particular:

1. How would Canadians be affected if we turned off the taps?
2. Where are we with alternatives?

How would Canadians be affected if we turned off the taps?

Imagining life without oil and gas has inspired everything from doomsday speculation to bloggers' social experiments in avoiding petroleum products.^{3,4} Everyone has assumptions about what it might mean to stop using oil and gas, but what does the data actually tell us?

The big picture

Modern civilization owes a great deal to oil and gas related resources. It has been estimated that crude oil provides 33% of global energy needs, with another 30% coming from coal and 24% from natural gas. Added up, this means that fossil fuels supply around 87% of human global energy needs.⁵ Even with existing political and social emphasis on renewable energy, including green energy subsidies and carbon taxes, the world's oil and gas consumption *will continue to rise for at least the next 30 years*. Natural gas will be the most in-demand, increasing by 1.1% per year to 2050.⁶

Although petroleum and other liquids will see a percentage decrease in global demand, particularly as growth in China slows, *actual usage* of these fuels will grow – by 1.2 million barrels a day (mb/d) per year – until at least 2024.

A 2019 report by the International Energy Agency (IEA) states, “the IEA continues to see no peak in oil demand, as petrochemicals and jet fuel remain the key drivers of growth, particularly in the United States and Asia, more than offsetting a slowdown in gasoline due to efficiency gains and electric cars.”

In plain English, even if more and more of us drive Teslas, demand for oil will continue to increase as air travel grows and consumers purchase more and more products that are made with oil.⁷

Demand for oil and gas is rising in the developing world because this is where people are working hardest to pull themselves out of poverty. Much of the new demand for oil will be in Africa, whose urban population is projected to grow by more than half a billion people by 2040. This is a much higher growth than China’s between 1990 and 2010, which brought about an unprecedented demand for building materials. The IEA’s World Energy Outlook for 2019 anticipates that “the rise in Africa’s oil consumption to 2040 is larger than that of China, while the continent also sees a major expansion in natural gas use, prompted in part by a series of large discoveries made in recent years.”⁸

Canada is extraordinarily dependent on energy. Despite having only 0.5% of the global population, we are the eighth largest consumer of oil and gas.⁹ The country’s vast size, combined with its frigid winters and many remote communities, makes fuel, heat, and electricity essential to survival, not just convenience. Fortunately, Canada is also the sixth largest energy producer in the world, as well as the fifth largest net exporter. We have the third-largest

proven oil reserves in the world, as well as being the fourth largest producer and exporter of crude oil. In 2018, 11% of Canada’s GDP came from energy and between 2013-17 government revenues from the oil and gas sector averaged \$16.8 billion.¹⁰ In 2018, Canada was the largest foreign supplier of crude oil to the U.S., accounting for 48% of total U.S. crude oil imports and for 22% of U.S. refinery crude oil intake. Canada exported 3.5 million barrels per day to the U.S. in 2018, totaling 96% of all Canadian crude oil exports.¹¹

Keeping oil and gas in the ground would first of all eliminate all the revenue and jobs generated by the industry. The Canadian Energy Research Institute projects that between 2019-2029, oil and gas development projects will add \$853.9 billion to Canada’s GDP. Job numbers are also projected to go up - from the 283,000 people directly employed in the sector in 2019 to 475,000 in 2029, a rise of 60%.¹²

Contrary as it might seem, it should also be kept in mind that Canadian oil and gas companies themselves invest a great deal in renewable energy, and that shutting down oil and gas would eliminate an important source of capital when it comes to transitioning. As businesses, they want to diversify their products in order to stay on top of ever-changing market, and in 2016 spent nearly \$2 billion on capital investment designed to research, develop and innovate renewable energy projects.¹³

But jobs, investments and tax revenues are only three of the areas that would be affected if Canada turned off the taps.

Transportation is another vital sector. Gasoline and diesel make up the bulk of oil products, coming in at 43% and 27% of every barrel of oil, respectively.¹⁴

28 million motorized vehicles were registered in Canada in 2018, including not only light vehicles such as cars and pick-

up trucks, but also heavy, diesel-powered vehicles such as tractor-trailers and construction equipment.¹⁵

Clearly, road traffic would grind to a halt, but so would many other forms of transportation and delivery. Cargo ships for one – this when around 26% of Walmart’s North American merchandise comes from China.¹⁶ We’ll explore the effects on transportation and delivery more closely later on.

Aside from transportation, there is also heating and electricity: 35% of Canadian homes are heated using natural gas,¹⁷ while 18.2% of electricity in Canada is generated by fossil fuels – second only to hydro power.¹⁸

Because oil and gas are so ubiquitous in our day-to-day lives, however, it’s easy to overlook even their most vital roles.

Chemicals derived from petroleum go into manufacturing more than 6000 products, many of them essential to daily life.¹⁹ These items are everywhere, some of them surprising; Aspirin, lightbulbs, and even our polymer cash money notes are made from oil.²⁰ Even where products are not made from petrochemicals, there is every likelihood that oil and gas were involved with their production or delivery, whether directly (as with production facilities and processes) or indirectly (getting employees to work, with the role of oil and gas in their own lives).

Some estimates suggest that 96% of the products we encounter every day are made from – or were produced through the use of – fossil fuels.²¹

Deeper than this is the role of oil and gas in having brought about *what we already have* – whether through heavy equipment that paved our roads and installed and maintain our electrical grids, to the homes and buildings which are already standing.

The typical home

The average Canadian household is fully reliant on oil and gas -- not simply for heat, electricity and day-to-day operations, but for their basic construction. Plastics and other petrochemicals are essential to modern buildings, lowering costs and raising energy efficiency. One study found that the use of plastic building and construction materials saved 467.2 trillion Btu of energy over alternative construction materials – enough to power more than 5.3 million Canadian homes for a year.^{22 23}

Here are just some of the housing materials that plastics and other petrochemicals contribute:

Household construction materials	
Styrofoam insulation	Carpeting
Fiberglass insulation	Polyethylene vapour barriers
Glues in plywood and particleboard	Insulation on wiring
Shingles and caulking	Plastic pipes
Asphalt driveway paving	Tiles and countertops
Vinyl windows and doorframes	Decking and flooring
Paints	

Sources^{24 25}

Once the home is inhabited, petrochemicals help to provide many basic goods, including appliances, electronics (televisions, computers, video game systems, etc.), plastic and synthetically upholstered furniture, toilet seats, shower curtains, and light bulbs to name a few.

It is during the day-to-day operations of a household that the oil and gas related products really begin to add up:

Household goods	
Kitchen and laundry room:	
Trash bags	Recycling bins
Plastic packaging inc. cellophane	Food preservatives
Cleaners	Detergents
Bedroom:	
Clothing and sheets from synthetic fabrics (nylon, polyester, spandex, etc)	
Pantyhose	
Children's room:	
Toys	Crayons
Disposable diapers	Video games
Kitchen and laundry room:	
Deodorants and antiperspirants	Toothpaste and toothbrushes
Soap	Perfume, lipstick and nail polish
Hair gel and hand lotion	Spectacles and soft contact lenses
Pharmaceuticals	Cleaners
Band-aids	Hair colouring
Acrylic and polycarbonate mirrors	Rubbing alcohol
Feminine hygiene products	Shampoos and conditioners
Garage:	
Lubricants and fuel	Plastic garden tools & lawn furniture
Shoes and shoe soles	Propane for barbecues
Paints, pesticides and fertilizer	Garden hose
Plastic tools/extension cords	Fishing line

Sources ^{26 27 28}

Parents should note that caring for an infant involves dozens of specialized oil products. From the initial pregnancy test through the laminated/polymer birth certificate to the infant potty, petroleum products are there every step of the way.

Other necessary items made using petrochemicals may include prenatal vitamin bottles, ultrasound equipment, ultrasound gel, medical exam tools (including speculums), measuring tapes, heart monitors, electronic thermometers, car seats, mattress covers, cribs and furniture, breast pumps, bottles, strollers, baby carriers, plastic-lined diaper bags, changing pads, pacifiers, teething toys, creams and petroleum jelly.

Once the child becomes old enough to go to school, oil and gas products are there too.

The classroom

Oil and gas play a crucial role in the classroom. In addition to providing heat and electricity, oil and gas companies pay billions of dollars in taxes that help to fund our education systems. School boards in Canada spent \$61.9 billion on education in 2016, the last year for which *Statistics Canada* provides figures.²⁹ Again, from 2013-2017, government revenues from the oil and gas sector averaged \$16.8 billion.³⁰

Many of the same building materials that go into building a home go into building a school – plywood, flooring, insulation, wiring, tubing, asphalt, and more. It's difficult to estimate how much more material a school requires to build than a house, but a reasonable estimate is that the average Canadian school is 30 times larger than the average home.³¹ Furthermore, specialized classrooms and facilities, including gymnasiums, labs, art studios and workshops, contain special equipment and materials homes may not have – these may include PVC flooring, chemicals, electrical equipment with insulated cords, plastic-handled tools, as well as petroleum-based paints and cleaners.

Among the many other petroleum-based items found in schools and classrooms are:

School products		
Whiteboards and markers	Binders	Sports equipment
Glue	Computers	Pens and crayons
Photocopiers	Plastic chairs	Dyes
Globes	Ink	Wastebaskets
Laminated charts, posters and books	Laminated desk/tabletops	Tape
Laptops/tablets	Synthetic fibre clothing/backpacks	Recycling bins

Sources³²

Health care

Health care depends on oil and gas, and is particularly vulnerable to shifts in petroleum supply.³³ Its reliance on oil and gas involves transport fuel and feedstocks for pharmaceuticals, as well as plastics and medical supplies, things for which there are few substitutes. And like education, health care in Canada is paid for by taxes, to which the oil and gas industry contributes in the billions.

In addition to providing heat and electricity for hospitals and fuel for emergency vehicles, oil and gas are also used

as feedstocks for the chemical processes that produce pharmaceuticals and plastics.³⁴ Furthermore, hospitals and other essential care facilities are required by law to have backup generators to provide “uninterruptible power systems”.^{35 36} Some of these generators run on natural gas, but most of them use diesel fuel.

Plastic and other petrochemical products are everywhere in health care facilities, including:

Health care goods		
Wheelchairs	Anti-histamines	Replacement joints
Syringes	Cortisone	Catheters
Latex gloves	Soap	Anaesthesia masks
Bags for blood and IV drips	Safety goggles	Rubbing alcohol
Aspirin	Artificial hearts	Acrylic lenses
Antiseptics	Prosthetics	IV lines
Bandages	Dentures	Anaesthetics
Pill bottles	Casts	Pacemakers
Hearing aids	Plastic parts in imaging/diagnostic equipment	

Sources^{37 38}

The grocery store

Like schools and hospitals, grocery stores are large buildings that require large amounts of petrochemical materials to construct, and a lot of heat and electricity to operate. But oil and gas play more important roles when it comes to what we eat – in growing, refrigerating and preserving our food, as well as making packaging lighter for transport.

Fertilizers are foremost. It has been estimated that half the world's population is sustained through the use of nitrogen fertilizers alone, which are produced using natural gas.³⁹ Petro-chemicals are also used in herbicides, as well as in the day-to-day operations of farms.

Foodstuffs are brought to stores by diesel-fueled tractor-trailers, but many fruits, vegetables and herbs also arrive via cargo ship: bananas from South America, tomatoes from Mexico, garlic from China. Canada also imported \$14.5 billion worth of fruits and vegetables in 2018, and only about half of all fresh produce was from the United States.^{40 41} The rest had to travel much further, which means diesel-powered cargo ships were involved.

Not surprisingly given its climate, Canada also has a robust greenhouse industry, whose crops are wholly reliant on heat, electricity and petrochemical materials such as greenhouse plastic. Over 640,000 metric tonnes of vegetables were grown in Canadian greenhouses in 2017, with a farm gate value of more than \$1.4 billion – roughly one tenth of imported food.⁴²

In addition to shipping, grocery stores rely on petrochemicals to help package and refrigerate their produce, meats, and dairy. Plastic packaging saves energy⁴³ as well as space on refrigerators shelves, while polymer components have helped to revolutionize the efficiency of refrigeration systems.⁴⁴ And when it comes to processed foods, preservatives derived from petrochemicals help to make food last longer, reducing waste as well as saving lives.⁴⁵

The following section will look at issues of transportation and plastic in greater detail.

COVID-19 and oil

It is difficult to imagine Canada trying to fight COVID-19 without oil. Countless products and services that are made with oil, or depend on oil for transport, have been utilized to help fight the virus.

For example, our health care system has been using many different oil-based products to fight the pandemic – from ventilators and syringes to diagnostic equipment and plastic face shields for staff, these goods have been helping to save lives.

Another example would be our grocery stores. While large segments of the economy have been shut down, Canadians have still been flocking to local stores each week to pick up their groceries. As noted, almost all of our groceries are delivered to local stores using gasoline or diesel-powered vehicles.

Finally, those working from home during the pandemic would have a much more difficult time doing so without oil-based products. Cell phones, computers and other electronic products (which include plastic parts) help us stay connected with our colleagues and customers.

Where are we with alternatives?

Turning off the taps and “keeping it in the ground” begs the question of substitutes when it comes to oil and gas. Environmentalists speak of alternatives, including electric vehicles and bioplastics, but it's important to recognize just how limited these options are when it comes to a country such as Canada, as well as on a global scale. While new energies, efficiencies and production capacities will eventually appear on the horizon, it's important to be realistic about the present and short-term future – the facts suggest “keeping it in the ground” simply isn't a realistic option.

Electric cars

In 2019, British Columbia passed legislation requiring that all vehicles in the province be zero-emissions by 2040.⁴⁶ Many western countries – France, Germany, Norway and the UK – have also proposed or entertained banning sales of internal combustion engines in the foreseeable future, with dates ranging from 2025-2040.⁴⁷ These timeframes are to allow markets and supply chains to adapt, but existing figures show just how far we have to go to become 100% electric.

Electric cars have grown in popularity, but they still make up only a tiny share of the Canadian auto market – 3.5% of auto sales as of Q3 2019.⁴⁹ Of the 23.1 million light vehicles registered, less than 1% were electric-powered. In fact, out of the 2 billion vehicles projected to be on the world's roads by 2035, 97.5% will still run on gasoline or diesel.⁵⁰

In addition to the low production volumes of electric vehicles, there are other challenges when it comes to replacing existing fleets. For example, two-thirds of vehicles sold in Canada today are either trucks or SUVs; categories which have virtually no electric models. More are coming, including the fully electric Ford F-150 pickup around 2023.⁵¹ However, Ford's Global Director of Electrification, Ted Cannis, anticipates that only around 10% of those sales would be in electric F-150 pickups.⁵²

Other drawbacks to current electric vehicles, as identified by a February 2019 CBC article, include the following:⁵³

- **Cost:** Electric vehicles cost at least \$15,000 more than comparable gasoline-powered models. This is not expected to change until the mid-late 2020s.⁵⁴
- **Range:** Most models can only travel 200km or less on a single charge
- **Charging stations:** Drivers must plan road trips well in advance as there are far fewer charging stations than gas stations, and can be difficult to locate
- **Recharge time:** While it only takes a few minutes to fill up with gasoline, it can take anywhere from half an hour to 14 hours to fully charge an electric vehicle

- **Climate performance:** Canada's coldest days in the winter can cause problems with electric car batteries, reducing their charge

Even as the materials required to make electric car batteries face a supply crunch by the mid 2020s⁵⁵, electric vehicles pose additional challenges to our electrical grids and infrastructures. In the U.S., plugging in an EV can be the equivalent of adding three new homes to the grid.⁵⁶ Bloomberg New Energy Finance has estimated that by 2040, adoption of electric vehicle will have driven a 300-fold increase in EV electricity consumption globally, with the cost of installing necessary charging stations reaching into the hundreds of billions of dollars.⁵⁷ One estimate put the cost at \$1.4 trillion, with a price tag of up to \$7.3 trillion for the world as a whole by 2030.⁵⁸

Finally, electric cars may not need gasoline, but they depend on oil in many other ways – throughout their delivery and supply chains, and also for many of their components. These include their tires, seatbelts, wiper blades, headlights, mirrors, steering wheels – even their exterior shell and parts of their frame. Approximately half of a typical car's volume is due to plastics made from petrochemicals, materials that also make the car lighter, and more energy efficient.⁵⁹ Plugging in to charge an electric car doesn't necessarily avoid petroleum products either. In several jurisdictions, including Alberta and Saskatchewan, for example, almost all of the electricity comes from oil, gas or coal.⁶⁰

Heavy trucks and equipment

Keeping oil in the ground presents even greater challenges when it comes to tractor-trailers and other heavy-duty diesel-powered equipment. Unlike cars, there are few to no electrical alternatives. Canada is a massive country, and trucking is the primary form of freight transportation (including two-thirds of the \$788 billion in trade with the United States). 90% of all consumer goods and foodstuffs are shipped by truck in Canada, whether in part or in full,⁶¹ and Canada's National Highway system clocked 20 billion vehicle-kilometres of truck travel in 2016.⁶²

Turning off the taps would mean removing 1.1 million heavy trucks from the road in Canada⁶³, including commercial freight vehicles, hydro trucks, fire trucks, and other vital forms of transport, industry, and emergency services. Needless to say, there are countless implications for society, and this number does not include the 2.3 million registered off-road, construction and farm vehicles (including the massive earth-movers that help to work the oil sands, as well as Canada's many mines that help produce the metals for the vehicles).

While regional and short-haul electric freight vehicles are available, electric semis and other heavy vehicles are still in the prototype stage, with arguments over their viability still up in the air.⁶⁴ Long-haul applications are especially problematic, with the weight of the necessary batteries taking up one third of the truck's payload, and making it twice as expensive as an equivalent diesel model.⁶⁵ The potential strain on the power grid of charging an electric semi is also debated, with one analyst [Anton Wahlman of *Street*] saying "it will be like plugging in a minor city to the grid at that particular interstate rest-stop. Can you spell brownouts? — no, make that blackouts."⁶⁶

BloombergNEF's *Electric Vehicle Outlook 2019* projects that even by 2040, only 19% of the heavy truck market will be electric-based sales, "mostly in shorter [range] applications." The study also notes that competition for conventional heavy trucks will come mostly from non-electric alternatives, including natural gas and hydrogen fuel cells.⁶⁷

Airplanes

Electric commercial aircraft are even less viable than electric heavy trucks while light, short-range planes are being tested, electric jetliners are nowhere in sight.^{68 69} As a result, keeping oil in the ground would essentially mean an end to air travel – including the 50,000 jobs at Air Canada, WestJet, Air Transat and Jazz.⁷⁰

A gallon of jet fuel contains 15 to 30 times as much energy as a lithium battery of similar weight, which makes alternative energies unfeasible.⁷¹ Instead of relying on batteries, efforts to make air travel more energy-efficient will rely on improvements in fuel efficiency and aerodynamics, as well as phasing out old models and avoiding empty seats.

New plastic construction materials, including carbon-fibre composites, are already helping to make the world's 26,000 passenger aircraft more efficient – a number that is projected to double by the year 2038.^{72 73}

Large cargo vessels

Keeping oil in the ground would halt most marine transportation as well. Practically everything Canada gets and ships overseas comes in a cargo vessel, which in 2018 totalled \$459 billion, or nearly 40%, in bilateral trade.⁷⁴ This includes not only merchandise from China but also off-season produce, and all European goods.

Large overseas cargo vessels, including container ships, are all diesel-only, with no electric models in the foreseeable future. Some small-scale, short-range applications are underway in Europe, including electric canal barges, but as with long-haul trucks, the issue with electrifying long-range routes is one of weight vs efficiency.⁷⁵ Unlike road vehicles, overseas vessels cannot plug in anywhere to recharge. Even with best lithium batteries available, for example, the Maersk Triple-E cargo vessel would require 100,000 metric tons of batteries for an intercontinental voyage, or 40% of its maximum cargo capacity.⁷⁶

Plastics

The manufacture of petrochemical products would come to a halt if we were to turn off the oil taps, so it's important to look at the implications for plastics. Crude oil provides the principal source of carbon for the whole of the chemical industry, including plastics manufacturing. Only around 1%

of the necessary feedstocks to create plastics come from other sources, meaning that 99% of plastics we encounter every day are produced with oil and gas.⁷⁷

The previous section showed how much Canadians depend on plastic—for everything from shoes to shingles to the very money in their wallets. The dependency is even greater worldwide, with many developing countries relying on plastics for basic food safety.⁷⁸

There are of course alternatives to some conventional plastics. Some major organizations have tried them out, not always successfully; Coca-Cola and Pepsi utilize some plant-based bottles, while the Danish toy company LEGO is looking at switching to a plant-based plastic.^{79 80} Swedish furniture company IKEA has committed to producing commercially viable bio-polypropylene, initially for small storage boxes, but with the goal of making all their plastic products based on recycled or renewable materials by 2030.⁸¹ In a larger-scale example, the state of California recently paved its first road using recycled plastic waste.⁸²

Halting oil and gas production would require more than everyone switching to paper straws and cloth shopping bags, however. There are many different kinds of petroleum-based plastic, with unique applications, properties and chemical compositions. Some are essential to medicine and engineering, with no bio-based substitutes.⁸³ Meanwhile, some plastic alternatives do more harm than good.⁸⁴ Not all are compostable; around 50% of bio-based plastics currently produced aren't biodegradable and need to be recycled^{85 86}, while some are no more biodegradable or recyclable than conventional plastics.⁸⁷

Filling demand would also be a problem. In 2019, global production capacity of bioplastics was 2.11 million tonnes – less than 0.6% of total plastic production. By 2024, this number will be 2.43 million tonnes, or around 0.7%.⁸⁸

It has been estimated that to grow all the necessary crops to replace petroleum-based plastics with bioplastics would require up to 18% of the Earth's current water usage and

up to 61% of its free arable land.⁸⁹ Such a shift would nonetheless entail massive amounts of farming, including necessary machinery, chemicals and facilities. These numbers also bring up past debates over the feasibility of replacing petroleum entirely with bio-fuels, where all arable land use might only have yielded enough fuel for a third of the world's cars.⁹⁰

Turning away from conventional plastic packaging would also be extremely costly in terms of energy. One study has shown that by using plastic instead of conventional alternatives (including cardboard, aluminum, wood, and others), Canada and the United States save more than 1.2 billion MJ of energy – the equivalent of removing 19 million passenger vehicles from the road for a year, or the energy equivalent of 215 million barrels of oil, 1.16 million tanker trucks of gasoline, 480,000 railcars of coal, or 108 supertankers of oil.⁹¹

Consumer choice

As this brief shows, it is extremely difficult for a modern society – especially a heavily oil-dependent nation such as Canada – to simply turn off the taps and stop using oil and gas products anytime soon.

However, there is nothing stopping those who wish to “keep oil in the ground” from making decisions as consumers to reduce their own personal usage of petroleum products. For example, a concerned protestor could give up flying and stop using cars and buses for transport. Using shoes and bicycles to travel from A to B would likely still require petroleum (the soles of many shoes are made in part with petroleum derivatives as are bicycle tires), but this approach would allow someone to reduce their demand for petroleum products.

Protestors could also forego purchasing products that may be convenient, but aren't essential: cell phones and computers and sunglasses to name a few. A protestor may not be able to do much about the materials used for

construction of a home they purchased, or an apartment they rented, but they could reduce their household's energy demand. It would be extremely difficult for a family living in a natural gas-heated home to give up heat during a Canadian winter, but protestors could set their thermostats to just above freezing (so their pipes don't burst) and wear additional layers of clothing. Alternatively, protestors could install solar panels to help heat their homes and provide electricity. However, some demand for fossil fuel-powered electricity may be required during cloudy days.

A Canadian protestor could also adopt a diet that is free from foods that are shipped across great distances – giving up bananas from South America, garlic from China and avocados from Mexico to name a few. During the summers, protestors could grow or purchase local food, can the goods and eat them in the winter. Information on the role of oil and gas in our daily lives is more widely available than ever, giving protestors and other objectors an unprecedented road map for avoiding petroleum products.

Without a doubt, the aforementioned measures are extreme by today's standards. However, they demonstrate just how interlinked our modern society is with petroleum products.

Consumers who are seeking more moderate ways by which to reduce their emissions might consider a number of different activities. Examples include: increasing efforts to recycle, participating in regional "giveaway weekends", and posting unwanted household goods on websites such as Freecycle.org. Consumers could also use carpool sites for local and long-distance travel. Videoconferencing is a tool that could help individuals and organizations reduce their need to travel at all.

Conclusion

This research paper gives an idea not just of how dependant the modern world is on oil and gas, but also how much of the modern world is owed to oil and gas. Whereas some environmental groups argue that governments must "keep it in the ground" in order to avert disaster, the data makes it clear that turning off the taps will ensure disaster.

Even leaving aside the crucial roles of oil and gas in the economy, transportation, energy efficiency, education and the health sectors, the dependency of agriculture and food production alone is conclusive. As Alex Epstein has argued:

"Reducing fossil fuel consumption by 95% would starve the modern mechanized agricultural industry of the energy necessary to continue its work producing affordable, abundant food—the consequence of which would be massive human malnourishment and starvation."

Alternatives to some oil and gas products are available, but only in very modest amounts, and in many cases only because oil and gas make them possible in the first place. There is no doubt that innovation, human enterprise and the free market will continue to find alternative energies, technologies and efficiencies, including the capacity to produce new materials on a global scale. As the data shows, however, these things will take time, and phasing out oil and gas is not remotely an option in the near future.

About the author

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