



Saskatchewan · Opinion

The path to net-zero emissions won't be easy, but here's how it can be done



To keep temperatures from increasing, we need to stop greenhouse gas emissions altogether

[Brett Dolter](#) · for CBC News opinion · Posted: Nov 18, 2019 3:00 AM CT | Last Updated: November 18



Greenhouse gas is like water flowing into a bathtub, says Brett Dolter. If you don't stop pouring the water in, eventually it will overflow. (CBC Graphics)

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So why is that the case?

Climate change is like a bathtub. The concentration of carbon dioxide (and other heat-trapping gases) in our atmosphere is like the level of water in the tub. Annual greenhouse gas emissions are like the flow of water from the bathtub tap. Every year we increase the water level by burning coal, natural gas, gasoline and diesel, which releases greenhouse gases like CO₂.

Those greenhouse gases trap heat. Like a greenhouse, they allow sunlight through, but block heat from radiating back out to space. The higher the level of CO₂ in the atmosphere (water in the tub), the more heat is trapped.

The result is rising global average temperatures, more powerful extreme weather events like hurricanes and floods, rising sea levels, species loss and increasing threats to the stability of human civilization.

Watch an illustration of why Brett Dolter says we must get to net-zero emissions to prevent global warming:

Brett Dolter, assistant professor in economics at the University of Regina, explains why reaching net-zero greenhouse gas emissions is key in the fight against climate change. 1:34

The current concentration of CO₂ in the atmosphere is about 410 parts per million (ppm). Before the industrial revolution began, the concentration was at 280 ppm.

If we are to stand a good chance of keeping the global average temperature increase below 2 C, we need to keep the concentration of CO₂ below 450 ppm. There is not a lot of room left in the bathtub.

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Think again of the example of a bathtub. The level of water in the bathtub will keep rising as long as the stopper is in place and the tap is turned on. Even a steady drip of water will increase the level in the tub over time.

We need to turn off the tap completely.

Letting water out of the tub

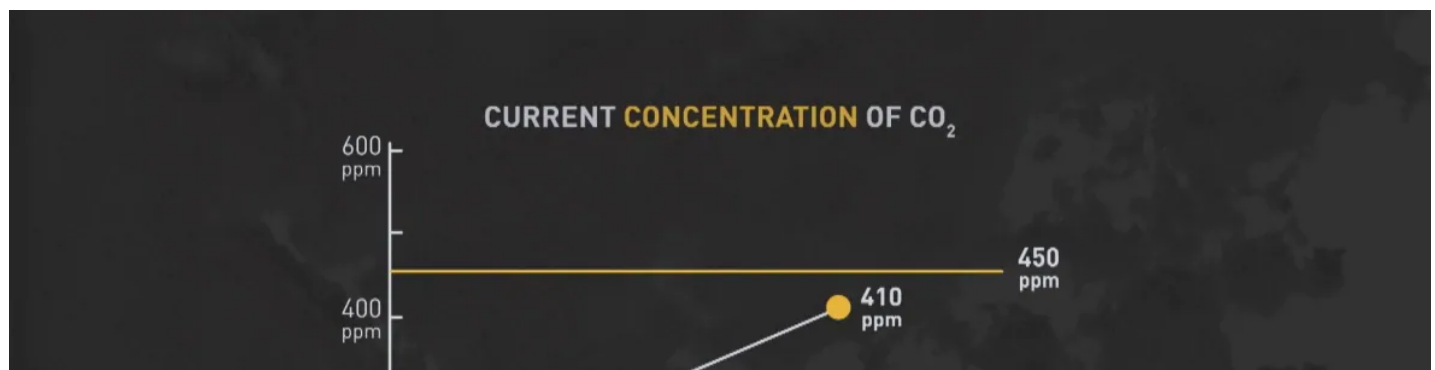
In other words, to meet the 2 C target, we need to reach net-zero CO₂ emissions by mid-century, but that doesn't mean we have to immediately eliminate any emissions whatsoever.

We can also look at ways to loosen the stopper — and let water out of the tub — by removing CO₂ from the atmosphere.

We can use natural processes like converting cropland to perennial grassland or replanting forests. Companies like [Carbon Engineering](#) are also creating technologies that can extract CO₂ from the atmosphere.

If the tub gets too full, we may need to use these technologies to let some water out.

In the end, getting to net-zero by mid-century will likely mean both getting to zero emissions in the energy and industrial systems, and also removing CO₂ from the atmosphere. But the quicker we can reduce our emissions, the less we'll have to rely on CO₂ removal.



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before
industrial
revolution

current

This graph shows the steady increase of CO₂ in our atmosphere since before the Industrial Revolution. We must keep the number before 450 ppm to prevent an average temperature increase of 2 C, says Brett Dolter. (CBC Graphics)

So how do we do it?

It won't be easy, but several studies now agree on the actions we need to take:

1) Use less energy

Energy efficiency is sometimes called "the first fuel." Before we worry about using clean energy, we can work to use less energy.

For individuals, this means adding insulation to our homes or repairing drafty windows.

For industry, it may mean buying energy-efficient equipment.

For cities, it means building walkable neighbourhoods where people can get to work, school and grocery stores without using their cars.

2) Clean up electricity

Burning coal and natural gas releases carbon dioxide. In Saskatchewan, the electricity sector is responsible for about 20 per cent of our annual greenhouse gas emissions.

To get to zero emissions, we need to use 100 per cent clean electricity.

There are two ways we might get there. Some argue we can use 100 per cent renewable energy

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While there is a debate on which path to take, there is no debate about the goal. We must eliminate greenhouse gas emissions from electricity production to stop climate change.

3) Electrify everything possible



Electric vehicles are cheaper to operate than their gas-powered counterparts, says Brett Dolter. (Go Ultra Low/Getty Images)

Once we can generate electricity without producing greenhouse gas emissions, we can use that clean energy to power our cars, heat our buildings and provide industry with heat and power.

Electric vehicles are already cheaper to operate than gasoline or diesel vehicles. Gasoline would have to be below 50 cents a litre in order for combustion engines to compete with electric

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4) Use zero emissions fuels for freight and air travel

Batteries are heavy, so electric vehicles may not be the best choice for long-distance freight hauling and air travel. These industries need fuels with a high energy density, meaning they contain a lot of energy per unit of weight.

Here we can look to [biodiesel and hydrogen](#). Hydrogen can be created using electricity to split water (H₂O) into Hydrogen and Oxygen. This provides a zero-emissions fuel that is energy dense and produces only water as a by-product when it is used.

5) Help industry get to zero emissions

Some industries generate greenhouse gas emissions like CO₂ in their production processes. For example, half of the emissions in the cement industry come from turning limestone into calcium oxide, or clinker.

These CO₂ emissions are inevitable if we want to use cement.

The same kind of "process emissions" are released in the steel industry.

We will still need cement and steel in our zero-emissions economy of the future, so how do we produce these products without releasing CO₂?



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Carbon capture technology, like what is being used at the Boundary Dam in Saskatchewan, offers one way for emission-heavy industries to exist in a net-zero world. (Michael Bell/Canadian Press)

In cases like these, the carbon capture and storage (CCS) technology that SaskPower has developed at Boundary Dam 3 will likely be necessary. CO2 emissions from cement and steel production can be captured and stored deep underground.

The technology is proven to work to capture emissions from coal-fired power. Its best use might be in hard-to-clean-up industries like steel and cement.

How do we get people and industry to take these actions?

The actions listed above are not free. If they were, we would already have taken them.

If we are going to motivate individuals, businesses and large industry to take these actions, we need the support of government policy.

Garrett Hardin described the solution to problems like climate change as "mutual coercion, mutually agreed upon." That's a pretty good definition of policy.

If we can agree as a province that we want to get to zero emissions by mid-century, then I hope we will also support governments putting in place policies to encourage us to get there.

Which policies are best?

There are five main approaches government can use:

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Government has provided information about climate change for the past 25 years, but greenhouse gas emissions continue to go up. Talk is cheap and not very effective at motivating action.

“We need to start asking whether we are building for 2019 or for 2050.”

- Brett Dolter

2) Incentives

We can pay people and companies to take action.

We can provide rebates when people buy electric vehicles, for example. We can provide low-interest loans for people to put more insulation in their homes.

Incentive programs are often popular because people feel like they are getting rewarded for doing the right thing. The trouble is, they are also expensive. Incentives often end up being paid to people who would have bought an electric vehicle anyway, or who were already planning to install more insulation. These people may be happy to receive free money, but that money has to come from somewhere and may not encourage a whole lot of additional action.

3) Regulation

We can put in place laws that require certain actions be taken, or that certain emission reduction targets be met.

This policy approach has the benefit of being effective. People and companies must obey the regulations or risk heavy fines or jail time.

However, while regulations may appear to be costless to government, meeting them can increase costs for businesses. These extra costs get passed on to customers. This means

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Getting fuel-intensive industries like airlines to convert to zero emissions fuels would be an important step in the path to net-zero emissions, says Brett Dolter.. (Chris O'Meara/The Associated Press)

4) Carbon pricing

We can put a price on pollution.

British Columbia did so in 2007 with a provincial carbon tax. That policy reduced greenhouse gas emissions by [5 to 15 per cent below](#) what they would have been otherwise.

In Saskatchewan, the federal government has placed a carbon tax on fuels like gasoline, natural gas and coal. In the short-term, people and businesses may not be able to avoid paying the tax, but in the medium-term people can buy vehicles that use less gasoline or no gasoline at all. Businesses can also invest in energy-efficient equipment and zero-emissions processes.

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Carbon pricing can be criticized for increasing fuel costs, but that is only half of the picture. It also raises revenues.

The federal carbon pricing system uses the revenues to provide rebates to households in Saskatchewan. These rebates mean that 80 per cent of households receive more money from the rebates than they pay in carbon pricing. If the Saskatchewan government wanted to, it could use carbon pricing revenues for other purposes, like paying off the debt, lowering the PST or increasing the Saskatchewan Low-Income Tax Credit.

You might wonder how carbon pricing can work if we give the money back. I previously explored that question in [this article](#).

5) Direct investment

The last policy option is for government to directly invest in zero-emissions technologies.

Direct investment can provide infrastructure such as power transmission lines that would be too risky or too costly for the private sector to finance and build.



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A transmission line between Saskatchewan and Manitoba could help provide backup for renewable energy infrastructures, says Brett Dolter. (Patrick Pleul/dpa via Associated Press)

The Saskatchewan and Canadian governments could agree to finance and build a new transmission line between Manitoba and Saskatchewan to increase the use of renewable energy. Saskatchewan's low-cost wind energy needs a backup, and Manitoba's hydroelectric reservoirs can provide it.

The key challenge here is ensuring that government makes investments that create a net benefit to society.

We can get to net-zero

The technologies exist to get us to net-zero emissions by mid-century. There are effective policies like flexible regulation and carbon pricing that can encourage us to adopt those technologies, but we need to start investing in zero-emissions today.

Whether it's our homes, our power plants or our industrial processes, we need to start asking whether we are building for 2019 or for 2050. If we are going to put a stop to climate change, then we need to change our policies and our investments today.

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