



CLIMATE Solutions



SAYING "YES" TO A HEALTHIER VISION FOR THE FUTURE



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As an environmentalist, I am often told that people like me seem to be opposed to everything. There are many reasons to stand up against new pipelines, coal facilities, gas plants and refineries, and against the influence that fossil fuel industries have on our governments. But behind the immediate and obvious impacts to our air and water, our rejection of these fossil fuel projects is based on an intuitive and realistic vision of another world – a world that leaves us shouting "YES!"

This report is about painting the vision of a world we can all support, one where doing a decent day's work does not jeopardize our children's ability to live in a stable, life-supporting climate.

We say "YES" to this vision each time we strengthen the wall of opposition standing in the way of the tar sands, oil pipelines and tankers, coal shipments and fracking

operations. We also promote this vision by creating and supporting alternatives to help end our dependence on fossil fuels and confront climate change.

Thankfully, with recent developments in the fields of energy production, transportation, housing and agriculture, we don't have to be vague or impractical when describing this new world. We need only point to some of the exciting projects and practices already being adopted by progressive cities and regions around the world, including within Canada.

The fossil fuel industry has launched oppressive public relations campaigns designed to stop us from believing

in collective climate action. But community groups and responsible political leaders are taking on the challenge and coming up with creative local solutions.

For instance, while the in-your-face protests against tar sands pipelines may dominate news headlines, that action is complemented by determined local groups who are quietly rebuilding and retrofitting communities to reduce energy use. And while the oil industry is in steep decline, the installation of solar panels on rooftops across the country is bringing a whole new meaning to the term "power house."

We've chosen to focus on developments in transportation,

housing, energy and food for our first-ever report on climate solutions. Quite simply, these are the ways Canadians like you and I are experiencing the challenge of climate change in our daily lives.

Climate change provides a chance for us to alter the way we look at how we move around, where we live, what energy we use and what food we eat. In many cases, these are areas in which we have a choice. Sometimes, the types of climate-friendly choices we wish for are not available. But increasingly, there are options that give us the means to significantly reduce our impact on the climate.

We have come a long way in the last decade when it comes to fossil fuel alternatives. With this report, we hope to provide just a small glimpse into the exciting changes taking hold right across the country.

Fossil fuels include oil, gas and coal. When burned, these products release carbon and other greenhouse gases that cause climate change.



Photo left: 2014 Defend our Climate rally in Vancouver (Michael Wheatley), right: Community info panel at Loutet Farm (Edible Garden Project).

Cover photos (clockwise from top left): Energy solutions photo collage (Perry Sky Jack), Vancouver Skytrain transit station (Creative Commons), Rooftop gardens in Vancouver (Creative Commons), Net-zero home in Edmonton (David Dodge).



A NEW ENERGY AGE

Energy surrounds us in different forms, including light, heat, movement and electricity. There are thousands of machines and appliances that require energy in our everyday lives, and most rely on heat or electricity to function. As a result, the electricity created to run our machines and appliances is responsible for 12 per cent of Canada's annual climate-changing greenhouse gas emissions.¹

Over the last 100 years, much of our electricity has been generated by burning fossil fuels such as oil and coal to drive turbines. These fuels are considered non-renewable because once they are removed from the ground and burned, they are irreplaceable.

Renewable energy, on the other hand, can quickly replace itself and is usually available in a never-ending supply. This is because it comes from the natural flow of sunlight, water,

wind or geothermal heat. Incredible inventions over the last decade have enabled us to capture some of that naturally flowing energy and transfer it to our homes and businesses.

Harnessing the sun's energy to generate electricity is the renewable power source with the greatest potential. One of the most significant advantages is the dramatic drop in the cost of solar photovoltaic equipment (solar panels). In 1980, a solar panel could cost up to \$75 per watt. By 2014, the cost had fallen to just \$0.75 per watt.²

In addition to the lower cost, solar equipment has become more and more effective. The massive growth in the use of solar panels has been led by Germany, a country with a lot less sunshine per year than many parts of Canada. With such great leaps in the technology, it's no surprise that the world's biggest banks are predicting a solar energy revolution.³



Photos (clockwise from top left): Solar water heating system on a Halifax public washroom (Halifax Solar City), T'Souke Nation Solar Project (T'Souke Solar), Workers installing solar panels on a home in Halifax (Halifax Solar City).

HALIFAX SOLAR CITY PROGRAM, NOVA SCOTIA

Solar City is a pilot program led by the Halifax Regional Municipality to help deliver solar water heating systems in homes across the city. The municipality provides a free assessment to see if solar water heating is suitable for your home, and provides financing support so homeowners can pay for the system over up to 10 years. Households end up saving hundreds of dollars each year on electricity, and the program also provides average yearly greenhouse gas reductions of 153,000 kg. This exciting project is just one example of a municipality taking the initiative when it comes to local power generation.⁴

T'SOUKE NATION SOLAR PROJECT, BRITISH COLUMBIA

The T'Souke Nation near Sooke, BC began planning its solar project in 2008, aiming to be a sustainable solar community. The project incorporated a guiding principle called the "Seventh Generation" – which meant planning for 100 years ahead.

The 62 kilowatt solar array above the Nation's canoe shed can meet the community's electricity needs, plus extra to sell to the provincial utility. Forty houses were equipped with solar hot water systems, and ten members of the community were trained to install them. In summertime, each of these systems can produce enough hot water for a family. As the first nation in the world to be entirely solar-powered, the T'Souke Nation's achievements are something every community can learn from.⁵



Photo left: Edmonton's Sparrow Landing net-zero townhouse complex (David Dodge), right: Residents enjoying the common area at Prairie Sky Cohousing Cooperative (Prairie Sky Cohousing).



HOMES THAT MAKE A DIFFERENCE

Did you know the average Canadian spends approximately 90 per cent of their time indoors, primarily at home? Buildings, including both home and work spaces, account for about 12 per cent of Canada's annual carbon emissions.⁶ Most of those emissions are created either by heating these spaces in winter, or cooling them in the summer.

There are many ways we can make our living spaces more energy efficient, thereby reducing their climate impact. Building with wood (instead of concrete) has climate benefits, as does better use of quality insulation. Passive solar heating is another popular way to reduce energy consumption; we can design our homes to make better use of the heating and lighting potential of the sun. Solar energy technologies are increasingly being incorporated into building design, and are far more affordable with every passing year.

Another powerful way to create climate-friendly homes is by sharing spaces with others. In Canada, the square footage of the average home has grown over the past few decades, while the number of people in each home has decreased.⁸ Studies have shown that low-density housing (for example, suburban single-family homes) is twice as damaging to the climate per person than higher density developments.⁹ This is partly due to the fact that suburban residents drive longer distances. **The average single-family detached home also consumes 88 per cent more electricity than the average apartment in a building of five or more units.**¹⁰

The good news is that Canadians are beginning to challenge traditional housing models by promoting climate-friendly cohousing and developing energy efficient buildings that drastically cut carbon emissions.

Energy used for heating and cooling represents 75 to 85 per cent of the total lifetime environmental impact of Canadian buildings.⁷

PRAIRIE SKY COHOUSING COOPERATIVE, ALBERTA

In Calgary, Alberta lies a residential development consisting of 18 private units. From a distance, it looks like any other housing complex – until you walk around. This complex has been designed to minimize the size of each individual unit in order to maximize the shared facilities, which then become an extension of everyone's living space. For instance, one large communal kitchen serves all the residents' needs, which means far fewer appliances are required. The culture of generosity and sharing increases the quality of life, while reducing the consumption of materials and energy.¹¹

EDMONTON'S NET-ZERO BUILDINGS, ALBERTA

In Edmonton, Alberta, there's a shift underway to construct "net-zero" buildings that can generate all of their own heat and electricity. Local building companies are creating not just individual homes, but net-zero office buildings and even a 14-unit townhouse complex.¹² Well-placed windows offset the need for heating by generating passive solar heat. Other features include effective insulation, efficient appliances and air-tight construction.

Homes designed this way can use 90 per cent less energy for heating and cooling than a regular home.

One of these "net-zero" homes can use as little heat as is generated by four 4-slice toasters when outside temperatures are at -32°C.¹³ How's that for reducing your carbon footprint?



THE BIG MOVE, ONTARIO

Traffic jams have become synonymous with life in the greater Toronto area over the last decade. Line-ups of cars are a common sight on highway routes to the suburbs, and there isn't adequate infrastructure for safe cycling in the city.

Recognizing the need to invest in transportation solutions, Ontario's transport authority has committed to the Big Move – the largest public transit expansion in half a century. The \$50 billion plan will create 1,200 kilometres of rapid transit over 25 years, tripling the extensive network that's already in place. When the Big Move is complete, 80 per cent of residents in the region will live within two kilometres of rapid transit. An additional 7,000 kilometres of bike lanes, trails and pathways mean pedestrians and cyclists will benefit, too.¹⁴



Photos: Tesla's technology is helping to bring electric vehicles into the mainstream, this car is getting a free charge (Creative Commons), The Big Move involves upgrades to Toronto area's GO Transit system (Creative Commons).

ELECTRIC VEHICLE ROAD MAP, MANITOBA

Did you know that if Manitobans shifted to electric transportation, they would have the least expensive vehicle fuel in North America? At least 98 per cent of the province's energy comes from wind, hydro or solar, and it's provided at the lowest electricity rates on the continent – meaning transportation costs could be equivalent to gas prices between six and 20 cents per litre. Manitoba also has more than 500,000 plug-in points already installed in homes, garages and parking lots, which are currently used to heat cars in winter but can easily be used for recharging electric vehicles.

Given all of these advantages, the Manitoba government is creating the infrastructure to make a major transportation shift. The comprehensive plan, called the Electric Vehicle Road Map, could make the province a global leader in the field.¹⁵



Photo: An electric car making use of Winnipeg's first charging station (Eric Reeder).



Photo: Community gardeners getting their hands dirty (Edible Garden Project).



Photo: Fresh fruit and veggies from the Family Farmers Network (Équiterre).

EDIBLE GARDEN PROJECT, BRITISH COLUMBIA

Situated in North Vancouver, the Edible Garden Project focuses on three important goals: sharing food, farming and teaching how to grow delicious food locally. Core to this project is a unique half-acre farm – Loutet Farm – located in a city park surrounded by residential properties. Through sales and other initiatives, the farm has quickly grown to sustain itself since ground was first broken in 2011. It's already generating enough income to cover all costs and provide a decent wage for a farmer. The project also manages a host of "sharing gardens" in backyards, on rooftops and boulevards where city dwellers learn new skills to grow their own food.²³

FAMILY FARMERS NETWORK, QUEBEC

Imagine having a fresh, healthy basket of locally-grown food delivered to your workplace every two weeks each summer. And imagine being able to connect with the farmer who produces that food. Montreal-based non-profit Équiterre has helped make this dream a reality for over 35,000 Quebecers with the Family Farmers Network.

Produce from more than 100 local family-run farms can be collected at 450 delivery points across Quebec, including workplaces, supermarket parking lots and even commuter train stations! Food delivered through the network travels a much shorter distance than the food in an average North American meal, which can travel an average of 2,400 kilometres from farm to plate.²⁴



MOVING IN A LIVEABLE WORLD

The carbon pollution from transportation in Canada accounted for 23 per cent of our greenhouse gas emissions in 2013.¹⁶ This large figure is a direct result of how our cities are designed, often based around the concept of suburban living with large housing plots.

This type of urban design makes car ownership a necessity, as suburban sprawl is difficult to service with public transit. With the growth of multi-car homes, more than three-quarters of all Canadians of driving age own a vehicle.¹⁷ As a result, personal vehicles account for the biggest share of household emissions in Canada.¹⁸

Electrified mass transit is a key solution to this unsustainable situation, and Canadian cities are leading the way in rebuilding transportation systems. In many provinces, the availability of cheap hydroelectric energy means there are major climate gains in filling efficient electric vehicles with a large number of passengers.

In our major cities, many buses and trains run on diesel. But the direct benefits to air quality and climate are pushing city planners to consider a big shift to electrification. As for private car ownership, charging stations for electric cars are popping up across the country. With more than a thousand charging stations from coast to coast, it's now possible to cross the entire country in an electric vehicle.¹⁹ With no tailpipe necessary, electric vehicles are the perfect way to transport ourselves in a stable, livable climate.

And when it comes to the greatest climate-saving vehicle of all, we don't need to look for a new solution. The bicycle has been with us for centuries, and it's increasingly restoring itself as a valued transport option in our cities. With the only emissions being sweat, there are climate benefits each time we opt to ride to a destination rather than take the car.



Photo left: A local company in Vancouver delivers office supplies by bike (Creative Commons), right: Quebecers collect produce from the Family Farmers Network (Mathieu Roy).



FOOD FOR A HEALTHY CLIMATE

When you think about what climate change will look like for Canadians in the next few years, one increasingly important topic is the price and availability of food.

In today's globalized marketplace, a lot of our food is coming from afar. Check out those tiny labels on your fruit – it's not unusual to see apples from New Zealand on Canadian supermarket shelves!

What is the connection between globally-sourced food and climate change?

Firstly, it's about water. For instance, climate change is causing longer and more severe droughts in major food-producing regions like California²⁰ – the US state that produces over one-third of the fruits and vegetables eaten by British Columbians.²¹ When water shortages affect places that produce so much of our food, the impacts are felt thousands of kilometres away.

Secondly, it's about the fossil fuels used in growing the food and getting it to our supermarket shelves. The fertilizers used in large-scale,

industrial farming are often made from fossil fuels, and require even more energy to manufacture and transport. Some fertilizers create a gas called "nitrous oxide," which has an even bigger impact on our climate than carbon dioxide.²²

When food is grown in another country, fossil fuels are also used to get it from the farm to your plate – whether by plane, ship, train or truck.

Thankfully, farmers across Canada are challenging the large-scale, globalized version of agriculture that has dominated our food systems since the 1960s. SPIN farming (short for "small plot intensive" farming) is gaining ground as growers realize the potential of smaller farms with very fertile soil. Organic, chemical-free agriculture is ideal, especially when it's local. When these types of farms are supported by nearby communities through programs like Community Supported Agriculture (CSA), the amount of fossil fuels required to both produce and deliver food is drastically reduced.

Agriculture in Canada, which is dominated by large-scale industrial farming, accounted for 10 per cent of the country's total climate-changing gas emissions in 2013.²⁵

CANADA'S GOVERNMENT NEEDS TO STEP IT UP ON CLIMATE

As this report has shown, many powerful climate solutions are available to us as individuals. Sometimes these options cost a little more than the dirtier, more polluting alternatives, but most of them pay for themselves over an extended period of time.

Municipalities and provinces have been leading the way in promoting alternatives to tackle climate change. But Canada's federal government also has a role to play. By supporting new technologies and energy alternatives, the government could help make these cleaner options more affordable for people like you. In the long term, promoting these solutions could also help reduce taxpayer costs in areas such as public health, which would benefit from a healthier climate.

When it comes to energy, it is clear a shift is happening. Economists who once doubted renewable energy's

ability to compete with dirtier fuels like coal and oil are now shifting their perspective.²⁶ Around the world, more renewable energy capacity is being added each year than oil, gas and coal combined. And with the price of wind and solar continuing to decrease, analysts are suggesting that fossil fuels have already "lost the race against renewables."²⁷

The shift to renewable power is happening despite the Canadian government's continued support for dirty fossil fuels, both politically and financially. Canada's federal and provincial governments subsidize the fossil fuel industry to the tune of \$34 billion annually, while global subsidies for the industry reach almost \$2 trillion every year.²⁸ If these figures were directed toward helping Canadians adopt some of the technologies in this report, fossil fuels wouldn't stand a chance!



Photos above: Tar sands bitumen processing plants in Alberta (garthlenz.com), Vancouver bike lanes (Paul Krueger).



Photo: WC National Campaign Director Joe Foy at Earth Day Festival, Vancouver (Michael Wheatley).

PAYING THE PRICE FOR CARBON POLLUTION

Some parts of Canada are already experiencing the powerful effect of putting a price on carbon pollution. In British Columbia, the provincial government imposed a tax on carbon in 2008, starting at \$10 per tonne and increasing by \$5 every year until it hit \$30 per tonne. Within five years, BC's economy grew while the amount of fossil fuels used (and carbon pollution created) by each British Columbian dropped by 16.1 per cent.²⁹

With Alberta, Quebec and Ontario all pricing carbon in one way or another, it's about time that a national price on carbon pollution was set. Without it, the cost of the damage caused by fossil fuels will continue to be paid by Canadian taxpayers.³⁰

A price of \$100 per tonne of carbon pollution would shift Canada towards a cleaner future, and the resulting revenue could be used to support some of the solutions mentioned in this report. Now that's a tax we can all support!

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TAKE Action

How you choose to live can be your solution to climate change.

- Buy local.** Look for food and other products that are made close to home – the extra cost is worth it. Visit the nearest farmer's market or a community-supported agriculture (CSA) program. Or even better, grow your own food!
- Reduce your energy consumption.** Who would have thought that the common bicycle could become such a powerful weapon against climate change? Whether you're riding your bike or taking the bus or train instead of your car, turning down the thermostat, installing power-saving retrofits on your home or using more efficient appliances and lightbulbs, your daily choices can make a big difference.
- Join the Wilderness Committee in the fight to stop tar sands pipelines.** The tar sands are Canada's largest contribution to climate change, and the industry produces the dirtiest oil on the planet. An expanded tar sands industry is not compatible with a safe, livable climate. That's why we are playing our part to stop major tar sands pipeline projects like Kinder Morgan's Trans Mountain pipeline and TransCanada's Energy East pipeline.
- Write to Canada's Environment Minister** and urge the federal government to walk away from tar sands pipelines and support a healthy climate by putting a price on carbon pollution.

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