ONTARIO'S CLIMATE FUTURE AND THE FOUR CRITICAL QUESTIONS DETERMINING IT

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In the months leading up to the 2022 Ontario election, the federal government released three documents that should have reshaped the campaign.

First, a Clean Energy Standard discussion paper laid out possible approaches to net-zero electricity by 2035, including an indication that Ottawa would not recognize natural gas as a transition fuel for electricity beyond that date. Next, the Emissions Reduction Plan outlined sector goals for the economy, including a desire for a 42% reduction in emissions from oil and gas production and a mandate for Zero Emission Vehicles to account for 60% of new vehicle sales by 2030. And third, Budget 2022 promised $15-billion for a new green growth fund to underwrite the transition through Canadian technologies and markets.

For all the signals from Ottawa, though, Ontario's policy debate barely flinched as the Ford government and opposition parties opted to focus on the here and now of a taxing pandemic and uncertain recovery, rather than the long horizon of climate policy.

Regardless, the next government may need to come to grips quickly with the need for Ontario to catch up with the race to net zero. The province's economy and climate commitments could hang in the balance, as the country and much of the world reorients for a new era of energy and climate disruptions that will require dynamic markets and flexible policies to keep challenges such as inflation, supply chains and labour markets from setting back economic growth and climate progress.

This year has already reframed Western politics with a new *trilemma* of energy, climate and economy. Some governments have accepted they can only hope for two of the three, and know political history suggests voters tend to put energy affordability and job security ahead of climate.

A recent report from RBC Economics and Thought leadership suggests a trifecta is actually possible, but only at significant cost to government. According to the report, "The New Climate Bargain: How Canada Can Manage Energy & Climate Security," that cost will be in the tens of billions of dollars, principally through emissions abatement technologies such as carbon capture to help major oil companies capture emissions onsite and pipe them to natural underground reservoirs — an approach that could see Canada increase oil exports by 500,000 barrels a day.

Ontario may need to consider similar pragmatic, and costly, trade-offs to thread climate strategies through the small eye of politics. Provincial leaders know voters don't hold them to account for gas prices — the world determines those — but do blame them harshly for high electricity prices, as the Wynne government discovered in 2018. For the June election, Ford's Progressive Conservatives are looking to a 3H strategy — housing, highways and hospitals — to speak to the daily concerns of suburban and small city voters. A fourth H — hydro — is at best something to be left for a second term, should the government be re-elected.

Over the next quarter century, Ontario will need to roughly double electricity production, and rethink the wiring of old neighbourhoods, planning of new communities and retooling of industrial incentives. None of this can be done in isolation. If the province and Canada are to meet the Net Zero pathway ambitions of 2030, the next Ontario government will need to play a leading role in a serious federal-provincial dialogue about economic transitions. The past half-decade of aspirational talk — "the economy and environment go hand in hand" — will need to give way to a pragmatic and strategic approach to the country's competitive advantages, including how to massively increase electricity supply in a way that doesn't impoverish the country or any region. And the focus of climate strategy will need to shift from the supply side of the oil and gas hinterland to the demand side of the country's major population centres, notably in southern Ontario.

To do that, the next government will need to address **four critical questions**:

1. Where will all this new electricity come from?

Ontario has a relatively green grid, thanks in large part to the transition over the past 20 years to replace cheap, dirty coal with expensive, clean renewables. Now comes the hard part.

To power a province of electric vehicles and homes heated by electricity rather than gas, Ontario will need a huge increase in productive capacity. Some of that can come from wind and solar, which together account for about 15% of production and can be 30% cheaper than natural gas. Nonetheless, fast-growing cities and new manufacturing centres will continue to need a lot of natural gas, which accounts for just under 10% of the province's electricity generation, as a transition fuel. That, in turn, will require the province to produce a clear transition plan to convince Ottawa and financial markets of the pathway to net zero, including how much reliance will be needed from abatement technologies, such as carbon and methane capture, and offsets like protected lands and forests.

Intermittency will be another challenge, especially for the Greater Golden Horseshoe (GGH), where a complex and dense web of residential, commercial and light industrial districts is not adequately wired for projected population growth, which could add a million people to the City of Toronto itself by 2050. Smart technologies to optimize grid management could help, but they won't offset the fundamental tensions growing between supply and demand. Retrofitting existing natural gas turbines so they can combust hydrogen can also help the province transition to emissions-free electricity without massive disruptions to the province's current network.

Most models show that a reliance on natural gas cannot continue if the province, and therefore Canada, is to get to net zero by 2050. According to analysis by the Montreal-based Trottier Institute, the share of fossil fuel consumption will need to drop sharply, starting in 2030, and sharper still through the 2040s. It suggests oil consumption will need to drop to 32% of 2016 levels and gas to 16%.

To get there, the province will need to rely on emerging technologies, including medium-duration energy storage, geothermal energy, hydrogen and new forms of nuclear energy. While costly refurbishments of current nuclear facilities will be critical to keeping the present system running, and getting emissions down by 2030, they won't be able to address future demand from population and economic growth, as well as transitions away from gas. Many advocates, including the federal government, believe small modular nuclear reactors can be a significant source of energy and perhaps an export opportunity, as CANDU technology once was.

Such plants can also be located in regions that have more open space, so long as transmission lines to major centres are available. Ontario may need four or five such facilities. Consider the retired, coal-fired Nanticoke Generating Station, which sits idle and yet has transmission lines leading to the GGH. Whatever the sites, local pressures, and political resistance to nuclear, will be contentious. So, too, will cost, as no one has developed such reactors at a critical scale. Environment and Climate Change Canada estimates the current cost of small modular nuclear production to be $9,584.69 per kilowatt — about 2.5 times the cost of conventional hydro, five times the cost of onshore wind and six times the cost of solar photovoltaic energy.

Hydro also remains an option, and equally questionable for cost. According to the Trottier Institute's 2021 Canadian Energy Outlook, Canada enjoys the world's third largest reserve capacity for hydroelectricity, which along with uranium, oil and gas remain competitive advantages. A massive expansion of Ontario and Quebec's grid and inter-ties between the provinces could bring more electricity from the James Bay region, provided there were a new commitment to inter-provincial cooperation and strong support from Ottawa. The Canada Infrastructure Bank would also be needed to absorb enough of the risk of such projects to give comfort to private investors, including pension funds, needed to underwrite the effort. Indigenous ownership would be additionally critical, in ways the province has not reconciled with in the past.

What's needed: An Ontario energy plan — and capital budget — for the 2030s and 2040s by 2025.

2. How can more housing be built without more energy being burned?

Ontario faces a housing crisis, and traditional ways of addressing the shortage will only compound the energy and climate crisis. New models are needed, from house design to community planning.

Roughly half the energy used to heat Ontario homes comes from fossil fuels, and that share continues to grow with every new subdivision. In the U.S., Rewiring America, a non-profit, estimates 100 million homes need to be rewired to replace gas-heated furnaces and hot water systems. Add in the need for EVs, and the cost per U.S. household works out to about US$70,000.

For Ontario, building retrofit costs alone could reach $700 billion over the next 25 years, and would likely need to be split between homeowners and government. Costs would come down over time, and scale can be achieved with incentives for neighbourhood-wide retrofits, including installation of heat pumps. But a province-wide housing plan, with new building codes and standards, would be needed, along with more demonstration effect. In the U.S., pilot projects are underway to build neighbourhood grids that allow homeowners to pool electricity from rooftop solar panels, as well as connect their supply with a larger grid to ensure they can manage peak periods of demand as well as sell excess supply to the wider system.

Ontario faces another challenge. Who will do all the work? The province already faces a skilled trades crisis, with job sites unable to keep pace with demand. As a recent RBC report, "Green Collar Jobs," laid out, Canada will be short millions of climate-skilled workers in the coming decade if new training and reskilling programs are not developed. This includes the mainstay of the Ontario economy and could hold back the transition if there aren't enough manufacturing workers for battery plants, construction workers to install heat pumps and electricians to build community grids.

What's needed: An expansion of the recent provincial housing strategy to include planning and financing tools for community grids, neighbourhood retrofits and skilled trades programs.

3. How will the province's overcrowded highways be rewired for EVs?

It's ironic, in some ways, that the provincial government committed to a new superhighway, the 413, to connect the east-west 401 at Mississauga to the north-south 400 at Vaughan. The six-lane expressway will be a boon to commuters in the 905 region, and presumably a political plum to candidates in that region. It also promises to ease one of Canada's worst choke points, the 401-400 interchange. And critically, it could help position Ontario for the net-zero manufacturing economy, as battery makers, critical mineral suppliers and EV manufacturers study the GGH for site prospects.

The province is in the equivalent of an arms race for those mandates with Michigan, Ohio and Tennessee. The next provincial government will need to work closely with Ottawa to present a competitive option, which includes green electricity and a skilled green labour force, as well as a better approach to permitting, regulations and taxes, if it wants to be part of the supply chain of a newer, greener manufacturing economy. But it also can attract investment by ensuring that highways and connected communities are part of that bigger vision. Like much of the U.S., Ontario tends to accommodate population growth through suburban sprawl and single-vehicle transportation. The province can change that with a master plan for highways wired for EV charging, and connected, green communities that change the nature of neighbourhoods and urban thinking.

The province can further show North American leadership by creating financial platforms to allow private enterprise to pool public and private capital to build those highways and other infrastructure such as inter-city rail. This will mean charging stations, large battery facilities and connected wiring to reduce range anxiety as the province prepares for a rapid shift to EVs. Ontario can also consider hydrogen corridors, similar to what Alberta is building for Calgary-Edmonton, to encourage trucking fleets to convert to hydrogen-fueled vehicles. None of this should be considered in isolation, however, as Ontario transportation design needs to be done in concert with U.S. federal and state policy, if the province is to remain as connected in the future as it has been in the past with the I-75 economy.

What's needed: Canada-US energy talks, to ensure both federal and key sub-national governments collectively shape the highway systems of the 2030s.

4. Will consumers pay?

The climate transition, and energy transition, will require leadership from government, business and civil society to help an uneasy public see a way through several more years of uncertainty. It also will require a far greater sense of individual responsibility — to manage household emissions, to understand the costs and benefits of choices, and to engage in community and local efforts to get to net zero.

For many years, the province put the costs of electricity development on the shoulders of industry rather than consumers. That eventually contributed to the exodus or closure of thousands of Ontario manufacturers, and significant pushback from commercial farming operators. Other provincial governments, particularly in Atlantic Canada, have backed down from efforts to get ratepayers to pick up more of the tab of transition to greener power generation. But over the next decade, most provinces will need to engage the public in a new conversation about the costs and benefits of clean electricity.

That includes capital costs. The country will not be able to shift to EVs, or solar-powered neighbourhoods, without massive upfront investments in infrastructure. Ontario can lead the way by creating a new platform to bring together public and private capital to help communities build new local infrastructure, and to help distributors build out networks for charging. The capital is available, from private investors and the federal government, and might benefit from a provincial entity that is aware of local preferences and planning needs, and able to coordinate efforts across regions.

Markets can play a role. The world is moving towards a market-based approach to transition, including the rapid development of international markets for the trading of emissions, and international standards for offsets. Ontario can be a leader in the shift, using the power and influence of Toronto as a financial and market centre, including the roles played by the many global financial institutions based in the province.

Inevitably, though, the next provincial government will need to assess where it wants to allocate financial resources, as it faces ongoing demands for more spending on health care and education. It will be challenging to make a case for energy subsidies, even to support the transition to net zero, and the next government may need to help consumers adjust to the idea of paying more, at least for the foreseeable future. It's an argument that would require extraordinary political leadership, and alignment with federal fiscal policies around carbon taxes and rebates — and a public accepting that, just as climate change is real, climate action is not free.

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