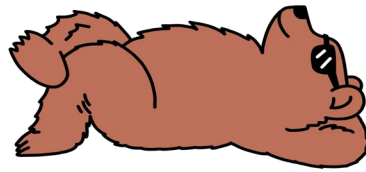


photographs by
Sarah Wright

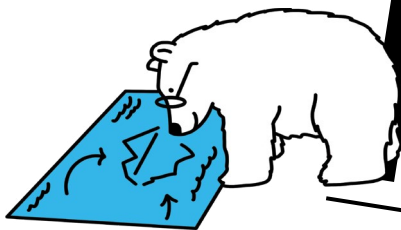
illustrations by
Sam Island



SIX IDEAS FOR A STRONGER, FAIRER AND MORE

SECURE CANADA

BIG COUNTRY, BIG IDEAS



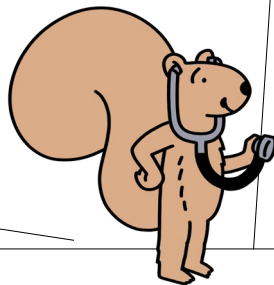
Canada stands at a crossroads. In this issue, U of T experts explore solutions to strengthen health care, protect the North, and expand our global impact. They show how sustainable technology, fair housing, and justice for Indigenous Peoples can shape a stronger, more resilient country — and chart the path forward for all Canadians.

UPDATE

THE CANADA HEALTH ACT

After four decades, the landmark law still protects universal care - but U of T experts argue it must evolve to face modern pressures

by
Ishani Nath



(PHOTO RETOUCHER) DANIEL HEARN; (LIGHTING) RO AGALAWATTE



● **They arrived before** the sun. On a snowy January morning in Walkerton, Ontario, hundreds of people began 2025 by lining up, bundled in scarves and winter coats, hoping to score the hottest ticket in town: the chance to register with a family doctor.

The crowd represented only a fraction of the more than six million Canadians who currently lack a family physician, and their presence was a stark reminder that, despite its reputation, the country's universal health-care system has gaps big enough for millions to slip through.

For many Canadians, universal health care is a point of pride. The Canada Health Act, passed by Parliament in 1984, is the legislative backbone of this system. It ensures that most residents can see a doctor or visit a hospital without worrying about the bill. Yet in the more than 40 years since its passage, the act has never been substantially updated.

Now, with the health system strained by long wait times, a critical shortage of family doctors and rising rates of mental illness and addiction, some health experts argue the time has come for a Canada Health Act 2.0.

"We need to fundamentally alter our thinking because not all Canadians have access to the medically necessary care they need," says Gregory Marchildon, a professor emeritus at the Institute of Health Policy, Management and Evaluation at the Dalla Lana School of Public Health and one of the country's leading voices on health policy. He wants us to rethink what it means to have "reasonable access to health services" and to redefine which health professionals can provide care.

ONE STANDARD FOR ALL

The Canada Health Act was designed to ensure that no matter where in the country someone lives they receive the same standard of health care without having to pay out of pocket. This ethos

is opposite to what airlines use, says Marchildon: “There’s no business class, there’s no economy class, there’s just one class.”

The legislation, only 13 pages long, sets out criteria for what services must be publicly covered. Provinces and territories then receive federal funding via the Canada Health Transfer, based on how they meet those criteria. Marchildon, who has written extensively about the introduction of Medicare in Canada, compares the act to a house: it provides the basic layout, and the furniture and appliances required, but leaves the provinces and territories free to add extras. He says the act was initially effective in making health care more accessible for those who previously couldn’t afford it.

Back then, however, the focus was on medically necessary hospital and physician care. Services from nurse practitioners, addiction specialists, physiotherapists and occupational therapists were not included under the act. Neither were First Nations’ traditional healing and treatments. Some provinces and territories have since passed legislation to cover these services, but access depends on where a person lives – and their ability to pay. Ontario, for example, saw several private nurse practitioner-led clinics pop up last year, with fees ranging from \$70 a visit to more than \$400 for a yearly membership.



“IT’S ALL ABOUT STRENGTHENING THE SYSTEM WE HAVE AND BUILDING ON OUR SUCCESS.”

—GREGORY MARCHILDON

The Canada Health Act passed the House of Commons in April 1984 with all-party support – a rare unanimous vote (264-0) – and received Senate approval just weeks later.

Provinces risk losing a portion of their Canada Health Transfer, today worth more than \$50 billion a year, if they breach the act’s principles.

Having moved to a new city, Marchildon himself is among those without a doctor. The last time he was sick, he simply didn’t receive care.

“But we can’t just keep adding more doctors,” he says. “That doesn’t do the trick.

“Good primary health care requires the contributions of many others. Nurse practitioners, for example, can more easily provide services to people living in areas chronically underserved by traditional family physicians.”

MODERN PRESSURES

The cracks in the system show up in many ways. In addition to the difficulty of finding a family doctor, many Canadians report exceedingly long wait times or barriers to care – delays that have been intensified by backlogs from the pandemic. In 2024, at least one in four people waiting for a hip or knee replacement didn’t get surgery within the recommended six-month window. More than half of young adults with early signs of mental health issues said cost kept them from seeking care. And one in 20 Canadians took measures such as skipping doses or delaying refills because of the out-of-pocket expense of prescription medication. The house, as Marchildon described, needs renovations.

“The act was groundbreaking in its time, but the care we need now goes far beyond hospitals and doctors,” says Sara Allin, an associate professor at the Dalla Lana School of Public Health and co-editor of the journal *Healthcare Papers*, which devoted a recent issue to reimagining the Canada Health Act.

Allin explains that changing the act is “the only real tool the federal government has to influence and shape the way the health system is organized.”

Marchildon agrees, noting that the current definition of “reasonable access” focuses almost entirely on eliminating user fees. “If access in the Canada Health Act was defined to include *timely* access, then provinces and territories would strive to reduce the most unacceptably long waiting times and barriers, since none would want to lose part of their cash under the Canada Health Transfer,” or, more significantly, he adds, “the bad publicity that comes with being in breach of the Canada Health Act.”

WHAT REFORM COULD LOOK LIKE

Revising the act could mean expanding insured services to include a broader range of health professionals – from nurse practitioners and midwives to addiction specialists – no matter where you live.

Marchildon argues that it could also mean building in greater accountability and transparency measures. In 2024, for example, the Canadian Medical Association called for a Chief Health Accountability Officer to monitor how the provinces and territories are meeting their obligations under the act – and to publicly report outcomes. “So much of our taxes go toward this transfer,” says Allin. “Updating the act could help ensure we get more out of that investment.”

Critics will raise concerns about the cost associated with adding more services to an already pricey publicly funded bill. But supporters counter that many changes could be achieved through more efficient organization, not just more spending. Nurse practitioners and physician assistants can often provide high-quality primary care less expensively than physicians, while expanded roles for pharmacists or midwives could also achieve

savings and relieve some of the workload falling solely to family doctors.

THE POLITICS OF CHANGE

Revising such an iconic piece of legislation, let alone one that hasn't been significantly updated in 40-plus years, is not simple. In that time, governments have sidestepped the issue by creating parallel legislation or "letters of interpretation" that adjust definitions without changing the act.

Last January, then federal Health Minister Mark Holland released an interpretation letter (effective next spring) to add health professionals including nurse practitioners, pharmacists and midwives to the list of "insured services" providers. Marchildon says steps like this are helpful but warns that these changes can be easily reversed as politics or parties change.

"One of the protections of the Canada Health Act is that it's of such great importance to Canadians that it is very difficult, for good reason, for the government to make major changes," says Marchildon.

Building consensus for change among provinces, territories, political parties, various stakeholders and the public will be a daunting task.

But Allin and Marchildon argue that the moment may be right. After four decades, Canadians have a clearer sense of the system's strengths and weaknesses. And the pandemic underscored both the value of universal health care and the urgent need for modernization. The act has ensured generations of Canadians access to care without paying out of pocket. The question now is how to protect that principle while adapting to 21st-century realities.

"Yes, there are challenges – but we've built something worth protecting, and we can make it better, from the bottom up with improvements to service delivery at a local level facilitated by provincial reforms, and from the top down through improvements to the Canada Health Act, initiated by the federal government," says Marchildon.

"It's all about strengthening the system we have and building on our success." ♣



INVEST IN INNOVATION

U of T experts argue that the country's economic future depends on turning ideas and resources into high-value industries

by
John Lorinc



In a chaotic moment when decades-old alliances and trade relationships have been upended seemingly overnight, Canadian leaders face a generational question: how can our country earn influence in a rapidly changing world order?

Great power rivalries are eclipsing previously stable global norms, leaving middle powers such as Canada to reassess their roles. “If you had asked me five or six years ago, I would have said the country that controls the process of globalization through institutions is the great power,” observes Manjari Chatterjee Miller, an international relations professor at the Munk School of Global Affairs and Public Policy. “That was the United States. Today, the international order built by the U.S. is in flux.”

Canada’s response, experts argue, should focus on an ambitious domestic agenda to boost productivity through innovation and harness its natural resources in new ways. This means developing new technologies to refine raw materials domestically and exploring new markets outside North America. Yet Janice Stein, founding director of the Munk School and the Belzberg Professor of Conflict Management, cautions against expecting sweeping changes overnight. “If we’re able to reduce the share of our exports going to the U.S. from 75 per cent to 65 per cent, that would be an achievement,” she says. “These next 10 or 15 years truly have to be about investing energy and effort in our own society, and preparing for a very different global economy.”

A *Financial Times* column published earlier this year points to Canada’s potential role as an energy and critical-minerals superpower. Endowed with

abundant natural resources, Canada possesses oil, uranium and potash, and increasingly crucial substances such as lithium, rare-earth elements and graphite. These materials are essential for the global transition away from carbon. “A country with [Canada’s] geography could clearly generate higher output,” wrote economist Tej Parikh. “To do so, the Canadian economy needs to become more efficient, raise investment and attract more high-skilled workers.”

But Canada’s future prosperity cannot rely solely on commodities. Dan Breznitz, a professor of political science and the Chair of Innovation Studies at the Munk School, says governments and businesses must focus on developing and exploiting home-grown intellectual property in ways that have previously eluded policymakers.

“Both the private and public sectors in Canada avoid engaging with new knowledge and new technology,” he says. “The result is falling productivity. We have the most highly educated workforce in the world, yet they work with old technology, old equipment and the old way of doing things.”

BOUNDLESS POTENTIAL

He draws a cautionary parallel with Argentina, a resource-rich nation whose recurring economic crises stem from an open-markets policy and the foreign acquisition of domestic resources. In Canada, long-stalled

Our reserves of rare earth elements are estimated at 15 million tonnes, but we depend on imports from China for usable, separated rare earth products.

median wages and low productivity rates reflect long-standing assumptions that natural resources will be processed abroad, that intellectual property will be acquired by offshore investors, and that Canadian firms looking to commercialize inventions must head south for venture capital. An alternative future, Breznitz argues, requires a strategic approach that uses Canada’s deep talent pool and vast resources to become a global player in selected sectors.

Stein points to the case of rare earth elements and critical minerals. While Canada holds some of the world’s largest reserves, the processing of these minerals is overwhelmingly concentrated in China. Sustained investment by China, as well as lax environmental standards, have given that country enormous clout in global supply chains, including over the U.S., for electronics and other high-tech products. “We need a grown-up discussion,” Stein says. “Do we want strategic leverage in that market? What costs are we willing to pay? What investments are we willing to make?”

What investments are we willing to make?”

Breznitz argues that policy should aim to jumpstart domestic innovation by commercializing Canada’s world-leading research. The Canadian government, he says, must encourage long-term experiments in strategic sectors, including banking, telecommunications, health, quantum computing and new materials. Policy interventions might include reducing market concentration in finance and telecom, attaching conditions to R&D tax incentives to prevent the loss of valuable intellectual property to foreign investors, and giving innovators incentives to test, scale,

Canada holds approximately 10 per cent of the world’s proven oil reserves, 30 per cent of the world’s potash (the largest share), and about 10 per cent of the world’s uranium reserves.

“WE HAVE THE MOST HIGHLY EDUCATED WORKFORCE IN THE WORLD, YET THEY WORK WITH OLD TECHNOLOGY, OLD EQUIPMENT AND THE OLD WAY OF DOING THINGS.” —DAN BREZNITZ



and also abandon floundering projects quickly. He cites examples such as AI large language models and semaglutide (the drug used to treat diabetes and facilitate weight loss, and sold under various brand names, including Ozempic). Semaglutide originated in no small part from research by Daniel Drucker, a U of T professor in the department of medicine working at Mount Sinai Hospital, but was commercialized by the Danish pharmaceutical company Novo Nordisk.

The driving principle, Breznitz adds, is maximizing high-value-added exports. This includes developing and commercializing clean mining technologies to process the minerals that will power a low-carbon society. “That’s how you grow our economy.”

WATERSHED MOMENT

Miller notes that the abrupt shift in Canada’s political relationship with the U.S. represents an inflection point that is pushing governments and businesses to revisit long-standing assumptions about our place in the world. Canada, she observes, has always existed under a “great power umbrella” – first the British empire, then the post-war U.S.-led order.

If this umbrella is gone, then Canada has some thinking to do. Our new and uncomfortable insecurity – of no longer being able to depend on a unique continental alliance – should provide not just a slogan (“elbows up”). It should fuel the political will to allow Canada to overcome the economic complacency that characterized the NAFTA era.

Canada can aim to become a mid-sized strategic power, like South Korea, with its high-tech manufacturing, or Switzerland, with its pharmaceutical industry, says Breznitz. “We don’t need to control everything. We can serve as an example of a rule-abiding, strategically open, and welcoming economy that the rest of the world aspires to. But for that,” he stresses, “we need to be ambitious.” ♣



A decade after the Truth and Reconciliation Commission’s Calls to Action, U of T experts weigh the gains, the gaps and the next steps

ADVANCE JUSTICE FOR INDIGENOUS PEOPLES

● **Canada has taken** steps toward reconciliation with Indigenous Peoples, but justice remains unfinished work. Here, Indigenous legal scholars John Borrows and Douglas Sanderson, and political scientist Sheryl Lightfoot speak with *University of Toronto Magazine* editor Scott Anderson about what’s been achieved, where the country is falling short and how to bring about lasting change.

Where have you seen the most encouraging progress since the Truth and Reconciliation Commission issued its Calls to Action – and where is Canada still lagging?

Douglas: The most meaningful change is widespread recognition that

Aboriginal Peoples exist and have a history – and that many details of that history are unjust. I don’t think there is general agreement on anything else except that residential schools were bad.

John: It was important that the Truth and Reconciliation Commission directed its Calls to Action not just to governments, but to the public, to universities, health-care organizations, arts groups, social workers – everyone.

Sheryl: One of the most remarkable innovations was calling on all levels of government – federal, territorial, provincial and even municipal – to adopt the United Nations Declaration on the Rights of Indigenous Peoples. This call for deep structural change opened the

possibility for governments to act, and we can acknowledge some progress. But one shortcoming is the lack of independent monitoring.

Douglas: Land acknowledgments in public schools may prove to be the most consequential. These are helping to shape a generation of children who understand that we are all living on Aboriginal lands, and that wrongs were done. When this generation is in charge of business and politics, things might become possible that are inconceivable to us now. We're not done with truth, though; there's much more to tell.

How do you distinguish reconciliation from justice?

Douglas: Justice provides a framework for identifying wrongs and making them right. People can struggle with reconciliation because they treat it as a thing to do rather than an end to achieve.

John: Justice is perspectival. You can't have only a top-down understanding of what's required to create meaningful and fair change. Indigenous people's voices, in particular, have been left out. Their own laws have been left out of defining what justice means. To create a more just society is to involve Indigenous people's own perspectives, legal traditions, standards, principles, criteria and authority.

Sheryl: As a country, we've taken baby steps toward accepting Indigenous legal orders alongside Canadian institutions. We're seeing innovations in British Columbia that will force us to rethink how we understand jurisdiction, title, property – and that could be revolutionary in some respects. But we are a long way from that nationally.

The “land back” movement – an Indigenous-led effort to reclaim stewardship of traditional lands – is often misunderstood. How would you explain what it really means?

Douglas: Land back is about

Douglas Sanderson is a professor and the Prichard Wilson Chair in Law and Public Policy at U of T's Henry N.R. Jackman Faculty of Law and the faculty's decanal advisor on Indigenous issues. →

↓
John Borrows is a professor and the Loveland Chair in Indigenous Law at U of T's Henry N.R. Jackman Faculty of Law.



governance, lawmaking and jurisdiction. Land itself is a small part of the equation. When non-Aboriginal citizens hear “land back,” I think what they hear is, “Get off my land,” and this contributes to the problems we are facing. We have to be able to talk about these issues with our settler neighbours in a way that is not frightening



to them. So, I don't like the phrase “land back.”

John: I don't like it either.

Sheryl: I'm not a fan myself.

Douglas: Because the land isn't actually what we're after. It's decision-making authority. That conversation, I think, is less frightening to people. It's incumbent upon us as scholars to start talking about this in different ways. And while courts can decide particular issues between particular parties, the question of justice and how we're all going to live together side by side is one that we need to decide for ourselves.

John: Even when a decision comes down from the court, most of the work needs to be done by citizens.

Sheryl: There have been experiments in New Zealand for a generation and a half concerning land back, co-governance and co-jurisdiction. There's usually an apology, a redress package and a conversation about what parcels of Crown land can be returned.

Sometimes the claimant group wants the land for commercial purposes or economic development; other times they want to return it to its natural state. In those cases, co-governance is often set up between the Māori group and the municipal government so decision-making becomes collaborative. As we consider land back, it's vital to stay open-minded about arrangements that honour everyone's duties to the land.

Since none of you like the slogan "land back," how might you rename it?

Douglas: I've seen "jurisdiction back" stickers, which is more apt but not good.

John: I like the seven grandmother-grandfather teachings amongst the Anishinaabe: "love, humility, respect, courage, truth, wisdom, honesty."

Douglas: Principles to govern a relationship.

John: That's right. It's not catchy, like

"land back." But those are the ways you live productively and helpfully.

Sheryl: For me, land back reflects a certain style of two-dimensional, colonial thinking – yours or mine, zero sum. What we're saying is relationships are far more than two-dimensional. It's about living with the land, living with the other people on the land, living with the non-human creatures of the land. And this invites a much more complex way of relating to and understanding one another that cannot be easily sloganized.

Looking ahead, what guides your work for justice?

Douglas: People want change to happen fast. So, I'm concerned that they will throw up their hands if they don't see progress. Aboriginal peoples are not going to give up their desire for massive structural change, but my settler neighbours might not see significant change and get bored of trying – especially when they're not even sure what it is they're supposed to be doing. I remind them that everything we do today has the potential to radically change the future. It took a long time to get into this mess and it will take a long time to get out. But it needs constant maintenance, care, love, honesty, truth.

Sheryl: Institutions don't change quickly by design. And progress is never linear. There will always be push-backs. We have to stay nimble and flexible, and when we hit resistance, highlight it, counter it and find other paths forward – because they're always out there.



Sheryl Lightfoot is a professor of political science in the department of political science and the Munk School of Global Affairs and Public Policy.

“LAND BACK IS ABOUT GOVERNANCE, LAWMAKING AND JURISDICTION. LAND ITSELF IS A SMALL PART OF THE EQUATION”

–DOUGLAS SANDERSON

Ten years from now, what do you hope Canada will have achieved?

John: I hope we recognize that there are many differences of opinion *within* Indigenous communities, families, societies – and that this is something to be celebrated. We have majority opinions and dissenting opinions in the courts. We have majority and minority parties in our parliaments and legislatures. If I'm dreaming, I would like to see that there are different ways to be Anishinaabe, Blackfoot or Salish. These different "ways of being" help us become a more dynamic society, and enable us to deal with dissent and difference. Often these are squelched in the service of trying to present a unified vision to the world or by people's stereotypes of Indigenous peoples.

Douglas: My 10-year ambition for the law school is quite modest. I would like to see non-Aboriginal people teaching Aboriginal law classes, and I would like to see more Aboriginal people hired into tenure track positions teaching anything but Aboriginal law – because they are excellent scholars, not drawing on their identity as Aboriginal persons. That would say to me that we are making real progress.

Sheryl: Ten years from now, on September 30, the National Day for Truth and Reconciliation, I would like us all to have the day off. Non-Indigenous people will be doing presentations for free on that day and taking time to reflect and do the deep work. 🌱

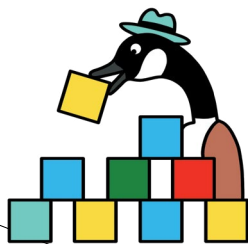


This conversation has been condensed for clarity and flow. A longer version appears at magazine.utoronto.ca.

Canada's housing crisis is squeezing families at every income level, but U of T experts say solutions are within reach.

BUILD HOMES FOR EVERYONE

● **This past spring**, Ben Rayner, a former *Toronto Star* reporter and music critic, found himself homeless. A combination of depression, separation from his partner and prioritizing time with his young daughter had lowered his income. Then, a sudden \$650-a-month rent increase dealt the final blow. Rayner was formally evicted



by Alison Motluk

and began couch-surfing. At his hearing before the Landlord and Tenant Board, he was told that it's not a landlord's job to be moral.

Rayner's story is a stark illustration of how acute Canada's housing crisis has become. At the top, housing has partly become an investment, making it harder for younger professionals to buy homes. At the same time, middle- and lower-income people struggle to find affordable rent, and those at the lowest end are being pushed out of housing altogether. While home ownership may seem disconnected from street homelessness, Alison Smith, an associate professor of political science at U of T Mississauga, says all levels of housing are interconnected: "It's a system."



(PHOTO RETOUCHER) DANIEL HEARN; (LIGHTING) RO AGALAWATTE



Addressing this long-running crisis requires bold action. One place to start, says Carolyn Whitzman, a senior housing researcher and adjunct professor at U of T's School of Cities, is a substantial public investment in non-market housing. She believes Canada should ensure that 20 per cent of the national housing stock falls into this category – roughly matching the share of Canadians who cannot realistically be served by market housing.

Such a target would bring Canada more in line with its international peers who have successfully addressed housing shortages and homelessness. In France, for example, in 2000, the national government set a mandate that 20 per cent of housing in most urban municipalities be non-market by 2020 – and in 2013 raised the target to 25 per cent by this year. The plan was supported through measures such as land purchases, savings bonds and payroll taxes. “So, it can happen,” says Whitzman. “It *has* happened.”

In Canada, by contrast, about 3.5 per cent of housing is non-market. Achieving 20 per cent would require a huge push from both governments and non-profits.

Whitzman traces the problem back decades. In the 1990s, the federal government passed responsibility for housing to provinces and territories. But most jurisdictions built little or nothing. A prevailing view at the time was that the market would solve our housing woes. It didn't. Investors were not interested in building low-rent homes, and the proportion of non-market housing declined, pricing many out of a place to live. “We need to accept that low-income people will never be served by the market,” says Whitzman.

In her recent book, *Home Truths: Fixing Canada's Housing Crisis*, she argues that affordable housing should be regarded as critical infrastructure, no less vital than hospitals, schools, libraries, sewers and bridges. When we invest in housing, the focus should not be only on financial returns, but also on how much *society* can be improved. She notes that non-market housing can reduce substance abuse and violence, lower demand for child

A 40-unit tiny home community in Duncan, B.C., was built for less than \$1 million and provides residents with beds, meals and around-the-clock supports.

Following the setup of the community, crime in the area dropped 18 per cent, emergency medical calls decreased and there have been no fires or floods.



protection and emergency health care, and keep people out of the justice system. In short, affordable housing supports community health.

Canada already has good precedents. Whitzman points to the St Lawrence neighbourhood in downtown Toronto, an innovative, high-density, socially mixed community of more than 4,300 homes built beginning in the 1970s. About one-third of the units are market-rate, while two-thirds are co-ops and public housing. A three-bedroom apartment still rents for as little as \$1,800 a month. “That is the difference that non-market makes,” says Whitzman. “It maintains affordability in a way that market housing simply doesn’t.” She calls non-market housing “perpetually affordable.”

Edmonton provides another model. City leaders there adopted the principle that everyone deserves a home and set a target of 16 per cent non-market housing in every neighbourhood. Revised zoning allows three-storey buildings almost anywhere, and laneway and garden suites can be severed into separate properties. “Edmonton is a poster child for zoning reform,” says Whitzman.

Even Toronto, one of Canada’s densest cities, needs to allow greater intensification, Whitzman says. “Up to four storeys should be permitted in every residential area, without limits on the number of units. We need apartment buildings, we need a new generation of rooming houses, and we need

seniors’ housing. We need everything.” The most important step municipal governments can take, Whitzman adds, is to create an enabling environment for small-scale intensification: “Legalize the housing that’s most needed.”

ENSURING INCLUSION

We also need to keep an eye on affordability, she says – and by affordable, she means housing within reach of people who earn less than half of the median income. A decade ago, the federal government announced it was getting back into the business of building housing and pledged to assist with financing, land procurement and construction. But Whitzman points out that \$55 billion of the \$88 billion earmarked under the National Housing Strategy between 2018 and 2028 has gone toward an apartment construction loan program where only three per cent of the units are affordable to those most in need. “They forgot to look at what affordable means,” she says.

In September, the federal government unveiled Build Canada Homes, a new agency to accelerate affordable housing construction. Whitzman calls it a welcome “restart,” noting that the approach is right but that the program needs to be expanded to meet demand.

While long-term structural change is

critical, Alison Smith says urgent solutions are also needed for those experiencing homelessness right now. She believes that quick-to-construct, low-cost, and well-designed and maintained tiny homes, supported by social services, offer an immediate, innovative solution that more small municipalities and suburbs should consider.

She has studied “The Village,” a community in Duncan, B.C., where one-person sleeping cabins are arranged in three circles, with a communal space including washrooms at the centre. Many residents had previously spent years living on the street. Some didn’t feel safe in shelters and existing supportive housing was full. Smith says the tiny home community “filled a pretty big gap.”

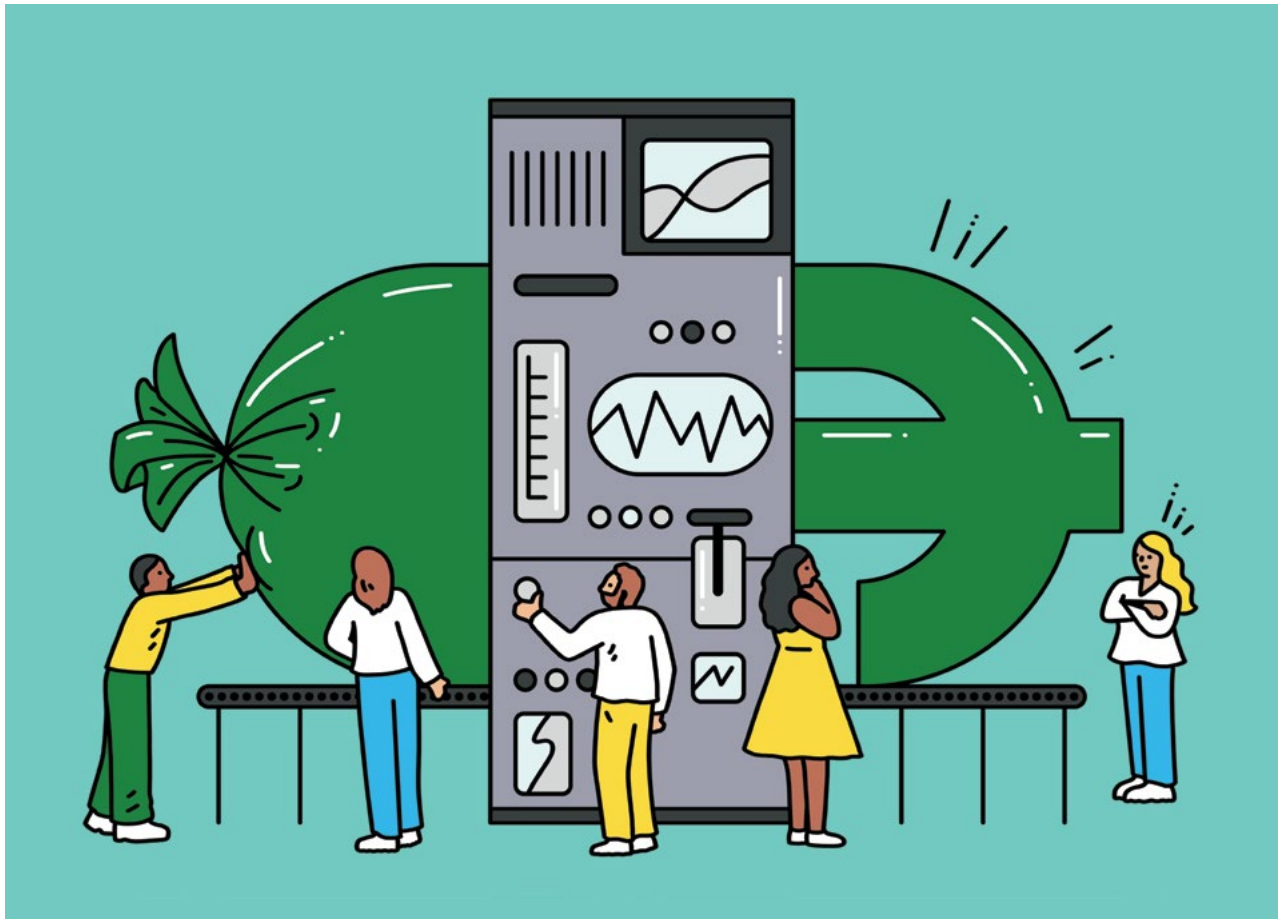
Each unit contains just a bed, a desk and a dresser. All meals are brought to the site, and other supports, such as mental and physical health care, addiction services, skills training and referrals to specialty organizations, are provided for residents, some of them around the clock. The entire project – 40 sleeping cabins and one staffroom cabin, plus two washrooms – cost just under \$1 million to set up. Community opposition was strong at first. But organizers held public meetings to address concerns, and resistance gave way to support. Smith notes that crime in the area has dropped 18 per cent, emergency medical calls have decreased and there have been no fires or floods.

Similar tiny house communities have been built in Manitoba, Ontario, New Brunswick and elsewhere. A limiting factor, says Smith, is land. Funding and arranging the needed services can also be a challenge. Providing the physical home may be the most obvious part of solving homelessness, Smith observes, but there’s so much more that goes into a home: “It’s about safety, it’s about care.”

Canada now faces a choice. The country could decide to become a place where one in five homes is perpetually affordable and where no one is left without a place to live. “What Canada should do,” says Whitzman, “is say that we’re going to end homelessness. We haven’t really said that yet.” ♦

“WHAT CANADA SHOULD DO IS SAY THAT WE’RE GOING TO END HOMELESSNESS. WE HAVEN’T REALLY SAID THAT YET”

—CAROLYN WHITZMAN



TURN WASTE INTO WEALTH

by Patchen Barss

Recycling rare-earth elements and critical minerals could make Canada a global leader in sustainable tech

● The race for global leadership in sustainable energy is also a race for critical minerals – the essential elements in electric vehicles, renewable power systems and other green technologies. These resources are unevenly distributed across the planet, concentrated in just a handful of countries, and geopolitics often dictates access.

Canada, however, has an advantage. Many of the materials identified in the federal government’s 2024 critical minerals strategy (part of a larger climate plan) can be mined domestically. Yet mineral extraction is expensive and environmentally disruptive; resources are finite. As global demand soars, the urgency of reclaiming and recycling critical minerals grows. To lead in sustainable energy, Canada must rely as much on its researchers as its miners.

A recent paper co-authored by Gisele Azimi, a professor of chemical engineering and applied chemistry and a Canada Research Chair in Urban Mining Innovations, predicts that by 2030

an estimated 350 million electric vehicles will produce 10 million tonnes of spent batteries. This represents a massive environmental challenge but also an enormous opportunity – for reclaiming the critical materials contained inside them.

Azimi studies rare earth elements and other materials vital to rechargeable batteries, including lithium, cobalt, nickel and manganese. “When these batteries reach the end of their life, are we simply going to dispose of them, creating massive dumps full of products that are rich in these elements? It doesn’t make sense,” she says.

Recovering these minerals wouldn’t just cut waste but would also support a resilient, made-in-Canada supply of materials the whole world is competing to secure.

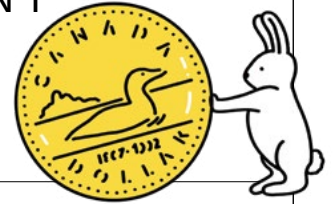
SUSTAINABLE SUBSTITUTES

Traditional means of extraction – in both mining and recycling – often rely on hydrometallurgy, which uses acid baths to separate and capture materials. While effective, the process generates large volumes of hazardous waste.

Azimi has developed a promising alternative. By heating and pressurizing carbon dioxide to create “supercritical fluids” – substances with the properties of both liquids and gases – her team can extract metals at least as effectively as acid, but with minimal waste.

The advantages are striking: carbon dioxide is inert, abundant, cheap and easy to recycle. That makes supercritical CO₂ not just cleaner but potentially cheaper than conventional recycling methods.

“WHEN THESE BATTERIES REACH THE END OF THEIR LIFE, ARE WE SIMPLY GOING TO DISPOSE OF THEM, CREATING MASSIVE DUMPS FULL OF PRODUCTS THAT ARE RICH IN THESE ELEMENTS? IT DOESN’T MAKE SENSE.” –GISELE AZIMI



While Azimi focuses on batteries, Aimey Bazylak works on related technologies such as water electrolyzers (which produce hydrogen fuel), and fuel cells, which create energy by electrochemically combining hydrogen or another hydrogen-rich fuel source with oxygen. Fuel cells can power vehicles or be used in industrial settings, but their components often degrade within as little as five years.

Bazylak, a professor of mechanical engineering who holds a Canada Research Chair in Clean Energy, aims to make these devices more efficient, durable and cost effective – in part by recovering critical materials from spent components. Efficient recycling methods not only make fuel cells more sustainable overall, but also provide cost savings for companies trying to commercialize them.

“We want to make sure that if companies like Hyundai or Ballard come to us, we’re giving them information that can advance their technologies that will go to market,” she says. “It’s my personal philosophy that as academics we want to serve the public. We can make a cleaner society possible now.”

In Bazylak’s lab, environmental goals converge with economic ones. “If I want to replace all the gasoline engines or diesel engines with fuel-cell engines, I have to make them cheaper,” she says. One of the biggest costs comes from the catalyst layer, which requires precious metals. “In fuel cells, there’s platinum. In water electrolyzers (the things that produce hydrogen), we also use iridium, which is even more valuable than platinum.”

Bazylak and Azimi both acknowledge that mining cannot be eliminated. But they believe it can be made cleaner. “When it comes to sustainability, I think it’s important to understand that, yes, we need to get these materials and that involves mining,” says Bazylak. “If we can do it more sustainably, then that makes the technology much more responsible.”

Fuel cells and electrolyzers also have another layer of complexity: they use polymers known as PFAS (polyfluoroalkyl substances), which are widely used in textiles and food packaging to make them water resistant. Critical mineral recovery often leaves PFAS residues that pollute waterways and



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even human bloodstreams. Bazylak hopes to either contain this waste more effectively or remove PFAS from the technology altogether.

Recycling technology that's also non-polluting – from creation through disposal – must be a central part of the strategy. "It's not really fair to say, 'Hey, these are green technologies,' if we don't think of the full life cycle."

By 2030, an estimated 350 million electric vehicles will create 10 million tonnes of spent batteries, a huge challenge – and opportunity – for recycling

Clean-energy devices rely on platinum and iridium, both expensive. Iridium alone costs more than \$6,000 CAD an ounce – underscoring the need for recycling.

technology and hydrogen infrastructure in order to stay ahead. "We have to buckle down and keep on working. We have the capacity to develop these technologies. We can produce them, and we can also create jobs and sell this technology worldwide."

AN OPENING FOR CANADA

In 2024, Bazylak was part of a team that was awarded \$2-million from the Ontario Research Fund for a multi-university project to find alternative methods for reclaiming both metals and polymers. "Our ultimate goal is to produce devices made from recycled material, and produce materials that are easier to recycle and don't have PFAS inside. We're taking a multi-pronged approach to a really sustainable life cycle for these devices," she says.

Bazylak and Azimi see opportunities for their own research, and for Canada to build on its reputation in the field. "Worldwide, Canadians are thought of very much as leaders in clean energy, especially in fuel cells and electrolysis," Bazylak says. "I feel strongly that in Canada, we need to put more funding into research."

Some Canadian companies already use hydrogen in the production of steel and in other industrial applications, but Bazylak says Canada needs to keep improving and adapting the

Azimi, meanwhile, is moving to commercialize her supercritical CO₂ method, though she acknowledges it takes time for industry to adapt. Pressurized vessels for carbon dioxide are widely used for other industrial purposes (including pharmaceutical production and decaffeinating coffee), but they are new to mining and recycling facilities.

Other Canadian ventures are further along. Li-Cycle, co-founded by Ajay Kochhar (BASC 2013) already offers recycling services for EV batteries and consumer electronics. In August 2025,

the company was acquired by Glencore, a mining and energy giant with a strong emphasis on recycling.

MOMENT TO LEAD

The stakes are high. Companies and countries that lead in building a circular economy – where materials are continually reclaimed and reused – will benefit economically, environmentally and strategically.

"The opportunities are quite large for Canada," Azimi says. "Electric vehicles are still a new technology. The lithium-ion battery in an electric car has about five to 10 years of life. As the number of EVs increases tremendously, this waste will increase. What should we do with it?"

For Azimi, the answer is clear: invest now or risk falling behind. "Canada has a real chance to lead. But if we don't move, those opportunities will pass us by," she says.

Bazylak echoes the concern. "This could be a tremendous success story for Canada. But without investing in homegrown technologies, people will simply buy from elsewhere," she says. "We need stronger support for research – because the capacity to lead is already here." ♣



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