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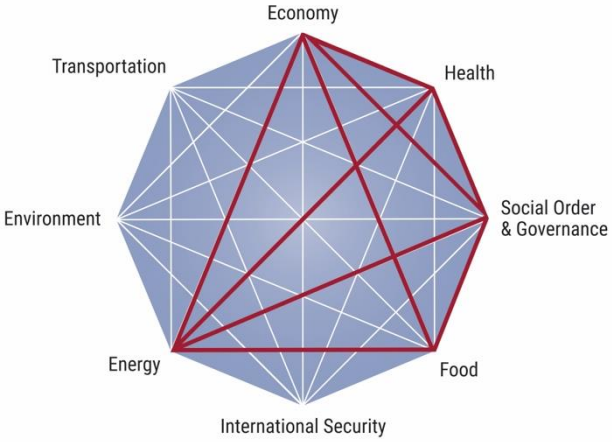
From COVID-19 to a more resilient future

Three interlinked transitions

Michael Lawrence



Summary

This Brief uses insights from complexity science to argue that—in the context of the COVID-19 pandemic—Canada must pursue *three interlinked transitions* if it is to reach a more equitable and resilient future: a transition in governance (towards localization), a transition in the economy (towards basic income and tax reform), and a transition in energy systems (towards renewables from fossil fuels).

Emerging trends

- The COVID-19 pandemic demonstrates that societal transformation is possible; it has also spurred growing calls for a more equitable, green, and resilient future.
- The present crisis offers a short but momentous opportunity for institutional change. More desirable arrangements will become locked-in to the extent that they can establish self-reinforcing feedbacks across interconnected systems—particularly those involving governance, economy, and energy.

Implications for action

- Measures taken now will shape and constrain future options, which means that decisions on immediate actions must consider long-term pathways.
- Short-term emergency income support could be expanded into a system of basic guaranteed income. The debt incurred from both could spur tax reform that promotes a more equitable distribution of income and wealth that would aid, and be aided by, the localization of decision making and economic activity.
- Positive feedbacks between retraining of the fossil fuel sector and investment and employment in renewable energy and green infrastructure can support better livelihoods while fighting climate change.

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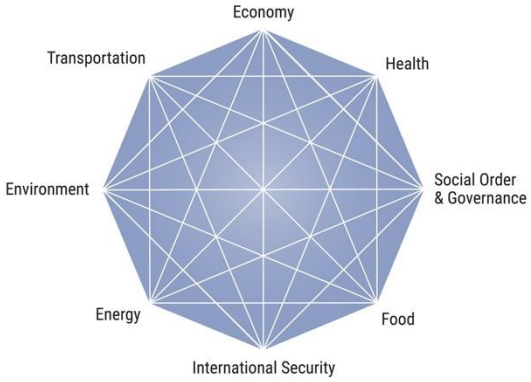
About the Cascade Institute

The Cascade Institute is a Canadian research center addressing the full range of humanity's converging environmental, economic, political, and technological crises. Using advanced methods for mapping and modeling complex global systems, Institute researchers identify *high-leverage intervention points* in cognitive, institutional, and technological systems that, if effectively exploited, could rapidly shift humanity's course towards fair and sustainable prosperity.

The Institute is located at Royal Roads University in British Columbia, a leader in training professionals to apply creative solutions to entrenched problems.

About the Inter-Systemic Cascades (ISC) Project

The Cascade Institute's *Inter-Systemic Cascades Project* maps causal routes through which the COVID-19 pandemic could sequentially destabilize associated national and global systems, causing cascades of change. This series of Briefs focuses on the pandemic's implications for the eight key systems highlighted around the adjacent octagon, and each Brief maps a possible causal route of destabilization among these systems. Cascades may be either "pernicious" (socially harmful) or "virtuous" (socially beneficial).



The analysis in this series starts from the assumption that societies are organized around cohesive sets of worldviews, institutions, and technologies (WITs), where:

- **Worldviews** are mental networks of concepts, beliefs, and values—often emotionally charged—that allow people to interpret things around them and plan their actions.
- **Institutions** are a community's rules governing social behavior, including formal rules (constitutions, laws, and contracts), informal rules (customs and norms), and mechanisms of enforcement.
- **Technologies** are problem-solving tools that people create by harnessing phenomena of their physical and social environments.

WITs in this Brief

Worldviews: resilience

Institutions: international trade, community based politics, taxation, targeted basic income

Technologies: renewable energy, green infrastructure

Pandemic Shock: Brief #2

From COVID-19 to a more resilient future: Three interlinked transitions

Background

The COVID-19 pandemic has overturned many long-held assumptions—among them that globalization is an irreversible process, that governments cannot (or should not) mount major interventions into economy and society to improve well-being, and that people are unable (or unwilling) to radically change their day-to-day lives and behaviors in order to solve collective problems.

The pandemic, moreover, foreshadows the shocks we can expect ahead in a world beset by a monumental climate crisis and spiralling economic inequality. Humanity faces an unpredictable and possibly calamitous future of droughts, extreme weather events, economic crises, resource scarcities, and additional health emergencies. But the fight against the virus also shows that human beings *can* make major changes in their behaviors, practices, and institutions. To address climate change, improve economic equality, and prepare for future crises, this Brief therefore asks:

What inter-systemic feedbacks, if effectively exploited, would help Canada expand its COVID-19 response to create a more resilient future?

The next section presents several insights on institutional change from the complexity literature and explains the relationship between COVID-19 and global interconnectivity. The Brief then examines three major transitions—and the reinforcing interactions between them—that could allow Canada to leverage its short-term recovery efforts to generate a more just, resilient, and sustainable future.

Box 1: a more resilient future

The coronavirus pandemic has energized conversations about the feasibility of integrated policy programs—under such headings as the "Green New Deal," "Just Recovery," or "Green Transition"—to enhance environmental sustainability and social equity. The analysis here uses the more generic term "resilient future," because the alternatives can be misleading. The notion of "recovery," for example, suggests a return to normalcy that is neither desirable nor possible. There is no going back to the way things were, but there is an opportunity to use the crisis to establish better social arrangements. Similarly, the term "New Deal," harkens back to the massive public works projects carried out in the United States during the 1930s, suggesting a massive exercise in planning and economic intervention by government. But today's challenges demand more locally contextualized and adaptable solutions.

Complexity insights on institutional change and global interconnection

Institutions are the "rules of the game" that guide our polities, economies, and societies. They are codified in laws, policies, and procedures, and people give them practical reality through their day-to-day actions and routines. Complex-systems research on institutional persistence and change offers the following insights on how our present crisis might affect the rules that will shape our future.[1]

1) Institutions tend to become more deeply entrenched over time because five positive (i.e., self-reinforcing) feedbacks enlarge the benefits of existing arrangements relative to those of potential alternatives:

    - *Learning Effects:* The more people use extant rules, the more they understand them; the more they understand the rules, the more they can do with them, so the more they use them.
    - *Coordination Effects:* The larger the number of people using a common set of rules, the greater the benefits those rules provide to all adherents because they enable more widespread interaction, which then encourages more people to use them.
    - *Self-Fulfilling Expectations:* The more that people expect a set of rules to persist into the future, the more likely they are to act in ways that ensure the rules endure.
    - *Switching Costs:* The greater people's material and psychological investment in existing institutions, the greater the cost to them to create alternatives, which encourages them to invest yet more in the current way of doing things.
    - *Interest Group Behavior:* The more some segments of society benefit from existing institutions, the greater their motivation and power to use those benefits to maintain the institutions and thus accrue even more benefit.

    Insight: If we want institutional change to stick, we need to use these feedbacks to make new arrangements self-reinforcing.

2) Institutions tend to develop as integrated sets across multiple spheres of activity. The rules governing one sector (the economy, for example) tend to interlock with the rules of other sectors (such as energy or food production) to form a broader "regime."

    Insight: Institutional change in one sector of activity often requires supportive change in the rules governing other sectors of activity.

3) Institutional change is "punctuated"—that is, long periods of stability are disrupted by "critical junctures." The latter represent brief windows in which many once-implausible options become possible, even likely. The choices made in such circumstances will quickly become locked-in by the feedbacks described above, thereby restricting future options in a process known as "path dependence."

[1] These insights about institutions are derived from Pierson (2004), Arthur (1994), North (1990), and Rosenbloom et al. (2019).

Insight: the present moment is a once-in-a-lifetime opportunity for radical institutional change, but the window will close quickly, as new sets of rules become locked-in. Decisions made now will enable some future options while closing off others.

Conventional policy analysis, which is biased towards linear thinking, might suggest that Canada should first solve its COVID-19 health crisis, then restart the economy, and then return to long-term environmental and social goals. Complexity thinking, in contrast, suggests that the measures taken now will influence and constrain institutional development well into the future, so that even "immediate" actions must be designed with long-term considerations in mind.

Finally, although each of humanity's gravest problems—including the COVID-19 pandemic, climate change, socio-economic inequality, and our collective vulnerability to crisis—has many unique causes, they share a key underlying driver: the dense worldwide interconnectivity arising from modern globalization. With its long incubation period and transmission through asymptomatic carriers, the coronavirus adroitly exploits the global mobility of people and goods. Simultaneously, globally integrated supply chains and capital flows exacerbate climate change by encouraging ever-expanding material consumption and externalizing ecological costs.

These arrangements have also worsened global socio-economic inequality through several positive feedbacks. International movements of capital have weakened national governments' regulatory and taxation authority, helped shift the balance of economic and political power within nations away from labor towards capital, and created global "winner takes all" markets. These trends have in turn allowed capital to accrue increasing political power and wealth, opening yet more opportunities for the internationalization of capital, while much of the world's population has been left behind (Harvey 2005).[2]

Complex systems thinking highlights the *character of interconnectivity*—both its quantity and quality—as a key determinant of system behavior. Cross-disciplinary research suggests that *loosely* connected networks of *heterogeneous* (diverse) units experience gradual change, whereas *tightly* connected webs of *homogenous* (similar) units tend to experience drastic, non-linear change, as exemplified by recent financial crises (Scheffer et al. 2012). By maximizing efficiencies, eliminating redundancies and delays, tightening supply chains, and pursuing full-capacity performance, modern globalization has created immense vulnerabilities to shock. Increasing the resilience of such complex systems entails adding redundancies (back-ups), limiting network interconnectivity, inserting firewalls (or stopping points) between network segments, and encouraging a diverse heterogeneity of units (Helbing 2009). The extent and character of global interconnectivity we pursue moving forward should reflect such considerations.[3]

[2] Although inequality between countries has declined since the early part of the millennium, inequality within societies and across humanity as a whole has generally increased (Milanovic, 2016; Oxfam, 2018).

[3] See also Dani Rodrik's (2011) "globalization paradox."

Insight: Complex systems such as the global economy involve trade-offs between efficiency and resilience that require careful balance.

Implications for action

Pathways to a more resilient future

This Brief proposes that a more resilient future requires transitions in governance, economy, and energy that are designed to reinforce one another through positive feedbacks (see Figures 1 and 2). This section describes these necessary transitions in the Canadian economy, while the final section examines the positive feedbacks in greater detail.

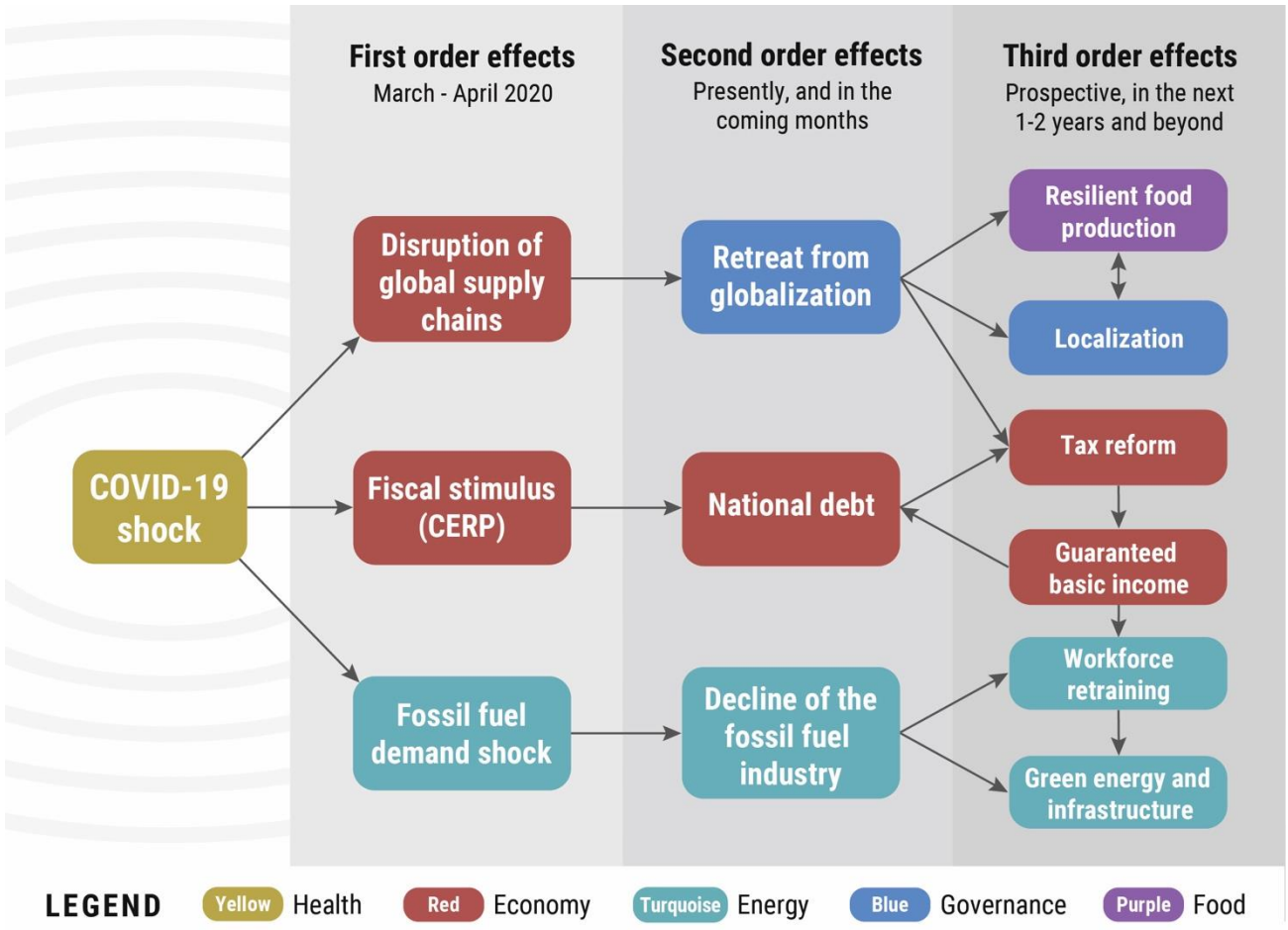


Figure 1: pathways to a more resilient future

In Canada, the **first order effects** of the COVID-19 shock unfolded within the first two months (March and April) after the pandemic struck.

- **Disruption of global supply chains:** The scramble to procure personal protective equipment for frontline workers, ventilators, and testing materials revealed just how vulnerable the world is to global supply chain disruptions. More broadly, restrictions on the mobility of goods and people caused trade, commodity prices, manufacturing output, and labour employment to plunge (CCSA 2020).

- **Fiscal stimulus (Canada Emergency Response Benefit):** The federal government rapidly enacted a variety of emergency financial measures amounting to 8.4 percent of Canada's gross domestic product to help individuals, businesses, and whole economic sectors through the economic turmoil of the pandemic.[4] With a vaccine still at least 12 to 18 months away and many businesses in jeopardy, however, a significant fraction of the Canadian workforce will remain unemployed or underemployed for the foreseeable future and will require medium- to long-term financial support.

- **Fossil fuel demand shock:** Lockdowns, border closures, and economic contraction sent global fossil fuel demand plummeting; petroleum demand fell initially by nearly one third. The lack of slack in the supply system saw storage facilities quickly fill and prices briefly drop towards zero, with Western Canada Select sinking as low as -$3.86 per barrel on April 20th (Homer-Dixon 2020).

The **second order effects** of the COVID-19 shock are trends emerging presently that may or may not continue over the next few months. This Brief argues that they should be managed and encouraged in ways that lead to a more resilient future (by way of third order effects).

- **Retreat from globalization:** Globalization was sputtering even before the present pandemic due to the 2008 financial crisis and the resurgence of nationalistic policies (*The Economist* 2019, 2020a). But COVID-19 has disrupted global interconnection even more profoundly. With 90 percent of its planes grounded, the aviation industry faces the biggest contraction in its history (CCSA 2020). The United Nations Conference on Trade and Development predicts that foreign direct investment will fall by 30 to 40 percent while the World Trade Organization expects trade to shrink by as much as a third (*The Economist* 2020b).

  Reductions in global interconnectivity are not temporary, and they will have both positive and negative effects. Globalization yields the benefits of specialization, efficiency, economy of scale, cheaper prices, and diversity of products. The rescaling of economic activity to national and local levels, however, can provide a buffer against crisis contagion and reduce vulnerability to supply chain disruption. The pandemic has revealed the advantages of a domestic manufacturing sector that can quickly retool to

[4] Government of Canada, Department of Finance, "Canada's COVID-19 Economic Response Plan," available at: https://www.canada.ca/en/department-finance/economic-response-plan.html.

address emergencies. The challenge ahead is to find a new balance between the benefits of global openness and local bases of resilience.

- **National debt:** Canada's COVID-19 response is undoubtedly racking up national debt. The Parliamentary Budget Officer (PBO) estimates that Canada will have a fiscal deficit of $250 billion this year, nearly five times greater than the deficit accrued by stimulus packages during the 2008 financial crisis (Cochrane 2020). Yet as we enter the worst recession since the 1930s, national debt is best conceived as an appropriate public investment in the people, infrastructure, and economic opportunities that will support livelihoods well into the future (Stanford 2020).

- **Decline of the fossil fuel industry:** Fossil fuel prices have rebounded somewhat (though not to pre-pandemic levels), but Canada's oil and gas industry remains in decline. Even prior to the pandemic crisis, it had shed jobs, investment, and future prospects (PetroLMI 2019). Hydrocarbons produced in Canada, and especially in Alberta's oil sands, are much more costly than those produced elsewhere—in monetary terms, in the ratio of energy spent in extraction to energy produced, and in environmental impacts (Erikson and Lazarus 2020). The survival of Canada's oil and gas sector indeed depends upon billions in federal and provincial government subsidies (IISD 2020; Corkal et al. 2020).

  Although committed to net-zero carbon emissions by 2050, Canada is far off the course needed to achieve its carbon-reduction goals (UNEP 2019); indeed, the country simply cannot meet its targets unless it quickly transitions to renewable energy.[5] A diverse range of governmental, corporate, and non-governmental actors is now calling on governments worldwide to seize the opportunity presented by the COVID-19 pandemic to accelerate the transition from fossil fuels to renewable energy.[6] The decline of the fossil fuel industry and growth of green energy are already underway but not unstoppable. Sensible government policy should facilitate this transition (Trout 2020).

The **third order effects** of the COVID-19 pandemic are prospective. They are measures that would connect second order effects to a more equitable, green, and resilient future over the coming years.

- **Localization:** The retreat from globalization—if sustained, as appears likely—will see many economic and political activities rescaled to national, regional, and local levels. This shift will open opportunities to empower community-based decision making, participatory budgeting, and local action on such issues as renewable energy, green infrastructure, public services, and food production. By the principle of *subsidiarity*, problems should be solved at the most local scale at which solutions are possible, while directly engaging those people and groups affected. Subsidiarity encourages inclusion, participation, and

[5] A recent poll found that 79 percent of Albertans want the province to transition towards renewable energy, although only 51 percent felt that the province should actually move away from oil and gas (DeCillia 2020).

[6] Such actors include the International Energy Agency (Birol 2020), *The Economist* (2020c; 2020d), McKinsey & Company (Engel 2020), the World Economic Forum (Crawford 2020), and the newly founded Independent Task Force for a Resilient Recovery (Smart Prosperity Institute, 2020). A recent poll conducted for McKinsey & Company (Engel et al. 2020) found that 61 percent of Canadians believe the government should prioritize climate action in its COVID-19 response, with only 30 percent opposed.

learning. The federal government should create the conditions for such self-organization and decentralized problem solving (see Helbing 2009). Localization also opens opportunities to include racialized and other marginalized communities in the decisions that affect them, especially concerning police reform, countering geographical segregation, and access to start-up capital.

- **Resilient food production:** Localization is especially beneficial for food production, as the pandemic has revealed the precariousness of global food supply chains (Yasmeen et al. 2020). Nearly one quarter of the world's food crosses a border before consumption. Countries tend to specialize in a few products and import most others. Meanwhile, just a handful of mega-sized corporations dominate international food markets, and production often depends on the exploitation of vulnerable groups, such as migrant workers (Clapp 2020). The localization process should support small- and medium-scale food enterprise at a local and regional scale to encourage diversity, build local knowledge, and prevent future supply chain disruptions. Key measures include infrastructure that enables people to buy directly from local farmers and support for food production at home (Qualman and the NFU 2019).

- **Guaranteed basic income:** As unemployment persists into a future marked by ongoing economic uncertainty, current emergency benefits should be expanded into a targeted basic income program. Such a measure provides minimum income to individuals and couples who are unemployed or underemployed to ensure a decent standard of living, including access to housing, nutrition, education, healthcare, and other services needed to pursue employment. Ontario's 2016 Basic Income Pilot Project, for example, guaranteed an income of 75 percent of the Low Income Measure, so that participants received up to $16 989 per year for single persons and $24 027 per year for couples, less 50 percent of any earned income.[7] Whereas a "universal" basic income provides the same lump sum to all citizens regardless of circumstances, a "targeted" basic income is available only to those who need it because their income falls below a minimum threshold (Pohler et al. 2020). Rather than extend ad-hoc and piecemeal recovery measures, a targeted basic income would streamline assistance into a single system, thereby easing the costs of administration while bracing Canadian society for future uncertainties and emergencies (see Forget and Segal 2020).[8]

- **Tax reform:** A targeted basic income program, of course, would add costs to a government budget already ballooning with fiscal stimulus.[9] These policies could provide the impetus to reform a tax system that is already long out-dated, problematic, and overdue for review (Gill 2020). In many ways, the national tax code instantiates the national social contract by setting out *who* pays *how much* to provide *which* public services to *whom*. Carbon taxes can help reduce carbon emissions, while tax incentives can advance the transition to green energy and infrastructure. More equitable and progressive taxes would

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[7] Government of Ontario, "Ontario Basic Income Pilot," available at: https://www.ontario.ca/page/ontario-basic-income-pilot. Unfortunately, the pilot program was cancelled before its completion, so its results could not be assessed.

[8] On the challenges of designing an effective basic income, see Green et al. 2020.

[9] The estimated annual cost of a targeted basic income program varies from 15 to 90 billion, depending largely on how it is implemented (Shah, 2020). A 2018 report by the Parliamentary Budget Officer, for example, found that a guaranteed basic income would cost $43 billion annually (Scotti, 2018).

target high concentrations of wealth, especially those accumulating offshore, not just income. The disbursement of recovery funds to businesses should therefore be conditional upon their commitments to reduce carbon emissions and their abandonment of tax havens. Governments have long feared that higher taxes would produce capital flight and discourage investment, but if economic activities and revenues are increasingly repatriated and localized (rather than globally dispersed) this risk recedes.

- **Retraining:** Rather than doubling-down on failing industries that exacerbate climate change, federal and provincial governments should assist fossil fuel workers—and others—to retrain for opportunities in renewable energy and green infrastructure. In 2019, an estimated 173,300 people worked directly in Canada's oil and gas industry, down nearly 25 percent from 226,500 in 2014 (PetroLMI 2019, 6). The International Institute for Sustainable Development (2020) estimates that government subsidies to the fossil fuel industry, if redirected, could fund job training for 300,000 workers. Targeted basic income would aid the conversion. Green spending by government creates several times more jobs than equivalent spending on fossil fuels (Engel et al. 2020),[10] in such areas as:

    - *Green energy*: Over the last decade, renewable energy sources, including wind and solar, have become cheaper to produce, higher in performance, and scalable from niche energy production to primary sources of society's energy (Strauch 2020a). Green energy production, transmission (via smart grids), and storage (via advances in battery technology) all provide growing sources of employment and innovation (IRENA 2019).

    - *Green buildings*: Carbon emissions and energy use can both be diminished by retrofitting buildings for higher efficiency, and by applying such standards to all new builds. The Canada Green Building Council (2020, 3) estimates that 460,000 Canadians already work in green building and generated $48 billion in 2018, twice their revenue just four years prior. Green construction saves money over the long run while generating local employment in the short run. Buildings should also be designed and upgraded to cope with extreme weather events, pandemics, and other future emergencies (see also Frappé-Sénéclauze 2020).

    - *Green transportation:* Effective social distancing requires widespread expansion and modifications to pedestrian walkways and public spaces (Strauch 2020b). Calls to increase and improve bike lanes long preceded the pandemic. The growing market for electric vehicles and consequent demand for charging infrastructure offer considerable opportunities for manufacturing and construction. And if air travel fails to rebound, high-speed trains powered by renewable energy can provide an alternative for short-and medium-distance travel.

- **Green energy and infrastructure:** With interest rates near zero, now is an ideal time for governments to invest deeply in green energy and infrastructure projects in order to create jobs, restart the economy, save money, and fight climate change. Assistance may come as tax rebates, loans, loan guarantees,

[10] For more specific proposals, see: Canada Clean Building Council (2020); Pembina Institute (2020); and Engel et al. (2020).

grants, and even public ownership (Engel et al. 2020). A recent report in the *Oxford Review of Economic Policy* (Hepburn et al. 2020) surveyed 230 of the world's leading economists, bankers, and economic officials and found that fiscal stimulus to green initiatives will not only combat climate change, but also bring the greatest economic return and employment rates. Mainstream expert opinion attests that green stimulus and economic recovery are mutually reinforcing objectives.

Establishing Positive Feedbacks

Alone, each of the measures highlighted above is unlikely to withstand political ups-and-downs, nor effect transformational change. *But as a package in which they reinforce one another, they are much more likely to take root and yield a green, equitable, and resilient future.* Applying the complexity insights from above, this section examines the *interrelationships* between third order effects and highlights the key feedbacks by which they buttress one another. It focuses upon four key outputs of the roadmap for a more resilient future:

- Localization: Community-based decision-making (such as participatory budgeting) and "grounded" (local and national) economic activity.
- Tax reform and public spending: A more progressive and equitable tax code that invests in economic wellbeing and environmental action.
- Livelihoods and wellbeing: Access to gainful employment, safety nets amidst vulnerability, and overall quality of life.[11]
- Green energy and infrastructure: Ecofriendly buildings, public spaces, energy generation, and food production.

Figure 2 below presents the interrelations between these four factors, alongside the decline of the fossil fuel industry, and the positive (reinforcing) feedbacks between them all.

[11] Note that this third order effect has been broadened from the "retraining" highlighted in Figure 1 in order to encompass a wider range of people than those directly involved in energy and infrastructure.

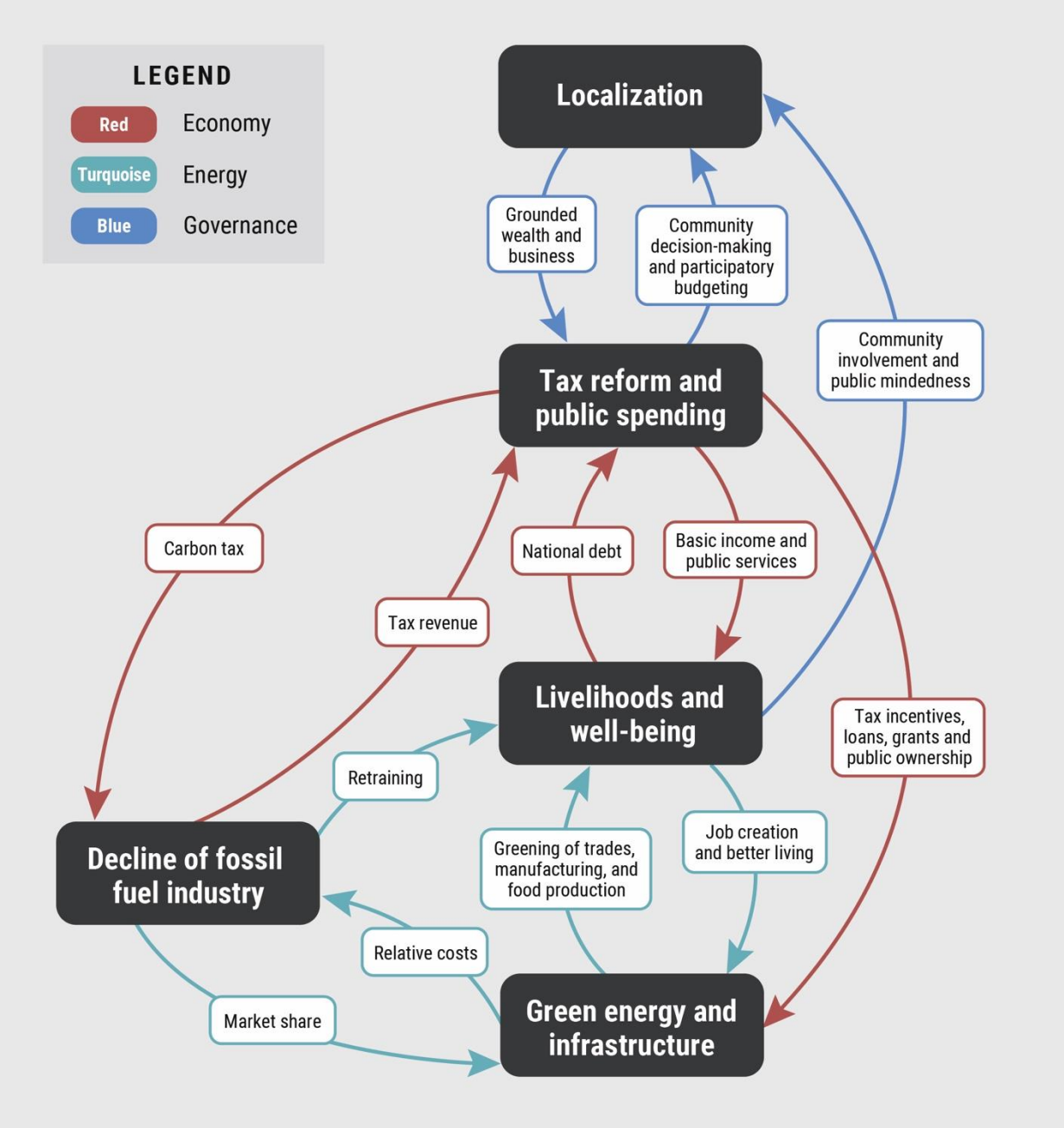

Figure 2: reinforcing interrelationships of third order effects

The coloured arrows, following the legend of Figure 1, highlight three positive feedbacks:

- Localization (blue): The “grounding” or rescaling of some economic activity to national and local levels, alongside stronger policies against tax evasion, generates increasing tax revenues. Tax reform empowers community-based decision-making through such measures as participatory budgeting, which in turn makes local investment more attractive.

- Taxes and public spending (red): Carbon taxes accelerate the decline of the fossil fuel industry, providing tax revenue while reducing emissions. Tax reform nurtures livelihoods and well being by funding a guaranteed basic income, worker retraining, high quality public services, and green energy and infrastructure projects through tax incentives, loans, grants, and public ownership. Any national debt incurred by such programs could spur further tax reform.

- Energy and workforce transition (turquoise): As the fossil fuel industry declines, it opens more market share for renewable energy and its attendant employment opportunities. As renewable energy is more widely employed, economies of scale render it increasingly cost-effective relative to fossil fuels. Guaranteed basic income and retraining programs support the livelihood and well-being of (former) oil and gas workers as they transition into other industries. Trades, manufacturing, and food production are reconfigured to support renewable energy and green infrastructure, which in turn create more jobs, innovations, energy savings, and improvements to quality of life. The latter encourages public-mindedness and participation in local decision-making.

These are the mutually supportive interrelations that should be deliberately established and strengthened for the institutional changes outlined in Figure 1 to truly take root, with the aim of improving climate action, social equality, and resilience in Canada. They are crucial loci of action. If they take hold and increasingly reinforce one another, they will deepen the niche created by the overall package.

While tools such as the Smart Prosperity Institute's (2020) *Resilient Recovery Framework* help considerably to evaluate the environment impacts, economic merits, and practical feasibility of particular policy proposals, complexity thinking suggests that a more resilient future will not come through separate, piecemeal actions, but must instead consider how different initiatives fit together and support one another (or not).

Finally, a more resilient future does not exist within the confines of Canada's borders; it requires global cooperation across multiple social systems to establish carbon pricing, reduce global emissions, sustain world trade, close tax havens, and regulate capital flows (see, for example Gallagher and Kozul-Wright 2019; Kozul-Wright 2019; Kozul-Wright 2020). This Brief nonetheless outlines steps that can be taken in Canada to advance transformative change.

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* Denotes policy proposals that respond to the COVID pandemic with specific recommendations that are consistent with the broader roadmap outlined in this Brief.

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About the author

Michael Lawrence is a Postdoctoral Researcher at the Cascade Institute. He uses complexity science to understand the coevolution of conflict, violence, and social structure, and through this work he has developed expertise on global governance, societal collapse, the psychology of dehumanization, transnational organized crime, and peacebuilding.

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