LEE-CHIN INSTITUTE

Rotman

Scaling Impact: Models, Theories and Pathways

For The Atmospheric Fund

April 2020

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Executive Summary

In late 2019, The Atmospheric Fund (TAF) commissioned research on how to scale larger low-carbon solutions in key urban areas in Canada.

Research was conducted by the Lee-Chin Institute (LCI) at the Rotman School of Management, University of Toronto. The project was guided and informed by TAF staff and a range of expert interviewees. The process focused on describing possible pathways and preliminary insights and thoughts in anticipation of that process (rather than an evaluation of past practices by TAF or providing a comprehensive set of recommendations).

This report explores the following two issues:

- what models, theories or concepts might best fit the purpose of creating the conditions to accelerate the adoption of low-carbon action
- best-fit approaches and tools for accelerating scale-up, provide analysis to guide strategy and organizational development.

The report begins by exploring several **models, theories and concepts** relating to scaling, including diffusion of innovation and "tipping points," multisolving, complexity theory, contestation, and discontinuity. These set the stage for discussion of several possible **pathways** to scaling-up an organization's impact:

- Public policy change, including political advocacy
- Market transformation
- Commercialization, including social entrepreneurship
- Social innovation
- Social change, including influencing norms and behavior change

The report then provides a series of insights based on the research on theories, models and pathways – both opportunities and challenges – for TAF's consideration as it proceeds into strategy review. Key insights to help TAF increase its impact include:

- TAF can build a broader range of alliances with organizations working on related social and environmental challenges that produce low-carbon impacts without necessarily being focused on low-carbon adaptation (e.g., housing, healthcare, etc.).
- TAF has the opportunity to reach and build a broader base of support across wider audiences (e.g., not only innovators and early adopters).
- TAF can more clearly optimize its priorities and performance by reviewing its current and future activities against two key dimensions: impact and time scale.
- TAF can review its public messaging with an eye to broadening its audience and clearer articulation of the benefits of its work (notably if they are consistent with audience values, and increasing observability).
- Major social and economic disruptions (such as the COVID-19 Pandemic and the collapse of oil prices) will almost certainly create a new openness to radical policy options, marketplace transformation and practical ideas to reboot the Canadian economy. TAF should harness this as an opportunity to overcome contestation about carbon emissions and present practical recovery solutions.

Background and Research Context

By Mary Pickering, TAF and LC3

In the face of the climate crisis and growing municipal adoption of a climate emergency stance, and within a backdrop of massive change driven by the COVID-19 crisis, we are seeking out new pathways to fast-track proven low-carbon solutions to full-scale deployment.

The newly-formed Low Carbon Cities Canada (LC3) initiative, of which TAF is a founding member, will provide local support to help significantly hasten the scaling of the many proven low-carbon action models we have at our disposal using existing know-how and technology, including actions like net-zero energy building retrofits, deployment of community-based power systems, circular economy/zero waste, distributed renewable energy systems, electric vehicle infrastructure and adoption, shared mobility services, and low-carbon forms of urban planning.

The specific role of LC3 Centres is to enable scale-up. We aim to take a systems approach and building broad constituencies of support by ensuring solutions simultaneously reduce greenhouse gas emissions, support community resilience to climate change and other shocks and stresses, improve public health, strengthen the local economy and support social equity. We recognize that addressing issues that impede progress, including weak business case, the need for workforce development, attraction of private capital flows, policy change, behavior change and adoption of new social norms, is key to scaling solutions.

We also recognize that the concept of scale-up itself has variations. The McConnell Foundation-commissioned report (2015) usefully differentiates between scale-out (replicating an idea or model), scale-up (targeting policy / rules change) and scaling deep (personal and/or relational impact by changing hearts, minds and cultural beliefs).

Project Origins and Intention

In May 2017, The Atmospheric Fund, in collaboration with Dunsky Energy Consulting and the SFU Centre for Dialogue, hosted the first of two sessions attracting urban low carbon specialists. We asked them what it would take to break through the incremental pace of climate action cities to accelerate change in the race against global climate change. It was here that we heard a strong call to action on moving away from pilot testing and incubation approach, and to focus instead on how to take the numerous proven climate actions to full-scale adoption.

Subsequently, in February 2019, TAF embraced scale-up as a key element in its 2019-2022 Strategic Directions, framing its new role as "Positioning Proven Solutions for Scale." The challenge? As a traditional incubator organization, TAF had limited experience in the scale-up sphere, and little knowledge about how to play such a role, what skills sets it might take, and how to measure progress against this new objective. This research paper is a response to this need for new understanding.

We offer this paper, developed with support from researchers Alison Kemper, Rod Lohin and Andrew Micak at the Rotman School of Management at the University of Toronto, and informed by TAF Senior Management Team and a group of fantastic and insightful interviewees, as a jumping off point in this important discussion. Our objective is to use a community-based approach to refine these ideas into a

set of working principles and evaluation metrics to support scale-enabling work at TAF and within the Low Carbon Cities Canada Network.

Next Steps

This paper will be circulated to a group of "first readers" who will provide us with responses to guide next steps in advancing this thinking towards practical action. With input from first readers, we will provide a more refined version of the paper to:

- Stimulate ongoing dialogue on the key components and strategies of scale-up
- Inform the re-development of a scale-up theory of change for Low Carbon Cities Canada
- Develop one or two metrics to help us assess progress towards preparing actions for scale and test these within the LC3 Network
- Consider what new skill sets, collaborations and partnerships would best serve scale-up work
- Identify new research that could help us further refine our understanding of scale-up theories and practices

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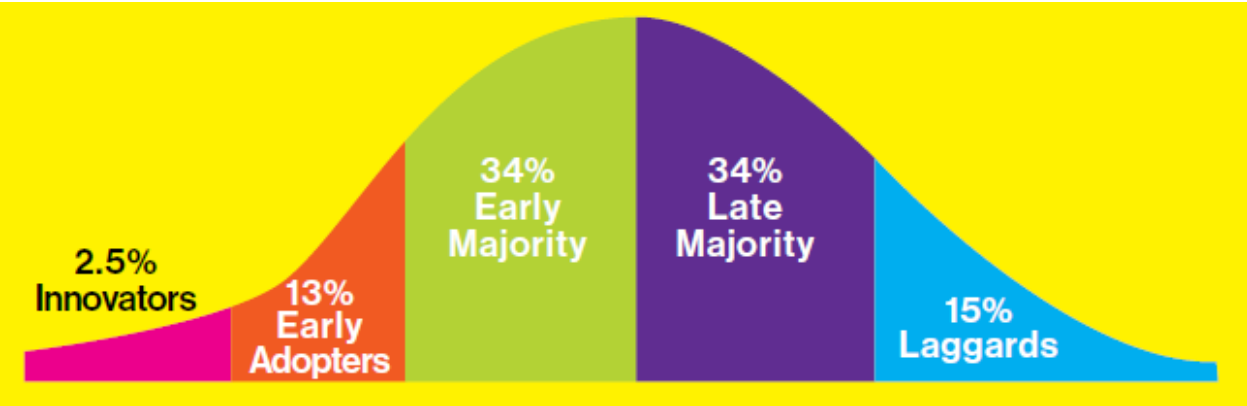
Briefing on Scale-Up Theories and Pathways

The concept of scaling up appears in many contexts. In business, it is most often associated with increasing the size and reach of early-stage companies in terms of market share and profitability. For social enterprises, it reflects the ability of the company to scale their financial position and social impact. In social development, scaling up typically involves replicating or accelerating successful policies and programs, for example, in health care, education or development innovations, across populations or countries.

The World Bank (2003) uses the following definition: "Scaling up is the efficient increase of socioeconomic impact from a small to a large scale of coverage" (cited in UNDP, 2013). This definition explicitly includes social impact in addition to economic growth. The World Bank later expanded this definition to reflect other considerations such as stakeholder engagement and sustainability (UNDP, 2013).

Theories and models

A core model underlying most ideas about scaling up is Everett Rogers' work on **innovation**. In his classic, *The Diffusion of Innovation* (1962, updated 2003), Rogers found "Individuals in a social system do not all adopt an innovation at the same time. Rather, they adopt in an over-time sequence." (Rogers, 2003) This sequence reflects "the degree to which an individual… is relatively earlier in adopting new ideas than other members of a social system" (Rogers, 2003). The most likely to adopt an innovation are Innovators (2.5% of the population), followed by Early Adopters (13.5%), and so on (Rogers, 2003).



In order to succeed, an innovation must be perceived to have the following attributes by potential adopters:

1. Relative advantage (over comparable ideas, products or services)
2. Compatibility (with the values, experiences and needs of adopters)
3. Simplicity (easy to understand and use)
4. Trialability (easy to try out at low risk/cost), and
5. Visibility (observable benefits; seen to be used by others) (Rogers, 2003).

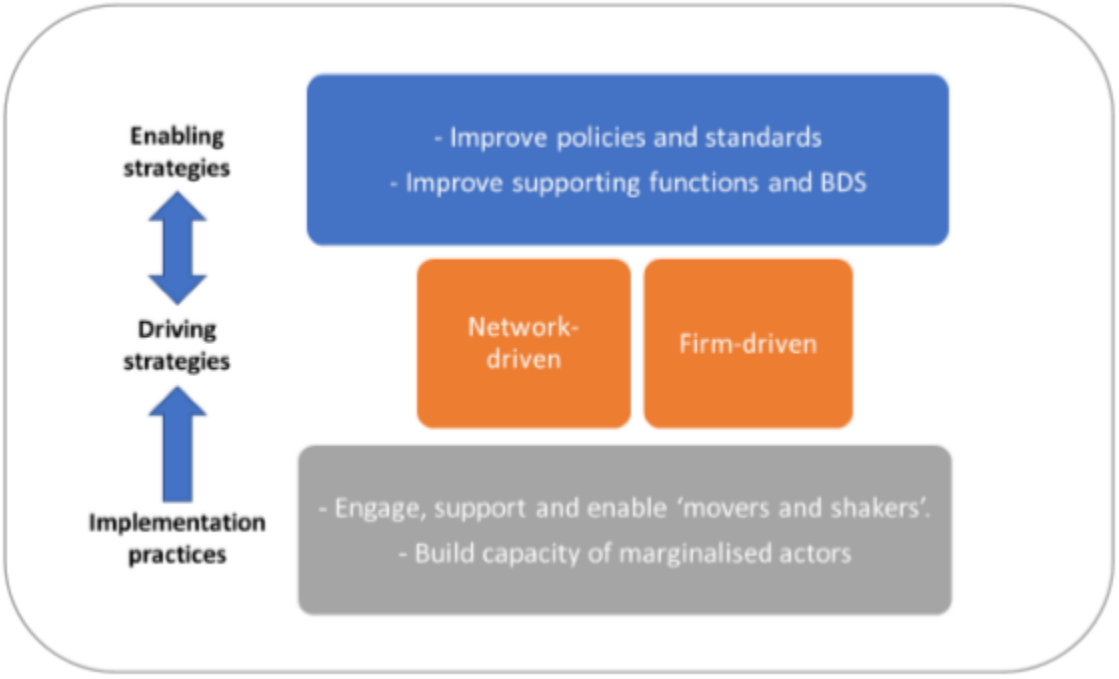
The key to the success of an innovation is that it crosses the "chasm" between early adopters and laggards into the majority— in other words, that it achieves critical mass.

Rogers' theory and models can help organizations understand if they are comprehensively demonstrating the benefits of their innovations, and who they focus on (e.g., early or later adopters). Strategic thinking about the most important audiences and the nature of benefits can help refocus strategies and actions on key objectives

The notion of critical mass is picked up later in the concept of the "tipping point" popularized by Malcolm Gladwell (2000) but derived from the work of researchers Milgram and, separately, Watts. Gladwell argues the tipping point is "the moment of critical mass, the threshold, the boiling point" at which "[i]deas and products and messages and behaviors spread like viruses do" (Gladwell, 2000).

There are many conceptions of how scaling up can be achieved. Researchers and observers describe dozens of strategies/actions/opportunities to facilitate scaling up.

One useful model depicts scaling up as an interaction between **enablers** (improving policies and supports for business development systems), **drivers** (actors), and **implementation practices** or ways to engage beneficiaries (Osorio-Cortes & Lundy, 2018). Strategic insights can be derived from this model by assessing an organization's current emphasis (e.g., which enabling strategies it uses to create system-wide benefits, which actors are most prominently engaged, and how it implements its strategies). It suggests careful attention should be paid to the different strategic supports, audiences and actions that organizations can focus on and the balance among them. This can provide a better understanding of strengths, weaknesses and opportunities.



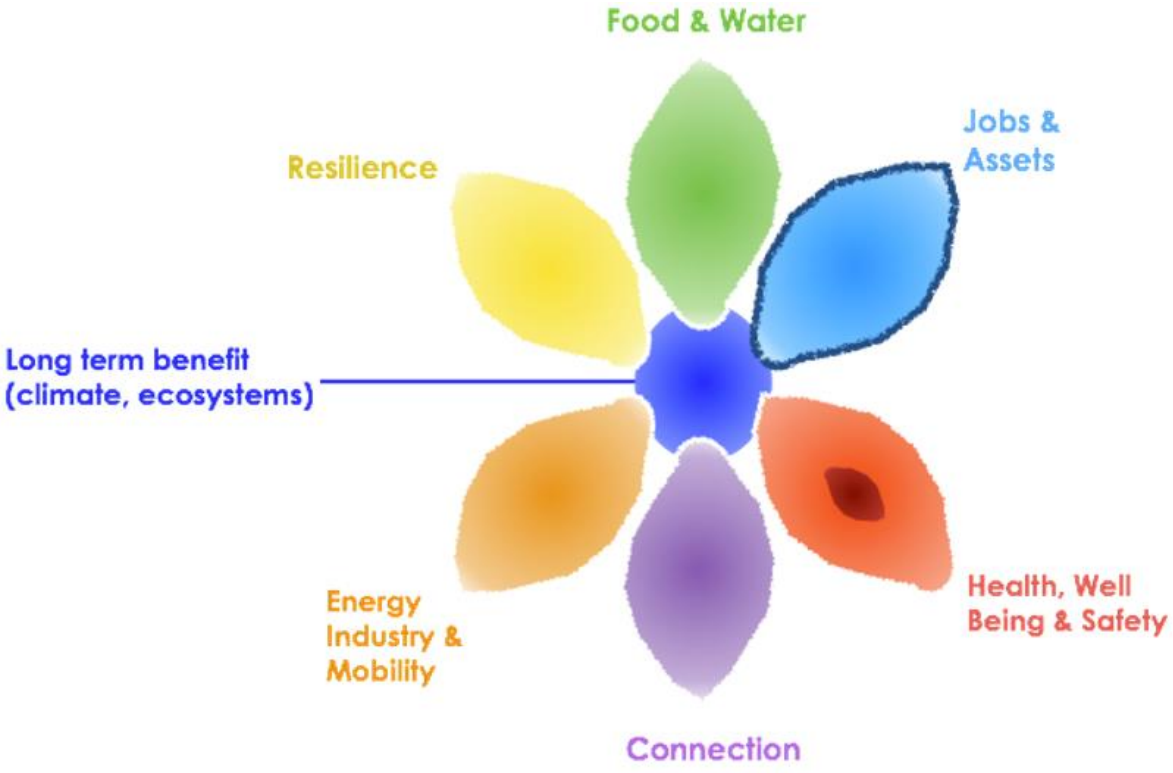
This model (and many others) acknowledge that there is considerable interplay between these strategies, actors and practices (sometimes called systemic change or systems dynamics). Approaches to systemic change include multi-solving and complexity theory.

Thought leaders and researchers have begun to use terms like socio-economic system or socio-environmental system, recognizing that climate change mitigation processes and decarbonization must

be modelled as complex systems change. Researchers are increasingly recognizing the urgency of multi-level action (Geels, 2011). The term scale is used more often in a geographical context and multiple stakeholders.

One approach to complex systems is **Multisolving**, a methodology for systemic change developed by Elizabeth Sawin, co-director of Climate Interactive, a US think-tank that applies systems analysis and computer simulation to climate change. In essence, multi-solving solutions look to find common solutions to complex problems across multiple strategies, actors and practices. Instead of scaling up one product or outcome at a time, multi-solving attempts to simultaneously resolve many problems through engaging a diversity of actors with differing problems. It can be seen as a process to "scale out." She states: it's "where people pool expertise, funding, and political will to solve multiple problems with a single investment of time and money. It's an approach with great relevance in this era of complex, interlinked, social and environmental challenges" (Sawin, The Magic of Multisolving , 2018).

This concept suggests that organizations working to achieve complex objectives "[r]eframe success as the best mix of multiple factors rather than maximizing one (for example carbon reductions)" (Sawin, 2016). In this model, finding a common and broadly relevant set of objectives and actions allows for more diverse partnerships, greater support and greater innovation – things that might be more likely to create a big change than a more focused, incremental approach.



Multi-solving is useful in understanding the dynamic play between core objectives and range of related issues, strategies and actors – with the intent of building broader coalitions with joint benefits.

Complexity theory, according to G. M. Grobman, "is a new way of looking at how complex structures form, adapt, and change" (Grobman, 2005). In particular, he notes (using the term scaling in a slightly different way):

> "One other feature of organizations explained by… complexity theory is the appearance of scaling, a natural phenomenon that is best described as having fractal qualities. There is a structure of "roughness" to quantitative data involving an organization that looks the same, whether the data is on a scale of days, months or years. In nature, one sees this in the structure of a tree, a cloud, a weather pattern, or a coastline - it cannot be determined whether one is looking at a foot of coastline or a mile of coastline because the pattern appears to be the same regardless of scale" (Grobman, 2005).

By using the fractal concept intrinsic to complexity theory, we can see scale as a product of simultaneously working at multiple levels of analysis. Scaling up is the result of multiple approaches, recognizing that multiple interventions at various scales may be necessary (Bernstein and Hoffman, 2019). This concept suggests that single-focus strategies may not be enough – and that even as organizations focus on singular elements, they must do so understanding who and how other parts of the system will be affected.

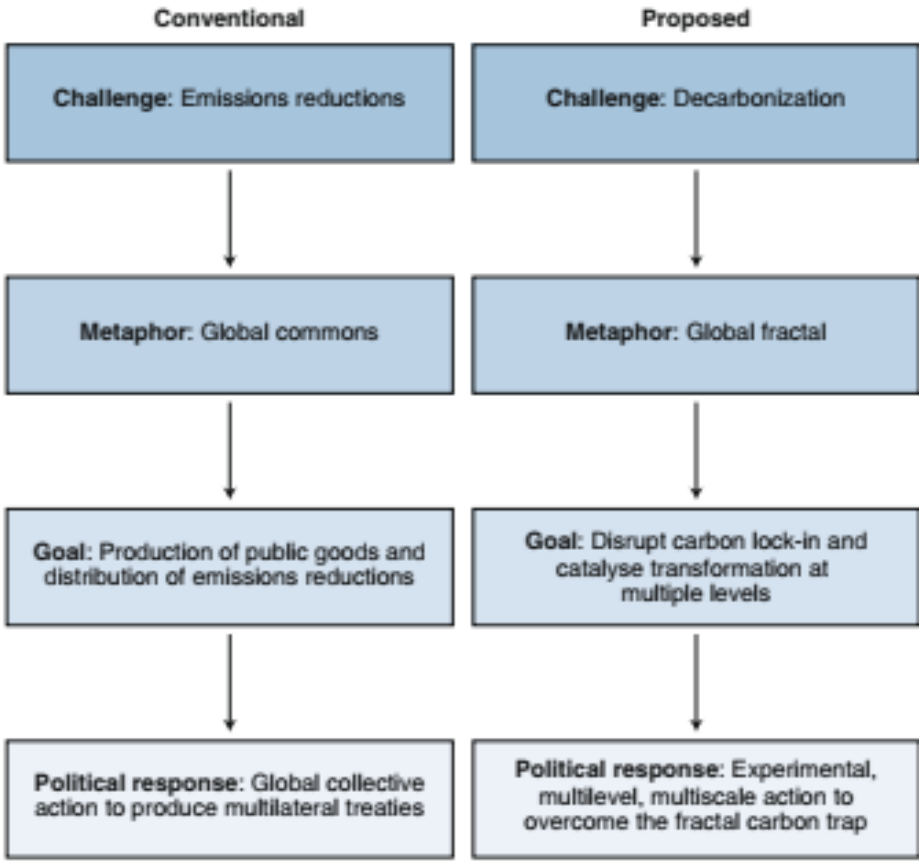
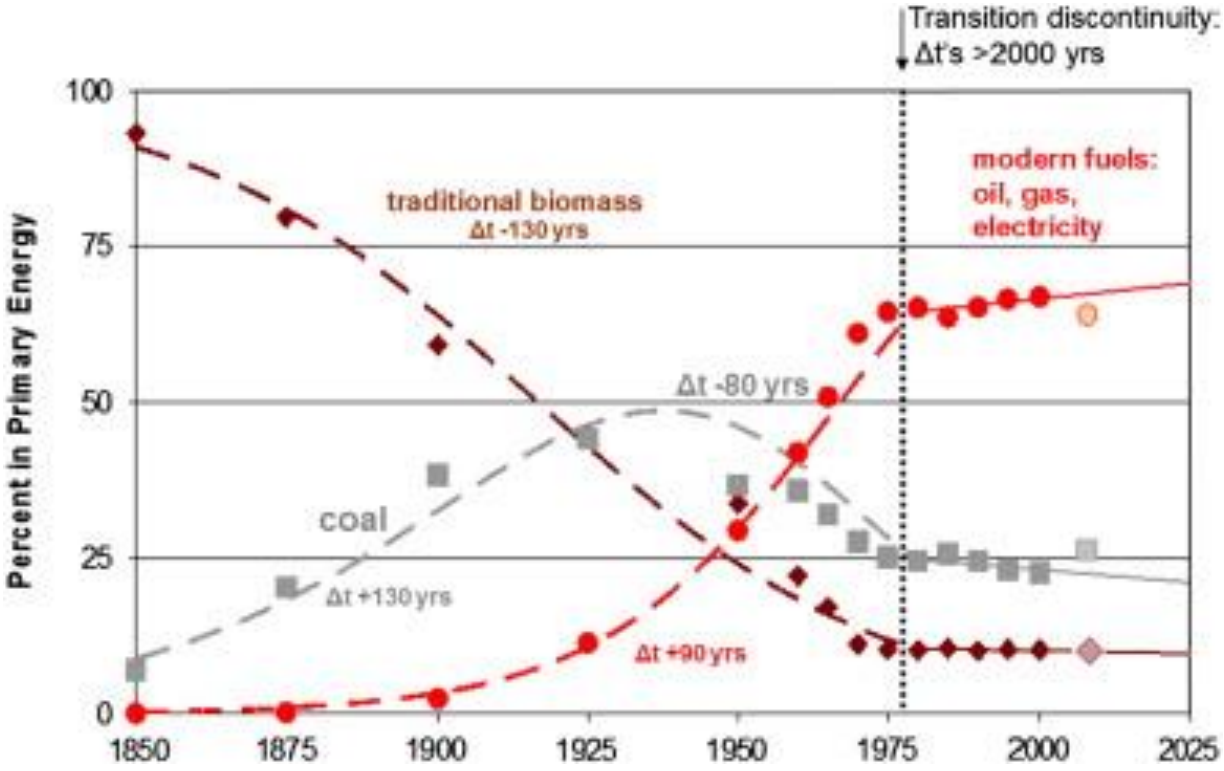


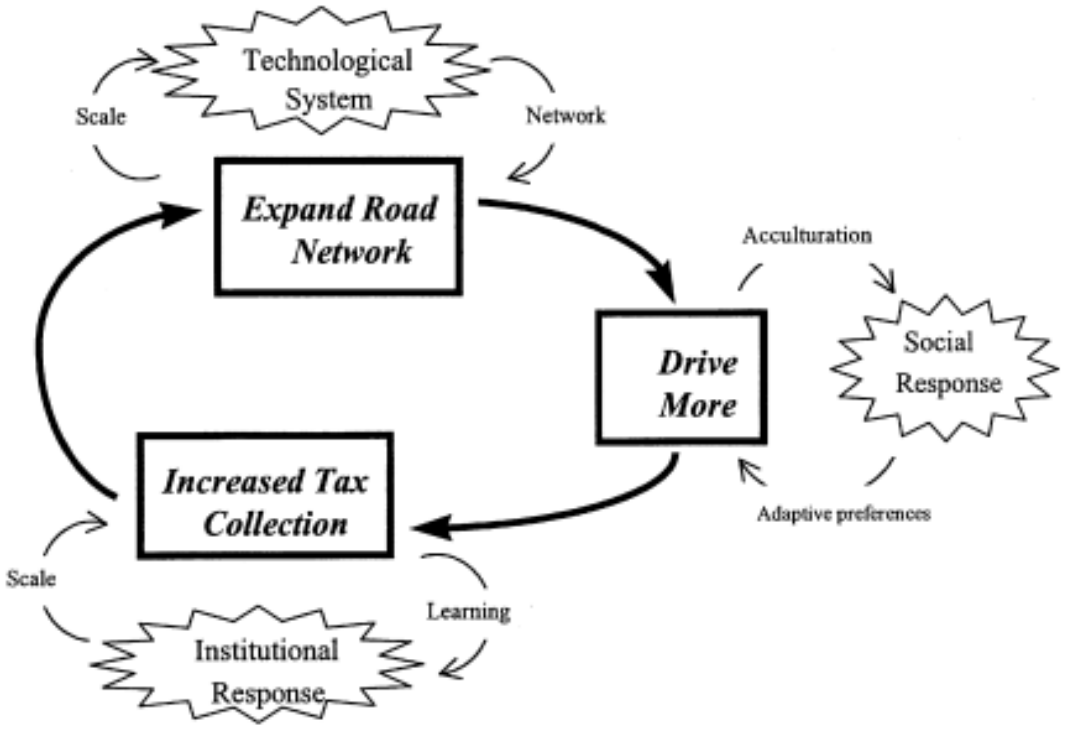
Fig. 1 | Metaphors and climate politics. The conventional logic of the 'global commons' metaphor and the logic of the proposed 'global fractal' metaphor.

Complexity theory suggests that a precondition of scale is the disruption of prior conditions at all levels. Scale-up happens with a multiplicity of solutions available after the initial disruption. A possible implication is that organizations may need to be more capable at creating disruptors and/or how to take advantage of disruptions caused by other circumstances.

This seems to be the case with energy transitions. Grubler (2012) shows that past energy transitions have not been as rapid as we might have imagined, and that since 1975, there has been little change. As a result, prior models of continuous, policy driven and gradual change are being replaced with new models of discontinuous and complex change. He also emphasizes the importance of changing demand side preferences rather than supply side push in these transitions.

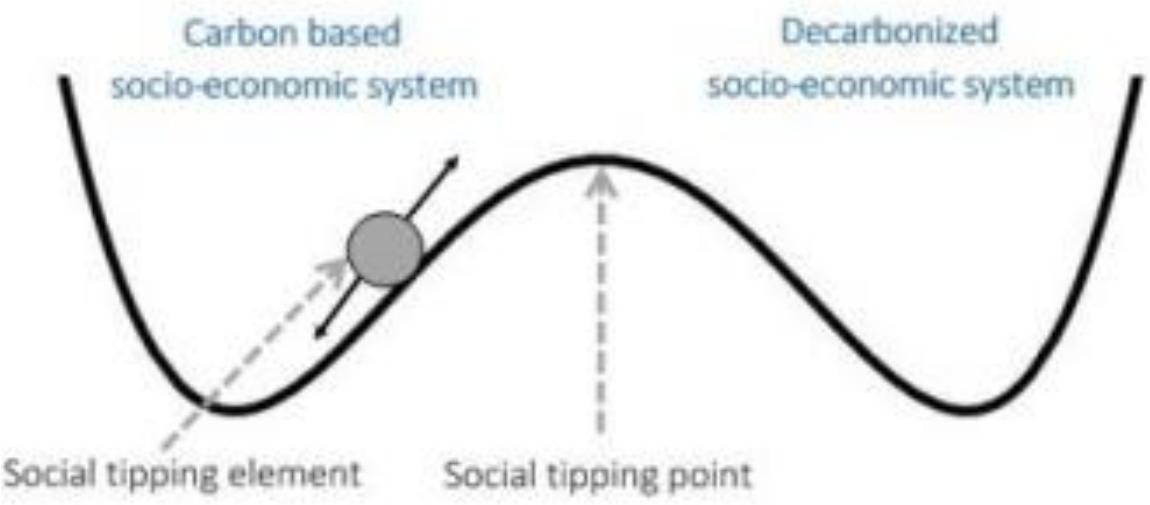


Working in opposition to a smooth energy transition is lock-in, specifically, **carbon lock-in**. Unruh created the concept of carbon lock-in, "a process of technological and institutional co-evolution driven by path-dependent increasing returns to scale (2000)", to explain the barriers to the diffusion of low carbon technologies. He illustrates the concept with a schema of a positive feedback mechanism. Consumers, governments, energy producers and automakers are all locked into a destructive cycle.



Research groups in Stockholm and Potsdam (Otto et al, 2020) ascribe the failure of decarbonization to the enormous lock in effects of multi-level, multi-scale carbon infrastructure. Achieving decarbonization requires that systems traverse a number of multiple social tipping points. Systems move through most moments of points of instability and risk and revert to business as usual.

Lock-in is typically incredibly difficult to overcome as every part of the existing carbon-based system reinforces every decision and action in its favour, while complicating or making impossible even minor changes to the system. However, there are times when lock-in can become fragile.



In this, most of the above theories and models do not acknowledge an underlying assumption: they are premised on the notion that scaling up is accomplished in a linear, exponential and ordered fashion. They rarely account for **discontinuity**, or shocks to the system, that can provoke unanticipated challenges – and opportunities.

A current example: the price of oil has plummeted in response to the twin shocks of COVID-19 and an oil price war and to the long term structural decline resultant from the fall in price of renewables. The market cap of the oil and gas industry has declined to a point where its investors might welcome nationalization and gradual unwinding.

It is possible that the abrupt and extreme events of recent weeks have shaken up elements of carbon lock in cycles. People aren't driving or flying, manufacturing is a fraction of its previous levels, and oil is impossible to sell. Reviving them will be enormously expensive. This break down offers significant opportunities for new initiatives to speed the energy transition and overcome lock-in.

Pathways

For the purposes of this project, the following approaches or *pathways* will be surveyed:

- Public policy change, including political advocacy
- Market transformation
- Commercialization, including social entrepreneurship
- Social innovation
- Social change, including influencing norms and behavior change

These pathways represent those approaches thought to be most relevant to and promising for TAF and LC3. It must be noted that these pathways overlap significantly in terms of the strategies, actors and practices involved. However, each has its own set of objectives and activities that can be described separately.

Public policy change, including political and social advocacy

Public policy is a set of decisions undertaken by governments and other political actors to "influence, change, or frame a problem or issue that has been recognized as in the political realm by policy makers and/or the wider public" (Hassel, 2015).

Policy-making involves both a political and technical process of articulating and matching stakeholders or other actor's goals and means. Policies created in this process then are "actions which contain goal(s) and the means to achieve them, however well or poorly identified, justified, articulated and formulated" (Howlett M., 2014).

The basic policy development cycle typically involves some variation of the following methodology:

- Agenda setting
- Policy formulation
- Policy adoption
- Policy implementation
- Policy evaluation (OECD - Observatory of Public Sector Innovation , 2020)

Public policy informs almost all government responses to problems and policy advocates (actors from all sectors and many different ideological perspectives) attempt to influence the policy development process through many different means (political engagement, lobbying, activism, etc.).

Policy on climate change has become a particularly fractious battleground. It is a "wicked" problem that impacts all levels of society and business sectors. Traditional approaches to policy and program development are increasingly inadequate to address the social, economic, environmental and political issues associated with climate change (Faling, Biesbroek, Karlsson-Vinkhuyzen, & Termeer, 2018) – new approaches that better assess policy frameworks, how power is exercised and how policies can be created and implemented must be considered if climate change is to be properly dealt with.

The process of decarbonizing is an ongoing and **contested change** effort likely to be driven at least in part by social activism. While many types of change are fleetingly or ineffectively contested (e.g. the

utilization of email, women's gradual adoption of pants), other changes are heavily and persistently contested (e.g. gun laws, numerous equality issues, abortion rights). Incumbent organizations create multi-level, multi-sectoral networks to resist change and reinforce dependencies upon the status quo. DeJordy et al. conclude that successful contestation results from the creation of an ecosystem of multiple actors who support and learn from one another. These actors are allied but dissimilar in many aspects. Change is not the result of a single strategy or actor, but the sustained effort of a network of change agents.

A recent paper analyses the activist groups and tactics that won same sex partner benefits from employers in Minneapolis-St. Paul in the 1990's (DeJordy et al., 2020). They identify five clusters of activist groups, all of which had strengths they brought to the effort. These clusters formed what the authors describe as an "inhabited ecosystem of challengers". That is, the ecosystem animated all groups those with early success, those with extensive struggles, and those which did not gain their objectives. The authors conclude, "Contrary to the idea that bold change comes largely from successful first movers, we find that there is learning when activists are thwarted by contention and face protracted battles. Such struggles can be seedbeds of new activities through experimentation, cultivation of reluctant or initially less skilled activists, articulation of new frames for naming injustices, and an expanded repertoire of tactics for securing change."

The implication of DeJordy et al. is that a large alliance of change makers who see the connections among their agendas could be effective at making change. There are many different advocacy outlooks that could help in the work to reduce carbon emissions, from bicycling advocacy to equitable housing to Indigenous land rights. Insatiable use of carbon is a symptom of larger social and economic problems that diverse activists have been addressing. Alliances may further everyone's work.

Sarah Stochowiak of Organizational Research Services Reviewing provides a useful overview of a range of theories and frameworks describing how power and policy interact. Her report *Pathways for Change* outlines six common theories or pathways for policy change. They include:

1. *Large Leap Theory* – Like seismic shifts, significant changes in policies occur when the right contextual conditions are in place (e.g., the battery of new policies and regulations to reduce the practice of drinking and driving that emerged when pressure for action by police services, politicians and the courts).
2. *Coalition Theory* – Policy change happens through the coordinated activity among a range of individuals with the same core policy brief (e.g. When a coalition of agencies encouraging a city to adopt an urban food policy).
3. *Policy Windows* – Policy changes occur when advocates are able to effectively define a problem, possible solutions, and/or shape or take advantage of the contextual factors that encourage "action" on the problem (e.g. the recent "window" to regulate gun ownership in the United States that emerged after incidents of gun violence).
4. *Messaging & Frameworks* – Policies change when advocates frame or present issues and policy options in a way that reflects the worldview and preferences of decision-makers (e.g. encouraging a Provincial Government concerned about a tight labour market to support the policies that strengthen early learning and care programs as way to encourage more parents to participate in the workforce).

5. *Power Politics (Power Elites Theory)* – Policy changes are more apt to occur when advocates develop relationships and work with those in positions of power and influence (e.g. working with oil and gas companies to develop policies that balance resource development and environmental sustainability).
6. *Grassroots (Community Organizing Theory)* – Policy change happens when those people directly affected by an issue work together to address that issue, including pressuring decision-makers to change specific policies (e.g. residents of an inner-city neighborhood organizing to pressure a municipality to change a policy that encourages suburban traffic to move quickly (and dangerously) through their streets). (Stachowiak, 2013)

Noted policy expert John Kingdon describes three categories of independent (and interdependent) variables that interact to produce "streams" for agenda setting when creating policy, as follows:

- The *problem stream* is filled with perceptions of problems that are seen as "public" in the sense that government action is needed to resolve them. These problems usually reach the awareness of policy makers because of dramatic events such as crises or through feedback from existing programmes that attract public attention. People come to view a situation as a "problem" based upon its variance with their understanding of some desired state of affairs.
- The *policy stream* is filled with the output of experts and analysts who examine problems and propose solutions. In this stream, the myriad possibilities for policy action and inaction are identified, assessed, and narrowed down to a subset of ostensibly feasible options.
- Finally, the *political stream* comprises factors that influence the body politic, such as swings in national mood, executive or legislative turnover, and interest group advocacy campaigns. (Béland & Howlett, 2016)

When these three streams converge, a "policy window" opens which allows *policy entrepreneurs* to take action and create policies and programs which significantly change the current way of doing things in their area of interest (Béland & Howlett, 2016).

Environmental issues, such as climate change, have set the stage for policy entrepreneurs to find a policy window and act. In the real world though, funding and finding solutions is often constrained by a number of issues such as funding gaps, lack of capacity, etc. The fact that climate change crosses multiple policy, problem and political streams also adds another level of confusion and difficulty for policy entrepreneurs looking to solve the wicked problem of climate change.

A study of policy entrepreneurs found that policy entrepreneurs looking to solve cross-boundary issues usually employed five strategies:

- Issue promotion – this is defined as *the actions of policy entrepreneurs that contribute to issue visibility, including publishing articles, giving speeches, voicing ideas in discussions and advising other stakeholders across boundaries*
- Issue framing – this broadly refers to *the use of narratives and stories to make sense of an issue by selecting particular relevant aspects, connecting them into a sensible whole and delineating issue boundaries*
- Coalition-building - this *refers to identifying contacts, building teams and points for cooperation and forming coalitions across the boundaries of levels and/or domains*

- Manipulating institutions - this includes *the actions of policy entrepreneurs to alter the distribution of authority and power and/or transform existing institutions*, and;
- Leading by example, *which includes undertaking pilot programs, using an exemplar policy, or testing preferred policy changes at a different policy level or across domain boundaries.* (Faling et al, 2018)

Boundaries can be crossed in multiple directions – *vertically* (strategies that crosscut the boundaries between different policy levels – for example, between the regional level and the national level), *horizontally* (strategies that crosscut the boundaries between administrative policy domains and issue departments within the same policy level) and diagonally (activities that cross both horizontal and vertical boundaries simultaneously) (Faling et al., 2018).

Examples

Many examples of how policy entrepreneurs have acted (and how they have negotiated power) can be seen in the context of environmental policy and climate financing.

MC^3 Project (Meeting the Climate Change Challenge)

MC^3 Project (Meeting the Climate Change Challenge) brought together over 100 researchers, practitioners, civil-society leaders, and policy-makers, led by researchers from to conduct an evaluation of leading municipalities across the province of British Columbia to identify the leading innovators and innovations on climate action (Dale, 2016).

MC^3 identified four critical success factors, in addition to leadership alignment between the elected and staff levels:

- *Systematic frameworks for policy-making and implementation*. Although there is no single blueprint for success for a low-carbon future, local governments that are successful in reducing carbon emissions within a broader low-carbon framework also "measure-reduce-offset" or "balance-report."
- *Institutionalization*. The most successful municipalities integrate climate change within a broader sustainability strategy, set sectoral targets, and lead by example in their own administration.
- *Partnering*. Strong and collaborative relationships with government, not-for-profit organizations, citizens, and business and industry are essential. Municipalities that link business through the green jobs/green growth agenda tied to energy efficiency are also achieving greater success.
- *Innovative financing solutions*. Municipalities that have developed innovative financing solutions to tackle energy efficiency and retrofitting issues are leading by example. One emerging strategy is the idea of a green revolving loan fund as a way of achieving ongoing energy and GHG savings without requiring annual budgetary approval. Another strategy is carbon pricing. (Dale, 2016)

Climate Finance Readiness Report

A 2018 study of climate finance programs - defined here as "*incremental investments and of financial flows …specifically and intentionally directed to reduce GHG emissions, undertake*

adaptation measures to climate change, and strengthen resilience" (Agbemabiese, Nyangon, Lee, & Byrne, 2018) - world-wide found that while most climate financing capacity was being built at the national level, there was "considerable potential for enhancing the effectiveness of these efforts by devoting at least equal attention and resources to the strengthening of city and municipal institutions. Municipal governments are emerging as key players in global climate change governance" (Agbemabiese et al., 2018).

Cities and the policy entrepreneurs within them "can play an increasingly important role in attracting climate-sensitive investments… Capacity building for investment readiness should not be limited to national and international agencies, but extend deeper through multi-level governance structures to cover a diverse set of actors in the public and private sector" (Agbemabiese et al., 2018)

"Municipal governments have often achieved greater success in design and deployment investment friendly policies and regulations by being able to change policy or to shift focus to other sectors as needed, often driven by pressure from local constituents. In general, ex-post flexibility of response, rather than the ex-ante ability to pick winners, has distinguished success from failure in investment and technology policy.*"* (Agbemabiese, Nyangon, Lee, & Byrne, 2018)

Insights: The frameworks and approaches above outline how policy makers view power and how "policy entrepreneurs" like TAF can work with stakeholders and spread their ideas. TAF should consider exploring and expanding a "cross-boundary" (across organizations, jurisdictions and issues) approach to policy entrepreneurship.

Interviewees also emphasized the critical importance of developing a strong presence and powerful allies in the success of any policy advocacy action.

A key informant was Jamison Steeve, Executive Director of the Martin Prosperity Institute, who was quite clear that public policy had to be radical to be effective. To gain any momentum, climate activists and organizations would need to build a constituency and develop a profound platform. They will need to create irreversible policies and programs. In brief, he said, "incremental change doesn't work." Irreversible changes supported by broad based constituencies are the only effective public policy interventions. He gave examples of more-or-less permanent changes through policies that created the Greenbelt, shut down Nanticoke, and created full day kindergarten.

As an example of policies that did not go far enough, environmental compliance manager Linda Drisdelle observed numerous companies evading the intent of demand pricing of hydro by installing gas generators to reduce the cost of electricity at peak periods. She feels that these interventions were too small, not comprehensive enough and did not enjoy near broad support.

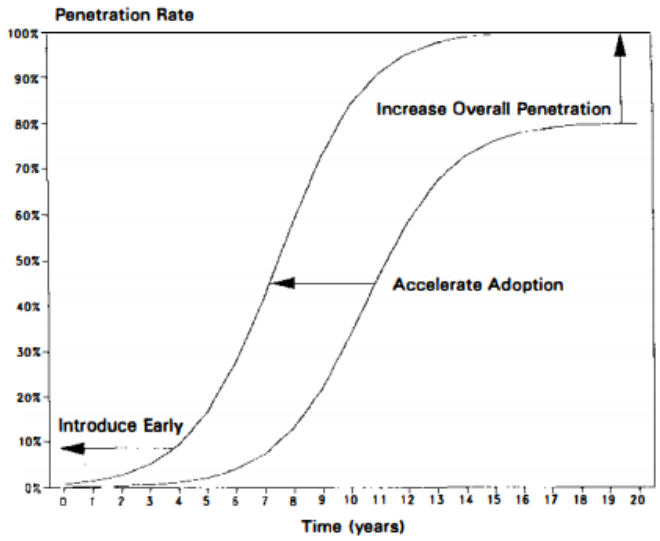
Similarly, policy frames that are incremental and/or subject to reversal create make consistent action by key players uncertain. Environmental lawyer Gray Taylor observed that the public sector's reversals on climate change had produced great timidity among institutional investors, who had begun to pull out of significant green investments.

Market transformation

Market transformation refers to a range of market-level enabling strategies to support scaling by private sector organizations. St. Pierre describes them as follows:

> "Market transformation refers to measures that support widespread and permanent change in the availability and adoption of products and services that are energy efficient or emit less greenhouse gases. The goal of market transformation is to increase the share of energy efficient, environmentally preferable products and services within targeted markets, through strategic measures that change market behavior" (St. Pierre, 2015)

This concept is clearly based upon the diffusion of innovation work of Everett Rogers. It posits that the adoption curve of technologies can be started earlier, accelerated faster and increased to greater penetration with targeted regulatory, tax and fiscal policies (Geller & Nadel, 1994), citing Hans (1992).

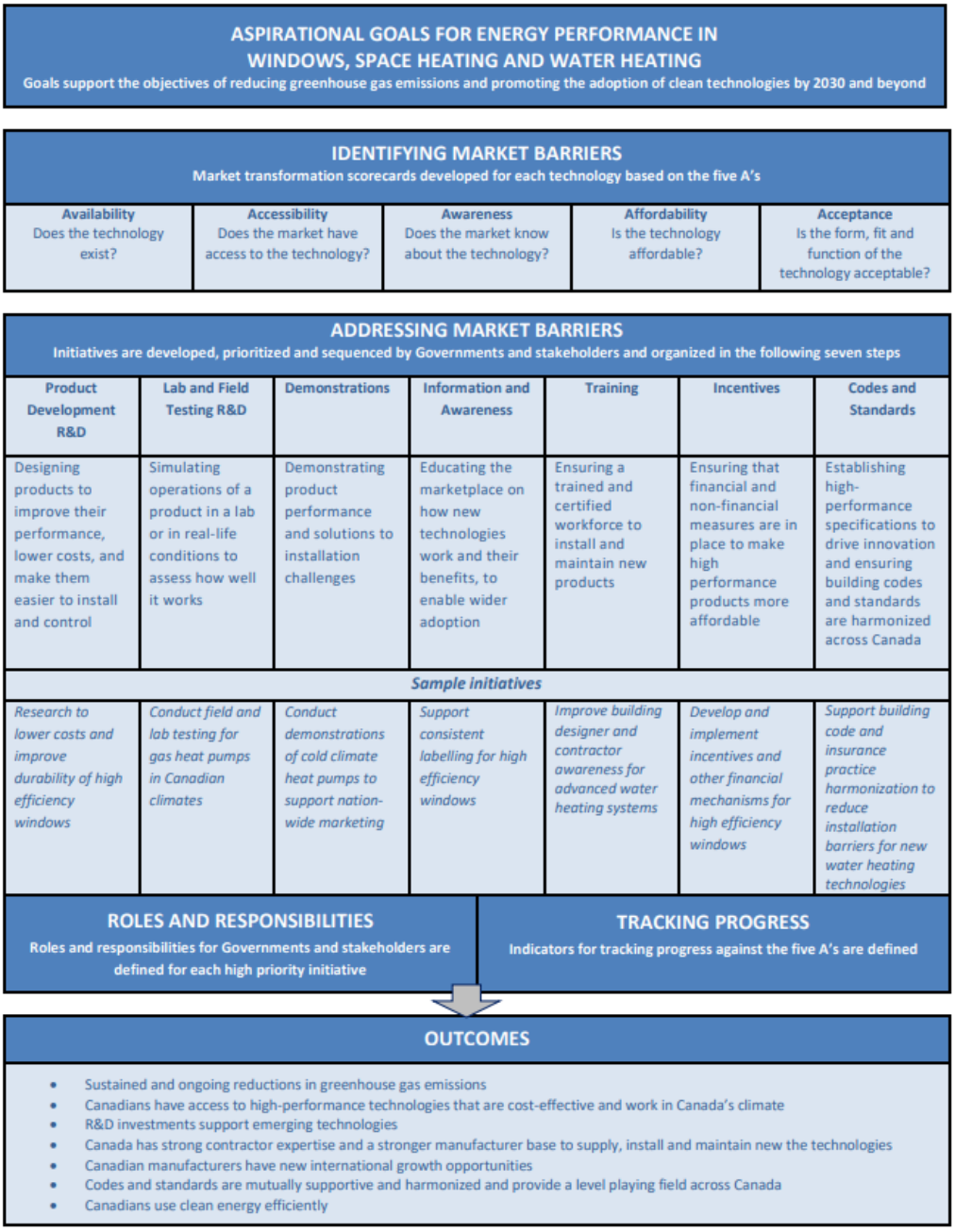


It's a very straightforward model: identify the barriers in low emissions product markets, then identify ways to make their commercial adoption viable. Then develop and implement the policies to make widespread adoption possible.

Market transformations are a mechanism by which governments can incentivize private sector agents to supply more efficient infrastructure, products and services. It allows diverse actors to collaborate to develop, produce and sell better commercial and consumer goods.

This framework was commonly espoused by Canadian governments, both provincial and federal and has been the approach has been extremely important in Canada in recent years. The Pan-Canadian Framework on Clean Growth and Climate Change (Government of Canada - Natural Resources Canada, 2018) mandated a collaborative approach by governments and leaders in the building and related industries. With the increasing number of provinces governed by Conservatives, this collaborative approach to changing the structure of markets has largely disappeared. Only Energy Star appliance ratings remain.

ES-1 Overview of the Road Map



Examples

Consortium for Energy Efficiency

Energy efficiency program administrators from the United States and Canada formed the award-winning Consortium for Energy Efficiency to achieve lasting and verifiable energy efficiency.

The CEE role is to influence national players—manufacturers, stakeholders, government agencies—to maximize the impact of efficiency programs. Energy efficiency is the heart and soul of CEE, but demand response works hand-in-hand for deeper savings. CEE also supports cross cutting trends in behavioral programs and evaluation.

The Institute for Market Transformation

Working with 20 [US] cities through the City Energy Project to develop and implement building performance policies that utilize ENERGY STAR Portfolio Manager®.

Launching the Landlord-Tenant Energy Partnership, partnering with 47 landlords and tenants to accelerate building energy performance in more than two million square feet of commercial building space using ENERGY STAR tools.

Serving as a trusted partner to the Urban Sustainability Directors Network on matters related to energy efficiency in buildings.

2030 Districts

2030 Districts are organizations led by the private sector, with local building industry leaders uniting around a shared vision for sustainability and economic growth – while aligning with local community groups and government to achieve significant energy, water, and emissions reductions within our commercial cores. Property owner/manager/developers join a local 2030 District to help them make significant changes to their properties to create reductions necessary to transition to a low carbon economy.

Insights

Market transformation is a major undertaking whether at a national, provincial, regional or local level. In December 2019, Peter Love (an energy consultant and advisor) spoke about many initiatives that would be viable with better support from the provinces. He saw possibilities of partnerships between the Federal government and municipalities and regretted the loss of provincial support. He identified provinces as the level responsible for regulatory controls, a necessary component of the market transitions pathway. In his opinion, progress without the alignment of provincial political leaders and policies would be difficult. Therefore, organizations in unsupportive climate environments will either need to find ways to reframe their objectives to fit with provincial interests, or look to support from other levels.

Market transformation approaches have typically required buy-in from diverse public and private actors, and TAF has been able to supply sensible, viable, well-researched options for these processes. Since the rise of provincial governments less committed to addressing climate change, market transformation has dropped from the public agenda. Going forward, the only source of recovery funding (and therefore policy initiatives) is the Federal government, as oil and gas companies increasingly go bankrupt and as provinces must concentrate on rebuilding their overwhelmed health, education and welfare systems. TAF's role as trusted policy advisor with "shovel ready" proposals will be key as the relevance and usefulness of market transformation wanes and as stimulus programs rise.

Commercialization (including social entrepreneurship)

One path to scaling up is to commercialize products and services that might support a transition to a low carbon economy. Typically, this would be done by:

1. Creating or supporting small businesses or social enterprises with low carbon solutions
2. Playing a key role in helping these organizations grow by providing advice, networks or direct or indirect funding, or
3. Working with larger, more established businesses to implement scaleable carbon solutions.

Small or medium-sized businesses (SMES)

As noted previously, scaling up is most commonly associated with early stage companies as they attempt to prove and grow their business models towards profitability and generating a return on investment for funders. There are many ways to grow businesses, including direct growth, licensing and franchising, and alliances and partnerships.

In this context, scaling up tends to focus on **actors** – in particular, the actions of individual firms and their immediate support network (founders, boards, funders and in some cases their networks). Firms' growth is also modulated by how they access **enabling strategies** (policies and business supports), and how they choose to **implement** their strategies (Osorio-Cortes & Lundy, 2018).

There is a rich literature (by academics, advisors, think-tanks and even business development services) on how to scale-up SMEs. A previous note on scaling up provided to TAF by the LCI goes into more depth about this literature (Lee-Chin Institute 2019). It tends to focus on companies' competitive differentiation and financial growth over their deliberate or incidental social or environmental impacts, and so holds only so much value as a point of reference for TAF. This section represents a summary of the most relevant parts of that note.

A typical example comes from *Scale-up UK: Growing Businesses, Growing our Economy*, a report based on a convening of experts from the business schools at the University of Cambridge and the University of Oxford (Barclay's, University of Cambridge, University of Oxford, 2014). The report highlights the following success factors for the fast scaling of small and medium-sized enterprises (SMES):

Six major factors related to firm growth	
Will to grow	A crucially important factor, albeit an obvious one. A large proportion of SMEs express limited desire to grow in the future. This may be for a variety of reasons that often revolve around issues relating to managing work-life balance or a desire to keep firms small so a founder can manage alone or with only a few employees. In addition, family ownership of firms further reduces the "will to grow" in small firms and makes them more conservative, often with a greater focus on current profits than growth potential.
Emphasis on the customer	Because of their scale, SMEs are in a privileged position to engage with customers and integrate that experience into their value propositions. This should work to the advantage of SMEs that want to grow rapidly.
Prior experience and top management team (TMT)	If the TMT has prior experience in the industry or with ventures, growth is more likely. Industry experience makes the TMT better prepared for the crucial details of industry dynamics, and previous venture experience enables them to learn faster from mistakes and successes. However, industry experience needs to be complemented by a broad and diverse skillset in order to maximise growth.
Alliances, Partnerships and Collaboration	A defining feature of SMEs is their lack of resources. The firms that grow successfully need to engage with their business ecosystem (customers, suppliers, etc.) in order to both leverage external resources and grow more internal resources. Many of these engagements take the form of formal alliances between the entrepreneurial firms and established companies.
Delegation and formalisation	Many small SMEs are managed and controlled by their founders, but such centralisation imposes a limit on size known as the "bottleneck of one mind". To grow beyond this limit, a formalisation of roles, organisation and processes is necessary – and such formalisation is often a prerequisite to successful delegation that allows growth without sacrificing decision speed and quality.
Innovation	Innovating in new products, new services and new technologies can spur growth. However, it's important to recognise that only a small percentage of innovators enjoy spectacular growth and such rewards tend to be concentrated in high-tech sectors.

This framework highlights the role of key actors in scaling (in particular, the founders/management team) – 4 or 5 of the factors listed above focus on their decisions and actions. Innovation is noted as an important factor, which relates to the discussion early about the "diffusion of innovation."

Only one of these six factors reflects upon issues exogenous (external to the firm): alliances, partnerships and collaborations. Here it notes that SMEs can attempt to overcome lack of resources by accessing networks, including business development services such as accelerators and incubators.

It should be noted that most sources highlight the fact that early-stage SMEs are high risk (e.g., 75% of startups that received venture capital backing fail) (Gage, 2012) . Those who work intensively with them (angel or seed stage investors, advisors, incubators and accelerators, among others), recognize this risk and mitigate it by building a portfolio of such companies in the hope that those that succeed will more than pay for those that fail.

Social enterprises

Social enterprises are businesses that offer social and environmental solutions. They often operate like for-profit firms although definitions and examples can vary widely in practice. There are a number of names for these kinds of organizations, for example B Corps (benefit corporations), or in the UK they are formally called "community interest companies".

There is a less developed literature on scaling profit-generating social businesses. One framework exploring different types of scaling-up social organisations was developed by Uvin and Miller (1996):

1. Quantitative scaling-up: increasing the number of customers (or members) of a company or its geographical working area
2. Functional scaling-up: expanding the number and the type of activities, moving from the delivery of a product or service to a business offering an entire system helping people get out of poverty
3. Political scaling-up: moving from service delivery to empowerment and change in structural causes of underdevelopment
4. Organisational scaling-up: diversifying sources of subvention, creating activities that generate income (Bocken, Fil, & Prabhu, 2016). Like other businesses, social enterprises can scale through direct growth or other implementation strategies. However, some social enterprises also pursue broader, systemic change by seeking to change enabling strategies (such as by created supportive new laws and regulations) or engaging with broader networks (such as advocacy organizations and social movements) (Bocken et al., 2016).

According to a report issued by Duke University's Center for the Advancement of Social Entrepreneurship and the Innovation Investment Alliance (a partnership between the Skoll Foundation and USAID's Global Development Lab):

> "Unlike commercially-focused organizations, social enterprises often work on problems that are entrenched, depend on cross-sector collaboration, and require multiple scaling pathways to engage, demonstrate, or sustain what seemed to work in an early-stage pilot. The road to scale is a journey and it's a complicated one:

- Scaling is not linear- Social enterprises and funders expect iteration during, but often not after, pilot tests. However, these case studies show that the road to scale is complex and therefore requires experimentation, feedback loops, and sometimes failure. Reaching systems change and transformative scale involves disrupting the status quo, which is not a linear process but entails pivots along the way.
- There are multiple pathways to scale - The case study organizations attempted to scale not just through organic growth but also through partnering, open source strategies, advocacy, and other means. Enterprises often attempt multiple pathways simultaneously and/or evolve through various pathways over time.
- Common roadblocks occur on the road to scale - While there is no one formula for scale, we can anticipate and prepare for common roadblocks. The case study organizations learned to lay the right foundations (people, systems, and infrastructure), create data and dashboards for tracking progress, adapt and pivot to impact, partner with others to scale more effectively, and zoom out to find opportunities and reduce opportunity costs" (Worsham, Clark, & Fehrman, 2017).

Accelerators and incubators

Accelerators help SMEs (and sometime social enterprises) grow and scale by selecting a few high-potential firms and providing intensive support, typically working with them 3-6 months. Accelerators may be non-profit, although they are often operated by groups of venture capitalists who take equity stakes in participating companies. Participants are usually provided with an on-site work place, plus business skills training, intensive mentoring and networking activity. The application process is typically highly competitive.

For instance, YCombinator, a top US accelerator, has two application seasons per year, accepting just two or three per cent of the several thousand firms applying (Madaleno, Nathan, Waights, & Overman, 2018). The Rotman School of Management operates the Creative Destruction Lab at several global sites focusing on specific "streams" – working with emerging companies whose key offerings are in artificial intelligence, blockchain, energy, health, oceans, quantum computing, and others. They also select just a tiny fraction of firms that apply (Creative Destruction Lab, 2020).

Incubators provide support to early-stage firms, often in exchange for rent, fees or equity. They typically use non-competitive entry and comparatively 'light-touch' support, typically targeting start-ups aged 1-5 years. Incubators are usually non-profit or run as managed workspaces, where firms have rolling contracts and pay rent, staying for between one and five years. Incubators provide workspace and ad hoc training relevant to the business (e.g. in accounting). Mentorship is also provided but is often minimal and tactical (i.e. advice as needed), as opposed to the more intense, scheduled, and consistent mentorship provided by accelerators (Madaleno et al., 2018).

Example

EIT Climate Knowledge and Innovation Community

EIT Climate is working to accelerate the transition to a zero-carbon economy.

Supported by the European Institute of Innovation and Technology, EIT works to identify and support innovation that helps society mitigate and adapt to climate change. EIT brings together partners in the worlds of business, academia, and the public and non-profit sectors to create

networks of expertise, through which innovative products, services and systems can be developed, brought to market and scaled-up for impact.

Through convening power, EIT Climate-KIC brings together the most effective groups to create the innovation that can lead to systemic change.

EIT identifies, sources and places public and private funds that stimulate innovation. EIT can track progress and outcomes and draw out learning and insight so that our funding partners can effectively invest their resources for maximum impact.

EIT operates across 13 European centres, including the major cities of Brussels, London, Paris and Berlin. Each centre has a director that forms part of an executive team led by a CEO based in Amsterdam. (Climage-KIC.org)

Working with more established businesses to implement scalable carbon solutions

Market transformation strategies (discussed previously) are one way to incent relevant existing businesses to align themselves with low-carbon goals. At the firm level, many options exist to generate growth, including expanding to new markets, acquisitions, licensing and franchising. Each of these strategies is complex and potentially require enormous capital inflows; however, it might be possible for TAF to act as a network facilitator of alliances, partnerships and collaborations between supportive policy makers, promising SMES and larger firms who can bring market access or other resources to bear.

Insights

The literature on scaling up firms appears to have limited relevance to TAF, except where TAF can play a significant role as a funder, incubator, or as a supportive network to access enablers, funds or markets, in particular, action in the policy arena or creating broad-based social support might be useful roles to enable change that market players can then act upon.

With respect to working with accelerators, or with individual SMEs or social enterprises, TAF should first consider partnership opportunities with key umbrella organizations to collaborate on policy or market transformations or provide network benefits. TAF can also highlight successful projects and participate in conversations about how to scale them.

Social innovation

Social innovation describes the process of finding and implementing solutions to societal challenges. Social innovations are best known in improving interventions (policies, processes, programs and products and services) relating to health care, education, or poverty reduction but can be applied to almost any social or environmental problem.

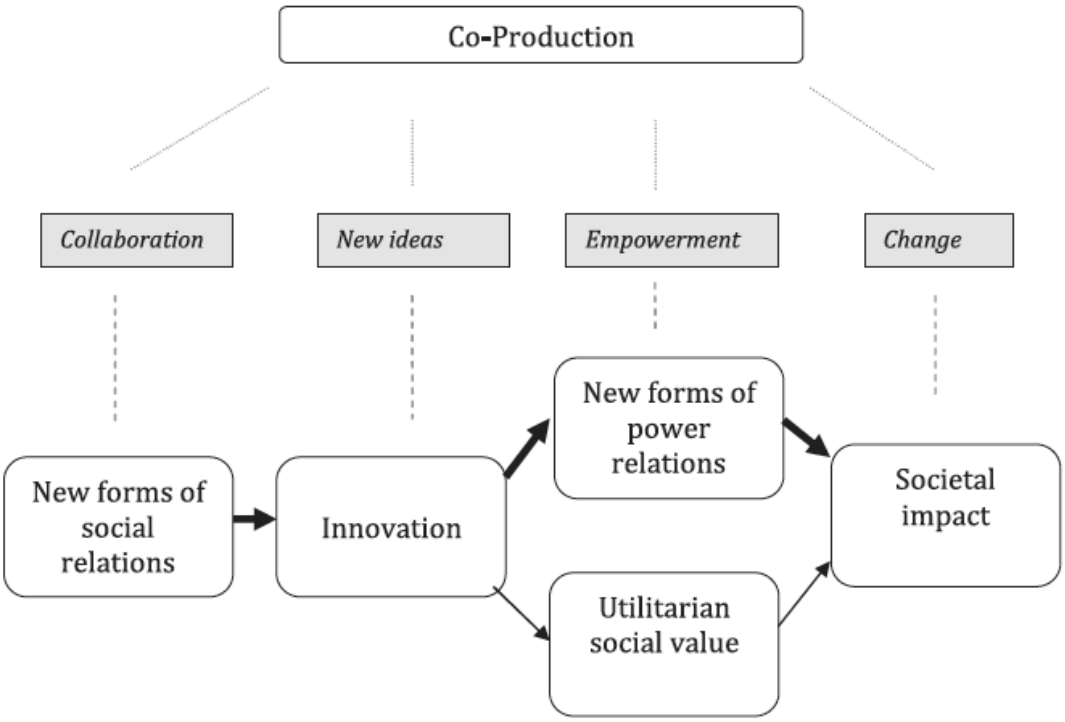
Frances Westley (2008) defines it as follows:

> "Social innovation is an initiative, product or process or program that profoundly changes the basic routines, resource and authority flows or beliefs of any social system. Successful social innovations have durability and broad impact. While social innovation has recognizable stages and phases, achieving durability and scale is a dynamic process that requires both emergence of opportunity and deliberate agency, and a connection between the two. The capacity of any society to create a steady flow of social innovations, particularly those which re-engage vulnerable populations, is an important contributor to the overall social and ecological resilience" (Westley, 2008).

Note that there is some considerable overlap between social innovation and social entrepreneurship. Both share the objective of improving human conditions, but social innovation tends to be more expansive in the actors involved (potentially any organization or networks of organizations, including government, public, private, or civil society groups) and involve a broader array of implementation strategies (again, almost any kind of action not limited to entrepreneurial or business models). Social innovation also tends to put less emphasis than social entrepreneurship on creating revenues that directly support activities.

A number of conceptual models have been developed to describe the process of social innovation. N. Ayob, S. Teasdale, and K.N Fagan developed "social innovation pathways":

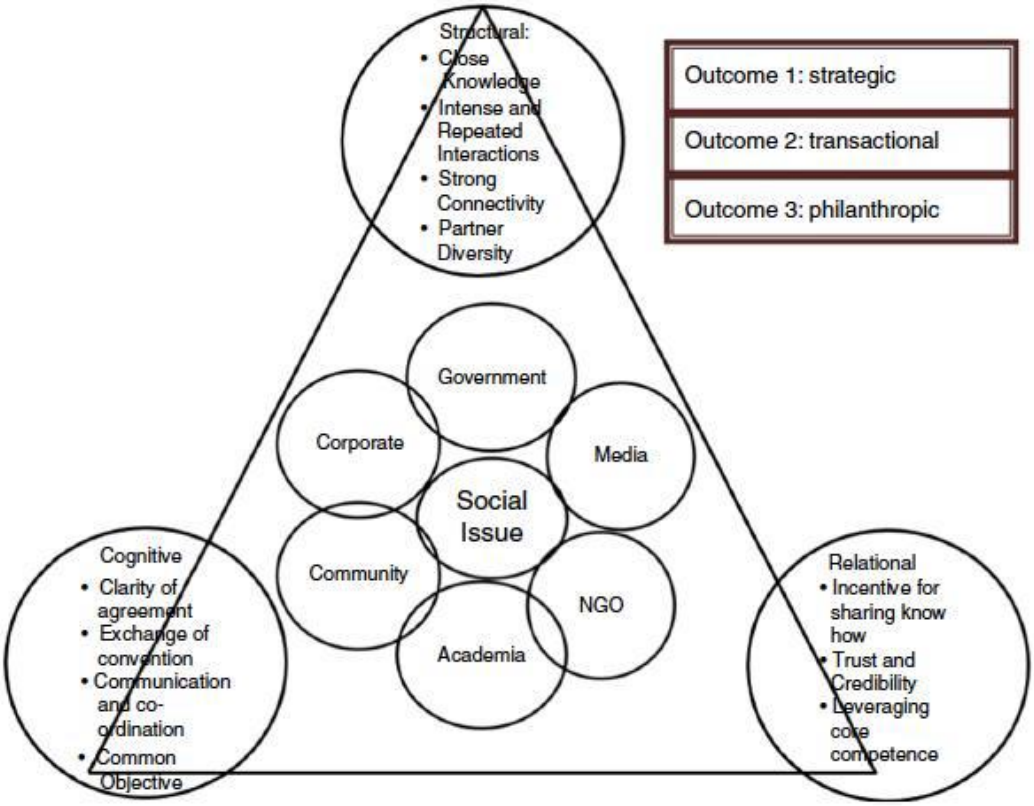
> "Social innovation involves new forms of collaboration, whether at an individual or organizational level, often implying new and less hierarchical relationships between government, civil society and citizens.
>
> Innovations can lead to a restructuring of social and/or extant power relations in the way they are implemented.
>
> The innovation should have a positive societal impact through its utilitarian value – improving the quality or quantity of life."



(Ayob, Teasdale, & Fagan, 2016)

B. Salim Saji and P. Ellingstad (2016) developed the "social innovation model for business performance and innovation":

> According to this model, there are three level of partnership dynamics that happens in a social innovation project - relational, structural and cognitive-level dynamics. [P]artners are brought together through initiating conversation based on the capabilities and core competencies and knowledge base of the partners. There is a complementary collaboration as well as competition between partners to become active in the relationship… Collaboration, enthusiasm, strategic fit, exploring for the fit, analyzing the existing strengths of the organization in terms of fit with the project that comes to them, seems to be the important factors in social innovation outcomes.



(Salim Saji & Ellingstad, 2016)

J. Kania and M. Kramer offer their "Collective Impact Framework," a "systemic approach to social impact that focuses on the relationships between organizations and the progress toward shared objectives" (Kania & Kramer, 2011).

Collective Impact was developed in response to the ineffective "business as usual" they observed among advocacy organizations trying to solve "wicked" problems such as poverty reduction, public health and economic development (Biggar, Ardoin, & Morris, 2017). In their opinion, many of these organizations failed to have a broader social impact as they eventually ended up working towards a narrow window of goals that were at odds with that of other complementary organizations (Kania & Kramer, 2011).

Collective Impact has been employed by a number of stakeholders since its inception. In Canada, the Tamarack Institute's Liz Weaver is a major proponent of the approach. The framework has already been employed a number of times within Canada at the municipal level as a poverty reduction tool in Edmonton, St John and Saskatoon.

Examples

Strive Partnership – Promoting Educational Success For Low Income Students

Founded in 2006, the Strive Partnership was formed in Northern Kentucky and Cincinnati to assist low-income and minority students achieve lifelong success in a "cradle-to-career" continuum. Realizing that many previous efforts to improve educational obtainment were falling short, Strive's stakeholders set to "advancing the next level of collective impact by fortifying the urban education ecosystem in Cincinnati and Northern Kentucky to ensure racial and economic equity".

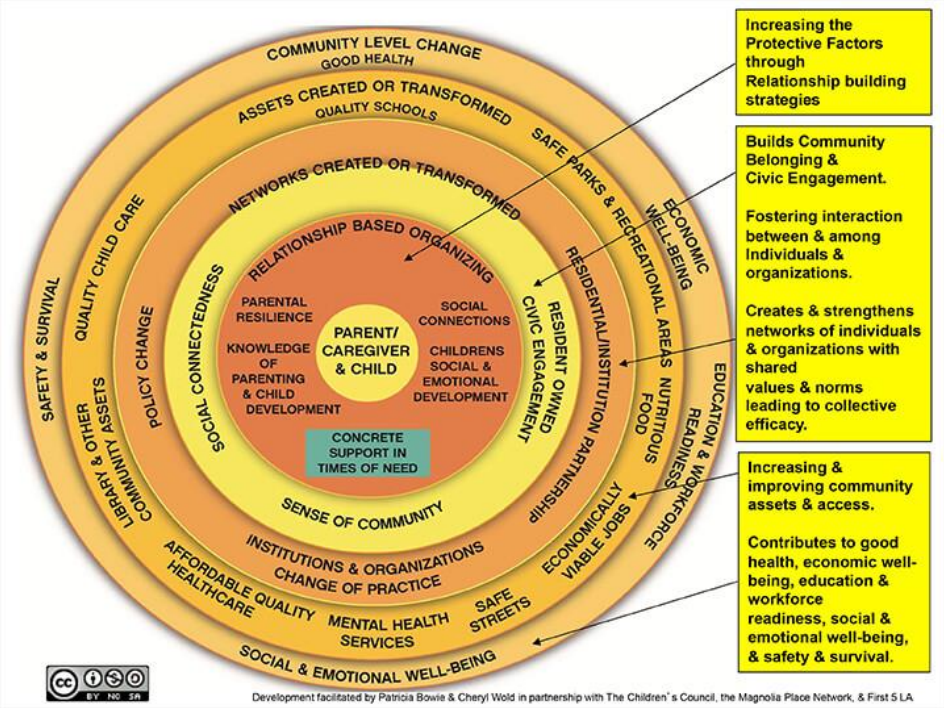
Strive accomplished this by developing a collective impact framework for education that "draws upon the insights and authority of these community-based stakeholders – including parents and caregivers, teachers, grassroots leaders, and students themselves – and actively enlists them in the co-design and co-production of solutions".

Strive tracks outcome data related to six critical milestones along the "cradle-to-career continuum" to determine the success of every child and learner (and assess the learning system). The milestones focus on:

- School Readiness
- Early Grade Reading Level
- Middle Grade Math
- College/Career Readiness
- College/Career Persistence
- Career/Life Pursuit (Strive Parternship , 2020)

The Magnolia Community Initiative (MCI) – The Promotion of Community Health and Well Being

The MCI is an organization which aims to "transform an entire community by uniting the residents, public and private organizations to change how both residents and organizations think and act, and to change how parents behave, with the ultimate goal of improving outcomes for an entire community of vulnerable, low-income children in Los Angeles" (MCI, 2020). The MCI operates on have been "Community Level Change Model" which hopes to build resilience (at the individual, family and social level) and community level changes sought (MCI, 2020). The image below is a graphic representation of "a theory of change built upon research, some key assumptions, and years of implementing and learning from community based prevention strategies" (MCI, 2020).



Insights

TAF already knows the importance of network-based and multi-level social innovation approaches like multi-solving and other frameworks mentioned above. Although they are potentially slow and difficult to measure in terms of impact, they ensure strong community involvement and the broadest possible support. TAF might continue or expand its collaborative efforts, leveraging the insights and perspectives of these emerging approaches. TAF could position itself as a "prime mover" in developing broader, region-wide or national schemes through LC3, as well as engaging in projects that may be outside of its specific issue area but consistent with its objectives.

Interviewees contacted had mixed reactions to social innovation as a concept. While they hoped that social innovation could produce positive impacts, there was also concern that the term had become so broad that it could describe almost any kind of intervention and made it difficult to assess effectiveness. For example, Mary Rowe of the Canadian Urban Institute is working to identify potentially effective low-carbon innovations and to jettison less effective ones. She has abandoned the funding of District 2030 and has begun to invest in industry-based initiatives. She employs the research of James Meadowcroft at Carlton into technology transformation. On this basis, she has funded a program to move medium haul trucking (between Edmonton and Calgary) from the use of diesel fuel to hydrogen, bringing the industry closer to the point of Schumpeter's creative destruction.

Social change, including influencing norms and behavior change

Research related to behavioral change on a societal level (influencing individuals) tends to fall into the realms of sociology and psychology (with nods to the diffusion of innovation work by Rogers).

Social contagion or behavioral contagion theory posits that information and beliefs can spread like a typical epidemic – "information spreads between individuals like a pathogen, with each exposure by an informed friend potentially resulting in a naive individual becoming infected" (Hodas, 2015). Over time, as an idea spreads, it can lead individuals to change their behavior. "In order to adopt a novel behavior, an individual needs to be convinced by a fraction of his/her social contacts larger than a given threshold" (Iacopini, 2019).

In practice, social contagion theory has been used to study a number of key phenomena – from suicides to social unrest to the spread of "viral" videos and memes online. It appears to be is a useful lens to look at adoption and acceptance of certain social norms, including those related to climate change and renewable energy use. Much of this research is centered on the idea (popularized by Gladwell) that there are "tipping points" that can "trigger rapid, nonlinear changes" driven by self-reinforcing positive-feedback mechanisms that inevitably and often irreversibly lead to a qualitatively different state of the social system" (Milkoreit, 2018).

These concepts are also further explored in behavioral economics. A notable concept is referred to as "nudging" – that is, introducing "a deliberate change in choice architecture with the goal of engineering a particular outcome" (Ly, Mažar, Zhao, & Soman, 2013). Often, nudging is based on positive reinforcement and indirect suggestions as ways to influence the behavior and decision making of groups or individuals – as opposed to forms of behavior change that are mandated by governments and policy makers (and may encounter resistance) (Ly et al., 2013).

While nudging is usually associated with consumer choice theories, it has direct applications towards personal and group behavior. Nudges share characteristics that can be classified across four different dimensions:

1. Boosting Self-Control vs. Activating a Desired Behaviour.
2. Externally-Imposed vs. Self-Imposed.
3. Mindful vs. Mindless.
4. Encourage vs. Discourage (Ly et al., 2013).

Examples

Nudging

		MINDFUL		MINDLESS	
		ENCOURAGE	DISCOURAGE	ENCOURAGE	DISCOURAGE
ACTIVATING A DESIRED BEHAVIOUR	EXTERNALLY-IMPOSED	Simplifying tax rules to make tax filing easier.	Placing signs to remind people not to litter.	Advertising that most people are recycling to increase recycling efforts.	Using fake speed bumps to discourage speeding[9].
BOOSTING SELF-CONTROL	EXTERNALLY-IMPOSED	Simplifying application processes for college grants to encourage higher-level education[10].	Installing car dashboards that track mileage to reduce gas usage[11].	Automatically enrolling for prescription refills to encourage taking medication.	Placing unhealthy foods in harder to reach places[12].
	SELF-IMPOSED	Maintaining an exercise routine by agreeing to pay a small penalty if a gym session is missed[13].	Avoiding drunk driving by hiring a limo service beforehand[14].	Joining a peer savings group to encourage saving money[15].	Channelling money into a separate account to reduce the likelihood of it being spent[16].

Solar panel adoption/London School of Economics Study

A 2017 study conducted by the London School of Economics on the adoption of solar panels found that "households, businesses and farms are more likely to install solar panels if others in their neighbourhood have already done so, and in particular if existing installations are highly visible" (Baranzini, 2017) – confirmation of one of Rogers' insights about observability. The study found:

- Visibility drives the effect. Panels integrated into the side of a building lead to more new adoptions than panels attached to a roof because they tend to be more visible.
- The effect decreases with distance and with time: the closer or more recent an installation is, the greater the 'contagion' effect.
- Business owners tend to be influenced by the installations of other businesses owners, and farm-holders by other farm-holders. Householders are influenced by all installations.
- Policymakers could use these effects to spur adoption of solar panel technologies by householders through, for example: installing signposts to emphasise the presence of a solar

panel; group pricing of panels at the neighbourhood level; public gatherings to share information on solar panels; 'electing' community-level solar ambassadors; and using referrals.

- Business organisations and local industry clusters could also stimulate adoption by firms by providing a platform for similarly sized businesses or those in the same sector to share experiences and tips. (Baranzini, 2017).

Insights

In terms of supporting behaviour change, TAF might consider more a more explicit role on its own or with key collaborators to build awareness and reinforce behaviours that "increase contagion." In particular, it might be possible to highlight the observability of the success of projects and their use by members of the community. This can be done directly or by funding partner organizations through relatively inexpensive campaigns on social media or traditional media and at trade shows. Project collaborators might be asked to also enhance their support for such marketing efforts, including through social media, signage, media interviews, etc.

Two of the interviewees touched on the problem of insufficient ambition in social change efforts. Laura Hache, Climate Action Lead at Youth Challenge International, described her work with groups of youth on behavioural change projects as "inside the box." She was having a great deal of success with one of her youth groups in training them to track Peel Region council and to depute on local recycling issues. When asked if she felt they could use this expertise to expand their area of concern to public transportation, bike lanes, or other environmental issues relevant to young people, she noted that the youth she works with in Peel Region could be a powerful force. However, she has not trained them to scale-up in their approach or to help organize other young people around the Golden Horseshoe. Success in this social change initiative did not bring scale (although this could have been due at least in part to the constraints of funding).

Gray Taylor expressed dismay at the lack of public uptake of the Home Energy Loan Program (PACE bonds) in Toronto. In spite of its wide availability and low cost, the public did not take up the offer. Taylor was baffled by the failure of the City's "If you build it, they will come" approach to reducing carbon use in private homes in Toronto. It is possible that the marketing approach was insufficient in highlighting benefits, particularly the observability of the innovation, or reach the right (mainstream) audience.

Insights and conclusions

This report has focused on a range of theories, models and pathways that organizations use to create social change. They are presented here to help TAF make key decisions about its future, in particular:

- what models, theories or concepts might best fit the purpose of creating the conditions to accelerate the adoption of low-carbon action
- best-fit approaches and tools for accelerating scale-up, provide analysis to **g**uide strategy and organizational development.

TAF is taking this opportunity to step back and learn more about current theories and paths in order to improve its impact. Like many other organizations seeking to create positive social change, the problems that TAF approaches are:

- systemic (complex) and/or fractal (operating simultaneously at multiple levels)
- contested at a political and social level
- bound by social/behavioural limits, and
- discontinuous/disruptive.

Possible approaches to accelerate low-carbon action (based on key issues outlined in the theories and pathways) include a clear, renewed set of choices about:

1. **Framing change:** which issues to focus on
2. **Enabling change:** how to influence the right policies and supports at the macro level
3. **Driving change:** how to operate as an organization individually and as a key influencer in a web of networks
4. **Creating new audiences for change:** building a broader base of support across wider audiences
5. **Demonstrating benefits of change:** how to communicate to spur "social contagion"
6. **Harnessing discontinuities to make positive change:** opportunities in shocks to the system

Based on this research and insights derived from it, TAF should consider the following opportunities (and challenges) as it reflects on its future.

Framing change: which issues to focus on

TAF's focus on low-carbon solutions is clear. However, the research and examples provided show that the systemic nature of the challenges means that there may be unexplored opportunities for TAF to ally with organizations working across a range of social challenges. Multisolving provides a methodology to "connect the dots" between TAF's specific mandate and that of a number of other potential partners.

Scholar Daniel Aldana Cohen says: "What does a national renewable energy system look like? How does that link to housing? Inside of that are a bunch of arguments about social housing, public transit, and public recreation" (Berger, 2020). These issues abound with elements that relate to TAF's mandate to support a transition to a low carbon economy.

By engaging in a broader discourse about the systemic connections between related issues such as health, housing and transportation (among others), TAF can enter into the work of a larger group of change makers. For example, TAF's expertise in infrastructure and transportation could be critical to the success of parallel social change initiatives to improve access to housing and – simultaneously – reduce carbon.

Enabling change: how to influence the right policies and supports at the macro level

TAF should review its policy work to clarify how well its activities match its interests across two domains:

- creating irrevocable policy change, and
- supporting business development (advising governments re: the allocation of stimulus funds toward decarbonization transition projects, supporting large businesses in key innovations, the potential for working with related accelerators or incubators).

As a low-carbon "policy entrepreneur," TAF should consider the core role of alliances (across organizations, jurisdictions and issues) to policy entrepreneurship in keeping with its framing of issues.

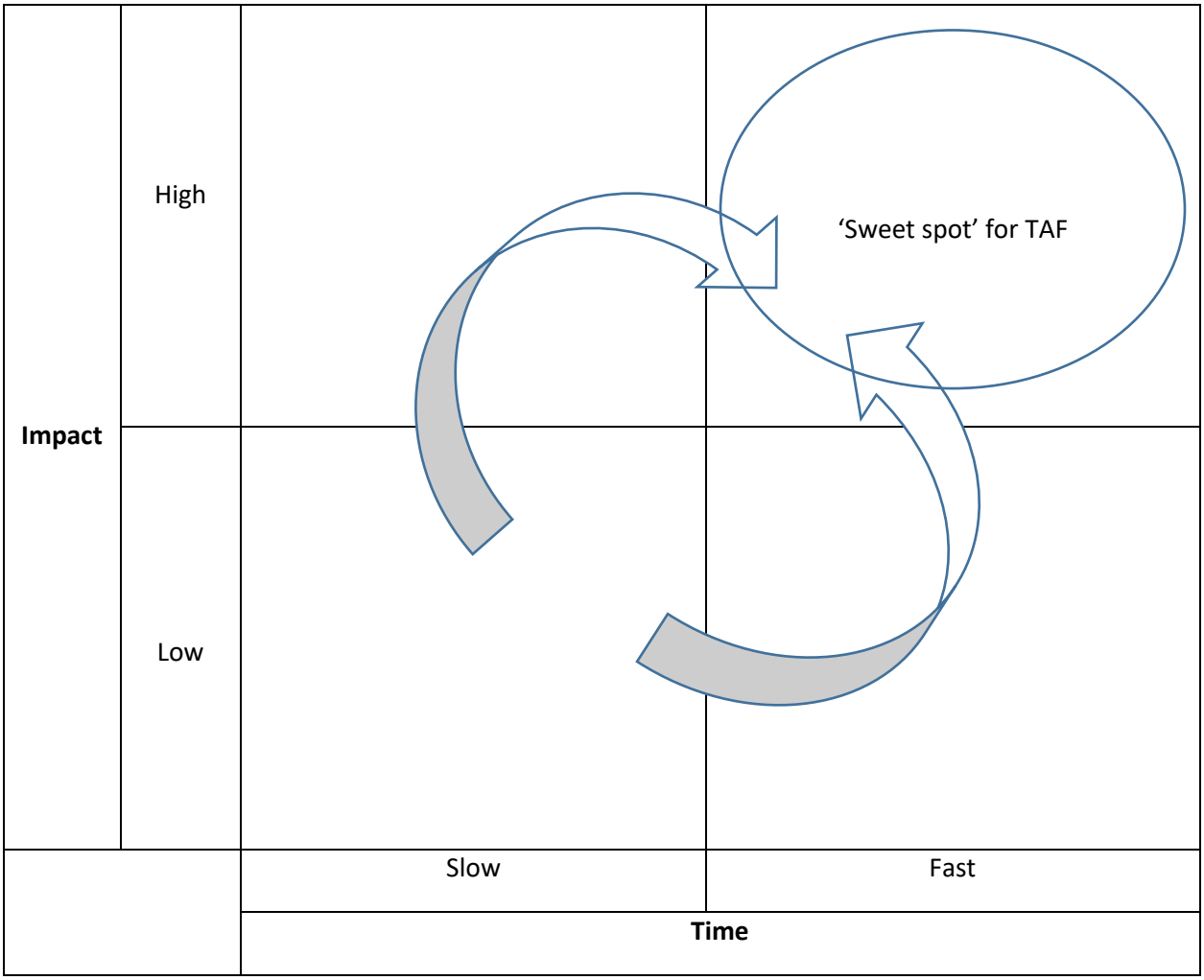
TAF should also consider developing a radical policy platform, even in the context of some unsupportive provincial governments.

In terms of market transformation and business development, TAF lacks the massive scale (or the tolerance for risk) necessary to have a major direct impact on markets as a direct investor or as a source of venture capital. However, TAF can work in partnership with allied organizations to develop a wide range of policy initiatives and provide network benefits to organizations that are seeking low-carbon solutions. TAF can also highlight successful projects and help entrepreneurs develop scaling strategies.

Driving change: how to operate as an organization individually and as a key influencer in a web of networks

TAF (and LC3) are unique entities connected to local communities but with a broader reach. They are small, have limited resources against the scale of the challenges they face, and (in the context of clear environmental signals) limited time.

Individually, TAF is clearly looking to increase impact despite these limitations. Beyond the learnings in this report, it should consider how to optimize its own performance against two key dimensions: impact and time scale. Governments in Canada, particularly the Federal government, also want to have positive impact on workers and consumers in a very short period of time. TAF's ability to quickly identify, package and sell employment and infrastructure investments that will reduce carbon emissions and increase quality of life will be critical. Close connections and alliances will enable more of these to be adopted. These might include work with the health sector to reduce particulate emissions, with Indigenous activists to stop pipelines, with the Maytree Foundation on building housing, or with the Federation of Canadian Municipalities to gain universal access to high speed internet for education and telecommuting.



This way, TAF can better understand its portfolio of initiatives and potentially focus attention on the highest-impact, fastest initiatives, whether they be taken on by TAF individually or with its networks.

There's no doubt this is a tricky balance. Given the complexity of the issues it works on, and the indirect nature of its work through many intermediaries or those it needs to influence without many incentives to offer, TAF's initiatives probably tend to be high-impact and slow.

TAF already conducts a good deal of its work through alliances. Although networks add to complexity and time, they ensure strong community involvement and the broadest possible support. As noted above, networks will also be instrumental in finding issues of common interest to broader audiences in a more and more regions. TAF should continue or expand its collaborative efforts, leveraging the insights and perspectives of these emerging approaches.

Alliances could produce gains faster than most other strategies. Examples include alliances with the health sector to reduce particulate emissions, Indigenous activists to stop pipelines, with Maytree on creating a national housing strategy or with anyone who's interested in universal access to high speed internet for education and telecommuting).

An underlying opportunity is in broadening TAF's presence and profile. TAF was known by climate specialists but less so by other interviewees and contacts. TAF should consider ways to create its own presence and relationships with key influencers, especially when working within coalitions. In a few key initiatives, TAF could position itself as a "prime mover" and promote its leadership.

Creating new audiences for change: building a broader base of support across wider audiences

A core insight in the diffusion of innovation literature and in behavioural economics is that it is essential to choose the right audience and reach them in the right ways.

TAF appears to be relatively successful at reaching innovators and to some extent early adopters as it's natural consituency. For most innovators, however, the real test is in leaping over the "chasm" to reach more mainstream consumers of an innovation (be they policy makers, business people, consumers or the public). TAF consider if – and how – to better reach more mainstream audiences.

Demonstrating benefits of change: How to communicate to spur "social contagion"

Beyond reaching a broader set of audiences, TAF should review its communication practices to see if it effectively transmits the benefits of its work to its audiences. In particular, it should consider if it reaches its audiences in a way that highlights (in Rogers' model) "compatibility with values and experiences," and "observability."

In other contexts, *observability* of an innovation (such as local consumers actually seeing solar panels being installed, or blue boxes being used by neighbors) was an essential factor in wider adoption.

This finding is compatible with behavioural economics, which should be another point of reference and a resource in the development of any social change initiative by TAF and its networks.

Harnessing discontinuities to make positive change: opportunities in shocks to the system

Climate change is itself a discontinuous change: the world can only bear so much carbon. TAF understands this challenge, but reduction of carbon emissions has remained a profoundly contested matter.

The COVID-19 Pandemic will almost certainly create a new openness to radical policy and practical ideas to reboot the Canadian economy – TAF and others may find a way to be heard in new ways if it (and its networks) have potential recovery solutions.
Given the history of contestation, TAF can now argue that the contestation is over (that carbon-intensive industries appear to have a new status as worthless assets) and that TAF and its allies have viable alternative solutions.

TAF should also work to support a positive recovery by working with its allies on a range of issues that produce low-carbon impacts. These may be directly in TAF's universe (such as actions towards a "green economy") but TAF should also consider a wider range of relative issues that can product low-carbon impacts but are not currently defined as obvious solutions to a low-carbon transition. Several have been noted, above, such as housing and transportation, and there are many more.

The Pandemic presents risks, too. Helen Mountford, the vice president for climate and economics at the World Resources Institute, says: “There’s a risk that countries and companies will revert back to what they know works. Shovel-ready coal or fossil fuel projects that were halted in recent years on environmental concerns could easily be reactivated. That would be a huge risk. (Lombrana, 2020).” It is extremely urgent to prevent a consensus developing that we need to rebuild or reboot the oil and gas, automobile, airline, and other high emissions industries for the renewed health of the economy. An urgent priority for TAF is to ensure that the Federal and Provincial governments do not make emissions worse by focusing exclusively on high emissions industries.

Infrastructure Minister Catherine McKenna announced on April 15, 2020, that she is seeking shovel-ready projects to fund, particularly in green infrastructure. Two days later, Prime Minister Trudeau announced $1.7 billion to hire workers to clean up orphaned oil wells but no money to bail out companies whose mines and pipelines were fast becoming worthless. These are strong signals the new Canadian economy may seek to be greener and that the economy might no longer be locked into producing and pumping oil.

Appendices

Appendix 1: Works Cited and Consulted

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Appendix 2: 10 Things to Read

Tipping points and fractals

1. Social tipping points are the only hope for the climate

Author David Roberts https://www.vox.com/energy-and-environment/2020/1/29/21083250/climate-change-social-tipping-points 2020-01-29

Abstract If there is any hope at all, it lies in the fact that social change is often nonlinear. Just as climate scientists warn of tipping points in biophysical systems, social scientists describe tipping points in social systems. Pressure can build beneath the surface over time, creating hairline fractures, until a precipitating incident triggers cascading changes that lead, often irreversibly, to a new steady state. (Think of the straw that broke the camel's back.) It is less a matter of simple cause and effect than of emergent network effects that are unpredictable and somewhat mysterious even in retrospect.

Why read this?

a. It's a great summary of this remarkable article: Otto, Ilona M., Jonathan F. Donges, Roger Cremades, Avit Bhowmik, Richard J. Hewitt, Wolfgang Lucht, Johan Rockström, Franziska Allerberger, Mark McCaffrey, and Sylvanus SP Doe. 2020. "Social Tipping Dynamics for Stabilizing Earth's Climate by 2050." *Proceedings of the National Academy of Sciences* 117 (5): 2354–2365.

b. It's a clear explanation of a complex sociology of change.

For extra challenge points, read the original article.

Also more popular work is going there, e.g. https://www.climate-kic.org/opinion/social-tipping-points/

2. This article by two UofT political scientists is superbly written. Bernstein, Steven, and Matthew Hoffmann. 2019. "Climate Politics, Metaphors and the Fractal Carbon Trap." Nature Climate Change 9 (12): 919–25. https://doi.org/10.1038/s41558-019-0618-2.

It's similar to #1, but published independently.

Networks of activists

3. Han, Hahrie. 2019. "Opinion | When Does Activism Become Powerful?" The New York Times, December 16, 2019, sec. Opinion. https://www.nytimes.com/2019/12/16/opinion/activism-power-victories.html.

4. Han, Hahrie, and Carina Barnett-Loro. 2018. "To Support a Stronger Climate Movement, Focus Research on Building Collective Power." *Frontiers in Communication* 3. https://doi.org/10.3389/fcomm.2018.00055.

5. DeJordy, Rich, Maureen Scully, Marc J. Ventresca, and W. E. Douglas Creed. 2020. "Inhabited Ecosystems: Propelling Transformative Social Change Between and Through Organizations."

Administrative Science Quarterly, February, 0001839219899613. https://doi.org/10.1177/0001839219899613.

Housing as an example of an issue connecting social and environmental platforms

6. Dougherty, Conor. 2020. "Build Build Build Build Build Build Build Build Build Build Build Build Build Build." The New York Times, February 13, 2020, sec. Business. https://www.nytimes.com/2020/02/13/business/economy/housing-crisis-conor-dougherty-golden-gates.html .
7. Cohen, Daniel Aldana. 2018. "Climate Justice and the Right to the City." *Penn: Current Research on Sustainble Urban Development. Philadelphia: University of Pennsylvania*. https://penniur.upenn.edu/uploads/media/Cohen.pdf
8. Multiple reports archived here http://www.unhousingrapp.org/resources

How to emerge from the crisis upon us—critical transitions and sustainability transitions

9. Theory of critical transitions seems to be interesting and helpful. "Complex systems ranging from societies, and ecosystems to the climate and our brain can have tipping points where a tiny push can invoke a critical transition to a contrasting state. Although such systems differ widely, mathematics suggest that some aspects of their behavior at tipping points are universal. This may help us to find ways to manage the opportunities and risks associated to tipping points." https://www.sparcs-center.org/key-concepts.html
10. Here is a very densely written paper that seems relevant. Köhler, Jonathan, Frank W. Geels, Florian Kern, Jochen Markard, Elsie Onsongo, Anna Wieczorek, Floortje Alkemade, et al. 2019. "An Agenda for Sustainability Transitions Research: State of the Art and Future Directions." Environmental Innovation and Societal Transitions 31 (June): 1–32. https://doi.org/10.1016/j.eist.2019.01.004.