# Creating Civic Value in Open Smart Communities

COMMUNITY SOLUTIONS NETWORK
WHITE PAPER

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# Acknowledgements

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The Community Solutions Advisory Service provides personalized data and technology-related support by sharing knowledge, expertise, experience, and guidance to municipal staff and Indigenous communities. The broader goal of the Community Solutions Network is to help communities build service area capacity and improve the lives of residents using data and connected technology approaches. The Community Solutions Network is supported with funding provided by Infrastructure Canada. The views expressed in this publication do not necessarily reflect those of the Government of Canada.

Founded in 2011, Open North is Canada's leading not-for-profit organization specialized in open smart cities, public consultation, open data and open government, and data governance. Our mission is to drive research, capacity-building and network collaboration across and within sectors to advance the responsible and effective use of data and technology in service to transparent, accountable and inclusive communities. With a multidisciplinary team of 15 staff (+ expert advisors), we work with the most innovative and connected communities and civil society organizations in Canada and internationally.

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# Content

# Introduction

## Civic Value & Civic Values.

As the concept of "Open Smart Cities" has matured, complex issues are arising. These issues range from reconfiguring relationships between municipal departments to placing restrictions on how urban technology is deployed. Cities must determine who is accountable for the impact of new technology and they must ensure that the technology is maintained over time. Finding a budget line for digital assets is a challenge, as is the process of safely and effectively collecting data and managing it at scale. In short, the challenges in contemporary Open Smart City initiatives are less about technology itself, and more about the ways it is deployed, monetized, and governed. We define these as issues of "civic value."

What is civic value? What values should guide contemporary policy-making and city-building? These questions are at the very center of municipal governance today, spanning sectors and communities of all sizes. This white paper does not present a single, authoritative, and final answer – instead, it offers new ways for communities to ask these questions, and to act on their answers.

A values-led approach to Open Smart Cities means constantly asking *if* and *how* technology truly benefits residents in their daily lives, and assessing to what extent all residents have access to those benefits.

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## The Context: the Smart City Challenge, the Community Solutions Network, & the COVID-19 Pandemic.

In recent years, communities across Canada have begun to face the complex issues of creating civic value with technology. Infrastructure Canada's Smart City Challenge (SCC) was an unprecedented effort to support communities small and large as they embraced technology to enhance quality of life for their residents. The initiative prompted communities to first engage residents, and then chart a course for urban futures. Momentum has carried on through the Community Solutions Network (CSN), which connects stakeholders to peers, resources, and joint initiatives.

The global COVID-19 pandemic brought an abrupt halt to ordinary municipal operations. It undercut regional economies, and required significant reapportioning of public budgets. The pandemic has stressed many of our urban systems, such as public transit. It has shed light on long-term structural inequalities – disparities in accumulated wealth, job insecurity, food deserts, access to healthcare, and availability of public green spaces. It has also highlighted the operational challenges that Canadian municipalities face, including their dependence on provincial governments, fiscal shortfalls, and lack of constitutionally appointed powers.

## Example: A Time of Emerging Paradoxes.

Beginning in 2018, the City of Saskatoon carried out significant community engagement to understand residents' challenges and aspirations. Access to broadband and digital services emerged as a significant issue. Civil servants hypothesized that lack of connectivity is a barrier to equitable social and economic development – for individuals and for communities. Indigenous[1] youth are disproportionately affected by this lack of access.

The City announced a priority to foster digital inclusion by increasing access to the Internet via public WiFi points in underserved communities. Soon after this commitment, the COVID-19 pandemic underscored the urgency of digital accessibility; education, citizen services, and effective healthcare delivery suddenly depended on digital infrastructure.

Saskatoon's initiative is guided by civic values: equity, accessibility, empowerment, and social inclusion. From a social and economic development perspective, public WiFi promises civic value – in terms of increased efficiency, municipal service delivery, and resident engagement. And yet the next steps are uncertain.

- *Which neighborhood should be the first to receive an access point? A first location would get the benefit of the new technology, but also bear the risks that come with any pilot project, where outcomes are uncertain.*
- *Should the network be owned and operated by the City, by a private Internet service provider, by a local Crown Corporation, Sasktel, or by residents themselves?*
- *Should the City prohibit residents from accessing illegal or unsavory websites on public WiFi?*

Each of these decisions is a paradox – all, or none, of the paths forward seem right, and it is unclear where any given path will lead in the near- or long-term future. This white paper explores real-world challenges, like the ones Saskatoon is facing, in communities across Canada.

**(1)** Several terminologies are actively in use across North America today, including Indigenous, Native American, First Nation, Tribal, etc. and each refers to a specific group or designation. Saskatoon uses the term "Indigenous" in its external communications about this project. Refer to the SCC proposal.

There has been a very real risk of making well-justified choices that have long-term negative effects in the interest of quickly solving an urgent problem. These conditions have made it ever more difficult to maintain a clear commitment to values.

In the context of the pandemic, it has appeared daunting – if not impossible – to address anything beyond the immediate. Every day has brought urgent problems, and focusing on them has been well justified, because lives are at stake. The right moment to solve longer-term, complex, and structural issues has continually receded into the future. There has been a very real risk of making well-justified choices that have long-term negative effects in the interest of quickly solving an urgent problem. These conditions have made it ever more difficult to maintain a clear commitment to values. This fundamental tension is significantly impacting Open Smart City initiatives today, and it is shaping how they unfold into the future.

## The Opportunity: Deep Transformation.

It is a pivotal moment for Open Smart Cities. It is *because* existing systems are stressed and cracking that there is a unique opportunity to rebuild them. There is no doubt that technology will be a part of urban life in the future, but we can no longer justify technology for the sake of technology, and we can no longer allow it to deepen structural inequalities.

As the world emerges from this crisis, we *can* and *should* define the role that technology will play in our post-pandemic communities. We can use it to create equitable and sustainable long-term futures, rather than focusing on newsworthy "quick wins." In spite of the challenges, civil servants and their collaborators have an opportunity and a responsibility to consider how to restructure the social, environmental, economic, political, and technical fabric of our communities.

We are seeing over and over again that shaping a better common future in the digital era does not begin and end in a single high-level Open Smart City policy. Values-led transformation is the result of slow, deliberate, and relational work by committed and creative civil servants. It is about making tactical decisions that amount to structural change.

And so this white paper is not an abstract framework or a theoretical position. Instead, it is grounded in critical decision points that communities are facing today. By interpreting these real-world cases from the perspective of civic value, we offer guidance for values-led transformation, using technology to create meaningful civic value.

## Structure & Methods.

This white paper is built on the foundation laid in the Open Smart Cities Guide by Tracey P. Lauriault, Rachel Bloom and Jean-Noé Landry. The 2018 guide presents a definition of Open Smart Cities and five core pillars of an ethical approach. The present white paper seeks to expand on the original guide in a number of ways.

The first is through a broad landscape scan of contemporary civic values frameworks. Our scan identified a wide variety of examples, from the International Open Data Charter to digital democracy platforms like Barcelona's Decidim, and from Harvard Business School's Creating Public Value framework to the crowd-sourced "hacktivism" that animates Taiwan's .g0v movement. These initiatives around the world consistently embrace a set of values that we take to be central elements of open smart cities today (see Section "Background on Civic Values" and Appendix A).

The landscape scan also revealed that the public sector typically uses two means of acting on civic values: (1) market-shaping, and/or (2) regulation. In other words, the

> It won't be enough to return to the status quo… Municipalities are uniquely capable of [advancing post-COVID recovery] in ways that will drive progress on key national goals, from achieving net-zero emissions and universal internet access to ending chronic homelessness. We can work together to tackle today's urgent pandemic challenges, with solutions that deliberately lay ground for tomorrow's recovery.

— Garth Frizzell,
FCM. Build Back Better Together

proverbial carrot and stick. Civil servants at the municipal level often see these tools as large, complex, and political, and generally assume that they operate best at a national or international level.

And yet there are *real-world situations* where civil servants can identify and enact civic values *today*, using the tools at their disposal – including carrots and sticks, and much more. In this white paper, we outline situations where communities have taken action to create *long-term* civic value during the COVID-19 crisis and recovery. The content of the paper is derived primarily from interviews with advisors who have worked with Canadian communities (through the CSN). Key interviewees also included representatives of municipalities themselves, and representatives of cross-municipality support organizations like the Federation of Canadian Municipalities, the authors of the 2018 Open Smart Cities Guide, and members of Canada's civic tech community.

## Key Findings.

We explored specific projects and initiatives that Canadian communities are advancing and the critical decision points that they are grappling with as they carry out that work (Section "Case Studies"). The case studies are presented in two parts, to show a contrast between different but related examples (e.g. a similar project in a small versus a large city, or two different approaches to the same challenge).

We found three recurring themes at the center of all this work: (1) outsourcing versus insourcing; (2) vertical and horizontal coordination; and (3) time horizons and project implementation. These three themes can manifest in positive and negative ways, and emerge across a number of specific municipal challenges, such as Internet and WiFi provisioning, open data initiatives, and new mobility. They influence municipal tools, such as procurement, database management, traffic regulation, and many more.

We found that the three themes played out in cities of all sizes. Surprisingly, conventional assumptions about the relative challenges of small and large cities are not always true. The conditions are certainly different, but the central issues are common across communities, whether they are small rural towns or dense metropolitan regions.

## Actionability & Audience.

This white paper is relevant to all city-makers, but it is particularly written for passionate civil servants and the close collaborators they work with. It reveals tangible issues that communities are facing, and synthesizes them with an operational approach to civic values. In that way, it offers a new perspective on familiar tools that exist in a municipal toolkit, and helps to repurpose them for a values-driven approach to Open Smart Cities. In short, the goal of this white paper is to empower civil servants as they navigate difficult decisions and paradoxes in the process of advancing Open Smart City initiatives to create civic value.

# Context

## The Canadian Smart City Challenge.

The 2018 Open Smart Cities Guide and the Smart City Challenge administered by the federal government's Infrastructure Canada (INFC) marked a turning point for Open Smart Cities in Canada. The objective of the SCC, as stated in the call for applications, was to "empower communities across the country to address local issues their residents face through new partnerships, using a smart cities approach."

The challenge statement offered an open-ended definition: "a smart cities approach means achieving meaningful outcomes for residents through the use of data and connected technology." In other words, the SCC left the details of *Smart Cities* and *meaningful outcomes* up to each community. Specific project plans would emerge from collaborative engagement processes between the public sector, academia, private sector partners, and residents.

The SCC asked communities to come together and imagine better futures, effectively creating a foundational network of local and regional relationships. To realize the potential of those networks, INFC created a follow-on initiative, the Community Solutions Network. The purpose of the CSN is to carry on the momentum that communities have initiated, aggregate knowledge and best practices, foster peer networking and learning, and provide support through an advisory service and other resources.

## The COVID-19 Pandemic.

The COVID-19 pandemic was a sharp turn in the progress of Open Smart City implementation across Canada. Regional, municipal, and Indigenous governments suddenly bore the responsibility of front-line service delivery for residents who were suffering the impact of the crisis. The public sector also had to engage in healthcare provision as disaster response, increase access to digital infrastructure, and guide the re-configuration of physical spaces and business practices to adapt to the new realities of lockdown and social distancing. In sum, the scope and weight of responsibilities borne by local governments and community groups dramatically increased during the pandemic.

Meanwhile, declining public transit ridership and defaults in property tax payments both undercut municipal revenue. During the first twelve weeks of lockdown, the City of Toronto lost an average $65 million per week, for a total of $800 million – or 6% of the City's operating budget.[2] The City of Vancouver suffered "a projected $85-million drop in revenue and $13 million in additional costs,"[3] at the close of 2020. Across Canada, municipalities may have lost between $10 billion and $15 billion in revenue over the first three quarters of 2020, and bore unanticipated costs, including developing new public safety measures and offering support for vulnerable populations.[4] In short, "increased expenditures and decreased revenues have resulted in large municipal deficits that, under provincial legislation, would need to be balanced in 2021 budgets," because municipalities are prohibited from running a year-over-year deficit.[5]

**(2)** According to Toronto Mayor John Tory, speaking during a press conference and quoted in "Cities 'bleeding' cash because of COVID-19 could be next financial domino to fall for federal government," *National Post*. Apr 04, 2020.

**(3)** According to City of Vancouver Draft Budget, published November 24, 2020. Covered also in "Vancouver proposes tax hike as COVID-19 digs a $100M revenue hole," CBC. Nov 24, 2020.

**(4)** "Protecting Vital Municipal Services," Federation of Canadian Municipalities. Apr 23, 2020.

**(5)** According to: "Municipal Finance and COVID-19 in Canada: What Comes Next?" Munk School Institute on Municipal Finance and Governance. 2020.

## Long Trends.

The federal government has provided an influx of immediate relief funding, but that may not be enough. Leading management consultancies are advising municipalities to bolster short-term capital liquidity through a slate of austerity measures and ad-hoc revenue streams. These include "pausing or cancelling special projects, including capital projects, imposing hiring freezes, and divesting non-essential assets, [including] unconventional instruments, such as sale and lease-back opportunities of parks or roads, [and] borrowing to cover financial shortfall" via provincial loan programs.[6]

Although they seem like crisis response tactics, measures like these are not new. Many of the COVID-19 effects we see are actually acute symptoms of longer-term structural issues that have been caused by underlying political and economic structures, or much earlier austerity measures. For decades, municipalities have embraced privatization, under-invested in their own human capital and digital assets, increased their dependence on higher levels of government, and disengaged with civic innovation.[7] Although these measures have seemed justified during the pandemic, they risk exacerbating the pre-existing challenges that cities face, and causing irreversible long-term effects.

Some, including the Canadian Urban Institute, advocate a different response.[8] These alternative measures include reallocating resources across levels of government, so that they better align with the new distribution of responsibility. They also include increasing municipalities' fiscal and legal autonomy – and creating networks of collaboration among communities. They include investment in human capital and technical infrastructure, so that communities can respond effectively today, and so that they are resilient into the future.

**(6)** "How municipalities can respond, recover, and thrive in the pandemic era," Deloitte. 2020.

**(7)** The Value of Everything, Mariana Mazzucato. *Public Affairs Books*, 2018.

**(8)** "What do our cities need to lead the recovery?" Canadian Urban Institute. Jun 25, 2020.

## Transformation.

In short, communities are faced with an unprecedented need, and an unprecedented opportunity, to fundamentally transform municipal government. If the Open Smart City agenda is to have a place in our communities' futures, it will not be as one-off projects to showcase buzz-worthy technology. It must be a cultural shift toward using technology carefully and meaningfully, where it genuinely aligns with civic values and when it can create widespread, long-term civic value.

A leading theory of organizational change suggests that transformation happens when *capability*, *motivation*, and *opportunity* align (see Section "Civic Values in Practice: Tools & Limitations"). The Community Solutions Network – and a host of other resources[9] – exist to support and augment municipal *capability*, particularly as it relates to urban technology. COVID-19 has presented us with a challenge and an *opportunity* to work differently. And those reading this paper surely have a *motivation* to advance Open Smart Cities!

The purpose of this white paper is therefore to galvanize these three factors, show where good work is already happening, and support communities as they proceed with a values-driven approach.

**(9)** KPMG list of resources; MFOA list of resources.

# Background on Civic Values

## Civic Value & Civic Values.

A significant barrier to creating civic value is simply the lack of clarity. What does "civic value" really mean? Are "civic values" specific to a community, or are there absolute values, like human rights? Several different disciplines offer definitions and frameworks for civic value, and organizations of all kinds – from the OECD to citizen hackers – have issued statutes that define it. Appendix B is a short list of various approaches to civic values from various organizations and at different levels of government.

For the purposes of this paper, we first make a distinction between "civic values" and "civic value."[10] The former refers to values held by the public and/or values in the public interest – such as openness, transparency, public engagement, and ecological sustainability.[11] The latter, civic value, is what the public sector creates and manages through its ongoing activity. That might include, for example, the value of having publicly available, low-cost transportation options to move about a city.[12] The premise of this white paper is that communities should actively discuss and declare *civic values* as they choose, create, and implement urban technologies that generate *civic value*.

## The Open Smart Cities Guide.

Although civic values are, by definition, specific to each community, there is a broad convergence around general principles. The 2018 Open Smart Cities Guide by Tracey P. Lauriault, Rachel Bloom and Jean-Noé Landry defines a values-oriented approach to Open Smart Cities and offers five core characteristics. The full description of the characteristics of Open Smart Cities can be found in the original report. The following five points are the author's interpretation and synthesis of the principles for the purpose of this paper. They have been shortened for clarity. Our landscape scan of civic values across sectors found that principles generally fall into similar categories (see Appendix A).

> Characteristics of an Open Smart City
>
> 1. Transparent governance;
> 2. Participation;
> 3. Technological best-fit;
> 4. Data sovereignty;
> 5. Non-technical solutioning

**(10)** "From Public Values to Public Value and Back Again," Eva Witesman. *Public Values Workshop; Center for Organization Research and Design at Arizona State University.* Jan 7 2016.

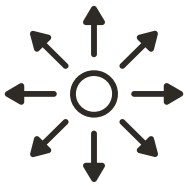
**(11)** Beck Jørgensen, T. & Bozeman, B. (2007). Public values: An inventory. *Administration & Society*, 39(3), 354-381.

**(12)** Professor Mark Moore, of the Harvard Kennedy School, has an ongoing agenda to build practical knowledge and expertise under the umbrella of "creating public value." Resources include courseware.

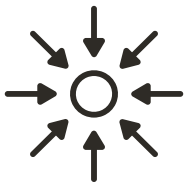
In our landscape scan, we found that values statements are typically operationalized in five ways: regulations and standards, funding criteria, high-level policy statements, coalitions, and auditing groups. These can be classified as "market-shaping" and "regulation" or the metaphorical carrots and sticks. They are most effective at the national and international levels over long time-frames (see Appendix B).

This leaves key stakeholders in communities asking *How can I put our values to work, in the daily practice of municipal government, and with the broader goal of advancing structural change?* To answer that question, it is important to focus on real-world levers. This white paper is focused on real-world implementation at the community level, in light of present crisis conditions and emerging technology-related initiatives.

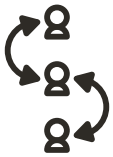
To this end, we analyzed case studies to find critical decisions that community stakeholders are faced with today – what we call "themes." These are:



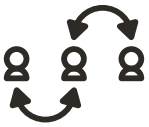
**Outsourcing**



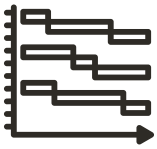
**Insourcing**



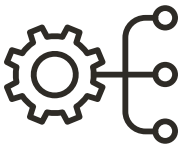
**Vertical coordination**



**Horizontal coordination**



**Time Horizons**



**Project Implementation**

Each one of these themes is related to real-world tools of municipal government. Each theme also represents opportunities to enact a values-oriented approach. By documenting specific case studies in Canadian municipalities, we make an explicit connection between theories of civic values and civic value, on one hand, and the real-world scope of action available to public sector stakeholders and their key collaborators, on the other. Themes are elaborated in detail in Section "Key Themes".

Most importantly, there is no "right way" to navigate these themes and use these tools. For example, in the "outsourcing versus insourcing" theme, municipalities can use procurement to define values as they outsource technology development. Conversely, they may recognize the need for long-term internal capacity and capability, and choose to hire staff with digital expertise who can build and maintain technology in-house. These examples illustrate many and varied opportunities to advance civic values in practice, and should be treated as a guide and an inspiration, rather than a set of instructions.

# Case Studies

The following case studies introduce projects that are happening in communities across Canada today. They are examples of digital transformation initiatives that use existing tools from the public sector toolkit: procurement, policy, community engagement, and more. The key elements of each case are tagged with relevant themes – such as "outsourcing" or "horizontal coordination" – which will be discussed in detail in the following section. Finally, each includes a summary of strategic decisions that the community has faced in the course of the project, or which they are currently facing today (they are currently unanswered). These are moments when stakeholders had to make a specific, operational choice about civic value and civic values.

1. Saskatoon: *Public WiFi for Digital Equity*

2. Toronto: *Public WiFi via ConnectTO*

## Network Access.

**Key Questions:** If digital accessibility is a fundamental need, what is municipal government's responsibility for network service provision? What is the best business model to ensure spatial and financial access to public WiFi networks? How does a government communicate an uncertain, exploratory project?

**Primary Tools:** Procurement, strategic partnerships, community engagement, benchmarking, and measurement (key performance indicatiors (KPI)).

3. Toronto: *Open Data Master Plan*

4. Mississauga *Data Platform*

## Policy & Public Data Platforms.

**Key Questions:** What is the open data policy? Under whose authority does the policy advance, and how is it implemented? Does the City build internal capability for data collection, management, and implementation, or procure technologies externally? What outcomes are expected, and on what timeline?

**Primary Tools:** Procurement, strategic partnerships, community engagement, benchmarking and measurement (KPIs), policy, legal/institutional frameworks.

5. Montreal: *Digital Data Charter*

6. Montreal: *New Mobility Technologies*

## Private Sector Data in Urban Space.

**Key Questions:** If a City issues a data charter, who (if anyone) is beholden to it – City staff, residents, or private companies? What leverage does each stakeholder group have with respect to the others? How will a data charter play a role in procurement and other rote municipal practices? And what is the value of municipal coalitions or data standards?

**Primary Tools:** Procurement, strategic partnerships, community engagement, budgets (operational versus capital expenditure), written OSC policy, legal/institutional frameworks.

## CASE STUDY 1 — Saskatoon: Public WiFi for Digital Equity

## PROJECT TYPE — Network Access

## GENERAL INFORMATION

- City Size: Midsize (270,000)
- Lead Stakeholders: IT (housed in Strategy and Transformation)
- Saskatoon Smart Cities Challenge Proposal and Executive Summary

## PROJECT AND BACKGROUND

- Based on insights from community engagement, Saskatoon's Smart Cities Challenge proposal centered on empowering Indigenous youth. A primary barrier is the lack of digital access. The initiative is to provide public WiFi in underserved communities.[13]
- The project methods and outcomes are uncertain, but civil servants are taking an open and honest communication approach. They are willing to try things and perhaps make mistakes – particularly because the pandemic has made digital access a more urgent concern.
- Saskatoon is internally well integrated. IT is situated within the broader department of Strategy and Transformation, and has a close operational relationship with other departments. There are established "intermediary" roles (similar to a business analyst) between tech and other departments.

**(13)** There are a number of projects related to community wifi and Indigenous broadband access in Canada. See, for example The Institutional Development of Indigenous Broadband Infrastructure in Canada and the United States: Two Paths to "Digital Self-Determination" and Community Wireless Infrastructure Research Project.

## KEY DECISIONS

- Which neighborhood should be the first to receive a public WiFi point? It will be the first to enjoy network access, but it will also be a trial run, where outcomes are uncertain.
- How should public WiFi be built, owned, and operated? By the City, by a private Internet service provider, by Saskatchewan Telecommunications Holding Corporation (or "Sasktel," which is a crown corporation), or by residents themselves? Should the City default to a conventional public-private partnership, or develop a new service delivery model, using local stakeholders and opportunities? What obligations does the latter imply?
- Should the City place restrictions on how public WiFi can be used – for example, prohibiting illegal or unsavory websites?

## TAKEAWAY

- In the face of uncertainty and urgency, honest communications build trust and beget new cross-departmental and cross-sectoral approaches. Creating dedicated roles to nurture alignment between municipal departments enhances collaboration and operationalization.

## CASE STUDY 2 — Toronto: Public WiFi via ConnectTO

## PROJECT TYPE — Network Access

## GENERAL INFORMATION

- City Size: Large (2.9 million)
- Lead Stakeholders: Chief Technology Officer, under the City Solicitor
- Smart City TO, Smart Cities Working Group, ConnecTO Report for Action, Toronto Mesh, Affordable Internet Connectivity for All - ConnectTO, COVID-19: Free Wi-Fi Pilot Project

## PROJECT AND BACKGROUND

- The City aims to bridge the digital divide and support economic development by increasing WiFi access to underserved Toronto residents. The work will be oriented by Equity and Inclusion, as stated in the Digital Infrastructure Plan. "Digital Infrastructure will be used to create and sustain equity, inclusion, accessibility, and human rights in its operations and outcomes. Digital Infrastructure will be flexible, adaptable, interoperable and responsive to the needs of all Torontonians, including equity-seeking groups, Indigenous people, those with accessibility needs and vulnerable populations."[14]
- Toronto has committed to three to four pilot projects, and has also embarked on a digital asset mapping project. The latter is a strategic investment in long-term capability to do Open Smart City projects; the former are highly visible projects that build momentum and inform future work.
- A major strategic goal is to streamline ConnectTO pilot projects with existing City projects for effective Internet connectivity planning (such as laying fibre in new residential construction work and integrating WiFi access points with Green Parking meters and Bike Share Toronto docking stations).
- Toronto City Council approved the creation of a municipal broadband network, which would make use of a combination of existing physical and digital city assets (existing dark and lit fibre, buildings, lights, sidewalks). A private sector partner will deliver connectivity to homes and businesses, and revenue will be reinvested back into communities to expand access to Internet service. There was a motion in City Council to engage in a broader review of the desirability, feasibility, and sustainability of varied business models for municipal broadband delivery (including but not limited to cooperatives, non-profits, joint ventures, and public-private

**(14)** Toronto Digital Infrastructure Plan, Update: January 29, 2020.

**(15)** "City Council direct the Deputy City Manager, Corporate Services, the Chief Financial Officer and Treasurer, and the City Solicitor to review the desirability, feasibility and sustainability of business models of municipal broadband delivery, including but not limited to co-operatives, non-profits (like NYC Mesh and Guifi.net), joint ventures and public-private partnerships, and issue any solicitations as desired."

02/02/2021 City Council Meeting: Affordable Internet Connectivity for All - ConnectTO

## PROJECT AND BACKGROUND (CONTINUED)

partnerships).[15] This highlights the opportunity to structure positive relationships and accountability across sectors.

For the COVID-19 free WiFi program (twenty-five locations), the City placed restrictions on streaming content and provided limited services that are optimized for web browsing, accessing news and online forms, and basic communications. This is an issue that should be addressed in all Open Smart City projects – it is a key decision point.

## KEY DECISIONS

- If service can be provided by organizations that are as diverse as large incumbent Internet service providers and neighborhood-based cooperatives, how should the City issue a tender that creates a level playing field?
- Does the City have a responsibility to support community groups that have a desire to manage their own mesh networks? And if there are many different (and overlapping) service delivery models, how can the City write legal contracts for very different organization types?
- How should security and privacy be managed? Is the City responsible for security, and what course of action should be taken in the event of a security breach?
- Should public sector entities regulate the use of public infrastructure? If so, what are the allowed and forbidden uses? On a practical level, how should the municipality police and enforce rules?
- How should the City evaluate success? Household cost for high-speed Internet? Number of residents served? Capability and capacity to self-govern WiFi infrastructure?

## TAKEAWAY

- Balancing longer-term structural work (e.g. digital asset mapping) with immediate and visible pilot projects can be strategically beneficial. Exploring varied broadband business models can foster positive cross-sector relationships.

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| **CASE STUDY 3** | **Toronto: Open Data Master Plan** |
| **PROJECT TYPE** | **Policy & Public Data Platforms** |

**GENERAL INFORMATION**

- City Size: Large (2.9 million)
- Lead Stakeholders: Smart City TO and the Smart Cities Working Group
- Toronto Open Data Master Plan, Open Data Policy

**PROJECT AND BACKGROUND**

- The key principles of Toronto's Open Data Master Plan are (1) community engagement and co-creation with the public; (2) focus on data that provides highest benefit to the public; (3) efficiency enhancements in the delivery of municipal services; and (4) inclusivity, removing barriers to data, and strengthening community resilience.
- The principles of the plan were based on the International Open Data Charter and guided by a public advisory group, which transitioned to a permanent advisory group for the project throughout its implementation.
- A cornerstone of the high-level Open Smart City initiative is an open data portal. The goal of the portal is to collect and maintain open data that supports internal and external stakeholders as they work to solve civic challenges and/or deliver municipal services using data.
- Smart City TO carried out a structured process to evaluate the City's existing digital assets and processes, validate data quality, and define use cases for open data. The process included quickly launching a beta portal (to see how various stakeholders would make use of open data), public workshops, review by the external advisory board, and engagement with local stakeholders. The structural work informed a visioning and strategy document (with clear goals and KPIs) that elected officials publicly accepted – and which thereafter provided justification for future decisions.
- Elected officials were in favor of procurement and showing "quick wins." However, a thorough evaluation of external providers showed that none could satisfy the criteria laid out in the visioning and strategy document. Because that document had been publicly accepted, the Smart City TO director could make a strong case for developing tech in-house. Furthermore, he used his position to shield program

## PROJECT AND BACKGROUND (CONTINUED)

staff beneath him, and gave them permission to work slowly and thoroughly, in spite of political pressure. This highlights the value of the prior invisible work – it provided a strong foundation for long-term success.

- The Open Data team manages the database and acts as a single point of contact. The team has consolidated technical capability and has a responsibility to interface with different city departments, as well as with the public.

## KEY DECISIONS

- Should the City of Toronto develop an open data portal in-house, procure an existing product, or contract the work from a vendor?
- Which department should manage the open data infrastructure – particularly if the data emerges from, and is used by, other departments? Where should technical expertise be concentrated – particularly if it means hiring or training?
- What are the goals for an open data portal? What KPIs validate progress along the way? Do these reward slow, structural work, or introduce a bias for newsworthy quick wins? The City's Open Data Master Plan outlines answers to these questions, demonstrating the value of a municipal digital policy as a driver for comprehensive transformation of internal processes and actionable projects.
- Operationalizing a high-level vision involves a structured process with a strategy document, concrete objectives and KPIs, effective public engagement, and backing from elected officials that provides leverage for future decisions and long-term success.

## TAKEAWAY

- Initial pilot projects can generate momentum, prove or disprove a hypothesis, and be good tools for soliciting stakeholder feedback. High-level commitments to civic values can provide political cover for municipal officials as they make tactical decisions in the future.

## CASE STUDY 4 — Mississauga Data Platform

## PROJECT TYPE — Policy & Public Data Platforms

### GENERAL INFORMATION

- City Size: Medium (800,000)
- Lead Stakeholders: Mississauga IT department, under the CIO
- Smart City Master Plan, Smart City Program

### PROJECT AND BACKGROUND

- The Smart City Master Plan was issued in 2019 after a period of community engagement. The plan is focused on enhancing quality of life by "integrating physical, digital and human systems in the built environment to deliver a sustainable, prosperous and inclusive future."
- There has been a personnel transition, and the official who is currently responsible for the master plan was not involved with its creation. This highlights the challenge of political cycles as they relate to project time horizons.
- The high-level goals of the plan are abstract, which makes them easy for many different stakeholders to agree on. However, it is difficult to translate those goals into actionable projects with clear KPIs – and particularly for various departments to agree on projects and targets.
- The City launched an open data portal in 2010. Using this resource, the City has hosted a number of challenges, including Tech and the City Hackathon (supported by ESRI Canada and focused on developing applications that "engage the community and improve quality of life"), and the 2020 Open Data Challenge (which prompted high school and post-secondary students to use open data for COVID-19 crisis response).

## KEY DECISIONS

- How should the City run an open innovation challenge related to pandemic response while also maintaining individual privacy with sensitive information? Does publishing open data increase residents' trust in government, or undermine it?
- How can the municipality ensure broad participation in a hackathon? Participants in these kinds of events are often white, able-bodied, male, well educated, and affluent. As a result, ideas lack meaningful input from alternate perspectives, and the "solutions" are not designed specifically for accessibility.
- Should the municipality explicitly train staff to use open data, according to program guidelines? If so, which staff? Does there need to be an explicit use case?
- Data is more useful when it is centralized and connected, because it is more efficient to work with and allows for integrated service delivery. However, a consolidated architecture also presents a risk of surveillance and/or security breaches. Is interoperability a feature or a bug?

## TAKEAWAY

- Abstract goals in a strategy document are challenging to operationalize. Open data portals provide opportunities for community engagement and civic tech initiatives.

## CASE STUDY 5 — Montreal: Digital Data Charter

## PROJECT TYPE — Private Sector Data in Urban Space

### GENERAL INFORMATION

- City Size: Large (1.8 million)
- Key Stakeholders: Laboratoire d'innovation urbaine de Montréal (LIUM), under the City Manager.
- Montreal Open Data Platform, LIUM, Montreal City Master Plan, Smart City Challenge Proposal (executive summary), Montreal Digital Data Charter

### PROJECT AND BACKGROUND

- Montreal's application to the Smart City Challenge was uniquely driven by deep community engagement: The City worked closely with a local ecosystem of businesses, organizations, cooperatives, and institutions. This laid the groundwork for ongoing partnerships based on shared values.
- Recognizing the importance of maintaining open data and regulating the impact of technology, the City developed a data charter committed to (1) protecting human rights; (2) promoting collective good; and (3) building a brighter future through data. The charter specifies the ethical use of urban data, discloses the City's protocols for using and managing data, and provides avenues for external auditing and oversight. The data charter emerged as part of a collaborative process with academia and numerous representatives across City departments. The charter is intended as a "living" iterative document based on feedback and comments from the wider community.
- The charter advocates rigorous criteria for the ethical use of data. It is limiting, almost prohibitive, as a basis for procurement, because few firms can satisfy the criteria. It therefore has little direct influence, but significant indirect influence. Adherence to the protocols is voluntary, and those who have elected to adopt the charter are primarily members of the local Open Smart City ecosystem (SCC partners). Participants self-audit – the charter is based on accountability, rather than enforcement. The data charter is focused neither on cross-City coalition building nor on broader technology market shaping. This project highlights the challenge of moving from abstract principles to structured, implementable protocols.

## KEY DECISIONS

- Is it wise to continue emphasizing the data charter during the COVID-19 crisis – a time when resources are scarce and immediate action is necessary?
- How can the City continue to do community engagement? How can the City continue to build the stakeholder ecosystem for Open Smart Cities? There was a moment of collective energy during the SCC proposal process, but following that, project timelines and budgets have made it increasingly difficult to conduct deep engagement and collaborative exploration with varied stakeholders.
- How can the City give the data charter more legal weight and legitimacy? Leverage would require auditing and enforcement. Influencing procurement would require a broader pool of applicants that could effectively meet high standards.

## TAKEAWAY

- A data charter can serve as a tool for outlining data ethics and accountability in a Smart City context, but actioning that charter can be challenging.

## CASE STUDY 6 — Montreal: New Mobility Technologies

## PROJECT TYPE — Private Sector Data in Urban Space

### GENERAL INFORMATION

- City Size: Large (1.8 million)
- Key Stakeholders: Laboratoire d'innovation urbaine de Montréal, under the City Manager.
- Montreal Data charter, Bixi Bike, JUMP Bike

### PROJECT AND BACKGROUND

- Montreal has an extensive bike-share system called Bixi – launched in 2009 as North America's first extensive bike-share network. The company is a locally based non-profit, and the City of Montreal is a significant shareholder. In 2018, Uber acquired an electric bike-sharing company, JUMP Bikes. That same year, dockless bike and scooter providers approached the City of Montreal about service delivery – although the company can deploy regardless of approval. Residents are outspoken about the need to regulate dockless mobility – vehicles are primarily used by tourists, and residents are wary about cluttering public space.
- In 2019, the City passed a bylaw stating that bike-share operators must be licensed, and that bikes and e-scooters can only be parked on bike racks or in areas designated by the City. This was justified using an existing regulation pertaining to food trucks (regulation of commercial activity in public spaces) but it is legally tenuous, because the City controls only sidewalks, while streets fall under provincial jurisdiction. The provincial highway code does not contemplate small dockless vehicles, and the regulatory revision process is slow. An ad-hoc ministerial decree made interim updates to code that apply to dockless e-scooters, specifying
  - road safety must be respected;
  - only certain public roads can be used during the early pilot phase;
  - data must be shared, to track/evaluate safety and integration with road traffic; and
  - the vendor must hold adequate insurance and pay a fee for a license to operate.

  Enforcement depends on data, but the collection, management, and use of data are a challenge. At first the operator was unwilling to share data, then only unformatted data. Finally the City negotiated for a standard data format (mobility data

## PROJECT AND BACKGROUND (CONTINUED)

standards [MDS]). The City then had to develop a data management protocol that also respects individual privacy, and an enforcement protocol (bringing the Data Analysis team in close contact with the Roadworks and Safety team that is tasked with fetching misplaced vehicles). This becomes an issue of leverage between public and private sectors.

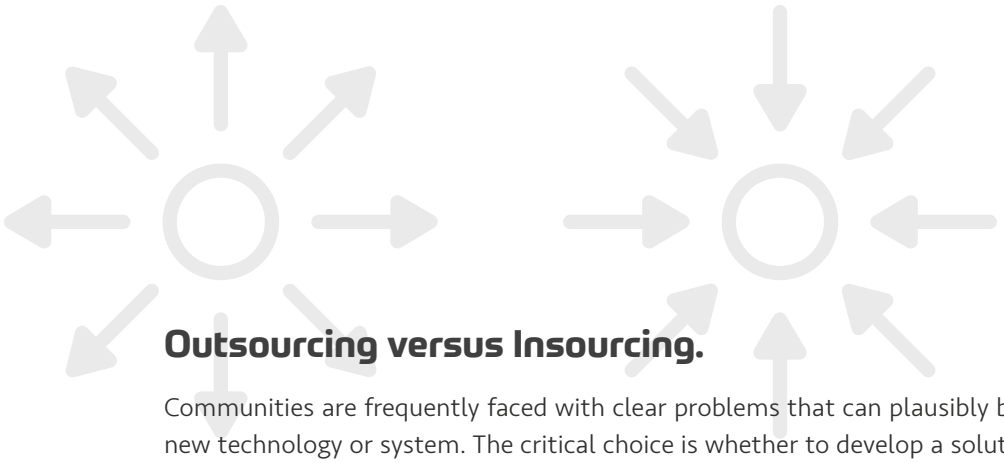
## KEY DECISIONS

- How should the City regulate "floating services"? Unlike other services that have clear boundaries in time and space (e.g. food trucks), new mobility devices can be left anywhere and used at any hour. These services commercialize all space at any time, revealing the limits of municipal control. In this case, mobility regulation and policy (such as highway safety code) must become technology regulation and policy.
- Should data be made open and public? Given the vendor's incentive not to disclose information, how can the City ensure that data is accurate? In what ways can a coordinated data standard (such as MDS) provide leverage and shape the market?
- Does the City have a responsibility to support local firms like Bixi? How should residents' opinions weigh against the demand from Montreal's robust tourism economy?

## TAKEAWAY

- New technologies operating in the public space may result in reactive policies, at the expense of long-term strategies. Data availability is a challenge; municipalities can consider using and/or developing a data management and enforcement protocol in collaboration with relevant municipal departments and external stakeholders.

# Themes



## Outsourcing versus Insourcing.

Communities are frequently faced with clear problems that can plausibly be solved by a new technology or system. The critical choice is whether to develop a solution internally or to seek an external technology. Each presents benefits and drawbacks, and should be considered from the perspective of civic value and values.

In the best cases, communities approach this decision with a systematic evaluation of needs, success criteria, and existing resources across the municipality and community stakeholders. This assessment can be translated into a technological scope and a set of grounding principles. This initial work is "invisible" – there is not a demonstrable, newsworthy outcome, but it lays a strong foundation for an effective procurement and/or an in-house development process. Either of these, if done well, will lead to a best-fit technology.

If it is clear that no existing technology can adequately satisfy the technological scope and principles, in-house development may be a good option. As they develop a solution, communities can ensure that the technology is best-fit to the problem at hand and integrates well with the many existing processes and structures of the municipality. Although insourcing is time-consuming and requires a significant amount of invisible work, it typically results in a technology that is well-fit to the needs of local stakeholders. It also means that civil servants have the capability to use, manage, and maintain the technology in the long term.

Municipal governments cannot (and should not) build every technology they use. Creating technologies in-house is time-consuming, requires significant technical expertise, and can feel like reinventing the wheel – especially if effective, fairly priced (ideally open-source), and well-maintained solutions exist. In these situations, outsourcing is well warranted!

Building on the initial process of problem and opportunity definition, and exploring the landscape of available solutions, communities may decide to outsource (typically via procurement). There are a number of important considerations:

1. Moving from a broad set of goals and principles to a well-scoped brief requires technical expertise. Turning to existing vendors to define the criteria undermines the integrity of the procurement, while relying solely on the IT department – rather than a topic-specific department, like Transportation or Parks – can mean that key aspects of technical integration are not represented in the brief.
2. External vendors may not have adequate familiarity with local constraints and opportunities to make purpose-fit solutions. And they have little incentive to do so, because they are not accountable for the ongoing work of implementation.
3. There can be an incentive for vendors to create "lock-in" conditions, using proprietary software and integrations. It can be difficult to see these traps at the beginning of a procurement process, but it is important to ensure that governments have the legal rights, financial security, and feasible opportunities to walk away.

Because they bear the responsibility for its effects, public sector stakeholders should be empowered to make decisions about the technology and carefully consider the short-term and long-term costs and benefits. External technologies may solve an immediate problem, but also require that the public sector sacrifices leverage to own, regulate, or negotiate with vendors, for example, or that the City loses opportunities to create civic value in the longer term.[16]

One of the primary issues in the discussion of outsourcing and insourcing is capability. When evaluating the lifecycle cost of ownership, communities should consider the long-term value of investing in technical capability[17] – by retraining current staff or hiring for technical expertise. This minimizes the City's position of reliance (being subject to the ongoing cost of third-party fees for maintenance and service provision, or the threat of technical obsolescence). It also expands the possibility of finding new applications of a technology. If a member of the Public Parks department, for example, can use environmental sensor data and is comfortable with the broader data management system, they can actively integrate those resources in their daily tasks and scope of responsibilities and find new applications for the technology in the future. This example highlights the issue of situating capability – note that the Parks department staff is directly using technology, rather than relying on the IT department or Smart City office.

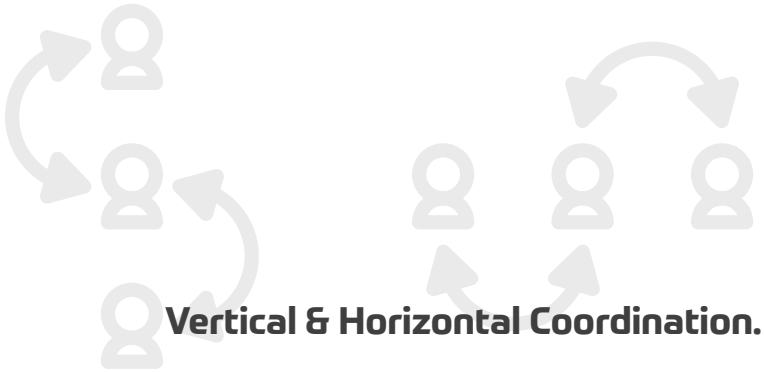
Finally, the division between outsourcing and insourcing is not always clear-cut. As previously noted, municipalities need to build technical capacity in order to effectively outsource. This will involve digital competence in scoping, procuring, implementing, and maintaining technology that comes from an external provider. Such capacity is particularly important in terms of minimizing municipalities' long-term dependence on external providers, avoiding technological obsolescence, and enabling municipalities to adapt and expand the technology in future uses. Similarly, municipalities may start with an open source solution and build enough capacity to adapt it to local needs and maintain it in perpetuity. There are also exciting examples of the public sector supporting local community groups as they build, own, and maintain technology. Some cities are adapting requests for proposals (RFPs) to consider such groups as a viable option (in addition to private sector companies) and expressing a preference for local organizations.[18]

**(16)** "Technology Procurement: Shaping Future Public Value," Bianca Wylie and Matthew Claudel. *Future Cities Canada: Community Solutions Portal*. 2020.

**(17)** "While civic tech is predominantly known for its innovative uses of technology to address challenges, it is equally focused on building capacity and changing behaviours of all stakeholders." Chatwin, Merlin R; Mayne, John. "Improving Monitoring and Evaluation in the Civic Tech Ecosystem: Applying Contribution Analysis to Digital Transformation." eJournal of eDemocracy and Open Government (JeDEM). 12(2): 216-241.

**(18)** See, for example, Toronto City Council's adopted proposal (February 2, 2021) for ConnecTO: Affordable Internet Connectivity for All. "City Council direct the Deputy City Manager, Corporate Services, the Chief Financial Officer and Treasurer, and the City Solicitor to review the desirability, feasibility and sustainability of business models of municipal broadband delivery, including but not limited to co-operatives, non-profits (like NYC Mesh and Guifi.net), joint ventures and public-private partnerships, and issue any solicitations as desired."

> For Canadian municipalities to thrive, a new model of local government will need to be formed that shifts historical patterns of service delivery, funding, and roles between levels of government.
>
> — Deloitte, *COVID-19: How municipalities can respond, recover, and thrive in the pandemic era*



## Vertical & Horizontal Coordination.

From small rural communities to sprawling metropolitan governments, the public sector is strongly defined by issues of coordination, in both the vertical (e.g. elected officials to department heads to staff) and horizontal (e.g. department to department) dimensions. This is particularly true in the case of Open Smart City policy and initiatives.

Vertical coordination can play out in both directions, and even outside of City Hall. On one hand, we saw several cases of higher-level officials providing support and "political cover" for implementation staff – allowing them to work in new ways, take risks, and test new ideas. On the other hand, staff were able to push back on political pressure from their superiors, using KPIs and the principles outlined in high-level policies. When leadership agrees to foundational principles in a strategic document, staff can refer to those commitments in order to justify a difficult decision. Regardless, it is crucial to maintain open communication, so that actors at all levels are aware of the high-level vision and the realities of implementation.

Open Smart City initiatives are influenced by levels of government that are above cities. This may be in the form of policy, funding (with outcome criteria), or legal structures. Provincial law can make regulation at the city scale possible or impossible, as in the case of Highway Safety Code that applies to dockless scooters and bikes.[19] The landscape of stakeholders also extends to the provincial level, as in the case of a crown corporation serving as network service provider.[20]

**(19)** "Highway Safety Code," Province of Québec.

**(20)** See the Saskatoon Public WiFi case study, a project with SaskTel.

An Open Smart City initiative can also open up the public sector to smaller levels of organization – neighborhoods, community groups, and individual residents. Community engagement not only helps to initiate and scope policies or projects, but also provides an avenue for residents to hold the public sector accountable. Such open accountability can be difficult for public sector stakeholders to embrace, particularly when a project brings the risks involved with new technologies or methods, and when outcomes are uncertain. There is a perceived risk of "bad optics" if a project doesn't go according to plan. However, this is often mitigated if public sector stakeholders take an open, honest approach to communication. Carefully communicating the goals, challenges, key decisions, and justifications – and being upfront about the possibility of making mistakes – can build trust with residents. We saw more and more municipalities communicating with this kind of sincerity during the pandemic.

The process of digital transformation invariably brings challenges of coordination across departments. Open Smart City initiatives will affect many – if not all – groups, from Parks to Transportation to Human Resources. There are three main considerations for horizontal coordination within municipal government:

1. Determine which department should be responsible for an Open Smart City policy, and which department – or departments – should invest in technical capacity. In some cases, there is a dedicated "Smart City" department; in others, it is the remit of an IT team; and in others, champions emerge in topic-specific agencies, such as Transportation. Any of these can be effective, but only if department heads and staff frequently align on principles, goals, and technical protocols, and only if technical capacity is distributed across these stakeholders (rather than being centralized in a single team, which can distort priorities and create undue dependency). There are many ways of achieving this kind of coordination. Some communities have intermediaries (such as "business analysts" or "project navigators") who bridge gaps, while others form project-based working groups. Other municipalities facilitate all-staff workshops. These are an opportunity to introduce a project and its long-term impact, as well as to establish key roles for departments or staff. In this way, all staff understand the project, appreciate its value, and act as ambassadors to the broader community.

2. Sharpen a policy into KPIs that resonate with different departments – particularly across policy and service delivery groups. The same general goal (such as *equipping marginalized groups to participate in the digital economy*) can be translated into many different operational strategies (mapping neighborhood fibre connectivity) and into policy (such as preference for local minority-owned vendors in technology procurement). KPIs can be both *qualitative* and *quantitative*. They can – and should – be revisited as a program is iteratively developed.

3. Mitigate risk and harm from a data systems standpoint. Integrated systems can be both a feature and a bug. A centralized data architecture can provide clear benefits, such as coordinated planning (installing fibre cable when utility maintenance crews are already planning to dig up a street for sewer maintenance). This kind of centralization can also present a risk of surveillance. Without proper privacy and data management protocols, various kinds of personal information can be connected. Furthermore, a single centralized system is more vulnerable to security breach. We saw communities managing these risks by carefully selecting what data *would not* be collected, and by designing intentional barriers between specific datasets.

The final consideration for horizontal coordination is outside of municipal government. We saw horizontal collaboration among similar departments in different communities – such as shared protocols for transportation data. These kinds of connections are often nurtured by connective organizations, whether they are philanthropic (Bloomberg Philanthropies), federal (the Community Solutions Network), coalition-based (the Federation of Canadian Municipalities), or regional (various natural asset management organizations).

The most robust Open Smart City programs involve not only representatives from across city departments, but also local community groups, local startups, and other collaborative organizations. The most effective examples of such collaboration involve clear allocation of goals and responsibilities at the outset of a project. Several municipalities turned to their community, not only to develop use cases (through hackathons or procurement) but also to shape the arc of a project from the beginning, to evaluate its success along the way, and to maintain the outcome in perpetuity.

As municipalities develop new systems – like an open data portal – sharing progress and resources (like a beta version of the portal, or initial datasets) encourages residents and organizations to develop capacity in tandem and provide feedback. An ecosystem-building approach to Open Smart City development broadens the available resources and capacities, and ensures that an initiative isn't threatened by municipal staff turnover or political cycles.

Many municipalities have an intention to engage community – typically to define program goals or identify certain details of a project. Engagement is an important element of a values-led approach, but there are a number of risks. The first is if engagement is a one-time event (followed by years of focused implementation); the project will lose relevance. The second is if the engaged population is not a representative group. And finally, if civil servants solicit residents' feedback, and residents make the effort to engage, it is crucial that the project reflects their input (or provides a clear, transparent justification for each decision). If it doesn't, trust is fractured, and residents will be less willing to engage in the future.

Honest, ongoing, genuine, and productive engagement builds trust, and it is a foundational precondition to soliciting feedback on any given project. To achieve this depth of engagement, some municipalities have created roles for local community members in their project teams. Others have a city staff person dedicated to public-facing communications and activities related to Open Smart Cities.

> When [LIUM, the Smart City team] get involved, it's usually late in the process. [Other departments say] 'we're not really satisfied with our ideas, could you please use your innovation magic wand on our idea.' When we are involved earlier, there is limited patience for structured innovation processes, people want the result now. It's also difficult to move the needle on intangible benefits. Business units in charge of a given domain tend to be territorial, consider themselves as the only people in a position to define if a proposal will work. Finally the overall prioritization process is laborious at the City. It should get better with our strategic planning process that resulted in the Montréal 2030 document end of 2020.
>
> — Stéphane Guidoin, Director of Montreal LIUM (Laboratoire d'innovation urbaine de Montréal)

## Time Horizons & Project Implementation.

In communities across Canada, it seems increasingly difficult – if not impossible – to focus on long-term goals and structural efforts during the present pandemic, and in the shadow of austerity measures. Crisis response demands quick action, and there is not enough time, resources, or certainty to meticulously lay plans. But that doesn't mean that projects cannot be guided by long-term agendas.

Open Smart City initiatives are often written at a high level of abstraction, which makes them easier for elected officials to support and easier to integrate with the agendas of various departments. However, there is a challenge of making such initiatives actionable. Divisions between departments become apparent when translating a policy into clear KPIs, project-based initiatives, and progress-tracking methods.

Effectively roadmapping an Open Smart City initiative emerged as one of the greatest challenges across all the cities we studied. The project plan is crucial, because it opens up or forecloses certain technological outcomes, policy options, details of service delivery, and more. However, project planning is increasingly difficult. The pace of technology is accelerating, and major events – whether a global pandemic or the announcement of a new tech company's campus – seem to redefine local conditions ever faster. The COVID crisis has instilled a sense of urgency, where acting quickly and with integrity is more important than laboriously planning and mitigating every possible risk. It is a time of broad uncertainty defined by constantly shifting unknowns. It is becoming nearly impossible to confidently write a three-, five-, or ten-year plan.

Throughout the twentieth century, projects were traditionally developed with a "waterfall" approach, where one piece led sequentially to the next. An alternative, often referred to as "agile development," focuses on quick "sprints" toward a concrete deliverable and constant re-evaluation. Open Smart City initiatives emerge best when they borrow elements of each approach. Visionary roadmaps are important for declaring long-term goals that justify thorough structural work, and lead to structural transformation in the public sector. Such roadmaps should be broken down into modular projects that are nimble, responsive, and relevant to ever-changing conditions. In implementing this work, it is crucial to connect high-level goals to specific projects, and feed results back up to policy – constantly evaluating, redirecting, and re-evaluating is a process of "constant, collaborative rule-making."[21]

Some communities are embracing that kind of hybrid approach, treating policy as a "living document" that reflects progress in the real world. In practice, this highlights the ongoing tension between quick wins and structural work. There is a constant pressure to deliver visible, successful projects quickly because of short political cycles and scarce project funding. This pressure can push communities to procure appealing technology products (like autonomous vehicles or open data software) as opposed to building internal systems

**(21)** "Shared Governance: A Democratic Future for Public Spaces," Bianca Wylie and Zahra Ebrahim. *Azure Magazine*. Feb 03, 2021.

and investing in technical assets and human resources. This tension can manifest as pressure to take quick action against an unwelcome technology, rather than doing the slow work of updating provincial law and forming deep partnerships with local organizations that can provide alternative technologies.[22] In either case, clearly articulated high-level principles and goals are a useful tool for justifying slow, structural work that results in long-term civic value.

**(22)** See the Montreal New Mobility Technology case.

That being said, quick wins can also be useful. Demonstrable projects build excitement among residents, enable real-world feedback, de-risk a larger deployment, and serve as a good entry point for stakeholders to imagine a possible future and give feedback. In the spirit of blending agile and waterfall development, quick projects should have a dynamic relationship with long-term goals: informed by them, advancing progress toward them, and helping to revise them.

This is particularly relevant in the midst of crisis conditions. If there are strong, clear Open Smart City values in place (like universal digital empowerment), the crisis becomes an opportunity to accelerate progress. This year brought clear examples: early childhood education suddenly depended on network access, so there is an urgent need to provide public WiFi quickly – especially to lower-income households and underserved neighborhoods. A quick deployment project can increase digital access – even if that specific WiFi deployment approach wasn't in the original project plan. With an attitude of agility and a commitment to civic values, communities can re-evaluate KPIs, communicate their progress openly, and continually engage with residents as they work toward long-term goals, despite constantly shifting conditions. Note that communication is vital, including keeping residents informed, providing justification for decisions and project changes, and allowing residents to hold the municipality accountable.

Setting goals, observing progress, and evaluating impact is an ongoing practice, and KPIs are at the center of it. KPIs help translate broad goals into specific actions, and give a project some initial direction. However, those KPIs may need to change, in response to emerging conditions, or based on the outcomes of earlier steps (discussed in more detail below). Importantly, KPIs that reflect civic value will be nuanced, and, perhaps, unconventional and qualitative. Open Smart City projects should consider the value of stakeholder capacity building, for example, or the value of trust-based relationships between stakeholders from different sectors. KPIs are a place where communities can express their values – for example, "equitable access to entrepreneurial opportunity for minority demographics" is a civic value, and a KPI can document the number of minority-owned businesses that responded to a tender, or the number that won contracts over the course of a year. KPIs might also express civic values by differentiating between organizations – for example, the city's revenue targets for infrastructure fees can be lower from community-based non-profit ISP collectives, as opposed to national technology corporations providing similar service.

When quantifying the civic value of a project, communities should consider the long-term costs and impact. One example is the tradeoff between the cost of procured versus in-house technologies. In-house development represents a greater cost of implementation, a longer timeline, and has human resource implications – but also results in a lower cost of maintenance over a five-to-ten-year period, opportunities for capacity building across departments, and the value of owning public infrastructure. A robust physical and digital asset mapping exercise is a good place to start.

The final dimension of project implementation is the relationship between sectors. By definition, Open Smart City technologies and broader digital transformation agendas engage public, private, academic, non-profit, and community sectors. It is important not to take the relationships between sectors as a given – defaulting to standard public-private partnerships, or RFPs and procurement. Civic value often arises from new sectoral dynamics – for example, a community-based cooperative owns and manages a technology, a local private company provides in-kind hardware, an academic institution provides technical training, and the City provides support by creating new policy.

In some cases, creating new cross-sector models is an explicit goal – as with civic tech hackathons, values-led procurement, and startup-in-residence programs. In other cases, it is a natural result of long-term engagement with residents and the local civic tech stakeholders – as with Montreal's ecosystem approach to the Smart City Challenge, which led to a number of new models, such as third-party urban data stewardship. In yet other cases, the foundations for a new model already exist. Crown corporations, community land trusts, and cooperatives all work toward a broader purpose and use alternative business models to get there. Before assuming that procurement from a for-profit technology company is the best solution, communities should consider if existing or potential alternative businesses could achieve the stated goal.

The relationships between sectors also manifest as issues of leverage. We saw several overtly values-driven Open Smart City policies, programs, and protocols that were entirely voluntary. These can be a strong declaration of civic values, but they are primarily effective within the local ecosystem of businesses and organizations, where there exist ongoing, trust-based relationships. If a City does not have capacity, capability, or legal jurisdiction to audit compliance or legally enforce performance standards, organizations (particularly larger, foreign companies) have little incentive to adhere to a local civic values charter. Without leverage, communities are pushed toward more antagonistic methods – ad-hoc enforcement based on tentative legal grounds, or seeking regulatory revision (typically at provincial or federal levels of government). However, leverage can be gained in a number of ways that are more generative than regulation and enforcement: co-designing use cases, running pilot projects, permitting or licensing, facilitating public communications, coalition with other cities, and much more.

One example of effective coalition is data standards, such as MDS transportation data format. When communities around the world have data in a consistent format, they can better evaluate the technology's impact through comparative analysis. With a clear documentation of impact, cities can cooperatively negotiate with companies to ensure more responsible operations. In short, coalition helps to shape markets.

# Civic Values in Practice: Tools & Limitations

This white paper is neither a step-by-step guide for creating civic value nor a definitive playbook for Open Smart City implementation. Rather, it is a field guide – including practical tools that are familiar to civil servants. In the case studies above, communities face critical decisions and paradoxes as they use these tools in the process of digital transformation.

Many of the decision points along an Open Smart City journey will be genuinely ambiguous – in other words, highly dependent on context and local needs. Should the municipality create and enforce policies for acceptable use of public WiFi? Should a technology be developed in-house or procured? Should open data be managed by a single IT department, or should responsibility be spread across several departments? Or should responsibility extend even further, to organizations outside of the public sector? In these situations, and many more, both options seem reasonable.

There is no single "right answer," but there is always "good process," even in a challenging crisis situation. Invariably, communities have the opportunity to use the tools at hand (from pilot projects to procurements to policies, individually or in tandem), to embrace a digital transformation with integrity, and to express civic values and create long-term civic value.[23]

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**(23)** The OECD's *Recommendations for Municipal COVID Response* includes many of the tools that we observed. The report suggests that national governments "support cooperation across municipalities and regions to help minimise disjointed responses and competition for resources. Promote inter-regional or inter-municipal collaboration in procurement especially in emergency situations. Promote the use of e-government tools and digital innovation to simplify, harmonise and accelerate procurement practices at subnational level," and several others.

OECD. "Recommendations for Municipal COVID Response" in *The Territorial Impact of COVID-19: Managing the Crisis Across Levels of Government*

## Relevant Tools.

| Tool | Description | Useful for | Dangerous when |
|---|---|---|---|
| **Policy** | ***An Open Smart City program, digital transformation agenda, or technology-oriented policy for existing departments.*** | Defining shared goals across departments; galvanizing the local community of residents and partner organizations; channeling provincial, federal, or philanthropic funding. | It remains abstract or vague; it outwardly demonstrates "action" but is not substantiated with commitments. |
| **Procurement** | ***Issuing RFPs or tenders, or acquiring sole-source technologies.*** | Sourcing technologies; stating values-led preferences (market shaping); aligning funding for mutual outcomes across different departments.<br>Sourcing from small and/or Canadian companies, to support local technology ecosystems. | The outcome is a foregone conclusion; requirements are too specific or unrealistic for more than one provider to satisfy; civil servants do not have the expertise to implement and maintain the technology; government does not have legal grounds to manage or discontinue the technology; the technology captures long-term civic value. |
| **Community Engagement** | ***Soliciting directed feedback or open-ended input from residents and/or organizations.*** | Building trust; soliciting ideas; incorporating additional resources; transparent processes, and meaningful evaluation. | It only takes place at the beginning of a project or policy initiative; it is without meaningful and continued follow-through; civil servants are unwilling or unable to incorporate feedback; it only addresses a subset of the population. |
| **Open Data** | ***A municipal database or portal.*** | Providing a resource to local businesses and groups; enabling accountability; supporting local digital literacy; streamlining internal municipal operations and improving information access for civil servants. | Privacy and security are not effectively managed; there is no clear use case; accessing data requires significant technical expertise; metadata are not clearly defined; the open data portal includes incomplete, non-representative, or biased data. |
| **Human Resources** | ***New hires and professional education, as well as hierarchical organization, allocation of responsibilities, accountability, and reporting.*** | Building capacity in the public sector; building working relationships between departments; achieving shared goals; providing "political cover" for responsible risk-taking. | There is a high degree of staff turnover; political cycles cause abrupt shifts in goals or funding; stakeholders assign blame; there is a systematic lack of communication between departments or across levels of bureaucracy. |

| Tool | Description | Useful for | Dangerous when |
|---|---|---|---|
| **Strategic Partnerships** | ***Non-contractual engagements with organizations, community groups, or companies.*** | Cross-sectoral programs; collaborative work toward mutual value; long-term projects. | Leverage is skewed; financial or non-financial benefits are disproportionate; roles and responsibilities are unclear. |
| **Projects** | ***Launching a new initiative or redefining an existing one.*** | Addressing a particular challenge; making an abstract idea more tangible; piloting a solution; building capacity; soliciting real-world feedback (particularly from non-experts). | They are treated as "silver bullet" solutions; there is no ongoing evaluation and iteration; risk is avoided and failure is not tolerated; immediate or long-term cost is high; value capture and leverage are skewed; technology doesn't solve a real problem; marginalized groups are not adequately and respectfully served. |
| **Measurement** | ***Defining or re-defining KPIs for municipal service delivery, existing, or new projects.*** | Demonstrating progress; aligning efforts across varied departments; making an abstract policy more concrete; translating abstract values into demonstrable outcomes. | Indicators are biased; indicators are strictly quantitative and/or financial; KPIs are revised too often or not enough; programs do not meaningfully change based on evaluation; underserved or marginalized groups are not explicitly addressed. |
| **Legal and Regulatory Frameworks** | ***Adapting existing legal frameworks, or developing new ones, that apply to emerging technologies; regulation or licensing.*** | When cross-sector collaborative exploration reveals shared value that can be safely achieved if a law or regulation is changed; when a city needs clear leverage in order to ensure values-driven technology deployment; there are threats to public well-being. | The regulatory revision process is slower than the process of technology deployment; regulation creates contentious relationship between public and private sectors. |
| **Service Delivery** | ***Any and all municipal services are opportunities for Open Smart City project development or build new capacity.*** | Ensuring that new technologies are actually meaningful to residents; aligning various departments to create mutual value. | Existing knowledge/expertise is not incorporated into new technology; underserved groups are further marginalized in terms of cost or access; municipalities depend on vendors for maintenance of critical infrastructure. |
| **Communication** | ***The ways in which a particular project or program is presented to the community, and/or transparency in project process, key decisions, and evaluation.*** | Building trust among residents and organizations; bringing additional stakeholders into an initiative. | There is a bias for quick, newsworthy, and exclusively positive press; there is internal misalignment. |

## Transforming Business-as-Usual.

Civil servants can use any or many of these tools, find others, or create new ones. The underlying success factor is a collective attitude of responsible risk-taking, creative innovation, and honest integrity. Comprehensive transformation is complex and challenging, because it entails risk and requires stakeholders to question the status quo and shift their individual and collective behaviour patterns. This is a culture shift within the public sector and in tandem with the broader community.

Theory suggests that this kind of behaviour change happens when *capabilities*, *opportunities*, and *motivation* align.[24] We saw this kind of transformation happening across Canadian communities throughout our research. Stakeholders in different sectors are *motivated* to change – to address long trends in social and economic injustice, to fulfill the promise of new technologies, and to respond to the immediate pandemic crisis. With online resources and professional development, new hires, or new partnerships, municipalities are acquiring the *capability* to realize Open Smart City projects. And communities are seizing *opportunities* for transformation, whether they use the tools outlined above, receive dedicated funding, or even see the latent potential in immediate crisis response.

The tools are available, the opportunities abound, and more and more communities are motivated to embrace a values-led approach to digital transformation. However, there are general limitations to consider. First, an Open Smart City initiative is not an immediate solution. Although the term "Smart City" is associated with new technologies like autonomous cars and sensor networks – many of which are products that can be procured immediately – only a small fraction of the work is net-new technology. In most cases, we can achieve our goals with the tools and technologies we already have! Solving complex problems takes time. Long-term success depends on many years of methodical building, such as establishing trust with residents by doing regular engagement and communicating honestly, building working relationships between departments and with outside organizations, and structuring digital systems for robust integration.

Many of these long-term factors happen behind the scenes and require a commitment to structural transformation. Engaging a truly representative sample of residents and genuinely incorporating their feedback requires new project development methods. Departmental capabilities and working relationships require strategic hiring and team-building. Procuring or regulating technology requires bureaucratic process reform and detailed changes to existing policy – often at higher levels of government. Deploying technology and opening data both require deep evaluation of – and often restructuring or replacing – underlying digital systems. Implementing Smart City technologies without this kind of foundational work will attenuate the potential for positive long-term outcomes – and even, in some cases, cause harm.[25]

Committing to a values-led approach will often bring difficult tradeoffs: It may appear to compromise efficiency or the financial bottom line. However, by acknowledging civic value more broadly – not only measurable efficiency and cost, but also factors like trust, empowerment, and distributed accountability – these apparent tradeoffs have greater parity.

**(24)** "The COM-B model of behaviour change [is] based on the assumption that behaviour (B) occurs as the result of interactions between capabilities (C), opportunities (O) and motivation (M):

*Capability:* The individual's psychological and physical capacity to engage in the activity concerned. It includes having the necessary knowledge and skills.

*Opportunity:* All the factors that lie outside the individual which make the behaviour possible or prompt it.

*Motivation:* All those brain processes that energize and direct behaviour, not just goals and conscious decision-making. It includes habitual processes, emotional responding, as well as analytical decision-making.

Chatwin, Merlin R; Mayne, John. "Improving Monitoring and Evaluation in the Civic Tech Ecosystem: Applying Contribution Analysis to Digital Transformation." *eJournal of eDemocracy and Open Government (JeDEM). 12*(2): 216-241.

**(25)** "Technology Procurement: Shaping Future Public Value," Bianca Wylie and Matthew Claudel. *Future Cities Canada: Community Solutions Portal*, 2020.

> There is a lot happening that is completely invisible to the average community member...these are the blueprints for long-term, foundational work.
>
> We have very methodically been bringing in certain foundational policies.... We cannot go out and make our data open if we do not yet have a policy about how to manage our data, and what that means for us as an organization.

— Jessica McDonald, Director of Community Development at Town of Bridgewater

# Conclusion

Communities across Canada face unprecedented challenges today. Many are rising to those challenges, with the capability, opportunity, and motivation to carry out Open Smart City initiatives. This white paper offers case studies of that work, real-world tools that are immediately available to communities, and broader thematics that summarize some of the opportunities and challenges that may arise.

Working with civic values, and creating civic value, often involves making decisions that appear paradoxical – every alternative seems like the right one, or the choice feels like a cul-de-sac with no exit. We observed overarching themes across these kinds of paradoxes: outsourcing versus insourcing, vertical and horizontal coordination, and issues of time-frames and project implementation. There are no definitively right or wrong answers to these kinds of decisions, just as there is no single path to becoming an Open Smart City. There is no single "right answer," but there is always "good process." Our research showed that a successful digital transformation initiative invariably means four things:

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1. **Cultural shift:** Embracing problem-solving, accepting reasonable risk, and being accountable for outcomes; ensuring that elected or higher-level officials provide "political cover" for implementation staff who are more directly engaging projects and taking risks.
2. **Strategic capacity building:** Furnishing municipal staff, as well as community organizations, with technology skill sets; increasing the number and variety of staff with a technical remit; investing in technology assessment and database management; evaluating digital and physical assets that can be used to create civic value.
3. **Cross-sectoral and cross-departmental relationships:** Building partnerships based on mutual respect and shared value creation, rather than assumptions about sectoral norms; exploring alternative contract and organization types; maintaining deep, ongoing community engagement to define civic values, steer initiatives, and evaluate success.
4. **Balancing vision and action:** Harmonizing high-level policy (goals, principles, and values) together with tangible action (projects, working protocols, existing systems, and municipal service delivery); delivering immediate crisis response without losing sight of values and long-term goals.

This guide augments the collaborative, inclusive and engagement principles initially defined in the OSC Guide. These have been updated and expanded through emerging collective knowledge. That means it will be most effective if it is used as a point of discussion and a platform for parallel action across communities. We encourage civil servants and community members to share these ideas and engage with each other along their paths toward values-led Open Smart City transformation.

# Appendix

## A. Common Civic Values Emerging from the Landscape Scan.

- Openness
- Accessibility
- Inclusivity
- Usability

- Accountability
- Transparency
- Ethical/Responsible decision-making
- User/Citizen control over personal data

- Integration of services (vertical/ horizontal)
- Silo-breaking
- Transferability
- Standardization

- Capacity building in public sector
- Localization of data, services, expertise
- Reducing inefficiencies
- Continuous improvement and adaptation

- Citizen empowerment
- Civic (data) literacy
- Broad-based economic development
- Anti-racism
- Social cohesion
- Mental/Emotional health

- Collaboration
- Common goals
- Shared value
- Trust
- Citizen engagement

- Climate change
- Urban resilience
- Public health

## B. Public Sector Approaches to Civic Values.

### Funding guided by civic values

- Impact Canada. Smart Cities Finalist Guide. Canada Smart Cities Challenge. 2018
- Mazzucato, Mariana. Mission-oriented innovation policy: Challenges and Opportunities. The RSA Action and Research Center, University College of London. 2017
- Caballero, Mary Hull. Guy, Kari. Equity in Construction Contracting: Some goals achieved despite mismanagement, waste, and gamesmanship. Portland City Auditor. 2020

### Coalitions for civic values

- Open Data Charter Network. The International Open Data Charter. 2015
- Open Government Partnership. The OGP Approach.
- Cities for Digital Rights. Declaration of Cities Coalition for Digital Rights. 2018

### Civic values through regulation

- European Commission. Proposal for a regulation of the european parliament and of the council laying down harmonised rules on artificial intelligence (artificial intelligence act) and amending certain union legislative acts. (Document 52021PC0206). 2021
- Gasiola, Gustavo Gil. Smart Cities through Smart Regulation: the Case of Sao Paulo. Editorial & Opinion, Social Implications of Technology, Societal Impact, IEEE Technology and Society. 2019
- Weiss, Mitchell. Moloney, Emer. Dessain, Vincent. Airbnb in Amsterdam (A). (Case 817-013). Harvard Business School. 2016 (revised 2017)

### Civic value through standards

- Open Mobility Foundation. Mobility Data Specification. Github. 2018 (updated 2021)
- The Foundation for Public Code. The Standard for Public Code. 2021
- New York City Mayor's Office of the Chief Technology Officer. NYC Guidelines for the Internet of Things. 2016
- Open & Agile Smart Cities. Minimal Interoperability Mechanisms. 2021

### Civic values in city policy and new participation tools

- Helsinki City Council. Strategy Programme 2013- 2016. City of Helsinki Economic and Planning Centre. 2013
- Merveille, Nicolas. Laboratoire d'innovation urbaine et service des technologie de l'information. Montréal's Digital Data Charter. 2020
- City of Edmonton. Smart City Challenge: City of Edmonton Final Proposal. 2019
- City of Kelowna City Hall. Intelligent City Strategy. 2020

**Civic values through new participation tools**

- CitizenLab. Community Engagement Toolbox.
- Barcelona City Hall. Decidim Developers Documentation.
- Pol.is. The Computational Democracy Project.
- Code for Canada. Gathering Residents to Improve Technology (GRIT Toronto).

**Civic values through auditing, advisory councils, and watchdog organizations**

- The Chicago Mayor's Advisory Council on Closing the Digital Divide. The City that (Net)Works: Transforming Society & Economy Through Digital Excellence. 2007
- Portland Smart Cities Steering Committee. Citywide governance structure for the City's Smart Cities Work (Resolution 37290). 2017

**Civic values through cooperatives and hacktivism**

- .g0v
- Code for Canada

## C. Interviewees.

| Name | Title | Organization | Community |
|---|---|---|---|
| **Tracey Lauriault** | Associate Professor, Critical Media & Big Data | Carleton University | N/A |
| **Bianca Wylie** | Principal | Digital Public | Saskatoon |
| **Gabe Sawhney** | Principal Partnership Advisor | Canadian Digital Service | N/A |
| **Andrew Salzberg** | Head of Policy | Transit | Squamish |
| **Ryan Garnett** | Manager of Data Analytics (former) | City of Toronto | Mississauga, Toronto |
| **Pierre-Antoine Ferron** | Governance & Performance Specialist | Autorite Regionale de Transport Metropolitain | Montreal, Bridgewater |
| **Stéphane Guidoin** | Director (former) | Montreal Urban Innovation Lab | Montreal |
| **Soumya Ghosh** | Senior Manager | MNP Technology Solutions | Oshawa, Hamilton |
| **Jean-Marc LaFlamme** | Managing Director | ReGen Villages | Victoria County / Churchill |
| **Colleen O'Neill** | Project Manager for Energize Bridgewater | Town of Bridgewater | Bridgewater |
| **Jessica McDonald** | Director of Community Development | Town of Bridgewater | Bridgewater |
| **Nathalie Vogel** | Urban Planning Intern | Town of Bridgewater | Bridgewater |