Infrastructure Canada

Canada

Building Pathways to 2050

Moving Forward on the National Infrastructure Assessment

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Minister's Foreword

When we launched the engagement on Canada's first ever National Infrastructure Assessment (the Assessment) earlier this year, we set out to develop three strategic priorities: to assess Canada's infrastructure needs and establish a long-term vision; to improve coordination among infrastructure owners and funders; and to determine the best ways to fund and finance infrastructure.

I am pleased to see the strong response to our March 2021 engagement paper, which requested views on the Assessment. Following twelve round tables with more than 150 organizations, discussions with experts and governments who have conducted their own infrastructure assessment, and with written submissions from over 300 individuals and groups including provinces, territories, municipalities, Indigenous groups, experts, non-profit organizations, industry, and many more, we now have a clearer picture of how the Assessment might take on these three priorities.

This Report highlights key recommendations that will help guide the design of the Assessment. Overwhelmingly, the submissions welcomed the Assessment as having tremendous potential to improve infrastructure decision-making in Canada. Critical to realizing this potential, stakeholders noted, was the need for an independent, non-partisan and credible advisory body to generate the evidence and analytical base needed to identify infrastructure needs and priorities in order to better align infrastructure investments with our strategic priorities.

Key recommendations address how to define a clear mandate for an independent advisory body to provide the Government with impartial, expert and evidence-based advice on challenges and opportunities for all major infrastructure in Canada; leveraging global best practices and domestic experiences; establishing long-term funding guidelines for public capital expenditure; and developing an infrastructure investment roadmap for Canada that prioritizes long-term investments.

We heard that the Assessment should offer a strategic approach to near, medium, and long-term investment decisions over the next 30 years and help us achieve a net-zero economy through coordination at all levels of government and continued collaboration with Indigenous communities, experts, stakeholders, industry, and Canadians more broadly. We heard that the needs of Indigenous communities should be addressed as an urgent priority in a manner that is consistent with reconciliation and self-determination. Finally, we heard loud and clear the need for improving coordination and collaboration among infrastructure owners and funders to better support strategic

infrastructure investments; for an analysis of alternative funding and financing mechanisms; for predictable public infrastructure funding; and for expanding funding sources beyond the tax base.

Our approach must be comprehensive in nature and consider national, intergovernmental, Indigenous, public-private, expert, civil society and other key perspectives that will be representative of all key stakeholders in Canada's infrastructure ecosystem. The result will be a forward-looking and evolving roadmap to 2050 to guide infrastructure spending by all orders of government as well as the private sector in the achievement of economic growth, social equity, and net-zero greenhouse gas (GHG) emissions by 2050 and to improve the standard of living for all Canadians.

Recent wildfires and flooding across the country have highlighted the importance of building resilient infrastructure in the face of climate change. Adaptation to the impacts of climate change is essential for any planning framework moving forward. We must also remember the international context, and pressures to adapt and remain competitive amid a rapidly changing climate, digital transformation, changing demographics, and shifting geopolitics. It is critical that we build back better and ensure that our investment strategy has Canadian taxpayers' dollars doing triple duty: creating good jobs and growing the economy, tackling climate change, and ensuring a better quality of life for all.

The climate crisis and the COVID-19 pandemic have exposed existing societal inequalities and investment gaps, and have exacerbated challenges, especially for Indigenous Peoples, Black and other racialized communities, youth, women, seniors, recent immigrants and persons with disabilities.

The complex and evolving picture of infrastructure needs in the 21st century, which includes childcare, affordable housing, public transit, high-speed broadband, and skills training, underscores the importance of developing the tools for achieving our three core objectives: Canada's economic growth and competitiveness; achieving net zero emissions by 2050 and building resilience to climate change; and promoting inclusivity and improving the quality of life for all Canadians.

It is a critical time to build a more prosperous, inclusive and resilient Canada. We aim to get there by working together, using the best available data, guided by global best practices in infrastructure planning, investment, design, and management, and leveraging private sector investment to go further and build back better than we ever could alone. The Assessment will play a key role in guiding governments of various political stripes along the way.

Catherine McKenna
Minister of Infrastructure and Communities

Key Recommendations Made During Consultations

With more than 300 organizations and individuals participating in the public engagement process for the National Infrastructure Assessment, we have distilled the following key recommendations to inform the Assessment's next steps:

1. The Government of Canada should create an independent advisory body, for example, a commission, to carry out the Assessment and provide the Government with impartial, expert and evidence-based advice on challenges and opportunities for major infrastructure in Canada covering all sectors of economic, social, sustainable and natural infrastructure.

2. In order to ensure clear, fact-based advice on Canada's infrastructure needs and the establishment of a long-term vision, the Government should define a clear mandate for the independent advisory body, to conduct a National Infrastructure Assessment of all major infrastructure in Canada, to be updated on a periodic basis, that will include a comprehensive inventory of Canada's infrastructure gaps, in-depth studies into infrastructure needs in Canada, and recommendations to the Government.

3. As a key component of Canada's strengthened climate plan, the Assessment should work to ensure that infrastructure investments drive us to net-zero emissions and build resilience to climate change. It should establish a strategic approach to near, medium, and long-term investment prioritization for Canada for the next 30 years, based on strategic outcomes, including Canada's economic growth and competitiveness, achieving net zero emissions by 2050, and promoting inclusivity and improving the quality of life for all Canadians.

4. The independent advisory body should leverage global best practices and domestic experiences, and consult and work closely with all levels of government, Indigenous communities, investors, experts, stakeholders, industry, and Canadians more broadly to define key gaps and areas of historical underinvestment.

5. The independent advisory body should engage directly with Indigenous communities to identify infrastructure needs and the infrastructure deficit, consistent with reconciliation and self-determination.

6. In parallel, the Government should :

    a. Establish consistent, long-term funding guidelines to support sustainable investment, based on Canada's fiscal capacity, global benchmarks and best practices, and make a concerted and sustained effort to expand the range of funding sources beyond the tax base;

b. Create a standing process for improved coordination and collaboration between different orders of government, Indigenous communities, and other infrastructure owners across the private and public sectors;
c. Assess the role of regulatory changes and other pricing mechanisms on future funding of infrastructure projects; and,
d. Continue to leverage the Canada Infrastructure Bank to accelerate infrastructure development and extend the Government funding envelope beyond traditional public funding, by encouraging private sector financing.

7. The Assessment should include a clear set of investment recommendations, including proposed timelines, and an infrastructure investment roadmap for Canada that is based on the results of the independent advisory body's work and a clear understanding of the collective investment capacity. It should also identify new programs required to spur investment in specific areas and to facilitate partnership with the private sector, and it should identify opportunities to prioritize Canadian workers, companies, innovation, and materials including through procurement policies with a focus on sustainable infrastructure.

I. Why We Are Undertaking a National Infrastructure Assessment

Infrastructure matters. Infrastructure underlies how Canadians live, learn, care, work, and play. Water. Energy. Broadband connectivity. Schools and hospitals. Child care and elder care. Parks and trails. Transit and railways. Ports and airports. Flood protection and waste diversion. This is just the beginning of a list of the many infrastructure-dependent elements that Canadian communities rely on to support our quality of life, tackle climate change, and enable our economy to flourish. However, infrastructure takes time to plan and develop, and requires resources to create, operate, and maintain. Ensuring that we are collectively investing in the right infrastructure assets is essential to Canada's economic, environmental, and social objectives in the short, medium, and long-term.

Across Canada, federal, provincial/territorial, municipal, and Indigenous governments as well as the private and not-for-profit sectors, invest significantly in infrastructure. Indeed, as calculated by Statistics Canada's Infrastructure Economic Account, Canada's infrastructure stock has grown to over $900 billion over the last decade, equivalent to about 46 percent of GDP. It plays a massive role in the country's success – but the mix of infrastructure serving Canadian communities today will not be all that we need in the future. Canada is facing many changes. For example, by 2050:

- Canada's climate will be hotter, and we will experience both more droughts and more precipitation across the country;
- Canada's population will be larger, perhaps by 20 to 30 percent;
- The economy will also have grown significantly, in ways that may look different from today's;
- New technologies will continue to transform many elements of daily life; vehicles on the road, for example, will be very different; and,

- As a whole, Canadians will be older and more diverse, with a smaller share of the population in the workforce, and that population growth is expected to play out very differently across regions and communities.

Our well-being, our prosperity, and our success in tackling climate change over the coming decades will depend on many things, including smart investments in 21st century infrastructure that support a net-zero economy and a stronger quality of life for all Canadians. Ultimately, investments in infrastructure, both public and private, must reflect the economy and society we wish to build.

Despite the critical role that infrastructure plays, jurisdictions around the world have struggled for decades with making high-quality, fact-based decisions around their infrastructure expenditures. In particular, governments have dealt with a series of consistent challenges:

- After decades of underinvestment and overreliance on traditional tax-based funding, they do not have the financial capacity to afford everything required to close gaps and build the infrastructure they need;
- Cyclical government spending, uneven over time – often linked to economic and/or electoral cycles – makes planning and procuring for large-scale infrastructure projects difficult; and,
- Sub-optimal choices in terms of where to spend limited money and on which projects as a result of having little in the way of a consistent, strategic process for prioritizing investments across outcomes, sectors, or geographies and facilitating tough conversations about where to spend capital.

Smarter and more strategic infrastructure investments are possible when decisions are based on a foundation of evidence, expert analysis, and consultation with Canadians. National and international entities, such as Canada's Expert Panel on Sustainable Finance, Canada's Advisory Council on Economic Growth, the Organization for Economic Co-operation and Development, and the International Monetary Fund, have been recommending a more strategic, longer-term approach to infrastructure decisions. Fortunately, Canada already has international examples to look to in terms of undertaking a strategic, evidence-based National Infrastructure Assessment, notably the United Kingdom, Australia, and New Zealand.

Our ambition to build 21st century infrastructure must be matched with stronger infrastructure planning practices and priority-setting for public investments, as well as for leveraging private sector capital in support of desired outcomes. Our vision is that the National Infrastructure Assessment will provide independent advice based on data, expertise, and engagement to better guide decisions, public and private, across Canada over the near, medium, and longer-term.

II. Consultation overview and recommendations for Canada's National Infrastructure Assessment

In March 2021, the Government of Canada launched an engagement process on how to undertake Canada's first ever National Infrastructure Assessment. The Minister of Infrastructure and Communities published an engagement paper – *Building the Canada We Want in 2050* – encouraging infrastructure decision-makers and stakeholders from coast to coast to coast to share their views on the next steps for undertaking the Assessment generally, and on three broad priority areas for the Assessment in particular:

A. Assessing Canada's infrastructure needs and establishing a long-term vision;
B. Improving coordination among infrastructure owners and funders; and,
C. Determining the best ways to fund and finance infrastructure.

In the engagement paper, written submissions were requested to provide those views, and Canada delivered. More than 300 organizations and individuals sent in written submissions, confirming a broad interest in the Assessment and the importance of the exercise to a wide array of sectors and individuals that rely on or are otherwise impacted by infrastructure decisions across the country.

This Report shares key conclusions and recommendations from feedback received in this preliminary engagement exercise and will help form the basis of the next steps for designing the National Infrastructure Assessment.

1. The Government of Canada should create an independent advisory body, for example, a commission, to carry out the Assessment and provide the Government with impartial, expert and evidence-based advice on challenges and opportunities for major infrastructure in Canada covering all sectors of economic, social, sustainable and natural infrastructure.

Across the submissions received, there was broad agreement that the Assessment must be independently conducted to be credible with infrastructure decision-makers across the country. This means that the body leading the work of the Assessment must have the capacity to lead such an exercise and be provided a mandate to offer independent advice. The degree of support received for an independent assessment suggests consideration be given to establishing this body as a permanent, standing entity with true independence and the ability to provide recommendations to the Government.

Having the exercise led by credible, independent voices would not be sufficient of course. Again, there was a broad consensus that the advice and recommendations of the Assessment must be expert-driven, evidence-based and supported by data. Many submissions spoke to different data-related issues, including the challenges with current data availability, opportunities to better leverage existing data (including working with Statistics Canada and the Federation of Canadian Municipalities), as well as new and innovative methods to better collect and share data to improve strategic infrastructure decision-making; however, in general, there was a strong recognition that the Assessment must be strongly rooted in data to offer effective advice and recommendations.

2. In order to ensure clear, fact-based advice on Canada's infrastructure needs and the establishment of a long-term vision, the Government should define a clear mandate for the independent advisory body to conduct a National Infrastructure Assessment of all major infrastructure in Canada, to be updated on a periodic basis, that will include a comprehensive inventory of Canada's infrastructure gaps, in-depth studies into infrastructure needs in Canada, and recommendations to the Government.

Both the submissions and roundtable participants expressed the importance of providing this advisory body with a clear mandate that includes conducting a comprehensive inventory and in-depth studies of Canada's infrastructure needs, which are then used to inform recommendations to the Government. Several participants raised that the body should provide interim reports, as well as reports focused on more narrow infrastructure topics as needed. The comprehensive Assessment would need to be updated on a periodic basis (e.g., every five years) to ensure neither it nor the recommendations that stem from it become out of date or inconsistent with our country's needs.

The submissions as a whole strongly welcomed the undertaking of Canada's first National Infrastructure Assessment and the adoption of a broad, long-term strategic approach to infrastructure decision-making with a focus on maximizing positive social, environmental, and economic outcomes.

Many implicitly saw this as an opportunity to focus on a number of key issues where informed, strategic choices are more urgently needed to ensure positive outcomes. This approach seemed to consider the Assessment as a roadmap or "north star", which could include recommendations for short (under 5 years), medium (5-10 years) and long-term (to 2050) steps to fulfill the Assessment's priorities.

Others saw the Assessment as an opportunity to strengthen awareness of needs and gaps very broadly, and to produce an audit of the current state of infrastructure and where resources are required. Still others noted that investment resources could be better leveraged, including from the private sector, if the Assessment was used to create a predictable pipeline of major projects for investment.

Finally, while there is widespread agreement that the Assessment should focus on the long term, some respondents also noted that this should not come at the expense of actions in the short, immediate term to address current needs.

Defining the "strategic approach" for the exercise and engaging early on in the mandate of the assessment to ensure it is well understood, will likely be an early priority for the exercise given the range of views reflected in the submissions received. More generally, given the wide range of challenges specific to particular regions and communities and the wide range of needs and interests to be supported by infrastructure, many noted the importance the engaging broadly across the country and tapping into a wide array of sectoral and regional expertise to support the Assessment.

Beyond these issues, there was strong support from many submissions for a strategic focus on outcomes. Effective infrastructure development must start from a clear perspective on the strategic outcomes we are targeting and have a performance measurement framework in place to track progress. Infrastructure can enable many goals, and it is critical to start with a sense of the outcomes we are attempting to deliver. Given our priorities as a country, and the input received through the engagement process, critical outcomes for Canada include:

1. **Driving economic growth and competitiveness:** Many noted the critical role that infrastructure plays in maintaining economic growth and competitiveness, as well as the importance of investing in trade and transportation infrastructure in particular to grow jobs and strengthen economic opportunities across Canada's regions;

2. **Achieving net-zero emissions by 2050**: The importance of reducing emissions, supporting electrification, improving energy efficiency, accelerating and deepening retrofits, and accelerating the uptake of relevant green technologies were among many significant issues and opportunities identified in this area;

3. **Building resilience to climate change**: The importance of this outcome was heard broadly from an array of infrastructure stakeholders, including from communities of all sizes from the largest urban centres to small and remote northern and Indigenous communities;

4. **Promoting inclusivity, including access to housing, healthcare, education, clean water, digital connectivity, jobs, training and workforce development, and improving the quality of life for all Canadians:** Many also underlined the importance of strengthening the quality of

life of all Canadians, and noted the deep connections with infrastructure investments and planning and inclusivity outcomes; and,

5. **Measuring performance and long-term planning:** An infrastructure performance measurement framework would provide needs-based insights into the gap to desired outcomes and analysis based on the key drivers underlying a cleaner, stronger and more resilient Canada in 2050. This could allow for the development of incremental and aligned 5-year, 10-year and 30-year infrastructure strategy and development plans that will replace the infrastructure project by project allocations of today.

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3. As a key component of Canada's strengthened climate plan, the Assessment should work to ensure that infrastructure investments drive us to net-zero emissions and build resilience to climate change. It should establish a strategic approach to near, medium, and long-term investment prioritization for Canada for the next 30 years, based on strategic outcomes, including Canada's economic growth and competitiveness, achieving net zero emissions by 2050, and promoting inclusivity and improving the quality of life for all Canadians.

The Government of Canada has committed to moving to net-zero emissions by 2050, and infrastructure investments will be key to meet this target. The Assessment will work toward that target by looking at global best practices as well as domestic experience and expertise to establish the evidence base and conduct the analysis required to plan the transition to a net-zero future.

The UK's National Infrastructure Commission, which we engaged with actively during consultations, has analyzed all of its recommendations to ensure that they are consistent with that government's net-zero target and has set out a roadmap for driving to net-zero by 2050. Canada's Assessment can look to the UK and other models to determine how best to support Canada's pathway to net-zero emissions by 2050, ensure every investment dollar increases resilience, and achieve its climate targets as quickly as possible.

On this topic, it is worth mentioning that a significant number of respondents advocated for procurement reform as a condition of infrastructure spending. Many submissions noted that a focus on initial, lowest-cost procurement can lead to sub-optimal decisions, and that moving to greater consideration of full life-cycle costs and the broader alignment with economic, social and environmental outcomes could make for more strategic decision-making. For example, a better understanding of embodied carbon emissions associated with material manufacturing and transportation could help us get to net zero life-cycle carbon. Having a better understanding of life

cycle carbon and the total cost of ownership of built assets could then translate into better procurement practices, including within a framework of full life-cycle costing. A procurement process based on outcomes could also expand markets for low-carbon products and support industry innovation.

Many submissions recommended that the Assessment support the development and implementation of a Buy Clean approach to ensure public infrastructure spending addresses embodied carbon and prioritizes the use of low-carbon materials. It was noted that a government 'Buy Clean Strategy' could aim to reduce the GHG emissions associated with the manufacturing, transportation, installation and disposal of materials used in the construction of buildings, road/transit networks, energy systems and other infrastructure. This could include better disclosure of embodied carbon in construction materials, new performance standards for embodied carbon, and new incentives to consider embodied carbon levels.

Submissions also underlined that Canada is well positioned to benefit from strategies to reduce embodied carbon given the availability of low-emissions electricity, leadership in clean technology innovation, access to low-carbon materials, and proximity to the United States, allowing Canada to trade with fewer emissions than our competitors. A Buy Clean Strategy for Canada therefore would have the added benefit of promoting Canadian and North American businesses, technologies and job creation that support the reduction of embodied carbon throughout the supply chain, construction and disposal of various infrastructure.

4. The independent advisory body should leverage global best practices and domestic experiences, and consult and work closely with all levels of government, Indigenous communities, investors, experts, stakeholders, industry, and Canadians more broadly to define key gaps and areas of historical underinvestment.

Given the breadth of infrastructure asset types and issues raised across the written submissions, it is perhaps not surprising that the importance of engaging broadly with governments, experts, stakeholders, and communities was a theme that came through strongly in the submissions. Having a process that is rooted in broad engagement will allow for a more robust consideration and analysis of Canada's infrastructure needs and priorities, as well as potential strategies and solutions. Many stakeholders noted the Assessment will require broad engagement with a diverse set of stakeholders to capture their perspectives and priorities, and clearly define potential impacts of potential future investments. It is clear from the submissions received that there are many with informed views and expertise to offer.

A transparent process for the development of the Assessment is also widely valued. Regular engagement, as well as transparency in the development of advice and recommendations over that period, will help ensure there are ongoing opportunities to inform the development of the Assessment – a goal sought by a large number of the submissions.

Many submissions advocated for representation from provincial/territorial, municipal, and Indigenous governments and organizations, as well as a broad array of sectors and community interests and leaders, to ensure varied interests are accounted for, particularly in recognition that most public infrastructure assets in Canada are not federally owned. Similarly, many noted that the unique needs of different regions and communities would need to be considered by the Assessment, and a broadly representative independent advisory body and governance structure would help to facilitate such consideration.

A message that collectively came through many submissions was that the persons making up the independent advisory body and any governance structure or working groups to support the Assessment should have a diverse range of experience and expertise. Ensuring a balance of skills, perspectives, and regional distribution will be key to highlighting and addressing the strengths and weaknesses of Canada's infrastructure development and to ensuring effective integrated and strategic planning.

In addition to representing owners, operators, funders, financiers, and regulators of infrastructure, some respondents identified the importance of hearing from traditionally under-represented groups such as Indigenous communities, racialized individuals, LGBGTQ2S+, remote communities, youth, and persons with disabilities to ensure the exercise is socially and economically inclusive.

Several submissions emphasized the importance of turning to other jurisdictions and drawing on already established global best practices and the role the assessment can play in developing and sharing best practices for coordination.

5. The advisory body should engage directly with Indigenous communities to identify infrastructure needs and the infrastructure deficit, consistent with reconciliation and self-determination.

Some respondents highlighted that if Canada wants to lead the world with next-generation infrastructure it needs to first work with First Nations, Inuit and Métis to address the existing infrastructure gap in many Indigenous communities. As such, many submissions argued it is essential to develop this long-term vision for infrastructure and multi-year funding in partnership with Indigenous communities, to support reconciliation and self-determination, sustainable and equitable development, and social and economic inclusivity. It was highlighted that infrastructure gaps are

deeply interconnected and that policy decisions for one type of infrastructure may have impacts across several types (e.g., power, wastewater, housing, transportation and trade, food sovereignty, health, community justice, education, etc.).

Submissions highlighted the importance of supporting capacity-building (e.g., supporting asset management initiatives) and of recognizing Indigenous leadership by investing in the agency of Indigenous peoples and communities, supporting Indigenous-led and delivered solutions, equipping Indigenous peoples with equitable resources, and ensuring appropriate access to funding. There was an emphasis on key infrastructure issues, including diesel dependency, the need for investments in safe and efficient transportation and trade corridors, high-speed broadband connectivity and workforce and skills training. Access to affordable capital for investments in major projects as equity partners and access to adequate early-stage project capacity and development funding were raised as key issues.

If done well, it was noted, distinctions-based Indigenous visions, priorities, and recommendations for infrastructure development, coordination, and funding would feature explicitly in the Assessment through a process that supports self-governance and respects the constitutional and treaty rights of Indigenous Peoples.

Further, it was underscored by some that the Assessment should align, rather than overlap, with the development of distinctions-based community infrastructure plans that are currently underway between Indigenous Services Canada and Indigenous partners, and that the Assessment could also help address misalignments in program delivery.

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6. In parallel, the Government should develop funding guidelines for public capital expenditure to inform the advisory body's work, guide consistent and long-term funding based on Canada's fiscal capacity, global benchmarks and best practices, and improve coordination between various funders and financiers of infrastructure.

    a. Establish consistent, long-term funding guidelines to support sustainable investment, based on Canada's fiscal capacity, global benchmarks and best practices, and making a concerted and sustained effort to expand the range of funding sources beyond the tax base.

Participants raised the importance of establishing a consistent, long-term funding envelope and guidelines to support sustainable investment, based on Canada's fiscal capacity, global benchmarks and best practices, and making a concerted and sustained effort to expand the range of funding sources beyond the tax base.

Predictable funding levels were identified in a large number of submissions as an important corollary to stronger planning and better investment decisions aligned with outcomes. Some noted that, to maximize the predictability of spending and industrial capacity, government should establish clear long-term benchmarks for public levels of infrastructure investment. For example, the United Kingdom has pegged its planning for public investment in infrastructure to a percentage of GDP growth. Doing this allows for better long-term planning.

At the same time, many suggested the Assessment should explore opportunities to expand the total funding pool available to infrastructure projects by continuing to leverage innovative funding and financing solutions. Many classes of infrastructure, from transmission lines to transit systems, have existing user-pay models that can partially offset the upfront capital investment required. The Canada Infrastructure Bank is already facilitating these types of transactions, which "grow the pie" and allow us to get more built for the same amount of public investment.

b. Create a standing process for improved coordination and collaboration between different orders of government, Indigenous communities, and other infrastructure owners across the private and public sectors.

Improving the coordination and collaboration among infrastructure owners and funders is critical given that infrastructure decision-making is particularly diffuse in Canada. This point was clearly affirmed in the written submissions, with a focus on the following topics:

- **Data collection and sharing:** Many submissions noted a need for better collaboration and coordination on data to improve informed infrastructure decision-making. Often data is not collected in a clear and consistent manner, making assessments of community infrastructure needs more challenging and limiting the effectiveness of broader planning efforts. Opportunities for decision-makers and innovators to benefit through more disaggregated and widely shared data were also identified.

- **Skills training:** Many recommendations spoke to the need for greater coordinated action to support skills training and address potential labour force gaps in the skilled trades, particularly with respect to skills in emerging green technologies and construction techniques and materials. Identified opportunities included measures to encourage uptake

of the skilled trades and support skills development generally, as well as opportunities to increase diversity in the skilled trades. Many colleges, institutes, and universities noted an interest in providing further advice on how to ensure Canada has the skilled workforce to support future infrastructure needs.

- Research and development coordination: A number of submissions noted opportunities for better coordination on infrastructure innovation to support and leverage Canadian research and development in building multiple pathways to net-zero. Identified opportunities included low-carbon hydrogen hubs, modes of electrification and transmission, energy storage, carbon capture and storage, as well as low-carbon technology and materials. Many colleges, universities, and private institutions noted the opportunities to better coordinate investment decisions that will support Canadian employers, technologies and products.

- Natural infrastructure: A large number of submissions made a case for the greater use of natural infrastructure to provide needed services and supports, rather than relying only on traditional "grey" infrastructure. Natural infrastructural investments can offer many co-benefits, not only in supporting community resilience to climate change, but also in supporting wildlife and offering communities public spaces for recreation and social connection. Some suggested there is merit in expanding cost-benefit analysis to include the benefits and co-benefits of natural infrastructure solutions.

- Building codes and standards: Others noted the importance of having the Assessment look at building codes and standards to accelerate the adoption of technologies and materials to better meet the challenges of climate change mitigation and adaptation, among other desired public policy outcomes. A connected area of collaboration, noted by some submissions, was the need to develop clear labeling for sustainable infrastructure, like LEED or Energy Star, to avoid greenwashing. An interest in considering measures to encourage innovation and promote the use of new technologies went beyond the use of building codes and standards in a number of submissions.

- Accessibility: Several submissions highlighted that more work is needed to strengthen and coordinate efforts across Canada in support of accessibility, both in terms of new construction and retrofits to existing facilities. Broader adoption of universal design principles could help to ensure that a broader array of Canadians benefit from infrastructure investments.

  More generally, many submissions highlighted the importance of using infrastructure investments to address social and economic inequities that have disproportionately affected various marginalized populations. Many submissions noted opportunities to reduce barriers, such as undertaking more inclusive engagement and consultations for infrastructure projects, opening up opportunities for careers in the skilled trades, and closing existing infrastructure gaps for Indigenous, rural, and northern communities.

Additional opportunities for improved coordination include:

- **Cross-border collaboration:** Some noted potential strategic opportunities for greater collaboration and alignment with the United States on our respective paths to net-zero emissions, with EV charging station infrastructure and the CLEAN Future Act offered as two specific examples.

- **Asset management:** Collaborating to strengthen asset management tools and practices was noted as an area of strategic value by a number of submissions. The challenges faced by smaller rural and remote communities in this regard was particularly underlined.

- **Cyber threats and resilience:** The protection of infrastructure and systems to address cyber threats was raised in a number of submissions, as well as the resilience of critical infrastructure more generally, with several recent international examples pointing to increased need for attention in this area.

c. Assess the role of regulatory changes and other pricing mechanisms on future funding of infrastructure projects.

Some submissions noted the role of regulations on infrastructure spending and construction. For example, a steady increase in the carbon price will help drive the viability of low emission infrastructure projects, such as electrification, as well as levels of private sector investment. Tracking and assessing the role of regulatory changes and other pricing mechanisms will be important for future infrastructure planning.

d. Continue to leverage the Canada Infrastructure Bank to accelerate infrastructure development and extend the Government funding envelope beyond traditional public funding by encouraging private sector financing.

Submissions confirmed that the Canada Infrastructure Bank is a critical tool in expanding capital available for infrastructure by crowding in private investment. Stakeholders discussed the role of the Canada Infrastructure Bank as an alternative source of financing as well as a potential mechanism to de-risk innovative and non-traditional infrastructure projects. Some discussed ways to evolve the Bank (e.g., to support large nation-building projects primarily, or alternatively a wider array of small projects; to support new and emerging technologies; to support non-physical infrastructure assets,

such as software or cybersecurity). The Canada Infrastructure Bank can continue to play a key role in expanding the range of funding sources beyond the tax base and increasing investments in Canadian infrastructure.

Some classes of infrastructure are best funded by public tax dollars; others will be better addressed by other forms of financing and long-term repayment through user fees and other revenue generation.

Many submissions noted the potential role private sector capital can play in supporting infrastructure assessments. Some spoke to the potential for further use of public-private partnerships for future large-scale projects. Several stakeholders suggested it may be challenging to meet Canada's climate, social, and economic goals without a broader adoption of alternate funding and financing models and a greater role for the private sector.

A number of submissions noted the importance of a predictable investment environment to increase private sector investment, such as through having a clear pipeline of projects. Others noted the need for ways to appropriately price climate risk in order to catalyze private sector investment in sustainable and resilient infrastructure.

Many respondents noted that the Assessment's mandate is ambitious, and therefore funding and financing options need to match that ambition. A number of submissions noted potential for innovative funding and financing tools, which could be explored by the Assessment including green bonds, land-value capture, asset-recycling, and innovation insurance. Others noted the need to develop new financing tools to better support Indigenous-led infrastructure projects. In terms of greater Indigenous participation in, and leadership of, major infrastructure projects, improved Indigenous community access to early-stage project capacity and development funding and financing tools could be explored.

Some submissions were less supportive of private sector investment in infrastructure in certain contexts, seeing public infrastructure in particular as a public good and suggesting that the adoption of user fees could lead to sub-optimal outcomes in some cases.

7. The Assessment should include a clear set of investment recommendations, including proposed timelines, and an infrastructure investment roadmap for Canada that is based on the results of the independent advisory body's work and a clear understanding of the collective investment capacity. It should also identify new programs required to spur investment in specific areas and to facilitate partnership with the private sector, and it should identify opportunities to prioritize Canadian workers, companies, innovation, and materials including through procurement policies with a focus on sustainable infrastructure.

It will be important for the independent advisory body to publish a clear set of investment recommendations for government and the private sector that includes proposed timelines. Such targets will provide a clearer picture for strategic planning and timing of infrastructure investments and improve coordination.

The independent advisory body should deliver a clear roadmap of Canadian infrastructure investment priorities in accordance with strategic outcomes, outlining clear sources of funding, Canada's capacity to pay for these investments, areas of high potential for innovative financing approaches, and targets for the timing of investments, with a high degree of buy-in from Canadians and their communities and across all levels of government.

III. Next steps for the National Infrastructure Assessment

Achieving the strategic outcomes that we collectively want for Canada's communities in 2050 will not happen by chance. The consultation input and recommendations outlined above set the stage for a National Infrastructure Assessment that can play a critical role in supporting long-term economic growth and competitiveness, reaching our emissions goals and ensuring resilient communities, and improving quality of life.

The Government's next steps will be to establish an independent, credible and non-partisan advisory body, for example, a commission, and to provide that advisory body with a clear mandate. The advisory body's mandate will include carrying out the National Infrastructure Assessment; consulting broadly and transparently with all key stakeholders, including Indigenous communities; providing expert advice; and, making recommendations to Government. The advisory body will be expected to draw from and leverage global best practices, including lessons learned from other

national infrastructure assessments, while developing an approach that addresses Canada's unique needs.

Funding to support the Assessment's initial work was proposed in Budget 2021, with a commitment of $22.6 million over four years, starting in 2021-2022, to improve infrastructure planning and help all orders of government make informed decisions about infrastructure projects that ensure we have stronger, cleaner, more resilient communities.

The Assessment will establish a strategic approach to near, medium, and long-term investment prioritization for Canada for the next 30 years. The Assessment will include a clear set of investment recommendations with proposed timelines and set out an infrastructure investment roadmap for Canada based on the advisory body's work and a clear understanding of the collective investment capacity.

In parallel, the Government will look to innovative ways to improve coordination and collaboration between different orders of government, Indigenous communities, and other infrastructure owners across the private and public sectors to set collective funding commitments. It will also consider establishing funding guidelines for public capital expenditure to inform the advisory body's work, which would improve coordination between various funders and financiers of infrastructure.

Many jurisdictions are struggling with the issue of how best to identify, plan and fund infrastructure going forward. For Canada's economy to remain competitive, it will be important for the Assessment to do so in a timely and responsive manner. An Assessment with a national infrastructure performance measurement framework that is based on the net-zero, economic inclusion, productivity and competitiveness targets for Canada in 2050 will enable a more performance-driven, evidence-based and transparent discussion of Canada's infrastructure needs. This performance lens will enable all orders of government, industry and the public to harness data to objectively assess the performance of Canada's infrastructure. Models for impact assessment can then be developed that will be explicitly aligned to performance today but also toward meeting the needs of Canada in 2050.

The Canada Infrastructure Bank will continue to play a key and evolving role in developing government-investor partnerships and alternative and innovative financing approaches to expand the range of funding sources beyond the tax base and increase investments in Canadian infrastructure. There remains tremendous potential to unlock public and private sector capital to improve quality of life in the long-term and to sustainably stimulate economic growth and jobs in the short, medium and long-term.

The Assessment is one element in the development of national and sectoral plans that would identify a roadmap to improve the quality of life for all Canadians today and out to 2050. Transformational reform will require addressing current challenges such as infrastructure priority-setting and siloed infrastructure planning and delivery, by integrating needs, data and performance

measurement. A focus on reforms that looks to develop a standardized approach and methodology to national and sectoral plans can also unleash funding and financing reforms to fund plans rather than projects.

The extensive public engagement and participation seen during this consultation is extremely encouraging. As we move forward with Canada's first National Infrastructure Assessment, continued engagement with Canadians and developing this initiative to suit the needs of our country will be critical. We look forward to continuing to receive input as we develop these next steps.

Annex: List of Signatories to Written Submissions Received

1. Acadia University
2. Act Urgently!
3. Adaptation to Climate Change Team (ACT) – Simon Fraser University
4. Aecon
5. Alberta Federation of Rural Electrification Associations
6. Alberta Urban Municipalities Association
7. Appraisal Institute of Canada
8. Architects DCA
9. Arup
10. Assembly of First Nations
11. Asset Management Ontario
12. Assiniboine Community College
13. Associated Equipment Distributors
14. Association of Consulting Engineering Companies - Canada
15. Association of Manitoba Municipalities
16. ATCO
17. Atlantic Colleges Atlantique
18. B+H Architects
19. Battle River Power Coop
20. BC Urban Mayors' Caucus
21. BCE Inc. (Bell)
22. Bike Cochrane
23. Biodegradable Products Institute
24. Black Diamond Group
25. Black Mountain Irrigation District
26. BlackBerry Limited
27. Blue Green Canada
28. Bouchard Associates
29. Bow Valley College
30. Brampton Transit
31. Brookfield Centre in Real Estate and Infrastructure (Schulich School of Business, York University)
32. Bruce Power
33. Business Council of Canada
34. C2C2C Unity Corridor Foundation
35. Canada Green Building Council
36. Canada West Foundation
37. Canada's Building Trades Unions
38. Canadian Association of Recycling Industries
39. Canadian Chamber of Commerce
40. Canadian Construction Association
41. Canadian Council for Public-Private Partnerships
42. Canadian Electricity Association
43. Canadian Energy Pipeline Association
44. Canadian Freshwater Alliance
45. Canadian Institute of Plumbing & Heating
46. Canadian Institute of Quantity Surveyors
47. Canadian Life and Health Insurance Association
48. Canadian Manufacturers & Exporters
49. Canadian Natural Gas Vehicle Alliance
50. Canadian Northern Corridor Research Program at The School of Public Policy (University of Calgary)
51. Canadian Nuclear Association
52. Canadian Nuclear Isotope Council
53. Canadian Parks and Recreation Association
54. Canadian Parks and Wilderness Society
55. Canadian Parks and Wildnerness Society - Québec Section
56. Canadian Public Works Association
57. Canadian Real Estate Association
58. Canadian Renewable Energy Association

59. Canadian Rural Revitalization Foundation
60. Canadian Society for Civil Engineering
61. CanaIdian Society of Landscape Architects
62. Canadian Union of Public Employees
63. Canadian Urban Transit Association
64. Canadian Urban Transit Research and Innovation Consortium
65. Canadian Vitality Pathway
66. Canadian Vehicle Manufacturers' Association
67. Canadian Water and Wastewater Association
68. Canadian Wildlife Federation
69. CanBIM
70. Canpotex
71. Cement Association of Canada
72. Chamber of Marine Commerce
73. Chemistry Industry Association of Canada
74. Cintra
75. Circular Economy Leadership Canada
76. City of Calgary
77. City of Edmonton
78. City of Guelph
79. City of Montreal
80. City of Mississauga
81. City of Ottawa
82. City of Vancouver
83. Clean Energy Canada
84. Climate Action Network
85. Climate Caucus
86. Coalition of Innovation Leaders Against Racism
87. Coast Funds
88. Colleges and Institutes Canada
89. Colleges Ontario
90. Community Foundations of Canada
91. Compost Council of Canada
92. Concrete Canada
93. CSA Group
94. Dark Matter Labs
95. David Suzuki Foundation
96. Deloitte
97. Disability Without Poverty
98. Drone Delivery Canada
99. École de Technologie Supérieure - Université du Québec
100. Edmonton Global
101. Efficiency Canada
102. Electricity Alliance Canada
103. EllisDon
104. Enbridge
105. Energy Services Association of Canada
106. Energy Storage Canada
107. Engineers Canada
108. Enwave Energy Corporation
109. EPCOR
110. Equilibrium Engineering
111. ESSA Technologies Limited
112. Evergreen
113. Federation of Canadian Municipalities
114. Federated Co-operatives Limited
115. Fertilizer Canada
116. First Nations Major Projects Coalition
117. FLO - AddÉnergie
118. Forest Products Association of Canada
119. FortisAlberta Inc.
120. Future of Infrastructure Group
121. General Electric Canada
122. Global Container Terminals
123. Global Infrastructure Hub
124. Global Infrastructure Investor Association
125. Government of Alberta – Alberta Infrastructure
126. Government of British Columbia - Ministry of Transportation and Infrastructure
127. Government of Manitoba – Department of Central Services

128. Government of New Brunswick - Department of Transportation & Infrastructure
129. Government of Newfoundland and Labrador – Department of Transportation and Infrastructure
130. Government of Northwest Territories - Department of Infrastructure
131. Government of Nova Scotia – Department of Infrastructure and Housing
132. Government of Nunavut - Department of Communities and Government Services
133. Government of Ontario - Ministry of Infrastructure
134. Government of Saskatchewan - Ministry of SaskBuilds and Procurement
135. Greater Toronto Airports Authority
136. Green Communities Canada
137. Green Infrastructure Ontario Coalition
138. Green Ribbon Panel
139. Greenbelt Foundation
140. Habitat
141. HCMA Architecture + Design
142. HealthCareCAN
143. HSBC
144. Huawei Technologies Canada
145. Humber College
146. Hydro One Networks Inc.
147. Imperial Oil Limited
148. Indigena Capital
149. Infrastructure Performance Exchange
150. Institut national de la recherche scientifique
151. Insurance Bureau of Canada
152. Intact Centre on Climate Adaptation
153. International Institute for Sustainable Development
154. International Longshore and Warehouse Union
155. International Union of Operating Engineers
156. Inuit Tapiriit Kanatami
157. Ivey Foundation
158. Johnson-Shoyama School of Public Policy
159. Kaleden Irrigation District
160. Kanin Energy
161. KingSett Capital
162. Kitikmeot Inuit Association
163. Kivalliq Inuit Association
164. Les Ponts Jacques Cartier et Champlain Incorporée
165. Local Enhancement & Appreciation of Forests
166. Lower Nicola Waterworks District
167. Lower Nipit Improvement District
168. M'Chigeeng First Nation
169. Maadjitawin Counseling & Consulting
170. MacEwan University
171. Manifest Climate
172. Mantle Developments
173. MBC Group
174. McGill University - School of Urban Planning
175. McMaster Innovation Park
176. McMaster University
177. McMaster University - Institute for Energy Studies
178. Mechanical Contractors Association of Canada
179. Merit National
180. Metro Vancouver Regional District
181. Mosaic Company
182. Municipal Finance Officers' Association of Ontario
183. Municipal Natural Assets Initiative
184. NAIMA Canada
185. National Coalition of Chiefs
186. National Trade Contractors Council of Canada
187. Nature Canada

188. Nature Québec
189. NeeStaNan Utility Corridor Proponents
190. Network for the Advancement of Black Communities
191. Nick's Island Dyking District
192. North Salt Spring Waterworks District
193. Northwest Territories & Nunavut Chamber of Mines
194. Northwest Territories Association of Communities
195. Nova Scotia Community College
196. Nunavut Tunngavik Incorporated
197. Oakvillegreen Conservation Association
198. Oceans North
199. Okanagan Falls Irrigation District
200. OMERS
201. Ontario Association of Landscape Architects
202. Ontario Environment Industry Association
203. Ontario Federation of Indigenous Friendship Centres
204. Ontario Good Roads Association
205. Ontario Nature
206. Ontario Power Generation
207. Ontario Recreation Facilities Association
208. Ontario Regional and Single Tier Treasurers
209. Ontario Road Safety Infrastructure Coalition
210. Ontario Sewer and Watermain Construction Association
211. Ontario Society of Professional Engineers
212. Ontario Waste Management Association
213. Osoyoos Irrigation District
214. Park People
215. Partners for Action, University of Waterloo
216. Passive House Canada
217. Peak Power Inc.
218. Pineview Improvement District
219. Plenary Americas
220. Polytechnics Canada
221. Polytechnique Montréal
222. Possibilian Ventures
223. Power Workers' Union
224. Prince Rupert Port Authority
225. Priority Decision Data Inc.
226. Progressive Contractors Association of Canada
227. Purpose
228. Qikiqtani Inuit Association
229. Quantum-Safe Canada
230. Québec Vert
231. Queen's University
232. Rain Gardens United
233. REALPAC
234. Regional Municipality of York
235. Regional Public Works Commissioners of Ontario
236. Renewable Cities
237. Residential and Civil Construction Alliance of Ontario
238. Rick Hansen Foundation
239. Royal Architectural Institute of Canada
240. Ruesécure
241. Rural Municipalities of Alberta
242. Ryerson University
243. s2e Technologies
244. Saskatchewan Association of Rural Municipalities
245. Saskatchewan Mining Association
246. Scarborough Transit Action
247. Sharc Energy Systems
248. Simon Fraser University: Renewable Cities
249. Sitka Foundation
250. Skaha Estates Improvement District
251. Small Change Fund
252. SNC-Lavalin

253. Southern Alberta Institute of Technology
254. Stantec
255. Sterasure
256. Sun Life
257. Surrey Board of Trade
258. Tamarack Institute for Community Engagement
259. TC Energy
260. Teck
261. Telesat
262. TELUS
263. The Calgary Airport Authority
264. The Institute of Asset Management (IAM) Canada
265. The TechKnowledgey Group
266. Toronto and Region Conservation Authorities
267. Toronto Foundation
268. Toronto Region Board of Trade
269. Town of Devon
270. Trails BC
271. TransLink
272. Tridel
273. Trottier Foundation
274. U15 Group of Canadian Research Universities
275. Unflood Ontario
276. Union of British Columbia Municipalities
277. United Way Centraide Canada
278. Université du Québec en Outaouais
279. Universities Canada
280. University of British Columbia
281. University of New Brunswick
282. University of Saskatchewan
283. University of Toronto Transportation Research Institute
284. University of Victoria
285. Vancouver Foundation
286. VCT Group
287. Vélo Canada Bikes
288. Waste Management Association of BC
289. Waterpower Canada
290. Watershed Watch Salmon Society
291. Western Canada Roadbuilders & Heavy Construction Association
292. Western Canadian Short Line Railway Association
293. Western Energy Corridor
294. Wilfrid Laurier University
295. Winnipeg Boldness Project
296. Winnipeg Metropolitan Region
297. WSP
298. York University
299 - 310:

    In addition to this list of organizations, 12 individuals signed or co-signed engagement submissions. Names are not listed for privacy reasons.