ONTARIO 360 – STRATEGIC INFRASTRUCTURE – TRANSITION BRIEFING

Innovative infrastructure for the economy of the future

Issue: Lack of public infrastructure reduces Ontario's productivity

For most people and businesses in Ontario, the province's infrastructure deficit is not news. Ontarians are acutely aware of the congestion that plagues many of our transportation arteries and the all-too-frequent maintenance issues that make Toronto's aging subway system less reliable. Businesses also face traffic delays that increase costs, and often cite high electricity rates as an impediment to growth. But what may come as a surprise to many is that Ontario has the lowest stock of infrastructure per worker among Canadian provinces, and the composition of Ontario's infrastructure is the least favourable to enhancing labour productivity among Canadian provinces.[1]

This historical underinvestment in infrastructure in Ontario can be turned into an opportunity. Rather than paving more roads and expanding sewage and power grids, Ontario could leapfrog a generation of infrastructure technology and invest strategically in new, smarter, greener and more efficient infrastructure for the economy of the future. While some of the foundational elements for this strategic investment are already in place, seizing this opportunity will require political leadership that engages public attitudes, private capital, universities and the entrepreneurial community.

Overview: What is being done about the infrastructure deficit?

Through the 1980s and 1990s, the stock of infrastructure as a percentage of GDP in Canada and Ontario fell, with Ontario's stock relative to the size of its economy systematically lagging behind Canada's.[2] The consequence of three decades of underinvestment is that Canada has an infrastructure deficit and

[1] Institute for Competitiveness and Prosperity. *Better foundations: The returns on infrastructure investment in Ontario*. September 2015. https://www.competeprosper.ca/work/working-papers/better-foundations-the-returns-on-infrastructure-investment-in-ontario

[2] Institute for Competitiveness and Prosperity. *Better foundations: The returns on infrastructure investment in Ontario*. September 2015. https://www.competeprosper.ca/work/working-papers/better-foundations-the-returns-on-infrastructure-investment-in-ontario

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Ontario is leading the way. There are a range of estimates of Canada's and Ontario's infrastructure deficits, but what they all have in common is that they are large. The Canadian Chamber of Commerce, for example, estimates Canada's infrastructure gap at between $50 and $570 billion.[3] The Ontario Chamber of Commerce estimates that at least $19 billion is needed to rehabilitate existing public infrastructure in Ontario, with future expansion and replacement costs pegged at $6-7 billion annually.[4]

Fortunately, a couple of foundational elements to redress this gap are now emerging.

First, after three decades of underinvestment in infrastructure, recent Ontario budgets have increased the commitment to infrastructure investment, and Ontario's stock of infrastructure is now rising as a percentage of GDP. [5] This is addressing some of the most serious and immediate infrastructure needs.

Second, the federal government has launched a new Infrastructure Bank. If done right, this will provide a hub of first-class talent in project evaluation, infrastructure finance and project execution. It will also provide new public capital that could partner with provincial capital, and, importantly, it provides a vehicle to leverage private capital to supplement limited public resources.

The need for reform

Canada has some of the world's most diverse, safe and livable cities but to capitalize of this advantage, we must address congestion. Toronto is now among North America's most congested cities.[6] We need to ensure that we have multi-modal transportation networks to move people, goods and services efficiently within and beyond our cities.

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[3] The Canadian Chamber of Commerce. *The Foundations of a Competitive Canada*. December 2013. http://www.chamber.ca/media/blog/131218-The-Foundations-of-a-Competitive-Canada/131218_The_Foundations_of_a_Competitive_Canada.pdf

[4] Ontario Chamber of Commerce. *Building Better: Setting up the Next Ontario Long-Term Infrastructure Plan for Success*. August 2017. http://www.occ.ca/wp-content/uploads/Building-Better-Aug-23-1.pdf

[5] Institute for Competitiveness and Prosperity. *Ontario Budget 2018: Investments in future productivity come with risk*. March 29, 2018. https://www.competeprosper.ca/blog/ontario-budget-2018-investments-in-future-productivity-come-with-risk

[6] TomTom Traffic Index. *Measuring Congestion Worldwide*. 2017. https://www.tomtom.com/en_gb/trafficindex/list?citySize=LARGE&continent=NA&country=ALL

As a country and as a province, we rely heavily on trade, but to grow our international markets we need to be able to deliver our exports to these markets. This requires investment in gateway transportation infrastructure to the United States as well as east and west across Canada and into global markets. Estimates for Ontario based on historical data suggest that investments in marine gateway transportation networks such as ports and waterways have large economic and productivity multipliers.[7]

This new infrastructure should also support innovation and look to the economy of the future. Increasingly, commerce, entertainment and education happen online, putting a premium on fast, inexpensive and ubiquitous broadband. Transportation is and will be increasingly transformed by electric, driver assisted and ultimately autonomous vehicles. We need to be at the vanguard of this transformation. This includes smart transportation infrastructure that communicates with vehicles to improve traffic flow, makes our roads safer, and reduces green house gas emissions. In waste management, science-based innovations are finding new ways to treat waste at lower cost, with less water and energy. The potential of new battery storage technologies, solar energy and other renewables, as well as smart energy management, all require a deep rethink of energy networks and distribution, and the investment and business models required to support greater energy efficiency.

How to move forward

Ontario has an opportunity to embrace investment in strategic infrastructure that leverages next-generation technologies to drive productivity growth and raise the standard of living of Ontarians. Some of the foundational elements are now in place, but embracing the opportunity to invest successfully in innovative infrastructure will require at least three additional elements.

First, investing necessitates making difficult choices, and this will require a clear policy anchor, an operational metric to assess economic value, a willingness to charge users for infrastructure services, and the fiscal discipline to use debt finance only when the economic returns exceed the cost of borrowing.

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[7] Institute for Competitiveness and Prosperity. *Better foundations: The returns on infrastructure investment in Ontario*. September 2015. https://www.competeprosper.ca/work/working-papers/better-foundations-the-returns-on-infrastructure-investment-in-ontario

The policy focus should be medium-to-long-run productivity growth -- measured as gross domestic product per worker. The primary criterion for strategic-infrastructure proposals should be whether they are of the scale and scope to raise productivity levels.

The simplest and clearest operational metric to identify strategic infrastructure would be its ability to generate future revenue streams. This requires a willingness to measure, meter and charge households and businesses for the service provided by the infrastructure. Fortunately, the outputs of most strategic infrastructure investments are already measurable and new low-cost sensors combined with vastly less expensive analytic capacity are rapidly expanding what we can measure.

When businesses and households value the service provided by the infrastructure, they should be willing to pay for the service through freight, electricity, broadband, water rates, transit fares and road tolls. These revenue streams provide a ready litmus test of the economic value of the project. Revenue streams that exceed the cost of borrowing provide a rational for debt finance by the public sector and are also more likely to attract private capital.

Second, investing in the scale of strategic infrastructure investments needed to achieve the productivity growth objective will require leveraging private capital. Fortunately, private capital is a willing partner when the infrastructure generates a direct revenue stream, the risk-return calculus is attractive, and there is a commitment to scale with a pipeline of projects.

The public sector will, in many cases, still need to take the lead on greenfield infrastructure projects because difficult-to-manage political and regulatory uncertainties will scare off private capital. Nonetheless, greenfield projects should include a rigorous assessment of the potential revenue stream. This is needed both to assess the economic value of the project and to create the conditions for future recycling to the private sector.

Asset recycling through the sale or lease of existing assets has the potential to substantially increase the overall stock of infrastructure. Existing infrastructure is attractive to private capital because it is less risky than greenfield investments and the private sector has the managerial expertise to operate it successfully and raise efficiency. However, to achieve the scale to be of interest to private capital, many municipal assets will need to be bundled into

larger and more diversified portfolios.[8] For example, investments in innovative, cleaner and more efficient waste management systems are beyond the capacity of most individual municipalities and the investments required are too small to attract large investors. The federal and provincial governments, however, could provide incentives for municipalities to work together and bundle waste management systems to achieve the scale required to attract pools of private capital.

Third, there needs to be a willingness to innovate, to try new modes of service delivery, to embrace new technologies, and experiment with new business models. This will require a new partnership between government, the private sector, the science community, universities and entrepreneurs. This includes a regulatory environment that protects consumers while embracing pilots and trials to test new technologies. Governments will also need to engage in new ways, such as fostering competitions to solve our most pressing infrastructure problems, and providing scope within the procurement system for innovative solutions and new players. Universities need to promote more interdisciplinary thinking to provide integrated solutions to multifaceted infrastructure challenges, and the entrepreneurial community needs to work with scientists to convert new inventions into commercial solutions.

The seeds of a more innovative and entrepreneurial approach to infrastructure are being planted within Ontario's science, business and policy communities. Ontario has permitted on-road testing of autonomous vehicles since 2016 and has a proposal out for comment to allow for fully driverless vehicle testing. The Sidewalk Toronto project in collaboration with Google provides a working lab combining urban design and digital technology to create more connected, sustainable and affordable communities.

The University of Toronto's focus on cities is fostering the interdisciplinary thinking required across multiple disciplines—engineering, the hard sciences, the social sciences, law, business, architecture and the arts—to build cities that will drive inclusive growth and innovation here in Ontario and beyond. The Creative Destruction Lab at the Rotman School of Management is launching a new infrastructure stream as part of its program for science-based ventures to support companies that aim to improve quality of life and resource utilization in urban environments. This program aims to scale innovative hardware and AI start-ups by leveraging partnerships with local and international urban

[8] The Canadian Council for Public-Private Partnerships and S&P Global. *P3 Project Bundling Roundtable Briefing*. October 4, 2017. http://www.pppcouncil.ca/web/pdf/briefing-paper-p3-bundling.pdf

planning experts, real estate development corporations, scientists and investors. Governments, businesses and universities need to foster this spirit of innovation and build on these initiatives.

Investments in innovative infrastructure that is aligned with growth will not just happen. This will require a clear policy objective and metric of success, the willingness and ability to charge users for infrastructure services, an institutional structure with the credibility and expertise to leverage private capital, and a spirit of innovation to consider new ways to deliver the services we have and new services for the economy of the future.

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