The Future of Infrastructure in Ontario's Municipalities

A call to rethink the way we plan for, fund and make decisions about the assets we will depend on for decades to come

By Michael Fenn, Fenn Advisory Services

The future of infrastructure in Ontario municipalities looks a lot brighter after the Wynne government's budget pledge of $130 billion over 10 years. But we need to choose the "right" infrastructure and to build it right. We need to build it using long-term, forward-thinking financial instruments and tax policies. To overcome short-term thinking, governments at all levels will also need to adopt more integrated decision-making models, better asset management practices and to work collaboratively.

The Residential and Civil Construction Alliance of Ontario (RCCAO), which represents Ontario's construction industry and construction unions, recently released a report looking at infrastructure into the year 2030. The report, *Building Our Tomorrow: The Future of Ontario's Infrastructure*, addresses how major trends or movements – so-called "megatrends" – and the rise of new infrastructure will affect Ontario's communities over the next 15 years.

To position the province properly for prosperity, we need to identify the key megatrends that will change our communities and then design and build infrastructure with these ideas in mind. These megatrends include, obviously, the pace and scale of technological change, but also energy and environmental impacts; impending economic and workforce changes; demographic changes – both at home, like aging, and abroad, like economic migration; the local effects of globalization, connectivity and urbanization; and, of course, the political and fiscal responses to these developments.

What should our municipal and provincial leaders be doing now to anticipate that rapidly changing world? Will societal trends and new technologies render some infrastructure unnecessary or misdirected, or open the door to different solutions?

Big decisions = big implications

Infrastructure decisions are both big decisions and long-term decisions. In a constrained fiscal environment, we must build the right infrastructure. Good infrastructure decisions pay dividends for generations. But short-sighted infrastructure decisions can burden us for decades.

A few prerequisites are required in order to make the "right" infrastructure decisions: (1) a clear-sighted economic development strategy; (2) high-priority, focused, evidenced-based decision-making from our municipal, provincial and federal governments; and (3) strong partnerships with industry and civil society. Our society and governments will need to respond more quickly and think differently about infrastructure than we have in the past. Remember the practical advice of Walter Gretzky to his son Wayne: "Don't skate to the puck. Skate to where the puck is going to be."

A great example of such innovative infrastructure planning occurred almost a century ago. When Toronto's first Bloor-Danforth subway opened in 1966, it saved money and construction time using infrastructure built under the Bloor Viaduct in 1918 for a subway that didn't exist and wasn't planned. The moral of this story: today's infrastructure seems expensive, but yesterday's infrastructure seems like a prudent investment. Today, rapid bridge replacement programs, like the Carling Bridge in Ottawa and the Aberdeen Bridge in Hamilton, demonstrate the same ingenuity.

To understand the changes we might see in the next 15 years, think back. Fifteen years ago, the iPhone did not exist, nor did Twitter or Facebook; 9/11 had not happened; only 11 per cent of people in developed countries used the Internet (now it's 45 per cent of China and 250 million in India). Apple stock had fallen to two dollars per share, but Blockbuster was a good investment because everyone needed to rent VHS movies.

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THE FUTURE OF INFRASTRUCTURE

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What are these megatrends?

Technological trends and the pace of technological change

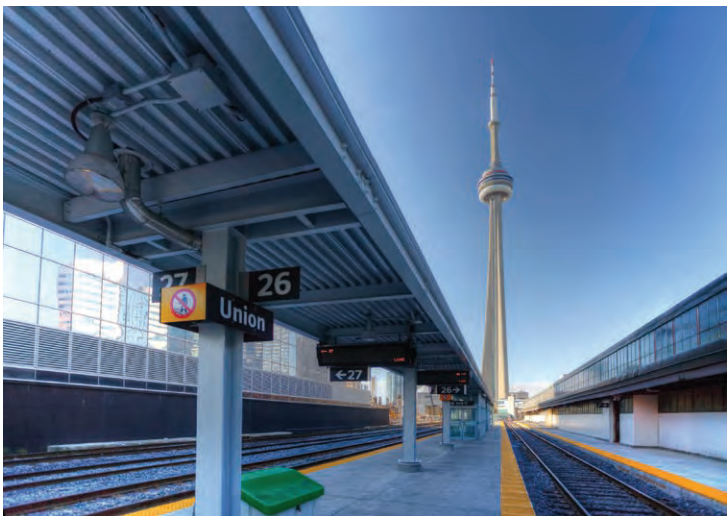
Infrastructure is, at its heart, technology. As a result, technology trends will most conspicuously affect infrastructure. Recent trends in technology in all fields have taught us a common lesson: many of our conventional assumptions and established practices can be swept away in a very short period of time by the advance of new technology and the public's embrace of it.

Advanced transportation technology will combine to change the look of our suburbs, urban cores, countryside and the transportation and energy infrastructure that serves them.

Consider the infrastructure impacts of emerging technologies:

1. "Driverless" vehicles
2. Swedish-inspired road fatality reduction programs
3. Fully automated transit systems with generic, world-standard designs and equipment
4. Re-engineered road-intersections, cycling, pedestrian and parking arrangements
5. More efficient and flexible modes of local public transit, school transportation and inter-urban trains
6. Mobility "hubs", like Madrid's intercambiadores
7. Widespread and more efficient mobility-assisting transportation designs
8. Commercial use of drones and localized logistics for Internet-based goods-delivery "fulfillment"
9. Very low energy-consumption vehicles and long-charge electric cars; and
10. Entirely new types of personal vehicles, business vehicles and transit systems addressing the issues of "the first/last 400 metres," customization of routing, "urban market" business-support vehicles and multi-modal connectivity

Future transportation infrastructure can give us faster and less congested trips, enabling long-distance commuting and dependable logistics. Broad-based acceptance of innovations – automated vehicle control, driver-assisted vehicles, road-pricing regimes, in-vehicle technology for distance-separation and collision-avoidance, expressway system-access controls, drone technology, vehicle-and-ride sharing, computer-aided logistics and dispatch, high-speed trains and a renaissance in water transport – will combine to revolutionize Ontario's transportation system.



A similar renaissance is occurring in rapid transit and public transit. Platform-side doors and automated train control in rapid transit and time-of-day and distance-sensitive, universally accepted, bank-linked, multi-purpose fare media will increase throughput and reduce congestion, despite increasing passenger volumes. Fare media will also be used for parking and convenience incidentals, like coffee and lottery tickets. As an appendix in the report notes, whether driver-assisted and automated cars will be positive or negative depends upon how these developments unfold and the extent to which municipal and provincial governments act proactively to plan and manage them, through regulatory and other means.

Social and demographic trends

As demographers have pointed out, since the "baby boom" generation learned to walk, Ontario's patterns of social demands (and related infrastructure demands) can be tracked closely to the annual aging of the post-war demographic cohort. As elementary and secondary schools built decades ago for boomers and their children progressively empty, facilities for the frail elderly are in great demand, with someone in North America turning age 65 every seven seconds. Suburbs designed for families need to be re-engineered to deal with changing housing and mobility needs and the advent of new transportation technology.

Environmental and energy trends

Sanitary sewers and storm water drainage systems, which were once adequate to face the "hundred-year storm", are increasingly incapable of withstanding periodic extreme weather events. Water quality and availability are emerging as major issues across North America and around the globe. Environmental impacts are motivating the Gates Foundation to offer rewards for re-inventing sewage systems and household toilets.

Energy infrastructure will be under increasing demands from burgeoning electronic communications and electricity-powered transportation, with "pinch-points" in transmission and increasing demands for higher (millisecond) tolerances in electricity stability. Technological progress and rising electricity costs will also give rise to a wave of localized micro-generation, from inexpensive rooftop solar generators to district heating and cooling systems.

Political and fiscal trends

At the fulcrum of all of these trends lie government and the public purse. How will these megatrends affect those charged with the responsibility for leading change and mitigating its impacts? In a constrained fiscal environment of capital rationing, with a huge overhang of (for now) inexpensively financed debt, governments have another challenge. Infrastructure must be well chosen.

Government tax regimes associated with physical assets, fixed-location

retailing, local transactions and corporate head offices will need to adjust to new economic models. This is especially true for municipal governments, which build and operate much of our basic public infrastructure using property taxes, utility rates, transfer payments and development charges.

What principles should guide municipalities?

Going into the future, over the next three municipal council terms, there are baseline assumptions or "guiding principles" we need to respect:

- Distances, scale and elapsed times will shrink; in all areas, just as they have in communications
- Functions will converge and margins of all kinds will be squeezed
- Individual customization will be both possible – and expected
- As we said earlier, global impacts will become local impacts, especially climate change effects, like more frequent extreme weather events
- Demographics will change our priorities
- Customer choice and preferences will determine our urban designs and planning
- But, we will also be plagued with short-term thinking and resistance to necessary change

What will this mean to municipalities and the communities that they serve?

With the convergence of miniaturization, pre-constructed components and new building materials and processes, the infrastructure of tomorrow will include more "light infrastructure." It will have a shorter life expectancy, new materials and designs, more capacity to be adjusted to meet changing, demographics, economics or use-patterns, along with a lower community impact and price tag.

In areas like transportation, new technologies, processes and designs may make long-distance commuting practical, predictable and cheap. By increasing throughput, we may see less severe congestion in areas like the Greater Toronto Area and Ottawa – and a revolution in everything from logistics and goods movement to land-use planning and community building across southern Ontario.

The bricks-and-mortar side of health care delivery and post-secondary education will be less important than technologically-enabled service delivery of all kinds, from care of chronic disease in the home and community, to the world's best scholars and teachers being available to you in your home or on your wrist. But we will need the new infrastructure to make all this possible.

The study's approach has not been to try to use a crystal ball. Realistically, we cannot predict the direction of infrastructure with great accuracy, nor can we anticipate all the spin-off effects that might be generated by new technology. But we can provide a telescope and a compass, in the form of practical guiding principles to better anticipate, prepare and seize opportunities early on and with more confidence. Of equal importance, an awareness of big trends can help us preempt, deflect or mitigate the avoidable risks and misdirection.

Above all, we need to have the right framework for making Ontario's infrastructure decisions. Among other recommendations, the report suggests these ingredients for a "future of infrastructure" strategy for the Ontario government:

1. Make infrastructure investment decisions based on an understanding of megatrends and using the most sustainable and forward-looking financial instruments and tax policies
2. Develop a future-oriented economic development and infrastructure strategy
3. A new, integrated decision-making structure for infrastructure decisions by the Ontario government and its partners
4. A suite of infrastructure innovation grant funds to promote future-oriented infrastructure investment and evidence-based benchmarking, in collaboration with municipalities, Aboriginal communities and private-sector firms, to address identified local challenges
5. Create an Ontario Future Council, focused on the future of Ontario's infrastructure, to give all of civil society – not just governments – a voice on these crucial issues

Overall, the report concludes that our civil society leaders must keep the future in view when making today's decisions. But we can't just leave it to the leaders, as we have in the past. We need to take an all-encompassing approach to policy-making that involves everyone.

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To read the full *Building Our Tomorrow: The Future of Ontario's Infrastructure* report, please visit: www.rccao.com/news/files/RCCAO_Future-of-Infrastructure_Sept2015.pdf