The Connected City — Autonomous and Connected Vehicles and the Future of Living

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Autonomous vehicles will change the way we live, work and commute into and out of cities. Traffic flows and patterns will be better managed. Roadways and streetscapes will be redesigned. They will be safer. Parking lots and garages will be repurposed. Waste services will change. Our future cities will look nothing like they do today.

And the transition is already underway:

- The University of Michigan has created Mcity, a micro-city allowing for simulated and suburban driving environments for AVs and connected vehicles;
- At the end of 2016, Audi began testing V2I technology in Las Vegas in which vehicles receive real-time signal information from the advanced, traffic-management system that monitors traffic lights via the on-board, 4G-LTE-data connection. When approaching a connected traffic light, the time remaining until the signal changes is displayed in the driver instrument cluster.
- General Motors began testing similar technology in 2017, and
- Also in 2017, a 35-mile stretch of Ohio's Route 33 was lined with fiber-optic cable and short-range radio transmitters, with testing along the AV-ready-highway expected to commence in the summer of 2018./li>

In Canada there is currently no federal or provincial legislation or guidance for municipalities to follow with respect to AVs or V2V and V2I communications. While **Ontario and Québec have introduced autonomous vehicle pilot programs, these are** focused on the early stages of AV testing and not on the important relationships that cities and municipalities will have in utilizing related technologies. Transport Canada too has been silent.

This gap was recognized by the Standing Senate Committee on Transport and Communications, which, on January 29, 2018, delivered its report on the regulatory and **technical issues related to the deployment of AVs and connected vehicles – "Driving Change: Technology and the Future of the Automated Vehicle." The report highlights** the fact that these vehicles are set to impact infrastructure and transportation planning, urban sprawl, land use, and public transit. Accordingly, in Recommendation 2, the Senate Standing Committee recommended that:

"…Transport Canada engage with provincial and territorial governments, through the Canadian Council of Motor Transport Administrators, to develop a model provincial policy for the use of automated and connected vehicles on public roads. The department should also involve municipalities in this engagement process."

Despite the lack of policy guidance, cities like Toronto, Ottawa, Edmonton and Calgary have already begun preparing for AV and CV technologies. In June of 2016, Toronto formed a staff interdivisional working group to collaborate on AV efforts. Toronto is the first city to devote full-time staff to AVs, and is in the midst of a Three-Year Automated Vehicles Work Plan which will direct further investigations into the role that AVs will play within its transportation system and wider City planning. On November 20, 2017, Toronto also announced that it was partnering with the popular navigation app Waze to share real-time data to help drivers get around the city. The two-way partnership means that the City will share its traffic data, including road closures, events, construction and other incidents with Waze, while the app will share its community-generated traffic data with the City.

Ottawa, Edmonton and Calgary have also all begun to test autonomous buses. With the high cost of the technology behind autonomous vehicles likely prohibitive of private-passenger for some time to come, we are likely to see AVs first deployed at the fleet level and as part of ride-sharing platforms. For example, in 2017, Uber Technologies Inc. partnered with the Town of Innisfil to become Canada's first ridesharing and transit partnership. After experiencing the expense and inefficiency of fixed-route buses, Innisfil determined that it was more affordable and reliable to subsidize on-demand transit service. In April of 2018, Innisfil announced an expansion of its ride-hailing program which was purported to have saved the town more than $8 million in the first year alone.

AVs are expected to take market share from traditional fixed-route/fixed-schedule municipal transit. There is the potential to connect those who live in areas that are currently under- or un-served by municipal transit. Furthermore, mobility continues to be an issue for Canada's growing aging demographic. Improving access to transportation – both geographical and economically – may enhance the quality of life for the 11 percent of Canadians that have a disability.

A fundamental shift in municipal policy and planning for public transportation, infrastructure, and parking will be required in order to accommodate and leverage the full use and benefits of AVs. Although these vehicles will be able to navigate within existing infrastructure, significant upgrades will be required to maximize the use of the technology. This may include the development of connected traffic signals, increased Wi-Fi connectivity and telecommunications, charging networks and municipal infrastructure capable of processing high volumes of data. These upgrades will require significant spending on V2I technology. To fund these large expenditures, cities will have to collaborate and partner with the automotive and technology players. Ownership, use and management of the data will be complex.

The staggering amount of data generated from V2V and V2I communications will only accelerate the pace of change in our cities. It will also bring increased concerns about privacy and the security of the data and threats of cyber-attacks.

But before AVs can be connected to our cities, governments at all levels will have to jointly determine how the opportunities and challenges of the technologies might best be

addressed. Unified and cohesive public policy towards the development of an architecture for V2V and V2I communications will be necessary for the full deployment of truly autonomous vehicles and smart cities.

By

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