

## Rise of automated vehicles influences infrastructure project selection

November 22, 2016 by **Bern Grush**



The rise of automated vehicles (AVs) will create opportunities for infrastructure across Canada but project selection must be rigorous as we cope with two overlapping and competing streams of automation.

The first stream: Semi-automated vehicles (2020-2035) will require a driver and will have a relatively strong start with high volumes of mostly personally owned vehicles in the initial AV period.

The second: Fully automated vehicles (2020-2050) will see drivers replaced by remote monitoring. Although these will arrive at the same time as semi-automated vehicles, the volumes will be far lower and will be limited, public-service applications such as local area robo-taxis and first/last mile robo-shuttles. Such fully driverless AVs will not become a common mode of personal and goods transportation until the mid-2030s, and likely will take a further decade before dominating the transportation landscape.

As these two automation modes mature, semi-automated has a critical initial market advantage that will sustain personal car ownership and use. These vehicles will compete for road space with non-automated cars, trucks and transit (what you're driving or riding in now); early robo-taxis and robo-shuttles; as well as cyclists and pedestrians.

As semi-automated driving trends toward greater convenience and affordability, more drivers will work, read and relax while commuting. This will encourage more outward urban growth, with a combination of intensification projects and new construction at sites farther from urban centres.

For infrastructure, this means that during the first 20 AV years, parking demand and traffic congestion around larger urban centres will trend upward.

However, this will reverse during the second phase of automation — after the mid-2030s. As fully driverless systems expand, significantly fewer people will want to own a car. It's expected that each fully automated car — supplied by governments and private companies as robo-taxis and robo-shuttles — will take at least four cars off the road, decreasing parking demand and traffic congestion.

Repurposing of parking garages and surface lots will be delayed during the first phase. Developers – especially those in the commercial and multi-residential markets – will be wary about providing too much parking, especially since the investment in underground parking can be expected to have increasingly shorter return-on-investment opportunities. Expect to see shrinking of parking minimums and parking construction that is more temporary or that can be readily repurposed.

As personal, semi-automated vehicles are driven greater average distances, expect increased congestion. In a region such as the Greater Toronto and Hamilton Area (GTHA) where 100,000 new residents arrive each year, or smaller cities with populations of 100,000 or more – such as Coquitlam, B.C. – semi-automation will contribute to an initial increase in private car use.

Of course, there are other factors that will influence congestion. In the GTHA, new transit will reduce car use and transportation demand management measures (e.g., toll lanes) will relieve congestion temporarily or in certain corridors. But the availability of increasingly better semi-automated, personal vehicles and the limited range of early driverless systems will result in a preference for personal vehicle ownership in the near term.

One challenge will be to plan and construct alternative public, shared or active transportation systems that increasingly rely on driverless AVs in the form of robo-transit.

In their early years, driverless taxis and shuttles will be suitable for use only in limited circumstances. Because of constraints on speed and place of initial operations – and regulations – driverless AVs will initially account for far fewer passenger kilometres travelled than self-driving vehicles. It is this slower adoption of automated transit that the report [“Ontario Must Prepare for Vehicle Automation”](#) points to when it asserts “congestion will get worse before it gets better.”

As robo-transit and robo-taxi systems become more widely deployed and hence suitable to more users, the ownership of non-automated and semi-automated cars will decline. Only then can congestion and parking demands be substantially reduced. During this phase, in full swing by the mid-2030s, we will see parking facilities re-purposed and the reconfiguration of municipal lanes, bike lanes and sidewalks. Some of these changes – especially related to road re-configuration – should be evident in earlier first/last mile and related projects.

There will be numerous ongoing infrastructure project decisions – many of which will require forward-looking construction teams to work closely with governments – as we go through these two competing phases. On a concluding note of caution, it is imperative that we consider that some changes made in the first 20 years of AVs will be followed by more disruptive changes in the 20 years after that. Urban planners/designers and engineers won’t be short of work.

*Bern Grush is a principal with the automated vehicle consultancy Grush Niles Strategic (Toronto and Seattle). Grush is the author of the report [“Ontario Must Prepare for Vehicle Automation,”](#) commissioned by the **Residential and Civil Construction Alliance of Ontario**.*