Applying Behavioural Insights to Reduce Commuting Emissions

Research Report

Prepared by the Behavioural Insights Team (BIT) for Environment and Climate Change Canada (ECCC)

THE BEHAVIOURAL INSIGHTS TEAM

This project was undertaken with the financial support of:
Ce projet a été réalisé avec l'appui financier de :

Environment and Climate Change Canada | Environnement et Changement climatique Canada

1. Executive Summary

Transportation is the second largest source of greenhouse gas (GHG) emissions in Canada.[1] Reducing emissions from commuting can play a key role in ensuring a clean, safe, and sustainable environment for present and future generations. Though many Canadians would like to reduce their carbon footprint through more sustainable commuting, they face significant barriers in doing so.[2] Structural barriers, such as the availability of public transit, limit commuting options and promote single occupancy driving. Even when reasonable options do exist, there are cognitive barriers, like the tendency to stick with the status quo, that stand in the way of making sustainable commuting choices. Commuting behaviours are particularly difficult to change because of how deeply entrenched these habits are.

However, COVID-19 has created a disruption in commuting habits, presenting a promising yet fleeting opportunity to encourage new, more sustainable, choices as we recover from the pandemic. Teleworking, which eliminates commuting altogether, has increased dramatically and survey data suggest potential for this change to persist. Though we have seen a reduction in the number of people commuting by car over the course of the pandemic, driving remains, by far, the most common mode of commuting. Transit use, on the other hand, plummeted, and health and safety concerns pose a threat to recovery in ridership.

Environment and Climate Change Canada (ECCC) engaged the Behavioural Insights Team (BIT) to conduct research and provide a deeper understanding of these commuting trends and to identify promising, evidence-based approaches to helping Canadians adopt more sustainable commuting behaviours as we recover from COVID-19. This work is part of ECCC's broader Green Economic Recovery policy work.

In this report, we recommend approaches that the Government of Canada may be able to implement through its own policies and programs, in its role as an employer, or through its funding capacity. We developed these recommendations based on a review of commuting data, a scan of relevant behavioural science literature, and consultations with academic experts and relevant government departments.

First, we propose ways to apply a behavioural science lens to certain large-scale policy levers (e.g., policies, programs, and transfers). Most of these ideas build on existing Government of Canada initiatives.

Recommendations to apply behavioural science to large-scale policy levers

- Leverage infrastructure investment processes to encourage municipal and regional actors to develop more effective strategies for modal shift (e.g., from private vehicle to public transit).
- Incentivize vehicle manufacturers to produce and promote EVs over combustion vehicles to help commuters reduce emissions without needing to change their commuting habits.

[1] Environment and Climate Change Canada. (2021). *Canadian environmental sustainability indicators: Greenhouse gas emissions.*

[2] Plotnikoff, R. C., Wright, M., & Karunamuni, N. (2004). Knowledge, attitudes and behaviours related to climate change in Alberta, Canada: implications for public health policy and practice. *International Journal of Environmental Health Research, 14*(3), 223-229.

- Make EV charging stations attention-grabbing (salient) and convenient to help address “range anxiety.”
- Support the development of models for road pricing that include psychological factors like “pain of paying” and share them with municipal and regional governments.
- Create or encourage programs that certify or provide a designation for workplaces that encourage low-emission commuting behaviours.
- More broadly, consistently integrate a behavioural science lens into the development and analysis of policies that impact transportation emissions.

Second, to address cognitive barriers to reducing commuting emissions, we propose complementary ideas for “nudging” commuting choices.

Recommendations to nudge commuting choices

Exploring new modes of commuting

- Provide personalized travel plans at transitional moments such as returning to the office, starting a new job, or moving homes.
- Run employee challenges to encourage people to try out commuting alternatives.
- Support adoption of contactless payment systems or other measures to increase ease of payment for public transit.
- Use behaviourally-informed communications to encourage employees to download mobile applications that make the reliability and convenience of public transit salient.

Returning to public transit

- Commission and share research on best practices for health risk communication in a public transit context.
- Subsidize time-limited free or discounted transit passes or tickets.

Maintaining teleworking post-pandemic

- Make hybrid working arrangements the default and prompt managers and employees to actively choose how time is split.
- Publicize the acceptance of hybrid working arrangements amongst managers.
- Nudge managers to take up new tools and training for performance management in a hybrid workplace.

Purchasing Zero Emission Vehicles (ZEVs)

- Encourage ZEV ownership through communications campaigns that leverage social norms.
- Support the development of a new price labelling standard that makes cost comparisons between ZEVs and combustion vehicles easier and more accurate.
- Use timely prompts to increase awareness and salience of ZEV incentives.

- Personalize information on the iZEV program website to help potential consumers choose a vehicle that meets their needs.

We suggest that ECCC work with its partners to assess and adapt these recommendations, prioritizing the time-sensitive recommendations that are tied to reopening plans.

2. Introduction

Project Context

Environment and Climate Change Canada (ECCC) has a mandate to ensure a clean, safe, and sustainable environment for present and future generations. The transportation sector poses a major threat to this vision. In 2019, it accounted for 25% of all GHG emissions in Canada – a 16% increase from 2005 levels.[3] Many Canadians support the idea of reducing their carbon footprint through climate-friendly transportation choices, but a variety of obstacles prevent them from moving from intention to action. Commuting choices, in particular, are complex habitual behaviours that are difficult to change. Large-scale and highly intertwined structural barriers such as the availability of public transit, land use planning, and limited road pricing restrict commuting options and promote driving. Individual cognitive barriers, like how deeply entrenched these habits are, limit the adoption of sustainable options where they are available.

Once people have formed a habit, such as driving to work every day, it is very difficult to deviate from that status quo to form new habits. The COVID-19 pandemic has disrupted many Canadians' commuting habits, offering a rare window of opportunity to encourage lasting behaviour change. For example, the proportion of the workforce teleworking increased from 4% pre-pandemic to 32% at the beginning of 2021.[4] Effective interventions may be able to help these changes stick and in doing so, reduce commuting-related GHG emissions. As part of a broader effort to support a Green Economic Recovery, ECCC engaged the Behavioural Insights Team (BIT) to identify promising, evidence-based approaches to help Canadians adopt and maintain more sustainable commuting behaviours as we recover from COVID-19.

This report applies a behavioural science lens to the design and implementation of large-scale policy levers that address structural barriers. It also additionally identifies complementary nudges[5] to address cognitive barriers limiting environmentally friendly commuting choices.

Project Approach

The scope of this project included:

- mapping the behaviours of key actors that could help reduce commuting emissions;
- describing trends in commuting behaviours over the course of the pandemic;

[3] Environment and Climate Change Canada. (2021). *Canadian environmental sustainability indicators: Greenhouse gas emissions*.

[4] Statistics Canada. (2021). Study: Working from home: Productivity and preferences. *The Daily*.

[5] Thaler and Sunstein, who coined the term, define a *nudge* as "any aspect of the choice architecture that alters people's behavior in a predictable way without forbidding any options or significantly changing their economic incentives:"

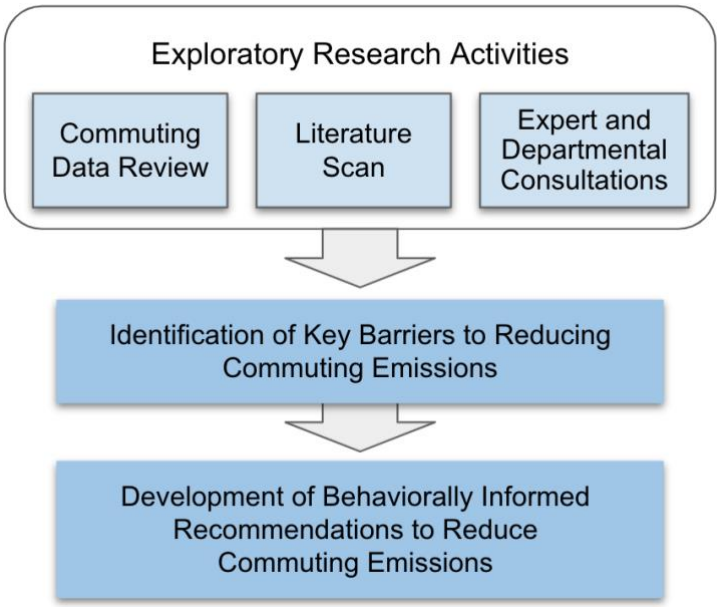
- identifying the structural and cognitive barriers to creating and sustaining environmentally-friendly commuting habits; and
- developing evidence-based recommendations to reduce commuting emissions in the months and years ahead.

We focused on approaches that the Government of Canada may be able to implement or otherwise encourage through its policies and programs, it's funding capacity, or in its role as Canada's largest employer.

To address these topics, we conducted a scan of relevant literature, a review of data on commuting behaviours, and consultations with academic experts and relevant government departments. We are grateful for the insights generated through consultations with representatives from Statistics Canada, Transport Canada, Infrastructure Canada, the Treasury Board Secretariat's Centre for Greening Government and Office of the Chief Human Resources Officer, Société de Transport de l'Outaouais as well as transport demand expert Dr. Khandker Nurul Habib (University of Toronto) and behavioural science expert Dr. Ariella Kristal (Harvard University). These exploratory research activities informed our identification of key barriers to reducing commuting emissions, based upon which we developed our recommendations.

A limitation of many behavioural interventions targeting commuting behaviours is that these have generally relied on self-reported survey data, focus groups, and correlational data. Further, the COVID-19 pandemic is a unique context; strategies and interventions that had not previously been effective may now work, and vice versa. Throughout our recommendations, we detail the evidence supporting different approaches and flag instances in which we believe that implementation in the context of COVID-19 recovery will lead to different results.

Figure 1 – Project Approach



The following sections present: how COVID-19 has impacted commuting in Canada (section 3); recommendations for applying behavioural insights to large-scale policy levers (section 4.1); proposed interventions to nudge commuting choices (section 4.2), and; considerations for next steps (section 5). It will be critical to consider equity implications in the implementation of these solutions to mitigate any differential impacts that could exacerbate inequalities.

3. The impact of COVID-19 on commuting

Overview of commuting trends in Canada

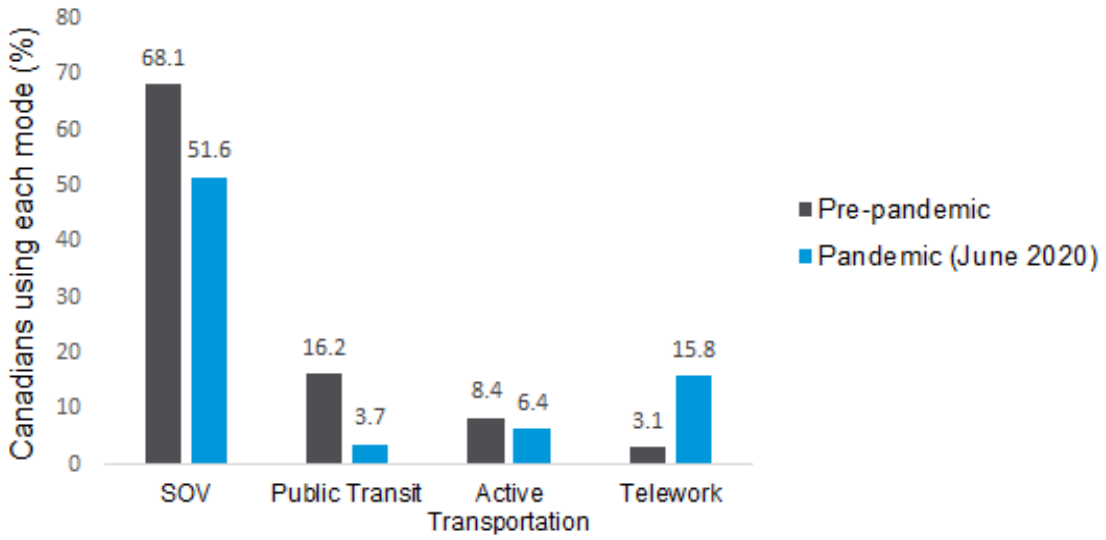
Prior to the pandemic, over 60% of workers in Canada's largest urban centres travelled more than 5 km to work, with a substantial minority traveling over 25 km to work (ranging from ~7 to 19%).[6] As distance from workers' jobs to city centres increase, the proportion of workers who commute primarily by car also increases. For instance, in Montréal in 2016, 90.9% of commuters who travelled more than 25 km drove to work, compared to only 35.9% of those within 5 km.[7]

Overall, most Canadians (~68%) drove personal motor vehicles to work or school.[8] About 16% took public transit, and 8.4% used active transportation, like biking (1.5%) or walking (~7%).[9] Data on carpooling is less clear, with estimates ranging from 3% to 12% of commuters in census metropolitan areas.[10,11] About 4% of Canadians worked remotely, or teleworked (with up to 14% working some hours from home).[12]

During the pandemic, many Canadians began to work from home or stopped working entirely, resulting in decreased commuting across all modes. However, there are different effects in the degree to which travel was reduced across modes – unfortunately, not always in ways that are beneficial to the environment. The largest decrease was among public transit users, many of whom switched to telework or to commuting by car. Despite a significant decrease, personal motor vehicles remained the most common way to commute. There is a concern that former car users will stick with, or return to, car use while past public transit users may form new lasting driving habits. On the other hand, efforts to maintain new levels of teleworking, which has increased from 4% to 32% as of January 2021, offer promise for reducing commuting-related GHG emissions long term.[13]

Figure 2 – Changes in Commuting During the Pandemic[14]

[6] Savage, K. (2019). *Results from the 2016 Census: Commuting within Canada's largest cities*. Statistics Canada.
[7] ibid
[8] Note: Some estimates run higher, see Savage & Turcott (2020); Harris, M. A., & Branion-Calles, M. (2021). Changes in commute mode attributed to COVID-19 risk in Canadian national survey data. *Findings*.
[9] Harris, M. A., & Branion-Calles, M. (2021). Changes in commute mode attributed to COVID-19 risk in Canadian national survey data. *Findings*.
[10] Statistics Canada. (2017). *Commuters using sustainable transportation in census metropolitan areas.*
[11] Harris, M. A., & Branion-Calles, M. (2021). Changes in commute mode attributed to COVID-19 risk in Canadian national survey data. *Findings*.
[12] Statistics Canada. (2021). Study: Working from home: Productivity and preferences. *The Daily*.
[13] Statistics Canada. (2021). Study: Working from home: Productivity and preferences. *The Daily*.
[14] Note: This excludes carpooling and respondents who reported "other".



Changes in commuting by personal motor vehicles

Personal motor vehicles continued to be the most common way of commuting for Canadians (51.8% of commuters, excluding teleworkers, in June 2020, down from 68.1% pre-pandemic).[15] The majority (84%) of people who commuted via personal motor vehicle had not switched to other modes of transportation, and most of the remainder had switched to telework rather than other modes of transportation.[16] Even this relatively modest drop had a large impact on congestion in highly urbanized regions. For instance, since the pandemic began in March 2020 Vancouver experienced a 47.2% decrease in morning rush hour traffic and a 34.9% decrease in the evening compared to 2019.[17] This is consistent with Canada-wide GPS data which showed that road congestion was lower than 2019 levels in all the cities that were analyzed.[18] In 2021, congestion has trended back toward pre-pandemic levels. For example, in January 2021 Vancouver's congestion was 31% below 2019 levels, but the gap had closed to 16% by May and about 14% in July.[19]

Changes in commuting via public transit

With the onset of lockdowns and widespread coverage of the pandemic in March 2020, public transit ridership (buses, trains, subways) dropped by 42% that month.[20] The downward trend continued with declines of over 80% in April and May.[21]

By June 2020, only 3.7% of workers were commuting via transit, down from 16%. Less than 20% of commuters who used transit before the pandemic continued to use it.[22,23] About 34%

---

[15] Harris, M. A., & Branion-Calles, M. (2021). Changes in commute mode attributed to COVID-19 risk in Canadian national survey data. *Findings*.
[16] Savage, K., & Turcotte, M. (2020). *Commuting to work during COVID-19*. Statistics Canada.
[17] TomTom. (2021). *Vancouver traffic.*
[18] TomTom. (2021). *Canada traffic.*
[19] TomTom. (2021). *Vancouver traffic.*
[20] Savage, K., & Turcotte, M. (2020). *Commuting to work during COVID-19*. Statistics Canada.
[21] Statistics Canada. (2021). Urban public transit, December 2020. *The Daily.*
[22] ibid
[23] Harris, M. A., & Branion-Calles, M. (2021). Changes in commute mode attributed to COVID-19 risk in Canadian national survey data. *Findings*.

of transit commuters switched to another mode of transportation, with the remainder (42%) teleworking[24] or losing their employment. Among the 34% who continued commuting, most used a personal motor vehicle (about 75%) and about 20% switched to active transportation. In a representative survey of the Greater Toronto Area, the proportion of commuters who switched from public transit to active transportation was much larger (almost 60%) and another 14% switched to car sharing or taxis.[25] The authors of this study highlighted the role that car ownership played in decisions to switch commuting modes, and noted that people with access to private cars left transit at higher rates and more often switched to driving.

Overall, the pandemic had a massive impact on use of public transit. By February 2021, Statistics Canada estimated that Canada's urban transit networks experienced a decrease of approximately 71% year over year, representing a decrease from 115.1 million trips.[26,27] Mobility trend data from Google reinforces the scale of this decline, estimating that traffic at public transit hubs, like bus stations, has decreased 54% from baseline (ranging from 26% in the Northwest Territories to 59% in Ontario).[28]

Changes in commuting via active transportation

Prior to the pandemic, 8.4% of Canadians commuted via active transportation modes.[29] Despite some former transit commuters switching to active transportation, data from June 2020 shows modest (but not statistically significant) declines in the proportion of Canadians walking (6.9% to 5.1%) and cycling (1.5% to 1.3%) to work.

Changes in teleworking

Statistics Canada estimates that about 39% of Canadians hold jobs that could be done remotely.[30] However, only 4% worked most of their hours from home prior to the pandemic,[31] although up to about 14% worked at least some of their hours from home.[32]

A representative survey of Canadians states that 39.1% of Canadians teleworked in March 2020.[33] By June 2020, between 15 to 22% of Canadian workers were working remotely[34],

---

[24] Savage, K., & Turcotte, M. (2020). *Commuting to work during COVID-19*. Statistics Canada.

[25] Habib, K. N., Hawkins, J., Shakib, S., Loa, P., Mashrur, S., Dianat, A., Wang, K., Hossain, S., & Liu., Y. (2021). Assessing the impacts of COVID-19 on urban passenger travel demand in the greater Toronto area: Description of a multi-pronged and multi-staged study with initial results. *Transportation Letters, 13*(5-6), 353-366.

[26] Statistics Canada. Table 23-10-0269-02 *Transportation activity indicators, percentage change*. Transport Canada.

[27] Statistics Canada. (2021). Urban public transit, February 2021. *The Daily.*

[28] Note: Baseline data computed between January 3 - February 6, 2020; Google. (2021). *COVID-19 community mobility reports.*

[29] Harris, M. A., & Branion-Calles, M. (2021). Changes in commute mode attributed to COVID-19 risk in Canadian national survey data. *Findings*.

[30] Deng, Z., Messacar, D., & Morissette, R. (2020). *Running the economy remotely: Potential for working from home during and after COVID-19.* Statistics Canada.

[31] Savage, K. & Turcott, M. (2020). *Commuting to work during COVID-19*. Statistics Canada.

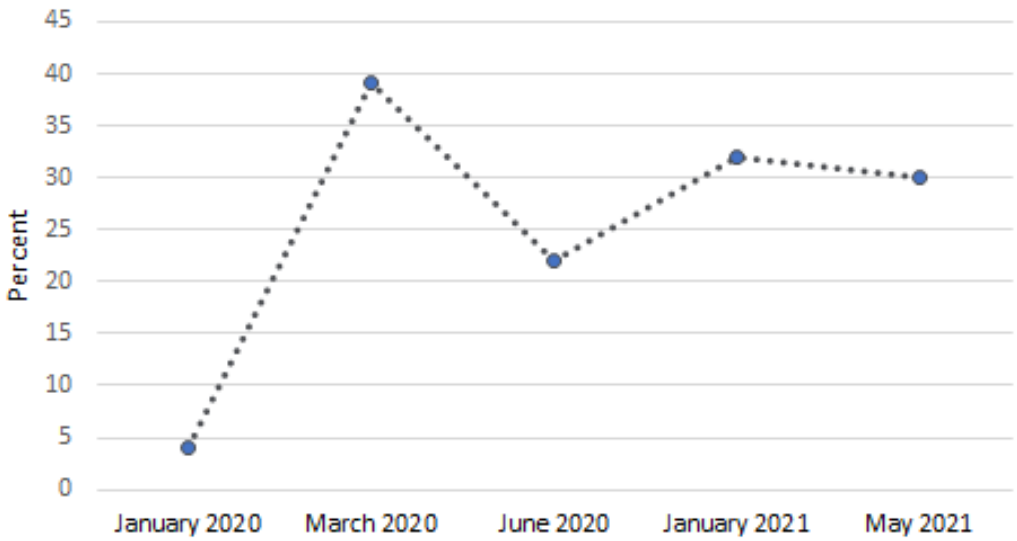
[32] Mehdi, T., & Morissette, R. (2021). *Working from home: Productivity and preferences.* Statistics Canada.

[33] Morissette, R., Deng, Z., & Messacar, D. (2021). *Working from home: Potential implications for public transit and greenhouse gas emissions*. Statistics Canada.

[34] Savage, K., & Turcotte, M. (2020). *Commuting to work during COVID-19.* Statistics Canada.

which increased and held steady at about 30% in 2021.[35,36,37] This survey data is reflected in mobility trend data indicating that traffic to workplaces decreased by 34% over baseline as of May 2021 (ranging from 2% in Prince Edward Island to 43% in Ontario, and no change in the Yukon).[38]

Figure 3 – Proportion of Canadians Working Remotely



Who switched and who didn't

Characteristics of workers who changed their commuting habits seem to be primarily related to holding jobs that are amenable to telework as opposed to demographic or individual characteristics. People who live in larger urban areas (i.e., with populations over 500,000), used transit previously, and held office-based jobs were more likely to have switched.[39] Workers with more education were also more likely to have switched to telework, with 38% of workers with more than a bachelor's degree working remotely, compared to 33% of people with a bachelor's degree and only 11% of workers with less than a bachelor's degree.[40] Immigrant workers, who are also more likely to live in larger cities and hold a university degree, were also more likely to have switched to telework compared to Canadian-born workers. However, immigrant workers and visible minorities also comprise a significant portion of essential workers, such as nurse aides and patient service associates (e.g., over a third, compared to less than a quarter in other occupations), who are unable to telework.[41]

A survey of transit riders in Toronto revealed that individuals who decreased or stopped their transit use during the pandemic were more likely to be white, able-bodied, born in Canada,

[35] Note: Workers aged 15 to 69 years

[36] Simeus-Kabo, M., Tait, M., & McKeown, L. (2021). Public transit in a post-COVID-19 Canada. Statistics Canada.

[37] Statistics Canada. (2021). Study: Working from home: Productivity and preferences. *The Daily*.

[38] Google. (2021). *COVID-19 community mobility reports*.

[39] Savage, K., & Turcotte, M. (2020). *Commuting to work during COVID-19*. Statistics Canada.

[40] Ibid

[41] Turcotte, M., & Savage, K. (2021). *The contribution of immigrants and population groups designated as visible minorities to nurse aide, orderly and patient service associate occupations*. Statistics Canada.

and have higher levels of education and more economic resources.[42] These workers may be more likely to telework or access alternate modes of transportation. This is consistent with data from the US that suggests communities with higher proportions of essential workers and populations disproportionately impacted by COVID-19 (i.e., African Americans, Hispanic people, women, and those over 45 years old)[43] were also less likely to have decreased their transit use.[44] Canadian surveys show similar patterns, with women were more likely than men to have switched their mode of commute.[45] It is also worth noting that several demographic factors, such as education, that were related to switching (either mode of transit and/or to telework), seem to be conflated with the location and nature of jobs held. For instance, an individual working in a highly technical field is likely to have a university degree, hold a job that is located in a major city, and have a position that can be done remotely. Additionally, transit users are more likely to live and hold office-based jobs located in larger cities[46], as well as work in higher paying industries with the option to telework.[47]

In most large urban regions across Canada, population growth slowed between July 2019 and July 2020 compared with the previous year as people moved to surrounding areas, although urban areas continued to be the fastest growing in Canada.[48] If this pattern holds, it could result in changes in commuting habits if individuals continue to work in urban centres.

Looking forward: Survey data on return to work

Survey data suggests that roughly 60 - 80% of Canadians who shifted to telework during the pandemic would prefer hybrid work arrangements, returning to the office several days a week or on an "as needed" basis and working remotely the rest of the time.[49],[50] Only 20% of Canadians want to return to the office full time.[51] A Canadian survey of human resource managers showed 52% were willing to continue flexible work arrangements post-pandemic[52], and other survey data puts this as high as 70% (for some of their workforce).[53] A small US survey found that most executives favoured a hybrid return-to-work model, with employees spending some amount of time in the office.[54] Only 13% were willing to convert completely to telework and only 5% felt that the company culture could be maintained without physical time in the workplace. Overall, workers are very keen to continue teleworking post-pandemic, at least some of the time, while employers are more hesitant.

---

[42] Palm, M., Allen, J., & Farber, S. (2020). Giving up public transit during the coronavirus is a luxury many Canadians can't afford. *The Conversation.*

[43] Note: In many cases, these are overlapping communities.

[44] Liu, L., Miller, H. J., Scheff, J. (2020). The impacts of COVID-19 pandemic on public transit demand in the United States. *PLoS ONE*, *15*(11), e0242476.

[45] Harris, M. A., & Branion-Calles, M. (2021). Changes in commute mode attributed to COVID-19 risk in Canadian national survey data. *Findings*.

[46] Savage, K. (2019). *Results from the 2016 Census: Commuting within Canada's largest cities*. Statistics Canada.

[47] Heisz, A., & LaRochelle-Cote, S. (2005). *Work and commuting in Census Metropolitan Areas, 1996-2001*. Statistics Canada.

[48] Statistics Canada. (2021). *Population growth in Canada's large urban regions slows, but still outpaces that of other regions.*

[49] Leger & The Canadian Press. (2021). *Returning to work - May 31, 2021*.

[50] Mehdi, T., & Morissette, R. (2021). *Working from home: Productivity and preferences*. Statistics Canada.

[51] ibid

[52] Benefits Canada. (2020). *Half of employers plan to continue flexible working policies post-pandemic: Survey.*

[53] CBRE(2020). *The Future of the office: 2020 Global occupier sentiment survey.*

[54] PwC (2021). *It's time to reimagine where and how work will get done: PwC's US remote work survey.*

Concern over the potential for COVID-19 transmission on public transit has led people to avoid it altogether or change their use patterns based on perceived risk (e.g., ride at less busy times).[55] This is a major concern among former transit users who are teleworking or have switched to other modes of transport when considering the return to physical offices. Of Canadians who are not comfortable returning to the office, almost all of them (94%) reported fear of public transit was one of their concerns.[56] Of those who felt safe returning to their workplace, 74% said they were very or extremely concerned about using public transit.

Ongoing safety concerns have led people to anticipate that they will use public transit less frequently in the future. Between 40 and 60% of commuters in global surveys anticipate using transit less often or not at all.[57] In contrast, the proportion of US workers who anticipate commuting by car and by active transportation post-pandemic both increased compared to pre-pandemic commuting.[58] A non-representative sample of Canadians found that 10% of pre-COVID-19 transit commuters did not intend to return to public transit and fewer people intended to return to carpooling.[59] Interestingly, the same survey did not report an increase in intent to drive to work. In fact, it noted a decrease, which was accounted for in the number of people reporting that they intend to telework. No changes in active transportation were reported. It is hard to anticipate how attitudes toward public transit and health risks will evolve as the pandemic and recovery evolve and there is little data regarding the potential extent to which transit will recover.

Looking forward: Low emission and zero-emission vehicles (LEVs and ZEVs)

As Canada moves into post-pandemic commuting, low and zero emission vehicles will be increasingly important to a green recovery if reliance on personal motor vehicles continues. Low and zero-emission vehicles make up a small proportion of personal motor vehicles currently on the road.[60] For instance, in 2020 only 6.2% of new vehicle registrations were for hybrid[61], plug-in hybrid, or battery electric vehicles.[62] While the current rates of purchases are very low, Canadians are clearly interested. A recent survey found that almost 70% of Canadians planning to buy a car in the next five years said they were likely to purchase an electric vehicle.[63] Realizing the full benefits of a transition to low and zero emission vehicles will also require shifting electricity generation to more renewable sources across the country.

---

[55] Kittleson & Associates. (2021). *Will COVID-19 permanently alter teleworking and commuting patterns? Here's what 1,000 commuters told us.*

[56] Savage, K., & Turcotte, M. (2020). *Commuting to work during COVID-19*. Statistics Canada.

[57] Bert, J., Schellong, D., Hagenmaier, M., Hornstein, D., Wegscheider, A. K., & Palme, T. (2020). *How COVID-19 will shape urban mobility*. Boston Consulting Group.

[58] Kittleson & Associates. (2021). *Will COVID-19 permanently alter teleworking and commuting patterns? Here's what 1,000 commuters told us.*

[59] Lahey, L. (2020). *Survey: 28% of Canadians will work from home after COVID-19 lockdown lifts.* Rates.ca

[60] Common, D., & English, J. (2019). Want an electric vehicle? Here's why it can be so hard to get one. *Canadian Broadcasting Corporation*.

[61] Note: Hybrids are not considered ZEVs, which inflates this 2020 statistic (as compared to the following statistics on ZEVs)

[62] Statistics Canada (2021) *New Motor Vehicle Registrations Data Visualization Tool.*

[63] KPMG (2021). *Electric Vehicles to make up majority of new car purchases.*

4. Applying behavioural insights to reduce commuting emissions

Commuting choices are complex habitual behaviours that are difficult to change due to structural barriers such as the availability of public transit as well as cognitive barriers like how deeply entrenched these habits are. There are two large sets of opportunities for applying behavioural insights to reduce commuting emissions. Subsection 4.1 below describes structural barriers and how large-scale policy initiatives that address these can benefit from a behavioural science perspective. Many of these recommendations build on existing Government of Canada initiatives. Addressing structural barriers through large-scale policies influences the realistic commuting options that people have – people who do not have access to public transit cannot choose an environmentally-friendly mode of commuting. But even if these barriers are addressed and people do have options, there are still cognitive barriers that stand in the way of making environmentally-friendly commuting choices. Subsection 4.2 describes these cognitive barriers and suggests complementary smaller-scale nudge interventions that the Government can play a role in implementing or funding.

4.1. Applying behavioural science to large-scale policy levers

Structural barriers to reducing commuting emissions

Key structural drivers of commuting choices include land use policies (e.g., how far people live from employment and the types of areas they live in), public transit and active transportation infrastructure, type of employment (i.e., amenability to teleworking), and the cost of zero-emission vehicles (ZEVs). Where commutes are long, transit is unavailable, cycling is unsafe, jobs cannot be done remotely, and ZEVs are expensive, people just do not have good options for low-emissions commutes. As a result, behaviour change strategies are unlikely to be effective. Traditional policy levers that can directly address the following structural barriers are therefore critical.

- **Public transit infrastructure:** Many Canadians do not benefit from accessible, convenient, high quality and reliable public transit systems. Though 90% of residents in Toronto, Montreal and Vancouver live within 500m of public transit, convenient access to public transit is lower in smaller and less densely populated metropolitan areas (e.g., 49% in Saint John).[64]
- **Land-use policy:** People living in large residential-only areas, like many suburbs, will more likely have to drive to work, whereas living in an area of mixed residential, recreational, and commercial land use more easily allows for active or public transportation options.
- **Active transportation infrastructure:** In addition to commute distance, barriers to active transportation include a lack of safe and well-connected walking and cycling

[64] Statistics Canada. (2020). Canada's three largest metropolitan areas have the most convenient access to public transportation. *The Daily.*

paths. For example, in Toronto, cycling-friendly zones are few and fragmented. People who commute along low-stress routes are more likely to cycle to work.[65] Other practical barriers to cycling to work include a lack of supportive workplace installations, like showers and bike racks.

- **Nature of employment:** Though teleworking has increased dramatically during the pandemic, only about four in ten Canadians hold jobs that can be done remotely (i.e., they do not need to be physically present to perform their functions or use specialized equipment).[66] Within this group, inadequate IT infrastructure, internet speeds, and lack of a dedicated workspace at home pose substantial barriers.
- **ZEV costs and infrastructure:** The high upfront costs relative to other vehicles and insufficient charging infrastructure in both public and private spaces are primary structural barriers.[67] Most ZEVs also have long waitlists and are rarely available in dealership lots. Both real and perceived lack of access to charging infrastructure contribute to concerns around charger availability and "range anxiety", the fear of being left without power during a trip.

Conversely, there are relatively few structural and practical barriers to driving traditional vehicles. Across the country, road pricing is uncommon, many workplaces provide free parking, and few streets are blocked off to cars. US data suggests that there may be significant "pent up" demand for vehicles as pandemic restrictions are lifted (i.e., the US saw an 11% increase in sales between January and March of 2021)[68] making efforts to shift these purchases to ZEVs particularly important.

The Government of Canada is already addressing many of these structural barriers through policy levers such as investments, economic incentives, legislation, regulation, taxation, and large-scale programs. Our first set of solution ideas relate to applying behavioural insights to inform the development and implementation of such traditional policy levers. Where timing is flexible, further research on local commuting attitudes and behaviours should be undertaken prior to making policy decisions or investments.

Solutions

Designing policy levers to align with how people process information, make decisions and behave can make these approaches more effective.

For example, in 2016 the UK introduced the Soft Drinks Industry Levy (now commonly known as the "Sugar Tax"). The goal was to improve public health by reducing the consumption of sugar in beverages, a major contributor to obesity. The design of the Sugar Tax was informed by behavioural science. Initially, the government was considering a tax proportionate to the amount of sugar in the drink. However, BIT's UK practice challenged the assumption that customers would be sensitive enough to small changes in prices of higher-sugar beverages to shift their habits. Like commuting, drink purchasing habits are deeply ingrained and hard to change. Instead, BIT recommended that the tax should have a primary goal of encouraging *manufacturers* to reformulate their beverages, shifting the onus off of

[65] Irving, T. (2019). Why don't more Torontonians cycle to work? *University of Toronto Engineering News*.
[66] Deng, Z., Messacar, D., & Morissette, R. (2020). *Running the economy remotely: Potential for working from home during and after COVID-19.* Statistics Canada
[67] Plug'n Drive. (2017). *Driving EV uptake in the Greater Toronto and Hamilton area.*
[68] Associated Press. (2021). *Auto sales rise 11% in 1Q on strong showing in March*.

individual-level behaviour change. To do so, we recommended setting specific thresholds where the tax would apply. Manufacturers were incentivised to reduce their sugar content below the thresholds and consumers could keep on buying the same products but consume less sugar. The government implemented this approach and the results were striking. Public Health England reports average sugar levels in drinks subject to the levy falling by 44% between 2015 and 2019.[69]

The Government of Canada is already implementing traditional policy mechanisms in ways that reflect behavioural science considerations, for example, by electrifying buses to reduce emissions without requiring modal shift. The Canada Infrastructure Bank has earmarked $1.5 billion over the next three years to accelerate the adoption of zero-emission buses and charging infrastructure.[70] This addresses the top barrier that transit agencies face in accelerating the deployment of electric buses: high upfront costs.[71] Similar to the Sugar Tax example above, electrifying buses is an excellent strategy because individuals can reduce their commuting-related emissions without having to change their habits.[72] The iZEV program is another example of a federal policy that is strong from a behavioural science perspective. It addresses the structural barrier of high upfront vehicle costs which is exacerbated by the cognitive barrier of *hyperbolic discounting* (or *present bias*), the tendency to overweight short-term costs and benefits over long-term costs and benefits. By providing a rebate of up to $5,000 on the purchase of a light duty ZEV at point of sale, the rebate program taps into people's sensitivity to short term costs and benefits. This point of sale rebate is likely to be more effective than providing equivalent returns in the future.

In this section, we build on existing Government of Canada initiatives and also propose new ways to apply a behavioural science lens to strengthen large-scale policy levers.

- **Leverage infrastructure investment processes to encourage municipal and regional actors to develop more effective strategies for modal shift (e.g., from private vehicle to public transit).**

  In 2021, the Government of Canada announced $14.9 billion for public transit projects over the next eight years.[73] This includes $400 million over the next five years towards Canada's first active transportation fund.[74] Depending on the asset type (e.g., major transit line, zero emission bus, active transportation infrastructure) and project in question, access to this funding may depend on satisfying conditions including demonstrating how the investments will drive down emissions, completing substantive environmental reviews, ensuring affordable housing along the line, and incorporating accessibility and other equity considerations, among other priorities.

[69] Public Health England. (2020). *Third year of industry progress to reduce sugar published.*
[70] Infrastructure Canada (2021). Canada Infrastructure Bank.
[71] Clean Energy Canada & SFU Morris J. Work Centre for Dialogue. (2020). *Catching the bus: How smart policy can accelerate electric buses across Canada.*
[72] Transit experts across Canada noted barriers including funding that is "administratively burdensome to access, short-term in nature, and often requires participation from three levels of government". Our behavioural science expertise suggests that administrative burden may have a significant impact and should be prioritized as the Government of Canada continues to support electrification.
[73] Prime Minister of Canada. (2020). *New public transit investments to build strong communities, fight climate change, and create new jobs across Canada.*
[74] Infrastructure Canada. *Canada's First National Active Transportation Strategy*

Infrastructure Canada could prompt funding recipients to consider and outline how they will encourage *use* of the infrastructure as part of the funding process, or even make demand management plans an evaluation criterion in competitive funding scenarios. The department is already pursuing a similar strategy in its piloting of the Climate Lens, which aims to add clarity and precision to the climate impacts of individual investments and encourage project planners to make choices consistent with Canada's climate goals. Given the impact of modal shift on climate outcomes, the Climate Lens itself could potentially be the vehicle for this prompt. The GHG Mitigation Assessment could be expanded to include prompts for how indirect emissions reductions may be achieved through modal shift. Proponents could be asked a short series of questions about the demand management strategies they will consider (e.g., land use planning changes, price incentives, communications campaigns, complementary infrastructure investments in first / last mile solutions, etc.).

Ideally, the Government of Canada could also help proponents develop their early thinking, working with experts to compile a short demand management reference guide and/or set of case studies, including "nudges" such as ways to reduce frictions, harness timely moments, use effective communication strategies, and design effective incentives. For example, BIT developed the Little Book of Green Nudges, an evidence-based guide being used in over 100 universities to encourage sustainable behaviours amongst students.

- **Incentivize vehicle manufacturers to produce and promote EVs over combustion vehicles to help commuters reduce emissions without needing to change their commuting habits.**

  The idea of 'reformulating' entrenched behaviours to make them less harmful rather than changing them, as exemplified by the Sugar Tax and bus electrification efforts, can also be applied to EV manufacturing. Most people will continue to drive, so decarbonizing this choice by focusing on the behaviour of upstream actors such as manufacturers will be critical. For example, electric car sales are set to triple in Europe after a recent EU legislation introduced new emission standards that requires manufacturers to reduce the average emissions of their vehicles to 95g of CO_2 per km, with steep fines for exceeding this threshold.[75] Manufacturers and dealerships are therefore incentivized to produce and promote EVs (for purchase or lease). In its regulatory capacity, the Government of Canada could consider this approach as a way to increase the supply of EVs in Canada.

- **Make EV charging stations attention-grabbing (salient) and convenient to help address "range anxiety."**

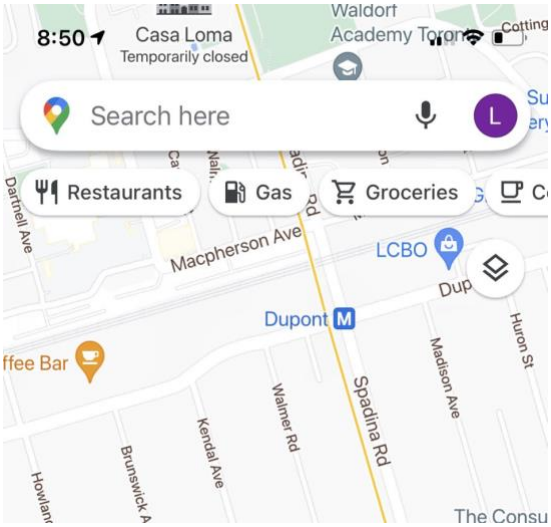
  Range anxiety is a major barrier to EV adoption; there is a strong correlation between the number of charging stations and EV adoption across jurisdictions.[76] Over the next three years, the Government of Canada will invest $150 million towards installing charging and hydrogen refuelling infrastructure in public places, multi-unit residential buildings, workplaces, and commercial areas. Behavioural science can be applied to

[75] Campbell, P. (2020). Electric car sales triple in race to meet Europe CO2 rules. *Financial Times*.

[76] Sierzchula, W., Bakker, S., Maat, K., & van Wee, B. (2014). The influence of financial incentives and other socio-economic factors on electric vehicle adoption. *Energy Policy, 68*, 183–194.

ensure that this investment is as effective as possible by informing the placement of the stations and ensuring that they are salient to potential users. *Availability bias* is the tendency to judge the frequency of an event or behaviour by how easily it comes to mind. If charging stations do not easily come to mind, people may hold the false belief that charging stations are less common than they are, contributing to range anxiety. The salience of charging stations can be increased, for example, by painting them a bright colour or by placing them at the front of commercial and residential parking lots, rather than at the back. Signage could be standardized to make it easier for drivers across the country to identify stations. Placing stations in locations that people would expect to find one, such as gas stations, is a powerful way to reduce *cognitive load* (i.e., the amount of mental effort required) and work with people's existing habits and expectations. This is equally true in the digital environment. Creating digital salience for EV charging stations on platforms that people already use can help highlight the availability of stations. For example, though Google Maps currently allows users to make a targeted search for nearby charging stations, the prominence of this information could be increased by including EV charging stations in the default bar of location suggestions, alongside gas stations. The Government of Canada may be able to use its funding to commission research and promote the development of salient and convenient stations.

Figure 4 – Google Maps app home screen



- **Support the development of models for road pricing that include psychological factors like "pain of paying" and share them with municipal and regional governments.**

  Road pricing and paid parking are fundamental ways to affect modal shift as they enable private vehicle users to bear the full cost of commuting. They increase the cost of driving, encouraging drivers to substitute newly costly car trips with public transit, active transportation, car sharing or teleworking. Though requiring employees to pay for parking at the workplace is likely to reduce driving, potential trade-offs related to well-being and disproportionate impact on low income workers mean that we cannot recommend this measure for all employers. There are many road pricing models that have been implemented around the world from Sweden to Singapore, including distance-based, congestion-based, and pay-as-you-drive.[77] However, there is limited publicly available research regarding how psychological factors influence the effectiveness of various models, which in turn, limits the ability of Canadian municipalities and regions to implement the most effective models. For example, during peak hours, drivers' behaviours can be inelastic in response to road pricing,

[77] Cavallaro, F., Giaretta, F., & Nocera, S. (2018). The potential of road pricing schemes to reduce carbon emissions. *Transport Policy*, *67*(15), 85-92.

meaning that they continue to drive despite lower costs of alternate modes of transportation.[78]

We know that not all costs are experienced in the same way - costs that are more transparent and salient have a higher *pain of paying* than others.[79] For example, paying cash has a higher pain of payment than paying by credit card[80] or mobile payment.[81] As a result, people spend less when using cash compared to credit or debit cards. Pain of paying is also higher when payment and consumption happen at the same time,[82] so making recurring payments has a higher pain of payment than paying a lump sum in advance (e.g., avoid a subscription or membership). Paying a lump sum in advance also risks tapping into the *sunk cost fallacy*, leading individuals to feel that they have already invested and are therefore committed to using the product or service.[83] With regard to parking or road pricing, this could mean avoiding time-bound passes and low-barrier methods such as auto-pay. ZEVs could be exempt from road pricing charges and revenues from combustion vehicles could be used to subsidize public transit. Simultaneous investments in public transit will be critical to mitigate any unequal financial burdens for low income workers[84] by providing access to convenient, cost-effective alternatives. To the best of our knowledge, these behavioural science considerations have not been rigorously explored and integrated into econometric road pricing models, a gap that the Government of Canada may be able to fill on behalf of municipalities.

- **Create or encourage programs that certify or provide a designation for workplaces that encourage low-emission commuting behaviours.** Employers play an important part encouraging employees to commute via active, shared, or public transportation. A study of US "Best Workplaces for Commuters" (BWC) found that employers who incentivize non-SOV commuting and provide support (i.e., financial, ride home services, information) for employees to do so, reduce employee trips and fuel consumption by 7 to 15%.[85] BWC is a government-sponsored designation for employers who have policies that encourage non-SOV commuting and meet certain criteria.[86] The BWC designation is marketed as "elite" and is paired with benefits to participating workplaces, such as national recognition and tax incentives. Similar "green" credentialing programs, such as LEED and green credentials for builders, have been widely adopted and are perceived as beneficial by

[78] Chin, A. (2012). Implications of Prospect Theory on Road Pricing Strategies. Sixth International Conference of Traffic and Transportation Studies Congress (ICTTS), American Society of Engineers.
[79] Zellermayer, O. (1996). *The pain of paying.* (Doctoral dissertation). Department of Social and Decision Sciences, Carnegie Mellon University, Pittsburgh, PA.
[80] Raghubir, P., & Srivastava, J. (2008). Monopoly money: The effect of payment coupling and form on spending behavior. *Journal of Experimental Psychology: Applied, 14*(3), 213-225.
[81] Gafeeva, R., Hoelzl, E., & Roschk, H. (2018). What else can your payment card do? Multifunctionality of payment modes can reduce payment transparency. *Marketing Letters, 29*, 61-72.
[82] Prelec, D., & Loewenstein, G. (1998). The red and the black: Mental accounting of savings and debt. Marketing science, 17(1), 4-28.
[83] Arkes, H., & Blumer, C. (1985). The psychology of sunk cost. *Organizational Behavior and Human Decision Processes, 35*, 124-140.
[84] US Department of Transportation - Federal Highway Administration (2021). Income-based equity impacts of congestion pricing - A primer.
[85] Herzog, E., Bricka, S., Audette, L., & Rockwell, J. (2006). Do employee commuter benefits reduce vehicle emissions and fuel consumption? *Transportation Research Record, 1956,* 34-41.
[86] https://www.bestworkplaces.org/

businesses with these designations.[87,88] The GC can create a certification program to incentivize employers to provide commuting benefits for their workers. Programs that use economic incentives, such as tax breaks, may lower the barrier for employers to start the certification process, but there is evidence from the BWC model that once the program is recognized, workplaces are willing to pay membership fees to retain their designations. Using salient branding allows employers to signal their participation both to prospective employees but also other employers, which may boost interest in the program.

- **More broadly, consistently integrate a behavioural science lens into the development and analysis of policies that impact transportation emissions.**

  As described above, the Government of Canada is already developing policy initiatives that reflect behavioural science principles. Point of sale rebates on electric vehicles are likely to be more effective than savings that come after purchase, and bus electrification eliminates the need for bus users to change their behaviour at all to reduce emissions. However, our consultations with government departments suggest that such behavioural science considerations are not systematically being considered in the development and analysis of policy options. Recognizing that behaviour change is central to transportation emissions reduction, we recommend that policy development and analysis includes:

  1. A clear identification of the specific behaviours the policy aims to shift, and the target population.
  2. A theory of change explaining how the policy, including the implementation approach, will accomplish that behaviour change.
  3. A rationale for the theory of change that references both relevant economic and behavioural science evidence.[89]

4.2. Nudging commuting choices

Cognitive barriers to reducing commuting emissions

Even when structural barriers are addressed through large-scale policy levers, significant cognitive barriers may continue to prevent Canadians from making green commuting choices.

- **Information gaps**, like not being aware of the savings from switching to transit or where bike lanes are located, are meaningful barriers to modal shift.
- **Confirmation bias** can entrench negative attitudes toward transit or active transportation; if people believe that transit is unreliable, they will see every instance

[87] Bruce, R. D., Gebken, R. J., & Strong, S. D. (2010). Evaluating the self-perceived benefits of green professional credentials in the building design and construction community: CPC, LEED-AP, and DBIA. *International Journal of Construction Education and Research, 6*(3), 165-178.
[88] Tucker, J. (2011). *Evaluating the self-perceived benefits of green professional credentials in the building design and construction community*. Masters thesis. Virginia Tech.
[89] Other types of data and evidence should also be considered, like public opinion research. Where important data is unavailable, gathering or generating it could be included in the policy proposal.

of a train or bus being delayed as important evidence they are correct in their general view.

- **Availability bias**, the tendency to value information based on how easily it comes to mind rather than how relevant it is, is a similar barrier. It's easier to remember the time when a late bus caused us to miss an important meeting than the hundreds of times it arrived on-time. (Even here, we see the importance of structural factors, like the reliability of transit service.)
- **Hyperbolic discounting**, the tendency to overweight short-term costs and benefits, can lead people to underestimate the true costs of driving (e.g., long-term maintenance, interest costs on leases) compared to immediate, upfront costs of public transit or ride hailing services. This also leads people to under-value EVs which tend to be more expensive upfront but significantly cheaper in the long run. It also explains why people so often undervalue the environmental costs of their choices, as the negative impact is often very long-term (and quite abstract).
- **Friction costs** refer to seemingly minor annoyances or time costs, which can have an outsized impact on behaviour. For instance, a US survey found that the biggest roadblock to recycling more was not having a recycling bin in each room in the home. Of the people surveyed, nearly three-quarters said they consistently recycle in the home, however only about half recycled in rooms outside the kitchen because of that small friction of walking to the kitchen to recycle the item.[90] Potential frictions abound in modal shifts, like looking up unfamiliar bus routes or purchasing transit passes. Cycling to work entails getting the bike out of the garage or home, ensuring that the tires are pumped, changing into athletic clothes and shoes, risking bad weather, knowing the best route, locking the bike up and showering and changing at work. When compared to the relative ease of driving and parking at work, these frictions act as a major disincentive to active travel and reinforce driving.
- **Status quo bias:** Most people drive to work; it's their status quo. Unfortunately, the status quo exerts a powerful influence on our behaviour. *Status quo bias*, our tendency to "go with the flow" of an existing habit or default, is likely the most significant cognitive barrier to reduced commuting emissions. It's also very hard to address through a nudge. Given this constraint, we think it's critical to target nudges at commuters whose habits have been disrupted. This includes people who have recently moved or started a new job. Now, it includes the very large number of Canadians whose commutes have been impacted by the pandemic. There is more opportunity to nudge commuting behaviours today than at any other time, but that window will close quickly.

The remainder of this report examines how to address the cognitive barriers described above through thoughtful interventions delivered to the right people and organizations at the right times. We want to capitalize on this critical opportunity to nudge commuting changes, while also laying out post-recovery opportunities for behavioural interventions that can be encouraged or incentivized by the Government of Canada.

[90] CONE (2014). *2014 Cone Communications recycling in the home survey.*

Solutions

The following recommendations focus on interventions that stem directly from the behavioural insights literature, largely taking the form of *nudges* – simple interventions that alter the environment in which people make decisions to encourage or make it easier to perform a desired behaviour. Nudges generally address different types of barriers than traditional policy reforms; they address *cognitive barriers* rather than structural ones.

Earlier in this report, we shared an example of applying behavioural science to a traditional policy lever, the Sugar Tax. We have also had success nudging reductions in sugary drink consumption. For example, we added visuals of stop signs next to soft drinks in a hospital cafeteria, reducing purchasing of these drinks by about 7%.[91] While the effects of this nudge are much smaller and more narrow than the Sugar Tax, this type of intervention is still helpful in addressing complex policy challenges like obesity – or emissions from commuting. Nudges can complement traditional policy levers to support behaviour change on multiple levels. Nudges have also been shown to be effective in promoting environmental behaviours. For example, US company Opower leveraged the power of social norms to reduce energy consumption. Mailing customers Home Energy Reports (HERs) that included information about how their energy use compared with their neighbours led to significant and enduring energy savings.[92,93]

We have identified the following target behaviours as essential to reducing commuting emissions: exploring new modes of commuting, returning to public transit, maintaining telework post-pandemic and purchasing ZEVs. Nudges to encourage these behaviours can be implemented directly by the Government of Canada (i.e., in its role as an employer) or by other actors (e.g., transit agencies) with support from the Government of Canada. While many of the recommendations below propose interventions that the GC can implement with its own workforce, note that these recommendations are broadly applicable to other public and private sector employers, should the federal government hold levers to influence these actors.

Exploring new modes of commuting

Reducing single occupancy vehicle (SOV) commuting is key to decreasing commuting emissions. In this section, we examine behaviour change strategies to encourage Canadians to switch to, or increase the frequency of, transit use, active transportation, and carsharing.[94]

Commuting behaviours are hard to change as they are habitual, with greener modes often subject to frictions or increased effort. Nudges can also be less effective for behavioural changes that must be sustained over time.[95] These barriers to change may be particularly significant for driving as the built and social environment makes commuting by car convenient, and the default choice for many people. As such, our literature scan suggests

[91] Local Government Association & Behavioural Insights Team. (n.d.). *Using behavioural insights to reduce sugar consumption in Liverpool.*

[92] Allcott, H. (2011). Social norms and energy conservation. *Journal of Public Economics*, *95*(9-10), 1082-1095.

[93] Allcott, H., & Rogers, T. (2014). The short-run and long-run effects of behavioral interventions: Experimental evidence from energy conservation. *American Economic Review*, *104*(10), 3003-3037.

[94] Low or zero emission vehicles are also considered greener modes of transport, but are covered in a separate section.

[95] Kristal, A., & Whillans, A. (2019). Why it's so hard to change people's commuting behavior. *Harvard Business Review*.

that many interventions such as the provision of information on greener modes tend to have little or no impact.

We recommend **targeted solutions for specific populations whose commuting habits are in flux, and who are new or occasional users of public and active transportation**. For example, people who have recently had their commuting habits disrupted due to COVID-19 or who are in moments of transition such as starting a new job or moving to a new home may be more receptive to nudges. This is what the City of Portland and BIT found in a trial aimed at boosting ridership of a bike sharing program. BIT sent postcards highlighting offers to two groups of potential users: those who recently moved into a neighbourhood with an existing dock, and those who lived in a neighbourhood where a new dock had recently been built. We found that new movers were almost four times as likely to redeem the offer than those with a new dock built in their vicinity. [96] Similarly, another study targeting people who had recently moved homes showed that an economic incentive that doubled the free travel period increased uptake and long-term usage of public transit, especially amongst initial low users.[97] This may be because new movers are more likely to be re-evaluating their transportation options since they are in a moment of transition and do not already have ingrained habits.

We have four recommendations for encouraging exploration of new modes of commuting amongst people whose commuting habits have been disrupted.

- **Provide personalized travel plans at transitional moments such as returning to the office, starting a new job, or moving homes.**

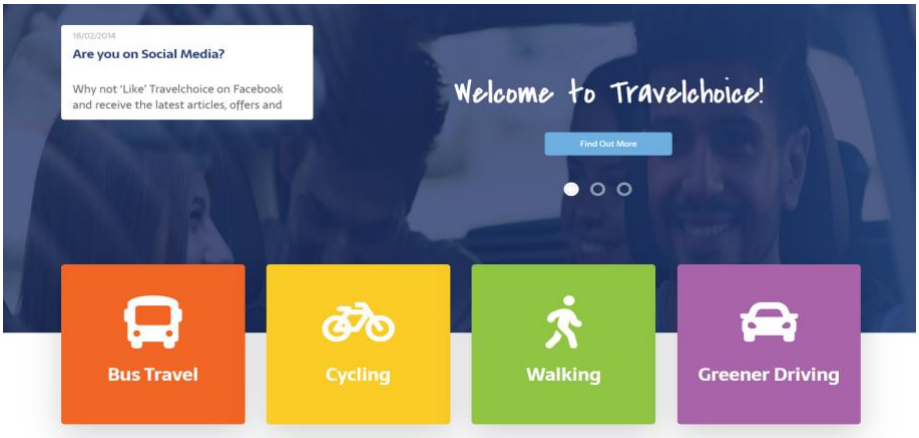
  Personalized travel plans (PTPs) provide commuters with information about their transportation options and related incentives based on where they live and work. PTPs can help people who lack knowledge of their commuting options or who fail to actively consider those options due to availability bias, two common cognitive barriers.[98] Good PTPs also reduce cognitive load in assessing options by providing simple information about costs (including available incentives) and routes. When provided by an employer, PTPs may also convey tacit support for alternative commuting measures, which could help drive uptake.

  Figure 5 – Travelchoice, a PTP website for the city of Peterborough, UK

[96] Kirkman, E. (2019). Free riding or discounted riding? How the framing of a bike share offer impacts offer-redemption. *Journal of Behavioral Public Administration, 2*(2), 1-10.

[97] Gravert, C. A., & Collentine, L. O. (2021). When nudges aren't enough: Incentives and habit formation in public transport usage. *Journal of Economic Behavior and Organization, 190,* 1-14.

[98] Scheepers, C. E., Wendel-Vos, G. C. W., Den Broeder, J. M., Van Kempen, E. E. M. M., Van Wesemael, P. J. V., & Schuit, A. J. (2014). Shifting from car to active transport: A systematic review of the effectiveness of interventions. *Transportation Research Part A: Policy and Practice, 70*, 264-280.



There is some evidence that PTPs used in combination with awareness campaigns can reduce commuting by single occupancy vehicle[99,100], but there is a lack of rigorous evaluations in this area and some methodologically sound studies have failed to find effects.[101] However, these studies did not specifically look at populations whose habits have been disrupted. We believe there is value in further experimentation and evidence generation. PTPs are a low cost intervention and may be worth testing in the Government of Canada's capacity as an employer. The GC can provide PTPs to existing employees as offices begin to welcome employees back and include PTPs as part of onboarding new employees. In the short term, the GC can leverage existing local platforms that create PTPs such as Smart Commute, and, if successful, in the longer term, support the funding and evaluation of similar programs across the country.

- **Run employee challenges to encourage people to try out commuting alternatives.**

  Employers can challenge employees to try out, or increase their use of, green commuting options (e.g., Bike to Work Month that many workplaces already participate in). Such opportunities may help employees overcome barriers including low cycling confidence and perceived safety. These employee challenges are most effective when employees are put in teams and can win prizes based on their teams' performance. There is evidence that both public commitments[102] and group-based incentives[103] are more effective to motivate behavioural change than private, individual commitments and rewards. Challenges can also take advantage of gamification, including elements like point systems, leaderboards, or badges, to motivate participation. A Flemish workplace cycling initiative that involved team-based contests, cycling points, and provided information substantially increased commuter cycling among employees who were aware of the program across all 12

[99] Chatterjee, K. (2009). A comparative evaluation of large-scale personal travel planning projects in England. *Transport Policy, 16*(6), 293-305

[100] Moser, G., & Bamberg, S. (2008). The effectiveness of soft transport policy measures: A critical assessment and meta-analysis of empirical evidence. *Journal of Environmental Psychology*, *28*, 10-26.

[101] ibid

[102] Epton, T., Currie, S., & Armitage, C. (2017). Unique effects of setting goals on behavior change: Systematic review and meta-analysis. *Journal of Consulting and Clinical Psychology, 85*, 1182-1198.

[103] Kullgren, J. T., Troxel, A. B. Loewenstein, G., Asch, D. A., Norton, L. A., Wesby, L., Tao, Y., Zhu, J., Volpp, K. G. (2013). Individual- versus group-based financial incentives for weight loss: A randomized, controlled trial. *Annals of Internal Medicine, 158*(7), 505-514.

workplaces.[104] The ability to participate in workplace challenges may be impacted by limited mobility or access to alternate modes of transportation (e.g., inconvenient transit or no place to store a bike). The GC can continue to run these challenges as a large employer and adapt these programs using evidence-based practices, such as gamification and timing. Using existing capacity (e.g., Experimentation Works), the GC can rigorously evaluate these campaigns to increase their efficacy and develop guidance on best practices that can be shared nationally. The GC can also support organizations running national campaigns through grants and contributions administered through agencies such as ECCC, Transport Canada, or the Public Health Agency of Canada.

- **Support adoption of contactless payment systems or other measures to increase ease of payment for public transit.**

  Decreasing associated "frictions"[105] makes it more likely that people will engage in a behaviour.[106] A study in Indonesia explored resistance to adopting a new mode of transportation introduced as a traffic reduction measure – a motorbike taxi service that enabled riders to book and track drivers on their phone. It showed that perceived ease of use (along with usefulness and trust) was a major barrier to adoption.[107] People are more likely to adopt mobile ticketing systems when it is compatible with systems they already use.[108] A transition to contactless payments, which allow customers to pay with their existing cards or phones rather than a dedicated transit card, may be a particularly welcome change in the context of COVID-19. 44% of Canadians report that the pandemic has changed their payment preferences to digital and contactless long term.[109] Such systems could also be useful for micro-mobility initiatives, such as bike-shares. In New York, Lyft integrated the bike-share service, Citi Bike, into its mobile application allowing users an easy way to pay for and access bikes and scooters.[110] Initiatives can also target friction when purchasing or reloading contactless payment options. For example, by making payment instantaneous (i.e., some transit cards, such as Presto, have a 24 hour period before funds are available) and including kiosks to reload cards in locations that are convenient to people with limited banking and internet access. Such nudges are likely to be particularly effective for new or occasional transit users as habitual users may no longer perceive these frictions as barriers. Frictions can be further reduced through the eventual development of a consumer-centric model of Mobility-as-a-Service (MaaS), which integrates different modes of transportation into an integrated single-ticket

[104] Dubuy, V., De Cocker, K., De Bourdeaudhuij, I., Maes, L., Seghers, J., Lefevre, J., De Martelaer, K., & Cardon, G. (2013). Evaluation of a workplace intervention to promote commuter cycling: A RE-AIM analysis. *BMC Public Health, 13*, Article 587.

[105] Friction refers to anything that makes an action harder to perform.

[106] Bhargava, S., and Manoli., D. (2015). Psychological frictions and the incomplete take-up of social benefits: Evidence from an IRS field experiment. *American Economic Review, 105*(11), 1-41.

[107] Tanimukti, I. P., Wibisono, C., Wardhono, V. J. W., Anggawidjaja, A. H. P. (2016). The effect of perceived usefulness, perceived ease of use, and trustworthiness on the consumer's intention to use (A case study of Go-Jek Indonesia). *Science International (Lahore), 28*(2).

[108] Mallat, N., Rossi, M., Tuunainen, V. K., & Öörni, M. (2008). An empirical investigation of mobile ticketing service adoption in public transportation. *Personal and Ubiquitous Computing, 12*, 57-65.

[109] Payments Canada. (2020). *Canadian spending and purchase habits have not yet returned to pre-pandemic preferences.*

[110] Hawkins, A. J. (2019). Citi Bikes can now be rented through the Lyft app. *The Verge*.

experience. The federal government can support these measures through subsidies for transportation systems and grants to support the development of partnerships.

- **Use behaviourally-informed communications to encourage employees to download mobile applications that make the reliability and convenience of public transit salient.**

  Some individuals may avoid public transit due to misperception that it is less convenient or reliable than it actually is. This can arise due to *availability bias*, with people overweighting highly salient, but relatively rare negative events (like major transit delays) that come easily to mind. Information about the frequency and reliability of transit could provide evidence to the contrary and reduce people's uncertainty around transit. As a large employer, the government could send behaviourally-informed emails encouraging their employees to download a transit application, such as the "Transit" or "Moovit", and nudging them to open and act on the email. For example, using social norms that reference the popularity of the apps or leveraging gain framing by highlighting the health benefits of active commuting. These applications provide real-time information about transit routes that may close the gap between reality and perceptions of reliability. In parallel, information such as vehicle arrival times and routes should also be salient in the physical environment, such as electronic displays in all bus stops.

Carpooling makes up a small proportion of Canadian commuters. A number of interventions have tried to increase the number of people who carpool, generally without success. Some interventions, such as the use of ride matching software (i.e., to match people with similar commutes) on a carpooling website, have increased carpooling[111], although a similar study failed to find a significant change.[112] Based on the strength of this evidence and the number of people who carpooled prior to the pandemic, directing efforts to increase carpooling may not be the best use of resources.

Returning to public transit

During the pandemic, transit ridership experienced a steep decline. Many riders switched to telework[113], with a small proportion switching to single occupancy vehicles or active transportation. Surveys indicate that up to 60% of commuters globally may not return to transit or intend to use it less frequently[114], primarily citing the ongoing risk of COVID-19 transmission.[115] We do not know whether people will quickly update these intentions if the risk of transmission declines, but there is a risk that they do not. For example, as people confront a wide range of decisions related to COVID-19 recovery, they may experience *cognitive overload*. They may be less likely to engage in deliberate risk calculations and more likely to default to their current, status quo commuting option. As workspaces re-open,

---

[111] Abrahamse, W., & Keall, M. (2012). Effectiveness of a web-based intervention to encourage carpooling to work: A case study of Wellington, New Zealand. *Transport Policy, 21*, 45-51.
[112] Kristal, A. S., & Whillans, A. V. (2020). What we can learn from five naturalistic field experiments that failed to shift commuter behaviour. *Nature: Human Behaviour, 4*, 169-176.
[113] Simeus-Kabo, M., Tait, M., & McKeown, L. (2021). *Public transit in a post-COVID-19 Canada.* Statistics Canada.
[114] Bert, J., Schellong, D., Hagenmaier, M., Hornstein, D., Wegscheider, A. K., & Palme, T. (2020). *How COVID-19 will shape urban mobility*. Boston Consulting Group
[115] Savage, K., & Turcotte, M. (2020). *Commuting to work during COVID-19.* Statistics Canada.

there is a window of opportunity to encourage return to transit, where it is safe to do so, before alternative modes, especially single occupancy vehicle trips, become habit.

- **Commission and share research on best practices for health risk communication in a public transit context.**

  As transit agencies across the country struggle with decreased ridership revenue, they may be unable to undertake or commission research into how to help commuters make evidence-informed decisions about health risks. There is a gap in the literature on how to help people make better risk assessments about infectious diseases and public transit. Unsurprisingly given the novelty of COVID-19, our literature scan did not identify any studies that directly addressed this challenge. The Government of Canada can address that gap by funding or developing relevant guidance and disseminating it to transit agencies. This research would focus on effective communications and operational strategies and could leverage adjacent insights on health risk communications, including:

  - Visuals that simplify the presentation of risk information can decrease the cognitive bandwidth required to process these messages, increasing comprehension. Specific strategies include using graphs to communicate relative risk[116] and relying on frequency statements (e.g., 2 in 10) in lieu of probabilities (e.g., 20%).[117]
  - Risk communication campaigns are more effective when they use multiple channels and messengers to reinforce the message.[118]
  - People often find stories and anecdotes more compelling than abstract, numerical statements.[119] Featuring personal narratives about return to transit in communications may be effective.
  - Social norms are a powerful communication tool, as people take cues about what behaviour is acceptable and what is risky from others.[120] Messages that evoke social norms about people using and returning to transit may reassure people that it is safe to do so themselves.

  We recommend that such communications take a two-pronged approach: helping people make accurate risk assessments relating to transit use and also offering strategies to help mitigate real or perceived risk e.g., promoting off-peak travel when transit is less crowded.

- **Subsidize time-limited free or discounted transit passes or tickets.**

  Risk perceptions related to COVID-19 may be assuaged by using transit and observing others doing the same, especially given low current ridership levels.

---

[116] Lipkus, I. M., & Hollands, J. G. (1999). The visual communication of risk. *Journal of the National Cancer Institute*, *25*, 149-163.

[117] Gigerenzer, G., & Edwards, A. (2003). Simple tools for understanding risks: From innumeracy to insight. *BMJ, (Clinical Research ed)*, *327*(7417), 741–744.

[118] Lundgren, R. E., & McMakin, A. H. (2018). *Risk communication: A handbook for communicating environment, safety, and health risks (6th ed).* Wiley-IEEE Press.

[119] De Wit, J. B., Das, E., & Vet, R. (2008). What works best: Objective statistics or a personal testimonial? An assessment of the persuasive effects of different types of message evidence on risk perception. *Health Psychology, 27*, 110.

[120] Lo, A. Y. (2013). The role of social norms in climate adaptation: Mediating risk perception and flood insurance purchase. *Global Environmental Change, 23*(5), 1249-1257.

Offering free or discounted transit passes or tickets could prompt people to return to transit during this window. This should be done in consultation with public health authorities to ensure they believe risk is sufficiently low. Overall, there is mixed evidence supporting the use of free passes, with some studies failing to find a noticeable change in commuting behaviours.[121] However, this type of intervention does tend to be effective among people who have a desire to use transit and for whom the infrastructure already exists.[122] We believe that many former transit users fit into this category. Though BIT research has shown that safety considerations such mask wearing and crowdedness are currently more important to people than discounts[123], discounts may be effective once commuters' risk perceptions begin to normalise. Offering passes or similar incentives on a time-limited basis allows them to be promoted using *loss aversion* and anticipated regret (e.g., "Don't lose out on a free month of travel"), which are often effective behaviour change tactics. It is important to note that as many former transit users transition to hybrid working arrangements, existing transit passes or ticket packages, such as a monthly pass, will no longer offer an economic benefit. Developing options tailored to part-time commuters may help encourage return to transit. In its capacity as a large employer, the Government of Canada could offer such incentives as employees are transitioning back to physical workspaces or to flexible work arrangements. Given the current financial pressure on transit agencies, the Government of Canada could also consider a funding mechanism to support transit operators in offering time-limited incentives as well as develop and implement new pricing approaches. As noted, uptake of discounted transit passes has been shown to be higher among higher-income employees who already have access to high quality convenient transit.[124] In order for all workers to benefit from discounted transit initiatives, these must be paired with increased access to transit and improvement of transit infrastructure in underserved areas.

Maintaining teleworking post-pandemic

Teleworking or hybrid working arrangements, which enable employees to blend telework with working in-office, have the potential to reduce net GHG emissions.[125] Telework has increased dramatically as a result of the pandemic[126] and survey data suggest that most people who shifted to telework during the pandemic would prefer hybrid working arrangements going forward. Only 1 in 5 such Canadians want to return to the office full time.[127,128] Employers, however, may be more hesitant.[129] The following recommendations

---

[121] Kristal, A. S., & Whillans, A. V. (2020). What we can learn from five naturalistic field experiments that failed to shift commuter behaviour. *Nature: Human Behaviour, 4*, 169-176.

[122] Thøgersen, J. (2009). Promoting public transport as a subscription service: Effects of a free month travel card. *Transport Policy, 16*, 335–343.

[123] full details under NDA

[124] Thøgersen, J. (2009). Promoting public transport as a subscription service: Effects of a free month travel card. *Transport Policy, 16*, 335–343.

[125] Kaddoura, S., Simpson-Marran, M., & Jeyakumar, B. (2021). *Connecting Canada on the road to 2030: Exploring the climate benefits and impacts of teleworking*. Pembina Institute.

[126] Statistics Canada. (2021). *Study: Working from home: Productivity and preferences*. The Daily.

[127] Leger & The Canadian Press. (2021). *Returning to work - May 31, 2021*.

[128] Mehdi, T., & Morissette, R. (2021). *Working from home: Productivity and preferences*. Statistics Canada.

[129] PWC (2020). Canadian workforce of the future survey.; See also: Choudhury, P., Larson, B. Z., & Foroughi, C. (2019). Is it time to let employees work from anywhere? *Harvard Business Review*.

address barriers to employers maintaining hybrid work arrangements as workplaces reopen post-pandemic.

While the focus of our research is commuting-related emissions, there are potential unintended consequences related to workplace equity. Women tend to take up flexible working arrangements at higher rates than men[130]; if workers are penalized for flexible or hybrid working (e.g., in promotion or pay decisions), inequality could increase.[131] Efforts to maintain teleworking post-pandemic should be complemented with HR and management processes that mitigate these risks.

- **Make hybrid working arrangements the default and prompt managers and employees to actively choose how time is split.**

  Though survey data shows that most employees would prefer hybrid working going forward, some individuals, such as those who are precariously employed, may be less willing to express that preference. Making hybrid working arrangements the default addresses barriers to uptake of telework options for both employees and employers.

  People tend to prefer *default* options over alternatives[132] and are even more likely to choose the default option in cognitively taxing situations.[133] For example, employees overwhelmingly stick to the default pension option they are automatically enrolled into.[134] Post-pandemic, employers may still view in-person working as the default and have complex approval processes for teleworking arrangements, reducing their likelihood. The Government of Canada, in its role as an employer, could adopt a hybrid work model as the default, prompting managers and employees to make an *active choice* about how exactly time should be split. People are unlikely to consider the costs of remaining in a default option unless they are prompted to do so. Active choice framing makes the choice salient, which encourages people to consider tradeoffs.[135] To encourage teleworking for new employees, positions could be clearly advertised as hybrid where appropriate to the role, and onboarding processes could require active discussion of work arrangements. This would not only help the environment, but also help attract top talent. In a recent trial with 20 million job applicants, BIT – in partnership with Indeed – found that jobs advertised as flexible (including telework options) attracted nearly 20% more applicants.[136]

---

[130] Davidson, S., Hacohen, R., Gesiarz, F., Hardy, T., Schein, A., & Burd, H. (2021). *Supporting men to take longer parental leave and work flexibly*. Research Report. Behavioural Insights Team & UK Government Equalities Office.

[131] Bonacini, L., Gallo, G., & Scicchitano, S., (2020). Working from home and income inequality: Risks of a 'new normal' with COVID-19. *Journal of Population Economics, 34*, 303-360.

[132] Jachimowicz, J. M., Duncan, S., & Weber, E. U. (2016). Default-switching: The hidden cost of defaults. *SSRN Electronic Journal.*

[133] Huh, Y. E., Vosgerau, J., & Morewedge, C. K. (2014). Social default: Observed choices become choice defaults. *Journal of Consumer Research*, *41*(3), 746-760.

[134] Choi, J. J., Laibson, D., Madrian, B. C., & Metrick, A. (2004). For better or worse: Default effects and 401(k) savings behavior. In D. A. Wise (ed.), *Perspectives on the economics of aging*. University of Chicago Press.

[135] Keller, PA., Harlam, B., Loewenstein, G., Volpp, KG. (2011). Enhanced active choice: A new method to motivate behavior change. *Journal of Consumer Psychology*, *21*(4), 376-383

[136] Londakova, K., Roy-Chodury, V., Geisiarz, F., Burd, H., Hacohen, R., Mottershaw, A., Ter Meer, J., & Likki, T. (2021). *Encouraging employers to advertise jobs as flexible. Behavioural Insights Team and UK Government Equalities Office*.

- **Publicize the acceptance of hybrid working arrangements amongst managers.**

  Managers may be less willing to offer teleworking arrangements if they believe that other managers are against it. *Pluralistic ignorance* occurs when people believe their peers hold different (i.e., more or less extreme) attitudes, beliefs, or behaviours than they do.[137] It leads people to conform to a perceived norm that does not actually exist. For example, a recent BIT trial showed that male employees consistently thought that their peers were less supportive of taking parental leave than they really were. Simply telling men that the majority of their male peers were supportive of parental leave significantly increased participants' intentions to take between 5 and 8 weeks of parental leave by 62%.[138] The Government of Canada can test this idea in its own workforce by surveying hiring managers about their own acceptance of hybrid work arrangements as well as their perceptions of their peers' acceptance. If there is a gap between what managers actually think and what they think *other* managers think, the government should communicate the survey data. Survey data should be disaggregated to enable managers to compare themselves to peers with similar profiles.

- **Nudge managers to take up new tools and training for performance management in a hybrid workplace.**

  Managers are often concerned about remote employees working less, multitasking, and mixing personal responsibilities with work while teleworking.[139] These concerns about productivity may be related to the *labour illusion bias*, which describes how people use the effort that goes into creating something or providing a service as a proxy for the value of that product or service.[140] Put more simply, if measuring productivity is a challenge, we often just measure the observable inputs instead, and it's harder to see who's working when employees are not at the work site. New approaches to supervision and performance management may be required to help managers feel comfortable with teleworking.[141] Indeed, 81% of Canadians are concerned about this transition, and report that managers require training on managing hybrid workplaces.[142]

  We understand that the Government of Canada, like other employers, is determining how to support managers in making the transition to more hybrid working. This could involve the development of trainings, guidelines, or management tools. Behavioural insights can inform the development and implementation of these supports to make them more engaging and effective. While the literature on behavioural insights and

[137] Sargent, R. H., & Newman, L. S. (2021). Pluralistic ignorance research in psychology: A scoping review of topic and method variation and directions for future research. *Review of General Psychology, 25*(2), 163-184.
[138] Davidson, S., Hacohen, R., Gesiarz, F., Hardy, T., Schein, A., & Burd, H. (2021). Supporting men to take longer parental leave and work flexibly. Research Report. *Behavioural Insights Team & UK Government Equalities Office*.
[139] Choudhury, P., Larson, B. Z., & Foroughi, C. (2019). Is it time to let employees work from anywhere? *Harvard Business Review*.
[140] Buell, R. W. & Norton, M. I. (2011). The labor illusion: How operational transparency increases perceived value. *Management Science, 57*(9), 1564–1579.
[141] Wilson, J., & Abrams, Z. (2019). The future of remote work. *Monitor on Psychology, 50*(9), 54-60
[142] KMPG (2021). *Canadians like hybrid model concept: Workplace reboot*.

change management / adult learning is too extensive to be summarized in this report, some compelling strategies include:

- Minimize cognitive load on hiring managers by providing resources that are as clear and simple as possible. For example, prioritize heuristics or *rules of thumb* for improved managerial practices.
- Test out different *messengers* to encourage uptake of resources and learning opportunities. For example, OCHRO (TBS) recently demonstrated the importance of messengers in a trial to encourage employee self-identification.[143]
- Consider generative strategies, which place responsibility for learning on the individual. For example, elaboration is a generative strategy through which learners use their own words and ideas to expand on a concept in a way that relates to their experience and understanding.[144]
- Use gamification strategies, like relative rankings and badges, to increase engagement with learning opportunities.[145]

Purchasing ZEVs

Though widespread lockdowns have caused a reduction in commuting by personal motor vehicle, over half of Canadians continue to drive to work.[146] This set of four recommendations focuses on how to help them reduce emissions by switching from a combustion engine vehicle to a ZEV. Beyond these recommendations, we recommend further attention on how lower-income individuals and communities can be supported in accessing and benefitting from ZEVs.

- **Encourage ZEV ownership through communications campaigns that leverage social norms.**

  The Government of Canada recently announced a new target for all new vehicles sales to be zero-emission by 2035 – 5 years earlier than the previous target.[147] We recommend leveraging this announcement in the context of the existing Zero Emission Vehicle Awareness Initiative to communicate changing social norms regarding ZEV ownership and the fact that society is moving away from combustion-dependent vehicles.[148] A recent study conducted by the UK Department for Transportation, in collaboration with BIT, tested a series of messages with people who had just renewed their car tax online. The messages all encouraged users to click through to a joint government and industry website that encourages electric

[143] Unpublished; presented by Elizabeth Hardy at a Canada School of Public Service event.
[144] Jonassen, D. H. (1997). Instructional design models for well-structured and iII-structured problem-solving learning outcomes. *Educational Technology Research and Development, 45,* 65–94.
[145] Dunlap, J. C., Verma, G., & Johnson, H. L. (2016). Presence experience: A framework for the purposeful design of presence in online courses. *TechTrends, 60*(2), 145–151.
[146] Harris, M. A., & Branion-Calles, M. (2021). Changes in commute mode attributed to COVID-19 risk in Canadian national survey data. *Findings.*
[147] Transport Canada. (2021). *Building a green economy: Government of Canada to require 100% of car and passenger truck sales be zero-emission by 2035 in Canada.* Government of Canada.
[148] Natural Resources Canada. (2021). *Canada raising awareness on zero-emission vehicles.* Government of Canada.

vehicle purchase. The two most successful messages 1) informed users that the government is consulting on ending the sale of new petrol, diesel and hybrid cars and 2) employed a behavioural strategy called *dynamic social norms* ("Join the 6,000 new drivers every month who make the switch to an electric vehicle").[149] A GC-funded campaign could leverage social norms through statistics showing Canadians' growing interest in ZEVs, complemented by narratives and testimonials from current ZEV users, which have been shown to be effective tools for persuasive communications.[150] Social norms can also be made more salient in the physical environment by expanding the rollout of green license plates to all provinces and territories.

- **Support the development of a new price labelling standard that makes cost comparisons between ZEVs and combustion vehicles easier and more accurate.**

  Financial barriers can be exacerbated by cognitive biases that affect people's abilities to fully assess the financial trade-offs of ZEV ownership. On average, ZEV ownership yields annual savings of $1,900 per year in operational costs compared to gas-powered vehicles.[151] However, *hyperbolic discounting* leads people to focus disproportionately on upfront costs (which are relatively high for ZEVs compared to other vehicles) while neglecting the benefits of lower future operating costs.[152] Given that most of the costs of ZEV ownership are in the present and most savings are in the future, people are more likely to underestimate the impact of these savings. We recommend developing a new price labeling standard that includes rebate information and total operational costs to help consumers better consider cost tradeoffs between different vehicle options (e.g., over a typical 9-year ownership period, ZEVs see $17,100 in savings relative to non-ZEVs).[153] Such standard pricing labels can be used on manufacturer websites, third party comparison websites and in car dealerships. Though there are jurisdictional limitations to the role that the Government of Canada can play in supporting the development of a new price labeling standard, a federal role could include conducting research into effective labelling practices.

- **Use timely prompts to increase awareness and salience of ZEV incentives.**

  Rebates and incentives can be a strong motivator of ZEV ownership given the high upfront costs. In British Columbia, approximately half of ZEV owners reported that rebates strongly influenced their purchase decision.[154] However, not all drivers know about these incentives, posing a barrier to uptake. For example, only 5% of gas car owners in Ontario knew about the provincial incentive program in 2017, which was

[149] UK Cabinet Office. (2021). *Make your next car electric: A behavioural science messaging trial*.

[150] The use of narratives and testimonials from relatable messengers are promising strategies for tailored outreach. See: De Wit, J. B., Das, E., & Vet, R. (2008). What works best: Objective statistics or a personal testimonial? An assessment of the persuasive effects of different types of message evidence on risk perception. *Health Psychology*, *27*, 110.

[151] Plug'n Drive. (2017). *Driving EV uptake in the Greater Toronto and Hamilton area.*

[152] Loewenstein, G. (1996). Out of control: Visceral influences on behavior. *Organizational Behavior and Human Decision Processes, 65*(3), 272-292.

[153] Plug'n Drive. (2017). *Driving EV uptake in the Greater Toronto and Hamilton area.*

[154] Axsen, J., Goldberg, S., & Bailey, J. (2015). *Electrifying vehicles: Insights from the Canadian plug-in electric vehicle study.* Sustainable Transportation Research Team, Simon Fraser University.

worth up to $14,000 at the time.[155] Communications can address this barrier, but they are only likely to be effective if they are timely – close to the moment of car purchase decision.[156] Sharing information about the Government of Canada's iZEV program at moments when people are thinking about their driving habits may be more likely to elicit engagement. For example, the Government of Canada could buy personalized web ads that appear when people use search terms related to buying a new car. This approach could be coupled with other behavioural insights for targeted communications, such as the power of personalization and eliciting social norms by noting the number of people in users' area who have already benefited from the iZEV program.

- **Personalize information on the iZEV program website to help potential consumers choose a vehicle that meets their needs.**

  Transport Canada's webpage on vehicles eligible for the Incentives for Zero-Emission Vehicles (iZEV) Program addresses an important barrier to ZEV purchasing: lack of knowledge regarding models available.[157] Personalizing information increases the likelihood that people will engage with content and shift their behaviours.[158] We recommend that Transport Canada personalize elements of the iZEV website. Currently, eligible vehicles are displayed in a searchable table with columns that can be sorted (see figure 6 below). This structure may lead to *choice overload*; a situation where having more choices makes decisions more difficult by increasing the cognitive burden of comparisons.[159] Personalizing this information by asking website users a series of questions such as "Are you purchasing or leasing?" and showing only information relevant to them can help reduce choice overload.

  Personalization could also help users better understand the functionality of ZEVs and what driving a ZEV would mean for their daily lives. For example, this page could include a function for drivers to input their home and work addresses to see how many times they could make their daily trip in eligible vehicles before having to recharge, along with a list of the most convenient charging stations.

Figure 6 – iZEV program eligibility website[160]

[155] Plug'n Drive. (2017). *Driving EV uptake in the Greater Toronto and Hamilton area.*

[156] Thompson, S., Michaelson, J., Abdallah, S., Johnson, V., Morris, D., Riley, K., & Simms, A. (2011). *Moments of change' as opportunities for influencing behaviour: A report to the Department for Environment, Food and Rural Affairs*. Defra.

[157] Behavioural Insights Team and UK Department of Transportation (2020). *Driving and accelerating the adoption of electric vehicles in the UK.* Research report.

[158] Gilbert, H., Sutton, S., Morris, R., Petersen, R., Galton, S., Wu, Q., Parrott, S., & Nazareth, I. (2017). Effectiveness of personalised risk information and taster sessions to increase the uptake of smoking cessation services: A randomised control trial. *The Lancet*, 389(10071), 823-833; See also: Haynes, L., Service, O., Goldacre, B., & Torgerson, D. (2012). *Test, learn adapt: Developing public policy with randomised controlled trials*. Behavioural Insights Team and UK Cabinet Office.

[159] Iyengar, S., & Lepper, M. (2000). When choice is demotivating: Can one desire too much of a good thing? *Journal of Personality and Social Psychology, 79*, 995-1006.

[160] Transport Canada (2021). *List of eligible vehicles under the iZEV Program*. Government of Canada.

Filter items

Showing 1 to 77 of 77 entries | Show 100 entries

Model Year	Make	Model	Trim	Fuel Type	Seating Capacity	Battery Size equal to or above 15 kWh	Incentive for Purchase or 48 month Lease	Incentive for 12 Month Lease	Incentive for 24 Month Lease	Incentive for 36 Month Lease	Eligibility Date
2018	Audi	A3 Sportback e-tron	Progressiv Technik	PHEV	5	No	$2,500	$625	$1,250	$1,875	2019-05-01
2021	BMW	i3	Base s	BEV	4	Yes	$5,000	$1,250	$2,500	$3,750	2020-12-21
2021	BMW	i3	Range Extender s Range Extender	PHEV	4	Yes	$5,000	$1,250	$2,500	$3,750	2020-12-21
2021	BMW	330e	RWD xDrive	PHEV	5	No	$2,500	$625	$1,250	$1,875	2020-04-21
2018/2019	BMW	i3	Base s	BEV	4	Yes	$5,000	$1,250	$2,500	$3,750	2019-05-29
2020	BMW	i3	Base s	BEV	4	Yes	$5,000	$1,250	$2,500	$3,750	2020-01-16
2020	BMW	i3	Range Extender s Range Extender	PHEV	4	Yes	$5,000	$1,250	$2,500	$3,750	2020-01-16

5. Next Steps

This report makes two sets of recommendations for reducing commuting emissions post COVID-19: applying a behavioural science lens to large-scale policy levers and nudging specific commuting choices, like exploring new modes of commuting, returning to public transit, maintaining teleworking and purchasing ZEVs. The application of behavioural insights in the context of commuting interventions is typically associated with leveraging nudges like the provision of personalized transportation plans, which can make commuting options easier to understand and more salient. While such measures have typically been insufficient to change deeply ingrained habits like commuting, the disruption caused by COVID-19 may offer a unique context in which these interventions are more effective. However, even in this context, the most important barriers to lower emissions commuting are structural and need to be addressed through large-scale policies and infrastructure investments. Here too, behavioural science has an important and under-utilized role to play. A behavioural science lens can help refine the design, implementation, and selection of policy options. For example, it leads us to prioritize measures that can reduce emissions *without shifting behaviour* (e.g., by electrifying buses or encouraging manufacturers to offer more ZEVs).

We encourage ECCC to work with its partners inside and outside of government to assess and adapt these ideas. While the ideas are based in sound behavioural science, other perspectives and expertise should be leveraged prior to implementation. We recommend that the GC prioritize solutions that rely on the limited window of time as lockdowns ease but before new habits solidify. BIT would be pleased to support further exploration, analysis, and prioritization of our recommendations.