



## **Region of Peel Goods Movement Strategy: Alternative Fuels and Efficiency Initiatives**

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## Project Overview

Region of Peel is an integral gateway for goods movement in the Greater Toronto Area and a strategic freight hub for distribution on a national scale. As a cornerstone of both the local and national economy, and as a rapidly growing industry, Partners in Project Green supports the Region of Peel with initiatives to manage goods movement in a forward-thinking and sustainable way through their Goods Movement Strategic Plan 2017-2021 (GMSP).

In alignment of our development of transportation-centric programming offered to our growing business community, Partners in Project Green was able to assist the Region of Peel by developing this report. Specifically, our collective discussion identified two strategic directions for which Partners in Project Green has the knowledge, experience, capacity, and industry alignment to enhance the efforts within the GMSP. This would be to support Peel's Transportation System Planning Department to pursue fuel efficiency and alternative fuels transportation initiatives that could be supported at a municipal level.

As a first step, we recognize that the Region of Peel required additional insight to research, validate with industry experts and recommend effective fuel efficiency and alternative fuel transportation strategies, initiatives and technologies for the freight sector that are commercially viable, readily available and are being adopted or implemented in other municipalities. This would allow the Region to promote best practices and contribute to advancing solutions and processes that reduce GHG emissions and align with other transportation and climate change plans and strategies within Peel.

Additionally, the GMSP previously identified initiatives that could be pursued to assist businesses with obtaining funding for alternative fuel solutions to reduce transportation GHG impacts. These initiatives would be aimed to promote innovation and technologies through the potential development of pilot opportunities or the utilization of best practices at a wider freight transportation industry scale. The GMSP also identifies the need to acknowledge businesses that are effectively mitigating climate change impacts with alternative fuel technologies or fuel efficiency measures. The joint effort pursued by the Region of Peel and Partners in Project Green are aligned to accomplish both desired outcomes.

## Timeline of Key Milestones

Objective	Completion Date
Project launch and kick-off call	April 24, 2019
Secondary research, list of interviewees, and key research questions	June 5, 2019
Stakeholder workshop	August 20, 2019
Online stakeholder survey	August 30, 2019
Primary research interviews	October 25, 2019
Final report of research and recommendations	November 8, 2019
Project wrap-up	November 15, 2019

## Research Methodology

The following approach was proposed to identify practical solutions and innovations of alternative fuel options and fuel efficiency strategies best suited for greenhouse gas (GHG) reduction potential in Peel. The research would emphasize practical and immediate actions the Region can take to accelerate growth in these sectors:

1. Determine research workplan – stakeholder collaboration and input, primary / workshop interviewee list, development of key research questions
2. Conduct primary and secondary research – secondary research to identify current and emerging initiatives and educational strategies, identify commercial viability and adoption ready approaches, provide an online survey, and complete primary and workshop interviews with strategic stakeholders

Key Research Questions
What do you see is the role of the Region of Peel in supporting the transition to alternative fuels and fuel efficiency initiatives for goods movement?
What barriers exist to widespread adoption of alternative fuels and fuel efficiency initiatives? How can the Region of Peel help to overcome these barriers?
What government action has most effectively accelerated adoption of alternative fuel and fuel efficiency initiatives?
What are some examples of successful public-private partnerships focused on alternative fuels?
Which investments in alternative fuels and fuel efficiency currently stand out as having the most appealing ROI?
How will electronic logging devices (required by 2020) improve fuel efficiency for trucking companies?
What does your organization see as the key benefits of alternative fuels and fuel efficiency?
What is the largest barrier within your company to adopting alternative fuels and fuel efficiency initiatives?
What area should Region of Peel focus to effectively encourage the adoption of alternative fuels or fuel efficiency initiatives? (e.g. vehicle pilots, refueling infrastructure, planning policy, etc.)

## Key Market Trends

Based on the industry insights obtained from the secondary research along with the online survey, the primary interviews, and the August 2019 workshop, the following key market trends were identified:

- **Insightful analysis and industry thought leadership being explored in the Canadian marketplace**

As showcased by the quality of secondary information currently available from Appendix A. Secondary Research section (focused on 2014-2019 reference material), there are a number of organizations and institutions exploring the issues of medium to heavy freight transportation and the long-term transition to the use of alternative fuels and fuel efficiency measures. This includes detailed regional analysis for challenges in Ontario from the Pembina Institute, Pollution Probe, Delphi Group, and the Toronto Region Board of Trade. In addition, there are national insights being derived from stakeholder groups such as Canadian Energy Systems Analysis Research (CESAR), Conference Board of Canada, Canadian Fuels Association, and Interuniversity Research Centre on Enterprise Networks, Logistics, and Transportation (translated to the French language acronym CIRRELT). Both sets of groups can serve as strategic partners for Region of Peel for additional research information, supportive lobbying platforms for provincial or national policies, and as an effective resource for the short-term showcase of regional education and awareness initiatives or capital/program pilot opportunities.

- **Industry best practices and progressive case studies**

Analyzing regional, national, and international case studies on the utilization of alternative fuels and fuel efficiency measures by the freight sector, there are a number of intriguing examples that were identified with multi-national players from BSR Future of Fuels (<https://www.bsr.org/en/collaboration/groups/future-of-fuels/case-studies>). Shared on this website link are 18 companies who have catalyzed effective change to the freight system in their international competitive landscape, some of which could be applicable to the Canadian marketplace. These include the utilization of electric vehicle trucks, use of diesel/hydrogen fuel blending, business case analysis of renewable diesel, and the fleet transition towards compressed natural gas. These case studies also coincided with regional and national pilot initiatives that have been independently spearheaded by corporations looking to understand the long-term potential to utilize alternative fuels and fuel efficiency measures, including regional test pilots by Canada Post, UPS, Nestle, Canadian Tire, IKEA, Loblaw, Martin Brower (McDonald's) and corporations within the Hydrogen Business Council. Additionally, there are funded academic pilots understanding the long-term impact of alternative fuel and fuel efficiency on procurement, maintenance, operational conditions due to seasonal weather, and fuel blending by CESAR and the Transition Accelerator; a pilot initiative that seeks replication in Ontario with potential strategic partners like Toronto Pearson, for example. Further expanding the capacity of regional pilots through existing partnerships with companies within the Peel Goods Movement Task Force could also result in moving the needle towards the use of alternative fuels and fuel efficiency measures in the Region of Peel.

- **Understanding the business case for disruptive technologies and leading-edge solutions**

Based on a validation of anecdotal insights from online survey, primary interviews, and workshop participants, there is a strong understanding of the business case potential to utilize disruptive technologies and leading-edge solutions in the alternative fuels and fuel efficiency marketplace in Canada, however, the market is not conducive to adoption and long-term implementation due to many factors. The lack of re-fueling stations for long-haul capacity is insufficient to enlist sectoral change, while the lack of financial incentive or capital capacity to justify the retrofit or acquisition of alternative fuel delivery vehicles is still a major barrier. Through effective industry engagement, education and awareness of drivers, and highlighting the need for monitoring and evaluation of data, the focus to transition the regional industry towards fuel efficiency measures and effective vehicle maintenance could be a short-term goal or target that the Region of Peel could positively influence. With capital costs of the acquisition of retrofit or new alternative fuel vehicles is quite high with long lead times for acquisition, the return on investment for a company at this stage is low to effectively make a transition in this margin driven, competitive marketplace. Conference Board of Canada's Greening Freight (2018) report analyzes established fuel saving technologies in use in Canada and the potential for the market to utilize disruptive technologies in freight transport. Similarly, Pollution Probe's Decarbonizing Transportation in Canada (2018) report prioritizes the order in which alternative fuels and fuel efficiency measures will be adopted, identifying the following ranking: engine efficiency, transmission efficiency, higher voltage electric architecture, hybrid powertrain, batteries and electric motors, and hydrogen fuel cells. These two references provide effective insights into the pulse of the national market, which can be translated to the market participants in the Region of Peel.

## Challenges and Issues

Based on the industry insights obtained from the secondary research along with the online survey, the primary interviews, and the August 2019 workshop, the following key market trends were identified:

- **Lack of industry awareness and ineffective communication**

Despite progressive multi-national companies looking at alternative fuels and fuel efficiency measures, the Tier II regional and national marketplace participants have limited awareness of the financial and operational benefits that can come from these types of transitional changes. Additionally, with the shortage of certified delivery drivers and long-haul providers in the regional landscape, the focus of educational programs and certification institutions is on basic training requirements rather than providing insights on efficient driving practices, fuel-saving opportunities, and the importance on seasonal maintenance. Addressing industry awareness can be positively influenced by the Region of Peel through partnerships established with regional and/or national freight trade associations, showcasing regional pilot opportunities available and sharing of relevant analytical content from the Smart Freight Centre. Additionally, with many regional vocational training institutions within reach of the Region of Peel, advocating for course load additions focused on sustainable driver training and best practices that improve driver health and wellness, this may lead to organic, grass roots influence for new delivery drivers and long-haul providers.

- **Limited capital infrastructure and procurement challenges for retrofit and new acquisitions**

Aggregate anecdotal and secondary research insights point to a universal issue identified regionally and nationally – a lack of existing infrastructure for refueling capacity at both major urban centres and long-haul hubs and transportation nodes. This is a challenge that requires a combined movement at all levels of government to evoke industry change, while encouraging major investments by utility providers and major alternative fuel sector participants to provide the required infrastructure to enlist long-term demand from the market participants. Coinciding with this major challenge are the long lead times for progressive end users to obtain retrofit and new delivery trucks and equipment for their fleets and a business case that generally doesn't meet marginal thresholds to justify capital investment of this nature for small-to-medium market participants. With an effective showcase of analytically driven business cases for both financial and operational benefits to market participants, Region of Peel could positively influence the regional players to seek out federal government incentives to transition to alternative fuel technologies and fuel efficiency measures. With a positive influence on regional infrastructure planning, the Region of Peel could encourage the strategic placement of utility-invested refueling infrastructure at major 400 series highways entering and exiting the regional transportation network core. This could accelerate the demand for retrofit and capital freight delivery trucks being sought after by the regional participants over time.

- **Different requirements for long-haul transportation vs. urban freight delivery**

Many non-profit, non-governmental, and academic primary research and online survey participants highlighted the contrast in sectoral requirements between long-haul transportation vs. urban freight delivery. Both have impactful contributions to rising GHG emissions in the region, but both have different segment solutions and distinct industry challenges. As previously mentioned, long-haul transportation requires the influx of refueling infrastructure to be established before major industry transitions towards alternative fuel technologies and fuel efficiency measures are sought after. However, urban freight delivery issues are focused more on consumer demands, route planning and by-law influence, and utilizing innovative logistical solutions to solve the long-term challenges. Learnings from the Region of Peel's off-peak delivery pilot initiative combined with showcasing unique regional case studies initiated by courier delivery specialists such as Canada Post and UPS could lead to other companies identifying creative, sustainable fuel efficiency measures or long-term transitional plans towards alternative fuel technologies. The positive influence of telematics (which highlights the demand for real-time package tracking, driver delivery efficiency metrics, and load management capacity) could be an area for which Region of Peel may want to explore in direct partnership with regional courier providers and specialized technology vendors.

## Insightful Quotations from Key Research Questions

The combined insights obtained from the online survey, the primary research interviews, and the August 2019 workshop are highlighted in key quotations extracted. These include the following:

<p style="text-align: center;"><b>Insightful Quotations from Key Research Questions</b></p>
<p><b>What do you see is the role of the Region of Peel in supporting the transition to alternative fuels and fuel efficiency initiatives for goods movement?</b></p> <ul style="list-style-type: none"> <li>• “Provide quality information and communication to fleet operators in community on fuel efficiency best practices.”</li> <li>• “Public awareness campaigns to educate on the benefits of alternate fuels, (while providing) specific curb stopping / delivery space for environmentally friendly vehicles.”</li> <li>• “A focus on developing high-power charging infrastructure in high-traffic areas for trucks. These locations can include truck stops, loading docks, freight terminals, ports, etc.”</li> </ul>
<p><b>What barriers exist to widespread adoption of alternative fuels and fuel efficiency initiatives? How can the Region of Peel help to overcome these barriers?</b></p> <ul style="list-style-type: none"> <li>• “Municipal governments must recognize that infrastructure is by far the largest obstacle and in consideration of long haul, the fact that there needs to be a coordinated effort among all three levels of government.”</li> <li>• “Public awareness of fuel efficiency best practices. Fleet managers trained and required to focus on short term cash savings while ignoring long term cost and emission reductions, no support offered for fleets to change current practices.”</li> <li>• “Municipalities can help overcome these barriers through information dissemination, public campaigns to build support for electric vehicles, creating an environment conducive to zero-emission vehicle (ZEV) infrastructure (amending relevant bylaws, when necessary), investing in ZEV infrastructure and providing incentives for ZEVs and ZEV chargers.”</li> </ul>
<p><b>What government action has most effectively accelerated adoption of alternative fuel and fuel efficiency initiatives?</b></p> <ul style="list-style-type: none"> <li>• “Emission testing, annual commercial vehicle inspections, electric vehicle subsidies, increased fuel costs with carbon tax.”</li> <li>• “Regulatory programs such as fuel efficiency standards for new vehicles as well as zero emission vehicle mandates.”</li> <li>• “Purchase incentives have historically been effective at accelerating adoption. The Federal iZEV purchase incentive program will be useful.”</li> </ul>
<p><b>What are some examples of successful public-private partnerships focused on alternative fuels?</b></p> <ul style="list-style-type: none"> <li>• “The most successful government action was ushered in by Natural Resources Canada through the SmartDriver Highway Trucking (SDHT) Program.”</li> <li>• “Certification training offered by the Automotive Aftermarket Retailers of Ontario program for vehicle efficiency identification and standardized inspection protocols.”</li> <li>• “Corporate recognition program established by Natural Resources Canada’s SmartWay program in North America.”</li> </ul>

**Which investments in alternative fuels and fuel efficiency currently stand out as having the most appealing ROI?**

- “Investment in several vehicle fuel efficiency technologies and packages have very cost-effective ROI. Several governments around the world have implemented regulations to accelerate the deployment of these cost-effective technologies in new light- and heavy-duty vehicles.”
- “The Electric Vehicle and Alternative Fuel Infrastructure Deployment Initiative (EVAFIDI) offers repayable contributions to support the construction of an electric vehicle (EV) fast charging, coast-to-coast network. The funding also supports natural gas infrastructure along key freight corridors and hydrogen infrastructure in metropolitan centres.”
- “Basic fuel efficiency services such as regular tire pressure check (using nitrogen), annual wheel alignment and tire balancing, regular vehicle emission health check scans of vehicle, regular fuel system cleaning, and route optimization tools.”

**How will electronic logging devices (required by 2020) improve fuel efficiency for trucking companies?**

- “70% of commercial and freight vehicles have a connectivity demand, while 30% of trucks and commercial vehicles already use telematics in North America.”
- “Uberization of the freight industry will optimize load carrying capacity and increase efficiency.”
- “Fuel efficiency and truck / package delivery track and trace demands are main drivers for market growth expectations from a retrofit capacity of existing fleets.”

**What does your organization see as the key benefits of alternative fuels and fuel efficiency?**

- “Reduced fuel cost, meeting corporate sustainable program goals, and reduced GHGs.”
- “Reduced long-term operating costs, less unplanned downtime, reduced emissions, increased employee satisfaction and improved public safety.”
- “Limited benefits associated with alternative fuels because we are a cross border carrier and there is no infrastructure in place for refueling or charging when it comes to alternative fuels.”

**What is the largest barrier within your company to adopting alternative fuels and fuel efficiency initiatives?**

- “Availability of alternative fuels - especially for applications where battery electric is not practical...”
- “With regards to fuel efficiency, I think the largest barrier is the lack of additional incentives from the government to help motivate both carriers and drivers to take it seriously.”
- “Lack of government support for business investment in new efficiency infrastructure / technology.”

**What area should Region of Peel focus to effectively encourage the adoption of alternative fuels or fuel efficiency initiatives? (e.g. vehicle pilots, refueling infrastructure, planning policy, etc.)**

- “Infrastructure and policy will help create an environment conducive to adopting alternative fuels.”

- “Vehicle pilots and planning policy are both beneficial but without refueling infrastructure, most carriers would not consider it an investment but an experimental expenditure with little to no ROI.”
- “Fleet education seminars to business owners and decision makers providing fuel efficiency solutions from local qualified service providers. Providing incentives and public awareness for local fleets that participate in and demonstrate best fuel efficiency practices.”

## Strategic Opportunities for the Region of Peel

Based on the industry insights obtained from the online survey, primary research interviews, and secondary research reviewed, the following strategic recommendations were derived for the Region of Peel:

- **Lead strategic education and awareness opportunities**

As previously mentioned, there are many vocational training and certification institutions for delivery drivers and long-haul freight providers within the Region of Peel, so a push towards enhancing course load development focused on sustainable and fuel-efficient best practices could be established. This could allow new delivery drivers and long-haul freight providers to understand the improvement to health and wellness within their profession, the emerging trends and hiring practices of progressive employers, and to understand the long-term demand for sustainable certification and training. Additional resource investment by the Region of Peel to showcase leading initiatives (e.g. pilots, case studies, best practices, analytical data sharing, etc.) that utilize alternative fuel technologies and fuel efficiency measures could positively influence the sectoral participation to pursue similar opportunities over time. Strategic marketing campaigns and informative signage to engage the general public on understanding freight transportation centric issues and challenges and how adjusting consumer buying habits could have a positive, lasting effect on regional traffic congestion and impactful changes to consumer goods delivery.

- **Explore collaborative alignment with jurisdictional municipalities with climate change action plans**

With the recent approval of the Region of Peel’s Climate Change Master Plan and the subsequent establishment of Climate Change Action Plans (CCAP) by jurisdictional municipalities (e.g. Town of Caledon, City of Mississauga, and City of Brampton), there are plenty of collaborative opportunities to align goals focused on freight transportation and industrial, commercial, and institutional (ICI) influence. Rather than tackling these issues individually, a unified approach to leverage common interests, goals, and targets, while utilizing momentum from visionary programs (e.g. City of Brampton’s Community Energy and Emissions Reduction Plan) can lead to council level buy-in, supportive resources from jurisdictional municipal staff, and a concerted outreach to industry end users and taxpayers. Conducting an inventory of jurisdictional CCAP’s and programs aimed at reducing ICI sector GHG emissions within the region will allow for a stronger unification of efforts over time. Partners in Project Green is serving as a strong nexus of this alignment, with established partnerships with staff and municipal council representation leading CCAP programming, while leveraging long-standing industry

community partnership to pursue common goals and targets. Adding the Region of Peel's GMSP short-term and long-term goals and targets to this effort will serve to maximize the collective benefit of Partners in Project Green's strategic placement. Additionally, there is a window in early Q1-Q2 2020 to utilize existing partnerships established between Partners in Project Green and the Town of Caledon, City of Mississauga, and City of Brampton through the Federation of Canadian Municipalities' Municipalities for Climate Innovation Program (MCIP - <https://fcm.ca/en/programs/municipalities-climate-innovation-program>) Transition 2050 funding to pursue collaborative pilot opportunities with the ICI sector. Since transportation GHG emission reduction could be a strong metric to align with these undefined pilot opportunities, the exploration with municipal staff responsible for each CCAP could be a fruitful conversation to pursue in the short-term.

- **Establish industry partnerships to encourage paradigm shift towards alternative fuels and fuel efficiency**

Experience drawn from the Region of Peel's leadership established with the Peel Goods Movement Task Force and the 2018-2019 off-peak delivery pilot with the ICI sector are strong examples of industry partnerships. From interactions with stakeholders through primary research interviews, many potential relationships that could be established on behalf of the Region of Peel were identified. As highlighted in the GMSP, a notion to establish an industry recognition program within the Region of Peel is within reach, as there are many progressive organizations looking to learn from pilot opportunities and incremental investments made towards alternative fuel technologies and fuel efficiency measures. Region of Peel can showcase many of these projects to positively influence the larger market segment, while encouraging the demand for refueling infrastructure by utility providers. Partners in Project Green aims to initiate a few strategic introductions with key stakeholders who have expressed interest in working alongside Region of Peel to achieve goals and targets in development with the GMSP. These include potential working partnerships with multi-national fleet managers, courier service providers, non-profit and non-governmental programs, and technology providers. If the focus of these strategic introductions is in furthering the alignment between Region of Peel's GMSP with efforts that will shift the paradigm of the industry over time, then many common goals and objectives will be addressed through collaborative partnerships facilitated by Partners in Project Green. Additionally, the research effort identified three transportation network centric grant and incentive opportunities available from Natural Resources Canada (e.g. Electric Vehicle and Alternative Fuel Infrastructure Deployment Initiative - <https://www.nrcan.gc.ca/energy-efficiency/energy-efficiency-transportation/electric-vehicle-alternative-fuels-infrastructure-deployment-initiative/18352>) and Federation of Canadian Municipalities (e.g. Pilot project: Transportation networks and commuting options - <https://fcm.ca/en/funding/gmf/pilot-project-transportation-networks-commuting-options> and Pilot project: Signature initiative - <https://fcm.ca/en/funding/gmf/pilot-project-signature-initiative>) for Region of Peel to lead with a collective ICI community partnership, which could be supported by Partners in Project Green and other collaborative channel partners. These are opportunities to consider in the immediate short-term, as they align with long-term jurisdictional CCAP efforts and the Region of Peel's Climate Change Master Plan.

## Appendix

### A. Secondary Research

A database of key industry reports and article references (2014-2019) utilized for the research effort include:

Resource	Reference	Website
<b>BSR</b>	Future of Fuels	<a href="https://www.bsr.org/en/collaboration/groups/future-of-fuels">https://www.bsr.org/en/collaboration/groups/future-of-fuels</a>
	The Sustainability Impacts of Fuels	<a href="http://www.bsr.org/reports/BSR_Future_of_Fuels_Understanding_Impacts_of_Fuels.pdf">http://www.bsr.org/reports/BSR_Future_of_Fuels_Understanding_Impacts_of_Fuels.pdf</a>
	Transitioning to Low-Carbon Fuel	<a href="http://www.bsr.org/reports/BSR_Future_of_Fuels_Transitioning_to_Low_Carbon_Fuel.pdf">http://www.bsr.org/reports/BSR_Future_of_Fuels_Transitioning_to_Low_Carbon_Fuel.pdf</a>
<b>Calstart</b>	Government of Canada Endorses Calstart’s Global Commercial Vehicle Drive to Zero Program	<a href="https://calstart.org/drivetozero-pr-28-canada/">https://calstart.org/drivetozero-pr-28-canada/</a>
<b>Canadian Energy Systems Analysis Research</b>	\$15 M project to test hydrogen fuel in Alberta’s freight transportation sector	<a href="https://www.cesarnet.ca/blog/15-million-project-test-hydrogen-fuel-alberta-s-freight-transportation-sector">https://www.cesarnet.ca/blog/15-million-project-test-hydrogen-fuel-alberta-s-freight-transportation-sector</a>
	Canada’s Freight Sector – Addressing Climate Change in the Face of Disruptive Change	<a href="https://www.cesarnet.ca/blog/canada-s-freight-sector-addressing-climate-change-face-disruptive-change">https://www.cesarnet.ca/blog/canada-s-freight-sector-addressing-climate-change-face-disruptive-change</a>
	Zero emission Transportation Fuels: Alberta’s New Economic Opportunity	<a href="https://www.cesarnet.ca/blog/zero-emission-transportation-fuels-alberta-s-new-economic-opportunity">https://www.cesarnet.ca/blog/zero-emission-transportation-fuels-alberta-s-new-economic-opportunity</a>
	The Future of Freight Part A: Understanding the System	<a href="https://www.cesarnet.ca/blog/future-freight-part-understanding-system">https://www.cesarnet.ca/blog/future-freight-part-understanding-system</a>
	Assessing Zero-Emission Alternatives to Diesel in Alberta	<a href="https://www.cesarnet.ca/blog/assessing-zero-emission-alternatives-diesel-alberta">https://www.cesarnet.ca/blog/assessing-zero-emission-alternatives-diesel-alberta</a>
<b>Canadian Natural Gas Vehicle Alliance</b>	Natural Gas Use in the Medium and Heavy-Duty Vehicle Transportation Sector	<a href="https://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/oeepdf/transportation/alternative-fuels/resources/pdf/NRCan_NGRoadmap_e_WEB.pdf">https://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/oeepdf/transportation/alternative-fuels/resources/pdf/NRCan_NGRoadmap_e_WEB.pdf</a>
<b>Conference Board of Canada</b>	Greening Freight	<a href="https://www.conferenceboard.ca/temp/e333f65c-c70b-4b7a-8176-02c287f361fe/9596_Greening-Freight_RPT.pdf">https://www.conferenceboard.ca/temp/e333f65c-c70b-4b7a-8176-02c287f361fe/9596_Greening-Freight_RPT.pdf</a>
<b>European Transport</b>	Crowd logistics: an opportunity for more sustainable urban freight transport?	<a href="https://www.researchgate.net/publication/318641594_Crowd_logistics_an_opportunity_for_more_sustainable_urban_freight_transport">https://www.researchgate.net/publication/318641594_Crowd_logistics_an_opportunity_for_more_sustainable_urban_freight_transport</a>

<b>Research Review</b>	The complexity of planning for goods delivery in a shared urban space: a case study involving cyclists and trucks	<a href="https://www.researchgate.net/publication/319181642">https://www.researchgate.net/publication/319181642</a> The complexity of planning for goods delivery in a shared urban space a case study involving cyclists and trucks
	Plan for sustainable urban logistics – comparing between Scandinavian and UK practices	<a href="https://www.researchgate.net/publication/320473846">https://www.researchgate.net/publication/320473846</a> Plan for sustainable urban logistics - comparing between Scandinavian and UK practices
	Towards a decision-support procedure to foster stakeholder involvement and acceptability of urban freight transport policies	<a href="https://www.researchgate.net/publication/320960343">https://www.researchgate.net/publication/320960343</a> Towards a decision-support procedure to foster stakeholder involvement and acceptability of urban freight transport policies
	Accommodating urban freight in city planning	<a href="https://www.researchgate.net/publication/329272834">https://www.researchgate.net/publication/329272834</a> Accommodating urban freight in city planning
<b>Global Newswire</b>	UPS Makes Largest Purchase of Renewable Natural Gas Ever in the U.S.	<a href="https://www.globenewswire.com/news-release/2019/05/22/1840772/0/en/UPS-Makes-Largest-Purchase-Of-Renewable-Natural-Gas-Ever-In-The-U-S.html?insight_sl=W0VD7iv2%2BC8hyslOu16mXw%3D%3D">https://www.globenewswire.com/news-release/2019/05/22/1840772/0/en/UPS-Makes-Largest-Purchase-Of-Renewable-Natural-Gas-Ever-In-The-U-S.html?insight_sl=W0VD7iv2%2BC8hyslOu16mXw%3D%3D</a>
<b>Lean &amp; Green</b>	100% Collaboration = 0% Emissions	<a href="https://lean-green.eu/">https://lean-green.eu/</a>
<b>Ministry of Transportation (Ontario)</b>	Freight Supportive Guidelines	<a href="http://www.mto.gov.on.ca/english/publications/pdfs/freight-supportive-guidelines-english.pdf">http://www.mto.gov.on.ca/english/publications/pdfs/freight-supportive-guidelines-english.pdf</a>
	Beyond the Finish Line	<a href="http://www.mto.gov.on.ca/english/panam-games/pdfs/2015-games-transportation-post-games-report.pdf">http://www.mto.gov.on.ca/english/panam-games/pdfs/2015-games-transportation-post-games-report.pdf</a>
<b>Natural Resources Canada</b>	Greening Government Fleets	<a href="https://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/energy/pdf/transportation/NRCan_GreeningGov_Fleets_e.pdf">https://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/energy/pdf/transportation/NRCan_GreeningGov_Fleets_e.pdf</a>
<b>National Observer</b>	Canada becomes first country to sign pledge for zero emission commercial vehicles	<a href="https://www.nationalobserver.com/2019/05/29/news/canada-becomes-first-country-sign-international-pledge-zero-emission-commercial">https://www.nationalobserver.com/2019/05/29/news/canada-becomes-first-country-sign-international-pledge-zero-emission-commercial</a>
<b>Pembina Institute</b>	Global momentum on clean transportation	<a href="https://www.pembina.org/blog/global-momentum-clean-transportation-lets-bring-it-canada">https://www.pembina.org/blog/global-momentum-clean-transportation-lets-bring-it-canada</a>
	Delivering Last-Mile Solutions	<a href="https://www.pembina.org/pub/delivering-last-mile-solutions">https://www.pembina.org/pub/delivering-last-mile-solutions</a>
	Local Planning for Goods Movement in Ontario	<a href="https://www.pembina.org/reports/local-freight-planning-in-ontario-final.pdf">https://www.pembina.org/reports/local-freight-planning-in-ontario-final.pdf</a>

	State of Freight Report	<a href="https://www.pembina.org/reports/state-of-freight-report.pdf">https://www.pembina.org/reports/state-of-freight-report.pdf</a>
	Fuel savings and emissions reduction in heavy-duty trucking	<a href="https://www.pembina.org/reports/freightclimateblueprints.pdf">https://www.pembina.org/reports/freightclimateblueprints.pdf</a>
<b>Pollution Probe</b>	Accelerating the Deployment of Zero Emission Vehicles: Atlantic Canada and the Prairies	<a href="http://neia.org/wp-content/uploads/2018/05/Probe-Delphi-ZEV-Report-Final.pdf">http://neia.org/wp-content/uploads/2018/05/Probe-Delphi-ZEV-Report-Final.pdf</a>
	Framework for Municipal ZEV Deployment	<a href="https://www.pollutionprobe.org/publications/framework-for-municipal-zev-deployment-report/">https://www.pollutionprobe.org/publications/framework-for-municipal-zev-deployment-report/</a>
	Decarbonizing Transportation in Canada	<a href="http://neia.org/wp-content/uploads/2018/08/Pollution-Probe-Decarbonizing-Transportation-Report-2018.pdf">http://neia.org/wp-content/uploads/2018/08/Pollution-Probe-Decarbonizing-Transportation-Report-2018.pdf</a>
	International Case Studies on Goods Movement Strategies	<a href="https://www.pollutionprobe.org/publications/international-case-studies-goods-movement-strategies/">https://www.pollutionprobe.org/publications/international-case-studies-goods-movement-strategies/</a>
<b>Toronto Region Board of Trade</b>	Report #1: Economic Impact of the Movement of Goods in the Toronto-Waterloo Innovation Corridor	<a href="https://indd.adobe.com/view/f71003e1-83ac-4775-9023-a7b2bc11fafa">https://indd.adobe.com/view/f71003e1-83ac-4775-9023-a7b2bc11fafa</a>
	Report #2: Movement of Goods Challenges in the Toronto-Waterloo Corridor	<a href="https://indd.adobe.com/view/b4a17024-948f-434b-a72c-9fd2f1a7adbc">https://indd.adobe.com/view/b4a17024-948f-434b-a72c-9fd2f1a7adbc</a>
	Report #3: Toronto-Waterloo Corridor Movement of Goods Business & Consumer Impacts	<a href="https://indd.adobe.com/view/2d47848c-8f3e-44c2-beeb-605e718fa88e">https://indd.adobe.com/view/2d47848c-8f3e-44c2-beeb-605e718fa88e</a>
	Report #4: Policies to Improve Goods Movement	<a href="https://indd.adobe.com/view/6896fa3d-e236-4da8-885b-3262533ed8c4">https://indd.adobe.com/view/6896fa3d-e236-4da8-885b-3262533ed8c4</a>
	Report #5: Three Bold Solutions for the Toronto-Waterloo Corridor	<a href="https://indd.adobe.com/view/e838e8e1-c7ce-49a4-adff-dcd4a8faaa28">https://indd.adobe.com/view/e838e8e1-c7ce-49a4-adff-dcd4a8faaa28</a>
	Report #6: Infrastructure Options to Improve the Movement of Goods in Canada's Innovation Corridor	<a href="https://www.bot.com/Portals/0/MOG_Rpt6_vFinal_Jan%2022.pdf">https://www.bot.com/Portals/0/MOG_Rpt6_vFinal_Jan%2022.pdf</a>

## B. Online Survey

The online survey was conducted from July to September 2019 with 10 respondents. Online survey respondents who participated in the effort include:

Online Survey Respondents
Canada Post
David Kriger Consultants Inc.
FP Innovations – PIT Group
International Council on Clean Transportation
Musket Transport Ltd.
OK Tire and Auto
Pembina Institute
Pollution Probe
Toronto Pearson
Weston Foods Canada Inc.

## C. Primary Research

The primary research interviews were conducted from June to October 2019 with 12 respondents. Three additional organizations participated in a primary research interview but requested not to have their interview transcript shared with Region of Peel. Primary research interviews that were completed in the effort include:

Primary Research Interview Respondents
Canadian Energy Systems Analysis Research Initiative
Canadian Fuels Association
Canadian Tire Corporation
David Kriger Consultants
Fleet Complete
Hydrogen Business Council
Interuniversity Research Centre on Enterprise Networks, Logistics, and Transportation (CIRRELT)
Musket Transport Ltd.
Nestle Canada
Pembina Institute
Transition Accelerator
Vision Transportation

## D. Stakeholder Workshop

Partners in Project Green hosted a stakeholder workshop in August 2019 to obtain insights, opinions, and recommendations from industry leaders in the transportation sector, with 11 participants in attendance. Seven additional organizations had registered for the workshop but did not attend due to conflicting circumstances.



The following stakeholders who attended the workshop include:

Workshop Participants
Canada Post
OK Tire and Auto
Mitsubishi Motors
Pembina Institute
Pollution Probe
University of Toronto
Region of Peel
Environment Canada