Toronto Pearson’s plans to green its fleet including use of hydrogen

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SWIFT
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Greater Toronto Fleet Greening Target

Light Fleet to be at net zero emissions in 2030, or in other words, YYZero in 2030.

By 2030, for vehicles for which there is no market solution, use renewable fuels

What are other airports doing (Feb 2023)

Royal Schiphol Group (AMS)			
	2030 Target Reduce light fleet emissions to 720t, from 1477t in 2021. Use HVO100[2](bio diesel) to offset the 720t CO2	Light fleet replace over coming years, balancing operational performance, environment & safety concerns	
San Francisco Airport (SFO)			
	Goal Achieved Policy's goal of 100% clean air vehicles in Airport and Airport-permitted fleets has been met.	Have replaced all of gasoline and diesel vehicles with clean air vehicles powered by alternative fuels like **electricity, renewable compressed natural gas (RCNG), and renewable diesel**	• 354 staff and utility vehicles. • 161 renewable compressed natural gas 21 plug-in electric • 50 hybrid-electric • 122 renewable diesel

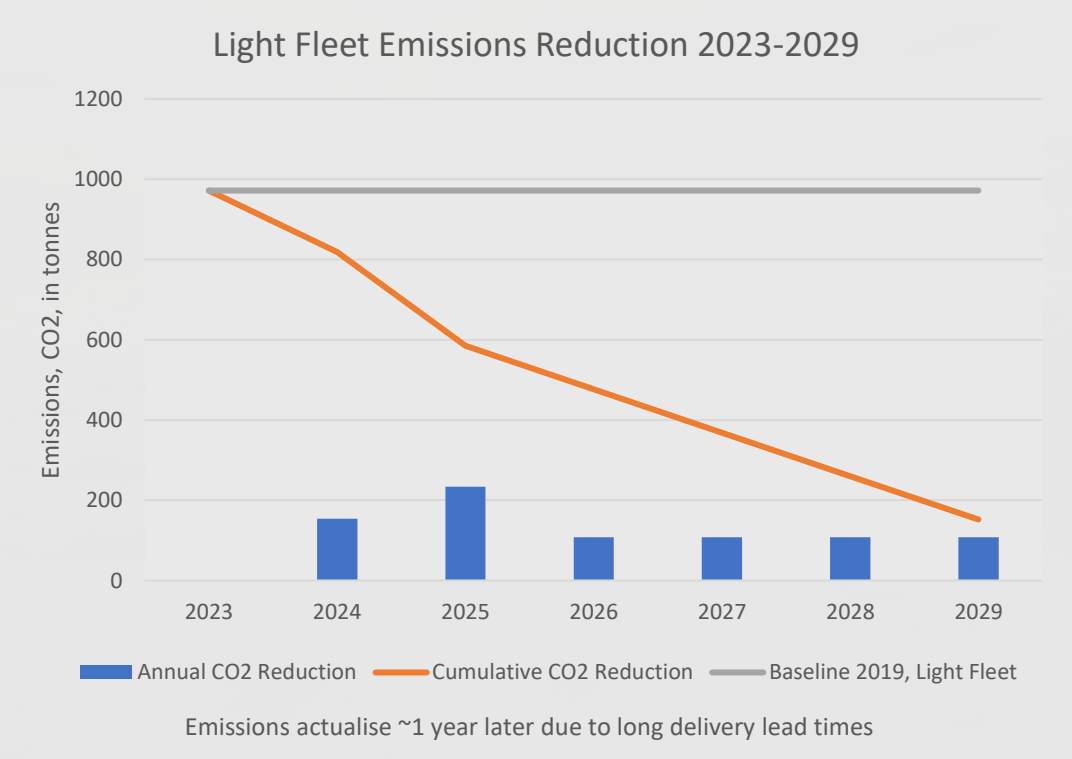
What are other airports doing (Feb 2023)

Los Angeles World Airports (LAWA)			
	2031 Target LAWA is committed to transitioning 100% of its sedan fleet to electric vehicles by 2031	LAWA has adopted **a zero emission-first purchasing policy for its light-duty vehic**les in its fleet of more than 1,100 vehicles.	41% of LAWA's fleet is powered by alternative fuel, including 120 electric vehicle sedans, 20 articulating electric airfield buses and the addition of the heavy-duty Nikola Tre BEV. Other fully electric vehicles currently in LAWA's fleet, or on order for delivery, include 26 Ford F-150 Lightning trucks, 10 Ford Mach E sedans, 32 new Class 4-8 trucks and up to 27 electric buses.

GTAA's light fleet replacement plan

VEHICLE TYPE	2023	2024	2025	2026	2027	2028	
CARS							
FCEV	5	5					
BEV	5	5					
PICKUP TRUCKS							
ICE	28						
HEV	3	18					
BEV			17	12			
ZEV					15	13	
SUVS							
HEV		3					
FCEV	5						
BEV	3	5					
ZEV				2	3	5	
VANS							
ICE	2	2					
HEV	6	5	2	3			
BEV				2			
ZEV					1	1	
TOTAL	57	43	19	19	19	19	176

ICE – internal combustion
HEV – hybrid EV
FCEV – fuel cell EV
ZEV – zero emissions vehicle


Light Fleet Emissions Reduction 2023-2029
Emissions, CO2, in tonnes
1200
1000
800
600
400
200
0
2023
2024
2025
2026
2027
2028
2029
Annual CO2 Reduction
Cumulative CO2 Reduction
Baseline 2019, Light Fleet
Emissions actualise ~1 year later due to long delivery lead times

Concerns related to greening the fleet

EV charging infrastructure	Getting chargers at every facility where staffing are based?
	Electrical capacity at each facility?
	Electrical capacity and cost to bring cabling in from the utility?
	Where does EV charging fit in the airport expansion plans?
	Who is responsible for EV charging, Fleet, Electrical or Engineering Department?
EV vehicles	Lack of EV pick up trucks in the market
Low emissions vehicles	Lack of hydrogen power vehicles in the market

Hydrogen Refueling at Pearson Q1 2024

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CARLSUN ENERGY

TORONTO PEARSON

Toronto Pearson Airport and Carlsun Energy Announce Ontario's First Public Hydrogen Refuelling Station for Light- and Heavy-Duty Vehicles

Carlsun Energy will design, build, operate, and maintain the station

Station is Ground-side at GTAA and will be accessible to the public

Station will be utilized for GTAA hydrogen-powered vehicle trials

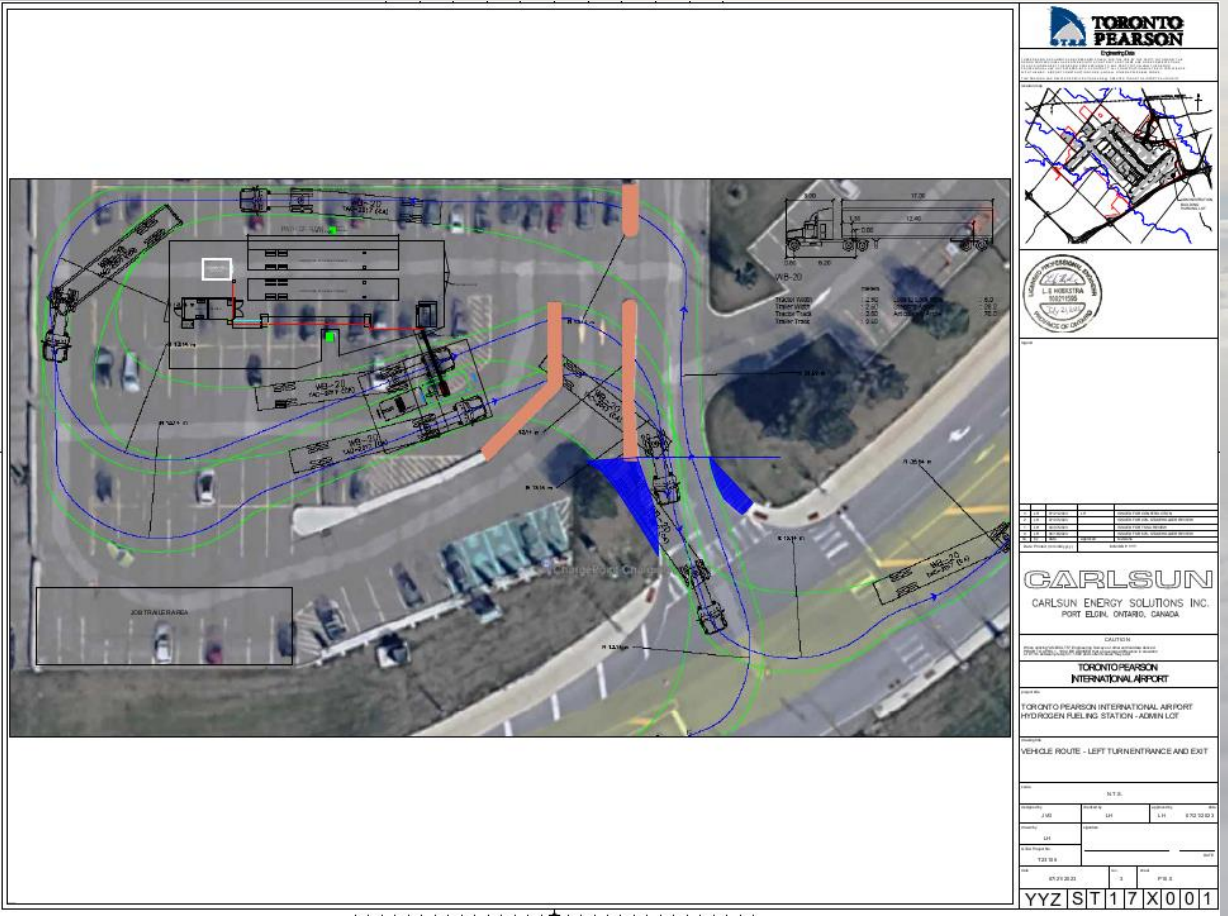
Carlsun Energy is managing all permitting and approval processes with GTAA, TSSA, and ESA

Co-funded by:

Government of Canada / Gouvernement du Canada

Zero Emission Vehicle Infrastructure Program

Station Layout



Designed to accommodate:

- **Worst case truck turning radius (53ft Class 8) which allows for all other vehicle types including Apron buses**
- **Driver-side and Passenger-side fuel tank filling**
- **Staging areas/lanes for multiple vehicles**
- **Total footprint of ~1500 m^2**
- **Necessary space for backing in gaseous hydrogen tube trailer deliveries**

Station Highlights

- **Dual hose – both 350bar and 700bar as per SAE J2601-1**
- **Capable of back-to-back fills at both pressures. Initial capacity or 75 kg/day**
- **Designed with scale-up capability in the future**
- **Initial T20 cooling (5-8 min. fill time for cars) with scale-up capability to T40**
- **HMI provided with PIN code access (POS-ready)**

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THANK YOU SWIFT 2023