

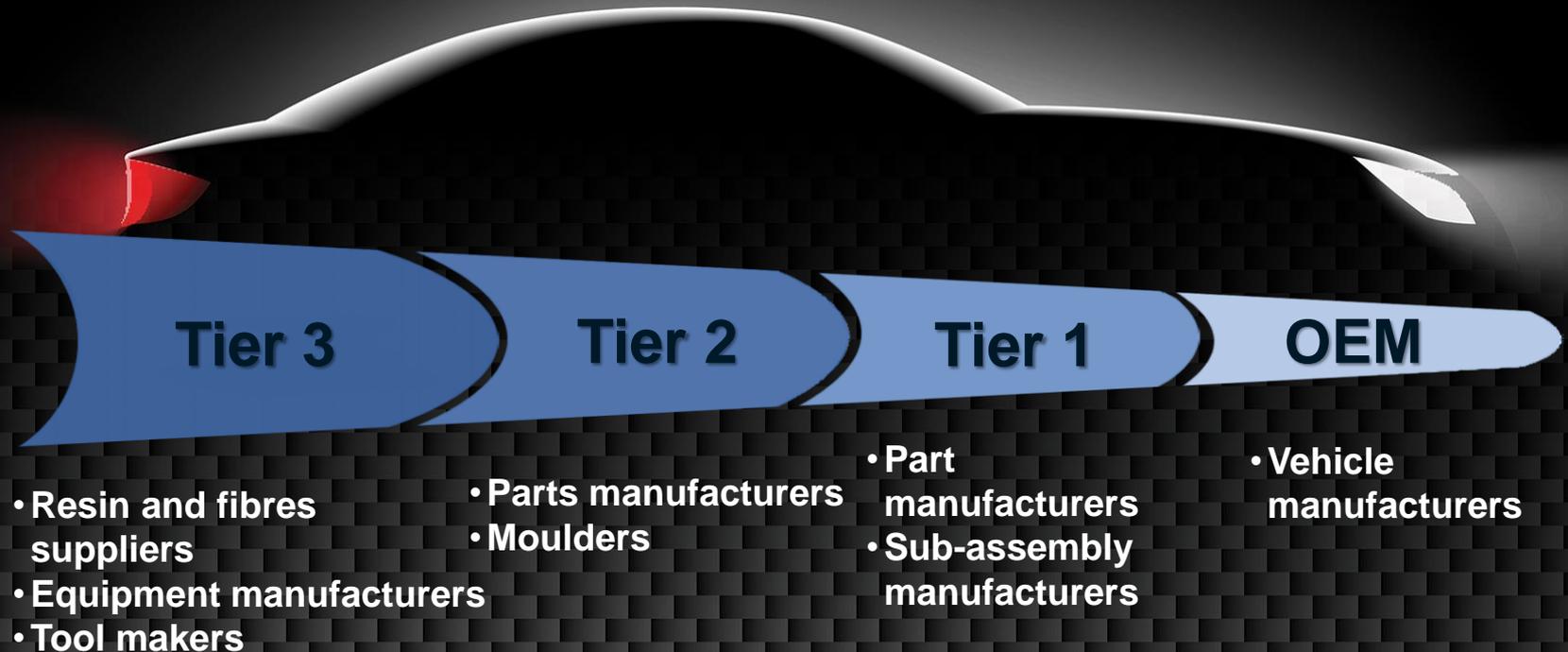
Canadian Industry: Automotive & Surface Transportation

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Automotive and Surface Transportation Research Centre
Revision 1
July 11, 2025



Ecosystem / Stakeholders



Capability clusters

Automotive sector

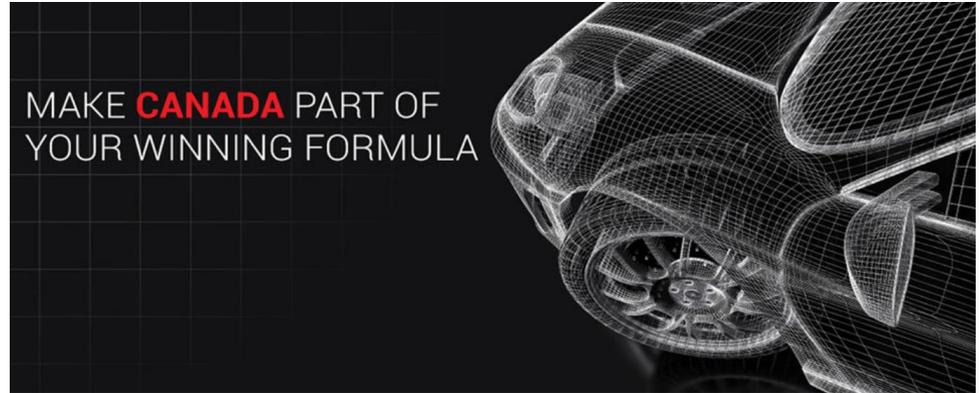
- >1000 companies
- 1275 facilities (2016)
- 20 passenger and commercial plants (2016)
- 700+ parts suppliers (2022)
500+ toolmakers (2022)
- 1.4M vehicles produced (>90% exported) (2022)
2.3M vehicles produced (2016)
- \$12.2B in GDP (2022)
- \$38B in exports (2022)



Capability clusters

Transportation sector

- 12 % of manufacturing GDP (2022)
- 23 % of manufacturing trade (2022)
- passenger vehicles, trucks and buses, auto parts and systems, truck bodies and trailers, as well as tires and machines-tools-dies-moulds (MTDM)
- auto industry: employs
>125,000 direct people in production
>370,000 people in sales and aftermarket
- All of automotive assembly is in Ontario, but component manufacturing in Ontario and Quebec.
- Manitoba and Quebec for heavy vehicles.



Capability clusters

Ontario

Vehicle assembly, original equipment parts, toolmaking, connectivity

Quebec

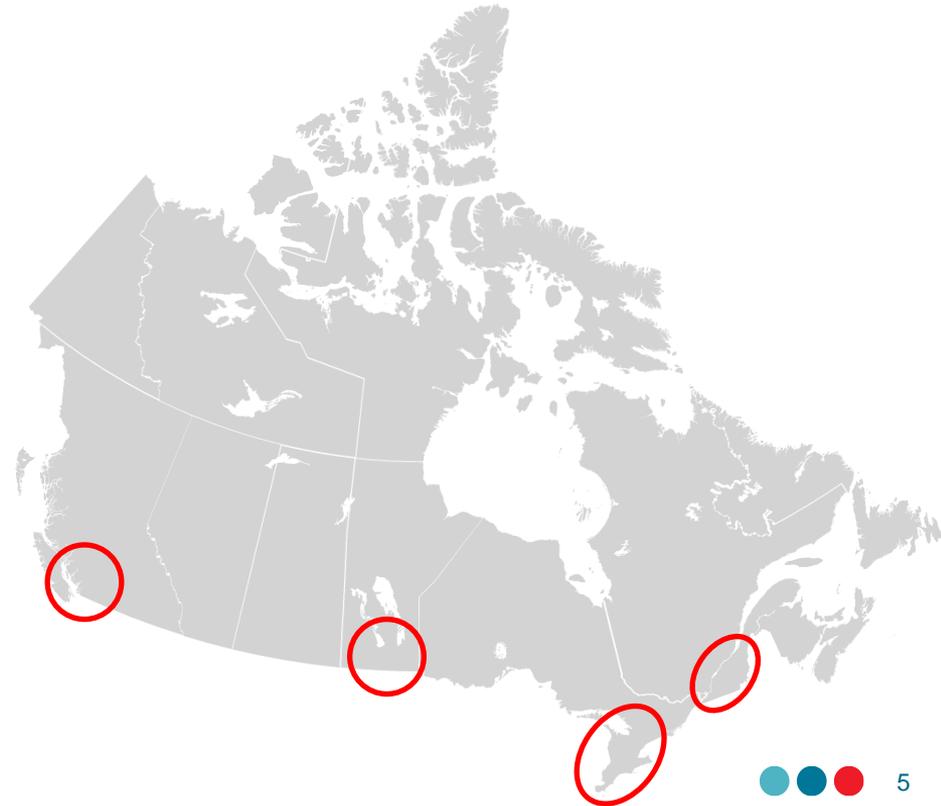
Trucks, buses, speciality vehicles, train, light metals, original equipment parts, electric vehicle (EV) components, connectivity, AI

Manitoba

Buses, speciality vehicles, cold-weather testing

British Columbia

Fuel cell EV cluster



Capability clusters

Leading companies

Ontario

Stellantis, Ford, General Motors, Hino Motors, Honda, Toyota, ABC Group, AGS Automotive, Aisin Seiki, Anchor Danly, Autoliv, BlackBerry/QNX, Brose, Continental, Dana, Denso, D&V Electronics, Dynaplas, ETAS/ESCRYPT, Faurecia, Flex-N-Gate, Goodyear, HBPO, Husky Injection Molding, Hydrogenics, Intelligent Mechatronic Systems, Johnson Electric, KSR International, Laval Tool, Lear, Linamar, Magna International, Martinrea, Matcor Automotive, Mitchell Plastics, Multimatic, NARMCO Group, Nemak, Next AI, Nucap Industries, Papp Plastics, Schaeffler, Toyota Boshoku, TE Connectivity, Valiant TMS, Valeo, Vari-Form, Wescast Industries, Woodbridge Group, ZF/TRW, Barrday, General Dynamics Land System, Armatec Survivability, DEW Engineering

Toyota



Ford / Multimatics



Capability clusters

Leading companies

Quebec

PACCAR (Kenworth, Peterbilt), **Volvo Bus** (Nova Bus, Prévost), **Blue Bird/Girardin**, Lion Bus, ABB, AddÉnergie, Bolloré Group, **Bridgestone**, Cooper-Standard, Element AI, Exo-S, Fluent AI, ImmerVision, LeddarTech, Phantom Intelligence, Raufoss Automotive, Spectra Premium, TM4, Toyoda Gosei, **Verbom**, Campagna motors, **Alstom**, Sogefi, Hutchinson, Demers Ambulances



Alstom



Prévost



Girardin

Capability clusters

Leading companies

Manitoba

Motor Coach Industries, New Flyer, Artik/OEM, Carlson composites, Champ Industries, Thompson Unlimited

British Columbia

Automotive Fuel Cell Cooperation, Ballard Power, Canadian Autoparts Toyota, D-Wave, Loop Energy, Mercedes-Benz Fuel Cell Plant, Mojo, Powertech Labs, Westport Innovations



New Flyer



Differences between sectors for composites

Differences	Aerospace	Surface Transportation	Automotive
Driver	Performance - high strength/stiffness, - low weight	Cost	Cost and production rate
Main materials	- Continuous fibre, mostly carbon - Higher performance resins	- Glass fibre mat, textiles and chopped fibre - Polyester, polyurethane, DCPD	- Discontinuous glass fibre - Filled thermoplastic compounds, thermosetting SMC/BMC
Main processes	Autoclaves, ATL/AFP	Hand lay-up, chopped fibre spray, infusion, RIM	Injection moulding (IM) , compression moulding, RIM
Production rate	<10 parts/day (structural)	<10 parts/day for bodywork <100 parts/day for components	>100,000 parts/year (aim >1 part/min)
Tooling	Medium cost	Low cost	High cost, but spread on millions of parts
Prediction / modelling	Composite laminate theory (CLT), composite damage models	Homogenised properties	Homogenised properties, general fibre orientation (IM), process simulation (IM)

THANK YOU

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