Canadian long-haul trucking route & operations characterization

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NRC·CNRC

Canadian Long-Haul Trucking Route & Operations Characterization

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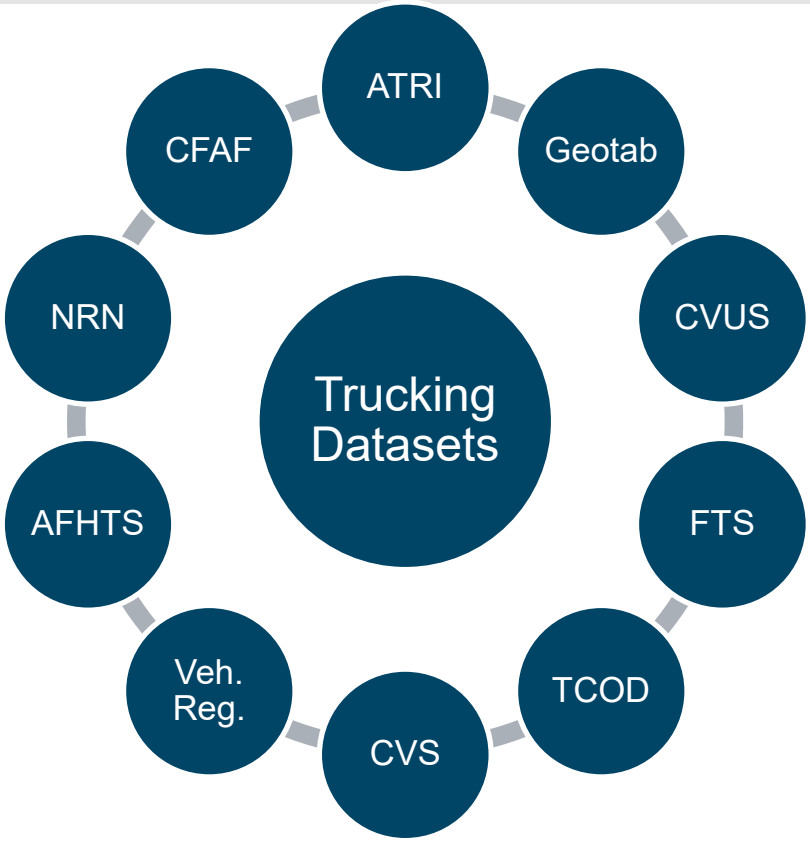
Background

- Canada transitioning to zero-emission medium and heavy-duty vehicles
- Trucking accounts for 90%[1] of all domestic freight shipments
- Long-haul trucking (>400 km/day) represents a particular challenge
- Need to characterize current long-haul operations and identify future infrastructure requirements to help assess the feasibility of ZEV for this segment

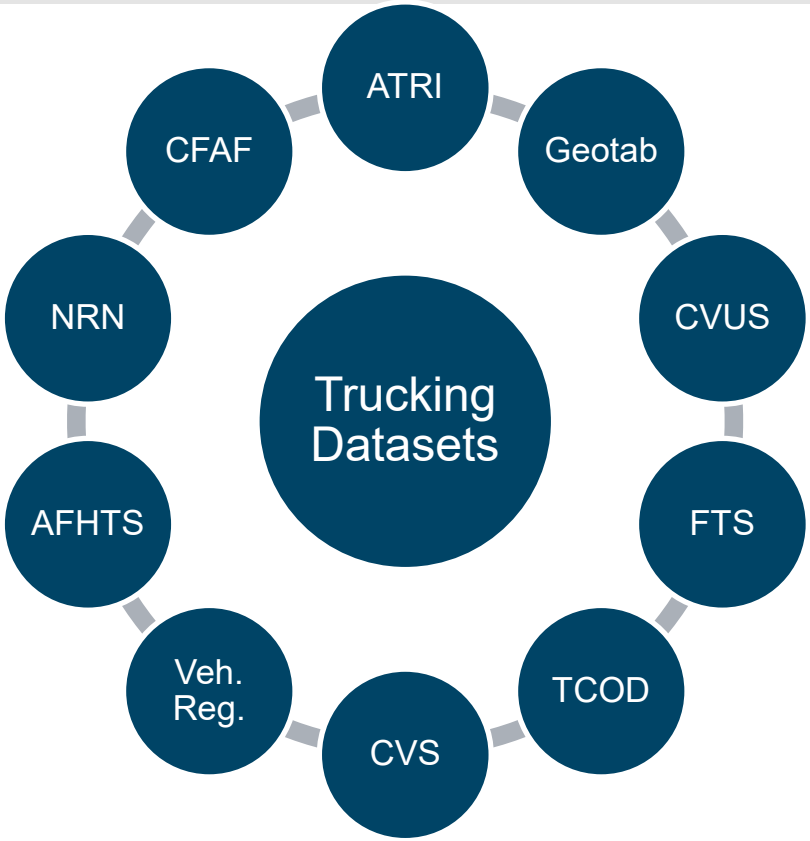
1. Commodity flows by mode in Canada: Canadian Freight Analysis Framework, 2017

Parameters of interest and potential data sources



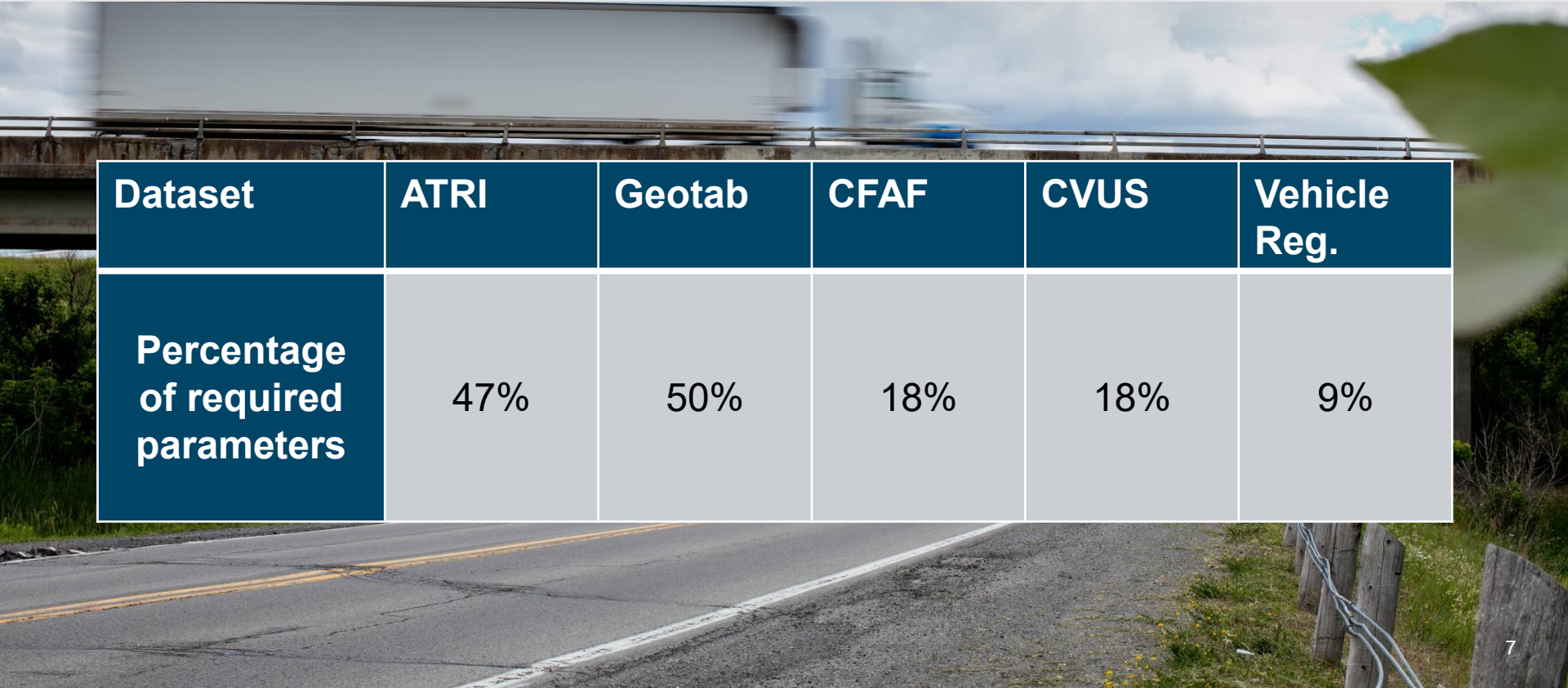
- ATRI – American Transportation Research Institute
- CVUS – Canadian Vehicle Use Survey
- FTS – Freight Trucking Statistics
- TCOD – Trucking Commodity Origin and Destination Surveys
- CVS – Commercial Vehicle Survey (Ontario) or Canadian Vehicle Survey (StatsCan)
- Veh. Reg. – Vehicle Registration
- AFHTS – Annual for-hire trucking survey
- NRN – National Road Network
- CFAF – Canadian Freight Analysis Framework

Parameters of interest and potential data sources



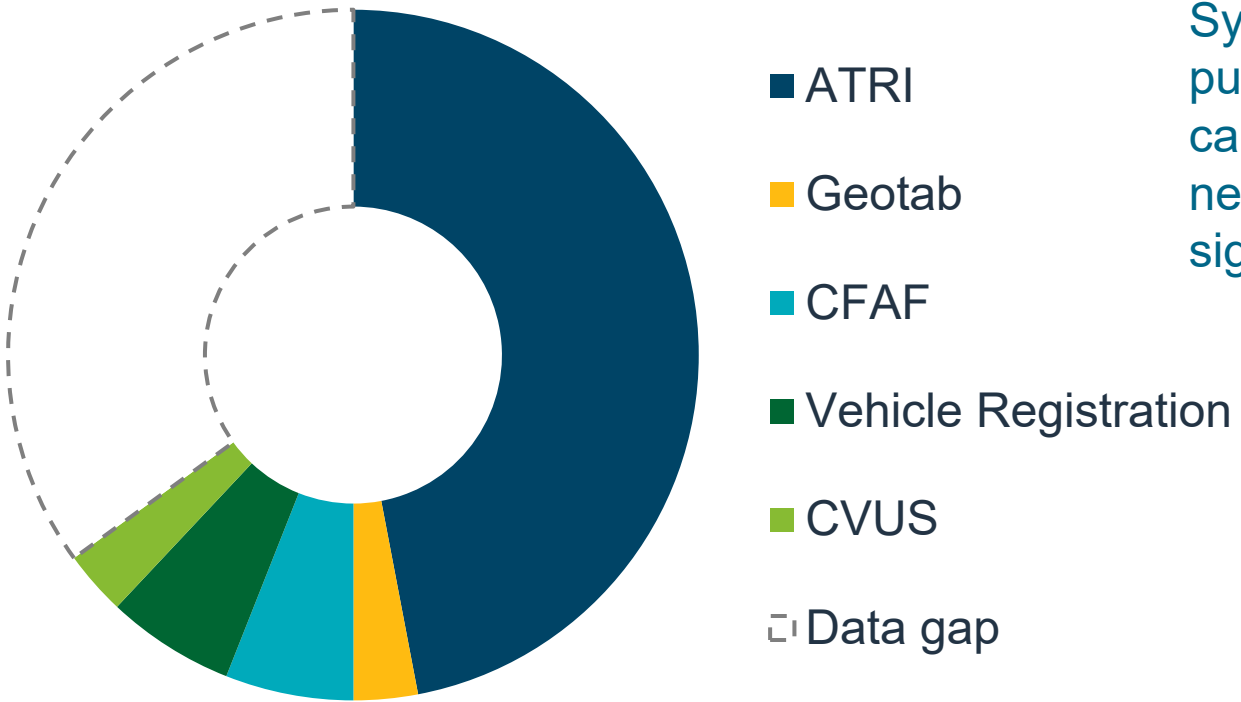
- Routing
- Trip length/frequency
- Vehicle travel
- Idle time
- Seasonal travel variation
- Powertrain
- Vehicle configuration
- Vehicle Age
- Axle configuration
- Fuel consumption
- Energy requirements
- Weights
- Volume
- Speed profile
- Acceleration profile
- Weather
- Altitude

Reviewed datasets



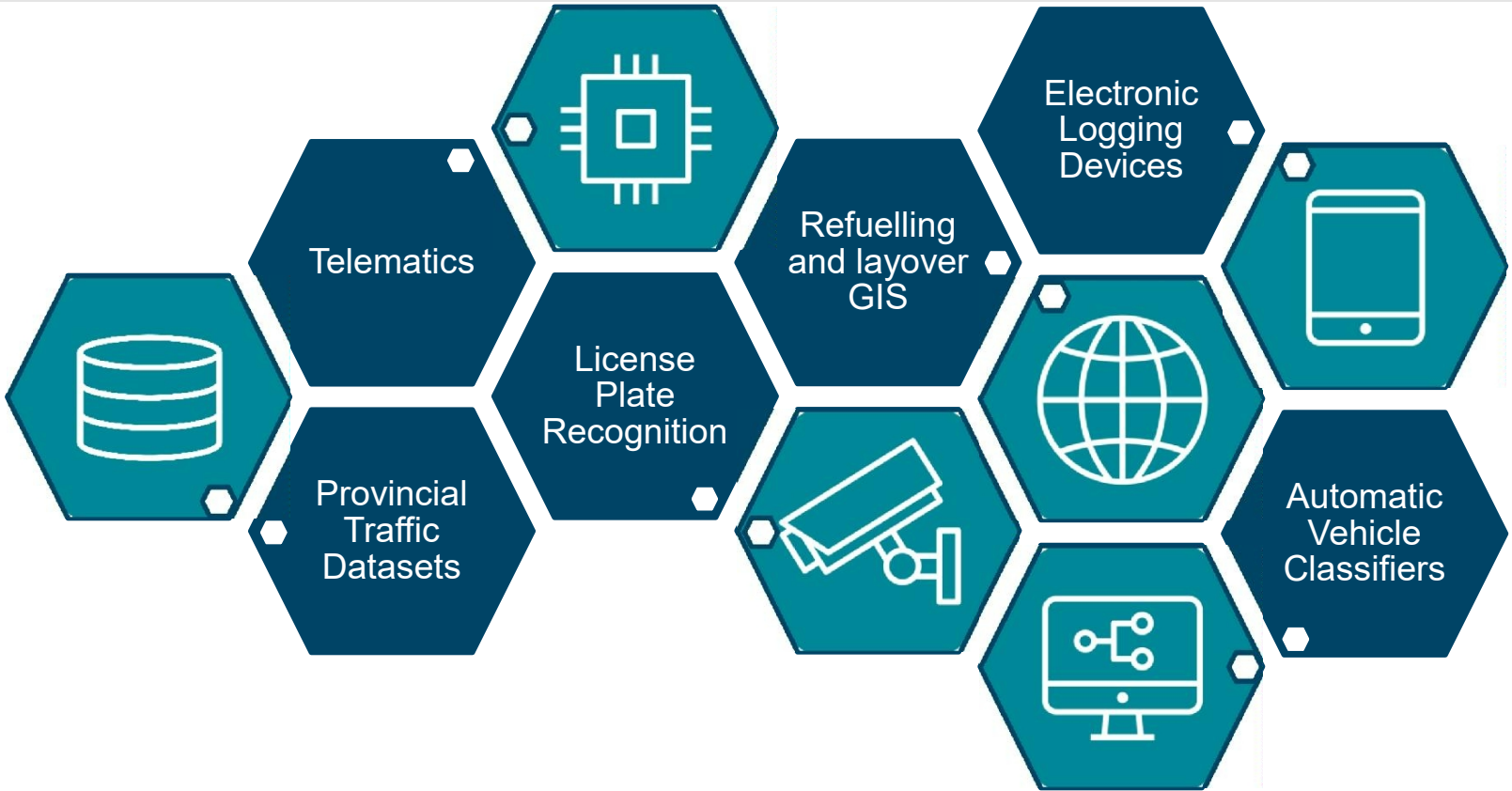
Dataset	ATRI	Geotab	CFAF	CVUS	Vehicle Reg.
Percentage of required parameters	47%	50%	18%	18%	9%

Overall availability of relevant parameters



Synthesis of commercial and publicly-available datasets can provide the majority of needed parameters, but significant gaps remain

Possible options for filling the gap



Proposed data analysis methodology

- Two phases
- Regional/national statistics assumed where route-level data is unavailable
- Development of an Energy Need Index to be assigned to route segments, based on the energy demand from long-haul trucking operations along that route
- Could be used to evaluate the feasibility of ZEV technologies given real-world Canadian operations

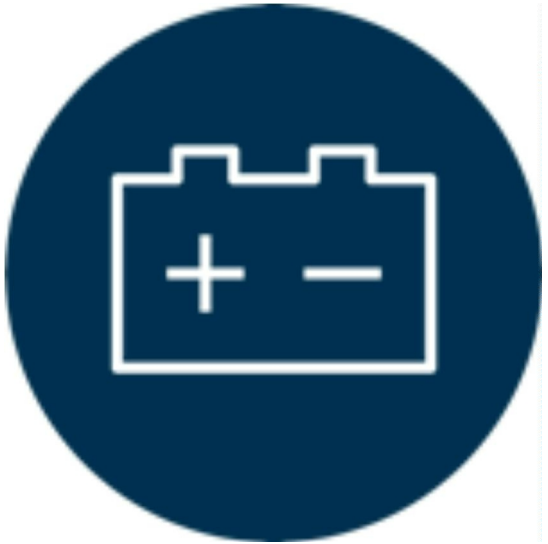
Proposed priority corridors

Source: National Research Council of Canada, *Canadian Long-Haul Trucking Dataset Meta-Analysis* (AST-2023-0032)

Phase I Phase II

Closing thoughts

- Importance of considering energy needs
- Data synthesis
- Focused on large scale long-haul, but adaptable to smaller scales
- Privacy considerations
- Full report available online: https://doi.org/10.4224/40003323



Thank you

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