



Vehicle Inventories and EV penetration stats for CAC Municipalities

Presenter:
Kevin Behan



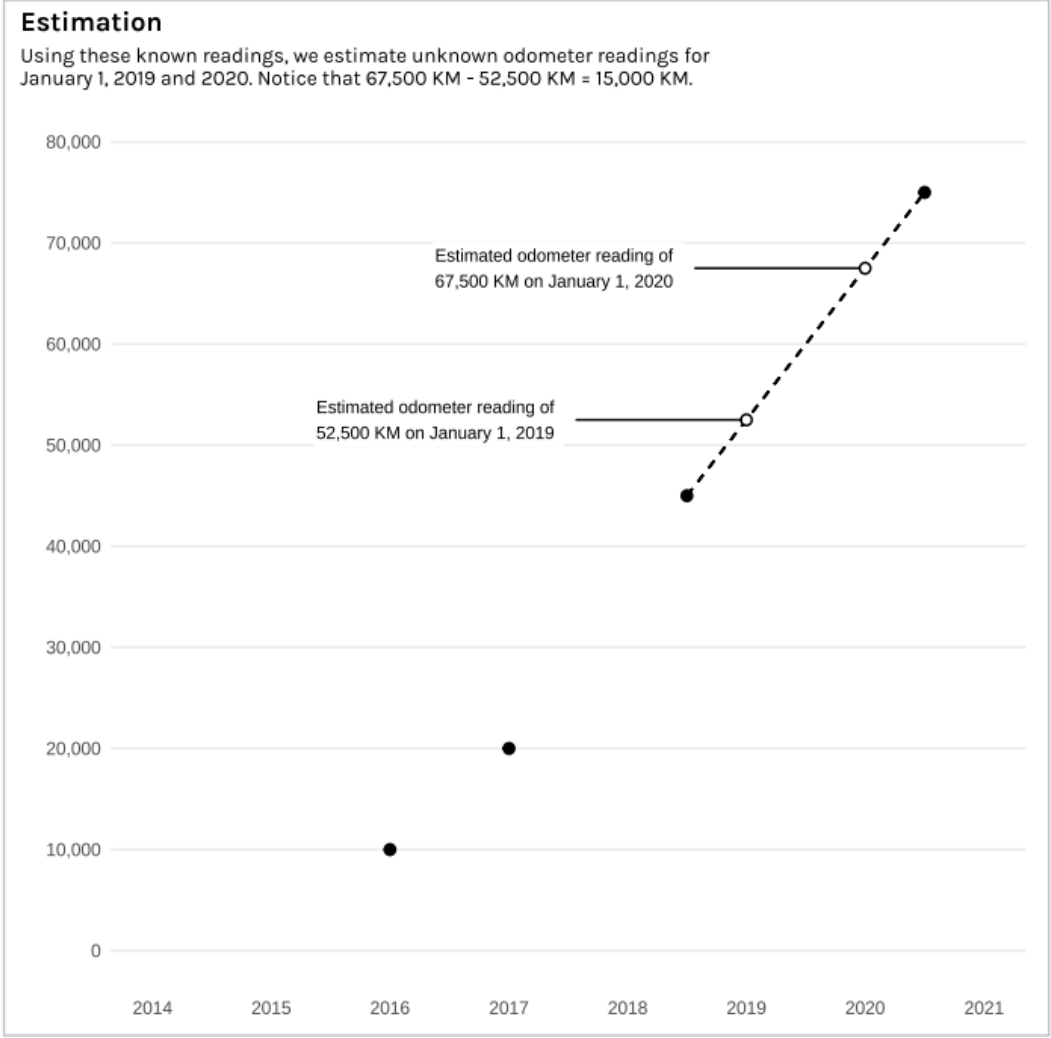
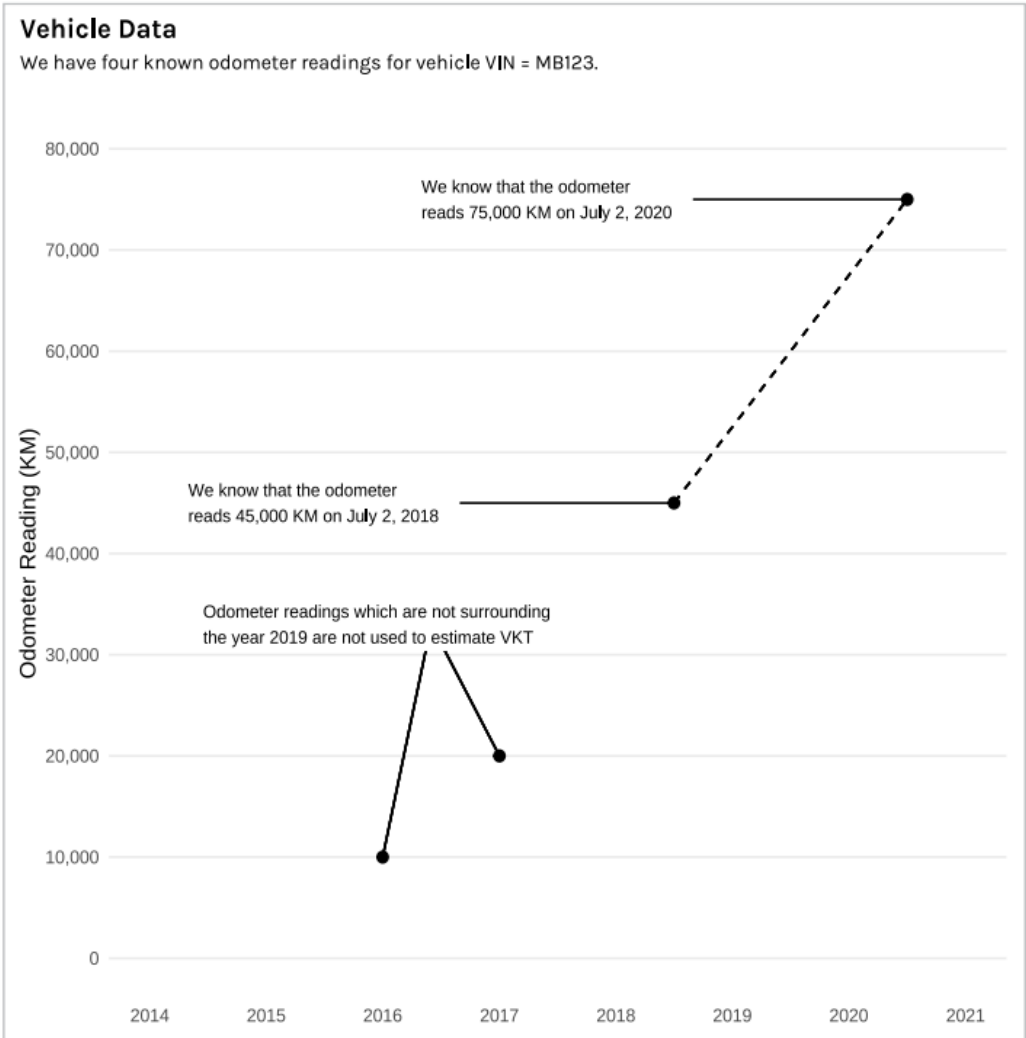


- Annual odometer readings by VIN
- 2016 – 2020 incl
- c12M records annually
- Includes all road going vehicles (incl commercial)
- Does not include farm/off-road vehicles
- Make, model, model year, body type, # axles, fuel type
- LT/ST Municipality, FSA (UT created based on multiple LT)
- Odo reading, reading date

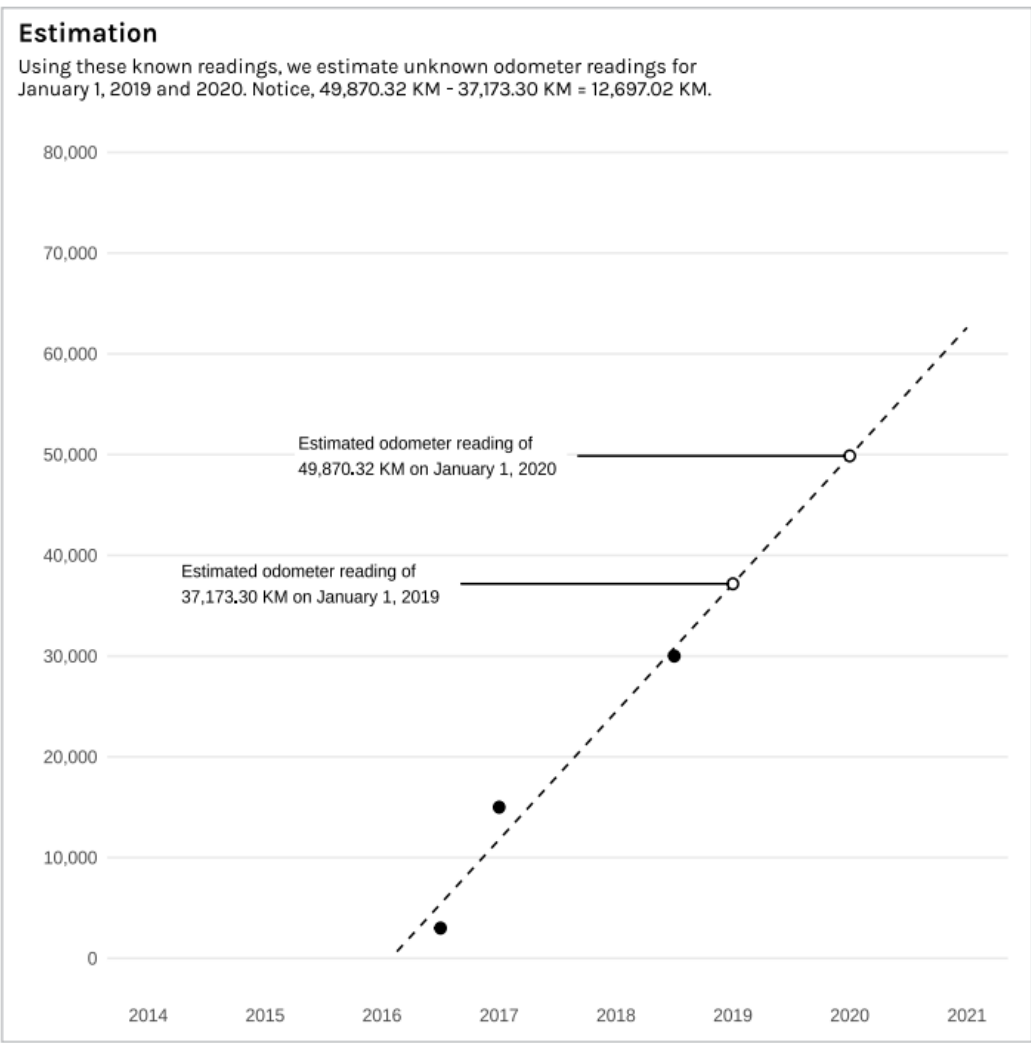
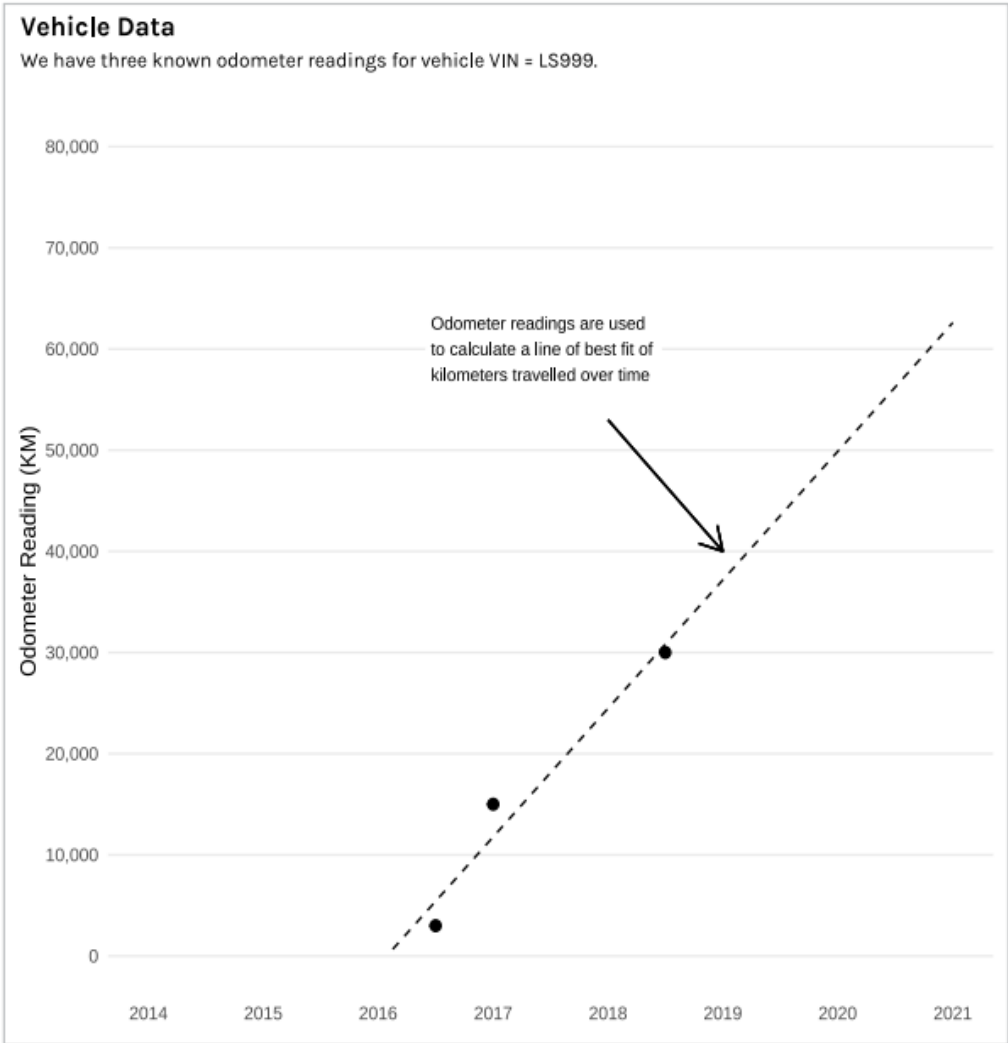


- Incorrect vehicle classification reported (e.g. different fuel type)
 - Most frequently reported vehicle characteristic is used
- Conflicting odometer readings (eg. Yr 2000 odo < Yr 2019 odo)
 - Conflicting reading is dropped from Inventory prior to VKT Estimation
- No municipal name / FSA provided
 - Not included in any VKT Estimation
- No vehicle make / model provided
 - Classified as a missing vehicle category in VKT Estimation
- Vehicle not registered in all years 2016-2020

VKT Estimation – odometer readings surrounding baseline year



VKT Estimation – odometer readings not surrounding baseline year

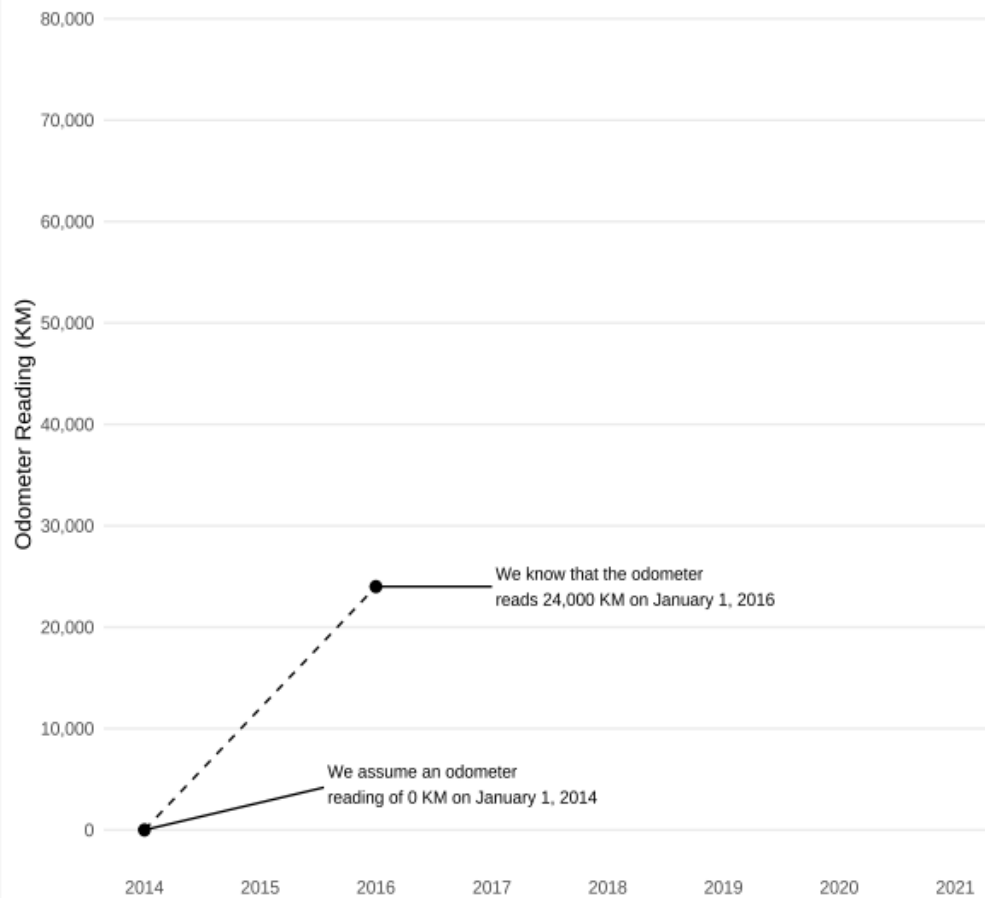


VKT Estimation – single odometer reading only



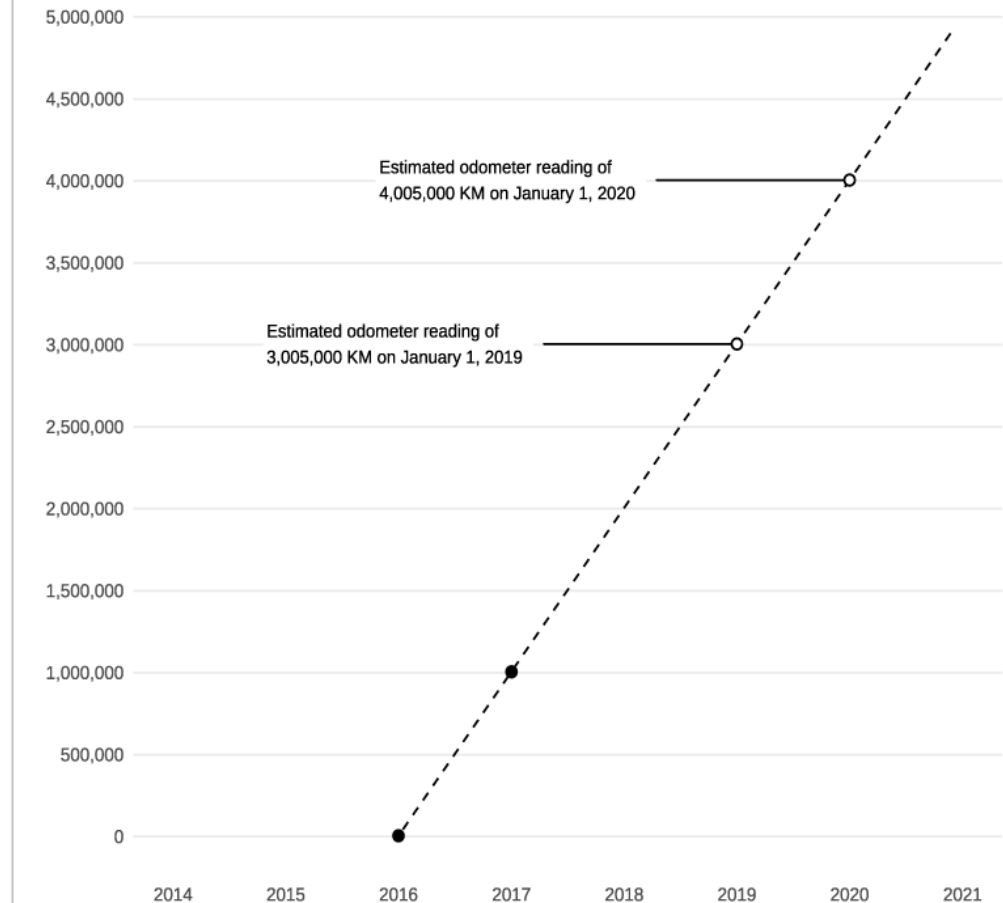
Vehicle Data

We have one known and one assumed odometer reading for vehicle VIN = S6000.



Estimation

Because of the abnormally large change in odometer readings between 2016 and 2017, our VKT estimate is very large.



Data Treatment Summary – M6J FSA Example



Description	Statistic
Total number of vehicles in the M6J 2019 Inventory.	13,631 (100%)
Total number of vehicles requiring VKT re-estimation.	996 (7.3%)
Number of vehicles with any missing odometer readings.	952 (7%)
Number of vehicles no available odometer readings.	923 (6.8%)
Number of vehicles with any conflicting odometer readings.	0 (0.0%)
Number of vehicles only conflicting odometer readings	0 (0.0%)
Number of vehicles with any decreasing odometer readings.	1,349 (9.9%)
Number of vehicles with a Daily 2019 VKT estimate above 640 KM.	43 (0.3%)
Number of vehicles with a Daily 2019 VKT estimate below 0 KM.	24 (0.2%)

VKT of vehicles with no odometer readings or only conflicting odometer readings is imputed using the within-fuel/body-type mean.

Output – Car / Light Truck



BODY TYPE	FUEL TYPE	VEHICLE COUNT	MEAN DAILY VKT	TOTAL DAILY VKT	MEAN YEARLY VKT	TOTAL YEARLY VKT
CAR	Compressed Natural Gas	3	28.01	84.04	10225	30675
CAR	Diesel	846	69.36	58679.08	25316	21417864
CAR	Electric	92	33.32	3065.16	12160	1118781
CAR	Gas	57529	53.52	3079014.79	19535	1123840398
CAR	Plugin Hybrid	86	51.67	4443.71	18859	1621954
CAR	Propane	1	49.49	49.49	18062	18062
LIGHT TRUCK	Diesel	258	64.44	16625.51	23520	6068310
LIGHT TRUCK	Gas	52	49.28	2562.59	17987	935347

Output – Med / Heavy Truck



BODY TYPE	FUEL TYPE	VEHICLE COUNT	MEAN DAILY VKT	TOTAL DAILY VKT	MEAN YEARLY VKT	TOTAL YEARLY VKT
MEDIUM TRUCK	Diesel	2239	57.47	128672.44	20976	46965441
MEDIUM TRUCK	Gas	20683	53.51	1106757.51	19531	403966491
MEDIUM TRUCK	Plugin Hybrid	7	23.04	161.25	8408	58858
MEDIUM TRUCK	Propane	3	0	0	0	0
HEAVY TRUCK	Diesel	497	25.6	12724.46	9344	4644428
HEAVY TRUCK	Gas	636	31.75	20193.5	11589	7370625
HEAVY TRUCK	Propane	3	7.05	21.16	2574	7722
NA	Gas	11	53.38	587.18	19483	214320



BODY TYPE	DESCRIPTION
CAR	A vehicle weighing below 2722 kilograms.
LIGHT TRUCK	A vehicle weighing at or above 2722 kilograms, with temporary living quarters or transport capacity exceeding passenger capacity.
MEDIUM TRUCK	A vehicle weighing above 8500 kilograms.
HEAVY TRUCK	A vehicle weighing above 15,000 kilograms.
BODY TYPE	Classification of a vehicle's size. One of 'Car', 'Light Truck', 'Medium Truck', or 'Heavy Truck'.
FUEL TYPE	A vehicle's fuel source. One of 'Gas', 'Diesel', 'Propane', 'Compressed Natural Gas', or 'Electric'.
ODOMETER READING	The total number of kilometers traveled by a vehicle. Indicated by the vehicle's odometer.



Questions?

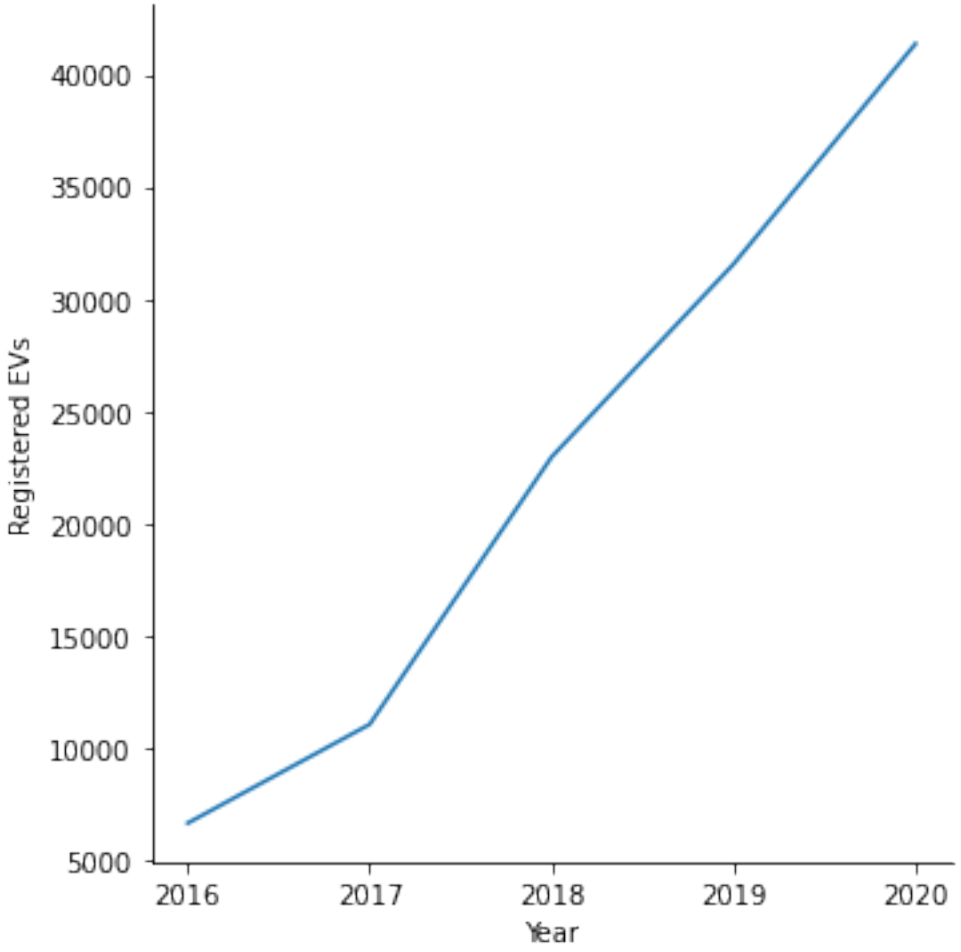


- MTO VIN 2016-2020 dataset
- Reclassified all GV into PHEV, EV, ICE (Hybrid)
- Reclassified all makes/models into correct fuel types
- Examined EV proliferation by CAC muni
- Excel file of for all Ontario munis provided [here](#)

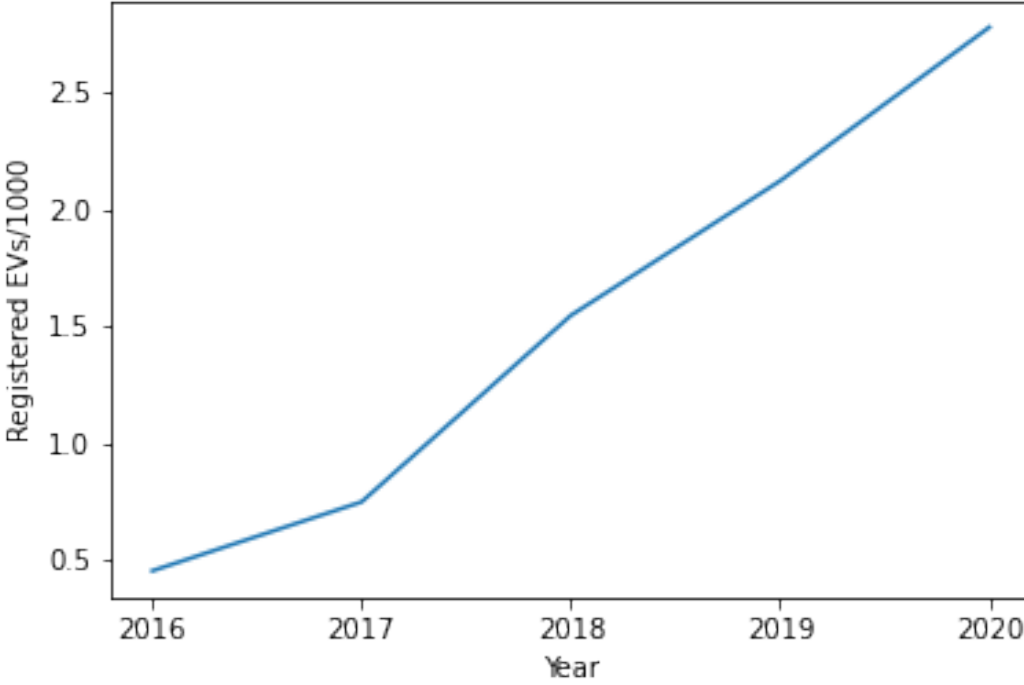
EV Growth rate 2016-2020 (all CAC members combined)



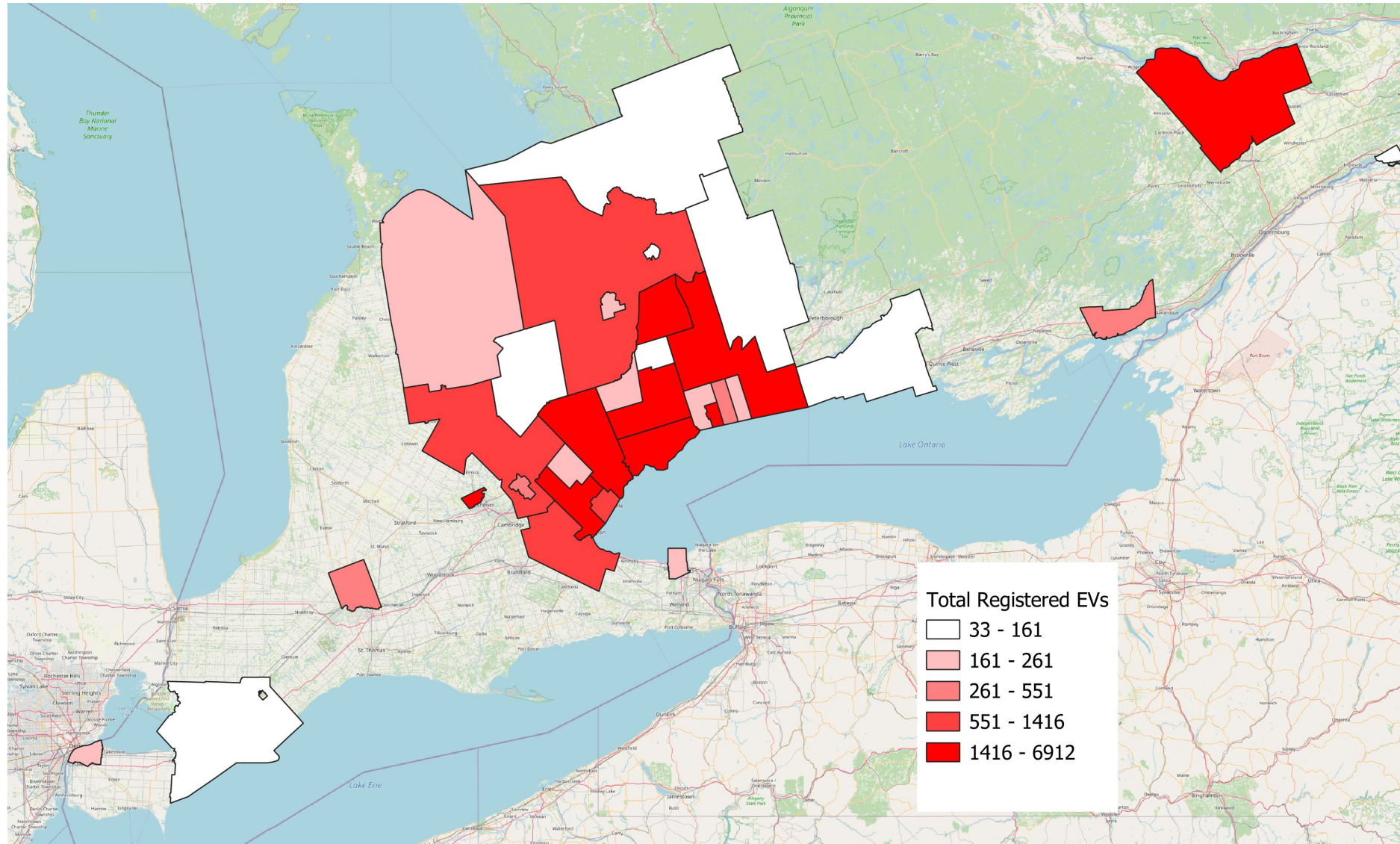
Total Registered EVs, All Regions



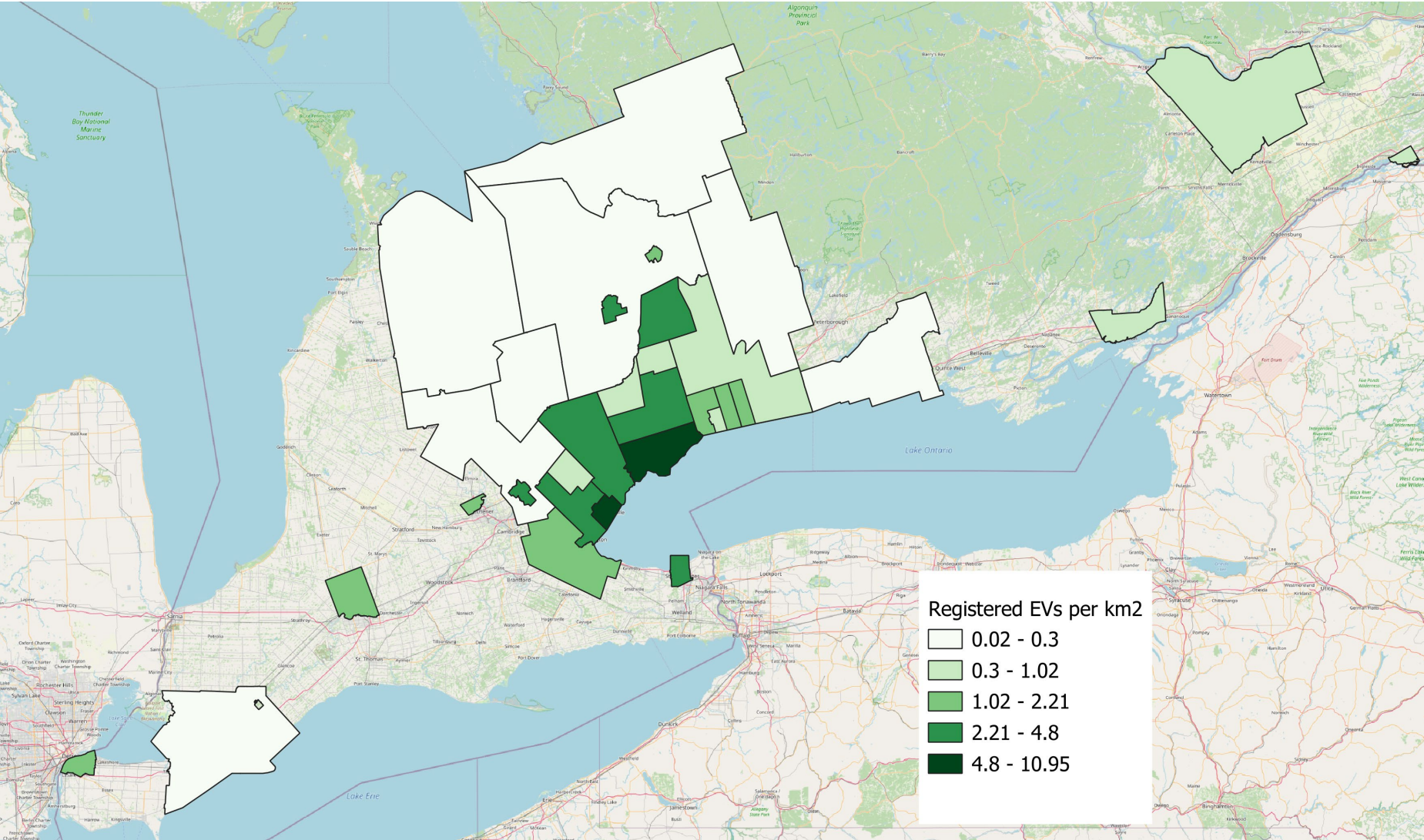
Registered EVs per 1000, All Regions



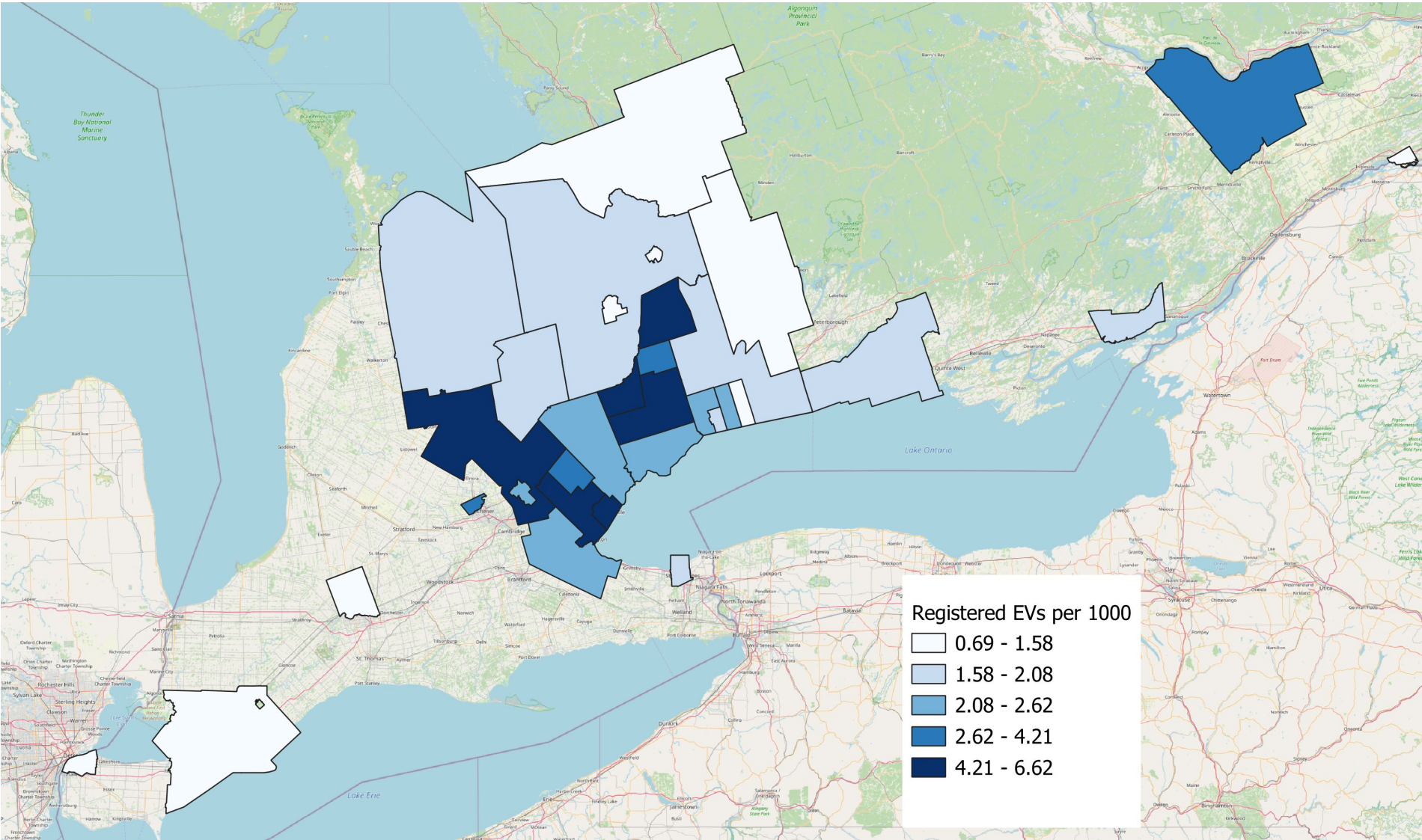
Total EV registrations by CAC member (2020)



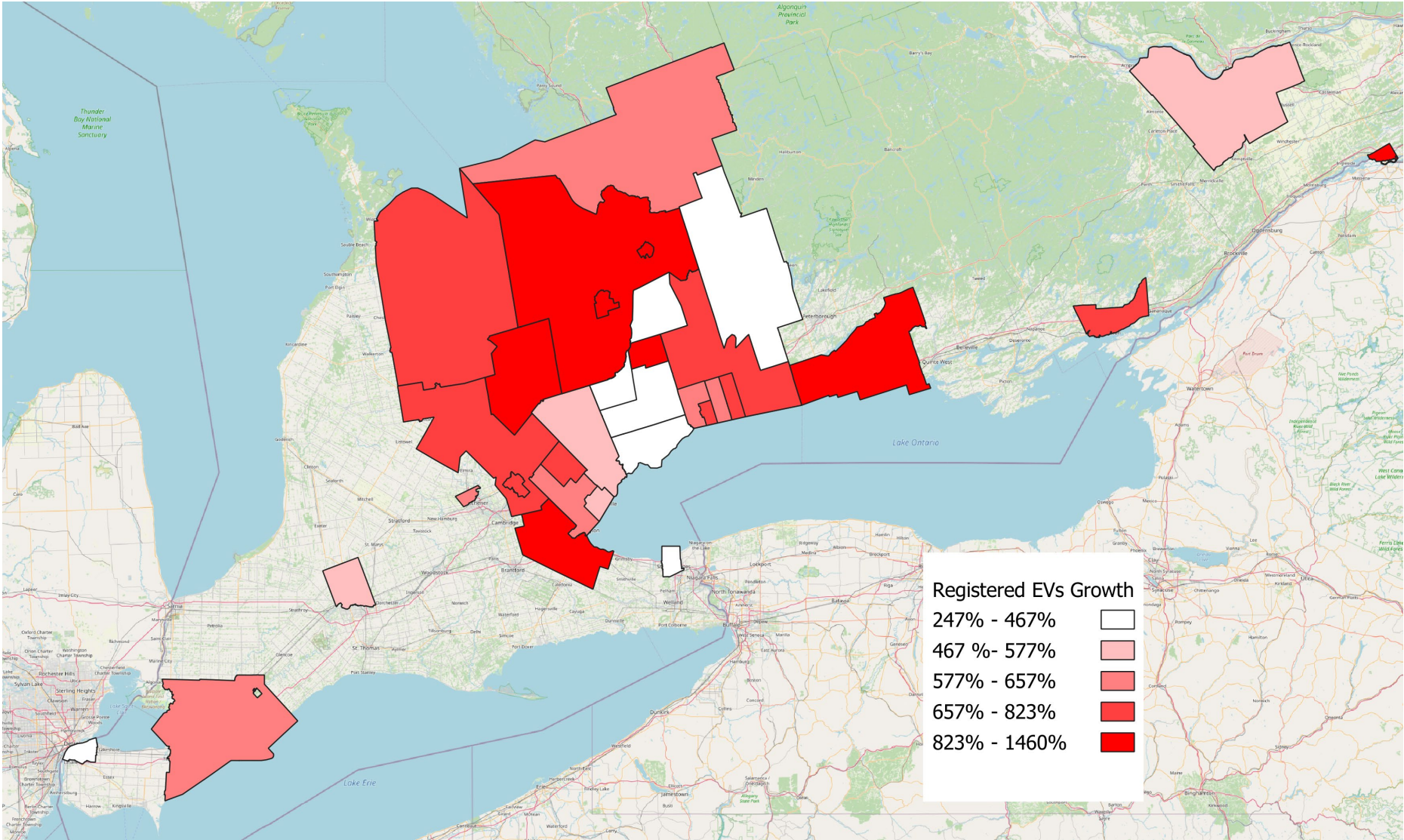
EV registrations per km² by CAC member (2020)



EV registrations per 1000 population by CAC member (2020)



EV growth rate (2016-2020) by CAC member



Raw Numbers



NAME	2020 REGISTRATIONS TOTAL			2020 REGISTRATIONS %		
	ICE	PHEV	EV	ICE	PHEV	EV
York	809691	1982	4977	99.1%	0.2%	0.6%
Toronto	1317819	2638	6912	99.3%	0.2%	0.5%
Ottawa	620498	1688	2692	99.3%	0.3%	0.4%
Peel	906764	1516	3559	99.4%	0.2%	0.4%
Waterloo	407189	803	1566	99.4%	0.2%	0.4%
Guelph	101300	213	371	99.4%	0.2%	0.4%
Hamilton	365563	727	1249	99.5%	0.2%	0.3%
Wellington	182252	330	574	99.5%	0.2%	0.3%
Kingston	86312	160	271	99.5%	0.2%	0.3%
Durham	491063	755	1422	99.6%	0.2%	0.3%
Dufferin	56753	91	139	99.6%	0.2%	0.2%
Barrie	108315	113	234	99.7%	0.1%	0.2%
Simcoe	418661	468	898	99.7%	0.1%	0.2%
St. Catharines	103923	201	222	99.6%	0.2%	0.2%
Northumberland	75549	104	150	99.7%	0.1%	0.2%
London	262758	385	516	99.7%	0.1%	0.2%
Grey	84001	112	163	99.7%	0.1%	0.2%
Muskoka	56356	58	98	99.7%	0.1%	0.2%
Orillia	24265	22	38	99.8%	0.1%	0.2%
Windsor	160031	170	198	99.8%	0.1%	0.1%
Cornwall	33429	19	33	99.8%	0.1%	0.1%
Chatham-Kent	90770	64	81	99.8%	0.1%	0.1%
Kawartha Lakes	69982	34	61	99.9%	0.0%	0.1%



- Examining VKT by fuel type
- EV ownership by FSA
- EV growth by vehicle MSRP
- Relationships with demographic characteristics (eg income)
- Suggestions from CAC members?
- Future year data acquisition?
- 2021/2022 issues – covid pause, registration requirement change



Questions?

Kevin Behan

kbehan@cleanairpartnership.org