

The electric bus revolution 2021



From a 60 vehicle pilot test to an order for 300 electric buses, this webinar will feature the journey travelled by the Toronto Transit Commission and guest presenter Bem Case, Head of Vehicle Programs for the TTC. It will also include a brief update on other Canadian electric fleet programs by series host, Bruce Nagy.

Thurs June 10, 2020 | 2:00 PM - 3:00 PM ET



Clean Air Partnership

CLIMATE SOLUTIONS WEBINAR SERIES





Clean Air Partnership

CLIMATE SOLUTIONS WEBINAR SERIES



WEBINAR SERIES - UPCOMING

◇ CARBON ACCOUNTING FOR GOVERNMENTS & BUSINESSES

◇ SEWAGE HEAT RECOVERY & COMMUNITY ENERGY

BRUCE (BF) NAGY
CLIMATE SOLUTIONS

- ◇ COLUMNIST & SPEAKER
- ◇ CONSULTANT
- ◇ AUTHOR 200+ ARTICLES ON CLIMATE SOLUTIONS
- ◇ AUTHOR *THE CLEAN ENERGY AGE*,
ROWMAN & LITTLEFIELD



Climate solutions
Expert best practices
Case examples
Clear priorities



SOLUTIONS, PRIORITIES, CASE EXAMPLES



BUILDINGS

NEW & RETROFIT TECHNOLOGY & PROGRAMS



TRANSPORTATION

ELECTRIC FLEETS, INFRASTRUCTURE & TRANSIT VEHICLES



POWER GENERATION & STORAGE

TECHNOLOGY, PLANNING & ECONOMICS

TODAY

BEM CASE - HEAD OF VEHICLE PROGRAMS TTC

- ◇ 60 VEHICLE ELECTRIC BUS PILOT TEST
- ◇ PLANS TO ORDER 300 MORE
- ◇ RELATED DEVELOPMENTS

WE WILL ALSO UPDATE ELECTRIC BUS PROGRAMS IN OTHER JURISDICTIONS

- ◇ OTHER CANADIAN CITIES
- ◇ OTHER COUNTRIES
- ◇ OTHER FLEETS
- ◇ NEW KINDS OF VEHICLES



TODAY'S GUEST PRESENTER



BEM CASE

HEAD OF VEHICLE PROGRAMS, TORONTO TRANSIT COMMISSION

WITH 20+ YEARS AT THE TTC, BEM HAS HELD ROLES THAT SPAN ACROSS THE ORGANIZATION, INCLUDING: SUBWAY MAINTENANCE, VEHICLE ENGINEERING, SAFETY, ENVIRONMENT, RISK MANAGEMENT, AND VEHICLE PROGRAM DELIVERY.

BEM IS ACCOUNTABLE FOR THE STEWARDSHIP OF A 15-YEAR PORTFOLIO OF VEHICLE PROCUREMENTS, OVERHAULS, AND LIFE EXTENSION PROGRAMS TOTALLING \$7+ BILLION.

THE VEHICLE PROGRAMS DEPARTMENT PORTFOLIO INCLUDES FLEET PLANNING, BUSES, EV CHARGING SYSTEMS INFRASTRUCTURE, STREETCARS, LIGHT RAIL VEHICLES, SUBWAYS, GREENER WHEEL-TRANS VEHICLES & NON-REVENUE VEHICLES.

THE ELECTRIC BUS REVOLUTION

THE GLOBAL ELECTRIC BUS FLEET IS PROJECTED TO GROW FROM 81,000 UNITS IN 2021 TO REACH 704,000 UNITS BY 2027, GROWING 43.1% EACH YEAR ON AVERAGE.



MORE THAN 90% OF THESE ARE IN CHINA, SO THE NON-CHINA WORLD FIGURES ARE MUCH SMALLER. INDIA IS BEGINNING TO RAMP UP AND MAY EVEN BECOME A MORE SIGNIFICANT PLAYER IN THE BUS WORLD THAN CHINA. OBSERVERS THINK INDIA WILL EVENTUALLY CONSTITUTE 10% OF THE GLOBAL TOTAL.

EUROPE AND NORTH AMERICA ARE GROWING VERY QUICKLY. ALTHOUGH NORTH AMERICAN ADOPTION REMAINS BELOW 1% OF THE GLOBAL FIGURE, ABOUT 10% OF TRANSIT AGENCIES ARE EITHER OPERATING A FEW ELECTRIC BUSES NOW, OR HAVE ORDERED SOME.

CANADA'S ELECTRIC BUS REVOLUTION

TORONTO



MONTREAL



BRAMPTON



VANCOUVER



GUELPH



VICTORIA



OTTAWA



USA



LOS ANGELES
NEW YORK
CHICAGO, ILLINOIS
MASSACHUSETTS
ALLEGHENY COUNTY (PITTSBURGH)
MINNEAPOLIS METRO TRANSIT
CHARLOTTE NC
PENNSYLVANIA
CHEHALIS, WA
WASHINGTON D.C.
NEW JERSEY
COLORADO
VIRGINIA
WEST VIRGINIA
SENECA, SOUTH CAROLINA
KING COUNTY, WASHINGTON
ALBUQUERQUE, NEW MEXICO
TWIN RIVERS, CALIFORNIA
HOWARD COUNTY, MARYLAND
AND MANY OTHERS

USA ELECTRIC SCHOOL BUSES



BLUEBIRD, THE LARGEST SCHOOL BUS COMPANY IN THE USA, HAS BEEN SELLING ELECTRIC BUSES FOR MORE THAN 20 YEARS BUT IN THE LAST TWO YEARS SALES HAVE TAKEN OFF.

IT EXPECTS TO SELL 3000 ELECTRIC BUSES IN 2022 AND EVEN MORE IN FUTURE YEARS.

THE COMPANY SAYS THERE ARE ABOUT 600,000 SCHOOL BUSES IN SERVICE IN THE USA AND CANADA.

INTERNATIONAL

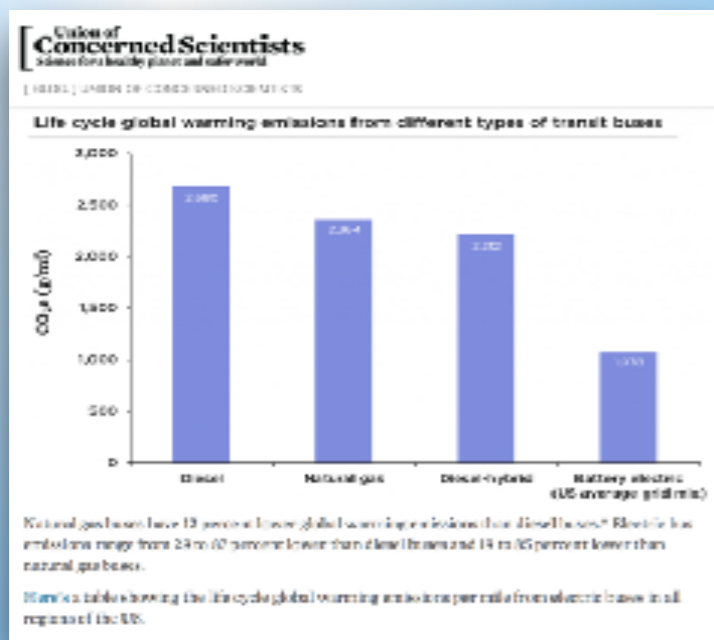
MOSCOW
SHENZHEN
LONDON
GLASGOW
BRUSSELS
BERLIN
PARIS
AMSTERDAM
CAPE TOWN

NETHERLANDS
CHILE
RWANDA
INDIA
AUSTRALIA
NEW ZEALAND



ADVANTAGES - ELECTRIC VS DIESEL BUS

- GREENHOUSE GAS EMISSIONS REDUCED FOR HEALTHIER PLANET
- DIESEL FUMES ELIMINATED - HEALTHIER PEOPLE: DRIVERS, PASSENGERS, CHILDREN, PASSERSBY, TRANSIT WORKERS
- COST SAVINGS ON FUEL
- COST SAVINGS ON MAINTENANCE
- RELIABILITY INCREASED BY ABOUT 10%
- COLD WEATHER STARTUP ADVANTAGES
- SNOWY WEATHER ADVANTAGE
 - TORQUE, MULTIPLE ENGINES
- LIFECYCLE COST REDUCTION – DISCUSSION
- PUBLIC HEALTH COST SAVINGS
- NOISE POLLUTION REDUCTION
- PASSENGER COMFORT INCREASED – GRIDLOCK MAY BE REDUCED
- REDUCTION OF LEAKED TOXIC FLUIDS FROM COMBUSTION ENGINES
 - INTO SOIL & POTENTIALLY AS RUNOFF INTO FRESHWATER BODIES
- REDUCTION OF VENTILATION EQUIPMENT INSIDE GARAGES
- AUTONOMOUS TECH EXPECTED TO ENHANCE SAFETY
- DATA COLLECTION ADVANTAGES & DISADVANTAGES
- GRANT FUNDING MORE AVAILABLE



CHALLENGES - ELECTRIC VS DIESEL BUS

- UPFRONT COST PREMIUM FOR BUS
- UPFRONT COST OF CHARGING INFRASTRUCTURE
- CHARGING INFRASTRUCTURE COMPLEXITY
- LONGER REFUELLING TIME
- ROUTING CHANGES – DISCUSSION
- TRAINING REQUIREMENTS, DRIVING, CHARGING, MAINTENANCE
- INDUSTRY STANDARDS & INTEROPERABILITY
- DATA COLLECTION ADVANTAGES & DISADVANTAGES
- GRANT FUNDING INADEQUACIES



OTTAWA HAS BIG PLANS

OTTAWA WILL BEGIN STUDYING THE OPERATION OF ITS FIRST FOUR ELECTRIC BUSES THIS FALL AND ORDER 74 MORE IN 2022.

IT IS CURRENTLY FINALIZING A \$400 MILLION LOAN FROM THE CANADIAN INFRASTRUCTURE BANK, AND SOME FUNDING FROM INFRASTRUCTURE CANADA.

THE PLAN IS TO PURCHASE 450 ELECTRIC CITY BUSES BY 2027, ONE OF THE MOST SIGNIFICANT FLEET CONVERSIONS IN THE COUNTRY. THE GOAL IS TO COMPLETE 100% ELECTRIFICATION OF THE CITY BUS FLEET BY 2036. CURRENTLY IT CONSISTS OF ABOUT 1000 BUSES.

THE PLAN INCLUDES CHARGING INFRASTRUCTURE FROM HYDRO OTTAWA.



**450 ELECTRIC BUSES BY 2027,
MORE THAN 1,000 BY 2036,
ACHIEVING 100% ELECTRIFICATION.**

EDMONTON - 40 WILL SOON BE 60

ANOTHER 20 ELECTRIC BUSES WILL BE ADDED TO THE FIRST 40 BY EARLY 2022.

THE FIRST 40 BUSES ARE ALL IN SERVICE AND USE OVERHEAD CHARGERS INSIDE THE GARAGE, WHICH HELPS SAVE FLOOR SPACE.

THE FIRST 40 BUSES ARE ALL FROM PROTERRA, HAVE BEEN FULLY TESTED FOR WINTERTIME PERFORMANCE, HAVE A RANGE UP TO 350 KILOMETRES ON A SINGLE CHARGE, AND COST ROUGHLY 30% LESS TO SERVICE AND MAINTAIN THAN CURRENT DIESEL BUSES.



U OF ALBERTA, U OF CALGARY AND eCAMION ARE STUDYING ELECTRICITY STORAGE AT THE KATHLEEN ANDREWS BUS GARAGE.

THE RESEARCH IS EXPECTED TO HELP OPTIMIZE COST AND EMISSIONS SAVINGS AS THE ELECTRIC VEHICLE PROGRAM EXPANDS TO OTHER GARAGES

VANCOUVER IS UP TO 19 ELECTRICS

15 MORE ELECTRIC BUSES HAVE NOW BEEN ORDERED AND ARE EXPECTED TO ARRIVE EARLY NEXT YEAR, FULLY ELECTRIFYING ROUTE 100 (22ND STREET / MARPOLE LOOP).

FUNDED THROUGH THE FEDERAL GAS TAX FUND, WITH FUNDING ALLOTTED THROUGH THE METRO VANCOUVER GAS TAX FUND.

EACH BUS IS EXPECTED TO REDUCE 100 TONNES OF GREENHOUSE GAS EMISSIONS AND SAVE \$40,000 IN FUEL COSTS PER YEAR

BUSES CAN BE CHARGED IN APPROXIMATELY FIVE MINUTES AT CHARGING STATIONS WHILE PICKING UP PASSENGERS.



IN FEB 2020 TRANSLINK MAYORS IN GREATER VANCOUVER VOTED FOR AN AGGRESSIVE LOW CARBON STRATEGY, ESTABLISHING PLANS TO CONVERT MORE THAN HALF OF ITS ENTIRE DIESEL BUS FLEET TO BATTERY ELECTRIC BUSES IN 10 YEARS. GREENHOUSE GAS EMISSIONS WILL BE CUT BY 44% BY 2030.

TRANSLNK WILL ADD 635 ELECTRIC BUSES, MULTIPLE CHARGERS ACROSS METRO VANCOUVER. 64% OF THE TOTAL TRANSIT BUS FLEET WILL BECOME ELECTRIC IN THOSE FIRST 10 YEARS, DIESEL BUSES REPLACED BY ELECTRICS. THE REMAINDER WILL THEN BE REPLACED BY 2050 OR SOONER. MARPOLE TRANSIT CENTRE WILL BE A 100% ELECTRIC BUS DEPOT WITH 280 CHARGES.

MONTREAL -As we noted last year

MONTREAL WILL HAVE MORE THAN 40 ELECTRIC BUSES BY THE END OF 2021

- 7 FAST-CHARGING NEW FLYER ELECTRIC BUSES NOW OPERATING ON THE MONCK BUS LINE.
- 30 LONG-RANGE ELECTRIC BUSES.
- 4 *MIDIBUSES* (30 FEET), A MID-SIZE VEHICLE BIGGER THAN A MINIBUS YET SMALLER THAN A STANDARD BUS.
- 2 PARA-TRANSIT ELECTRIC MINIBUSES.

BY 2025 ALL NEW BUS ORDERS WILL BE ELECTRIC

EXPECTED BENEFITS:

- REDUCE GHG EMISSIONS
- SUPPORT GROWTH OF QUÉBEC INDUSTRIES
- USE CLEAN (NON-POLLUTING) QUEBEC ENERGY



QUEBEC -New excellent news

2600 electric school buses operating by 2024

NEARLY 2,600 NEW ELECTRIC
BUSES FOR SCHOOL TRANSPORT
ON THE ROAD WITHIN THREE
YEARS.

INVESTMENT OF \$250 MILLION.

65% OF THE SCHOOL
TRANSPORTATION FLEET
ELECTRIFIED BY 2030.

REDUCTION OF 800,000 TONNES
OF GREENHOUSE GAS
EMISSIONS.



LAVAL - 10 NEW ELECTRICS

LAVAL HAS 3 NEW ELECTRIC BUSES ON THE ROAD AND EXPECTS TO ADD 7 MORE SOON.

THEY'RE FROM MANIOTBA'S NEW FLYER AND THE CITY SAYS THEY REDUCE EMISSIONS BY 60-70 TONNES PER YEAR.

THEY ARE DESCRIBED AS QUIETER, SMOOTHER AND BETTER FOR PEOPLE WITH PHYSICAL CHALLENGES, BECAUSE THEY THEY LOWER TO THE CURB FOR BOARDING AND DISEMBARKING.



12 ELECTRICS FOR PRINCE EDWARD ISLAND

PRINCE EDWARD ISLAND ANNOUNCED IN NOVEMBER THAT IT HAD PURCHASED 12 NEW ELECTRIC SCHOOL BUSES FROM LION ELECTRIC IN QUEBEC.

THEY WERE DELIVERED IN MARCH AND WENT INTO SERVICE IMMEDIATELY. EACH BUS COMES WITH ITS OWN CHARGER.

THE PLAN IS TO REPLACE ALL 332 DIESEL BUSES WITH ELECTRIC, WHICH WILL LIKELY TAKE MORE THAN 10 YEARS BECAUSE 25-30 WILL BE REPLACED EACH YEAR.

THE GOVERNMENT SEES IT AS A PRIORITY BECAUSE DIESEL BUSES ARE THE TOP GREENHOUSE GAS EMITTER IN THE PROVINCE.

THE FIRST 12 BUSES COST \$4.8 MILLION, OF WHICH \$2.1 MILLION WAS PROVIDED BY THE FEDERAL GOVERNMENT



LION SAYS CHARGING BUSES WITH ELECTRICITY COSTS 80% LESS THAN FILLING THEM WITH DIESEL.

THERE IS ALSO A 60% SAVING ON MAINTENANCE ACCORDING TO THE COMPANY BECAUSE THERE ARE ONLY 20 MOVING PARTS IN AN ELECTRIC ENGINE COMPARED WITH MORE THAN 2000 IN A DIESEL ENGINE.

HALIFAX

Postponed to 2023?

IN MAY 2021, THE CITY OF HALIFAX VOTED TO ADD 210 ELECTRIC BUSES TO ITS FLEET AS PART OF ITS BUS RAPID TRANSIT STRATEGY AT A COST OF \$100 MILLION BY 2028. IT WILL RESULT IN THE REPLACEMENT OF HALIFAX BUSES BY 2028.

BUSES WILL ARRIVE IN 2023. OVER THE NEXT FEW YEARS, THE EXPANSION AND ACQUISITION OF BUSES WILL BE LIMITED TO RAGGED LAKE TRANSIT.

THE FOUR DESIGNATED ROUTES WILL BE PART OF THE TRANSIT STRATEGY WITH DEDICATED ROUTES.

EACH ELECTRIC BUS WILL PROVIDE \$100,000 IN SAVINGS AND \$24,000 IN SAVINGS IN MAINTENANCE COSTS.

FUNDING IS BEING PROVIDED BY THE FEDERAL GOVERNMENT THROUGH INFRASTRUCTURE INVESTMENT ACT, THE GREEN NEW DEAL, AND ALSO FROM THE PROVINCE.



BRAMPTON

FIRST 8 ELECTRICS: TWO FROM QUEBEC-BASED NOVA BUS AND SIX FROM WINNIPEG-BASED NEW FLYER. THE SELECTION OF CANADIAN SUPPLIERS IS DELIBERATE. ONE OF THE PROJECT'S GOALS IS BOOSTING DOMESTIC MANUFACTURING AND EMPLOYMENT.

“BASED ON PRELIMINARY MODELLING...IT IS ESTIMATED THAT EACH BATTERY ELECTRIC BUS COULD RESULT IN DIESEL FUEL AND MAINTENANCE COST SAVINGS OF APPROXIMATELY \$50,000 PER YEAR PER BUS.”



IN JULY 2019 BRAMPTON PURCHASED EIGHT ELECTRIC BUSES & FOUR CHARGING SYSTEMS, EACH OF WHICH IS EXPECTED TO CUT GREENHOUSE GAS EMISSIONS 235 TONES EVERY YEAR. A YEAR LATER THE CITY ANNOUNCED PLANS TO BUILD A NEW TRANSIT GARAGE, TO HELP SUPPORT A FULLY ELECTRIC ZERO-EMISSION BUS FLEET. BRAMPTON'S GREENHOUSE GAS REDUCTION TARGET IS 80% BY 2050.

FUNDING: NATURAL RESOURCES CANADA'S ELECTRIC VEHICLE INFRASTRUCTURE DEMONSTRATION PROGRAM, WHICH CONTRIBUTED \$3.49 MILLION AND ENERGY INNOVATION PROGRAM, WHICH CONTRIBUTED C\$7.67 MILLION. CUTRIC COORDINATED A GROUP PURCHASE WITH YORK AND VANCOUVER.

YORK REGION

IN JUNE 2019 YORK REGION PURCHASED SIX ELECTRIC BUSES FROM CANADIAN MANUFACTURERS NEW FLYER AND NOVA BUS.

AN OVERHEAD CHARGING STATION IS LOCATED AT NEWMARKET TERMINAL. THE PILOT STARTED IN JUNE 2020. BUSES CHARGE UNDERNEATH THE OVERHEAD STATION BEFORE PICKING UP PASSENGERS AT THE PLATFORM.



THE REGION EXPECTS THE PILOT TEST WILL SHOW THAT ELECTRIC BUSES CAN:

- REDUCE FUEL AND MAINTENANCE COSTS
- REDUCE NOISE
- REDUCE EMISSIONS

YORK REGION'S GOAL IS TO REACH ZERO GREENHOUSE GAS EMISSIONS BY 2051.

OAKVILLE REPLACING 57 DIESELS WITH ELECTRICS

BATTERY-ELECTRIC BUSES WILL REPLACE 57 OF THE TOWN'S DIESEL BUSES OVER THE NEXT SIX YEARS, AND 16 ADDITIONAL NEW ELECTRIC BUSES WILL BE ADDED TO THE FLEET. AS WELL AS ELIMINATING EMISSIONS, ELECTRIC BUSES TRAVEL MORE QUIETLY, HAVE REDUCED MAINTENANCE COSTS AND WILL SAVE THE TOWN ABOUT \$120,000 PER BUS OVER A 14-YEAR LIFE SPAN.

THE FEDERAL GOVERNMENT CONTRIBUTED \$26.5 MILLION, THE PROVINCE \$22.1 MILLION, CITY OF OAKVILLE \$17.6 MILLION.

WILL ALSO FUND PROJECTS TO MODERNIZE THE TRANSIT EXPERIENCE:

- WIFI ON ALL BUSES
- A SMART PHONE APP THAT WILL GIVE RIDERS ACCESS TO A BUS LOCATION, ARRIVAL, DEPARTURE TIMES. WILL ALSO INTEGRATE WITH THE METROLINX TRIPLINX PLANNER
- FOR RIDERS USING SPECIALIZED TRANSIT SERVICES, THERE WILL BE ON-DEMAND SCHEDULING SOFTWARE AND A REAL-TIME TRIP MANAGEMENT MOBILE APP.
- SAFETY AND ACCESSIBILITY IMPROVEMENTS TO 249 BUS STOPS.



UPDATE: OAKVILLE HAS NOW ALSO RECEIVED FUNDING FROM NATURAL RESOURCES CANADA TO INSTALL 44 NEW EV CHARGERS

ELECTRIC VANS & LIGHT TRUCKS



ELECTRIC 3 WHEEL DELIVERIES



FLEET VEHICLES - CANADIAN CITIES



FLEET VEHICLES - NY CITY UPDATE



GHG OF ENTIRE FLEET CUT BY 50% BY 2025 (2000 FULLY ELECTRIC)
SAVING 80% ON FUEL, 65% ON MAINTENANCE

ELECTRIC FLEETS



| | |
|-----------------------------------|---------------------|
| RYDER | 150 |
| RYDER HAS ORDERED | 500 MORE |
| NEW YORK CITY | 591 |
| NEW YORK CITY | 2000 BY 2025 |
| UPS | 300 |
| FRITO LAY | 280 |
| LA POLICE | 100 |
| VANCOUVER | 100+ |
| DHL | 45 |
| PACIFIC GAS & ELECTRIC | HUNDREDS |



**DESI PLEASE SWITCH TO
BEM CASE, TTC**

RESOURCE SCREENS

MONTREAL - from last year

PREPARATIONS FOR THE THE STINSON BUS GARAGE

MORE THAN 50 KILOMETRES OF ELECTRICITY, FIBRE OPTIC AND NETWORK CABLES.

53 JUNCTION BOXES CONNECT THE BUSES TO THE CHARGERS. CONNECTION CABLES RUN BETWEEN THE UNITS AND THE BUSES.

EIGHT PANTOGRAPHS HAVE BEEN INSTALLED.

FOR BUS DRIVERS AND MAINTENANCE EMPLOYEES, IT IS A NEW KIND OF VEHICLE. THEY ARE BEING TRAINED ON DRIVING AND RECHARGING.

THE SUPERVISORY CONTROL AND DATA ACQUISITION (SCADA) SYSTEM, MEANS CHARGE STATUS CAN BE MONITORED AND CONTROLLED REMOTELY.



A CHARGE INDICATOR SHOWS THE BUS IS LESS THAN 50% CHARGED



MONTREAL - From last year

THERE ARE THE 12 CHARGERS THAT RECHARGE BUSES IN THE FOUR MAIN ELECTRICALLY EQUIPPED AISLES.

BUS CHARGERS CONVERT ALTERNATING CURRENT (AC) TO DIRECT CURRENT (DC) AND ADJUST THE VOLTAGE.

AN ENHANCED AIR CONDITIONING SYSTEM IS NEEDED AS THE CHARGERS EMIT QUITE A BIT OF HEAT.

THE DASHBOARD DISPLAY SCREENS SHOW CHARGE STATUS, LOW-VOLTAGE (24V) BATTERY VOLTAGE, 12V CIRCUIT VOLTAGE, OPERATIONAL STATE OF DIFFERENT BATTERY GROUPS, AND REAL-TIME CONSUMPTION.

A SIGNAL CONCENTRATOR COLLECTS INFORMATION SUCH AS ALARM DATA, ELECTRICAL DATA AND CHARGE DATES FROM THE CHARGERS AND SENDS THEM TO THE SCADA SYSTEM.



Tyler Seed

Business Development Analyst



Ontario Power Generation

At OPG we design, build, operate and maintain high-power charging infrastructure that not only reduces costs, but also emissions.

As a global climate change leader and energy innovation company, OPG's electrification expertise is unparalleled.

From growing what will be Ontario's largest electric vehicle public charging network, to the electrification of one of the province's largest bus fleets, we are helping change the way we travel.

Current OPG Electrification Projects

- TTC eBus charging infrastructure
- Ivy EV Fast Charger Network (in partnership with Hydro One)
- Amherst and Wolfe Island electric ferry charging infrastructure



A province-wide approach to electrify transit

Ontario Power Generation is working with agencies to efficiently, reliably, and cost-effectively provide the charging infrastructure that Ontario's transit agencies require as they move to electrify.

As the largest utility in Ontario we're best positioned to coordinate a province-wide procurement and construction program to provide the best possible value to Ontarian riders and ratepayers, while decarbonizing transit.

~15%

in infrastructure cost savings through aggregated procurement

5-15%

in infrastructure costs offset by energy market revenue

~40%

time savings in procurement

CUTRIC

GOVERNMENTS FROM THE THREE PREVIOUS SCREENS, VANCOUVER TRANSLINK, BRAMPTON AND YORK REGION WERE ALL SUPPORTED IN THEIR PILOT TESTS BY THE CANADIAN URBAN TRANSIT RESEARCH & INNOVATION CONSORTIUM (CUTRIC). CUTRIC IS A NON-PROFIT THAT HELPS CITIES WITH GROUP PROCUREMENT, SECURING FUNDING, DATA ANALYSIS AND TECHNOLOGY INTEGRATION RELATED TO ZERO EMISSIONS TRANSIT.



IN ADDITION TO HELPING WITH SMALLER PILOT TESTS CUTRIC COLLECTS AND ANALYZES LARGE QUANTITIES OF DATA FROM TORONTO TRANSIT AUTHORITY, SOCIÉTÉ DE TRANSPORT DE MONTRÉAL, EDMONTON TRANSIT SERVICE AND OTHERS. IT THEN PROVIDES NATIONAL REAL-TIME ANALYSIS OF E-BUS PERFORMANCE, CHARGING PATTERNS, ENERGY AND ELECTRICITY LOADS, AND ENERGY INTENSITY, TO HELP CITIES AND TRANSIT AGENCIES MAKE EMPIRICALLY-SOUND DEPLOYMENT CHOICES, UNDER THE BANNER *THE ACES BIG DATA TRUST*.

WHILE WORKING WITH CITIES AND BUS MANUFACTURERS ON PILOT TESTS CUTRIC HAS ESTABLISHED BEST PRACTICES RELATING TO STANDARD TECHNICAL PROTOCOLS AND INTEROPERABILITY BETWEEN VENDOR TECHNOLOGIES THROUGH *THE PAN-CANADIAN ELECTRIC BUS DEMONSTRATION AND INTEGRATION TRIAL*.

The electric bus revolution 2021



QUESTIONS?



Clean Air Partnership

CLIMATE SOLUTIONS WEBINAR SERIES





Clean Air Partnership

CLIMATE SOLUTIONS WEBINAR SERIES



WEBINAR SERIES - UPCOMING:

- Carbon accounting for governments & businesses
- Sewage heat recovery & community energy

THANK YOU

Dates & registration - Desislava Stefanova

DStefanova@cleanairpartnership.org

Content - Bruce Nagy

bruce.nagy@rogers.com Twitter: @BFNagy



**Clean Air
Partnership**

CLIMATE SOLUTIONS WEBINAR SERIES

