Innovating Municipal Transit through Refurbished and Repowered Fleets

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COVID-19 has transformed the global economy and created new financial challenges for local governments. In transportation, innovation and greater financial viability are pivotal to help combat declining revenue and rising costs.

The COVID-19 pandemic has had a significant impact on the transit industry. As many workers transitioned to remote work, ridership plummeted to an all-time low. This, coupled with the additional costs of providing increased safety and sanitization measures for existing fleets, has created resounding financial impacts.

COVID-19 has forever altered the way Canadians commute and public transit is critical to the recovery of local municipalities. Now more than ever, it is imperative to rethink the future of transit and adopt solutions that ensure both financial and environmental viability within the sector.

Refurbishment, while not a new concept, is an incredibly cost-effective way to provide safer, more sustainable transit. The current innovation allows for the overhaul of existing buses to extend the lifespan from 12 to 18 years, at approximately one third of the cost of a new bus. This type of asset management strategy has been adopted by several progressive transit authorities, who enjoy not only the cost benefits but also reduced maintenance and greater inventory efficiency. Refurbishment also provides opportunities for upgrades and component overhauls, creating a clean, modern fleet to increase ridership.

COVID-19 also presents an opportunity to scale up to the electrification of transit. While electric buses have higher upfront costs, the long-term benefits of green power greatly outweigh the initial investment, as the initial cost is recovered through savings on reduced fuel and maintenance costs over the bus's lifespan. Not only do these buses have longer lifespans, but they significantly reduce operating costs and have clear environmental benefits.

As all levels of government begin to roll-out strategic investments in public transit infrastructure, there is an opportunity to create a cleaner, more sustainable transit system for future generations.

Refurbishment and repowering are examples of how municipalities can innovate and make smart, long-term investments in the post-COVID-19 era. The current situation provides a golden opportunity to optimize and transform existing fleets and reduce operating costs, create more sustainable solutions, and protect public safety.

BENEFITS OF REFURBISHMENT

The economic impact of the pandemic on transit will be felt for years to come, and the cost of maintaining fleets will continue to be a key strategic consideration. Refurbishment is not only a simple and affordable process compared to the cost of purchasing a new bus, but it also reduces operating costs and expands the bus life span. Waiting for a new bus can often take up to a year, so the speed of refurbishment provides an additional benefit, as most buses can be completely transformed within eight weeks. Refurbishment also provides greater efficiency of inventory turnover and more streamlined supply chain management and reduces maintenance.

One of Canada's largest transit authorities, York Region Transit (YRT), has served as an example for other regional institutions in extending the life of their fleet through refurbishment, after the Ontario Bus Replacement Program was eliminated in 2007.

The Program provided 75 percent capital funding to municipalities for the replacement of transit fleets at 18 years of age between 1974 and 1995. It also provided between 33 and 75 percent capital

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funding to perform major structural refurbishing to extend the bus life beyond the design life of 12 years.

In 2011, the Transportation Services Committee recommended that the lifespan of YRT's conventional and Viva buses should be increased from 12 to 18 years and that major structural and mechanical refurbishing costs were included in future capital budgets to support the increase to 18 years. In a report, the Committee identified that an 18-year bus life results in approximately $67,500 in overall savings per bus.

Beyond economic and environmental benefits, refurbishing offers an opportunity to completely re-think conventional transit, by adding features to ensure proper social distancing measures, reconfiguring buses through reduced seating and increasing signage for example, as well as including increased protective measures such as thermal cameras to screen for temperatures, or body counters to indicate when a bus has reached its full capacity. These types of measures can help rebuild trust in public transit systems and increase rider confidence.

BENEFITS OF REPOWER

Another long-term, cost-effective investment opportunity for local governments and municipalities is the adoption of green power. The federal government recently announced a $180 billion investment over the next 12 years, to support initiatives such as public transit projects and green infrastructure. These investments demonstrate the clear need to rethink and repower the industry and adopt more sustainable solutions. While green power requires an initial investment, it provides cost benefits for decades to come.

While the purchase of new green fleets comes with a high price tag, there is another approach that provides all the benefits of going green while mitigating challenges. Repowering involves taking an existing diesel bus, repowering it with a clean propulsion system and refurbishing the bus so that it is essentially new.

Repowering is the most cost-effective and environmentally friendly way to electrify a fleet. The capital cost of repowering a bus, for example, is 50 percent less than purchasing a new battery electric bus and the process takes less than six months to complete, which represents one quarter of the current procurement times for new battery electric bus deliveries. Operating a clean propulsion system, like ZEV Clean Power, is 41 percent cheaper than diesel power and extends the life span of the bus by 50 percent. Converting to zero-emission propulsion also drastically

reduces greenhouse gas emissions and cuts noise and vibration in half, increasing rider comfort.

While electrifying a fleet may seem daunting, it's recommended that local governments partner with a provider who can offer this transformation through a phased approach. A more gradual introduction allows systems to test and learn about different charging technologies and service planning approaches before committing to a broader implementation. A provider that works with multiple transit systems, such as MTB Transit Solutions, can also help governments expand their capacity to connect with other municipalities and integrate their buses into the network of charging stations and services available in the area.

By repowering and refurbishing existing buses, local governments can test and learn before committing to transforming their complete fleet, make informed decisions on infrastructure improvements and operational costs, and demonstrate that smart investments are being made to meet sustainability goals.

The Federation of Canadian Municipalities (FCM) is another example of how institutions are innovating to elevate transportation in Canada. In recent years, FCM advised the federal government to deliver funding as predictable allocations to all cities and towns with transit systems, so they can plan ahead and develop their strategies to bring to life the best solutions in transit to make their cities livable, competitive and sustainable. Along with this recommendation, FCM has also worked on a proposal to get more Canadians moving with a permanent transit fund and support for electric bus fleets.

HOW DOES REPOWERING A BUS WORK?

Providers such as MTB Transit Solutions offer a three-step process to convert buses to ZEV Clean Power:

> *"Innovation has always been the key for municipalities to unlock savings while continuing to provide good public services. Such as finding ways to extend the service life of valuable assets. Diesel bus refurbishment to get an addition 6+ years of service makes sense particularly now with the added financial pressures resulting from COVID-19. Staying on track to go green is now a greater challenge. The option of diesel bus conversion as part of a refurbishment to zero emissions electric is an innovative cost-effective alternative."*
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> **- Bob Shelton, Former long-serving Ontario CAO, Public Works Director and member of MTB Transit Solutions Advisory Board**

1. Refurbishment: includes tearing down the bus, revealing which parts need replacement or repair
2. Removal: includes taking away all diesel components (transmission, steering, fuel tanks, radiator, etc.)
3. Repower: installation of the ZEV Clean Power components (electric motor, electric steering, battery packs, electric air compressor, etc.)

Electrifying fleets requires a complete system change including bus depot and facility overhauls, a new operating model and software systems, new relationships with utilities and growth of staff expertise and capacity. Local governments can work with transit providers for assistance with charging stations, power grid consultations, construction, route analysis, maintenance, and staff training. It'simportant to recognize that a transition to a green fleet does not need to happen overnight – but that this movement to green transit leads to incredible cost savings in the future.

BUILDING TRANSIT SYSTEMS FOR FUTURE GENERATIONS

The transportation industry is the second largest source of greenhouse gas emission in Canada, and transit has an important role to play in improving this record and helping Canada meet its climate change commitments. Strong partnerships have been established between different levels of government, members of the transportation industry and individual Canadians, to reduce the negative impact transportation activities can have on the environment.

Supported by the Federal Sustainable Development Strategy (FSDS), Transport Canada and its partners actively contribute to Canada's sustainable development goals including greening government operations and moving towards a low-carbon operation in facilities and fleets. Transport Canada has identified several measures under the low-carbon government goal to support the Government of Canada's target to reduce greenhouse gas emissions from federal operations by 40 percent by 2030.

To meet Transport Canada's goals for making transportation green and innovative, the institution is working with provinces and territories through a Pan-Canadian Framework on Clean Growth and Climate Change to support a low-carbon transportation system.

At a local level, municipalities are in the early stages of implementing greener fleets including electric buses. Canada has relatively few electric buses on its roads, especially compared to pioneers such as Shenzhen in China, which counts now with over 16,000 fully electric buses on its roads and there are currently more than 425,000 electric buses on the road worldwide.

The pandemic presents a golden opportunity for Canada to modernize and re-think our transit systems for future generations. Investments in electrified transit and refurbishment are essential to a resilient recovery and can help reshape public transportation to be both safer and environmentally friendly.

MEETING CANADIANS EXPECTATIONS FOR GREENER TRANSPORTATION

Beyond the goals set forth by governments, Canadian citizens are actively participating in the process of greener transportation. In a recent consultation about the country's transportation system, Canadians said pollution should be reduced in all modes of transportation, and options

such as alternative fuels and electric power should be considered. In Canada, many municipalities are beginning to take the necessary steps to increase electric fleets. For example, transit authorities in Montreal, Toronto and Vancouver have committed to providing 100 percent zero-emission transit by 2040, 2042 and 2050 respectively.

Local governments and federal authorities have an opportunity to collaborate with manufacturers and transportation agencies to successfully navigate through the challenges that bus electrification implies, including the need for infrastructure, training and technology interoperability between buses and charging stations.

Refurbishing and repowering Canadian buses serves not only to the purpose to support transportation agencies in their transition to the post-COVID-19 era, but also to remain at the forefront of innovation, using new technologies to offer a renovated commuting experience while smartly investing and reducing operational costs.

GARA HAY is President of MTB Transit Solutions Inc. With offices in Milton, Ontario and Orchard Park, New York, MTB is Canada's largest bus repair and refurbishment company. Gara joined MTB in 2018 after spending the previous 3 years as General Manager of 13 Peterbilt heavy truck dealership locations in Ontario. Gara brings over 25 years of senior management experience primarily in the transportation business. Gara has a Bachelor of Business Administration degree (BBA) from Acadia University in Wolfville, Nova Scotia. Gara resides in Aurora, Ontario with his wife and two children.