

TRANSIT TALK

VOL. 40

Vancouver foresees Purchase of New Trolleybuses in 2027-2028

The first of Vancouver's current fleet of electric trolleybuses hit the streets back in 2005, replacing a fleet of Flyer E901 and 902 models. With the oldest trolleys now entering their 15th year of service, TransLink is making plans to renew the fleet in the 2027-2028 time frame. Typically, the life expectancy of a modern trolleybus in Vancouver has been 20-25 years. (The typical life expectancy of diesel buses is about 12.) Vancouver operates a fleet of 262 electric trolleybuses – it is the largest electric bus fleet in Canada.

According to TransLink CEO Kevin Desmond, the agency envisions an order of 188 standard 40-foot trolleys for 2027 delivery, and an order of 74 60-foot articulated trolleys for 2028 delivery, with the procurement process beginning in about 2025. The trolleys will not be replaced with battery buses, says Desmond, but with trolleybuses.

Battery buses may offer greater maneuverability in some senses, but this benefit would come with a very significant financial cost, explains Desmond. Replacement with any other technology would “need to address the key issue of an entire upheaval of the fleet's supporting infrastructure”.

There are over 370 kms of overhead running wire within the City of Vancouver and western Burnaby, including Metrotown, that serve 13 trolley routes. Many of these routes are amongst the busiest bus routes in the entire region. And the length of the wire network continues to grow. Wires are currently being installed along West 12th Avenue between Arbutus Street and Cambie Street, as well as portions of Cambie Street and Macdonald Street to provide transit service during construction of the Millenium Line Broadway Extension. (continued on Page 2)

Mexico City receives New Trolleybuses from Chinese Manufacturer Yutong

40 Yutong battery-equipped trolleybuses began appearing on the streets of Mexico City in the middle of last year, with a further 23 vehicles due to arrive in December. In Motion Charging—the ability to operate considerable distances offwire with traction batteries that are charged while connected to overhead—is a new feature on these 63 vehicles and will allow up to 70 km of offwire operation when fully charged.

Urban Transport Magazine says the new Yutong ZK5120C vehicles represent Mexico City's first trolleybus procurement in 20 years.

The 12-meter trolleybuses have a passenger capacity of up to 90 passengers, including standees. (con't on Page 2)

Top Transit Agencies in U.S. all Operate Multi-Modal Fleets Trolleybuses, Streetcars, Rail-Based Transit and Buses work Together for top Quality Service

A recent survey by WalletHub looked at public transit in 100 cities across the United States and measured its performance on 17 key metrics to determine where passengers fare best on their daily commute. The top three performing cities emerging from the survey were Seattle (#1), Boston (#2) and San Francisco (#3). Fourth and fifth place went to Washington, DC and Madison, Wisconsin. The city that fared poorest in the survey was Indianapolis, Indiana.

The best cities had transit that was easily accessible from all parts of the city, convenient to use, safe and reliable. Similar surveys conducted in recent years have yielded similar results, and Seattle and San Francisco have repeatedly been top performers. (continued on Page 2)



**Published by the Electric Traction Committee
of the Edmonton Trolley Coalition**
Edited by Retired Employees of the Edmonton Transit Service

Vancouver Trolleys (continued from Page 1)

"If the trolleys were to be replaced by battery buses, these wires would have to be dismantled at great cost," explains Desmond. Furthermore, Vancouver Transit Centre — the maintenance and storage facility for the trolleys, located next to the northern foot of the Arthur Laing Bridge — would also have to undergo an expensive revamp to remove the trolley infrastructure and install charging infrastructure.

The trolleys "are true zero emissions [vehicles], they work really well, and everyone is happy with them. I think it makes sense to keep the trolleys and draw our attention to replacing internal combustion engines," Desmond told reporters. Purchasing another generation of trolleys will allow the agency to focus on retrofitting other transit facilities for battery buses to replace diesel and diesel-hybrid buses.

In 2018, the Mayors' Council approved TransLink's new direction of a low-carbon fleet strategy that switches the public transit authority's operational fuels to renewable energy sources by 2050, with interim targets set for 2030 and 2040. The goal is to reduce the system's overall greenhouse gas emissions by 80%, achieved largely by transitioning away from diesel and diesel-hybrid buses into electric technologies. Replacing one type of electric bus with another type of electric bus will not achieve progress in terms of this low carbon fleet strategy.

Brian Tucker, Chair of the Edmonton Trolley Coalition, commented that this direction is "as one would expect". "Vancouver has demonstrated time and again that it has a well-run transit system and that it does not make decisions frivolously. That is why it remains one of the top transit systems in North America, and why it has continued to operate an excellent electric bus system for many decades while others resorted to less sustainable modes like diesel buses." Tucker added that although battery vehicle technology is growing by leaps and bounds and there are many advantages to battery buses, grid connected technologies like trolleybuses still offer much greater energy efficiency—nearly twice that of battery buses. "Think about it: *In a world where we need to be energy conscious, replacing a trolleybus with a battery bus is like taking out your new energy saving LED bulbs and replacing them with incandescents,*" he said.

[Information Sources: Daily Hive, December 23, 2019, ETC]

Vancouver Deploys Battery Buses

In September 2019, TransLink launched its first battery buses for regular service. These vehicles add more electric bus technology to Vancouver streets, which are also served by 262 electric trolleybuses.

Four battery buses now operate daily on Route 100 between South Vancouver's Marpole Loop and New Westminster's 22nd Street Station bus loop. The initiative is part of the Pan-Canadian Electric Bus Demonstration and Integration Trial, which is led by the by the Canadian Urban Transit Research and Innovation Consortium (CUTRIC).

Two of the buses are built by Winnipeg-based New Flyer, and the other two by St. Eustache Quebec-based Novabus. A charging station has been installed at each end of the line. In order to evaluate charging technologies, the charging equipment is also from two different manufacturers: ABB and Siemens.

(continued on Page 7)

Mexico City (continued from Page 1)

Representatives from the manufacturer studied public transit in Mexico City intently prior to constructing these vehicles in order to tailor them to Mexican operating conditions and passenger needs. The vehicles are equipped with a telematics system which provides information for intelligent fleet management. In addition, a parts warehouse was set up in Mexico City to ensure a seamless supply of spare parts.

Claudia Sheinbaum, Mayor of Mexico City, said: "Dual-powered electric trolleybuses are of great significance for improving public transportation and the urban environment in Mexico City. To improve urban accessibility, we must improve public transportation. Therefore, we will be increasing the number of electric vehicles in our city. Yutong dual-powered trolleybus technology is proven to be successful and emission-free." [Source: Sustainable Bus, Dec. 2, 2019]

Top Transit Cities (continued from Page 1)

A noteworthy feature of the top performing cities is that all operate multi-modal systems. In these systems, long distances can be covered with rail based modes or bus based modes with limited stops and right-of-way. This allows for quick cross-town commutes, even in unfavorable traffic conditions. Streetcars and trolleybuses provide a segment of the service in high density neighborhoods where ridership is high. These modes have a distinctive on-street presence that accentuate the availability of transit service, and tend to exhibit greater integration with communities. Service is generally frequent, even so on many bus lines that serve outlying areas, which contributes to a sense of security and reliability. Top performers are generally cities that have invested heavily in quality public transit.

According to the American Public Transportation Association, quality transit contributes to economic growth. Every \$1 invested in public transportation generates \$4 in economic return. Public transit also reduces vehicle accidents and can help to cut down on pollution. [Information sources: METRO magazine, January 2, 2020; ETC]



Berlin, Germany eyes Trolleybus for Future Transport System

Trolleybuses operated in Berlin for decades. The last trolleybus route, the O37 between Lichtenberg and Marzahn in the eastern portion of the city, was decommissioned in 1973. But now it looks like they may be close to making a comeback, most likely appearing first in the suburb of Spandau.

Quiet and fume-free, these pure electric vehicles make for an excellent urban transport system and may provide the key to allow Berlin to implement electric bus technology on a large scale with In Motion Charging.

A study by the transportation administration identified four routes in Spandau that would be ideal for trolleybuses: the M32, M49, X49 and X34. These are all high capacity lines with frequent service. Recent news reports foresee the Heerstrasse and Brunsbuetler Damm as test routes.

Petra Nelken, spokesperson for the Berliner Verkehrsbetriebe (BVG), Berlin's transit operator, told reporters January 12th that Spandau would be ideal for testing trolleybus technology, adding that residents there have been asking to have streetcar lines built for some time.

Nelken confirms that it is still early in the planning process, and so a date for the start of testing cannot yet be given. It will be three years at least, say experts. Although the Berlin Transportation Administration is pushing for trolleybuses, the BVG still has to file a planning application, and then the overhead wires would need to be erected and a request for proposal (RFP) drawn up to order the vehicles, says Nelken.

Trolleybuses have been proposed several times in the past couple decades, but the proposals didn't amount to much. Now it appears that plans are much more concrete.

Berlin recently terminated testing of inductively charging battery buses on Route 204 (Zoo – Suedkreuz), stating that they were not very successful. Four Solaris Urbino 12 buses were equipped with inductive charging modules to recharge onboard batteries at the ends of the route. The charging technology was provided by Primove, a subsidiary of Bombardier Transportation. The vehicles and charging equipment apparently proved complex to maintain. But this test project provided insights into the requirements for future electric bus operations in the German capital, lending credence to the idea that trolleybuses with In Motion Charging are the way forward. [Information Sources: Berlin Inforadio, January 11, 2020; Berliner Zeitung, January, 12, 2020; Electric Trolleybus News (R. C. DeArmond) December 8, 2019; previous report on this topic in Tagesspiegel, August 6, 2018]

Electric Buses are the Present and Future in Milan

On a sunny afternoon in June 2019, the first new trolleybus for Milan's fleet arrived in the Italian city. Supplied by Solaris Bus & Coach, with electrical equipment by Kiepe Electric, the new articulated Trollino is the first of 80 such vehicles that will allow a radical renewal of the trolleybus fleet in Milan. Three vehicles per month will be delivered.

These trolleybuses are the first units for the Italian market equipped with In Motion Charging developed by Kiepe Electric. The system allows wireless operations thanks to a 45 kWh battery pack. The Solaris Trollino as ordered by Milan is able to travel for around 14 km off-wire, according to the manufacturer. It features two motors with an output of 120 kW each, so that the power source is split between two axles (the second and third). The vehicles have room for about 136 people, including standees.

ATM, Milan's municipal public transport company, announced plans last year to electrify its entire bus fleet consisting of some 1200 vehicles. 25 Solaris battery buses are operating in the city already. The conversion is to be complete by 2030. From 2020 on, the agency plans to buy only electric vehicles.

Solaris is also entering in the French trolleybus market. The Polish company recently won a tender for the supply of 22 12-metre trolleybuses to Saint-Etienne by 2022. The vehicles will be fitted with a Skoda drive system and 40 kWh battery. [Source: Sustainable Bus, June 13, 2019]

New Trolleybuses coming to Bergen, Norway

Polish manufacturer Solaris will be entering the Norwegian trolleybus market, as the transit agency Keolis Norge, Bergen's service provider, recently signed a contract for 10 Solaris Trollino trolleybuses at a total cost of 8 million Euros. Delivery of the new vehicles is to commence in September of this year.

Trolleybuses serve a single 7.5 km route in Bergen. The new Solaris vehicles will be equipped with 55 kWh traction batteries to enable over 11 kms of offwire operation. Charging will take place when the vehicles are operating under wire.

The 18 metre vehicles will have seating for 47 passengers, with each seat equipped with a seat belt. A space for service dogs will be provided behind the driver.

The Italian city of Milan has ordered approximately 80 similar vehicles. [Sustainable Bus, December 2, 2019]

Iveco Crealis Trolley on Test in Nancy, France

An Iveco Crealis trolleybus equipped with In Motion Charging (IMC) has been undergoing testing in Nancy (France) since June of last year. The trolleybus, already on order by the City of Limoges (France) and winner of the Sustainable Bus Award 2019, is equipped with a Skoda Electric powertrain and can run without an overhead power supply thanks to a battery pack on board.

Offline range and performance, particularly in hill climbing situations, is being evaluated. The testing is being conducted by manufacturer Iveco.

Two of this same Crealis model will be supplied to Limoges Métropole to modernize its trolleybus operation. The new Crealis vehicles will supplement a fleet of nearly 30 existing trolleybuses that serve the busiest routes in Limoges. According to the manufacturer, the Crealis model with IMC can operate on batteries for 25-40% of its route.

Limoges has proudly operated electric trolleybuses for more than 50 years. [Sources: Sustainable Bus, June 7, 2019 and Mobilités Magazine June 7, 2019]

Solaris Double Articulated Trolleybuses on Display at Bus Conference in Gdynia, Poland

Polish bus manufacturer Solaris invited European transit agencies to attend an electric bus conference in the Polish city of Gdynia in June last year. The city was chosen as a venue because it has a large trolleybus network.

In addition to pure trolleybuses, Gdynia also uses hybrid trolleybuses and In Motion Charging as well as hybrid diesel-electric vehicles.

Solaris took the opportunity to demonstrate its first double articulated trolleybus, a high capacity, high performance electric vehicle. The 24.77 metre long, four axle trolleybus is called the Trollino 24. It is being tested in Gdynia.

The Trollino 24 has a five door layout – two doors in the front, one in the middle and again two doors in the rear section. It is powered by electric motors which power the second axle at the front end as well as the center axle. The fourth axle, which is the axle of the rear section, is steered. As a result the Trollino 24 is just as maneuverable as a regular 18 metre articulated vehicle.

A short demonstration trip on the Solaris Trollino 24 was undertaken for conference attendees within the depot area since the vehicle does not yet have the necessary permits for operation on public streets.

An official world premiere of this new model was held later in October at “Busworld” in the Brussels Exhibition Center. [Information Sources: Urban Transport Magazine, July 2, 2019 and later issues]

ETI Trolleybuses fade from scene in Dayton and San Francisco

Replaced by New State-of-the-Art Trolleybuses

For many years, San Francisco and Dayton have been unique in operating trolleybus fleets built by Electric Transit Incorporated (ETI), a U.S. offshoot of the Czech company Skoda. The vehicles were essentially derived from Skoda 14Tr and 15Tr models, but tailored to the specifications of the respective cities. Both cities have undergone a process of trolleybus fleet renewal recently, and the previous generation of ETI trolleys have been gradually fading from the scene as the new vehicles arrive.

The last official day of service for ETI trolleybuses in San Francisco was September 7th. Coach 5538 from the old ETI fleet was selected to join MUNI's historic fleet, as it still wears its original livery. Only six ETI trolleybuses remained on MUNI property by the end of November last year.

With steep grades that require a high performance vehicle to negotiate, San Francisco operates 278 trolleybuses on 16 routes and has the 2nd largest trolleybus system in the Western Hemisphere. Its new trolleybuses are XT40 and XT60 models built by New Flyer.

In Dayton, Ohio, new Gillig/Kiepe trolleybuses, known locally as “NexGen” trolley coaches, with In Motion Charging have been fulfilling regular duties operated by the previous generation of ETI vehicles since November 21st. The last official day of service for ETI trolleybuses was advertised as October 4th. On December 21st, as the Third Street Bridge in Dayton was about to close, a group of trolleybus supporters, joined by GDRTA CEO Mark Donaghy, organized a farewell run with ETI coach 9835. [Sources: International Trolleybus News, R. C. DeArmond, September 9, 2019; Jake Biermann, December 23, 2019]

ELECTRIC STREETCAR NEWS



Toronto's CLRV Streetcars make Last Run

Forty-two years after first arriving in Toronto, the TTC's Canadian Light Rail Vehicle (CLRV) streetcars made their last runs on December 29th, 2019. The streetcars began replacing Toronto's fleet of PCC streetcars back in 1979. The last CLRV streetcar arrived in 1982.

On December 29 from 10 am to 2 pm, two of the streetcars ran as a free service between Bathurst Street and Greenwood Avenue to commemorate the final day of service. All customers riding along Queen Street from 10 am to 2 pm were also treated to a free ride.

A TTC spokesperson said that 196 CLRV streetcars were purchased, supplemented in 1988 by an additional 52 Articulated Light Rail Vehicles (ALRVs), which were nearly double the length of the CLRV. The last of the ALRV fleet was officially retired in September last year.

This fleet is being replaced by 204 Bombardier low-floor streetcars which have been slow to arrive. This has resulted in buses being used to replace streetcar service on some routes. [Information Source: Daily Hive, December 27, 2019]

Orange County, California Streetcar Construction heads into 2nd Year

It has been a year since the groundbreaking ceremony. With major utility relocation nearly complete, the Orange County Transportation Authority (OCTA) has announced that construction on its modern electric streetcar line is now well underway and entering its second year.

The OC Streetcar route will cover 4.1 miles and serve Santa Ana's downtown and dense employment areas. It will carry passengers between the Santa Ana Transit Center and a transit stop at Harbor Boulevard and Westminster Avenue in nearby Garden Grove, running along Santa Ana Boulevard, Fourth Street and the Pacific Electric Right-of-Way to connect with the OCTA's busiest bus routes. It will use six Siemens S70 vehicles providing 10-15 minute service.

The OCTA reports that the relocation of utilities is expected to be completed early in 2020. Foundations will be poured for the streetcar maintenance and storage facility along the Pacific Electric Right-of-Way in Santa Ana during 2020. Work on the 350-foot bridge across the Santa Ana River will resume soon, as well, as the foundation and walls were completed in 2019.

Federal funding is expected to pay for more than half of the \$408 million streetcar project. Other funds come from Measure M, Orange County's half-cent sales tax for transportation improvements, also known as OC Go. The project is on track to begin operation in early 2022. [Information source: OCTA News Release, December 5, 2019]

Tempe Streetcar receives \$75 Million Federal Grant

A \$75 million grant will help Valley Metro of Tempe, Arizona complete a streetcar to improve mobility in that city's historic downtown. The streetcar will span 3 miles, serve 14 stops and link riders to Arizona State University and Valley Metro's LRT. Brookville Equipment corporation will supply six Liberty model streetcars capable of off-wire operation.

The streetcar line is slated to open in 2021. Construction began back in August of 2018. Total project cost is \$192 million, a good portion of which is being funded by P3 public-private partnerships and through a special proposition approved by voters known as Proposition 400. [Information Sources: U.S. FTA, September 25, 2019; Railway Age, September 26, 2019; Mass Transit Magazine, September 26, 2019]

BATTERY BUS NEWS



Battery Buses face Challenges

Ashville North Carolina finds Battery Buses not Universally Applicable

After delays and much anticipation from local climate and transit advocates, Asheville North Carolina finally deployed five battery-electric buses last June. The buses promise to reduce the city's carbon footprint by 270 tons per year. But the addition of the battery vehicles has not been seamless. Questions linger about the buses' ability to keep up with their diesel and hybrid counterparts on Asheville's demanding routes. And it remains uncertain whether the city's goal of transitioning to a 100% electric fleet by 2030 using battery vehicles is still feasible.

Experience with the Proterra battery electric buses has shown that features such as speed and range fluctuate widely depending on temperature, weight and changes in elevation. "If you're driving on a lot of hills, you're using more energy," says Assistant Transportation Director Jessica Morriss. "Another variable that comes into play is the load, or how many people are on the bus. With a full bus, you're using more energy." Freezing or hot conditions also impact battery life and performance. "As you can imagine, it's when you put all of those variables together [that] there are different outcomes. One day, a bus might be able to run on the S3 route all day long if conditions are good," Morriss explains. "If it's cold outside, it might not be able to, and it might need a recharge at some point during the day."

Matt Horton, Chief Commercial Officer at Proterra, says that while battery-electric technology remains imperfect, demand for battery vehicles continues to grow worldwide. Since the first Proterra battery buses hit city streets in 2010, 90 cities across the U.S. have added the buses to their fleets and are also experiencing the growing pains of the new technology. Cities that purchase Proterra's buses are required to provide additional training for drivers to mitigate some of the issues related to range. That includes teaching drivers to manage the bus's regenerative brakes, which increase range by redirecting energy to the battery. "If you do that right, you're going to recapture a lot of energy that will enable you to drive a long distance during the day," Horton says. "If the bus driver isn't used to it and they're jamming on the accelerator and then jamming on the brakes, you're going to be a lot less energy efficient, and that's going to impact your range."

Route planning also plays a major role in getting the most out of the vehicles. Currently, Asheville's electric buses are only deployed on three routes. All three were chosen for their relatively flat, straight topography that maximizes range.

Morriss says plans to add more battery buses have been placed on hold. "I think that what we've decided at this time is that the battery vehicle technology, but also electric bus technology in general, is changing very rapidly, so we are pressing pause at this time so we can continue to evaluate other [options]." The city is looking at hybrid buses, but also plans to add two new diesel buses to its fleet by the end of the year.

(Editor's Note: In October, the U.S. PIRG Education Fund, Environment America Research & Policy Center and Frontier Group released a new report highlighting the experience of six early adopters of battery buses. The report outlines the successes, challenges and lessons learned. Such information may help to avoid experiences like those in Asheville and Indianapolis.) [Sources: Mountain Express, Nashville NC, July 6, 2019; US PIRG Education Fund News Release, October 10, 2019]

Los Angeles orders 130 Battery Buses

Back in 1991, Los Angeles tried to come up with a strategy to reduce the emissions associated with its huge bus fleet. Initially a large electric trolleybus system was proposed to serve trunk routes. But promises of fuel cell buses being "just around the corner" thwarted the investment, and, of course, as we now know, fuel cell technology has never really matured to be reliable and viable for on-vehicle use. Subsequently, a fleet of compressed natural gas (CNG) buses was purchased as a way to address the emissions problem. Although far from achieving what electric trolleys would have achieved, they certainly allowed a shift away from diesel for the Los Angeles local service operator LACMTA.

It looks like battery buses are now poised to provide another pollution solution for the Los Angeles area, as the provider of DASH and Commuter Express services, LADOT (Los Angeles Department of Transportation) has ordered 130 battery electric buses from manufacturer BYD.

A BYD spokesperson said the purchase is in line with Los Angeles' new sustainability goals that include converting the entire LADOT fleet to zero-emission buses by 2030. All city vehicles are to be converted to zero emission by 2050.

BYD says it is estimated the 130 buses will reduce greenhouse gas emissions by 8,225 metric tons per year and by 98,700 metric tons over the buses' 12-year life, reducing greenhouse gas emissions by 81 percent compared to current natural gas buses. The 130 model K7M 30-foot, 22 seat buses will be built at BYD's Coach & Bus factory in Lancaster, Calif. They will have a range of up to 150 miles, and can be charged in 2.5 to three hours. [Source: BYD Motors, November 14, 2019]

MCI Long Range Battery Bus Successfully Tested

MCI's first all-electric coach designed for long distance highway travel was tested by service provider FlixBus on a round trip from San Francisco to Sacramento back in October. This test was the first of its kind in North America. Long distance battery buses are already running in France and Germany. [FlixBus](#) now plans to work with bus partners and MCI to order battery coaches to provide service in key corridors including Los Angeles to San Diego, San Francisco to Sacramento, Portland to Seattle, and New York to Philadelphia. [Source: METRO Magazine, October 30, 2019]

Vancouver Battery Buses (con't from Page 2)

The cost of battery buses today is about \$1 million each, with another million added for each charging station at each route terminus. Based on a previous TransLink report, the cost of the charging infrastructure required to support widespread adoption of battery buses runs between \$250 million and \$750 million, depending on the electrification scenario. This figure does not include the buses.

So conversion from diesel technology to battery buses is pricey, but battery buses have some decisive advantages. Not only are they zero emissions, with each bus reducing greenhouse emissions by some 100 tonnes per year, but their operating costs are far lower. Each battery bus can save around \$40,000 annually in fuel costs, which adds up quickly.

TransLink anticipates a fleet transition from diesel to battery buses beginning in 2023 could save \$1.4 to \$1.6 billion in operating costs, resulting in a net savings of \$655 million to \$1.3 billion by 2050.

Long-haul, off-wire battery technology for electric trolleybuses is being developed as well, with many trolley cities moving towards In Motion Charging – a feature that allows trolleybuses to charge batteries while under wire, and then provide service for great distances to neighborhoods that are offwire. [Information Sources: TransLink, September 11, 2019; Daily Hive, December 23, 2019; Dale Laird]

Montreal Takes Delivery of First Long-Range Battery Bus

Montreal operator Société de transport de Montréal (STM) received its first long range battery bus in November – the first in a series of 30 manufactured by Winnipeg-based company New Flyer. The bus will be outfitted with instrumentation to allow the collection of performance data in order to gather information critical to furthering STM's long term fleet electrification goals. STM has proposed purchasing only electric vehicles as of 2025.

STM CEO Luc Tremblay said that 38 battery electric vehicles of various types will be put into service in 2020. These will add to the three fast charging buses already operating under the City Mobility project. Rigorous testing will ensure that the battery electric vehicles are able to meet the service requirements of Montreal's bus network.

The bus is powered by 440-kWh Li-NMC batteries and has an expected range of about 250 km. Recharging will take place with inverted pantographs at the Stinson Bus Garage. [Source: STM News Release, November 11, 2019]

Sacramento to Operate Electric Bus Across Causeway

Beginning April 6th, 2020, the Yolo County Transportation District (Yolobus) and the Sacramento Regional Transit District (SacRT) will begin operating a new battery electric bus service across the Yolo Causeway to connect Sacramento and Davis. The new service will be dubbed the "Causeway Connection" and will carry the slogan "Getting between Davis and Sacramento has never been so electric." [Source: SacRT News Release, December 12, 2019]

SFMTA and ChargePoint Bring Battery Buses to San Francisco

Battery buses are slated to hit the streets of San Francisco this Fall, according to the SFMTA. As part of the revitalization of the agency's Woods Bus Yard, charging infrastructure to support at least nine battery buses is being installed.

This is the first step in the planned electrification of the San Francisco diesel bus fleet by 2035. San Francisco already operates a large electric bus fleet in the form of trolleybuses, as well as other electric surface transportation (streetcars, cable cars), and is ahead of other California municipalities in the use of zero emission technology. It has over 800 city buses.

The electrification of buses is forecast to be one of the most aggressive trends in transit in the coming years, with experts anticipating that electric buses of one type or another will make up about half of all those in service in the United States by 2029 and nearly 70 percent of all buses in operation by 2040.

Chargepoint is an electric vehicle infrastructure company. It operates the largest network of independently owned EV charging stations and manufactures the technology employed in this network. ChargePoint will be working closely with SFMTA to build the electric bus infrastructure for the Woods Bus Yard. Leveraging the company's advanced high-powered charging architecture, the project will include nine ChargePoint Express Plus DC charging solutions with power provided by nine ChargePoint Power Blocks, enabling a charging output of more than 150 kW per bus. In addition to hardware, ChargePoint will empower SFMTA teams with a suite of powerful software solutions to help improve efficiency and lower electricity costs. [Sources: NGT News, October 4, 2019; ChargePoint News Release, October 2, 2019]

Volvo receives Europe's Largest Battery Bus Order

Volvo has announced it has received the largest single order for battery buses in Europe. It will deliver 157 articulated battery-electric buses to European transit provider Transdev starting in 2020. The buses will operate on several routes in Gothenburg, Sweden. With their introduction, emissions and noise will be reduced such that the buses will be able to operate in sensitive areas.

Transdev is Europe's leading operator of electric buses of all types. In the Netherlands, for example, the company operates 20 million passenger km with electric trolleybuses and 30 million passenger km with battery buses every year.

Volvo Buses President Håkan Agnevall told media that Volvo is a pioneer in electromobility and sustainable public transport. "This large order confirms that electric buses are recognized as a sustainable and financially viable solution for demanding high-capacity public transport needs."

All of the buses will be the Volvo 7900 articulated model. It can carry 150 passengers with an energy consumption 80 percent lower than that of a corresponding diesel bus. Quick charge stations installed along the routes will be used to charge the buses, using the commonplace OppCharge interface. [Information Sources: Sustainable Bus, Nov. 5, 2019; Transdev Web site, accessed January 23, 2020]

Miami-Dade, Florida buys Battery Buses

Miami-Dade, Florida announced in October last year that it will purchase 33, 40-foot Proterra Catalyst E2 electric buses and up to 75 plug-in Proterra chargers. The purchase represents the largest battery bus order on the East Coast. [Source: Proterra News Release, October 8, 2019]

BYD 60 foot Articulated Battery Bus completes Federal Testing at Altoona

The U.S. Federal Transportation Administration's Bus Testing Program is designed to promote the production of better transit vehicles. Before a bus can be purchased with U. S. Federal funds, it must have passed testing at the FTA's facility in Altoona, Pennsylvania.

It was announced October 8th that BYD's 60-foot battery electric K11M articulated transit bus had successfully completed durability road testing under the FTA's new pass/fail guidelines in Altoona. BYD says its K11M became the first battery powered transit bus of its size to complete the full 15,000-mile durability test in 106 days.

The first 60 foot battery bus to pass testing at Altoona was a New Flyer built model tested back in 2017. Prior to 2016, a lack of FTA tested and approved battery vehicles was often cited by transit authorities as a reason for not considering battery buses. [Sources: FTA Web site, accessed January 23, 2020; BYD Motors News Release, October 8, 2019]



Vancouver's current fleet of New Flyer electric trolleybuses dates from 2005. See p. 1. [Photo: Shutterstock]



A Polish-built Solaris Trollino 24 double articulated trolleybus at the Electric Bus Conference in Gdynia in July, 2019. See. p. 4. [Photo: Urban Transport]



An Iveco Crealis articulated trolleybus on test in Nancy, France. See p. 4. [Photo: Mobilités Magazine]



Toronto said goodbye to its Candian Light Rail Vehicles on December 29, 2019. They are being replaced by Bombardier streetcars. See p. 5. [Photo: Shutterstock]



A Novabus battery electric bus recharges at a charging station while on test in Vancouver, August 2019. See p. 2 and 7. [Photo: Dale Laird]



A scene from the farewell trip on December 21st, as Daytonians said goodbye to their yellow ETI trolleybuses (left). The vehicles are being replaced by Gillig bodied NexGen trolleybuses (at right). See p. 4. [Photo: Jake Biermann]