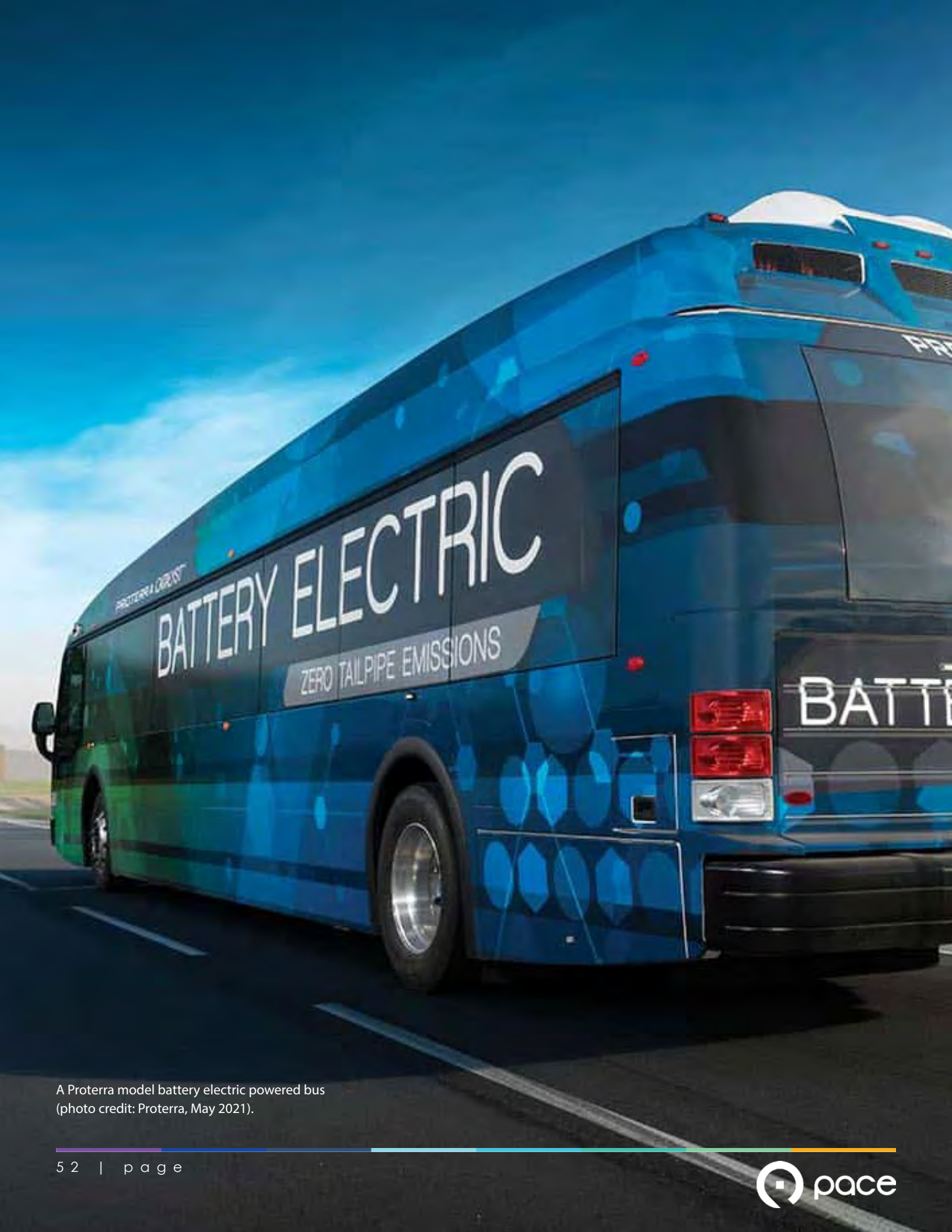


A Proterra model battery electric powered bus (photo credit: Proterra, May 2021).

A-1 Electric Bus & Zero-Emission Fleet Transition

Initiative: Develop a plan for transitioning Pace's facilities and fleet toward 100 percent zero emission bus (ZEB) technologies. Plan for battery electric bus (BEB) fleets and study other emerging alternative and clean energy technologies for potential future application.

IMPLEMENT NOW | implement later | further investigate

Supports Goals:
Responsiveness, Safety, Adaptability, Collaboration, Environmental Stewardship, Fiscal Solvency, and Integrity

ACTION ITEM 1 Implement 100 Percent Zero-Emission Fleet by 2040

Chapter 1 of *Driving Innovation* discusses the profound environmental impact of greenhouse gas emissions on the climate crisis. While Pace by its very nature as a transit agency helps reduce regional transportation-related emissions in taking cars off the road and instead riding Pace's family of services, our agency is nonetheless still an emitter of greenhouse gases using diesel-powered vehicles.

With an ever-increasing urgency to move away from fossil fuels in mind, and a desire to do our part in resolving this crisis, Pace is committed to the goal of operating 100 percent zero-emission vehicles by the year 2040.

The following pages of the A-1 initiative provide further details on the specific technologies and strategies Pace is currently undertaking to acheive this committment. Whether through battery electric buses (BEB) or other alternative transit fleets, Pace will remain adaptable in its approach to fulfulling its goal of environmental stewardship, while concurrently ensuring fiscal solvency and making the most use of tax payer dollars.

Pace is committed to the goal of operating 100 percent zero-emissions vehicles by the year 2040.

ACTION ITEM 2 Implement Battery Electric Bus (BEB) technology

Pace recognizes how interest to electrify vehicles across private industry and US federal, state, and local governments has been intensifying throughout 2020-2021. Looking ahead, the agency will holistically evaluate a transition path to converting its fleet to battery electric buses (BEB).

Among the many first steps we are taking, Action Item 2 of the A-2 Capital Improvement Projects initiative describes Pace's forthcoming Facilities Plan. This effort will include an investigation of the prerequisites that BEB technology requires to successfully operate. Once established, Pace will further plan what next steps to take toward transitioning the rest of its fleet.

In the coming year, Pace is also slated to receive two fully electric paratransit vehicles as part of an IDOT-led purchase of buses. The agency is also in discussions with various other regional stakeholders to identify partnerships for procuring vehicles and charging infrastructure, as well as explore funding opportunities that will allow Pace to pursue the implementation of this technology.

A Union of Concerned Scientists 2017 study[3] indicates that BEB's have 70 percent lower global warming emissions than CNG or diesel hybrid buses even when considering the lifecycle emissions required to generate the necessary electricity. Similarly, a 2018 US PIRG Education Fund Study[4] indicates that implementing BEB's lower operational costs yields fuel and maintenance savings over a vehicle's life cycle.

Pace praises the efforts of many other transit agencies across the nation and world who are investing heavily in transitioning their fleets to BEB and other green, renewable, and environmentally-cognizant sources of vehicle propulsion. We will coordinate closely with the CTA who is already pioneering this technology in the Chicago region, as well as IDOT, Illinois Tollway and other regional partners to identify opportunities to share resources, ideas and expertise for electrifying public fleets.

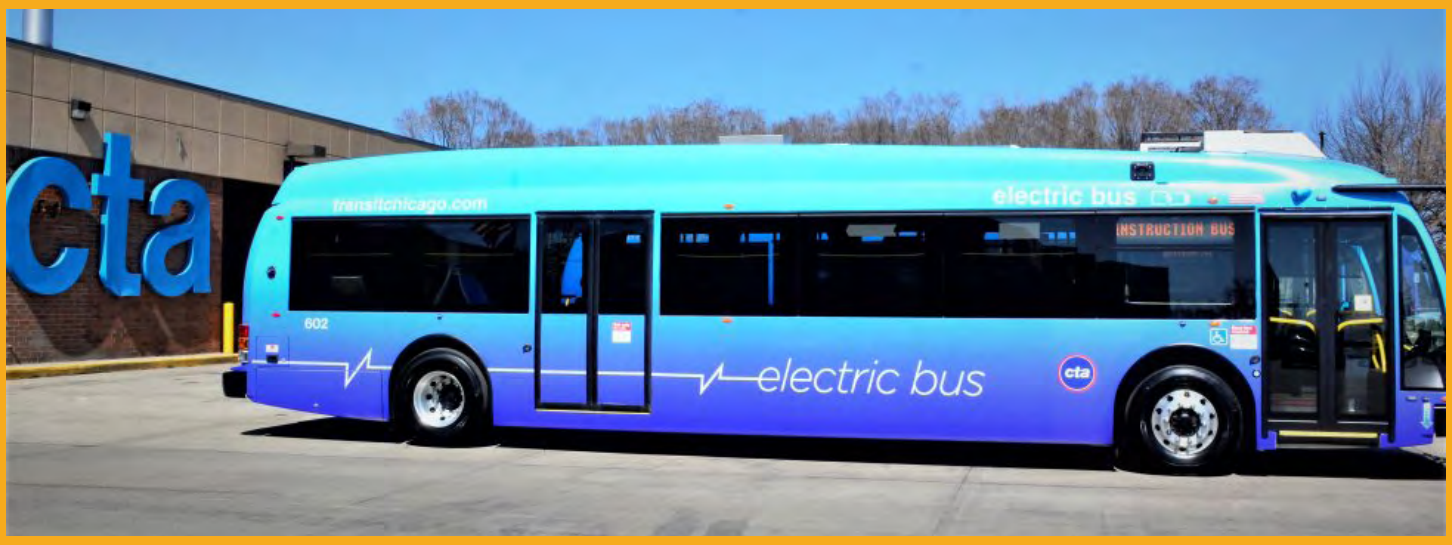
The upcoming Pace Facilities Plan will be among the first steps in investigating the prerequisites that battery electric buses need to successfully operate.

[3] Chandler, Sara et al. *Delivering Opportunity: How Electric Buses and Trucks Can Create Jobs and Improve Public Health in California.* Union of Concerned Scientists. 2017

[4] Casale, Matt & Mahoney, Brendan. *Paying for Electric Buses - Financing Tools for Cities and Agencies to Ditch Diesel.* U.S.. PIRG Education Fund. 2018.

A New Flyer model battery electric powered bus operated by TriMet in Portland, Oregon (photo credit: TriMet, August 2021).

Alternative Fuels | Battery Electric Bus and Hydrogen Fuel Cell Electric Bus



Top photo - *A CTA battery electric bus (BEB) vehicle. The CTA is pioneering the use of this technology in the Chicago region with vehicles now in revenue service. As part of the pilot project, quick-charging units have been installed at key points along the busy #66 Chicago Avenue route which operates using BEB vehicles. For this work, the CTA was awarded the 2020 Innovative Solutions Award from METRO Magazine.*

Bottom-left photo - *TransLink in Vancouver has had BEB's in service since 2019 as part of a Canadian national pilot project. Fast-charge infrastructure is seen above the vehicle.*

Bottom-right photo - *Since 2018, Alameda Contra-Costa Transit District (AC Transit) has been piloting hydrogen fuel cell electric (FCEB) buses as demonstration projects, and has encouraged other transit agencies to follow suit in recent years. Bi-products of these zero-emission buses are limited to water and heat, and they feature ranges than more closely match traditional diesel buses .*

ACTION ITEM 3 Diesel & Compressed Natural Gas (CNG) Transition

Pace has made major investments in CNG vehicles over the past few years. In 2018, Pace completed a compressed natural gas (CNG) bus garage in Markham that houses 98 CNG buses, and the egency has also acquired land in Wheeling to replace its current Northwest Division, which will feature exclusive CNG technology among 115 new vehicles. Benefits of CNG include lower fuel cost, lower maintenance cost, elimination of harmful particulate pollution, and lower greenhouse gas emissions than diesel.

Nonetheless, Pace recongizes that both diesel and CNG are fossil fuels that produce greenhouse gas emissions. Moving forward, Pace will curtail new spending on diesel vehicles. Similarly, Pace will limit expansion of CNG technology to the current South and forthcoming Northwest Division operations.

Ultimately, Pace aims to make CNG a transition technology that provides a cleaner alternative to diesel, and allows the agency the prerequiste time to implement BEB and other 100 percent clean fuels.

ACTION ITEM 4 Investigate Emerging Alternative Fleets

Pace recognizes that other vehicle propulsion technologies may have potential to one day replace or augment Pace's transit fleet beyond its forthcoming BEB technology.

Transit agencies across the nation have been investigating, piloting and operating alternatives such as hydrogen fuel cell electric buses (FCEBs). There may also be long-term cost efficiencies in retooling CNG facilities with fuel cell technologies that are worth further investigation.

Moreover, completely new and innovative technologies may be invented and developed in the coming years which may be of interest for Pace to explore.

Overall, Pace will carefully weigh the implications of operating multiple vehicle technologies under any scenario, and ensure its ability to maintain the highest standards in safety, training, and maintenance prior to making new commitments. Additionally, Pace will ensure that previous funding for technologies such as CNG, BEB, or any other new technology is not wasted and that assests reach the full useful life cycle before being replaced, or are otherwise repurposed to achieve the highest possible return on investment.