BAE Systems, a leader in platform electrification, is using their proven series electric propulsion system to advance zero-emission bus technology. Our all-electric propulsion system is best known for dramatically improving the efficiency and fuel economy of more than 10,000 transit buses worldwide. Now a derivative of that system is being used to advance electrification in zero-emission transit producing a wide range of benefits including the full electrification of vehicle accessories and enabling efficient, long-range zero-emission buses using hydrogen fuel cell technology.

For more than 20 years, BAE Systems has partnered to demonstrate and deploy fuel cell bus technology. With teammates ElDorado National and Ballard Power Systems, we have commercialized the American Fuel Cell Bus model. As the powerful name implies, the American Fuel Cell bus is a zero-emissions bus designed to achieve the same level of performance, reliability, and durability that transit operators require while also being Buy America compliant. The bus model has completed Altoona testing and is California HVIP eligible. The model is in production with 21 already delivered. They are all-weather buses and are deployed across a wide range of operators and locations from extreme hot to extreme cold climates.

Why BAE Systems’ powered fuel cell electric buses?

- Zero emissions: no pollution, hydrogen is the sole fuel source, producing only pure water in the exhaust
- Quiet and comfortable: all electric drive delivers quiet operation
- All electric accessories: electric air conditioning, power steering, air compressor and cooling systems mean higher reliability and efficiency
- Lightweight, and energy dense lithium-ion battery technology provides added performance and efficiency
- Production qualified systems and components: reliable, proven commercialized technology
- Designed with the maintainer in mind: easy access to maintenance and inspection points
- Fully supported through an established support network for the entire bus
- Buy America compliant, Altoona tested
**How does the system work?**

The propulsion system blends power from the high voltage batteries and hydrogen fuel cell system through state-of-the-art power electronics to provide propulsion at the wheels and to energize electrified accessories. For added efficiency, regenerative braking is utilized to capture kinetic energy during braking and store it in the high voltage batteries. Additionally, the bus is capable of low power, short duration driving solely on the battery when the high voltage batteries have sufficient charge. This feature allows the bus to be moved at the depot without having to start the fuel cell.

Compressed hydrogen (CH2) is stored onboard the bus and converted to electricity by the Fuel Cell system. Electrical power from the Fuel Cell is delivered to the Li-ion Battery and the propulsion system.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bus chassis/model</td>
<td>ElDorado National 40' AXESS FC</td>
</tr>
<tr>
<td>Curb weight</td>
<td>34,800 lb (15,785 kg)</td>
</tr>
<tr>
<td>Seats/stands</td>
<td>38 plus driver/19 standees</td>
</tr>
<tr>
<td>Power plant propulsion</td>
<td>Ballard Power Systems FCvelocity®-HD85, 85 kW fuel cell</td>
</tr>
<tr>
<td>Hybrid system</td>
<td>Series electric propulsion system</td>
</tr>
<tr>
<td>Electrical energy storage</td>
<td>186 kW, 50 kWhr Li-ion energy storage</td>
</tr>
<tr>
<td>Accessories</td>
<td>Electronic alternator, electrically driven cooling systems, HVAC, power steering, and air compressor</td>
</tr>
<tr>
<td>Fuel storage</td>
<td>Gaseous hydrogen: 60 kg at 350 bar</td>
</tr>
<tr>
<td>Nominal Range</td>
<td>312 miles (502 km) under typical urban transit cycle</td>
</tr>
<tr>
<td>Length, width, height</td>
<td>493.5 in (12.5 m) L; 102 in (2.6 m) W; 139 in (3.5 m) H</td>
</tr>
</tbody>
</table>

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