Performance Report
Hybrid Buses

October 2, 2013
Board of Directors

Forty-foot Hybrid Buses

- Purchase Information
- Technical - Specifications
- Hybrid Design - How It Works
- Technical - Advantages
- Diesel Emissions Reductions
- Technical - Other Features
- Training
**Purchase Information**

<table>
<thead>
<tr>
<th>Buses purchased</th>
<th>Total cost</th>
<th>Cost/bus</th>
</tr>
</thead>
<tbody>
<tr>
<td>25 Forty-foot hybrids</td>
<td>$16,783,850</td>
<td>$671,354</td>
</tr>
<tr>
<td>21 Forty-foot diesel</td>
<td>$9,377,105</td>
<td>$446,529</td>
</tr>
<tr>
<td>16 Twenty-nine-foot diesel</td>
<td>$6,657,493</td>
<td>$416,093</td>
</tr>
</tbody>
</table>

Hybrid incremental cost funded by FTA
State of Good Repair grant

Delivery – Hybrids & four 29-foot Diesels
- 4 or 5 buses per week starting mid-October
- Approximately 3 weeks preparation
- Remainder of order mid-2014 delivery

**Technical: Specifications**

Hybrid Buses:
- Body length  40 feet
- Body width   102 inches
- Body height  11 feet 6 inches
- Capacity     39 seats, 2 wheelchairs
Parallel Hybrid Design

Major Components:
- Cummins ISB Engine
- Allison EV40 Drive Unit
- Allison Duel Power Invertor Module Controller
- NiMH Battery Pack - Energy Storage System
Technical - Advantages

• 6.7L - vs - 9.0L Clean Diesel
• Smaller diesel engine – lower emissions
• Emission certification levels same as compressed natural gas (CNG) engines
• Less fuel/lower operating cost
• Significantly quieter operation
• Extended brake life

Diesel Emissions Reductions

<table>
<thead>
<tr>
<th>NOx Emission Levels</th>
<th>1980's</th>
<th>1990's</th>
<th>2000's</th>
<th>2010</th>
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</thead>
<tbody>
<tr>
<td>grams per bhp/hr</td>
<td>10</td>
<td>6</td>
<td>4</td>
<td>2.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1.2</td>
<td>0.2</td>
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</tbody>
</table>

Unregulated
Diesel Emissions Reductions

- **EMP Cooling System**
  - Improved cooling
  - Reduces power drain of the engine (less fuel)
  - Greater access to engine and other components
  - Eliminates the possibility of fire from a hydraulic line leak
- **Vanner Beltless Alternator (DC-DC Convertor)**
- **UTC Camera System 7 cameras** (2 exterior)
- **Amerex V-25 Automatic Fire Detection & Suppression System**
- **BRT front cap styling**
Technical: Other Features

• LED headlamps
  - Improved visibility
• Hanover destination signs
  - 10-year warranty
  - Integrated login with AVL/farebox system
• C.L.A.S.S. (Contact Less Acoustic Sensing System) Rear Doors
• Driver Console – Enhanced Visual Stop Request
• Sure-Lok Dual Auto-Loc™ Wheelchair Restraints
• Lift-U Wheelchair ramp (6:1)
• Added – 2 vertical stanchions (wheel-well)
• Recaro Ergo Metro with LiquiCell padding (Driver Seat)

Training

Mechanics (more than 3,700 training hours)
• Allison Transmission Hybrid Drive Service
• Allison Transmission Electric Drive Energy Storage System
• Dynex I/O Controls Multiplex Electrical System
• Gillig Maintenance Training
• Cummins ISB Engine Training

Bus Operators (approximately 500 training hours)
• Hybrid Bus Orientation for Bus Operators
Let’s go see our 1st Hybrid bus!