Hybrid Buses in the Real World

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HYBRID BUSES IN THE REAL WORLD

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Hybrid Buses in the Real World

- **Background**
  - In the fall of 2009, the University at Albany received a grant to purchase hybrid buses.
  - Submitted as part of the Capital District Clean Cities Coalition via NYSERDA under the ARRA (stimulus) funding.
  - The University received approximately $400,000 to cover the incremental cost of purchasing 5 hybrid vehicles as well as funding for administrative and training costs.
Bus design

- The buses were designed from the ground up by Mathews Bus using Thomas C2 engines.
- The University chose to go with school bus type hybrids rather than transit type hybrids due to capacity needs and cost factors. We also requested buses with wheelchair lifts.
- To our knowledge, only 6 buses of this type are operating in New York, 5 on the UAlbany campus and 1 in the Monroe Central School District.
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Bus deployment
- The buses were deployed in two phases.
- The first two buses began their runs in December, 2010.
- The remaining three buses began operating in June, 2011.
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- **Mileage performance:**
  - The hybrids are currently averaging 7 mpg.
  - This is an improvement from the average of 5 mpg for comparable diesel buses.
  - This equates to a savings of over 3,000 gallons of diesel, 67,540 pounds of CO2 (almost 34 tons) and $10,160 in cost savings to date.
  - The preliminary data shows that mpg decreased significantly during the summer months of operation.
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## Hybrid fleet mpg:

<table>
<thead>
<tr>
<th>Date</th>
<th>3/11</th>
<th>6/11</th>
<th>9/11</th>
<th>12/11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ave MPG in the quarter</td>
<td>7.28</td>
<td>8.03</td>
<td>5.77</td>
<td>8.16</td>
</tr>
<tr>
<td>Ave MPG, cumulative</td>
<td>7.28</td>
<td>7.7</td>
<td>6.2</td>
<td>7.1</td>
</tr>
<tr>
<td>Number of buses deployed</td>
<td>2</td>
<td>2</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>
Advantages of hybrids:

- Better fuel performance.
- Reduced emissions.
- Meet EPA emission standards.
- Larger capacity.
- Air conditioning works wonderful in the summer.
- Runs are conducive to hybrids, a low speed; stop and start run.
Advantages of hybrids:

- Aesthetic appeal; nice, sleek look, signage indicating it as a clean vehicle, does not leak random fluids.
- Consumer appeal, some charters that have specifically requested the hybrid for their trip.
- Hybrids do run quieter but in our models there is only a subtle difference. Since our models are a school bus design with a front engine and air brakes, they don’t go totally silent at a light like a hybrid car might.
Disadvantages of hybrids:

- Heating in the winter. The engine block does not generate heat like the diesel buses; a supplemental heating element is a desired improvement.
- Reliability issues due to problems with the mechanical systems. None of these problems are the result of the hybrid piece but rather due to multiplexing.
- Replacement batteries costly.
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Disadvantages of hybrids:

- Training of drivers and mechanics required.
- Acceleration differences. Hybrids will not accelerate quickly when gunning the engine but will pause. Hybrids are not scheduled on runs where quick acceleration across high traffic lanes is necessary.
- Deployment was such that the hybrid fleet is similar in age and will need to be replaced around the same time (consequence of the terms of the grant).
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- **Alternative to hybrids:**
  - Propane
  - Compressed natural gas

- **Why these were not an option:**
  - Lack of fueling stations near the campus.
  - Cost and administrative requirements to establish a fueling station on site.
  - Since the time of the grant, these obstacles have somewhat diminished. Some fuel providers will now provide infrastructure at a greatly reduced cost or with little upfront capital and stations may not need to be made available to the public.
  - Other Clean Cities Coalition members who bought either propane or CNG vehicles have reported good results in terms of their operation, environmental and economic benefits. The University is still considering a CNG bus in the future.
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- Use of Clean Cities Coalition:
  - Funding for this project would not have been possible without the presence of the Clean Cities Coalition.
  - The Capital District Clean Cities Coalition maintains an active branch with quarterly meetings, access to resource and networking information and partners with NYSERDA to facilitate grant opportunities.
  - There are several Clean Cities Coalition groups throughout the country. We would recommend any college and university to join their local branch.
  - More information on these can be found at: http://www1.eere.energy.gov/cleancities.
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Questions?

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