Hybrid Commercial Vehicle

Next generation parallel hybrid vehicle for commercial applications

Sara Erkfeldt, Volvo Group Trucks Technology, sara.erkfeldt@volvo.com

Motivation

- Hybridisation of urban transport vehicles can help to simultaneously reduce fuel consumption (CO₂ emissions) and exhaust emissions.
- Cost is considered a major obstacle for market introduction of hybrid vehicles.
- Research to reduce cost and enhance efficiency of the hybrid system and components incl. electric auxiliaries is necessary.

Objectives

- Develop highly efficient hybrid systems and components enabling mass market introduction
- Final result is the demonstration of an 18-ton hybrid city bus and a 6-ton hybrid distribution truck.
- Improvements compared to current generation hybrids:
  - Fuel consumption 5% lower (or 30% wrt. conv. diesel)
  - Weight reduction of 500 kg for 18-ton bus
  - Hybrid system cost reduction of 40%
  - Improved drivability and performance
  - Noise and exhaust emissions reduction

Achievements

- A Hybrid User Forum to evaluate the market is up and running.
- Demonstrations of current generation hybrids - two buses (Solaris & Volvo) and two trucks (Iveco & DAF) - performed in several cities in Europe.
- Test cycles and procedures were developed to test and compare performance of hybrid vehicles and components.
- Electrical auxiliaries in charge of driver- and passenger comfort functions, chassis functions and powertrain functions were developed and replaced the normal production auxiliaries.
- Simulation and testing activities show that the project targets on fuel consumption will be met for the studied vehicles.

Projects partners

- Project website: www.hcv-project.eu

Achievements cont.

- Electrical, safety and abuse tests on energy storage cells (Li-ion and SC) show that the solutions are promising. Test results were also used for the development and validation of models of Li-ion and SC modules.
- Evaluation of the cost reduction of hybrid components shows that the target will be met.
- The completion of the lightweight bus chassis showed that the weight reduction target was met with wide margin.
- Two advanced 2nd gen. hybrid demonstrators (Volvo city bus and Iveco distr. truck) were developed based on results from demonstration of current gen. vehicles and project targets.
- During autumn 2013 the vehicles will be tested on the streets of Europe and evaluated with respect to project targets.

Table: Main Benefit of Electrical Auxiliaries

<table>
<thead>
<tr>
<th>Component</th>
<th>Main Benefit</th>
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</thead>
<tbody>
<tr>
<td>Electric Air conditioning</td>
<td>≈60% less power consumption</td>
</tr>
<tr>
<td>Electric Air Compressor</td>
<td>≈7.7% lower FC</td>
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<tr>
<td>Electric Heating</td>
<td>≈8.9% lower FC</td>
</tr>
<tr>
<td>Electric actuated mechanical braking</td>
<td>Improved braking performance</td>
</tr>
<tr>
<td>Electro-hydraulic steering</td>
<td>≈1.7% lower FC</td>
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<tr>
<td>Electric fan</td>
<td>≈4.6% lower FC</td>
</tr>
<tr>
<td>High power generator</td>
<td>≈30% lower engine load to produce electricity</td>
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