Northeast Diesel Collaborative 2015 Partners Meeting

October 27th, 2015
Effenco brings reliable and cost effective energy efficiency solutions to heavy transportation equipment

- Founded in 2006
- Sold first hybrid systems in 2009 for refuse trucks
- 2 patents extended to 12 countries
- Based in Montreal, Canada
- Active in Canada, U.S. and Europe

 Courtesy of Google Earth™
Vocational trucks are slow, very slow.
Vocational trucks all have the common feature of spending 40-60% of their operating time immobile with low or zero engine power demand, accounting for more than 25% of the total fuel consumption.

These numbers align with more than 3 million miles of operating data collected by Effenco in the U.S., Canada and Europe.
ACTIVE STOP-START™ TECHNOLOGY

ELIMINATES fuel consumption related to idle and parasitic loads
REPLACES or time shifts PTO and HOTEL loads

Active Stop-Start™ technology
A powerful constant mesh transmission mounted integrated starter-generator ensures an automatic and seamless engine restart on demand.

Ultra-capacitors are used to supply energy to the integrated starter-generator and to power body equipment and hotel loads with the engine off.
STOP-START TECHNOLOGY IN ACTION

Engine is off (EO) while idling, manually loading or using bin lifts.

System fully functional at very low speeds.

Engine automatically restarted for compaction cycle.

No-lag acceleration after engine restart.

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Fuel Savings = Avoided engine hours \times \text{Baseline Fuel Rate}

Operation without Stop-Start

Baseline fuel rate

Avoided engine hours

Operation with Stop-Start
PERFORMANCE VALIDATION

- NYC’s Vehicle Testing and Analysis Facility (VTAF)

- Reference cycle NYGTC

- Reflects million miles worth of operating data

- Demonstrated engine hours avoided based methodology
# Performance Validation

## Dyno Test Results Summary

**New York Garbage Truck Duty Cycle (NYGTC)**

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Idle Reduction</td>
<td>92%</td>
</tr>
<tr>
<td>Engine Run Time Reduction</td>
<td>48%</td>
</tr>
<tr>
<td>Fuel Savings</td>
<td>30%</td>
</tr>
<tr>
<td>$\text{CO}_2$ Emission Reduction</td>
<td>30%</td>
</tr>
<tr>
<td>$\text{NO}_x$ Emission Reduction</td>
<td>31%</td>
</tr>
</tbody>
</table>
ON THE FIELD

Shunter Truck
Whole Sale Distribution Application

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FEATURES AND BENEFITS

15 - 30 %

SILENT LOADING

290 kg (640 Lbs)

REDUCED MAINTENANCE

10-25 TONS CO₂/YR SAVED

NO INFRASTRUCTURE REQUIRED

DRIVER APPROVED
Proposed rule for vocational trucks:

• 16% improvement on fuel efficiency by 2027
• Solutions should provide a 6-year payback
• Idle reduction technologies = key element
• Expect a 70% adoption rate for Stop-Start

Effenco’s Active Stop-Start™ technology is a bolt-on solution that provides bankable savings, now.
Benoit Lacroix, Eng., Ph.D.
VP Sales & Marketing
benoitlacroix@effenco.com
+1-514-975-3045