

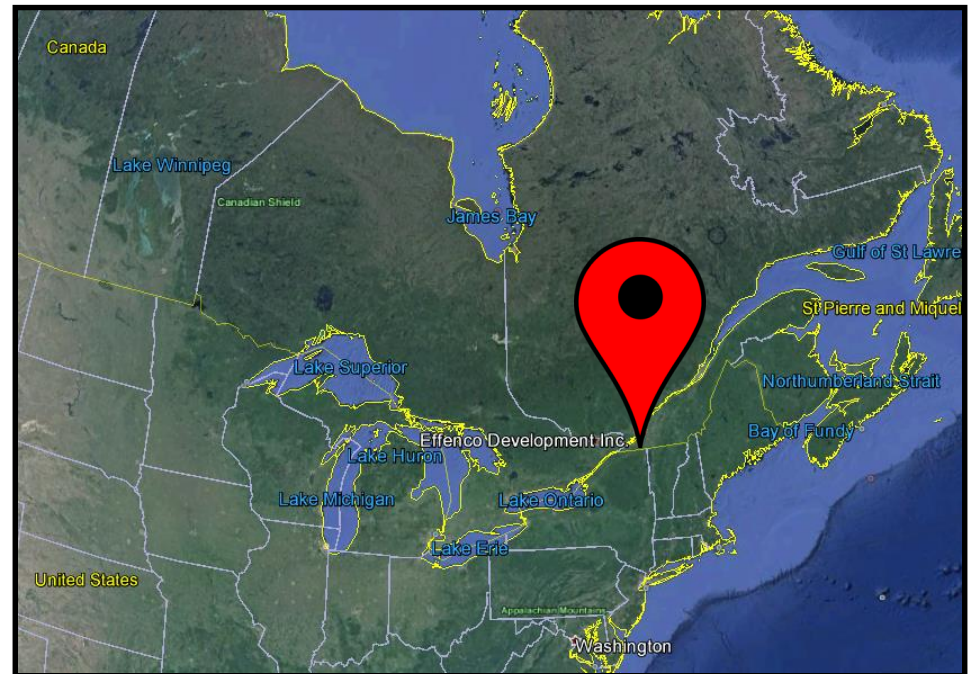


**Northeast Diesel
Collaborative
2015 Partners
Meeting**

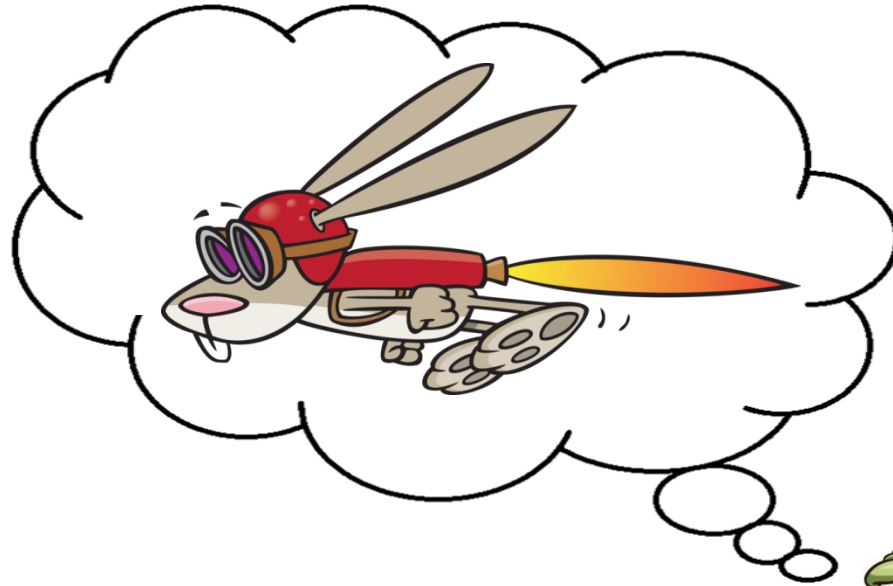
October 27th, 2015

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™

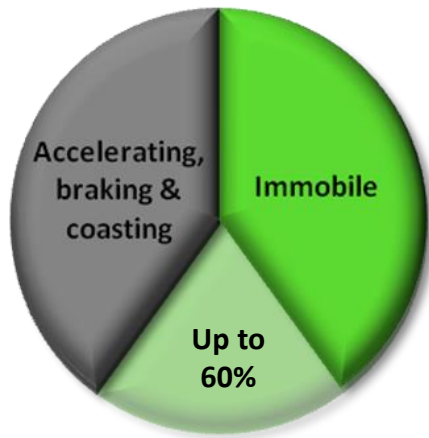


**Vocational trucks
are slow, very slow.**



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.**

Operating Time



Immobile Time as a Proportion of Operating Time



REFUSE¹

54%



YARD²

45%



DELIVERY³

49%



BUCKET³

53%

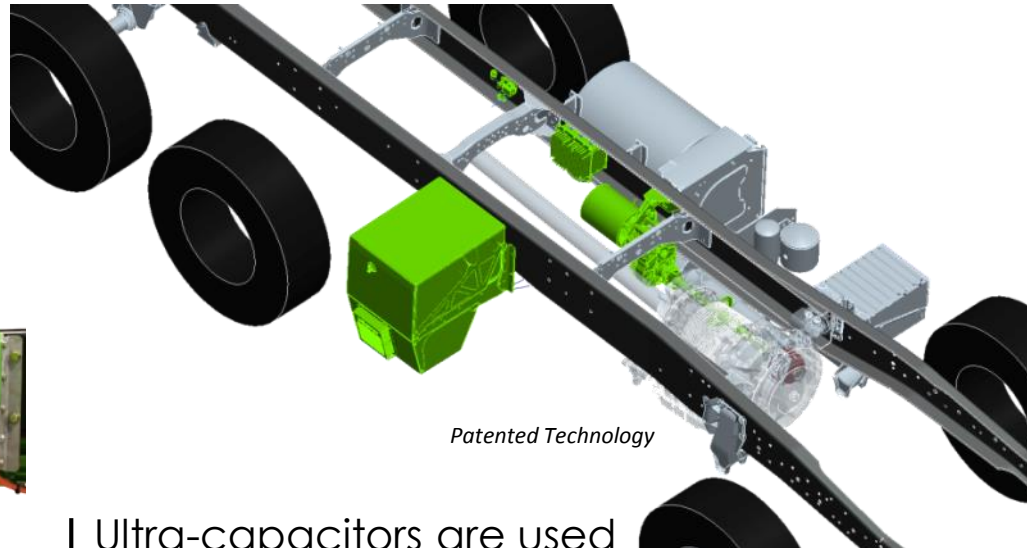
- 1. National Renewable Energy Laboratory
- 2. Ports of Long Beach and Los Angeles
- 3. US Department of Energy

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

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

Active Stop-Start™ technology

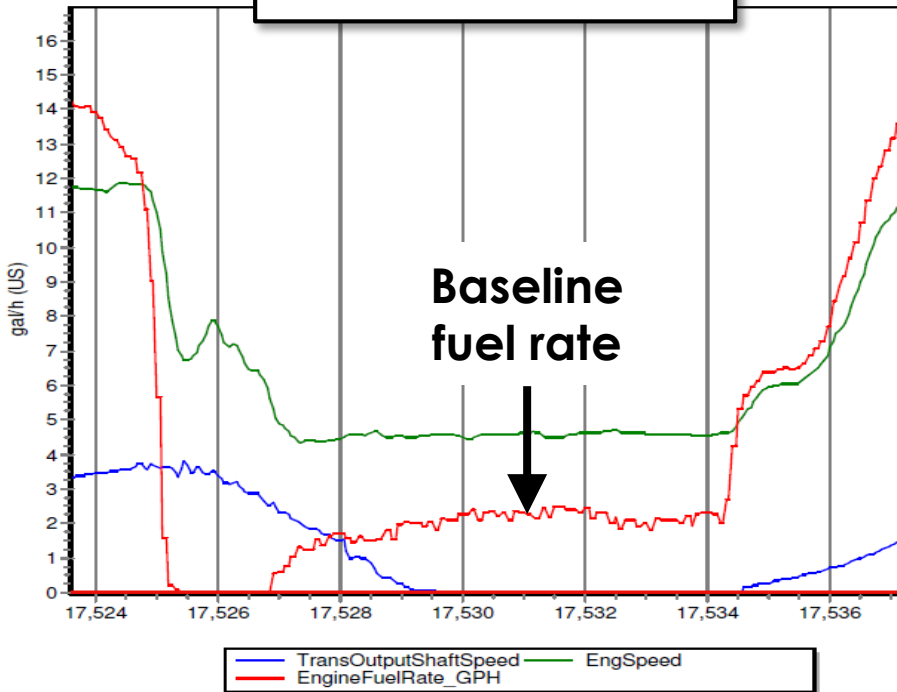
A powerful constant mesh transmission mounted integrated starter-generator ensures an automatic and seamless engine restart on demand.



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

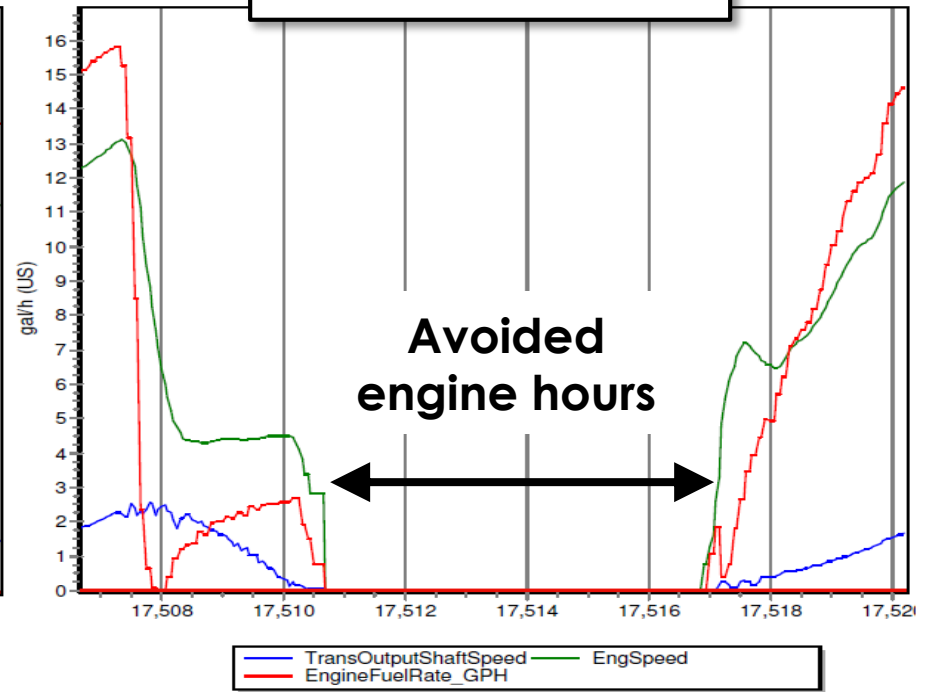
Fuel Savings = Avoided engine hours X Baseline Fuel Rate

**Operation without
Stop-Start**



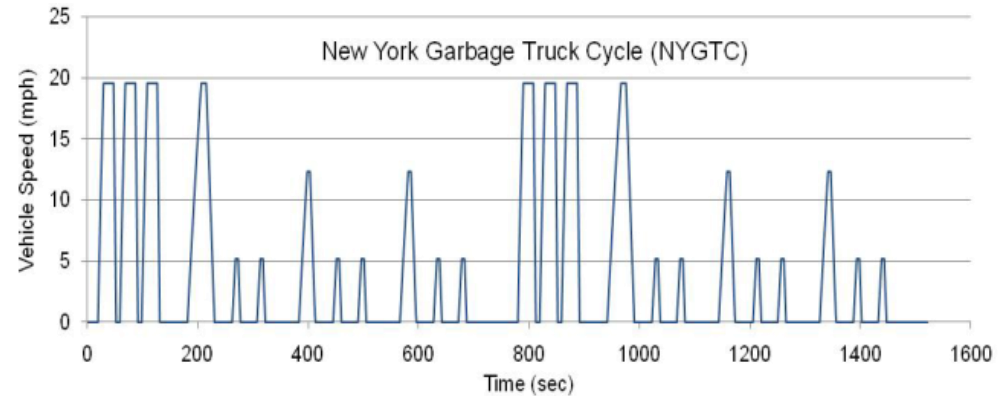
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**Operation with
Stop-Start**



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- NYC's Vehicle Testing and Analysis Facility (VTAF)
- Reference cycle NYGTC
- Reflects million miles worth of operating data
- Demonstrated engine hours avoided based methodology





VEHICLE TESTING & ANALYSIS FACILITY

DYNO TEST RESULTS SUMMARY

NEW YORK GARBAGE TRUCK DUTY CYCLE (NYGTC)

▶ Idle Reduction	92%
▶ Engine Run Time Reduction	48%
▶ Fuel Savings	30%
▶ CO ₂ Emission Reduction	30%
▶ NO _x Emission Reduction	31%

Shunter Truck Whole Sale Distribution Application



50% REDUCTION
ENGINE HOURS



32% FUEL SAVINGS
2,650 Gal./YR SAVED



30 TONS
CO₂/YR SAVED

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.

THANK YOU!

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