Kentucky Hybrid Electric School Bus Program

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Project ID #
ARRAVT062

Overview

Timeline

- Project awarded December 2009
- First bus delivered July 2010
- 164 buses in operation May 2012 – 75% complete
- Project closes December 2013

Barriers and Risks

- Acceptance of new technology for powering school buses
- Education curve for communities
- National leadership exposure

Budget

- Federal funding - $12.980 million
- Recipient share - $15.336 million

Project Partners

- Kentucky Department of Education (KDE)
- Kentucky Clean Fuels Coalition (KCFC)
- 174 Local Kentucky School Districts
- Kentucky Division of Air Quality
- Kentucky Department for Energy Development and Independence
- Kentucky Finance and Administration Cabinet
- Thomas Built Buses
- Cummins
- IC (International)
- Navistar
- Eaton Corporation
- NEED (National Energy Education Development)

Relevance

- Kentucky not only has the largest fleet of hybrid diesel-electric school buses in the nation, but now the performance data to share.
- Charge sustaining hybrid electric school bus technology formerly not used in these numbers.
- Kentucky offers varied topography to gain real world performance data.
- KCFC gathers performance data monthly and uploads to its website, and shares with industry partners.
- KCFC coordinates with manufacturers to provide training to drivers, technicians, first responders, and community leaders.

Relevance

Kentucky Hybrid School Bus Program
February 2011 - January 2012

The hybrid bus program has, on average, demonstrated a
33% increase
in school bus fuel economy.

8.40 = average hybrid mpg of all busses
6.31 = average baseline mpg

Approach

- Kentucky Department of Education has school bus purchasing process already in place.
- Hybrid technology easily added to current purchasing process.
- ThomasBuilt and IC (International) are the manufacturers of the buses.
- Kentucky Department of Education and KCFC compose criteria for school districts to address when Request for Application is released.
- Individual school districts order hybrids through KDE using the same process they have been familiar with.
- Training is conducted by KCFC for first responders, technicians, and drivers.
- Districts where buses are placed report performance data on a regular basis.

Approach

Request for Application date	Numbers of Buses	$ Spent
February 2010	34	$2,083,678
October 2010	71	$4,226,330
April 2011	25	$1,491,084
September 2011	34	$2,165,478
	164	$9,966,570

Future: May 2012 – Final Request for Applications
December 2012 – Final delivery

All districts are reporting regularly.

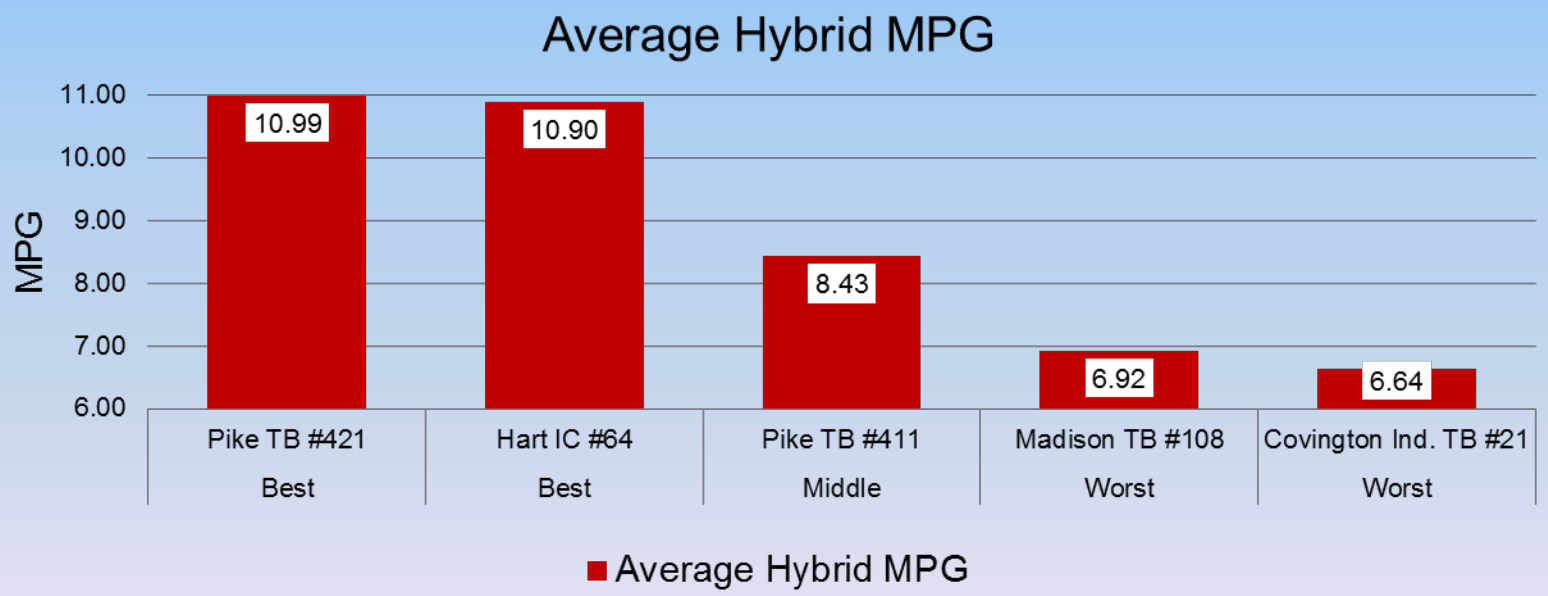
Jobs at the KDE were not created to oversee the Hybrid Bus project; however, portions of salaries have been charged to the grant.

Technical Accomplishments and Progress

- Data downloaded directly from ECM (Electronic Control Module). Formal data gathering from ECM began February 2011.
- Information gathered includes MPG, miles driven, gallons/trip, brake actuations, cumulative miles, cumulative gallons, and all idle data.
- Hands-on experience has addressed education curve.
- Training is conducted by KCFC for first responders, technicians, and drivers.
- Data tracking has provided district to district and manufacturer comparisons.
- We have proven the hybrid electric technology is applicable to school bus applications.
- The only two variables directly affecting performance are the driver and the route.

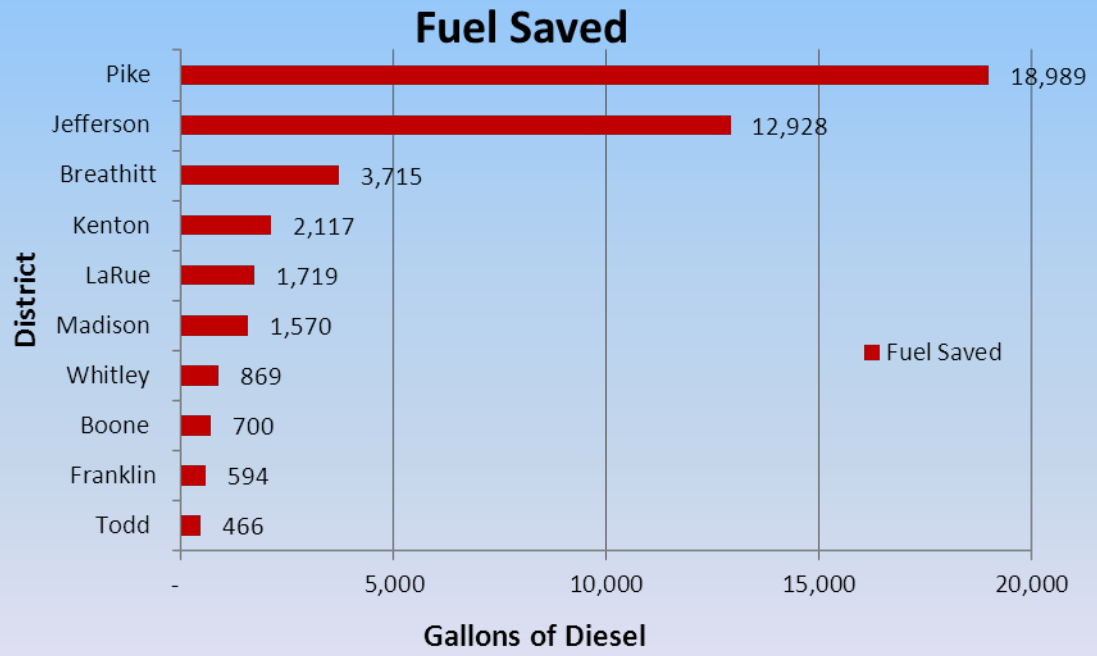
Technical Accomplishments and Progress

Best v. Worst Hybrid MPG



Technical Accomplishments and Progress

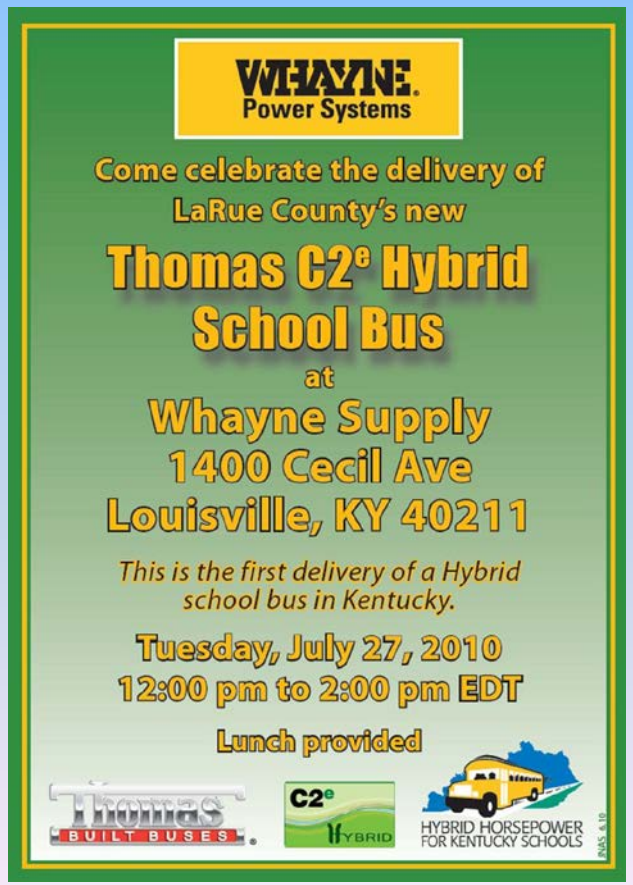
Top Ten District Fuel Savings



44,000 total gallons of diesel fuel saved from Jan 2011 – Feb 2012

448 kg / 494 tons of CO_2 emissions saved

Technical Accomplishments and Progress



First hybrid bus delivered to LaRue County

Day of Bus Delivery!

Training is conducted by KCFC for first responders, technicians, and drivers.

Press releases are provided for training by KCFC. Thomasbuilt and IC provide training documents, spec sheets, safety documents, etc.

Approximately 300 people have been reached by this training.

Technical Accomplishments and Progress

Technical Accomplishments and Progress

KCFC video - *Electric and Plug-in Hybrid Vehicles*
http://www.cleancities.tv/FeaturedContent/AlternativeFuelsVehiclesandTechnologies/ElectricDrive.aspx?VID=110524_Kentucky_Commonwealth_Clean_Cities_V3.flv&Cap=110524_Commonwealth_Clean_Cities_01.xml

Collaborations / Partnerships

Project Partners

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Future Work

- K-12 curriculum
- Transportation directors surveyed
- Project overview to all superintendents
- All districts receiving hybrid buses will be required to participate in training
- Real time video from driver's perspective – to be produced
- Final placement of remaining buses and funding expended
- Continued data gathering from KCFC as required by ARRA

Summary

- Kentucky has the largest fleet of hybrid diesel-electric school buses in the nation.
- The hybrid bus program has demonstrated a 33% increase in school bus fuel economy.
- Individual school districts order hybrids through KDE using the same process they have been familiar with.
- Training is conducted by KCFC for first responders, technicians, and drivers.
- 164 hybrid buses have been purchased for $9,966,570.
- 10.99 MPG is best recorded fuel efficiency in Kentucky's hybrids.
- Since using hybrids, 44,000 gallons of fuel have been saved.
- Kentucky continues to build upon its highly-successful hybrid bus program by collaborating with a wide variety of entities.