Idle Reduction Projects for the Advanced Vehicle Testing Activity

Ken Proc, Project Leader, Fleet Test and Evaluation

Center for Transportation Technologies & Systems
National Renewable Energy Laboratory
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Outline

• Overview of Activities to Date
• Evaluation and Validation Projects
• Solicitation for Truck OEM Factory Installation
• Future Activities
On-Board Idle Reduction Technologies for Heavy-Duty Trucks

**GOAL:** To maximize the introduction and use of idle reduction technologies in heavy-duty trucks

**Objectives**

1. Develop objective in-use information on the performance of on-board idle reduction technologies
2. Identify and implement strategies to overcome critical cost barriers
3. Conduct education and outreach
AVTA’s Idle Reduction Technologies Activities to Date

- Worked with trucking industry stakeholders to identify issues hindering introduction of idle reduction technologies
- Conducted Government/Industry conference & workshops
- Developed technology demonstration plan
- Awarded 3 data collection/technology validation projects
- Issued solicitation for truck OEM on-line installation
- Supporting development of the National Idling Reduction Plan
Idle Reduction Technologies Data Collection Validation Projects

**GOAL:** To gather objective in-use information on the performance of available technologies

- **Specifications and costs**
  - System descriptions
  - Capital and installation costs
  - Payback period
- **Vehicle operation**
  - Fuel consumption (truck idle and idle reduction system)
  - Engine oil consumption and changes
  - Maintenance (truck and idle reduction system)
- **Other evaluation information**
  - Engine and component wear
  - Resale value
  - User impressions
Schneider National Evaluation Project

- Demonstration team: Schneider, Freightliner, Webasto
- Trucks idle approximately 480 hrs/year
- Cooling (19 trucks)
  - New product utilizes phase change medium
  - Charged during normal operation using existing AC
- Cab heater (100 trucks)
  - Diesel-fueled air heater
  - Offered as OEM option
- 4Q FY03- 2Q FY05
  - Extension awarded to continue testing
Schneider National Evaluation Project

- Cab cooling performance and results (Jun – Sep 03)
  - Provided 10 hrs of cooling up to 85°F ambient; 7 hrs at 90°F
  - Cab cooler trucks idling time 15% vs. 19% for control trucks
  - No measured fuel economy benefit (7.0 MPG for both test and control trucks)

- Issues
  - Lack of insulation
  - Poor airflow
  - Difficult install
Schneider National Evaluation Project

• Cab heating performance and results (Nov 03 – Apr 04)
  – Heated cab at 70°F in ambient temperatures down to 0°F
  – Cab heater trucks idling time 9% vs. 22% for control trucks
  – 2% improvement in fuel economy (6.7 MPG for heated vs. 6.5 MPG for control)

• Issues
  – Lack of temp. adjustment
  – 5% failures
Caterpillar MorElectric Technology Evaluation

- Team: Caterpillar, International Truck, and Cox Transfer
- 5 new MorElectric™ trucks; 5 new control
- Trucks idle about 1830 hrs/year
- Electrically-driven accessories
  - On-road operation more efficient
- Three main components
  - HVAC unit
  - Generator
  - Auxiliary Power Unit (APU)
- Project runs 4Q FY03- 4Q FY05
  - Project extension awarded to continue testing through 4Q FY07
Caterpillar MorElectric Technology Evaluation

• Accomplishments
  – Caterpillar and International completed engineering design work required for installation
    • Selected 2-piece HVAC design to minimize vehicle modifications and address weight distribution issues
    • Designed interface wiring

• Status
  – First test truck built and undergoing initial validation testing
  – Remaining four trucks to enter service by end of November 2004
Espar Heater and Electric AC Evaluation

- Team: Espar, International Truck, and Wal-Mart
- 20 trucks with combined heating and cooling systems
- At least 2 control trucks
- Bunk heater
  - Diesel fueled air heater
- Engine pre-heater
  - Diesel fueled coolant heater
- Roof-mounted electric air conditioner
  - Operates on starting or auxiliary batteries
- Project awarded September 2004
- Installation of equipment is underway
Solicitation for Truck OEM Factory Installation

• Develop full-function IR technology as factory option
• Integrate into on-board design and assembly by MY07
• Demonstrate cost savings versus aftermarket installation
• Document fully
• Teams should include truck OEM (lead), IR device manufacturer, fleet
• $300-500K total funding, 2-3 awards, 50/50 cost-share
• Project duration 2-3 years
• Award late 2Q, FY05
AVTA’s Future Activities for Idle Reduction Technologies

- Education and outreach (FY04-FY05)
- Coordinate with Idle Elimination Manufacturers Association in addressing policy and institutional barriers (FY04-FY05)
- Extend data collection/demonstration projects (FY06, if warranted and funding available)
- Additional solicitation for on-line installation of idle reduction technologies at truck OEMs targeting year 2008 emission and fuel consumption requirements (FY06, if warranted and funding available)
- CoolCab
Reducing Truck Idling Through Enhanced Cab Thermal Management

**THE CHALLENGE**

Most cab climate control systems require idling to provide thermal comfort.

Varying thermal conditions inhibit use of idle reduction technologies.

**THE SOLUTION**

Design efficient thermal management systems that keep the cab comfortable without the need for engine idling:

- Reduce thermal load
- Focus on occupant comfort
- Improve equipment efficiency

Solar Reflective Glazings

Testing

Integrated Numerical Modeling

Air Conditioner Efficiency

Thermal Comfort Evaluation
For More Information

- Status Report on Idle Reduction Technology Demonstrations
  - [www.avt.nrel.gov/idle.html](http://www.avt.nrel.gov/idle.html)