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## DOE to Fund up to \$14.55M for Vehicle RD&D Projects: PHEV Li-ion Materials and Manufacturing; Thermoelectric HVAC; and Aerodynamic Heavy-Duty Truck Trailers

4 DECEMBER 2008

The US Department of Energy (DOE) [selected](#) six cost-shared research projects for the development and demonstration of alternative vehicle technology projects totaling a DOE investment of up to \$14.55 million over three years, subject to annual appropriations. The projects were selected under three diverse topic areas: lithium-ion battery materials and manufacturing; thermoelectric heating, ventilation, and air conditioning; and aerodynamic heavy-duty truck trailers. ([Earlier post.](#))

Private sector contributions will further increase the financial investment for a total of up to \$29.3 million. The selections are part of DOE's continuing work to develop high efficiency vehicle technologies and are not part of the previously announced \$25 billion Advanced Technology Vehicles Manufacturing Loan Program for retooling. ([Earlier post.](#))

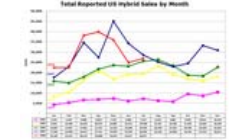
**Battery Materials and Manufacturing.** DOE selected three projects for funding totaling up to \$13.9 million in cost-shared cooperative agreements, with a DOE share of up to \$6.85 million, subject to annual appropriations. The projects will focus on improving battery material performance and developing manufacturing processes to increase performance and decrease cost of plug-in hybrid electric vehicles (PHEV) batteries.

- **FMC Corporation** (Charlotte, NC) has been selected for negotiation of a three-year, up to \$6.2 million, DOE share of up to \$3.0 million, award for scaling up production of stabilized lithium metal powder for high energy Li-ion battery cathodes. These powders can be used to produce battery cells with reduced losses during the initial cell charging.
- **BASF Catalyst LLC** (Iselin, NJ and Elyria, Ohio) has been selected for negotiation of an award for a 30-month, up to \$5.0 million, DOE share of up to \$2.5 million, project to develop an industrial process for domestic production of low cost Li-ion battery cathode materials. BASF will use low cost precursors and known industrial methods to reduce the cost of Li-ion battery materials. They will partner with Farasis Energy, Inc. of Hayward, Calif., a company experienced in Li-ion battery development.
- **3M Company** (St Paul, Minn.) has been selected for negotiation of an award for a three-year, up to \$2.7 million, DOE share of up to \$1.35 million, project aimed at developing advanced negative electrode materials for PHEV Li-ion batteries. The novel anode alloy material will result in higher battery capacity while maintaining good charge/discharge performance.

**Thermoelectric Systems.** DOE selected two projects totaling up to \$13 million in cost-shared cooperative agreements, with a DOE share of up to \$6.5 million, subject to annual appropriations. These projects were selected to accelerate the development of thermoelectric (TE) systems that provides the heating, ventilation, and air conditioning (HVAC) in vehicles.

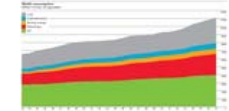
The use of solid state TE devices to heat and cool a vehicle's passenger compartment can increase vehicle efficiency by reducing engine load; by reducing or eliminating the need for conventional air conditioning refrigerants, these vehicles further reduce greenhouse gas emissions. TE HVAC enables the use of distributed cooling/heating units that cool/heat the occupants rather than the whole cabin and its components. While applicable to all commercial and passenger vehicles, TE HVAC is particularly attractive for hybrids and plug-in hybrids where an electrically driven air conditioning system can maintain occupant comfort even when the engine turns off.

From the Dashboard  
**US Sales of Hybrids Down 6% in July 08**



US sales of hybrids were down 6% in July 2008 year-on-year, for a new vehicle market share of 2.4% of the month.

**Global Energy Consumption Up; Coal Fastest Growing Fuel**



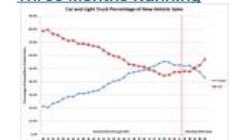
The ongoing strength of world economic growth last year, despite financial market turmoil which began in August, continued to support global energy consumption. Although growth in primary energy consumption slowed in 2007, compared to 2006, but at 2.4% it was still above the 10-year average for the fifth consecutive year, according to the BP Statistical Review of World Energy. Coal remained the fastest-growing fuel, but oil consumption grew slowly.

**US VMT Down 1.8% in April: Sixth Straight Month of Declines**



US vehicle miles traveled (VMT) dropped 1.8% in April, for the six monthly decline in a row. Total estimated VMT for the month was 245.9 billion miles. Moving 12-month total shown.

**Sales of Cars Pass Trucks Three Months Running**



Car sales in May exceeded truck sales for the third month in a row, with the gap between the two widening each of those months.

**New US Hybrids in April Pass 3% Market Share**



Reported sales of hybrids broke past a 3% share of new vehicle sales in April 2008.

- **Ford Motor Company** (Dearborn, Mich.) has been selected for negotiation of an award for a 36-month, up to \$8.4 million, DOE share of up to \$4.2 million, project to accelerate the deployment of light-duty automotive thermoelectric HVAC technology. This work will focus on the development of a zonal TE HVAC system, while reducing energy consumption of existing HVAC systems by one third. Partners include Visteon, BSST, DOE's National Energy Renewable Laboratory, and Ohio State University.
- **General Motors Corporation** (Warren, Mich.) has been selected for negotiation of an award for a 36-month, up to \$4.6 million, DOE share of up to \$2.3 million, project to develop a system that provides thermal comfort equivalent to current HVAC systems while using significantly less energy. The team will design, test, and evaluate the thermoelectric system components and then integrate the components into a demonstration vehicle for testing and evaluation. Partners include Delphi Thermal Systems, University of California at Berkeley, and University of Nevada at Las Vegas.

**Aerodynamic Trailers.** DOE selected one project, with a total value of up to \$2 million, with a DOE share of up to \$1 million, to accelerate the development, evaluation, and deployment of advanced aerodynamic trailers that can significantly reduce fuel consumption of heavy-duty tractor trailers.

- **Navistar International Corporation**, (Fort Wayne, Ind.) has been selected for a 30-month project that will design, demonstrate, and bring to market a tractor trailer combination and tire package that can reduce the fuel consumption of a heavy vehicle by at least 15%. Following development, a commercial fleet will evaluate the benefits of the new technology package through real-world use. After the term of the project, the team members will make this fuel-efficient technology package available for sale. Team members include Frito Lay, Kentucky Trailer, Freight Wing, Michelin, and DOE's Lawrence Livermore National Laboratory.

December 4, 2008 in [Batteries](#), [Fuel Efficiency](#), [Thermoelectrics](#) | [Permalink](#) | [Comments \(3\)](#) | [TrackBack \(0\)](#)

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COMMENTS

In the last 4 or 5 years, DOE (and other Depts) must have financed well over 1000 R & D projects for the advancement of ICE vehicles, Hybrids, PHEVs, BEVs, advanced batteries etc etc.

How many projects effectively turned into a new or improved mass produced product?

Posted by: HarveyD | Dec 4, 2008 1:34:54 PM

Rather than invest all the money for lithium batteries, it should also be spent to develop cheaper manufacturing processes for Sodium-Nickel-Chloride, ZEBRA, batteries which are far better suited for auto and truck use than Lithium batteries and already well tested even by GE for mining truck and railroad locomotives. It might also invest in research to produce a version that uses no Nickel but only cheaper iron in case nickel becomes too expensive, but even at high prices it does not represent a major cost compared to manufacturing costs. Even in current ZEBRA batteries, Iron stores at least a few percent of the energy and supplies high power for heavy discharge at low charge.

Lead acid batteries are far cheaper per cycle of energy stored than lithium and the FireFly carbon foam may improve this. EFFPOWER already has prototype high power bipolar lead batteries for hybrids like Prius. The Carbon Foam of Firfly may not be the ultimate improvement of the performance of lead batteries; Atraverda is working on a lead titanium oxide bipolar battery.

Aerodynamic trailers can of course be built to provide significant fuel savings at present motorway speeds.

Thermo-electric coolers are a waste of money. There are far more efficient free-piston Stirling refrigerators made by Global-Cooling also being incorporated into portable coolers by Twinbird and previously by Coleman. The coolant valve also produced by Global-Cooling could also increase the efficiency of present systems at almost no change or cost.

The free piston compressors also invented by a sterling engine company and now made and sold for refrigerators by LG increase refrigeration efficiently in such refrigerators by forty percent over similar power standard compressors. Just changing the coil wires and electronics would make them suitable for 12 volt operation.

All pumps and compressors in all cars should be converted to electric operation to save energy. It is well known how to make large enough alternators to power them, and semiconductors can control them with great efficiency. Additional batteries, eventually from Firefly, can hold enough energy from regeneration for much operating time when the engine is not running.

The free piston or other electric compressor can be mounted on the body and eliminate hoses from the system so that the whole system can be welded sealed so that no repair is ever needed for much more than the life of the car. The sealed system can use either highly purified cheap propane or Isobutane as an environmental refrigerant. There is very much less danger from such a welded sealed system than from the regular engine fuel system and far less than the danger from accidents. The sealed system also could allow the use of present refrigerants because there will be very few systems that leak and no losses to the air except in the case of an accident.

Isobutane is now used worldwide, except in the US, for home refrigerators. Not one report of a house explosion has come or could come from such use because of the small amounts used. There is far more danger of explosions from gas stoves and heating systems or even a few butane lighters.

Hydraulic hybrids can be very cost effective; even the UPS vehicle is being replicated. The Semitrailers themselves would be well served by hydraulic hybrid installations. ..HG..

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Posted by: Henry Gibson | Dec 4, 2008 2:09:45 PM

Henry, what is the expected high volume (say 1 million BEVs) cost of sodium batteries?

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Posted by: | Dec 4, 2008 8:02:21 PM

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*[PLEASE KEEP COMMENTS ON TOPIC. DISAGREEMENT IS FINE, INSULTS, ABUSE OR WILD DIVERSIONS ARE NOT. COMMENTS NOT MEETING THOSE STANDARDS WILL BE DELETED. ABUSE OF ANOTHER COMMENTER'S EMAIL ADDRESS WILL RESULT IN THE BANNING OF THE OFFENDER FROM THIS SITE. IN AN ATTEMPT TO PREVENT THE POSTING OF INSULTING AND ABUSIVE COMMENTS, THIS SITE MAINTAINS A LIST OF PROHIBITED WORDS AND PHRASES, WHICH, UNFORTUNATELY, GROWS WITH TIME. INCLUDING ONE OF THE PROHIBITED WORDS OR PHRASES WILL FLAG THE COMMENT AS "SPAM", AND IT WILL BE BLOCKED.]*

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