Transportation Fuels

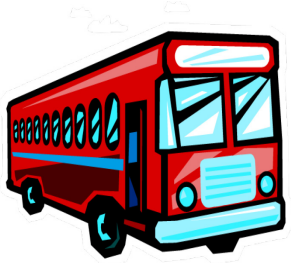
DOE would invest $52 million to fund a major fleet transformation at Idaho National Laboratory, along with the installation of nine fuel management systems, purchase of additional flex fuel cars and one E85 ethanol fueling station.

Transportation projects, such as the acquisition of highly efficient and alternative-fuel vehicles, are not authorized by ESPC legislation. DOE has twice proportion of medium vehicles and three times as many heavy vehicles as compared to the Federal agency average. As a result, emerging technologies which enhance light vehicle performance will not substantially contribute to goal compliance in DOE. Existing transportation budgets can be used to fund acquisitions of new vehicles, but often cannot cover the incremental cost of alternative fuel vehicles or the infrastructure and fuel delivery costs.

INL Diesel Buses Replaced with 84 CNG Buses, Add & Update CNG Infrastructure

- 2,534 $MtCO_2e$ of GHG Mitigated
- Increased Alternative Fuel Consumption by 358,400 GGE Annually
- Reduced Petroleum Consumption by 544,800 GGE Annually
- 1,000 Green Jobs Created

Investment Cost = $49,650,000



Replacing the bus fleet at Idaho National Laboratory (INL) would, as a single activity, achieve significant reductions in petroleum use across DOE. INL is the second-largest petroleum consumer in the DOE fleet. A fleet of 84 aging buses used to transport employees from surrounding communities to the lab logs over 2.5 million miles per year. By replacing these buses with compressed natural gas (CNG) alternatives and funding the construction of additional CNG infrastructure, DOE will simultaneously cut its petroleum use while increasing its alternative fuel use well above existing mandates. Additionally this activity will eliminate more than 2,500 metric tons of GHG emissions in the process as well has large amounts of harmful particulate pollution. Further benefits could be realized if the new buses are more comfortable and equipped with modern telecommunications infrastructure, as ridership could go up dramatically and in turn produce significant reductions in scope 3 GHG emissions associated with extended worker commutes by those lab personnel that chose to drive 100-plus miles per day rather than ride the bus.

Existing fleet regulations have encouraged alternative fuel infrastructure development by first creating demand for alternative fuel (EPAct 2002 alternative fuel acquisition requirements), then requiring increased alternative fuel use (EO 13423 and EISA 2007), and then in requiring alternative fuel infrastructure development (EISA 2007). Investments in E85 infrastructure will build upon existing DOE efforts to encourage private investment where possible and will expand alternative fuel availability for Federal and, in some cases, public fleets and vehicles.

Benefits – The proposed $52 million investment to decrease DOE petroleum use and increase alternative fuels are the only set of projects which do not yield a positive net present value in this proposal, even when accounting for social and environmental costs when total costs are used. Yet, when it is recognized that the buses are past their useful life and replacement is required, an analysis based on incremental costs indicates a positive return on investment at the 14 year mark.

The main portion of this investment, which would replace the fleet of diesel buses at Idaho National Laboratory, has a calculated net present value of negative $21 million over the 12-year standard life of the vehicles. It should be noted that this includes the full cost of replacing diesel buses with compressed natural gas, and also restricts the savings calculation to 12 years, whereas vehicles may remain serviceable for longer periods.

A full analysis of the costs and benefits should take into account that the buses, which are between 20 and 30 years old, require replacement. Assuming replacement is a given necessity, the analysis should measure the incremental cost of CNG bus acquisitions (as opposed to a straight diesel-to-diesel replacement), measured against the annual fuel cost savings of CNG. The incremental cost of one CNG bus over one diesel bus is approximately $100,000 (a range exists; this estimate assumes the highest value in the range). CNG buses are expected to save, on average, $7,300 in fuel costs per year. The incremental cost of CNG can therefore be expected to yield a simple, non-discounted payback in approximately 14 years, with the added benefit of contributing toward the agency's petroleum and alternative fuel requirements.

Transportation fuel projects such as this should be viewed in the context of agency performance, and not strictly evaluated on an avoided-cost basis. Fuel switching, from petroleum-based fuels to alternative fuels, necessarily carries an incremental cost in new infrastructure and vehicles, which can only pay for itself if the future cost of petroleum dramatically rises, or the marginal cost of alternative fuels substantially decreases, neither of which is assumed in this proposal's analysis.

Transportation: The proposed investment would enable DOE to **meet and exceed** Federal mandates in petroleum reduction and alternative fuel use. The projects proposed would reduce petroleum across DOE fleets by 23 percent while increasing alternative use by 244 percent. The transportation projects achieve a combined GHG reduction of 4,700 metric tons annually. These are estimated projections just on the known effects of fuel replacement; should the INL bus replacement encourage additional commuting, DOE will also see a reduction in its Scope 3 GHG emissions, which under E.O. 13514 is required by all agencies.[1]

[1] Large-scale site remediation efforts conducted by the Office of Environmental Management can cause DOE's annual petroleum use to fluctuate dramatically and has the potential to push DOE out of goal compliance, depending on the scale of future activities.

Data Source: See page 20 for explanation →		A	B	A	A	A	A	C	D
Site	**Conservation Measure**	**Estimated Implementation Cost ($)[2]**	**Net Present Value at 3% Discount Rate**	**Estimated Annual Petroleum Savings (GGE/Yr)**	**Estimated Annual Petroleum Cost Savings ($)**	**Estimated Annual Alt. Fuel Consumption (GGE/Yr)**	**Estimated Annual Alt. Fuel Cost ($)**	**Estimated Annual Greenhouse Gas Emission Mitigated (MtCO2e)**	**Estimated Annual Social Cost of Carbon Savings ($)**
INL[3]	CNG buses and infrastructure	$49,650,000	-$21,011,354	544,800	$1,236,696	358,400	-$620,032	2,534	$50,130
Incremental costs of CNG only, 12-year life cycle:		*$8,400,000*	*-$2,890,032*						

[2] Note: the implementation cost of the INL bus replacement project includes full vehicle replacement and infrastructure costs. Costs for the other E85 FFV projects include only the estimated incremental vehicle cost of E85 over conventional fuels and the cost of software for the fuel management systems. Infrastructure and vehicle replacement costs are borne by the sites.

[3] The INL bus replacement leads to fuel switch from diesel to compressed natural gas which results in a decrease of fine particulate matter emissions and an annual health benefit of $2,200,000 based on EPA's Diesel Emissions Quantifier tool located at: http://cfpub.epa.gov/quantifier/view/index.cfm. This does not apply to the remaining transportation measures.