

Assessment of Fuel Savings Technologies For the State of Texas Vehicle Fleet

Summary

The Texas Legislature tasked the State Energy Conservation Office (SECO) with directing a demonstration program to assess the value of Fuel Savings Technologies (FST). SECO issued a Request for Information (RFI) on December 19, 2003 inviting submissions for a possible demonstration project. The criteria used for the selection was taken directly from the enabling legislation.¹

Six submissions were received by the deadline. A review by SECO, the Texas Department of Transportation (TxDOT), and the Texas Commission on Environmental Quality (TCEQ), found that none of the submissions met all of the established criteria to warrant a demonstration.

In addition, even if one of the submissions had met all of the established criteria, the possible entities that could be designated to conduct the demonstration would not have been able to do so due to staffing and financial constraints.

Since the required demonstration cannot be conducted at this time, SECO is not able to make recommendations as to the validity of the claims made by the manufacturers about their FST.

SECO does however recommend that the TCEQ New Technology Research and Development program be used in future considerations of FST evaluations.

Introduction

In 2003, the Texas Legislature tasked SECO with the direction of a demonstration of at least four fuel-saving devices or additives on a combined maximum of 100 TxDOT vehicles or non-road diesels to determine “the fuel-saving technologies that may cost-effectively reduce fuel consumption and save state revenue.”²

SECO was further required to select the four FST through consultation with “government and business organizations that are currently using FST,” consideration of “technologies that have demonstrated fuel economy benefits of five percent or more in field tests or recorded use data of government organizations or businesses that operate fleets,” and determination of “whether each technology selected has the potential to be cost-effective.”³

¹ Article 5, H. B. 7, 78th Legislature, 3rd called session.

² Texas Government Code §447.011(a) as Added by Acts 2003,78th Leg.,3rd called session.

³ Texas Government Code §447.011(d) as Added by Acts 2003,78th Leg.,3rd called session.

The legislation further directs that FST may not be considered if it is known to reduce engine performance, reduce the life of the engine, require additional maintenance, or degrade the air quality.

The legislation further allowed SECO to “designate” certain agencies to “assist with executing the demonstration, compiling the results, estimating the potential average fuel savings of the technologies in different applications or preparing a final report.”⁴ Those agencies are as follows: the TCEQ, the Texas Transportation Institute, the University of Texas Center for Transportation Research, and the University of Houston Diesel Emissions Center.

Process

SECO issued a RFI on December 19, 2003 from manufacturers of FST and from public and private vehicle fleets that would like to have their FST considered in the subsequent demonstration project. The notice was placed on the Texas Building and Procurement Commission’s Electronic State Business Daily, mailed to vendors listed on the Certified Master Bidders List and mailed to any vendor that had previously contacted SECO about their FST, as well as to vendors whose contact information was supplied by their Austin trade association representative.

A team made up of personnel from TxDOT, TCEQ, and SECO reviewed the submissions.

Criteria

The criteria used were drawn directly from the legislation⁵ and were published in the RFI and were built into the RFI as documents that must be provided by the submitter:

1. A document showing that the FST reduces fuel consumption with a projected savings in fuel cost over a one-year period that exceeds the cost of purchasing and using the technology.
2. A document showing that the submitted device, fuel or fuel additive results in a fuel savings of 5% or more in tests conducted under the United States Environmental Protection Agency (USEPA) fuel economy federal test protocol or tests conducted under protocols at laboratories recognized by SECO, TCEQ, or USEPA.
3. A document certifying that the device contains no lead metals.
4. A document showing that the fuel or fuel additive is registered in accordance with the Code of Federal Regulations 40 C.F.R. part 79 and that the fuel additive contains no mutagenic material.
5. A document showing the willingness of the manufacturer to cover all costs, including, but not limited to the cost of the device, fuel, or fuel additive; the cost of installation of any device including removal; and the cost of vehicle maintenance and operation required due to the use of the device, fuel, or fuel additive.

⁴ Texas Government Code §447.011(f) as Added by Acts 2003,78th Leg.,3rd called session

⁵ Article 5, H. B. 7, 78th Legislature, 3rd called session.

6. A document that shows the FST does not increase oxides of nitrogen emissions or toxic air contaminants.
7. A document showing that the FST does not degrade air quality or human health or negatively impact the environment.
8. A document showing that the FST will not void a manufacturer's warranty, and any other supporting documentation as necessary upon request of the Comptroller and SECO.

Submission Evaluations

- Submissions were received from the following:

Company	Product	Product Type	Manufacturer Description
ECO-Fuel Systems	Eco Fuel Systems Vapor Enhancer	Device	Causes a break-up of the hydrocarbon chains allowing a finer spray from the fuel injectors resulting in a more complete burn of the fuel.
Maxma LLC	Enviro Max/ Enviro Max Diesel	Fuel additive	Fuel soluble catalyst designed to enhance the burning of fuel, limiting emissions.
Clean Diesel Technologies	Platinum Plus Fuel Borne Catalyst	Fuel additive	Uses micron-sized metallo-organic particles suspended in the fuel that releases oxygen in the combustion chamber resulting in improved in-cylinder combustion.
UniqueCO Enterprises, Inc.	Uni-Cell	Device	Uses a strong magnetic field that causes polarization at the molecular level that breaks up the "clumps" of hydrocarbon molecules allowing a more complete burn of the fuel.

EnergyCel	Energy Cel	Device	Uses a strong magnetic field that causes polarization at the molecular level that breaks up the “clumps” of hydrocarbon molecules allowing a more complete burn of the fuel.
Biofriendly Corporation	Green Plus Fuel Catalyst	Fuel additive	Fuel soluble catalyst designed to enhance the burning of fuel, limiting emissions.

- Evaluation Process

Each submission was evaluated using the aforementioned criteria. While all criteria was judged by the evaluation committee, TxDOT was asked to pay close attention to those documents dealing with “mile per gallon” issues and TCEQ was asked to pay close attention to the documents dealing with emissions criteria.

Findings

- RFI criteria issues

The evaluation team found that no one technology met all of the criteria set forth in the enabling legislation. While some of the documents did provide enough information, most did not provide credible evidence of fuel-savings or emissions reductions. This generally centers on a lack of use of proper protocols.

The “cost-effective” and “5% fuel-savings” criteria are somewhat intertwined in that the “5% in fuel-savings” criteria may make the device “cost effective.” No submission presented credible evidence of either. Miles-per-gallon tests conducted by any protocol other than the generally accepted Society of Automotive Engineers protocols were not considered to be credible.

Emissions issues faced the same credibility issues. The “testing” provided by the submitters ran from measuring tailpipe emissions on a car in a parking lot to dynamometer tests conducted at Southwest Research Institute.

- Demonstration Conduct Issues

SECO sent a notice to each of the entities listed in the bill asking if they wished to be designated by SECO to setup the testing protocols, oversee the demonstration, and gather the information. The responses received indicated a need for funding. One request indicated the cost could run well over \$100,000. A review of the type of protocol needed indicates that amount is a reasonable estimate. The required field testing can account for up to 90% of the total cost of the demonstration.

Conclusions

While FST are becoming increasingly available, and have been on the market for some time, there seems to be a disconcerting lack of independent third-party data produced in controlled environments that support the many claims made by the manufacturers and vendors.

There appears to be a large amount of supportive empirical data in the form of testimonials about emissions reductions and fuel economy that are backed by various data, including some limited data that may satisfy many of the State's concerns. These testimonials came from individual users (including a SECO employee) and fleet managers. But, again, that data is empirical in nature.

The limited acceptable data furnished to SECO by the respondents regarding system and theory was limited to emissions testing and fuel economy testing done on dynamometers at various recognized labs around the state and nation.

The area of deepest concern was the lack of properly controlled field tests used to identify the fuel economy benefits of a given FST. While there are acceptable standard protocols used for those types of field tests, the tests using those protocols are very expensive and time consuming.

If the State wishes to pursue FST in the future, it is SECO's opinion that the following recommendations be followed:

1. Decide what specific test protocols and test data will be used to evaluate and verify the FST claims. The current process of pre-qualifying an FST by demonstration may not be the best use of State resources. In that process the State would be duplicating what has already been demonstrated.
2. If the State wishes to make its own determination of the effectiveness of an FST the state should use existing resources such as the TCEQ New Research and Technology Development Program. The State should provide financing for the evaluation of the fuel economy benefits by a state agency or institution of higher education that has the ability to conduct the proper fuel economy field tests.
3. Evaluate the FST based on viewing the emissions and fuel economy benefits holistically, not as individual data points.