

Case study n°1

Applying ASTM International Standards in Support of Environmentally Friendly Fuels

Countries: Peru, United States of America, Zimbabwe

Level: National, Subnational and Local

SDG Addressed: SDG7 – Affordable and Clean Energy



Summary

The objective of this case study is to demonstrate how ASTM standards, regarding alternative and renewable fuels such as ethanol and biodiesel for road vehicle use, are used in Peru, the United States and Zimbabwe to reduce the use of fossil fuels. Standards were critical in evaluating the safety of alternatives, promoting commercial success and encouraging regulator and public acceptance. Their adoption by the regulator resulted in an increase in the use of local forms of energy and helped reduce energy imports. The government agencies involved were national regulatory and standardization authorities. This directly contributed to the achievement of SDG Goal 7.2 “increase substantially the share of renewable energy in the global energy mix.”

Background

Regulatory and market momentum continue to build for alternative and renewable fuels, such as ethanol and biodiesel for road vehicle use. Both support the use of local forms of energy and help reduce energy imports. For example, ethanol is widely used as a gasoline extender and octane number enhancer; biodiesel is an alternative fuel derived from vegetable oils and animal fats. Standards are critical to evaluate the safety of alternatives, promote commercial success and encourage regulation and public acceptance.

Strategy

The five standards work together to reduce the use of petroleum-based fuels:

- D4806 for Denatured Fuel Ethanol for Blending with Gasoline for Use as Automotive Spark Ignition Engine Fuel;
- D5798 for Ethanol Fuel Blend for Flexible-Fuel Automotive Spark-Ignition Engines;
- D6751 for Biodiesel Fuel Blend Stock for Middle Distillate Fuels;
- D975 for Diesel Fuel Oils;
- D7467 for Diesel Fuel Oil Biodiesel Blend.

Results and Impact

According to the U.S. Environmental Protection Agency, “greenhouse gas emissions from the transportation sector primarily involve fossil fuels burned for road, rail, air, and marine transportation.” Ethanol fuel produces less greenhouse gas emissions than gasoline or diesel. “Biodiesel... usually produces less air pollutants than petroleum-based diesel.”

Energy use policy citing alternative fuels must be backed by technical specifications to facilitate acceptance in the public and private sectors. These technical standards are critical to the activities carried

out by those regulating, selling, purchasing, operating with, and testing the fuel.

Challenges and Lessons Learned

The challenges included:

- Modifying the requirements of long-standing fuel compositions calls for broad stakeholder engagement (regulators, producers, equipment manufacturers of end-use products).
- The range of laboratory equipment needed to adequately confirm the achieved specifications may not be available in all countries due to varying levels of economic development.
- Taking a balanced approach, when prescribing fuel composition that represents performance-based property limits and remains flexible enough to accommodate geographical, seasonal and regulatory requirements.

Standards represent an effective, time tested tool for transferring innovative knowledge pertaining to fuel additives and alternatives to practical application. For Zimbabwe, the denatured ethanol standard D4806 was adopted to use for checking the quality of ethanol being used for mandatory blending. The denatured ethanol standard is referenced in the Statutory Instrument 17 of 2013. Zimbabwe produces biofuels mainly for energy security, reduction of fuel import bill and environmental protection. The country is currently facing acute foreign exchange shortages and use of biofuels assists in reducing the fuel import bill.

For the United States of America, the commitment to a strong, sustainable agricultural and industrial economy includes usage of both traditional petroleum based fuels and biofuels. In order to ensure that fuels conveyed for consumption are produced in conformance with strongly developed, consensus driven specifications. The Tennessee law, for example, directs the adoption of ASTM International standards for engine fuels which has resulted in a remarkable improvement in the uniformity of fuels supplied in the state, with 97 % compliance on all fuels analysed.

For Peru, the ASTM standard D4814 helped the government to establish new specifications of motor use gasolines to address national requirements for lower levels of lead and sulphur. Peru also referred to the ASTM International standard D6751 in the

Supreme Decree DS 021-2007-EM, Regulation for Biofuels Commercialization, because a suitable national standard did not exist. When the Peruvian Technical Standard NTP 321.125:2008 was eventually developed and approved, it was based on ASTM D6751, with modifications for conditions that are specific to Peru.

Potential for Replication

The ASTM standards are feedstock neutral enabling the universal application of the specifications. Diesel fuel is used globally for a wide range of automotive and heavy equipment diesel engines. Recognizing the impact of fossil fuels on climate change, regulators, manufacturers and consumers are inclined to consider, accept and support options that lessen the environmental impact of petroleum fuels. ASTM International voluntary consensus standards make such changes possible.

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