

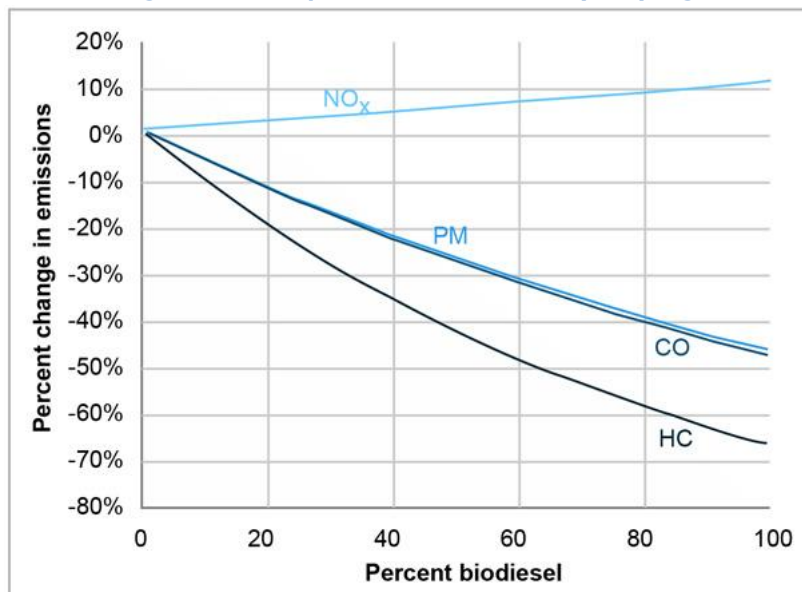


A Biodiesel Solution to a Regulatory Conflict

Conventional biodiesel fuels are domestic, renewable fuels derived from natural oils. They are the only alternative fuels to have been submitted to the USEPA for a complete evaluation of the emission levels and resultant health effects as compared to those experienced with traditional diesel fuels. Alternative Petroleum Technologies (APT) is completing development and beginning commercialization of an EMULSIFIED biodiesel fuel with even better emissions reduction characteristics than conventional biodiesel fuels.

At the California Air Resources Board, much discussion is focused on AB 32, the Global Warming Solutions Act of 2006, and the Low Carbon Fuel Standard (LCFS) element of AB 32. Although they are important elements in the LCFS, biodiesel fuels conflict with California's efforts to reduce NO_x emissions as part of its State Implementation Plan (SIP) to comply with federal air quality mandates. It has been well documented that conventional biodiesel fuels INCREASE NO_x emission levels as compared to traditional diesel fuels anywhere from 2% to 10%.

Average Emission Impact of Biodiesel for heavy-duty engines



Source: California Energy Commission

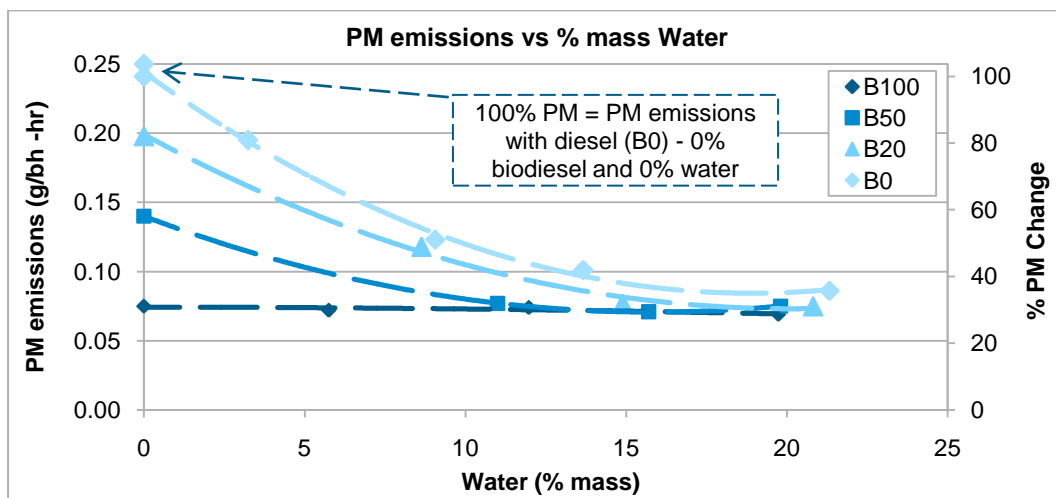
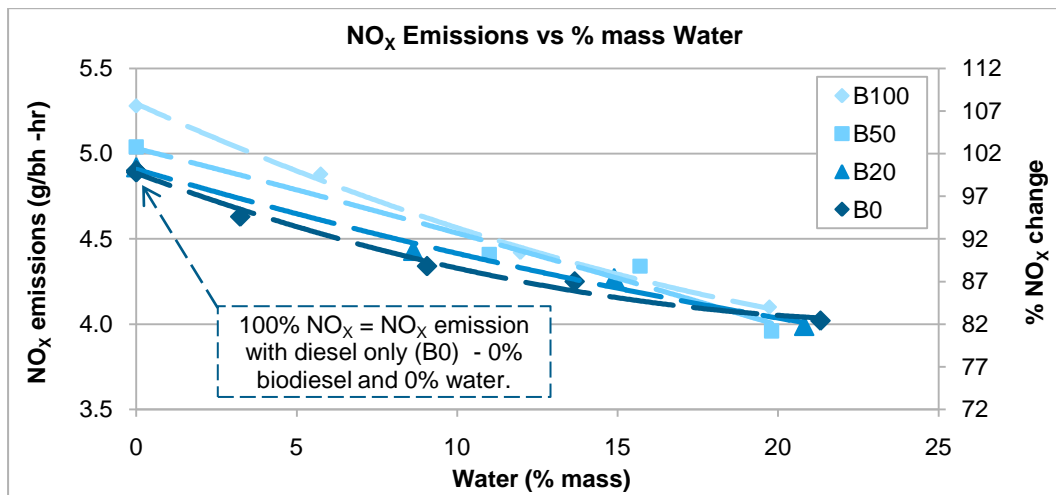
The APT product offering is an EMULSIFIED biodiesel fuel that augments conventional biodiesel fuel particulate matter and CO_2 reductions with a reduction in NO_x emissions and a further reduction in particulate matter emissions. It mitigates the NO_x conflict while improving the overall emissions profile of conventional biodiesel fuel.

The technical community has known for many years that emulsified diesel fuel, made by blending water and additives into diesel fuel, will reduce emissions of NO_x and particulate matter (PM) compared with regular diesel fuel. In 2004, the Air Resources Board completed formal verification of an emulsified diesel fuel. Several Society of Automotive Engineers (SAE) publications have also explained the emission reduction benefits, as well as a better energy utilization of emulsified diesel fuel. Improved energy utilization is important when considering the lower inherent energy content of biodiesel fuel. However, several issues, including incompatibility with certain diesel engine components and operability concerns due to power loss, have minimized widespread acceptance of emulsified diesel fuel. Many of these problems can be attributed to the high water content (20% by weight) of the verified emulsified diesel fuel.

Although the APT biodiesel fuel product is a water-emulsion fuel, it does not suffer from the same operational issues, because the water content is not as high (6% compared to 20%). The concept behind the APT product is in part based on LOW water content emulsified fuel experience in Europe, where minimum operational issues have developed over numerous years of experience and government standards have been written for LOW water content emulsified diesel fuels.

An engine dynamometer proof of concept evaluation conducted by APT at the Southwest Research Institute (SWRI) in San Antonio, Texas of an EMULSIFIED B20 biodiesel fuel with 6% by weight water, showed a 5.9% reduction in NO_x and a 44% reduction in PM on a grams/brake-horsepower/hour (gm/bhp-hr) basis versus an Ultra-Low Sulfur Diesel (ULSD) baseline fuel. Conventional B20 biodiesel fuel in the same engine under identical conditions showed a 1.4% INCREASE in NO_x and only a 17.8% reduction in PM versus the baseline ULSD fuel.

The focus of the APT water-emulsion biodiesel fuel is a B20 blend (a 20% biodiesel). However, the SWRI evaluation demonstrated that a NO_x reduction compared to a baseline ULSD can be achieved in various biodiesel fuel blends from B20 to B100. The SWRI evaluation also demonstrated that a PM reduction compared to a baseline ULSD can be achieved in various percentage biodiesel fuel blends from B20 to B100.



Discussions are under way with the Air Resources Board regarding emissions verification of the water-emulsion B20 fuel. While verification is pending, end users can evaluate and demonstrate the benefits of the water-emulsion B20 fuel under a developmental fuel waiver issued by the California Division of Measurement Standards.

In an over the road demonstration in a 2000 Peterbilt truck with a CAT C12 engine and the maximum legal load, use of the 6% weight water B20 biodiesel fuel was transparent to the truck operator when compared to regular diesel fuel. (No loss of road speed or gear). The truck was in service from the Sacramento area to the Reno/Tahoe area and to elevations of 7200 feet. The same truck on a chassis dynamometer at a Caterpillar dealer was able to maintain road speed and HP within engine specification between 1200 and 2000 RPM.

The manufacturers of numerous verified diesel emission control systems (such as diesel oxidation catalysts and diesel particulate filters) have indicated that their systems are compatible with biodiesel blends at B20 or less. The 6% water-emulsion B20 biodiesel fuel in combination with a diesel oxidation catalyst (DOC) showed a PM reduction of 62% compared to a ULSD baseline during the SWRI evaluation testing. Verification testing is planned for the combination of a water emulsified B20 biodiesel fuel and a diesel oxidation catalyst. This technology combination will have an economic advantage in certain situations as an alternative to a costly diesel particulate filter (DPF) installation.

Alternative Petroleum Technologies is a publicly held environmental company that features a proprietary emulsion technology for a broad range of petroleum products. APT holds license rights to the only emulsification technology of its kind that has been verified by the California Air Resources Board and registered with the Environmental Protection Agency in the United States of America. APT uses third parties to construct and manufacture its proprietary blending units and additives and holds over 100 patents and patent applications worldwide. APT offers a range of environmental technologies that include emulsions of conventional petroleum products such as diesel and fuel oils and emulsions of unconventional petroleum products such as residual and waste oils. APT products have been tested in mobile and stationary engines, in fire-tube and water-tube boilers and in combustion turbines. As such, APT products can provide environmental AND economic benefits to major sectors of the economy – from transportation (land-based and marine) systems and off-road construction machinery to electric power generation stations and commercial/industrial heating units.