



American Ingenuity—Cleaner Air for California

A Retrofit Solution for Mobile and Portable Diesel Engines

In 2000, as part of its charter to reduce public exposure to air contaminants produced by diesel engines, the California Air Resources Board (CARB) approved the “Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel Fuelled Engines and Vehicles.” The plan requires mandatory replacement or retrofit of the nearly 1.3 million diesel engines operating in the state California. The plan divides diesel engines into two types, “mobile” and “stationary” and established for each different standards of remedy. Essentially, the plan allows for the cost-effective retrofitting of stationary engines, but because at the time of plan adoption there were no known retrofit solutions available, the program effectively mandates only costly replacement of mobile and stationary portable engines. As a result of the high cost of new systems, engine owners have been either slow to comply or have found it more cost-effective to merely accept fines for noncompliance. Today, technology has caught up and we believe there is a viable way to retrofit portable diesel engines that both serves the public good and helps the California economy.

TYPES OF DIESEL EQUIPMENT

The relevant CARB regulations, emissions standards, retrofitting options, verification and reporting requirements are complex. They vary by both engine classification and usage model. At the highest level, CARB classifies diesel engines as either Mobile or Stationary. The engines are further sub-classified into Tiers. The dirtiest or “uncontrolled” engines are classified as Tier 0, while higher tier engines (Tier 1 through Tier 4) are cleaner.

FILTERING OUT DIESEL PARTICULATES

There are a number of technologies that are available to reduce particulate matter from diesel-fueled engines. These technologies can be categorized as engine design changes, exhaust treatments, or fuel additives. One of the leading cost-effective technologies for reducing harmful diesel emissions is the diesel particulate filter, or DPF. These devices generally consist of a wall-flow type filter positioned in the exhaust stream of a diesel engine. As the exhaust gases pass through the system, particulate emissions are collected and stored. The effectiveness of diesel particulate filters is proven and well documented.



Both CARB and the U. S. Environmental Protection Agency have reported emission reductions of 85 to 97 percent for various types of catalyzed diesel particulate filters. Today, DPF technology provides the most economically viable approaches for reducing harmful diesel particulate matter emissions. Unfortunately, current CARB regulations do not allow for DPF retrofits on TIER 0 portable engines.

ONE ENGINE □ TWO DIFFERENT CLASSIFICATIONS

In California, approximately half of the engines that are used on agricultural lands for the purpose of growing crops or raising animals are diesel engines. On most farms, it is not unusual to have two identical engines, one used to power a pump mounted on a mobile piece of equipment (a portable engine) and the other powering a similar pump but fixed in one space. Despite the fact that both diesel engines are identical (with identical emissions), CARB regulations result in two different classifications. Herein lies the problem.

According the Butte County Air Quality Management District (AQMD), 49% of their registered portable agricultural engines are Tier 0 diesel engines.

Because current CARB regulations do not allow for DPF retrofits on Portable Tier 0 engines, 49% of Butte county agricultural portable equipment owners must replace a perfectly good engine to meet regulatory requirements. CARB estimates that the average cost to replace a diesel engine can range from \$11,000 to \$43,000 (depending on the size and horsepower). In contrast, the average cost to purchase and install a DPF system is estimated to be approximately \$6,400.



THE POSITIVE ECONOMICS OF RETROFITTING

Owners or operators of portable engines have been able to register their units under the CARB Statewide Portable Equipment Registration Program (PERP) in order to operate their equipment throughout California without having to obtain individual permits from the numerous local air districts. Today, there are approximately 38,000 portable engines registered in PERP. Data was not available for the per cent of Tier 0 portable engine owners throughout the entire state. Applying the Butte county 49% results in as many as 18,620 owners in the state who could fall in this category. Based on current CARB regulations, Tier 0 engines are not eligible for DPF retrofits. Hence the only recourse available to owners in order to meet emission requirements is to replace the entire engine.

According to a recently released CARB report, the average Tier 0 engine replacement cost in Butte County is roughly \$16,000. Which means, the estimated cost to replace nearly 18,620 (or 49%) of the registered Tier 0 portable engines will exceed \$290,000,000.

Cities and towns, farmers and small business owners are ultimately responsible for making sure their Portable engines are compliant with CARB emission regulations – thus leaving them on the hook for the majority of the engine upgrade costs and potentially thousands of dollars in fines should they fail to meet compliance testing. The estimated

cost to retrofit 18,620 Tier 0 Portable engines with DPF filters would be only \$119,200,000 – representing a savings to California farmers and small business owners of approximately \$174 million dollars. This level of savings could very well make the difference in whether or not a small business can remain a going concern. Additionally, the market associated with manufacturing, installing, certifying and maintaining DPF equipment for portable engines would create scores of additional jobs..

THE TRANSFER FLOW BREAKTHROUGH

Transfer Flow, Inc., a Chico, California-based fuel system manufacturer, has developed a breakthrough diesel particulate filter (DPF) system that has been proven to dramatically improve air quality performance of older Tier 0 stationary and portable engines at a fraction of the cost of engine replacement.

The Transfer Flow DPF system has been engineered to enable older diesel-powered equipment to meet California and Butte County's stringent Air Quality Management District (AQMD) and California Air Resources Board (CARB) emissions regulations by removing particulate matter--or soot--from the exhaust of a diesel engine. The solution will allow Tier 0 stationary and portable emissions engine owners—a group that includes municipalities, schools, farm owners and small and medium businesses-- to retrofit their existing equipment to comply with state and county regulations rather than expend the high cost of new equipment replacement. Retrofitting costs approximately 15 percent of the cost to replace most engines.

More information about Transfer Flow's DPF solution can be attained by calling the company directly at (530) 893-5209 ext. 11. As part of its introductory campaign, the company will schedule a no-cost retrofit evaluation by one of its engineers.