

Appendix G

Economic Impact Analysis Methodology

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The major factors affecting the economic impact of the proposed ATCM are: (1) the number and characteristics of engines affected; (2) changes in the overall portable diesel-fueled engine population due to implementation of the proposed ATCM; (3) the cost and timing of early replacement of engines before the end of their useful life; and (4) the cost and timing associated with the addition of diesel PM control technologies.

Engine Population

Staff estimates that there are 33,000 portable diesel-fueled engines larger than 50 horsepower operating within California. This estimate is based upon the number of engines identified for the year 2000 emissions inventory, with updated information for agricultural irrigation pumps.

Information for engines registered with the Statewide Portable Equipment Registration Program (PERP) and assumptions used for estimating the year 2000 emissions inventory was used to characterize the engines. There are about 14,000 diesel-fueled engines registered with PERP. For each of these engines, the owners registering the engines were required to provide the following information as part of the application for registration: the size of the engine based upon horsepower rating, age of the engine, and application description for the engine (for example, the engine was used to power a compressor). In addition, emissions were estimated using operating hours that were used to establish the 2000 inventory.

Because permits have not been required for agricultural activities, there is limited information regarding the use of agricultural irrigation pumps. Staff relied on information provided by local district staff as well as data collected for the Carl Moyer Program. Based upon these information sources, staff assumed that the average irrigation pump is 99 horsepower and operates about 1,000 hours annually.

For the other 16,000 engines, information for engines registered with PERP was used to characterize these engines. All the engines registered in PERP, as a whole, are probably not reflective of all the portable diesel-fueled engines that operate in California. PERP is more heavily populated with engines associated with the rental, oil-well services, and marine construction industries. The rental industry has the newest fleets in California, while both the oil-well services and marine construction industries use very large engines that tend to comprise some of the oldest fleet of portable engines in California. Removing these particular categories of engine applications from PERP, the ARB staff believes that the remaining PERP engines collectively represent the rest of the portable engines in California.

Overview of Impact of Proposed ATCM

The proposed ATCM initially requires all portable diesel-fueled engines to be certified to an emission standard for newly manufactured off-road engines by January 1, 2010. Owners of portable diesel engines will meet with this requirement by replacing any noncertified engines in their fleets with new certified engines. Fleet emission standards then become applicable January 1, 2013 and January 1, 2017, with full compliance by January 1, 2020. These standards are expected to be satisfied by a combination of engine replacement and add-on retrofit technology.

Engines used exclusively in emergency applications or designated as low-use engines are subject to the 2010 requirement, but are not subject to the fleet emission standards. Nevertheless, these engines are required by January 1, 2020, to be either certified to a Tier-4 emission standard or equipped with a Level-3 verified technology.

Costs

The economic impact for the proposed ATCM is based upon replacing an engine prematurely and the costs associated with the addition of air pollution equipment. Costs were projected from 2005 to 2037, the last year a cost would be attributed to the proposed ATCM.

The proposed regulation will require the early replacement of existing portable diesel-fueled engines with newer cleaner engines. The cost attributed to engine replacement or repower would be the economic value to the owner for each year the engine has been prematurely replaced. Based on information used for the emissions inventory and the PERP, staff assumed the useful life of a diesel-fueled portable engine to be about 25 years. The lost useful life would be the difference between 25 years and the average age of the affected engines at the time a standard becomes effective that forces the replacement of the engines. The average age of each affected group of engines was based upon the age of engines for similar types of engines registered with the PERP. Conversely, for the purposes of this analysis, engines that are more than 25 years old have reached the end of their useful life, and no cost was include in the economic impact of the proposed ATCM for the replacement of this group of engines.

To estimate the economic impact caused by early replacement of portable engines, staff estimates the annual value for each year of lost useful life as the cost of the engine annualized over a 25-year period. The cost to replace or repower a portable engine is expected to range between \$135-220/horsepower. The \$135 dollars per horsepower represents replacement and installation of the engine and the \$220 dollars per horsepower represents the cost of replacing an entire unit, such as a generator set.

The use of verified Level-3 control technologies will be necessary to satisfy the proposed fleet standards that become effective by January 1st, 2017. For the purposes of evaluating the economic impact associated with these standards, the cost is based upon retrofitting the engines with diesel PM particulate filters. The cost of a filter is estimated at \$40/horsepower and this cost would be paid out over 10-year period. Based upon current manufacturer's guarantees of 8,000 hours of use for a particulate trap and the average operation of a portable diesel-fueled engine, the particulate trap should have a useful life of 16 years. In some cases, an additional particulate trap was included in the cost analysis.

All costs are reported as 2002 dollars. Where future costs are mentioned, they have also been adjusted to 2002 dollars using standard accepted economic procedures. An annual interest rate of five percent is used. In addition, no cost or benefit was included for the ATCM for engines registered with PERP for the purposes of complying with the 2010 requirement. Engines registered with the PERP are already required to be replaced by January 1st, 2010.

2010 Requirement that All Engines Must be Certified

This requirement is expected to affect 11,500 engines. At January 1st, 2010, these engines would have five years of useful life at the time the engine was replaced. Cost associated with early replacement would be distributed from 2010 to 2014. In addition, agricultural irrigation pump engines were assumed to have five years of useful life at the time the engine was replaced.

No costs were assumed for engines that are already at the end of their useful life. This was true of 25% of the engines that are less than 175 horsepower and 37% of the engines that are 175 horsepower and larger.

2013 Fleet Emission Standard

The proposed fleet standard would require the replacement or use of retrofit technology on nearly all Tier 1 engines that are less than 750 horsepower. This requirement is expected to affect about 6,000 engines. At January 1st, 2013, these engines would have operated 9-17 years or would have a remaining useful life of 8-16 years at the time the engine was replaced. Cost associated with early replacement would be distributed from 2010 to 2028.

The engines that are less than 175 horsepower would be replaced with a Tier 3 engine, since the Tier 4 engines are not expected to be available for this horsepower range until 2012 or 2013. For engines that are 175 horsepower and larger, Tier 4 engine are expected to be available since 2011. The economic impact analysis assumes that all engines within this size range would be replaced with a Tier 4 engine. In addition, staff included in the analysis the purchase of an additional diesel particulate filter 15 years after the initial engine purchase.

2017 and 2020 Fleet Emission Standard

The proposed fleet standards will require the retrofit of 30,000 engines. About half of the retrofits would occur by January 1st 2017 and the remainder would be completed by January 1st, 2020. In addition, engines that have not been subject to the fleet requirements (engines used only in emergency applications or are low-use engines) would be required to either retrofit or replace the engine.