

**Summary and Analysis of Comments:
Control of Emissions of Air Pollution
from Locomotive Engines and Marine
Compression Ignition Engines Less than
30 Liters Per Cylinder**

**Chapter 6
Benefits**

Assessment and Standards Division
Office of Transportation and Air Quality
U.S. Environmental Protection Agency

6	BENEFITS	6-1
6.1	Benefit-Cost Analysis	6-1

6 BENEFITS

What We Proposed:

The comments in this section correspond to Section VI of the preamble to the proposed rule, and are targeted at the benefits of the program. A summary of the comments received, as well as our response to those comments, are located below.

6.1 Benefit-Cost Analysis

What Commenters Said:

Tidewater Inc. (Tidewater) noted that the purpose of the Notice of Proposed Rulemaking (NPRM) is to reduce emissions. However, in practice, this is partly being achieved by engine manufacturers tuning their engines to produce lower emissions at the expense of peak engine efficiency. The commenter stated that the costs of this loss of efficiency will increase fuel consumption as much as 5% or more. The commenter also stated that this lower performance must also be accounted for in the design of future vessels through specification of larger engines and directly affects the marketability of our vessels in competition with foreign vessels not subject to the rules. The commenter questioned whether or not EPA did a cost benefit analysis on this impact of these regulations; and if the cost benefit analysis justifies “the increased fuel consumption, increased costs to consumers, and potential loss of jobs to foreign competition that is not subject to the rulemaking.”

Environmental Defense, the Natural Resources Defense Council (NRDC), et al. noted that the Draft Regulatory Impact Analysis (RIA) demonstrated that the benefits of the proposed standards far outweigh the costs of compliance to affected industries and society in general. The total monetized benefits, based on published studies of PM-related premature mortality, are estimated at \$12 billion in 2030, assuming a 3 percent discount rate (or \$11 billion assuming a 7 percent discount rate).

The commenters noted this estimate does not include additional benefits that, if monetized, would substantially increase the benefits stemming from the adoption of the proposed standards. This estimate does not account for the significant benefits related to decreases in ozone, toxic emissions and nitrogen and sulfate deposition, as well as additional positive impacts from reductions in particulate matter (PM). The commenters believe that these benefits could be quite substantial, and should be quantified further and included in the final impact analysis for the rule.

The commenters stated that since diesel exhaust is a highly complex and variable mixture containing numerous carcinogenic compounds, it is difficult to quantify the cumulative health effects. The commenters cited the NRPM (72 FR 15956) and another study that suggest that

unmeasured pollutants may have a significant contribution to adverse health effects. The commenters thus stated that they believe it is very likely that significant health benefits will accrue with reduced diesel emissions, beyond what has been quantified in the Draft RIA (OAR-2003-0190-0592.1, p. 42- Appendix B).

In particular, the commenters noted, the proposed rule acknowledges the important role that ozone can play in premature mortality but does not include ozone reduction benefit estimates in their final cost benefit analysis. A large body of published scientific research demonstrates the significant negative impacts of ozone on human health, and

The commenters also stated that recent research has also demonstrated the negative impact of nitrogen and sulfate deposition on ecosystem health and value. A recent study on only Adirondacks State Park found that New York State residents were willing to pay between \$336 million and \$1.1 billion annually to reduce negative ecosystem impacts driven by sulfate and nitrogen deposition. The proposed standards would contribute significantly to valuable efforts to reduce these harmful depositions across the U.S.

The commenters stated that, in the proposed rule, the monetized benefits from reductions in PM-related mortality and morbidity substantially outweigh the minimal costs. Monetized benefits are estimated at \$12 billion in 2030, assuming a 3 percent discount rate (or \$11 billion assuming a 7 percent discount rate), while the total cost of complying with the program is estimated to be \$600 million in 2030. Prices of rail and marine transportation are estimated to increase by less than one percent.

The commenters stated that they support the conclusion that the cost benefit analysis shows substantially higher benefits versus costs. The commenters also highlighted that the benefits would be even more substantial and further outweigh the costs of compliance if the additional non-monetized benefits, particularly ozone impacts, were included, and strongly urge the Agency to include them in its final analysis. They stated that they agree with the finding that the estimate of benefits is likely conservative.

The Passenger Vessel Association (PVA) commented that it believes that EPA should address the total cost/benefit equation in its preamble discussion. The commenter noted that the NPRM seeks to reduce two classes of unfavorable emissions at a cost of increased fuel consumption, increased carbon dioxide (CO₂) generation, new or expanded fuel/urea distribution and production systems. The commenter stated that it believes that these and other factors may reduce the positive effects of this rulemaking through the detrimental impact on other environmental programs such as reduction of greenhouse gases.

A number of private citizens commented that they believe that, while cost objections to the proposal by the diesel engine industry are understandable, the costs to public health of not implementing the proposal are both greater financially for our society, and more compelling in nature - namely human suffering and loss of life. The commenters noted that, because the connection between diesel engine emissions and disease has been established, and because it is possible to reduce emissions, that becomes a mandate. The commenters stated that they believe

that diesel engine industry representatives are commissioned to protect their bottom line and therefore must oppose any additional expense — be it 20% or 1%. Lastly, the commenters stated that they believe that this creates a societal dilemma where government leadership is needed to guide industry and to advocate for the health of the public.

Letters:

Passenger Vessel Association (PVA) OAR-2003-0190-0576.1

Tidewater Inc. OAR-2003-0190-0557

Environmental Defense et al OAR-2003-0190-0592.1

(Environmental Defense and NRDC, along with the following organizations: American Lung Association, Carolinas Clean Air Coalition, Citizen Action- Illinois, Citizens for Pennsylvania's Future (PennFuture), Clean Air Task Force, Clean Air Watch, Clean Water Action (National), Clean Water Action Alliance of Massachusetts, Clean Water Action Connecticut, Clean Water Action Pennsylvania, Clean Water Action Rhode Island, Environment Northeast, Group Against Smog and Pollution, NJ Environmental Federation, Public Citizen Texas Office, Respiratory Health Association of Metropolitan Chicago, the Sustainable Energy and Economic Development(SEED) Coalition, U.S. PIRG.)

Private Citizens (*various*)

Our Response:

EPA agrees that the total estimate of benefits associated with the standards does not include the full complement of PM, ozone, and air toxics-related benefits that, if quantified and monetized, would increase the total estimate of rule-related benefits. These benefits remain unquantified because of current limitations in methods or available data. For example, we have not quantified a number of known or suspected health effects linked with ozone and PM for which appropriate health impact functions are not available or which do not provide easily interpretable outcomes (i.e., changes in heart rate variability). Additionally, we are unable to quantify a number of known welfare effects, including reduced acid and particulate deposition damage to cultural monuments and other materials, and environmental benefits due to reductions of impacts of acidification in lakes and streams and eutrophication in coastal areas. As a result, we may underestimate the total benefits attributable to the implementation of the final standards.

Though omitted in the proposal for this rulemaking, we quantify and monetize the ozone-related health impacts associated with the final rule. This reflects EPA's most current understanding of the science surrounding ozone impacts on human health and welfare, consistent with the recent ozone criteria document and the analysis of the proposed ozone National Ambient Air Quality Standards (NAAQS).

Using the most conservative benefits estimate, the 2020 benefits outweigh the costs by a factor of 10. Using the upper end of the benefits range, the benefits could outweigh the costs by a factor of 25. Likewise, in 2030 benefits outweigh the costs by at least a factor of 10 and could be as much as a factor of 28. Thus, even taking the most conservative benefits assumptions, benefits of the final standards clearly outweigh the costs.

With regard to the comment that engine manufacturers are re-tuning their engines to lower emissions at the expense of peak engine efficiency, we address this issue elsewhere in this document. Please refer to Section 11.1.2 of this Summary and Analysis of Comments document for more information. The same commenter questioned if EPA was accounting for lower engine performance in the design of future vessels and if this would affect competition with foreign flag vessels (and ultimately be reflected in the cost-benefit analysis of the rule). This issue is addressed elsewhere in this document; please refer to Section 3.2 for more information.

With regard to the comment that the regulations target criteria pollutants at the expense of increased fuel consumption and CO₂ generation, please refer to Section 11.1.2 for a response.