

SORE REGULATIONS DRAFTED BY CARB

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Thank you for rulemaking that diligently implements AB 1346. There is an impressive level of detail and quantitative analysis. I am pleased to note that you conclude ZEE to be "cost-effective" and "technologically feasible" as stipulated by AB 1346. Please finalize rulemaking by July so that implementation may commence in January 2024.

COMPARATIVE COST OF ZE V ICE EQUIPMENT

Please reveal your model for calculating the difference in cumulative costs of ICE-powered equipment v ZE equipment by posting it in the SORE section of your website. Also note the duration of ownership for which the cumulative costs of ZE are lower than that of ICE SORE.

As production and sales of ZEE rise, economies of scale will likely decrease the cost of ZEE while increasing the cost of ICE. Also, battery prices are likely to continue their downward trajectory.

SOCIAL COST OF CARBON

There is a wide range of SCC estimates. These are rising each year as the costs of climate change rise.

<https://www.regulations.gov/comment/OMB-2021-0006-0047> (click Download to view)

The Interagency Working Group (IWG) relies upon a model that is incomplete and thus underestimates SCC. Recent peer-reviewed scientific research provides more accurate estimates than the IWG model. See references in the link for links to citations. Discount rates greater than zero do not represent accurate estimates of SCC. To incorporate intergenerational impacts, which IWG indicates are important, the discount rate should be zero or less. This would provide a more empirically-defensible estimate, which would be well over \$100/MT CO₂e (in contrast to \$51 at a 2.5% discount rate as calculated by IWG).

IWG plans to increase its estimate of SCC in January. CARB publications, on any topic, after the release of the new estimate should use the new estimate when computed at a discount rate of zero.

MEDICAL COSTS

Only two medical costs (cardiovascular premature mortality and ER visits for asthma attacks) were factored into your cost : benefit analysis for this rulemaking. You mentioned that there are many other medical costs. Some SORE-induced disorders follow. These should be factored into this SORE rulemaking if you have time. If not, please do so for future rulemaking.

Noise

SORE noise pollution levels have been proven to elevate stress, exacerbate a wide range of chronic medical disorders (e.g. heart disease, diabetes, and immune disorders including cancer), increase antisocial behaviors (e.g. violence), decrease hearing ability, disturb napping (e.g., of young children, geriatrics, pets, and those working at home), repel wildlife (e.g. pollinators) and pets, disrupt concentration, increase accidents/injuries, decrease productivity, and interfere with the quiet enjoyment and utility of one's premises. Laborers using SORE are at elevated risk of hearing impairment.

Gases and Airborne Toxins

Gas emissions from ICE have been proven to decrease longevity, induce shortness of breath, exacerbate chronic respiratory disorders, increase risk of cardiovascular disorders (e.g. heart attack), trigger allergic reactions, decrease lung function, increase upper respiratory infections, diminish cognitive function, decrease alertness, and lower endurance. The combination of ICE gases impairs heart, liver, and lung capacities to expel toxins.

Heavy metals, toxic and fatal in sufficient doses, increase oxidant damage, cancer, cardiovascular disease, organ damage, and neurodegenerative disorders (e.g., Parkinson's and Alzheimer's).

Benzene induces birth defects, leukemia, anemia, bone marrow damage, cancer, drowsiness, and immune impairment.

Nitrogen oxides cause chronic respiratory disorders (e.g., cancer), cardiovascular disease, and diabetes mellitus.

Sulphur oxides induce shortness of breath and decrease longevity.

Carbon dioxide exposure may temporarily cause headache, dizziness, shortness of breath, and fatigue; chronic impairment of visual acuity, cognitive function, and kidney function; cancer, and brain damage.

Carbon monoxide, fatal in high doses, causes confusion, shortness of breath, diminished endurance, impaired cognitive function, and brain damage.

Formaldehyde temporarily induces wheezing and fatigue; causes cancer, birth defects, and asthma.

Aldehyde causes cancer, liver damage, and cilia impairment.

Volatile organic compounds induce fatigue and shortness of breath; cause respiratory disorders, cancer, cardiovascular disorders, liver dysfunction, kidney dysfunction, cognitive impairment, and dementia.

Methane temporarily induces shortness of breath, weakness, and drowsiness; increases ground-level ozone (which kills 1 million people annually worldwide).

Particulate Matter

Fine particulate matter ($PM_{2.5}$) pollution is from engine emissions as well as debris that is dispersed from the ground into the air: This may be carried up to hundreds of miles by wind and remain airborne for weeks. Shorter durations and distances are probably more typical, but further research is needed. Locations where PM emissions are higher have chronically elevated PM levels. PM from decomposing detached organic matter launched into the air commonly contains pathogenic microbes, pollen, pesticides, fertilizers, and herbicides. PM increases risk of preterm birth disorders and mortality, cancer, mutagenesis, cardiovascular disease, chronic kidney disease, exacerbation of respiratory disorders, and increases risk of Alzheimer's Disease.

The CA Dept. of Public Health probably has data on each of the above disorders and annual costs of treating each. For future publications on any emissions issue, CARB should use more complete data on morbidity and mortality costs to estimate the benefit to cost ratio. A more comprehensive medical cost estimate is vital for the evaluation of any policy. If a more complete cost analysis reveals a benefit : cost ratio of 3.9 while a cursory analysis reveals a ratio of 1.3, the implication is that thrice as much funding is warranted.

A more comprehensive analysis also avoids being misquoted, e.g., "CARB estimated the benefit to cost ratio to be 1.3." In haste, the important qualifications you made may be omitted.

AVOIDING A LAST-MINUTE FLURRY OF ICE PURCHASING

Die-hard fans of ICE SORE will be tempted to stock up on this prior to January 2024. Some may even stockpile ICEE for future use or surreptitious sales to others after the effective date of the ban. To minimize this, consider adding a rule that disincentivizes purchase of new and used SORE, effective starting in July. An environmental mitigation tax could be added to the cost of ICEE and that fee could be credited to purchase of ZEE. This would be revenue-neutral for the CA Treasury because the decline in sales tax revenue from ZEE would equal the increase in tax revenue for ICEE. Manufacturers that make ZEE typically make ICEE, so sales revenue decrease of ICEE would be offset by sales revenue increase of ZEE.

ISSUES FOR FUTURE SORE RULINGS

Decreasing the inventory of SORE after 2023

In the case of the transition from ICE SORE to ZEE, a statewide program that recycles used ICE equipment for scrap metal and provides rebates on the purchase of ZEE, while imposing a surcharge on sales of used ICE, would retire ICE equipment more rapidly. This would diminish emissions more swiftly. Another revenue source to consider is GGRF funded by Cap & Trade.

Vacuum Mode

Most leaf blowers have a vacuum mode. This gathers debris whereas in blow mode debris is re-aerosolized. The smallest-diameter blower-driven particles may stay aloft for weeks. So, if a yard has blow service weekly (and assuming that PM lingers over the yard), there is continuous contamination of air quality 24/7. In addition to stationary and SORE sources of PM, mobile sources contribute to PM levels in urban areas. ICE engine exhaust and brake and tire wear on all kinds of vehicles emit PM on a daily basis. After fires deposit PM in our yards, the volume of PM dispersed into the air by leaf blowers is elevated.

Manual Tools

CARB should provide education on its website and in conjunction with "road shows" that demonstrate ZEE, re. minimization of use of power tools by increasing use of manual tools. Many landscapers report that manual tools are effective for many kinds of tasks that SORE mowers and blowers are used for. The lifecycle emissions from manual tools is significantly less than that of SORE. Landscaping crews, and other SORE operators, would benefit in many ways. Noise pollution from manual tools is far less than that of ZEE and other kinds of SORE. Laborers would also benefit from increased aerobic exercise. They would be compensated by their employer for exercising on the job, instead of setting aside after work time to work out in a fee-based gymnasium.

Please consider establishing a program of incentives for trading in SORE in exchange for new manual tools.

Noise

Because higher decibel levels cause more pathology including hearing impairment, medical costs due to use of high-decibel SORE probably exceed the costs from use of quieter SORE. Thus, a surcharge should be imposed on the sale of SORE that have a peak-RPM volume exceeding 65 decibels. This would apply to new and used SORE including ZEE SORE. The surcharge would increase significantly with each higher ten-point range. This would decrease sales of higher-decibel SORE and would incentivize manufacturers to produce quieter designs.

REFERENCES ON MEDICAL EFFECTS OF ICE

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DIESEL AND GASOLINE ENGINE EXHAUSTS AND SOME ...

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