

**State of California  
Air Resources Board  
Board Item Summary**

**Item #21-13-2: Public Hearing to Consider Proposed Amendments  
to the Small Off-Road Engine Regulations:  
Transition to Zero Emissions**

**Staff Recommendation:**

Staff recommends that the California Air Resources Board (CARB or Board) adopt the proposed amendments to the exhaust and evaporative emission regulations for small off-road engines, including the incorporated certification and test procedures (collectively, Proposed Amendments).

**Discussion:**

Small off-road engines (SORE), are spark-ignition engines with rated power at or below 19 kilowatts (25.5 horsepower) used in non-stationary equipment. As a result of SORE regulations and increasing adoption of zero-emission equipment (ZEE) by residential and professional users, SORE emissions have decreased by 50 percent since 2000. However, emissions from SORE are still significant, and emissions of smog forming pollutants from SORE already exceed those from light-duty passenger cars in California. SORE emissions are expected to increase as California's population grows and are forecast to be nearly twice those from light-duty passenger cars in 2031. CARB staff is proposing amendments to the SORE regulations that would transition SORE equipment to ZEE as soon as possible. The Proposed Amendments are necessary to achieve SORE emission reductions expected under the Revised Proposed 2016 State Strategy for the State Implementation Plan (2016 State SIP Strategy), to meet the goals of California Executive Order N-79-20 to transition off-road vehicles and equipment operations to 100 percent zero-emission by 2035 where feasible and to meet the requirement of California Assembly Bill (AB)1346 (Chapter 753, Stats. of 2021) to adopt cost-effective and technologically feasible regulations by July 1, 2022, to prohibit engine exhaust and evaporative emissions from new small off-road engines.

The Proposed Amendments were developed through an extensive public process. CARB contracted with California State University, Fullerton to conduct an intensive survey of households, nonlandscaping businesses, and landscapers on their ownership and use of SORE equipment and ZEE. Throughout survey development, feedback was obtained from the SORE Working Group, which included manufacturers, trade associations, government agencies, individuals, and environmental organizations. In addition, CARB staff held three public workshops to discuss the survey results, emissions estimates, and potential regulatory options with stakeholders; conducted outreach to landscaping groups; and held numerous meetings with interested stakeholders. Stakeholders' comments during and after these informal pre-rulemaking discussions provided staff with useful information that staff

considered during development of the Proposed Amendments. The public process also included an informational briefing to the Board during a public meeting and participation in community meetings and conventions such as the Green Schools Summit in Pasadena, California Landscape Industry Show in Ontario, Long Beach Landscape Expo, and the NorCal Landscape Show in San Mateo. CARB runs a ZEE demonstration project, called the ZEE Roadshow, to loan professional-grade, zero-emission landscaping equipment to landscaping crews throughout California. Twenty-three organizations have participated in the ZEE Roadshow since 2018, with nearly all crews finding at least one ZEE type that they preferred over SORE equipment and many purchasing ZEE afterwards.

### **Summary and Impacts:**

The Proposed Amendments would set emission standards for smog-forming pollutants to zero beginning with MY 2024 for all SORE except portable generator engines. A delayed phase-in for generator engines would allow time for the zero-emission generator market to further develop. The Proposed Amendments would set more stringent emission standards for portable generator engines beginning with MY 2024, and emission standards of zero beginning with model year (MY) 2028. The Proposed Amendments would add a new emission reduction credit program for zero-emission generators to incentivize manufacturers to increase production of zero-emission generators with the greatest energy storage and highest power output. The Proposed Amendments also include updates to the SORE regulations to better reflect real-world operating conditions, ensure expected emission reductions are achieved under the emission standards, and harmonize the SORE regulations with some recent updates to federal test procedures. The Proposed Amendments would not affect engines already in use.

Staff estimates that 93 percent of equipment subject to the SORE regulations would be ZEE by 2035 under the Proposed Amendments, as compared to only 54 percent under existing regulations. The primary benefits of the Proposed Amendments are emission reductions of the smog-forming pollutants, oxides of nitrogen (NO<sub>x</sub>) and reactive organic gases (ROG). Staff estimates the Proposed Amendments would reduce summer average emissions by 7.9 tpd NO<sub>x</sub> and 64.5 tpd ROG in 2031, which exceed the expected emission reductions from SORE in the 2016 State SIP Strategy. These emission reductions would result in significant health benefits for Californians, and the economic value of these benefits and other cost-savings from using ZEE would exceed the costs of implementing the Proposed Amendments. Health benefits include reducing premature deaths, hospital visits for cardiovascular and respiratory illnesses, and emergency room visits for asthma, especially in sensitive receptors including children, the elderly, and people with chronic heart or lung disease.

Some users may experience savings when using ZEE. ZEE can have higher upfront purchasing costs than SORE equipment. Even so, many users can experience savings after they purchase ZEE due to decreased fuel, maintenance, and repair costs. Overall, the total net direct cost of the Proposed Amendments is estimated to be \$4.08 billion accrued from 2023 through 2043. Including the health benefits valuation of \$8.82 billion and the tax and fee revenue impact of \$0.47 billion, the Proposed Amendments are estimated to have a total net benefit of \$4.27 billion accrued through 2043.