

May 3, 2006

Contact – Angela Skowronek

**Workgroup Recommendations and Other Potential Control Measures**  
**Non-Automobile Gasoline Engines Workgroup**

**NA002 & NA006 – Increasing the Rate of Small Engine Turnovers and Portable Fuel Container Turnovers through the Use of Incentive-Based Initiatives**

Implementation of incentive-based programs to increase small engine turnover would reduce emissions of Volatile Organic Compounds (VOCs), CO and particulate matter. Programs to increase the turnover rate include a commercial landscape equipment replacement program, a residential lawn mower replacement program, a residential replacement program for chainsaws, and a portable fuel container replacement program (vehicles or watercraft).

**DESCRIPTION**

A commercial landscaping equipment replacement program would focus on older high-use handheld equipment that does not meet the most stringent emissions standards. This equipment category includes small handheld equipment such as leaf blowers and string trimmers. The handheld equipment used by the commercial landscape industry consists mostly of two-stroke engines. Commercial users operate this lawn and garden equipment almost everyday. Due to the heavy use of this equipment, it is expected to have a short service life. A report by Booz, Allen & Hamilton for California Air Resources Board (CARB) indicates that the average life span for two –stroke leaf blowers and string trimmers are 2.85 years. Although the service life is expected to be short, a replacement program would hasten the turnover of the large population of equipment in this category. The United States Protection Agency (USEPA) 2005 Nonroad model estimates that the commercial landscape equipment (2-stroke) population in 2008 will be approximately 74,572 trimmers/edgers and 29,000 leaf blowers and vacuums. A replacement program for commercial chainsaws was analyzed but due to the short life span of 1.33 years as indicated in the report by Booz, Allen & Hamilton, was not recommended. In addition, the USEPA 2005 Nonroad model showed that no benefit would be realized for such a program. A change in the emission standards would be required to realize reductions from a replacement program of this type.

A lawn mower replacement program would focus on replacement of residential gasoline lawn mowers with electric mowers (corded or uncorded.) Most lawn mowers used by homeowners have four-stroke engines. The USEPA Nonroad model estimates that the residential lawn mower (4-stroke) population for 2008 will be 1,248,081. Electric lawn mowers are currently available for use by homeowners, especially for homeowners with smaller sized lawns. Homeowners typically use lawn mowers from once a week to once a month. Since lawn mowers are used on a limited basis, this equipment is expected to have a long service life. In a report by Booz, Allen & Hamilton, the average life span for a residential lawn mower is 7.04 years.

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A residential replacement program for chainsaws would focus on replacing older gas-powered chainsaws with newer technology chainsaws. The chainsaws in this category have two-stroke engines. The USEPA 2005 Nonroad model estimates that in 2008 there will be 197,481 chainsaws for residential use. Currently, electric chainsaws are available. However, they tend to be small and lower weight than their gasoline counterparts. Gasoline-operated residential chainsaws are expected to have a long in-service life due to their limited usage. In a report by Booz, Allen & Hamilton, the average life span for a residential chainsaw is 5.21 years.

A Portable Fuel Container program would focus on accelerating the changeover to the new portable fuel container standards that went into effect on January 1, 2005. The need for a changeover program was identified due to the long life span of portable fuel containers.

**IMPLEMENTATION**

Participation in these programs would be on a voluntary basis. These programs would be implemented using incentive-based initiative such as a coupon/scrap program. Coupon/scrap programs are not limited to a certain type of equipment but have been targeted towards lawn mowers.

Several local districts in California have sponsored “trade-in” events where an old gasoline lawn mower can be traded in for a voucher that can be used towards the purchase of a new electric lawn mower. Sometimes the vouchers can be combined with a manufacturer rebate, which can significantly reduce the price of a new electric lawn mower.

**COST**

In California, the Air Quality Management Districts fund incentive-based programs (coupon/scrap/trade-in) through mitigation fee, individual city sponsors, and state matching funds. A possible funding source in New Jersey could be a Supplemental Environmental Project (SEP). A SEP is an environmentally beneficial project that a violator agrees to perform as part of a settlement of an enforcement action.

The Sacramento Metropolitan Air Quality Management District (SMAQMD) has had a lawn mower trade-in program for the last several years. Since the program began in 1997, over 6,000 electric lawn mowers have replaced their gasoline counterparts. The total cost of the program through 2003 was \$1.1 million, which includes the cost of the

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vouchers of \$772,000 and marketing costs of \$335,000. Resultant cost per lawn mower was less than \$200.

South Coast Air Quality Management District (SCAQMD) has conducted a lawn mower exchange program for the past three years. During this time, approximately 11,500 gasoline-powered lawn mowers were traded in for cordless, electric mowers that produce zero emissions. In 2006, the SCAQMD proposed to carry out a similar exchange program, with a goal of exchanging up to 4,000 gasoline mowers for electric mowers. SCAQMD intends to offer the mowers to the public for \$100 each. The cost of the program is \$740,000 for the contract with the lawn mower manufacturer and \$116,000 for outside business and organizational support to assist in implementing the program.

In addition, SCAQMD has recently developed a Leaf Blower Exchange program for professional gardeners and landscapers. This program allows professional gardeners and landscapers to trade in their old, but operational, backpack leaf blowers for a new low-emissions low noise model for only \$200. The suggested retail price of this model is \$459. This program allows up to ten leaf blowers per business to be exchanged. As of March 3, 2006, the three remaining events were completely booked.

**EFFECTIVENESS**

Commercial handheld landscaping equipment contributes the following estimated amounts to the New Jersey's 2002 nonroad inventory:

Trimmers/Edgers/Brush Cutter – 13.78 tons of VOC per Summer Day

Leafblowers/Vacuums – 12.63 tons of VOC per Summer Day

Preliminary calculations using the USEPA 2005 Nonroad model indicate that benefits associated with a commercial landscaping equipment replacement program for trimmers/edgers/brush cutters would provide a reduction of 4.53 pounds per summer day of VOCs for each 1% turnover scrapping the Tier 0 and Tier 1 equipment.

Residential lawn mowers contribute an estimated 5.66 tons of VOC per summer Day to New Jersey's 2002 nonroad inventory. Preliminary calculations using the USEPA 2005 Nonroad model indicate that benefits associated with a residential lawn mower replacement program would provide a reduction of 74 pounds per summer day of VOCs for each 1% turnover scrapping the Tier 0 and Tier 1 equipment.

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Residential chainsaws < 6 HP contribute an estimated 1.93 tons of VOC per Summer Day to New Jersey's 2002 nonroad inventory. Preliminary calculations using the USEPA 2005 nonroad model indicate that benefits associated with a residential replacement program for chainsaws would provide a reduction of 4.09 pounds per summer day of VOCs for each 1% turnover scrapping the Tier 0 and Tier 1 equipment.

Portable fuel containers accounted for an estimated 34 summer tons per day (8,887 tons per year) in the New Jersey 2002 Emission Inventory. The New Jersey Consumer Product Rule (Subchapter 24) includes a new section on portable fuel containers. This section became effective January 1, 2005. It is estimated that this rule will reduce portable fuel container emissions by approximately 70 percent at the end of an estimated 10-year turn around.

**COST EFFECTIVENESS**

The SMAQMD has estimated that they have reduced approximately 68 total tons of HC + NO<sub>x</sub> from the annual lawn mower trade-in programs from 1997- 2003. The average voucher cost was \$116 per electric lawn mower sold and the cost-effectiveness per pound was approximately \$ 8 of HC + NO<sub>x</sub>.

Cost effectiveness data was not available for SCAQMD lawn mower exchange program or leaf blower exchange program.

**SOURCE**

1. A Collaborative Report Presenting Recommended Air Quality Strategies for Further Consideration by the State of New Jersey, prepared by the Non-Automotive Gasoline Engines Workgroup, October 31, 2005, pg. 9, pg. 10, and pg. 11.  
([http://www.state.nj.us/dep/airworkgroups/docs/final\\_na\\_workgroup\\_report.pdf](http://www.state.nj.us/dep/airworkgroups/docs/final_na_workgroup_report.pdf) )
2. Phase 2: Emission Standards for New Nonroad Spark-Ignition Engines at or Below 19 Kilowatts. United States Environmental Protection Agency (USEPA) Regulatory Support Document. December 1997. Pg. 9-3.  
(<http://www.epa.gov/otaq/regs/nonroad/equip-ld/ph2nprm/ph2rsd-1.pdf>.)
3. Report to the Board on the Potential Electrification Programs for Small Off-Road Engines, Staff Report, Air Resources Board, April 2, 2004, pg. 7, pg. 19, pg. 20,

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- pg. 21, and pg. 22. (<http://www.arb.ca.gov/msprog/offroad/sore/staff-report-electrification-programs.pdf>)
4. South Coast Air Quality Management District, Board Meeting Date: March 3, 2006, Agenda No. 5, pg. 2, pg. 4, pg. 5.  
(<http://www.aqmd.gov/hb/2006/March/06035a.html>)
  5. South Coast Air Quality Management District Leaf Blower Exchange for Professional Gardeners/Landscapers, pg. 1 and 2.  
(<http://www.aqmd.gov/tao/leafblowerexchange.htm>)
  6. A Collaborative Report Presenting Air Quality Strategies for Further Consideration by the State of New Jersey, Prepared by the Volatile Organic Compounds from Processes and Consumer Products Workgroup, October 31, 2005, pg. 11.  
([http://www.state.nj.us/dep/airworkgroups/docs/final\\_voc\\_workgroup\\_report.pdf](http://www.state.nj.us/dep/airworkgroups/docs/final_voc_workgroup_report.pdf))
  7. USEPA Nonroad Model, population data.  
(<http://www.epa.gov/otaq/nonrdmdl.htm>)

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