

**SACRAMENTO METROPOLITAN
AIR QUALITY MANAGEMENT DISTRICT**

For Agenda of **July 28, 2005**

To: Board of Directors
Sacramento Metropolitan Air Quality Management District

From: Larry Greene, Air Pollution Control Officer
Sacramento Metropolitan Air Quality Management District

Subject: SB 656, Implementation Schedule for District Particulate Matter Control Measures

Recommendation

Approve the proposed implementation schedule for District PM_{2.5} and PM₁₀ control measures, as required by Section 39614 of the California Health and Safety Code (SB 656).

Executive Summary

In 2003, the California Legislature enacted Senate Bill 656 (SB 656, Sher, Health and Safety Code Section 39614) to reduce adverse health impacts, including development of lung and heart disease and premature death from exposure to particulate matter (PM) levels above the state ambient air quality standards. Sacramento County exceeded the state's annual PM₁₀ standard by about 40% and the PM_{2.5} standard by 4% on average over the past 5 years. In addition, the District exceeded the state 24-hr PM₁₀ standard up to 14 days per year during the past 5 years.

SB 656 required the California Air Resources Board (CARB) to develop a list of the most readily available, feasible, and cost-effective control measures that could be employed to reduce PM emissions. The CARB list is based on California rules and regulations existing as of January 1, 2004, and was adopted by CARB in November 2004. Subsequently, under SB 656, each air district is required to prioritize the measures identified by CARB, based on the cost-effectiveness of the measures and their effect on public health, air quality, and emission reductions. By July 31, 2005, the District must adopt an implementation schedule for the most cost-effective measures.

SB 656 specifically requires that districts exclude from the implementation schedule any measures which are already scheduled for adoption within two years of the date of adoption of the SB 656 implementation schedule. For the majority of the stationary and area source categories, the District has already adopted measures that are substantially similar to those on the CARB list. District staff has identified measures in four source categories – wood-burning fireplaces/heaters, fugitive dust, charbroilers, and on-road motor vehicle mitigation – which may achieve cost-effective particulate matter emission benefits.

Staff has proposed an implementation schedule for control measures. The schedule sets dates ranging from 2006 – 2012 for the District to complete further study of each measure. The preliminary cost effectiveness for the proposed measures ranges from a net cost savings to an increased cost of \$13,000 per ton of PM emissions reduced. If the study confirms cost-effective emission benefits for a measure, then the measure will be considered by the Board for adoption. The dates for full implementation of adopted measures range from 2007 – 2015.

Attachments

The following table identifies the attachments to this memo:

Attachment	Item	Page #
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Background

Senate Bill 656 (SB 656) was passed into law on February 21, 2003. This bill was introduced in order to reduce emissions of particulate matter less than 10 microns in size (PM10) and less than 2.5 microns in size (PM2.5). SB 656 required the California Air Resources Board (CARB) to develop and adopt a list of the most readily available, feasible, and cost-effective proposed control measures, based on rules, regulations, and programs existing in California as of January 1, 2004. The list was adopted by CARB in November 2004. The bill also requires CARB, by January 1, 2009, to prepare, and make available to the public, a report on the actions taken by the state and districts to comply with the requirements of the bill. The bill will sunset on January 1, 2011.

The CARB list of control measures includes the following emission source categories:

1. Stationary combustion sources
2. Woodstoves and fireplaces
3. Commercial grilling operations
4. Agricultural burning
5. Construction and grading operations
6. Diesel-powered engines used in stationary and mobile applications

By July 31, 2005, SB 656 requires each district to adopt an implementation schedule for the most cost-effective local measures from the CARB list after prioritizing the measures. District staff has identified measures in four source categories (wood-burning fireplaces/heaters, fugitive dust, charbroilers, and on-road vehicle mitigation) which may provide cost-effective, particulate matter emissions reduction benefits.

Health Impacts

Both coarse (PM10) and fine (PM2.5) particulate are linked to serious health impacts, including premature mortality, acute and chronic bronchitis, asthma attacks and emergency room visits, upper respiratory illnesses, and days with work loss. Exposure to particulate pollution is particularly dangerous for sensitive groups including, but not limited to, the elderly, individuals with asthma and other lung illnesses, infants, and children. Particulate matter is a complex mixture of chemicals. Some particulates, like diesel smoke, are carcinogenic or otherwise considered toxic.

Local Particulate Matter Air Quality

The largest emission sources of PM in the District inventory are combustion sources (including motor vehicles), wood burning, and cooking. Fugitive dust sources also make up a substantial portion of the PM10 inventory. Ambient monitoring data, however, suggest that the fugitive dust contribution at the monitoring site is smaller.

In the Sacramento area, there is a seasonal variation in ambient PM concentrations, with higher concentrations in the fall and winter months. Secondary formation of ammonium nitrate from precursors emitted by stationary and mobile combustion sources is considered a major contributor to PM2.5 emissions in this area. Sacramento County exceeded the state's annual PM10 standard by about 40% and the PM2.5 standard by 4% on average over the past 5 years. In addition, the District exceeded the state 24-hr PM10 standard up to 14 days per year during the past 5 years.

Proposed Control Measures

The table below lists the recommended control options and the implementation schedule for these control options.

PM Control Measures and Implementation Schedule

Control Measure	Further Study Completed	If Cost-effective Emission Benefit Determined	
		Consideration by the Board	If adopted, Full Implementation Date
Wood Burning Fireplaces and Wood Burning Heaters			
Require use of USEPA-Certified Phase II or equivalent devices	2006	2007	2008
Public Awareness Program with either a voluntary curtailment or mandatory curtailment	2006	2007, if mandatory curtailment needed	2007
Require replacement of non-certified units upon sale of property*	2006	2007	2008
Restrict number of wood burning fireplaces allowed in new residential developments*	2006	2007	2008
Control of wood moisture content. Prohibit burning materials that are not intended for use in fireplace/heater	2006	2007	2008
Combustion			
Add-on control for chain-driven charbroilers	2007	2008	2009
Fugitive Dust			
Limit PM emissions from vehicle travel on paved roads by requiring use of PM10-efficient street sweepers by governmental agencies or their contractors	2008	2009	2013
Limit PM emissions from construction, demolition, excavation, extraction, grading, and other earthmoving activities, inactive disturbed land and from track-out resulting from construction and demolition operations	2009	2010	2011
Limit PM emissions from vehicle travel on unpaved roads	2010	2011	2016
Transportation			
On-Road Motor Vehicle Mitigation Option	2012	2014	2015

* These measures may take the form of model ordinances.

Business Cost Impacts

The cost effectiveness ranges for the proposed control measures are listed in the following table.

Control Measure Category	Cost Effectiveness \$/ton
Wood Burning	Cost Savings - \$12,060
Fugitive Dust	\$33 - \$12,293
Combustion (Charbroilers)	\$3,148
Transportation	\$10,000 - \$13,000

District Impacts

Specific staffing needs will be determined during the rule development process for each of the proposed control measures listed under the SB 656 implementation schedule.

Emission Impacts

Staff selected control measures that have the potential to reduce PM2.5 or PM10 emissions by substantial amounts. The emissions reductions for each proposed control measure are discussed in the write-up for each control measure (Appendix C of the attached Staff Report, Page 38 of this Board Package). More data will be needed to refine these emission reduction estimates.

Environmental Review and Compliance

The proposed action for the Board of Directors is to approve the list of control measures that staff will study further for feasibility based on emission reduction benefit and cost effectiveness. The most promising measures will be developed for adoption and implementation according to the Board-approved schedule.

The District Environmental Coordinator has determined that the proposed action is statutorily exempt from the California Environmental Quality Act (CEQA) under Section 15262 of the State CEQA Guidelines (SCG) – Feasibility and Planning Studies. Feasibility or planning studies for possible future actions that have not been approved, adopted or funded do not require the preparation of an environmental impact report or negative declaration, but do require the consideration of environmental factors (SCG §15262).

At this preliminary stage the proposed control measures do not appear to adversely impact any other environmental resources, such as land use and planning, biological or cultural resources, or public services because they will not require the construction or relocation of new facilities and are generally expected to impose control requirements on existing facilities and activities. The District will make the appropriate determinations and analysis under CEQA for those control measures proposed for implementation during the initial rulemaking process.

Public Comments

A public notice for the Board hearing to consider the adoption of the District's SB 656 program was published in The Daily Recorder on June 28, 2005. The public notice was also mailed to all interested and affected businesses. Staff also posted the notice and the Board Package materials on the District's website (www.airquality.org).

A public workshop was held on June 6, 2005 to discuss the proposed implementation schedule. Staff received comments from interested and affected parties. Staff made revisions to the list of proposed control measures by removing the requirement applicable to agricultural operations which would have prohibited tilling on high wind days. In considering comments from farmers, Staff concluded that the minimal emission reduction potential of such a measure did not justify the additional burden that would be placed on the agricultural industry. The comments and their responses are included as Appendix D to the Staff Report (Page 103 of this Board Package).

Responses to Board Members Questions

During the March 24, 2005 Board Hearing some members of the Board raised questions/comments to Staff that needed further action. These questions and their answers are listed below:

Comment One member commented that the preliminary draft staff report, presented at the March 25, 2005 Board meeting, contains two apparently contradictory statements regarding the carcinogenicity of wood smoke. One sentence states that wood smoke is "*12 times* more carcinogenic than equal amounts of tobacco smoke," while the next sentence states "a single fireplace operating for one hour and burning 10 pounds of wood generates *4,300 times* more carcinogenic polycyclic aromatic hydrocarbons (PAHs) than 30 cigarettes."

Response The statements are different types of comparisons and are not contradictory. The statement that “The USEPA estimates that wood smoke is 12 times more carcinogenic than equal amounts of tobacco smoke” is a comparison of the *carcinogenic potency of equal masses* of each type of smoke particles, and is a reference to a paper submitted to a conference on chemical risk assessment¹ by Joellen Lewtas of the USEPA Health Effects Research Laboratory. The statement that “A single fireplace operating for one hour and burning 10 pounds of wood generates 4,300 times more carcinogenic polycyclic aromatic hydrocarbons (PAHs) than 30 cigarettes” is a comparison of the *total masses of PAHs emitted* from each of these activities.

Comments Another member asked Staff to provide the Board with an update of similar PM regulations that have been adopted or are being proposed in the air basin or districts within the air basin.

Response The districts of Butte, Feather River, Glenn, Shasta, Tehama, and Yolo-Solano have already adopted one or more of the control measures to reduce PM emissions from residential wood burning. The implementation of measures to reduce wood smoke in these and other districts is summarized in tables in Appendix C of the attached Staff Report (pages 44, 49, 56, and 62 of this Board Package). There is no indication yet that these districts are planning to adopt additional measures to control wood smoke. The draft SB 656 staff report for the Placer district includes a schedule for further study and adoption of wood burning control measures that is nearly identical to the proposed implementation schedule for our district.

Comment Another member asked Staff to provide information about the availability of EPA Phase II wood burning equipment (e.g., catalytic and noncatalytic) and the cost impacts to new and existing homeowners.

Response USEPA Phase II certified wood stoves and inserts have been required to be sold since 1992. USEPA does not currently have certification requirements or emission standards for wood burning fireplaces. Fireplace inserts are heating units that retrofit into an existing fireplace (masonry or factory-built). They burn wood, gas or wood pellets and offer superior efficiency. Inserts utilize the existing chimney, though a flue liner or other modification may be

¹ Lewtas, J., Carcinogenic Risks of Polycyclic Organic Matter (POM), Proceedings of the Conference on Chemical Risk Assessment in the DoD: Science, Policy, and Practice, Dayton, Ohio, April 8-11, 1991.

necessary. Vent-free inserts require no chimney or flue modification. Most have blowers to circulate the heat. Inserts are used to change an existing non-efficient fireplace into an efficient, heat producing zone heater.

There is currently no technology available to retrofit uncertified wood stoves and inserts and they will have to be replaced with certified equipment. Existing uncertified wood stoves can be made unusable by welding the door shut or by removing the flue at a cost of approximately \$300 according to a local fireplace vendor. Existing fireplaces can be retrofitted with USEPA certified inserts. These inserts are readily available on the market. There are two types of certified wood stoves and fireplace inserts – non-catalytic and catalytic. Currently, the most common stoves on the market are non-catalytic, but there are benefits to both. Catalytic stoves employ a catalytic converter which works as an afterburner to reduce wood smoke. The converter is a cast ceramic honeycomb coated with either platinum or palladium. Once the converter is pre-heated to light-off temperature (500–600 degrees Fahrenheit), the smoke is routed through the catalyst which burns the tars, vapors and other organic compounds that make up wood smoke. Non-catalytic stoves attain two, three or even four stages of combustion by guiding the smoke coming off the burning wood to targeted zones in the firebox where it is mixed with pre-heated oxygen. With temperatures in excess of 1,000 degrees Fahrenheit, the stove burns the wood smoke.²

The added incremental cost to new home owners is about \$1,000 per fireplace. The cost of retrofitting an existing fireplace with a fireplace insert ranges from \$1,500 - \$3,500 depending on the size of the inserts and the types of modification needed to be done to the existing fireplace. Certified wood stoves and fireplace inserts are much more efficient in burning wood and can pay off for their added costs over time depending on their level of use. The following tables compare the annual fuel costs of various wood burning appliances:

² Hearth Patio, and Barbecue Association

Table 1³

Low Emission, New Technology Alternatives to Conventional Uncertified Stoves Burning Cordwood	
Stove/Product	Annual Costs Compared to Conventional Stoves Using Cordwood
Certified Non-Catalytic Stoves	\$67 less
Certified Catalytic Stoves	\$16 less
Pellet Stoves	\$145 more
Masonry Heaters	\$109 less
Manufactured Densified Fuel	\$291 more

Table 2³

Lower Emission Alternatives Compared to Existing Zero Clearance and Masonry Open Radiant Fireplaces Used as Supplemental or Primary Heat Sources	
Stove/Product	Annual Costs Compared to Conventional Stoves Using Cordwood
Certified Non-Catalytic Cordwood Insert	\$11 less
Catalytic Cordwood Insert	\$52 More
Pellet Inserts	\$53 More
Gas Insert Natural Gas	\$139 less
Gas Insert LPG	\$102 less

³ It's Win-Win – New Hearth Product Sales Can Be Part of the Solution for New Air Quality Regulations;
 Hearth Products Association Journal, April – June 1998

Conclusion

The District is required to adopt a SB 656 implementation schedule by Section 39614 of the California Health and Safety Code. Therefore, Staff recommends that the Board approve the proposed implementation schedule.

Respectfully Submitted

Larry Greene; Air Pollution Control Officer
Sacramento Metropolitan
Air Quality Management District

Approved as to form:

Kathy Pittard, District Counsel
Sacramento Metropolitan
Air Quality Management District

Attachments

Attachment A

Board Resolution for SB 656

RESOLUTION NO. AQM 05_____

**BOARD OF DIRECTORS
OF THE SACRAMENTO METROPOLITAN AIR QUALITY
MANAGEMENT DISTRICT**

WHEREAS, the Board of Directors of the Sacramento Metropolitan Air Quality Management District is required to adopt, by July 31, 2005, an implementation schedule for control measures to reduce emissions of particulate matter by Section 39614 of the California Health and Safety Code (SB 656); and

WHEREAS, on November 18, 2004, the California Air Resources Board (CARB) adopted a list of the most readily available, feasible, and cost-effective control measures for districts based on rules, regulations, and programs existing in California as of January 1, 2004; and;

WHEREAS, the Board of Directors of the Sacramento Metropolitan Air Quality Management District has considered the CARB-adopted list of control measures and has excluded those measures which are substantially similar to those already adopted by the District or proposed for adoption within the next two years; and

WHEREAS, the Board of Directors of the Sacramento Metropolitan Air Quality Management District has prioritized the schedule for adoption and implementation of proposed control measures based on the effect each measure will have on public health, air quality, and emission reductions, and on the cost-effectiveness of each measure; and

WHEREAS, the Board of Directors of the Sacramento Metropolitan Air Quality Management District held a duly noticed public workshop on June 6, 2005 and a duly noticed public hearing on July 28, 2005 and considered public comments on the proposed implementation schedule; and

WHEREAS, the Board of Directors of the Sacramento Metropolitan Air Quality Management District recognizes the exempt status of the proposed implementation schedule under the California Environmental Quality Act (CEQA) pursuant to Section 15262 – Feasibility and Planning Studies, of the State CEQA Guidelines.

NOW, THEREFORE, BE IT RESOLVED THAT the Board of Directors of the Sacramento Metropolitan Air Quality Management District approves and adopts the following implementation schedule for particulate matter control measures under SB 656:

PM Control Measures and Implementation Schedule

Control Measure	Further Study Completed	If Cost-effective Emission Benefit Determined	
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Require use of USEPA-Certified Phase II or equivalent devices	2006	2007	2008
Public Awareness Program with either a voluntary curtailment or mandatory curtailment	2006	2007, if mandatory curtailment needed	2007
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Board Resolution
SB 656
July 28, 2005

ON A MOTION by Director _____, seconded by Director _____,
the foregoing resolution was passed and adopted by the Board of Directors of the Sacramento
Metropolitan Air Quality Management District, State of California, this 28th day of July 2005, by
the following vote, to wit:

AYES: Directors

NOES: Directors

ABSENT: Directors

Chairperson of the Board
Sacramento Metropolitan Air
Quality Management District
State of California

(SEAL)

ATTEST: _____
CLERK OF THE BOARD
SACRAMENTO METROPOLITAN AIR QUALITY MANAGEMENT DISTRICT

Attachment B
Staff Report for SB 656

Attachment C

Evidence of Public Notice