

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Final Socioeconomic Report For Proposed Rule 445—Wood Burning Devices

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EXECUTIVE SUMMARY

A socioeconomic assessment was conducted for Proposed Rule 445 (PR 445)—Wood Burning Devices. A summary of the assessment and findings are presented below.

Elements of the Proposed Rule	Proposed Rule (PR) 445 would require all fireplaces installed in new developments to be gaseous-fueled. For existing residential and commercial developments (remodels), PR 445 would require wood burning devices to be clean technology. PR 445 would also require that commercial firewood-selling facilities only to sell seasoned firewood (20% or less moisture content) from July through February. In addition, PR 445 prohibits the burning of non-wood items such as trash and includes a mandatory wood burning curtailment program during periods of poor air quality. The PR 445 is expected to result in a PM _{2.5} reduction of 1.0 ton per day, where 0.32 ton per day is from new development.
Affected Facilities	PR 445 would potentially affect homebuilders and commercial firewood sellers in the Basin. Homebuilders belong to new housing operative builders [North American Industrial Classification System (NAICS) 236117] and the commercial firewood sellers belong to the industry of fuel dealers (NAICS 454319). Additionally, PR 445 would affect the general public who use wood burning fireplaces and other devices.
Assumptions of Analysis	It is assumed that builders would install dedicated natural gas units in new home construction which is wholly attributable to requirements of PR 445, not including industry trends and local ordinances. It is also assumed that commercial firewood facilities would purchase moisture meters to measure moisture content of the firewood.
Compliance Costs	The total average annualized cost of PR 445 from 2008 to 2020 is estimated at \$3.916 million. The majority of the cost \$3.912 million will be incurred in the industry of new housing operative builders (NAICS 236117) and the remaining will be incurred by commercial firewood sellers (NAICS 454319).
Regional Economic Impacts	Based on the above assumptions, the compliance cost of PR 445, and the application of the Regional Economic Models, Inc. (REMI) model, it is projected that an average of 126 jobs could be forgone annually between 2008 and 2020. The job impacts reflect in aggregate the industry structures the proposed rule is affecting. It should be noted that industry trends in new construction and local ordinances are increasingly going to gaseous fireplaces. It is estimated that 44% of new houses are constructed with dual fuel/natural gas ready fireplaces and that; approximately 45% of those are constructed with dedicated gaseous appliances already.

	Therefore about 45% of the \$3.912 million cost of the proposed rule might not be realized as the industry trends indicate that they would have potentially occurred anyway.
Competitiveness	The sector of construction (NAICS 23) where new housing builders belong (NAICS 236117) would experience the largest increases (less than one-hundredth of one percent) in the relative cost of production and relative delivered price.

INTRODUCTION

Proposed Rule (PR) 445 would require all fireplaces installed in new developments (starting construction six months after the rule is adopted) to be gaseous-fueled. For existing residential and commercial developments (remodels), PR 445 would require wood burning furnaces to be the cleanest technology available. PR 445 would also require commercial firewood-selling facilities only to sell seasoned firewood (20% or less moisture content) from July through February. In addition, PR 445 prohibits the burning of non-wood items such as trash and includes a mandatory wood burning curtailment program for 2013 and later years in specific areas during November-February should there be a forecast of poor air quality.

LEGISLATIVE MANDATES

The socioeconomic assessments at the South Coast Air Quality Management District (SCAQMD) have evolved over time to reflect the benefits and costs of regulations. The legal mandates directly related to the assessment of the proposed rules and amendments include the SCAQMD Governing Board resolutions and various sections of the California Health & Safety Code (H&SC).

AQMD Governing Board Resolutions

On March 17, 1989 the SCAQMD Governing Board adopted a resolution that calls for preparing an economic analysis of each proposed rule or amendment for the following elements:

- Affected Industries
- Range of Control Costs
- Cost Effectiveness
- Public Health Benefits

On October 14, 1994, the Board passed a resolution which directed staff to address whether the rules or amendments brought to the Board for adoption are in the order of cost effectiveness as defined in the AQMP. The intent was to bring forth those rules that are cost-effective first.

Health & Safety Code Requirements

The state legislature adopted legislation that reinforces and expands the Governing Board resolutions for socioeconomic assessments. H&SC Sections 40440.8(a) and (b), which became effective on January 1, 1991, require that a socioeconomic analysis be prepared for any proposed rule or rule amendment that "*will significantly affect air quality or emissions limitations.*" Specifically, the scope of the analysis should include:

- Type of Affected Industries
- Impact on Employment and the Economy of the Basin
- Range of Probable Costs, Including Those to Industries

- Emission Reduction Potential
- Necessity of Adopting, Amending or Repealing the Rule in Order to Attain State and Federal Ambient Air Quality Standards
- Availability and Cost Effectiveness of Alternatives to the Rule

Additionally, the SCAQMD is required to actively consider the socioeconomic impacts of regulations and make a good faith effort to minimize adverse socioeconomic impacts. H&SC Section 40728.5, which became effective on January 1, 1992, requires the SCAQMD to:

- Examine Small Business Impacts
- Consider Socioeconomic Impacts in Rule Adoption

H&SC Section 40920.6, which became effective on January 1, 1996, requires that incremental cost effectiveness be performed for a proposed rule or amendment relating to ozone, carbon monoxide (CO), oxides of sulfur (SO_x), oxides of nitrogen (NO_x), and their precursors. Incremental cost effectiveness is defined as the difference in costs divided by the difference in emission reductions between one level of control and the next more stringent control.

AFFECTED INDUSTRIES

PR 445 would potentially affect homebuilders and commercial firewood sellers in the Basin. Homebuilders belong to the industry of new housing operative builders [North American Industrial Classification System (NAICS) 236117] and the commercial firewood sellers belong to the industry of fuel dealers (NAICS 454319). According to the 2005 County Business Patterns, there are approximately 322 builders in the four-county area. Of the 322 builders, 141 are located in Los Angeles County, 66 in Orange County, 70 in Riverside County, and 45 in San Bernardino County. Based on a District staff survey, there are about 77 commercial firewood sellers in the Basin. Out of the 77 firewood sellers, 41 are located in Los Angeles County, 17 in Orange County, four in Riverside County, and the remaining 15 in San Bernardino County. Finally, PR 445 would affect the general public who use wood burning fireplaces.

Small Businesses

The AQMD defines a "small business" in Rule 102 as one which employs 10 or fewer persons and which earns less than \$500,000 in gross annual receipts. In addition to the AQMD's definition of a small business, the federal Small Business Administration (SBA), the federal Clean Air Act Amendments (CAAA) of 1990, and the California Department of Health Services (DHS) also provide their own definitions of a small business.

The SBA's definition of a small business uses the criterion of either gross annual receipts (ranging from \$0.5 million to \$17 million, depending on industry type) or number of employees (ranging from 100 to 1,500). The SBA definitions of small businesses vary by 6-digit NAICS code. The facilities affected by PR 445 belong to the industry of new

housing operative builders (NAICS 236117) and commercial firewood sellers (NAICS 454319). A gross revenue of \$31 million is the criterion below which a business is considered small for the former and a gross revenue of \$6.5 million is the criterion below which a business is considered small for the latter.

The CAAA classifies a facility as a "small business stationary source" if it: (1) employs 100 or fewer employees, (2) does not emit more than ten tons per year of either VOC or NOx, and (3) is a small business as defined by SBA. Due to the lack of a list of individual new housing builders, it is not possible to determine their small business status. Moreover, lack of data on number of employees and gross annual sales of the affected commercial wood sellers precludes staff from determining their small business status.

COMPLIANCE COST

Compliance costs of PR 445 stem from three major requirements: installation of dedicated gaseous-fueled devices in new developments, installation of U.S. EPA Phase II-certified or equivalent devices in existing residential and commercial developments (i.e., remodels, replacements, additions), and restrictions on sales of seasoned firewood (20% or less moisture content) from July through February.

The total annualized cost of the PR 445 is estimated at \$3.916 million when averaged between 2008 and 2020. The analysis did not go beyond 2020, although equipment life and annualized costs would continue. Table 1 provides a summary of the estimated annualized cost of PR 445.

Table 1
Costs of PR 445 by Industry (in millions of 2007 dollars)

Industry	2008	2015	2020	Average Annual (2008-2020)
New Housing Operator Builders (NAICS 236117)	\$0.540	\$4.431	\$7.434	\$3.912
Commercial Firewood Sellers (NAICS 454319)	0.004	0.004	0.004	0.004
TOTAL	\$0.544	\$4.435	\$7.438	\$3.916

New Housing Development

To estimate the number of new housing units, staff applied Southern California Association of Governments' (SCAG) household projections to the 1997 baseline estimate of wood burning households by county. It is assumed that each wood burning household has only one wood burning device. The number of wood burning devices in new developments is projected to be 14,608 for 2008, 15,509 in 2015, and 16,732 in 2020, respectively. It is assumed that only dedicated gaseous-fueled devices would be installed in these new developments to comply with the proposed rule.

Based on a study conducted by the District compliance staff, 59% of new houses are constructed with some type of fireplaces (44% dual fuel/gas ready plus 14% dedicated natural gas plus 1% electric=59%). Based on the Air Quality Management Plan

(AQMP), 24% of households burn wood. Therefore, 55% of total constructed fireplaces (24/44 times 100) burn wood. This is translated to mean that 45% of those constructed with gas ready fireplaces are dedicated gas based on consumer choice. So, it can be reasonably concluded that 45% of the annualized cost might not be realized due to this trend.

Incremental cost for a dedicated natural gas unit relative to an uncontrolled wood burning device is estimated at \$500 (Sacramento Metropolitan AQMD, 2006). No additional operation and maintenance costs are expected. A fireplace is assumed to last for 20 years. The total annualized cost of dedicated natural gas devices to the sector of new housing operative builders (NAICS 236117) at four percent real interest rate is estimated at \$3.912 million when averaged over the period from 2008 to 2020. There are many factors that contribute to the price of a home in Southern California and it is difficult to assess how the incremental cost of installing a gas log set would be passed on to the cost of new residences, if any. For purpose of illustration, a \$500 gas log set, if the cost was passed on to home buyers directly, the mortgage payment at 6% interest for 30 years would increase by \$3 per month. The regional economic model presented in subsequent sections of this report incorporates the compliance costs born by the industries affected by the proposed regulation.

Existing Development

Additional costs would occur if U.S. EPA Phase II-certified (or equivalent) devices are installed in existing houses (i.e., remodels). However, these costs cannot be quantified because the number of traditional, open-hearth fireplaces that would have been added to existing homes through remodels, additions or replacements is unknown. Additionally, it is not possible to estimate which hearth product (i.e., EPA Phase II-certified wood burning, pellet or gaseous-fueled device) would be installed to comply with PR 445.

Firewood Sellers

To comply with the restriction on firewood sales, owners of commercial facilities may elect to purchase hand-held moisture meters to measure wood moisture content. Costs for the devices vary based on features; however, models are commercially available for \$100 to \$200 per unit. For the purposes of this analysis, the cost of \$200 is used.

For the 77 commercial firewood facilities in the Basin, it is assumed that although not required by the proposed rule, each facility would buy one moisture meter and the device would last five years. The total annualized cost of purchasing moisture meters, at four percent real interest rate, is estimated at \$4,000. The meters are simple to operate and do not require routine maintenance, as such no costs for operating and maintenance were assumed.

JOBS AND OTHER SOCIOECONOMIC IMPACTS

The REMI model (version 9.0.3) is used to assess the total socioeconomic impacts of a policy change. The model links the economic activities in the counties of Los Angeles, Orange, Riverside, and San Bernardino. The REMI model for each county is comprised of a five block structure that includes (1) output and demand, (2) labor and capital, (3) population and labor force, (4) wages, prices and costs, and (5) market shares. These five blocks are interrelated. Within each county, producers are made up of 66 private non-farm industries, three government sectors, and a farm sector. Trade flows are captured

between sectors and borders as well as across counties and the rest of U.S. Market shares of industries are dependent upon their product prices, access to production inputs, and local infrastructure. The demographic/migration component has 160 ages/gender/race/ethnicity cohorts and captures population changes in births, deaths, and migration.

The assessment herein is performed relative to a baseline without PR 445. Direct effects of the policy change (Proposed Rule) have to be estimated and used as inputs to the REMI model in order for the model to assess secondary and induced impacts for all the actors in the four-county economy on an annual basis and across a user-defined horizon. Direct effects of PR 445 include additional costs of proposed requirements to affected industries and additional sales of control devices by local vendors at the county (or finer) level and by industry.

PR 445 would create an additional demand for products in the heating equipment manufacturing due to the purchase of natural gas burning fireplaces. There would be additional demand for products in the instruments and related product manufacturing due to the purchase of moisture meters. On the other hand, the expenditure made by the affected facilities would increase their additional cost of doing business.

The total employment impact of PR 445 across industries in key years is shown in Table 2. It is projected that an average of 126 jobs could be forgone annually from 2008 to 2020 in the local economy. This represents about 0.0012 percent of the total average annual jobs forecasted in the four-county area from 2008 to 2020.

Compliance with PR 445 will start in the year 2008. In 2008, 9 additional jobs could be created in the local economy due primarily to increased sales by the manufacturers of these appliances (NAICS 333414), as shown in Table 2.

The sectors with the greatest jobs forgone annually (17 jobs) between 2008 and 2020 are primarily construction (NAICS 23) where new housing operator builders (NAICS 236117) belong. The reduction in disposable income from the overall jobs foregone dampens the demand for goods and services in the local economy, resulting in jobs forgone in sectors such as retail trade (NAICS 45) and real estate and rental and leasing (NAICS 53).

Table 2
Job Impacts by Industry by Year

Industry (NAICS)	Year			Average Annual (2008-2020)
	2008	2015	2020	
Construction (23)	-1	-21	-33	-17
Machinery Manufacturing (333)	7	5	5	6
Rest of Manufacturing (31-33, ex. 333)	1	-9	-16	-7
Wholesale Trade (42)	1	-5	-9	-4
Retail Trade (44-45)	0	-19	-29	-16
Real Estate and Rental and Leasing (53)	-1	-14	-24	-12
Finance and Insurance (52)	0	-9	-15	-8
Professional and Technical Services (54)	1	-13	-24	-11
Management of Companies and Enterprises (55)	0	-1	-2	-1
Administrative, Support and Waste Services (56)	0	-13	-23	-11
Educational Services (61)	0	-5	-9	-4
Health Care and Social Assistance (62)	0	-7	-14	-6
Accommodation and Food Services (72)	0	-14	-22	-11
State and Local Government	0	-7	-16	-6
Other Industries	1	-20	-33	-17
Total	9	-151	-265	-126

The job impacts include all the companies (affected and unaffected by PR445) in the respective industries.

Competitiveness

The additional cost brought on by the proposed rule would increase the cost of production of the affected industries relative to their national counterparts. Changes in relative production costs would thus be a good indicator of changes in relative competitiveness. The magnitude of the impact depends on the size and diversification of, and infrastructure in a local economy as well as interactions among industries. A large, diversified, and resourceful economy would absorb the impact with relative ease. Implementation of PR 445 increases the cost of doing business for affected industries.

It should be noted that a builder's increased cost at the local level is not an issue for competitiveness as they are building for local demand. As stated earlier, the trend in the building industry is moving towards gaseous fireplaces in new home construction due to consumer choice and local building ordinances. The \$500 incremental cost for a gas log set is very small relative to the costs of other construction materials used in building new homes.

An index of 0 indicates that there is no change in the cost of production relative to the rest of the United States. An index of above or below 0 means that the cost of production in the four-county areas resulting from the proposed rule is higher or lower, respectively, than that in the rest of the U.S.

As shown in Table 3, the indices of both relative production cost and delivered price were rather small across all sectors. The sector of construction (NAICS 23) where new

housing builders belong (NAICS 236117) would experience the largest increases in the relative cost of production (0.0060% in 2015), as shown in Table 3. In 2020, the relative cost of production in this sector would increase to 0.0090%. All the remaining sectors will experience a smaller magnitude of increase in production cost due to the PR 445.

Changes in production costs will affect prices of goods produced locally. The relative delivered price of a good is based on its production cost and the transportation cost of delivering the good to where it is consumed or used. The average price of a good at the place of use reflects prices of the good produced locally and imported elsewhere.

Based on the measurement of relative delivered prices in the REMI model, the proposed rule is projected to result in higher delivered prices. These impacts are similar to those for the relative cost of production. The same industry sector of construction (NAICS 23) would experience the largest increase in relative delivered prices (Table 3). These are composite price indexes on all products produced in the construction industry. Indexes on individual products (e.g., new housing) are not available. Nearly all other industries will experience a smaller magnitude of increase in relative delivered price.

Table 3
Impacts on Relative Cost of Production and Delivered Prices
(Relative to the U.S.)

Industry	Relative Cost of Production		Relative Delivered Price	
	2015	2020	2015	2020
Forestry, Fishing, Other	0.0010%	0.0010%	0.0000%	0.0000%
Oil and Gas Extraction	0.0010%	0.0020%	0.0010%	0.0010%
Utilities	0.0020%	0.0020%	0.0000%	0.0010%
Construction	0.0060%	0.0090%	0.0000%	0.0010%
Manufacturing	0.0010%	0.0010%	0.0010%	0.0010%
Wholesale Trade	0.0000%	0.0010%	0.0000%	0.0010%
Retail Trade	0.0010%	0.0010%	0.0010%	0.0010%
Transportation and Warehousing	0.0010%	0.0010%	0.0010%	0.0010%
Information	0.0010%	0.0020%	0.0010%	0.0010%
Finance and Insurance	0.0010%	0.0020%	0.0010%	0.0010%
Real Estate, Rental and Leasing	0.0020%	0.0040%	0.0010%	0.0010%
Professional and Technical Services	0.0010%	0.0010%	0.0010%	0.0010%
Management Companies and Enterprises	0.0010%	0.0010%	0.0000%	0.0010%
Administrative and Waste Services	0.0010%	0.0010%	0.0010%	0.0010%
Educational Services	0.0010%	0.0010%	0.0010%	0.0010%
Health Care and Social Assistance	0.0010%	0.0010%	0.0010%	0.0020%
Arts, Entertainment and Recreation	0.0010%	0.0020%	0.0010%	0.0020%
Accommodation and Food Services	0.0010%	0.0010%	0.0020%	0.0030%
Other Services (excluding Government)	0.0010%	0.0020%	0.0060%	0.0090%

AVAILABILITY AND COST-EFFECTIVENESS OF ALTERNATIVES

Health and Safety Code Section 40440.8 requires an analysis of the availability and cost-effectiveness of alternative control measures. The cost of these alternative measures are either unquantifiable or a cost-savings. In analyzing these alternatives, consideration was also given to the technological feasibility, total emission reduction potential, the rate of

reduction, public acceptability, and enforceability in accordance with Health and Safety Code Section 40922.

One alternative is to not adopt the proposed rule. The emission reductions, however, are necessary as part of the AQMD's plans to meet State and federal air quality standards. Several other possible alternative control measures are discussed below.

One alternative would be to establish density restrictions that would allow the installation of a limited number of traditional, uncontrolled fireplaces in rural areas. The traditional, uncontrolled fireplaces produce more emissions than dedicated gaseous-fueled fireplaces allowed under Proposed Rule 445. This would reduce the emission reduction benefits of the proposed rule.

Another more stringent option would be to initiate the mandatory wood burning curtailment program prior to 2013. Staff believes that public education is an important component of any wood smoke reduction program and, to that end, will be initiating a comprehensive education and outreach program subsequent to rule adoption. This education and outreach program will inform the public of health effects from wood smoke and identify cleaner alternatives. The public will also be informed when it is not advisable to use wood burning devices due to poor air quality as part of the education and outreach program.

A further more stringent option would be to include a property transfer requirement that would require households with non-U.S. EPA Phase II-certified heaters (not open hearth fireplaces) to remove or replace these devices at the time of sale. Staff believes that the benefits of such a program would be limited because the number of these devices used in warm climates, such as southern California, is unknown. Furthermore, based on an average turn-over rate of ten years per property it could be estimated that a very limited number of these devices would be subject to property transfer provisions prior to the 2015 PM_{2.5} attainment date. For these reasons, staff believes that the current proposal, in conjunction with an incentive program that encourages the public to switch from wood burning to gaseous-fueled devices, will achieve emission reductions in a more timely manner.

RULE ADOPTION RELATIVE TO THE COST-EFFECTIVENESS SCHEDULE AND NECESSITY OF ADOPTING THE RULE

On October 14, 1994, the Governing Board adopted a resolution that requires staff to address whether rules being proposed for adoption are considered in the order of cost-effectiveness. The 2007 Air Quality Management Plan (AQMP) ranked, in the order of cost-effectiveness, all of the proposed control measures for which costs were quantified. It is generally recommended that the most cost-effective actions be taken first.

PR 445 would implement the 2007 AQMP control measures BCM-03—Emission Reductions from Wood Burning Fireplaces and Wood Stoves—to further reduce PM₁₀ emissions. Control measure BCM-03 was ranked 10th in the order of cost-effectiveness (\$11,000 to \$17,000 per ton of PM_{2.5} reduced) in the 2007 AQMP. It should be noted

that for this air basin reductions in directly emitted PM_{2.5} are 7 or 8 times more effective than NO_X, a precursor to PM_{2.5}. Adoption of PR 445 is necessary to assist in the attainment of state and federal PM standards for the South Coast Basin.

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