ASSOCIATION OF HOME APPLIANCE MANUFACTURERS

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TESTIMONY

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On Behalf of
The Association of Home Appliance Manufacturers

Before the Maryland House
Economic Matters Committee

HEARING

SB 418
Relating to Energy and Water Efficiency Standards

April 1, 2021

Chair Davis, Vice Chair Dumais, and members of the Committee, the **Association of Home Appliance Manufacturers (AHAM) strongly urges the committee to oppose SB 418**, an act concerning appliance efficiency standards. Although AHAM understands the bill's intent to save energy, the legislation has a number of problems relating to home appliances that need to be addressed.

AHAM represents manufacturers of major, portable and floor care home appliances, and suppliers to the industry. AHAM's membership includes over 150 companies throughout the world. In the U.S., AHAM members support more than one million jobs, have a $198 billion economic impact, and produce more than 95% of the household appliances shipped for sale. In Maryland, the home appliance industry is a significant and critical segment of the economy. The total economic impact of the home appliance industry to Maryland is $1.2 billion, nearly 8,000 direct and indirect jobs, $194.1 million in state tax revenue and more than $426.6 million in wages. The home appliance industry, through its products and innovation, is essential to consumer lifestyle, health, safety and convenience. Home appliances also are a success story in terms of energy efficiency and environmental protection. The purchase of new appliances often represents the most effective choice a consumer can make to reduce home energy use and costs.

SB 418 will restrict the availability of air cleaners/purifiers in Maryland and effectively remove approximately 60% of air cleaners from the shelves. No other state has created this type of standard for air cleaners, and for very good reason. In 2004, California was considering energy standards for air cleaners and reversed course after careful consideration and input from industry. Please find the attached report by AHAM on this issue, which outlines the reasons why energy standards for air cleaners are not appropriate.

Maryland consumers will be faced with fewer options at higher cost, potentially putting them out of reach for lower-income residents. Air cleaners/purifiers are a critical tool in the fight against COVID-19, asthma, allergies, and other health risks. Now, especially for people with health concerns, is the exact wrong time to limit the availability of the lower cost products by setting unnecessarily strict requirements with a product people depend on for their health at home.

The legislation also completely undercuts the very purpose of the ENERGY STAR program, which has successfully created a label designating the more efficient products in the marketplace. For air cleaners/purifiers, SB 418 points to an old Energy Star version, making it difficult to identify which products meet the levels. ENERGY STAR had an October 2020 effectivity date for revision 2.0 on air cleaners. Even with this new version, ENERGY STAR standards are not intended to serve as a minimum, but are a goal for companies to strive towards by maximizing a product's efficiency. The ENERGY STAR label designation informs the consumer about the more efficient products that are available. ENERGY STAR never was and never should be used as a mandatory minimum.

Clean Air Delivery Rate (CADR)

CADR indicates the volume of filtered air delivered by an air cleaner. The higher the tobacco smoke, pollen and dust numbers, the faster the unit cleans the air in the room. The AHAM label (below) is found on the packaging of more than 15 million air cleaners shipped per year and lists the three CADR particulate reduction numbers ─ one for tobacco smoke, one for pollen and one

for dust. But even more importantly, this label indicates the suggested room size, as tested, that is appropriate for the consumer, avoiding the tendency to just buy bigger and bigger units. This rating system, which indicates performance at the most efficient room size, greatly advantages the people with limited financial resources.

AHAM's Verifide program provides a uniform and practical verification of energy, volume and certain performance criteria for each product, with an independent laboratory performing the verification testing. AHAM is recognized by the EPA as a Certification Body and is approved to administer verification testing for purposes of the ENERGY STAR program. Manufacturers that participate in the programs are identified by the AHAM Verifide Mark (see below) that appears on the product packaging or rating label.

For purchasing the right air cleaner, a person can easily find the AHAM suggested room size noted prominently on the label. This suggested sizing should match the size of the room the consumer is trying to clean. Air cleaners today exist across the full range of CADR. If the CADR rating, which is directly linked to performance and room size, is limited based on wattage as a result of this bill, it will likely cause customers to buy multiple or bigger air cleaners to obtain the performance they were trying to achieve. The reason for this is because any air cleaner first and foremost has to move air across a filter to clean it. The denser the filters, the more watts are needed to move the air through the filtration system. In order to reduce the wattage of the fan/motor system, the filters could be made either less dense or move less air. For example, an optimal air cleaner for a small bedroom for a child that is 10 x 10 feet, or 100 square feet; is a unit with a smoke CADR of 65. In order to be ENERGY STAR in that small size, the product's wattage would be limited to half the smoke CADR. If the smoke CADR were 65, then the

product would be limited to 32 watts. On 120 volts power, that means it would have to operate at less than 1/4 of an amp. That is not many amps to move air through a filter.

The electricity cost for the needed wattage is very low for the important health benefits. For example, if one unit used 100 watts and another used 40 watts, and even assuming it runs 12 hours a day, 365 days a year, the energy difference is only 263 kWh/year or $2.77/month.

As leaders in energy efficiency and active participants in efficiency matters before the U.S. Department of Energy, AHAM is opposed the bill's language authorizing the Maryland Energy Administration to adopt rules to enforce minimum efficiency standards for certain products and establish or amend appliance efficiency standards. Under federal law, manufacturers have three years to comply with regulations, which allows for redesign, retooling of factories, pilot product testing, safety testing, and many other requirements to ensure the product is ready for the market. Technical standards such as these are very costly to develop and the Maryland legislature should consider whether it is economically feasible for the Energy Administration to absorb these costs.

Conclusion

AHAM appreciates the opportunity to provide comments on SB 418 and strongly urges the Economic Matters Committee to oppose the bill. The goal of saving energy is important but should not be considered irrespective of other consequences, such as impacts to healthy indoor air quality and the products' availability to lower income and disadvantaged populations. AHAM strongly urges you to reconsider this bill for the reasons set forth in this testimony. For future reference, my contact information is (202) 202.872.5955 x327 or via electronic mail at jcassady@aham.org.

Report to
California Energy Commission

Analysis
of
Energy Efficiency of
Room Air Cleaners

Prepared by:

The Association of
Home Appliance
Manufacturers

August 9, 2004

Wayne Morris

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I. Summary

The Association of Home Appliance Manufacturers (AHAM) represents the manufacturers of portable air cleaners sold in the United States. AHAM is the author of the American National Standard for measuring the performance of portable air cleaners with respect to pollutant particle removal. AHAM administers a third party testing program to verify the performance rating of products produced by participating companies and a proprietary market statistics program which tracks factory shipments of portable air cleaners for the U.S. market.

AHAM was *not* asked by the California Energy Commission (CEC) to provide any of its expertise in the development of the staff report or consultant's report, which are the basis of the draft efficiency standards. We provide this analysis so that the Commission will have a more fact based depiction of the industry, the market segmentation, energy usages, technology situation, and consumer impact of the draft regulations.

The study produced for the Commission is in error in most of the key areas of focus relevant to determining whether efficiency standards are appropriate. This is due to the absence of accurate energy, market, manufacturing and consumer impact information.

- The contractor incorrectly assumed that saturation of air cleaners in households in California is above the national average. This is not confirmed by actual survey information. In fact, saturation of air cleaners in California is actually less than most areas of the U.S. and usage is less than many other areas of the U.S.

- The consultant suggested the use of a variation to the present test procedure for energy efficiency by suggesting the use of a measurement of wattage at an average of high and Low speeds. AHAM members believe that this is an inappropriate measurement. The U.S. National Standard for measuring performance of air cleaners, ANSI/AHAM AC-1-2003, calls for testing of performance at high speed only. This standard has been subjected to the ANSI peer-review process, known as the Canvas Method for standards development. Testing of unit performance at speeds other than high speed is unnecessary and unduly burdensome. It is estimated that it would cost the industry over $1 million to measure performance additionally at low speed. The federal test procedure for room air conditioners provides an excellent approach for addressing portable air cleaners. In this program consumers operate the product at speeds other than "high" setting, but all energy efficiency measurements are taken at high speed only.

- The consultant has incorrectly estimated the design life of these appliances. The actual design life is considerably less, which becomes important in calculating the payback to the citizens of California.

- The consultant states in the draft analysis that it could not find a relationship between retail price and energy efficiency. Based on the AHAM review of 73 basic energy models of room air cleaners, we believe the relationship is defined and quite evident.

- The consultant states that the difference between a lower energy efficient air cleaner and a more energy efficient model with the ability to meet the suggested energy standard is the use of a capacitor-start motor. This suggestion is not supported by the facts provided by product manufacturers.

- The data presented by AHAM shows that instituting an energy efficiency standard at or near 2.1 CADR/Watt high could destroy the retail price points for units at <$50 and at $50-100. This is likely to have a profound effect on consumers who depend on the availability of smaller air cleaners, with lower CADR values, for smaller rooms. This may be especially true for those consumers who are at fixed incomes or who are economically disadvantaged.

- Most of the models the consultant surveyed were above $200 retail price point, which were then used to make assumptions about all air cleaners. This extrapolation cannot be relied upon as accurate since the real market for these products indicates the majority of price points and units shipped are below this price point.

- The data clearly shows that with the cost impact of the new standards level, the payback to the consumer in California is well beyond the life-span of the unit, and in many cases well beyond even the 8 years that the consultant chose to measure payback against.

- The impact on energy in California is considerably less than predicted. The first year statewide energy savings is actually 11.4 GWh not the 22 estimated by the consultant. In addition, the first year peak demand savings is 1.3 MW not the 4 estimated by the consultant.

- The Net Present Value is a number that evaluates whether a consumer will benefit from a new energy standard. Specifically, it identifies whether the energy savings of an efficiency regulation are larger than the increased price of the product resulting from the new standard. A negative number signifies that consumers would pay more for the product than they would save in energy over the life of the product. In this case, the Net Present Value for each of the 5 retail price points is a **negative number**. Under a U.S. Department of Energy rulemaking, this fact alone would be enough to disqualify the proposal from being enacted as it would not be considered economically justified.

In all measurements above it is clear that the consumers in California would lose significantly if energy efficiency standards for portable room air cleaners are promulgated as suggested by the CEC.

By choosing to promulgate energy efficiency standards, the CEC is needlessly jumping the gun when a market-based approach could have greater market impact, such as the U.S. EPA Energy Star program.

II. Introduction

The AHAM represents the manufacturers of portable air cleaners. AHAM was not contacted prior to the release of the "Draft Analysis of Standards Options for Portable Room Air Cleaners" as written by Davis Energy Group for Pacific Gas & Electric and the CEC ("Draft Analysis"). The Draft Analysis contains many serious errors which could have been avoided if the CEC had contacted AHAM.

In June-July 2004, AHAM undertook energy and cost analysis of the portable room air cleaner market. AHAM surveyed 15 major manufacturers of air cleaners, representing over 120 basic model units. These 120 basic model units represent over 200 models at retail. Typically, a cost and energy analysis by one of AHAM's product councils will take from 4 to 6 months. In order to comply with the request from the CEC from the CEC, AHAM conducted this analysis in approximately 8 weeks. While this analysis represents most, but not all, portable air cleaners, AHAM has made a good-faith effort to ascertain data on a wide variety of units in the marketplace. We present these findings to the CEC in hopes that with actual facts, the CEC may be able to make a proper decision on the need for energy efficiency standards for portable room air cleaners.

III. Product Description

AHAM has over 25 years of experience with portable room air cleaners. The product is a device that is designed to be moved from room to room, connected to the main electric source, and to remove substances from the air.

The term "portable air cleaner" represents many different types of air cleaning technology. Some units are fan and filter based air cleaners. These units utilize a motor, fan, and filter assembly to trap particulate materials from the air stream. The filters used in most portable fan and filter air cleaners vary from light non-woven materials to woven materials to paper based materials and finally, high Efficiency Particle Absorption (HEPA) media, which is designed to trap 99.97% of all particles 0.3 microns or greater.

Many filtration type air cleaners will use the addition of an ionizer to enhance performance. This ionizer unit uses additional energy by charging the airstream either before the filter or after to impart an electrical charge to particles which will then be attracted to the opposite charge on a treated and charged filter media.

Other types of air cleaners may use an electrostatic precipitator design to achieve particle reduction. In this type of air cleaner, air is forced between a highly electrically charged series of metal grids. As they pass through the grids, the particles are first charged and then attracted to the set of plates with the opposite charge. While this type of air cleaner does not typically have a filter media, it attracts the particles to the plates within the air cleaner, and these plates can be cleaned periodically.

Ionization air cleaners are ones in which the ionization charge is emitted to the airstream or environment around the air cleaner. They may use a set of plates or rely on the room surfaces with opposite charges to act as the repository for the particles. While ionization air cleaners may not have filtration media, they use other means to attract and hold particles.

Removal of particles from a room environment is not dependent upon one type of air cleaner. The performance of all types of air cleaners can be measured using the American National Standards Institute (ANSI)/AHAM standard AC-1-2003. AC-1 provides a uniform method of test for measuring the performance of room air cleaners in terms of Clean Air Delivery Rate (CADR). This is the U.S. national standard for measurement of portable air cleaner performance and has been used since 1989. AHAM sponsors a certification program for portable room air cleaners that includes testing to ANSI/AHAM AC-1 specifications and verification through follow-up selection and periodic testing of production to assure that the performance remains the same as published in the quarterly directories. This program is open to AHAM members and non-members alike.

ANSI/AHAM AC-1-2003 calls for testing of performance at high speed only. This standard has been subjected to the ANSI peer-review process, known as the Canvas Method for standards development. Testing of unit performance at speeds other than high speed is unnecessary and unduly burdensome. Ratings at high speed are sufficient, as is the case with other multi-speed appliances, such as room air conditioners. Appliances are typically optimized at maximum speed. Different manufacturers use lower speeds or medium speeds based on a number of factors (i.e. sound/noise, size of units to room size, velocity of air, comfort to the person, air flow and direction). As the relationship between high speed and low speed is not the same from model to model, it is not appropriate to measure performance other than at high speed. It is estimated that it would cost the industry over $1 million to measure performance at low speed too, as proposed by CEC.

One of the most important features of the Air Cleaner Certification Program has been the correlation of CADR to the appropriate room size. By using a table, consumers can use the CADR measurement to choose the air cleaner most appropriate for their situation. This program also enhances energy efficiency programs by giving consumers information on performance and room size, and by discouraging “over purchasing”, or the purchasing of air cleaners too large for the room in which they are used. Conversely, any movement to remove certain price segments from the marketplace could have that very effect and encourage consumers to purchase large, more energy-consuming air cleaners for small or medium size rooms.

IV. Air Cleaner Market

AHAM conducts factory shipment statistics for the portable air cleaner business on a monthly basis, and has done so for more than 12 years. The AHAM Business Data Program makes this information available to member companies on a monthly basis but this information is not available to the general public. AHAM has offered to release the shipment data for the last 2

years to CEC on a confidential/proprietary basis. This information shows that the assumption Davis Energy Group has made is in error and significantly overestimates the shipments in the U.S. per year.

A. Ownership

According to the 2000 Census, there are 11.5 million households in California. According to survey data, ownership of air cleaners is about 14% in the Western census region, which equates to approximately 1.6 million households in California owning at least one air cleaner.

B. Segmentation

The air cleaner market extends from a number of small portable air cleaners used in small rooms or areas, to air cleaners which function in large rooms or areas. In addition, according to trade publications, it extends from price segments below $50 to units above $200. While there may not be exact segments between the two, for purposes of this energy and cost exercise, AHAM has chosen to develop information on 5 retail price point segments: Under $50, $50-100, $100-150, $150-200, and over $200. We will report on the energy usage, efficiency and cost to achieve the CEC proposed efficiency levels at each of these retail price points and at the Shipment Weighted Average (SWA), in some cases, of the 5 segments. AHAM members believe that it is important to consider the impact of such energy efficiency standards on air cleaners at different retail price points independently, as they represent segments of different performance, different market segments of the population, and different reasons for purchase. Any action by CEC to invoke energy efficiency standards will have an impact on air cleaners at different performance and different retail price segments. It will likely also have an effect on the ability of consumers to choose an air cleaner that fits their needs.

We do not know the source of market penetration of high efficiency options on page 3 of the consultant's paper, and no source is cited. We will make available information on the percentage of market at each of the 5 retail price point segments, based on a recent survey of AHAM members.

V. Saturation and Usage

In addition, AHAM and its members have access to saturation data based on recent surveys of consumers across the U.S. The contractor incorrectly assumed that saturation of air cleaners in households in California is above the national average. This is not confirmed by actual survey information. In fact, saturation of air cleaners in California is actually less than most areas of the U.S. and usage is less than many other areas of the U.S. Not only does AHAM have access to accurate survey data on usage and saturation, but this information is broken into 4 U.S. geographic regions. Therefore, AHAM has access to data that is more appropriate to the situation in California than "national" data.

From an NFO Worldwide survey of owners of air cleaner, we know that in the Western U.S., 70.7% of consumers owning air cleaners own 1 air cleaner and 29.3% own more than one. While we do not know how many consumers may own 2 or more than 2 air cleaners, for purposes of this survey, we will consider the more than 1 air cleaner to be 2 units. Thus, the factor per household is 1.293. Knowing that there are approximately 1.61 million households with air cleaners in California, this represents a field of approximately 2.082 million units. A different confidential saturation survey data for the Western U.S suggests a penetration of 11.6% and with 74.7% owning one air cleaner and 25.3% owning more than one. This survey would result in 1.672 million air cleaners in use in California. Because of the diversity of these two numbers, we will report on the impact on California energy using both a "high" field estimate and a "low" field estimate.

AHAM has conducted an in-depth survey of energy data on 73 basic models of air cleaners across all 5 of the retail price segments. AHAM has data on the approximate number of units shipped, amperage, wattage, CADR, and energy efficiency of each of these units. This survey represents a considerably more accurate database than the hand-selected sample the consultant conducted and involves actual energy measurements. In addition, because of multiple derivative models off the basic model platform, this survey represents over 100 actual models of portable room air cleaners in the marketplace.

Current/Wattage. From survey of the 73 basic models, we know that the approximate average high speed represents 104 Watts. We know that the approximate average low speed represents 54.7 Watts. And, we know that the approximate average medium speed represents 79.3 Watts. In addition, for those air cleaners that use an "automatic" setting the approximate energy use is 78 Watts.

Speeds. From the regional breakdown of data, we know that 12.7% of people in the West region use air cleaners on "high" setting; 35.6% of people in the West use air cleaners on low; 42% use air cleaners on medium; and we know that 10% of people in the West use air cleaners on "auto" setting. The weighted average is 0.608 amps x 120 Volts equals 73.01 Watts, or 0.07301 Kilowatts per unit.

Daily usage. The regional data also shows that 29% of people in the West use air cleaners 24 hours a day; 25% use air cleaners 1-4 hours a day; 25% of people use air cleaners 5-8 hours a day; and 20.4% of people use air cleaners from 9-23 hours a day. The daily weighted factor is 0.5183 or about 12.5 hours a day.

Seasonality. The census region data also shows that 71% of families in the West region use air cleaners year around while 29% use them only in allergy season.

- Of families that use them year around, 67% of the families in the West use them every day; 8.7% use them 5-7 days a week; 11.2% use them 3-4 days a week; 4.7% use them 1-2 days a week; 7% use them once or less than once per week. The combined average is 297 days per year multiplied by 71% of population in West that use them year around equals 211 days per year.

- Of the families in the West that use air cleaners seasonally, the average is 5 months. Of these 29% use them every day; 15.9% use them 5-7 days per week; 17% use them 3-4 days per week; 8.3% use them 1-2 days per week; and, 29.8% use them once or less than once per week. The combined average is 83.7 days per year multiplied by 29% of population in the West using them seasonally equals 24 days per year.

Add the two and it gives 235 days per year multiplied by 24 hours per day equals 5640 hours multiplied by the 0.5183 factor for hours per day equals about 2921 hours per year.

This information is considerably different from that of the consultant, but represents far more accurate data.

VI. Savings Potential

A. Baseline Energy Use

AHAM surveyed all of its member companies in the Air Cleaner category and developed a database of 73 units, in each of the 5 retail price segments, and with full information on energy usage, efficiency, CADR performance, usage data, etc. This represents a fact-based description of the energy usage of these products as opposed to the consultant's estimate which was based on an article in a magazine.

The consultant describes wattage ranges on high speed from 68 to 264 watts, and on low speed from 15 to 180 watts. The AHAM survey of units shows this data to be inaccurate. The actual range of wattage on high speed is 30 to 200 Watts, and on low speed from 13-113 Watts, as shown in Table 1 (SWA = shipment weighted average).

Table 1.

Retail Price-Points	SWA Wattage Low	SWA Wattage High	SWA CADR/Watt
<$50	30.7	52.9	1.105
$50-100	35.7	63.8	1.344
$100-150	53.2	102.1	1.457
$150-200	64.9	138.7	1.781
>$200	61.2	128.1	2.215

B. Energy Efficiency Measurement

The U.S. Environmental Protection Agency (EPA) Energy Star Program has recently concluded a year-long study on an Energy Star Program for room air cleaners. The Program was just recently announced and began a few weeks ago. The Program utilizes the CADR measurement of performance according to ANSI/AHAM AC-1-2003 as the basis and wattage on high speed. This is a prudent approach. EPA has just set the Energy Star level for room air cleaners at 2.0 CADR/Watt to represent the top 25% of the industry.

The consultant to the CEC has suggested an aberration of the present test procedure for energy efficiency, by suggesting the use of a measurement of wattage at an average of high and Low speeds. AHAM members believe that this is an inappropriate measurement. As stated before, one of the most import features of a test procedure is to be able to have all units tested the same and be able to compare results. The setting of a "low speed" is dependent upon many items and will not be the same percentage relationship to high speed in all air cleaners.

Currently there are many energy efficiency programs overseen by both the CEC and the U.S. Department of Energy. In many cases, the products are used at different speeds, under different usage patterns, at different times, and with different current draws operating different features. However, none of these programs suggest a measurement of anything other than the current and wattage at high speed.

The federal test procedure for room air conditioners provides an excellent approach for addressing portable air cleaners. In this program too, consumers operate the product at speeds other than "high" setting, but all energy efficiency measurements are taken at high speed only. Measurement and reporting of performance and standards setting at other speeds would result in significant and costly modifications to the current test procedures for determining portable air cleaner performance and would not provide a more effective measure of energy usage.

Because of this disparity and extremely large range in the setting of low to high speed, among many other issues, it is not appropriate to measure energy efficiency at CADR per Watts averaged between low speed and high speed.

Because of the need to preserve integrity in the measurement protocol, AHAM has chosen to convert the proposed CEC standard of 2.7 CADR/Watt average to a similar value when measured at CADR/Watt on high speed only. AHAM first conducted a two-week evaluation of all air cleaners in the AHAM program together with information on the performance (CADR) and wattage measurements at high, Low and Medium speeds. The formulas were then compared. While it is not possible to make an exact conversion, we believe that the value that comes closest is **2.1 CADR/Watt** based on high speed watts and is relatively equivalent to 2.7 CADR/Watt when using the average watts of high and low speeds. For purposes of the cost and energy efficiency evaluations AHAM has chosen 2.1 CADR/Watt (high speed only) as the standard case.

C. Life-Span of Room Air Cleaners

It is difficult to accurately predict the exact life-span of a portable room air cleaner. There are many factors involved in the design of the product, many components that can affect the life-span, differences in consumer use/abuse, and hours of operation. Nevertheless, using the average hours per year of use shown above (i.e. 2,921), AHAM surveyed its members to determine approximate years of design life.

While we have no information to suggest that usage differs between the five price point categories shown above, we do believe consumers will select and use air cleaners according to the different room sizes in which they are used. This could influence usage. While manufacturers attempt to give consumers the highest value for the retail price of a unit, there are some differences in components between lower retail price point units and higher retail price points. The results of the life-span survey are shown below in Table 2.

Table 2.

	Retail Price Points				
	<$50	$50-100	$100-150	$150-200	*>$200*
Design Life in Years	*4.0*	*4.2*	*5.0*	*5.2*	*5.7*

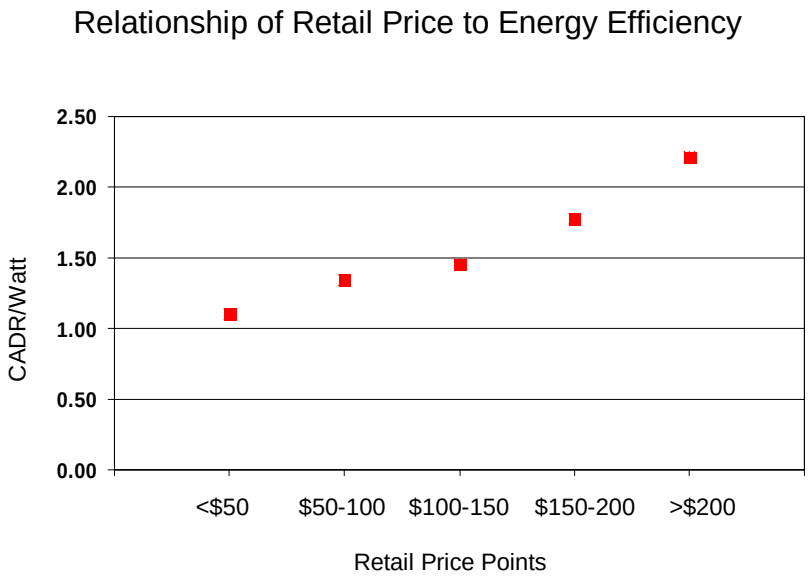
As shown, this deviates significantly from the estimate used by CEC that the average life-span is 8 years.

In addition, data from the NFO survey of Air Cleaner ownership shows that 93% of households in the Western US have owned their air cleaners 6 years or less.

D. Relationship between Retail Price and Energy Efficiency

The consultant stated that it could not find a relationship between retail price and energy efficiency. Based on the AHAM review of 73 basic energy models of room air cleaners, we believe the relationship is defined and quite evident. See Figure 1 for shipment weighted average of efficiency of today's air cleaners.

Figure 1.



VII. Cost Impact of New Standard Level

A. Comparison of Manufacturer's Cost and Retail Price

AHAM does not have specific data on the relationship between manufacturer's U.S. cost and the retail price of room air cleaners. A paper was written for the U.S. Department of Energy by Arthur D. Little Consulting in 2000 for the Government Regulatory Impact Model (GRIM) analysis for the standards setting rulemaking of clothes washers. This paper gives information on the add-on between manufacturer's cost and retail price to the consumer. While this factor was not developed for this product category and is known to underestimate the relationship between manufacturer costs and total add-on, it is nevertheless the only published factor to our knowledge and does provide a uniform benchmark to compare current and future costs related to the suggested energy standard. Based on this factor, we offer this analysis.

Table 3.

Manufacturer's Cost	Manufacturer's Add-on	Retail Add-on	Tax Add-on	Total Add-on Factor
X	1.35x	1.40x	1.052x	1.99x

Source: Arthur D. Little GRIM Analysis, Chapter 6, "Mark-ups for Price Determination," Federal Register Notice, Volume 65, No. 194, October 5, 2000.

B. Cost Per Unit

As with any proposed energy standard, there is a cost. The consultant makes a suggestion that the difference between a lower energy efficient air cleaner and a more energy efficient model with the ability to meet the suggested energy standard is the use of a capacitor-start motor. This suggestion is not supported by the facts provided by product manufacturers. As manufacturers told the CEC at the May 2004 hearing, many of the models currently on the market use a capacitor-start motor and still do not meet the proposed standard level.

Based on manufacturers' data, Table 4 shows the added cost, and corresponding retail price, to bring units from the current baseline efficiency shown in Table 1 to the standard of 2.1 CADR/Watt. The full impact of the standard is only partially shown by the calculation of the manufacturer's cost and retail price. This will be discussed in Section IX.

Table 4.

	Percentage of Market	SWA Current Mfrs. Cost ($)	SWA Current Retail Price @ 1.99 ($)	SWA New Standard Mfrs. Cost ($)	SWA New Retail Price @ 1.99 ($)	Difference In Retail Price ($)	**Percentage Increase Retail Price (%)**
<$50	18.5%	$15.83	$31.50	$37.85	$75.32	$43.82	**139.1%**
$50-100	21.66%	$24.51	$48.77	$52.27	$104.02	$55.24	**113.3%**
$100-150	32.70%	$33.90	$67.46	$59.76	$118.92	$51.46	**76.3%**
$150-200	21.83%	$51.84	$103.16	$87.00	$173.13	$69.97	**67.8%**
>$200	5.94%	$62.64	$124.65	$104.43	$207.82	$83.16	**66.7%**

It is important to mention that even though the shipment weighted average of the current efficiency (CADR/Watt) for the "Over $200" price point units is above the suggested standard level (see Table 1), the cost increase is significant for those manufacturers currently not meeting the new level of 2.1. Thus, the shipment weighted average of the cost and calculated retail price increase is shown above for this category.

As with any approximation of a factor between manufacturer's cost and retail price, there are situations that do not fit exactly. This is evidenced by the fact that by using this factor, the price points for what exists today would be significantly below the actual price point in which these units are currently sold. This could mean that the 1.99 factor is too low to account for this product and market. However, by using a factor that is higher and likely more appropriate to this product category, the calculated payback would be longer and consumer net present value even a larger negative number. It is even more clear that by instituting an energy efficiency standard at or near 2.1 CADR/Watt high, would likely destroy the retail price points for units at <$50 and at $50-100. This is likely to have a profound effect on consumers who depend on the availability of smaller air cleaners, with lower CADR values, for smaller rooms. This may be especially true for those consumers who are at fixed incomes or who are economically disadvantaged. As mentioned above the 1.99 factor developed by A.D. Little, while perhaps underestimating the true markups, nevertheless provides a uniform factor for understanding the impact of the suggested standard on the market.

C. Saving Potential

AHAM conducted a preliminary evaluation of the cost of energy efficiency standards at the proposed standard level of 2.1 CADR/Watt high (which we have explained is approximately equal to the level CEC has proposed at 2.7 CADR/Watt average at high and low speeds). The consultant to CEC used a simple telephone survey on a few models of air cleaners and made approximations of the energy efficiency levels.

Most of the models the consultant surveyed were above $200 retail price point, which were then used to make assumptions about all air cleaners. This extrapolation cannot be relied upon as accurate since the real market for these products indicates the majority of price points and units shipped are below the price point used in the consultant's analysis.

As shown below, the baseline energy usage of today's air cleaners is not 305 kWh/year as estimated but rather (based on the retail price points of the units) is between 115 and 273 kWh/unit. The table below shows the current Shipment Weighted Average of current energy use and that of units meeting the proposed 2.1 CADR/Watt energy standard.

Table 5.

	Current SWA Annual Unit Energy Use (kWh/yr)	Current SWA Annual Energy Cost (@$0.115 Per kWh)	New SWA Annual Unit Energy Use (kWh/yr)	New SWA Annual Energy Cost (@$0.115 per kWh)	Difference Energy Use (kWh/yr)	Difference Energy Cost ($)
<$50	115	$13.19	59.81	$6.88	54.85	$6.31
$50-100	136	$15.66	89.28	$10.27	46.92	$5.40
$100-150	210	$24.21	143.53	$16.51	66.95	$7.70
$150-200	273	$31.36	203.85	$23.44	68.10	$7.91
>$200	253	$29.08	183.64	$21.12	69.25	$7.96

As this chart makes clear, there is energy to be saved if the minimum energy efficiency of air cleaners were raised to a 2.1 CADR/Watt level. However, the savings per year is a few dollars even at the average utility cost rates that are available in some parts of California ($0.115/kWh).

Based on a shipment weighted average of all of the 5 retail price point categories, the difference in energy is 61.3 kWh and the difference in energy cost savings is $7.05. And, the range is from a low of $5.40 per year to a high of $7.96.

D. Payback

The most important element in this section is the simple payback at each of the retail price points based on the difference in retail price (as shown in Table 4) divided by the difference in annual energy cost (as shown in Table 5). The results are shown in Table 6, compared to the average life span of units in each price range.

Table 6.

	Average Life-Span of Unit (years)	Simple Payback at 2.1 CADR/Watt (years)
<$50	4.00	7
$50-100	4.20	10.2
$100-150	5.00	6.7
$150-200	5.20	8.8
>$200	5.70	10.4

It is clear that with the cost impact of the new standards level, the payback to the consumer in California is well beyond the life-span of the unit, and in many cases well beyond even the 8 years chosen by the consultant to measure payback.

E. Impact on California

Table 7.

Retail Price Points	Per Unit Annual Savings (kWh)	First Year Statewide Savings (GWh)	First Year Peak Demand Savings (MW)
<$50	54.85	1.948	0.222
$50-100	46.92	1.951	0.222
$100-150	66.95	4.203	0.479
$150-200	68.10	2.884	0.329
>$200	69.25	0.79	0.090
Total		11.7	1.3

As is shown by Table 7 above, the first year statewide energy savings is actually 11.7 GWh not the 22 estimated by the consultant. In addition, the first year peak demand savings is 1.3 MW not the 4 estimated by the consultant.

The full replacement statewide annual energy savings and full replacement peak demand savings are both dependent upon the size of the field of units in California. As we discussed above in Section IV, the size of field can be estimated using information available to us from more than one source. Rather than average the data, we present the impact on annual savings and peak demand at full replacement based on both the “high” field estimate and “low” field estimate.

Table 8.

	Full Replacement Statewide Annual Savings at "low" field estimate (GWh)	Full Replacement Statewide Annual Savings at "high" field estimate (GWh)	Full Replacement Peak Demand Savings at "low" field estimate (MW)	Full Replacement Peak Demand Savings at "high" field estimate (MW)
<$50	16.97	21.13	1.92	2.39
$50-100	16.99	21.16	1.92	2.39
$100-150	36.60	45.58	4.13	5.15
$150-200	25.12	31.27	2.84	3.53
>$200	6.88	8.56	0.78	0.97
Total	104.23	129.79	11.58	14.42

Contrast this with the consultant's estimates of a full replacement statewide savings of 187 GWh and full replacement statewide peak demand savings of 32 MW. Again, we find the consultant estimates to be overstated.

VIII. Economic Analysis

A. Life Cycle Cost

Based on the information provided by the manufacturers and expected life-span, we have calculated the consumer net present value. See Table 9.

Table 9.

Retail Price Points	Design Life (years)	Annual Unit Energy Savings (kWh)	SWA[1] Present Value of Energy Savings ($)	Difference in Retail Price, Current v. New Std. ($)	Customer Net Present Value ($)
<$50	4.0	54.85	$21.37	$43.82	-$22.45
$50-100	4.2	46.92	$19.07	$55.24	-$36.18
$100-150	5.0	66.95	$31.57	$51.46	-$19.89
$150-200	5.2	68.81	$33.53	$69.97	-$36.44
>$200	5.7	69.25	$36.41	$83.16	-$46.76

[1]Net present value of annual energy savings is calculated over the expected design life, discounted at 7%.

The Net Present Value is a means of determining if the energy cost savings of a regulation are more than the increased price of the product resulting from the regulation. A negative number signifies that consumers would pay more for the product than they would save in energy over the life of the product. In this case, the Net Present Value for each of the 5 retail price points is a **negative number**. This fact alone would be enough to disqualify the proposal from being considered under a U.S. Department of Energy rulemaking, as it does not pass the requirement of being economically justified.

IX. Consumer and Industry Impact

A. Consumer Impact

In all measurements above it is clear that the consumers in California would not benefit if energy efficiency standards for portable room air cleaners are promulgated as suggested by the CEC.

The promulgation of such a standard would also have an impact on the marketplace and availability of needed technologies in improving indoor air quality for the citizens of California. At the same time that the California Air Resources Board (ARB) is calling for better measures to mitigate indoor air quality issues the CEC could inadvertently promulgate regulations to remove affordable technologies for many consumers to improve indoor air quality.

In testimony before the CEC, manufacturers have stated that the real impact of a rulemaking may be to deny these products to consumers who need them most. According to data from the US Environmental Protection Agency study on children's health, the manufacturers noted that asthma and chronic allergic reactions are higher among the lower socioeconomic groups. By increasing the cost of smaller units with lower retail price points by $45 to $55, this action may take these units out of the buying potential of many families.

B. Energy Star

By choosing to promulgate energy efficiency standards, the CEC is needlessly jumping the gun and preempting a market based approach which could have greater impact, namely the U.S. EPA Energy Star Program. Indeed, by choosing a minimum energy efficiency standard above that of the EPA Energy Star Program (2.0 CADR/Watt), the CEC seems to be choosing to either ignore or attempting to usurp the Energy Star program.

C. Industry Impacts

The impact on the air cleaner industry will be significant with any state energy efficiency mandatory regulation. Manufacturers are under increasing pressure to increase the value of products to consumers. This has often resulted in the pressure to reduce manufacturing costs. This has resulted in the movement of most manufacturing facilities to locations outside the United States. Any actions by the CEC could result in further pressures to reduce what available U.S. manufacturing there is in the air cleaner market.

Instead of allowing manufacturers to focus on improvements to product design, features, and performance, the suggested energy standards for portable air cleaners would require manufacturers to focus on energy efficiency in segments where there is little payback to consumers and in fact, the net present value to consumers is negative.

X. Recommendations

The recommendations of AHAM to the CEC are as follows:

1. The rulemaking should not proceed until CEC thoroughly reviews these and other data.

2. The CEC should work WITH market based programs such as the AHAM CADR Certification Program and the U.S. EPA Energy Star Program to find a more cost effective method for evaluating the energy consumption of portable air cleaners.