2008 California Energy Commission Title 24 Building Energy Efficiency Standards
November 16, 2007

Draft Report
Revise Default EER in ACM

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Overview

The updated Federal appliance efficiency standards require that single phase central air conditioners and heat pumps manufactured after January 23, 2006 with a cooling capacity less than 65,000 Btu/h have a seasonal energy efficiency ratio (SEER) of no less than 13. The SEER rating is the result of three tests at 82°F ambient air temperature and includes the effect of cycling. The SEER rating is representative of air conditioning conditions in the humid eastern part of the United States, but is less representative of the relatively hotter and dryer conditions found in the California Desert and Central Valley.

When air conditioners are tested for their nominal capacity they are tested at 95°F ambient temperatures. Cooling capacity and energy consumption measured during this test can be combined into an EER rating. which is a "ratio calculated by dividing the cooling capacity in Btu/h by the power input in Watts at any given set of rating conditions, expressed in Btu/h/W." The EER rating conditions are more representative of hotter portions of the state and during times of statewide peak electrical system demand.

Both the EER and SEER ratings are standardized by the Air-conditioning and Refrigeration Institute (ARI). Manufacturers are only required to label their equipment with the SEER rating. Due to Federal preemption provisions in the National Appliance Energy Conservation Act (NAECA)[1] states cannot require higher equipment efficiencies or regulate the sale of equipment based on a test method other than that for SEER. Thus the sales of air conditioners cannot be restricted based on the EER rating.

However, the Alternative Compliance Method (ACM) Manual does allow one to submit HERS (home energy rating service – independent site inspections) verified EER rating data to obtain a compliance credit under the performance method. The performance method uses a building simulation computer program to evaluate the trade-offs between energy efficiency measures – the efficiency in one component can be reduced if it is offset by efficiency improvements in another component. When a HERS verified EER rating is entered into the compliance software, the temperature dependent air conditioner efficiency curves are modified to account for the EER rating at 95°F and the SEER rating at 82°F and interpolated between these rating points at intermediate temperatures.

The current ACM assumes that the base case or "standard design" SEER 13 air conditioner has an EER of 10. The Heschong Mahone Group, on behalf of PG&E, has conducted interviews with large mechanical equipment distributors and has found out that of all the SEER 13 equipment being sold by these distributors the EER ratings are between EER 11 and EER 11.5. These distributors are selling approximately 100,000 SEER 13 units statewide. Thus by setting the standard design EER to 10, the California Energy Commission, is giving a 10% credit on high temperature operation to those air conditioners with standard or non-premium EERs.

Thus the current approach to EER is creating a loophole in the standard where compliance credit is given for a standard efficiency air conditioner. In the hottest climates where the impact is the largest, a minimally compliant home would receive a 7% compliance credit. This credit allows permit applicants to lower the efficiency of other building components. If only 10% of new homes are taking advantage of this loophole, the impact on the state is approximately **1.6 GWh/yr** and **3.7 MW** peak demand for the life of each year's new homes. Thus at the end of 10 years, this simple change to the ACM would reduce electricity consumption by 16 GWh/yr and reduce peak demand by about 37 MW.

We recommend that the standard design EER for a SEER 13 air conditioner be raised to the lesser of the proposed design EER and EER 11. This change would give credit to air conditioners with premium high temperature efficiency such as EER 11.5 and EER 12 air conditioners but would not give credit to air conditioners with standard levels of EER. This proposal would not penalize any air conditioner but only give credit to high performers.

[1] USC42 Sec. 6297. "Effect on other law"

Description

This report proposes to update the default EER calculation for equipment with SEER rating in Residential and Nonresidential Alternative Calculation Manual from the current default EER 10 for SEER 13 equipment to EER 11. This increased default EER value would not prohibit the use of any air conditioner; it would however eliminate the performance credit for air conditioners with standard levels of high temperature efficiency.

Energy Benefits

The energy benefit from this measure is that it would close a loophole in the ACM so that the credit associated with EER reflects the real savings associated with installing an air conditioner with premium high temperature performance and that there not be credit for installing a standard performance air conditioner.. Since the performance approach allows trade-offs between building components, this unearned or excessive credit results in energy loss as this credit is used to reduce the energy efficiency of the remainder of the building components which may last 30 years or longer.

Non-energy Benefits

Since this affects the wide range of measures this can impact the non-energy benefits of a more comfortable home with less radiant losses, less drafts and better performing equipment. Since this measure would reduce an excessively high peak demand base case, to the extent that selection of final measures reflects this high peak demand base case, there are electrical system reliability benefits.

Statewide Energy Impacts

A detailed analysis found that the first year's implementation of the proposed changed would reduce electricity energy consumption by 1.56 Gigawatt/hr per year, and reduce electrical demand coincident with utility system peak by 3.7 Megawatts. This conservative analysis was based on the assumption of only 10% of new homes taking advantage of the EER credit afforded by a HERS inspection of the EER rating. This assumption is doubly conservative as it assumes that this 10% fraction is evenly spread across the state rather than the EER credit being taken advantage of more frequently in those climates where the credit is greatest. The savings calculated here is for residential construction only. Some small commercial construction which uses single phase air conditioners would also be affected – the savings from this building sector is also not calculated here. Thus the savings estimate is extremely conservative.

The discounted present valued energy cost savings after applying this conservative estimate (3% discount rate, 30 year period) is $8.4 Million for one year's new construction. After 10 years of this code measure the savings would be approximately tenfold or about $83.7 Million of energy cost savings that accrue over the life of these buildings.

Table 1: Statewide Energy, Demand and Present Valued Energy Cost Savigns

Savings from 11 EER Baseline	Energy Savings (MWh/yr)	Demand Savings (MW)	PV 30 yr Cost Savings (PV$ Millions)
First year savings	1,565	3.7	$8.4
10th year savings	15,648	37.1	$83.7

This estimate was based upon a energy simulation modeling of prototypical single family and multifamily dwelling units with all of the 2008 Title 24 proposed energy efficiency measures already applied to the standard design building and expanded up to the population of one year's new construction which is estimated to be 300 Million square feet per year for all residential building types. See the Results section of this report for a detailed description of how the statewide energy impacts were calculated.

Environmental Impact

The emissions impacts are calculated by multiplying the change in statewide electricity and natural gas consumption by the respective emissions factor values generated by the California Energy Commission for evaluating the environmental impacts of the 2005 standards as shown in Table 2 below.[2]

Table 2:Emissions Factors used to calculate the air emissions reductions resulting from end-use reductions in electricity and natural gas consumption

Emissions factors	NOx	CO	CO_2	PM10
Natural Gas, California (lbs/MMBtu)	0.094	0.03	115	0.01
Electricity, Western States (lbs/MWh)	0.383	0.23	1200	0.06

Given the electricity savings of 1,565 MWh/yr for each year's of new residential construction, the first year's savings and the tenth year emissions savings are given in the table below.

Table 3:Air emissions reductions resulting from reduced electricity consumption

Savings from 11 EER Baseline	Energy Savings (MWh/yr)	NOx (lbs/yr)	CO (lbs/yr)	CO_2 (tons/yr)	PM10 (lbs/yr)
First year savings	1,565	599	360	939	94
10th year savings	15,648	5,993	3,599	9,389	939

Type of Change

The proposed change would modify the Nonresidential and Residential Alternative Calculation Manual on the default EER values used to determine equipment effectiveness. The current calculation methodology gives credit for unit with EER values over 10, resulting in at least 10% air conditioning credit for typical air conditioning performance. The proposed change recommends the EER used for calculating the energy consumption of a SEER rated standard central air conditioner shall be the lesser of the EER rating of the air conditioner used in the proposed design or the default EER calculated in Equation R4-41 for the SEER value meeting the Appliance Efficiency Regulations minimum requirements.

Technology Measures

Measure Availability and Cost

The changes proposed to the standard do not require the purchase of any technology beyond that which meets the prescriptive requirements of the standard. Thus there is no particular cost associated with this measure. The availability of measures that are required to meet the prescriptive standards has already been documented in the California energy standards or Federal appliance regulations proceedings.

Useful Life, Persistence and Maintenance

Not applicable.

[2] Table 1, Appendix B page 2, Initial Study/Proposed Negative Declaration for the 2005 Building Energy Efficiency Standards for Residential and Nonresidential Buildings September 2003 P400-03-018 http://www.energy.ca.gov/reports/2003-09-12_400-03-018.PDF Values provided by the CEC System Assessment and Facilities Siting Division.

Performance Verification

This proposal is not making any recommendations to change the current verification requirements for high EER equipment. Thus as is the current protocol, to claim a credit for installing high EER equipment, a HERS rater would verify the EER of the installed equipment

Cost Effectiveness

To the extent that the prescriptive requirements of the building efficiency standards are cost-effective, this measure is cost-effective. This measure would require that the credit due to EER improvements are equivalent to the energy savings that results from comparing the proposed EER to the EER of the majority of equipment sold. For SEER 13 equipment, the vast majority equipment sold is EER 11.

Analysis Tools

The energy savings from this measure are calculated by the existing algorithms described in the Alternative Compliance Method manual. The only change needed is to change the standard design default EER.

Relationship to Other Measures

Since this measure impacts the performance method, this measure impacts the trade-offs between measures. The impact that this change has on the baseline of comparison is dependent on climate. In the cool climate zones, there is no change to the baseline, and in the extremely hot climate zone 15 a 7% compliance margin due to EER would be eliminated

Methodology

For the proposed change, research surveys and analysis were conducted to determine the EER values of units available in the marketplace and sold in California. To determine the EER values of available manufactured units, the following data sources were used for the analysis:

- The ARI's Unitary Directory of Certified Product Performance for Air Conditioners and Air Conditioner Coils Single Package and Split Systems[3]: A listing of products that have underwent ARI certification process for product performance
- The California Energy Commission's Appliance Database[4]: A listing of all appliances currently certified to the California Energy Commission by their manufacturers as meeting currently-applicable efficiency standards.

In addition, a market survey of HVAC sales to better understand the distribution of EER's of SEER 13 products sold into the California market was conducted.

We interviewed some of the largest distributors and installers of air conditioners in California. Our sample group sells approximately 100,000 air conditioners per year. The respondents were asked to describe their largest selling SEER 13 products and for each product what fraction of SEER 13 sales did each product represent. We continued this line of questioning until they had described at least 80% of their SEER 13 sales.

[3] Air-Conditioning and Refrigeration Institute. "Unitary Directory of Certified Product Performance for Air Conditioners and Air Conditioner Coils Single Package and Split Systems." (2006). <http://www.aridirectory.org/ari/ac.php >. (Accessed 07 June, 2007)

[4] California Energy Commission. "Appliance Database." (June 7, 2007). < http://www.energy.ca.gov/appliances/appliance/ >. (Accessed 07 June, 2007)

The energy savings for the proposed change was calculated based on MicroPas energy simulations of single family and multifamily prototypical models that have included all of the proposed 2008 residential measures in the standards case model. The default EER for SEER 13 equipment was changed from EER 10 to EER 11 and the change in TDV kBtu compliance margin, kWh/sf and peak kW demand was calculated. Peak kW demand was calculated based on air conditioner sizing and a 65% diversity factor was applied.

The energy savings results were expanded to a statewide estimate of single family and multifamily new construction figures and modified by both the market saturation of central air conditioning by climate zone and an estimate of what fraction of new homes are receiving HERS ratings for air conditioner EER.

Results

Table 4 displays the results of an analysis of the ARI Product Directory and CEC Appliance Database which summarized the number of SEER 13 products listed in each source, the average EER found for all products, the minimum EER found for all products, and the maximum EER found for all products. It should be noted that for the CEC Appliance Database, the minimum EER is 10.5.

Table 4. EER Product Information for SEER 13 Air Conditioners

	Number of Products	Average EER	Minimum EER	Maximum EER
ARI Product Directory	33,534	11.1	6.8	13.0
CEC Appliance Database	721	11.5	10.5	12.7

Table 5 lists the number of products found between six EER value categories and the percentage of each category compared to the total number of products. For products with EER values under 10, the percentage of units falling under that category was minimal at less than 0.4%. For products with EER values under 10.6, the percentage of units falling under that category was less than 4% of the total products. About 90% of the products were found to have EER values between 11 and 13. The CEC and ARI databases may not agree about the exact distribution of EER's for SEER 13 equipment but both databases have very few models with and EER less than 11.0.

Table 5. EER Bin Data for SEER 13 Air Conditioners in CEC Appliance Database and the ARI Certified Product Performance database

EER Bin	CEC Count	CEC % of Total	CEC % Cumulative	ARI Count	ARI % of Total	ARI % Cumulative
Less than 10	0	0.0%	0.0%	148	0.4%	0.4%
10.0 to 10.5	14	1.9%	1.9%	1,141	3.4%	3.8%
10.6 to 10.9	62	8.6%	10.5%	1,997	6.0%	9.8%
11.0 to 11.3	283	39.3%	49.8%	22,516	67.1%	76.9%
11.4 to 11.6	88	12.2%	62.0%	4,178	12.5%	89.4%
11.7 to 11.9	74	10.3%	72.3%	2,587	7.7%	97.1%
12.0 to 12.9	200	27.7%	100.0%	964	2.9%	99.99%
13 and more	0	0.0%	100.0%	3	0.01%	100.0%
Total	721	100%		33,534	100%	

CEC staff at the June 2007 workshop brought up the concern that the CEC and ARI appliance databases describe the number of air conditioner models with a given SEER and EER rating but this does not necessarily portray accurately the distribution of number of unit sales by EER. Thus we contacted the largest HVAC equipment suppliers and contractors in the state and asked them about the EER of their largest selling SEER 13 equipment. We asked detailed questions about the quantity and efficiency of SEER 13 models sold until we had captured at least 80% of each distributor's SEER 13 product sales. The results of this survey are even more compelling. No one claimed to be selling any SEER 13 products with EERs below EER 11. The results of this survey are plotted in Figure 1.

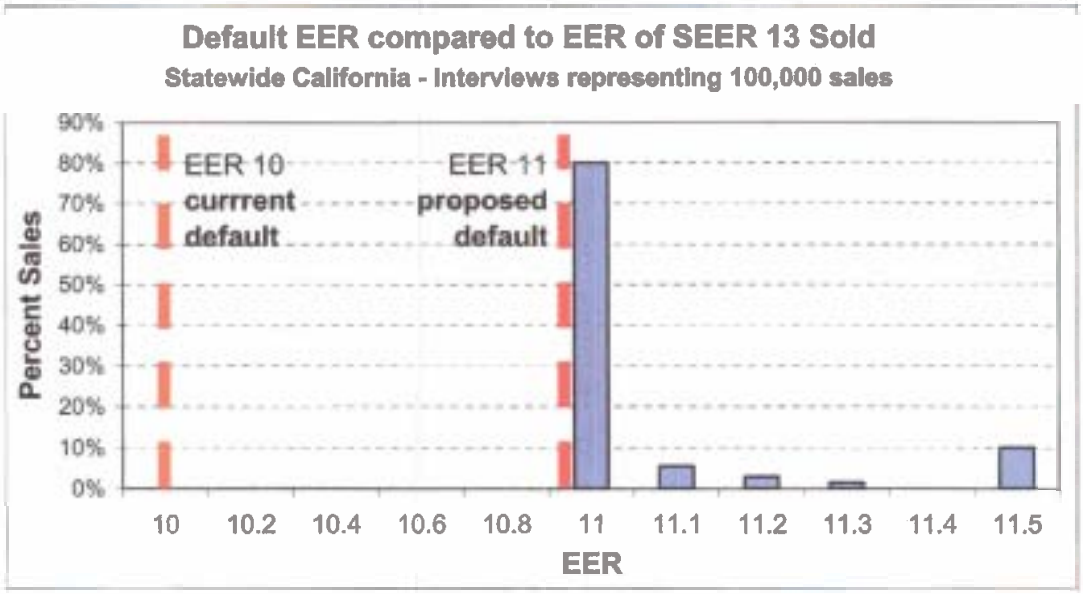

Figure 1: Summary of Distributro/Contractor Interview – Distribution of SEER 13 Energy Efficiency Ratios (EERs)

The distribution of EER values for units sold in California is displayed in Figure 1. As one can see, none of the top selling products by the large distributors have EER values less than EER 11. Up to EER 11.4, as the EER increases, the quantity of sales decreases. However, there is a significant number, around 10%, of SEER13/EER 11.5 air conditioners sold; presumably this is due to the significant performance credit afforded by specifying EER 11.5 air conditioners.

The result of evaluating both of these databases led to our consideration of a default EER that represented more closely the distribution of actual equipment efficiencies. This new default would match the current default EER for SEERs up to 11.5. The new default would maintain the same slope of EER versus SEER up to SEER 12.7 and then be a constant EER 11 for all SEER ratings over 12.7. The current and proposed default EER equations are plotted on Figure 2.

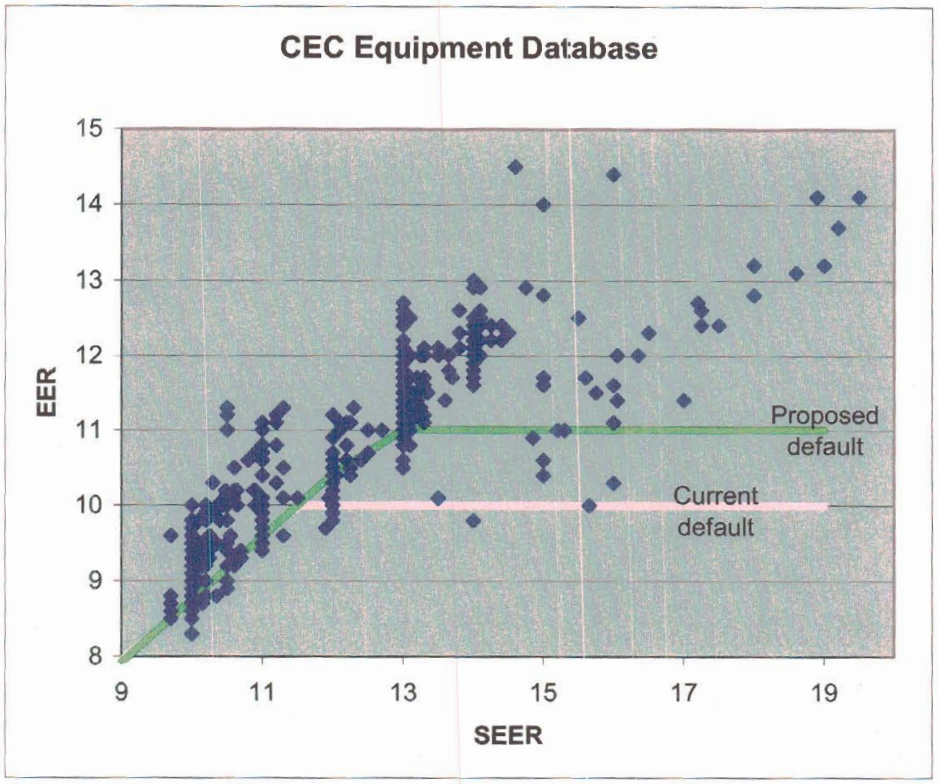

Figure 2: Current and Proposed default EERs with respect to SEER plotted on CEC appliance database.

Energy and Cost Savings

The single family and multi-family energy savings estimates per dwelling unit are based on MicroPas modeled energy savings per single family and multifamily dwelling unit for each climate zone with the full complement of measures anticipated for the 2008 building efficiency standards. The peak demand savings are based on the EER rating for the peak air conditioning loads and multiplied by a 65% diversity factor. For single family, statewide results are the weighted values for a 2,100 sf one story and a 2,700 sf two story. 45% of the homes are one story and 55% are two story. Single story models have equal areas of glass facing in each of the four cardinal directions. For multifamily, statewide results are the values for a 6,950 sf two story with 8 dwelling units (869 sf per dwelling unit) with equal wall and glazing areas facing in each of the cardinal directions.

Table 6: Statewide Single Family and Multifamily Dwelling Savings Per Climate zone

	Single Family Dwelling Savings					Multifamily Dwelling Savings				
Climate Zone	TDV % Savings	TDV kBtu/sf	TDV kBtu/home @per home***	Savings kWh/yr	Peak kW	TDV % Savings	TDV kBtu/sf	TDV kBtu/ dwelling unit	Savings kWh/yr	Peak kW
1	0.0%	0.0	0	0	0.35	0.0%	0.00	0	0	0.17
2	1.0%	0.6	1533	36	0.34	0.9%	0.08	69	13	0.17
3	0.1%	0.0	57	2	0.36	0.0%	0.00	3	1	0.19
4	0.2%	0.1	233	4	0.26	0.2%	0.01	11	1	0.14
5	0.0%	0.0	16	0	0.25	0.0%	0.00	0	0	0.13
6	0.0%	0.0	0	0	0.27	0.0%	0.00	0	0	0.14
7	0.1%	0.0	44	1	0.27	0.1%	0.00	3	0	0.14
8	1.0%	0.4	950	18	0.26	0.8%	0.05	44	7	0.14
9	2.1%	1.0	2381	51	0.36	1.7%	0.12	106	18	0.17
10	3.2%	2.0	4752	121	0.39	2.6%	0.23	200	41	0.18
11	3.4%	2.9	7144	156	0.38	3.0%	0.34	296	53	0.18
12	2.2%	1.5	3613	75	0.34	2.0%	0.18	158	26	0.17
13	4.1%	3.5	8565	274	0.36	3.5%	0.40	345	89	0.17
14	3.9%	3.5	8584	227	0.41	3.4%	0.41	353	76	0.19
15	7.1%	7.6	18499	688	0.42	6.0%	0.86	744	227	0.19
16	0.4%	0.4	878	17	0.38	0.3%	0.04	33	5	0.19

***Average square footage for a single family home is 2,430.

****Average square footage for a multifamily dwelling unit is 868.75.

It should be noted that in 9 out of the 16 climate zones, that increasing the EER baseline has less than a 1% impact on the compliance margin.

Statewide Energy Savings

Statewide energy savings were determined using the modeled energy savings per dwelling unit, the number of housing starts, the average square footage per dwelling unit, the saturation of air conditioning units from the Residential Appliance Saturation Study, and derated to 10% of the statewide amount to represent the percentage of certified HERS rated buildings[5].

Table 7: 1st Year Statewide Savings

Climate Zone	Single family units per Year*	Multifamily units per year*	Central AC Saturation**	Total Units w/A/C	Cost savings (PV $ thousands)	Energy MWh/yr savings	Peak KW savings
1	422	89	0%	0	$0	0	0.00
2	3,364	1,344	44%	2,062	$38	6	59.91
3	3,909	3,758	33%	2,515	$1	0	69.59
4	3,200	4,596	82%	6,393	$11	1	121.25
5	1,496	412	21%	403	$0	0	9.15
6	6,932	7,978	65%	9,632	$0	0	192.67
7	6,048	3,967	54%	5,438	$2	0	118.32
8	4,141	1,890	84%	5,048	$55	7	113.93
9	4,622	2,575	86%	6,182	$159	24	179.68
10	15,172	4,763	95%	18,898	$1,137	192	639.96
11	6,618	1,220	100%	7,838	$782	110	270.72
12	24,671	5,154	95%	28,393	$1,406	188	891.02
13	9,497	686	97%	9,898	$1,302	259	344.51
14	5,510	629	97%	5,979	$760	127	233.52
15	8,810	1,793	100%	10,603	$2,697	647	405.30
16	4,055	880	34%	1,693	$20	2	58.02
Total	**108,468**	**41,732**		**120,975**	**$8,371**	**1,565**	**3,708**

* Table 16 - Estimated Housing Starts by Climate Zone (Eley 2003)

** Residential Appliance Saturation Survey (RASS 2004) – filtered by new construction (1997-2003)

[5] Based on private communication with Robert Scott, CHEERS and Mike Bachand, CalCERTS. Approximately 10,000 single family homes received HERS ratings for the EER credit in the first three quarters of 2007.

Cost Effectiveness

To the extent that the prescriptive requirements of the building efficiency standards are cost-effective, this measure is cost-effective. This measure assures that the credit given to high EER equipment matches the actual savings these air conditioners would realize as compared to the standard high volume products being currently sold in the California market.

Recommendations

Proposed Standards Language

This proposal does not require any changes to the standards language outside of the Alternative Compliance Method manual.

Proposed Alternative Compliance Method (ACM) Manual Language

Note that the original language is in black, added language is in blue and underlined and stricken language is in ~~red font and with a strikethrough~~.

Residential ACM

RACM Section 3.6.4 Cooling Equipment

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Standard Design. The cooling system for the *Standard Design* building with a central system shall be of the same type identified in the Appliance Efficiency Regulations and selected for the proposed design with a SEER meeting the Appliance Efficiency Regulations minimum requirements. For non-ducted non-central cooling equipment, the efficiencies shall be from the Appliance Efficiency Regulations for Room Air Conditioners, Room Air Conditioning Heat Pumps, Package Terminal Air Conditioners and Package Terminal Heat Pumps for the type and size in the *Proposed Design* where the size may be a user input or shall default to 24 Btu per hour per square foot of conditioned floor area. When a *Proposed Design* uses both a split system air conditioner and another type of air conditioner, the *Standard Design* SEER shall be a conditioned floor area weighted average of the SEERs of the cooling equipment. The EER used for calculating the energy consumption of a SEER rated standard central air conditioner shall be the lesser of the EER rating of the air conditioner used in the proposed design or the default EER calculated in Equation R4-41 for the SEER value meeting the Appliance Efficiency Regulations minimum requirements.

RACM Section 4.7.1 Cooling System Energy

Equation R4-41

When

~~SEER < 11.5~~	~~EER = 10 – (11.5 – SEER) x 0.83~~
~~SEER >= 11.5~~	~~EER = 10~~
SEER < 12.7	EER = 0.455 + SEER x 0.83
SEER >= 12.7	EER = 11.0

Nonresidential ACM

NACM Section 2.5.2.7 Equipment Performance of Air Conditioners with SEER Ratings and Heat Pumps with SEER and HSPF Ratings

Standard Design: The standard design shall use performance curves based on the SEER of the equipment required by the Standards. The default EER, as defined below shall be used. The standard design heat pump shall have an HSPF as required by section 111. The COP at 47° F shall be determined as below. The efficiency at other outdoor temperatures shall be based on the default DOE-2 HEAT-EIR-FT curve….

The EER for different EWB and ODB conditions. These are given by the following equations.

Equation N2-1 $EER_{67,82} =$ SEER

~~Equation N2-2 $EER_{67,95}$ = From Manufacturer Data [when available]~~
~~= 10 (11.5 *SEER*)×0.83 [default to SEER <11.5]~~
~~= 10 [default to SEER ≥11.5]~~

Equation N2-2 $EER_{67,95}$ = From Manufacturer Data [when available]
= 0.455 + SEER x 0.83 [default to SEER <12.7]
= 11 [default to SEER ≥12.7]

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US DOE Central Air Conditioner and Heat Pump Rulemaking webpage, Content Last Updated: 10/25/2007 http://www.eere.energy.gov/buildings/appliance_standards/residential/central_ac_hp.html

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The Pacific Gas and Electric Company sponsored this report as part of its CASE (Codes and Standards Enhancement) project. Steve Blanc of PG&E is the project manager for this nonresidential CASE project. Pat Eilert is the program manager for the CASE program. The Heschong Mahone Group is the prime contractor and provided coordination of the nonresidential CASE reports.

Jonathan McHugh, Cynthia Austin, and Linda Murphy of the Heschong Mahone Group, conducted all of the surveys, performed database analysis and developed this report. Ken Nittler of Enercomp, Inc. conducted the statewide MicroPas analysis.

Our thanks go to Jeff Hirsch of JJ Hirsch Associates for alerting us to this problem in the performance approach.

Appendix 1 Phone Interview Survey

Hello, I am ____ at HMG working for a Pacific Gas & Electric Company funded project to help the California Energy Commission better understand the technical characteristics of the top selling SEER 13 equipment sold in California. The data you share with us is strictly confidential and will only be reported on in terms of average statistics generated from the entire group of participants in this survey.

If you need more information about this project you can talk to ___ at the California Energy Commission. His number is ____.

Questions	Manuf	Make	Model #	How many/ fraction?	EER
1) What is your largest selling SEER 13 central air conditioner? (Model Number etc so EER can be looked up on ARI or CEC database).					
1a) How many or what fraction of SEER 13 units are this model?					
1b) Do you know the EER of this air conditioner? If yes what is it?					
2) What is your second largest selling SEER 13 central air conditioner? (Model Number etc so EER can be looked up on ARI or CEC database).					
2a) How many or what fraction of SEER 13 units are this model?					
2b) Do you know the EER of this air conditioner? If yes what is it?					
3) What is your third largest selling SEER 13 central air conditioner? (Model Number etc so EER can be looked up on ARI or CEC database).					
3a) How many or what fraction of SEER 13 units are this model?					
3b) Do you know the EER of this air conditioner? If yes what is it?					
4) What is your fourth largest selling SEER 13 central air conditioner? (Model Number etc so EER can be looked up on ARI or CEC database).					
4a) How many or what fraction of SEER 13 units are this model?					
4b) Do you know the EER of this air conditioner? If yes what is it?					
5) What is your fifth largest selling SEER 13 central air conditioner? (Model Number etc so EER can be looked up on ARI or CEC database).					
5a) How many or what fraction of SEER 13 units are this model?					
5b) Do you know the EER of this air conditioner? If yes what is it?					
How many SEER 13 air conditioners do you sell per year?					
Do until you have captured about 80% of SEER 13 sales.					
Who are the other large HVAC distributors (contractors, etc)?					
More Questions - if top 5 is not enough	**Manuf**	**Make**	**Model #**	**How many/ fraction?**	**EER**
6) What is your sixth largest selling SEER 13 central air conditioner? (Model Number etc so EER can be looked up on ARI or CEC database).					