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Joint Comments on C&I Fans and Blowers NOPA

Additional submitted attachment is included below.

April 29, 2022

Alejandro Galdamez
Efficiency Division
California Energy Commission
715 P Street
Sacramento, CA 95814

Docket Number: 22-AAER-01
TN Number: 241470

Dear Mr. Galdamez:

This letter comprises the comments of the Pacific Gas and Electric Company (PG&E), San Diego Gas and Electric (SDG&E), and Southern California Edison (SCE) in response to the California Energy Commission (Energy Commission) notice of proposed action (NOPA) regarding Commercial and Industrial Fans and Blowers.

The signatories of this letter, collectively referred to herein as the California Investor-Owned Utilities (CA IOUs), represent some of the largest utility companies in the Western U.S., serving over 32 million customers. As energy companies, we understand the potential of appliance efficiency standards to cut costs and reduce consumption while maintaining or increasing consumer utility of products. We have a responsibility to our customers to advocate for standards that accurately reflect the climate and conditions of our respective service areas.

The CA IOUs are generally very supportive of CEC's NOPA and the inclusion of the Fan Energy Index (FEI) as the energy conservation metric. We appreciate the work that CEC has done to address our comments and those of the industry in this rulemaking. We ask that CEC consider the following recommendations for clarifying and improving the reporting requirements for fans and blowers:

1. **The CA IOUs recommend that the CEC remove the labeling requirement to report FEP_{ref} at FEI = 1.0, and we propose that the label not include the phrase "at FEI = 1.0."**

   Fans do not have single values for FEP_{ref} and FEP_{act} at FEI = 1.0**.** Figure 1 shows an example fan curve with many duty points where FEI = 1.0. Each duty point has a different FEP_{ref} and FEP_{act}. For example, using Figure 1, we will assume that point A represents an airflow of 6,000 cubic feet per minute (cfm) and a pressure rise of 4.0 in. w.c., and Point B represents and airflow of 8,000 cfm at a pressure rise of 1.0 in. w.c. This fan would have an FEI of 1.0 at both points, but the FEP_{ref} of Point A is 6.22 kW, while the FEP_{ref} of Point B is 2.72 kW.

   FEP_{ref} is a higher value at point A than point B, even though both have an FEI = 1.0. Therefore, we suggest CEC not include "FEP_{ref} at FEI=1.0" as a required value for the label.

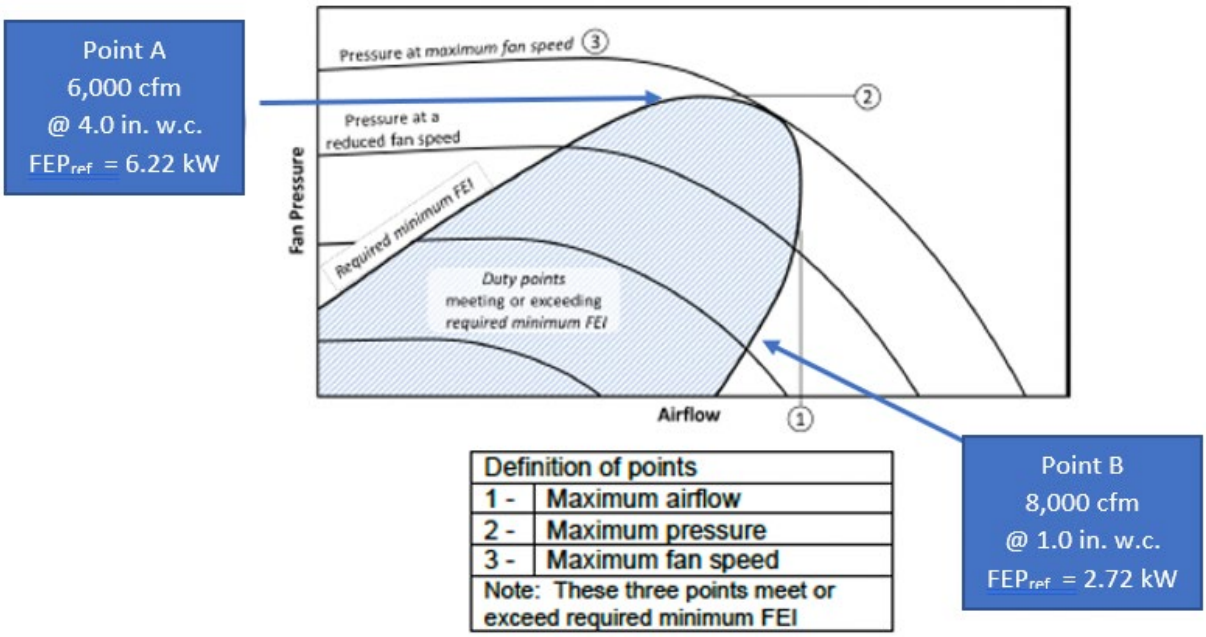

Figure 1: Example of fan curve where FEI = 1. but FEP_{ref} is changing. FEP_{ref} at duty point A is higher than FEP_{ref} at duty point B. At all points along the curve representing FEI = 1.0, FEP_{ref} is equal to FEP_{act}.
Source: Air Movement and Control Association (AMCA)

The CA IOUs also suggest that the phrase "at FEI = 1.0" not be used for any of the labeling requirements. The reported value on the label may be at a pressure, airflow, or fan speed where FEI is greater than 1.0. For example, the maximum fan speed may not be limited by FEI but by a motor power or structural limitation. Instead, we propose using "compliant," as shown in the strikeout/underline text below.

Proposed changes to Section 1607 – *Marking of Appliances* are in red text, with underlined text indicating additions and strikeout text indicating deletions. In addition, the text includes editorial changes not discussed previously.

§ 1607. Marking of Appliances.

…[skipping (a) through (d)(15))]

(16) Commercial and Industrial Fans and Blowers. Each commercial and industrial fan and blower shall be marked with a legible and permanently fixed label, which may be in tabular form (as shown below):
(A) The label shall include the following information:

1. manufacturer name; and
2. brand name or brand code; and
3. model number; and
4. serial number; and
5. date of manufacture; and
~~6. FEP_{ref} at FEI=1.0;~~
7. maximum compliant ~~air flow~~airflow (SCFM) ~~at FEI=1.0~~; and

8. maximum compliant speed (RPM) ~~at FEI=1.0~~; and
9. maximum compliant pressure (inches water gauge) ~~at FEI=1.0~~.

2. The CA IOUs recommend the following changes to Table X in Section 1606 – Filing by Manufacturers; Listing of Appliances in MAEDbS:

a. We suggest requiring additional information be provided in addition to the three reported FEI points.

CEC must confirm that data supplied by manufacturers for the three regulated points – maximum compliant fan speed, maximum compliant airflow, and maximum compliant pressure – match the manufacturer's catalog data and that FEI is calculated correctly. To that end, we suggest that for each reported metric (fan speed, pressure, and airflow) the other two corresponding values be reported, along with FEP_{ref} and FEP_{act}.

For example, for the maximum compliant pressure, the manufacturer would report the corresponding airflow, fan speed, FEP_{ref}, and FEP_{act}. This information will allow CEC staff to quickly compare those values to results in the manufacturer's catalog or selection software. The proposed changes are shown in strikeout/underline format at the end of this section.

b. The CA IOUs recommend removing the requirement to report single values for FEP_{ref} and FEP_{act}.

As described in Comment 1, a fan can be compliant at many duty points and reporting a single value for FEP_{ref} and FEP_{act} is not representative.

c. **We propose that the phrase "at FEI=1.0" be replaced with "compliant."**

As suggested in Comment 1, the FEI at one or more of the reported values may be greater than 1.0. Using "compliant" will prevent confusion in those cases.

Please see our suggested changes to Table X below in red text. In addition to the changes already described, there are some clarifying and editorial suggestions.

Table 1: Proposed Changes to Table X

Appliance	Required Information	Permissible Answers
Commercial and Industrial Fans and Blowers	Fan type	Centrifugal housed, centrifugal inline, centrifugal unhoused, centrifugal PRV supply, centrifugal PRV exhaust, axial inline, axial PRV, inline mixed-flow, power roof/wall ventilators, axial panel, radial housed
	Fan impeller diameter (in.)	
	Motor model number (if fan is certified with a motor)	Motor model number. If the motor and fan are sold under a single model number, enter the model number here.
	Transmission	Direct, V-belt, synchronous-belt, flexible coupling, none

Appliance	Required Information	Permissible Answers
	Controller model number (if fan is certified with a controller)	Model number of the controller. If the controller and fan are sold under a single model number, enter that model number here
	Maximum compliant fan speed (RPM) ~~at FEI=1.0~~	
	Airflow (SCFM) at the maximum compliant fan speed	If there are multiple duty points where this fan speed is compliant, select one
	Pressure (inches water gauge) at the maximum compliant fan speed	The resulting pressure at the selected airflow
	FEP_{act} (kW) at the resulting pressure	FEP_{act} (kW) at the duty point at the maximum compliant fan speed
	FEP_{ref} (kW) at the resulting pressure	FEP_{ref} (kW) at the duty point at the maximum compliant fan speed
	Maximum compliant pressure (inches water gauge) ~~at FEI=1.0~~	
	Airflow (SCFM) at the maximum compliant pressure	Resulting airflow (SCFM) at the maximum compliant pressure
	Fan speed (RPM) at the maximum compliant pressure	Resulting fan speed (RPM) at the maximum compliant pressure
	FEP_{act} (kW) at the maximum compliant pressure	FEP_{act} at the resulting airflowat the maximum compliant pressure
	FEP_{ref} (kW) at the maximum compliant pressure	FEP_{ref} at the resulting airflow at the maximum compliant pressure
	Maximum compliant ~~air flow~~ airflow (SCFM) ~~at FEI=1.0~~	
	Pressure (inches water gauge) at the maximum compliant airflow	Resulting pressure (inches water gauge) at the maximum compliant airflow
	Fan speed (RPM) at the maximum compliant airflow	Resulting fan speed (RPM) at the maximum compliant airflow
	FEP_{act} (kW) at the maximum compliant airflow	FEP_{act} (kW) at the resulting pressure at the maximum compliant airflow
	FEP_{ref} (kW) at the maximum compliant airflow	FEP_{ref} (kW) at the resulting pressure at the maximum compliant airflow
	~~FEPact~~	~~Tested, calculated~~
	Is the model a Series Tested Fan?	Yes; No
	Associated Series Tested Fan Model ~~Number (if calculated)~~	Fan product line and model, (N/A if ~~tested~~not a Series Tested Fan)
	Method of FEPact determination	Section 6.1, 6.2, 6.3, 6.4, or 6.5 of the test method
	~~FEP_{ref} at FEI=1.0~~	~~Reference fan electrical power (kW)~~
	~~FEP_{act} at FEI=1.0~~	~~Actual fan electrical power (kW)~~

3. The CA IOUs ask CEC to reconsider the limitation on publishing fan performance data for duty points that are not compliant.

Section 1607(B) states:

> No marketing or catalog information shall provide performance data for any duty point where the FEI is less than 1.0. Performance data provided to consumers shall be provided only for the operation of the fan where the FEI is equal or greater than 1.0.

We understand and support the motivation driving this requirement. However, we believe that it will create problems for California consumers for three reasons.

First, there are many existing fan installations where the fan was poorly selected and installing a larger fan that operates inside the FEI ≥ 1.0 bubble will be impossible or prohibitively expensive. For example, if a fan is installed in an enclosed space, such as a machine room, that would have to be enlarged for a fan that meets FEI ≥1.0 at the design duty point, the costs may be many times the cost of simply replacing the fan. This problem will happen more often with low-pressure applications, where it would not be possible to achieve the needed efficiency without using a larger-diameter fan.

Second, variable-speed fans in variable-air-volume systems typically do not operate along a single system curve. Typically, as airflow is reduced, system pressure does not decrease along a quadratic curve. Therefore, the fan operating duty point may fall outside of the FEI ≥ 1.0 bubble for low airflows. This is not an energy efficiency problem, since the fan's power at these low airflows is a small fraction of its full-design airflow power; however, designers need the fan performance information at these duty points.

Finally, fan performance information is used for troubleshooting fan system problems. Technicians will typically measure two performance values (out of airflow, pressure, and fan speed) and use the published fan performance data to determine the third value. If the fan is running at an operating point outside the bubble, the technician will not be able to calculate the third point and diagnose the problem.

Therefore, we suggest that manufacturers be allowed to publish fan performance data but clearly indicate inefficient values that are outside the FEI ≥1.0 bubble. We propose the following language for Section 1607(B):

> Marketing or catalog information that provides performance data for any duty point where the FEI is less than 1.0 shall include the statement "inefficient operating point."

We are aware that others have suggested phrasing like "not compliant with California Title 20." However, we believe this is not accurate since compliance with Title 20 means that the manufacturer has tested the fan and reported the boundaries of the FEI≥1.0 bubble. Therefore, the fan can be compliant with Title 20 even if the performance at the duty point does not meet Title 20's intent.

4. **The CA IOUs support the use of the enforcement requirements in §1608. Compliance, Enforcement, and General Administrative Matters (Section 1608).**

   During the public meeting held by CEC on April 12, 2022, one stakeholder suggested that instead of using the test tolerance laid out in Section 1608, CEC should use the tolerances provided in *AMCA 211-22 Certified Ratings Program Product Rating Manual for Fan Air Performance* (AMCA 211). The CA IOUs disagree with this recommendation. The tolerances in AMCA 211 are very wide, allowing 7.5 percent on fan shaft power and 10 percent when the fan is tested with a motor.

   The tolerances from AMCA 211 would allow a fan tested with a motor to have an FEI of 0.91 and still be considered to pass an enforcement test. Though we appreciate the justification AMCA has put forth in AMCA 211 for their tolerances, however, we believe it would create market distortions. Manufacturers who make a good-faith effort to provide accurate data would have a disadvantage against those who take advantage of the extra margin.

   In addition, we believe that allowing the use of industry-defined tolerances would create a bad precedent and lead other manufacturers in other categories to demand the same.

In conclusion, we would like to reiterate our support of CEC's NOPA on Commercial and Industrial Fans and Blowers. We thank CEC for the opportunity to be involved in this process.

Sincerely,

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Kate Zeng
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