July 24, 2025

REPORT #: E25-497

Portable Air Conditioners Standard Evaluation

Prepared For NEEA:
Meghan Bean, Senior Market Research & Evaluation Scientist

Prepared By:
Jennifer Holmes, Principal Consultant
Jeff Pritchard, Managing Consultant

Contractor Contact Information:
Michaels Energy
400 Main Street, Suite 200
La Crosse, WI 54601

Northwest Energy Efficiency Alliance
PHONE
503-688-5400
EMAIL
info@neea.org

Contents

Executive Summary

The Northwest Energy Efficiency Alliance (NEEA) contracted with Michaels Energy (the evaluation team) to conduct an independent evaluation to:

1. Assess NEEA and its partner organizations' influence on the portable air conditioner (AC) federal standard, documented in Docket EERE-2013-BT-STD-0033.

2. Estimate the proportion of total energy savings from the standard that resulted from NEEA and its partners' influence.

The NEEA Codes and Standards team supports standards development for various product classes. The NEEA Codes and Standards team tracks their efforts throughout the standards development process and identifies which standards have the highest potential for energy savings. Independent contractors conduct evaluations to assess NEEA and its partners' efforts and their overall influence on the standards.

This analysis pertains to the Notice of Proposed Rulemaking (NOPR) published on June 13, 2016,[1] through which the U.S. Department of Energy (DOE) proposed a new energy conservation standard for portable ACs. The Final Rule, published in the Federal Register on January 10, 2020, adopted the first energy conservation standard that applies to all single-duct and dual-duct portable ACs manufactured in, or imported into, the U.S.[2] Compliance with the standard is required on and after January 10, 2025.

The evaluation team identified the following organizations as NEEA partners:[3]

- Appliance Standards Awareness Project (ASAP)
- Alliance to Save Energy (ASE)
- National Consumer Law Center (NCLC)
- Consumers Union
- American Council for an Energy-Efficient Economy (ACEEE)
- Natural Resources Defense Council (NRDC)
- Northeast Energy Efficiency Partnerships (NEEP)

[1] 81 FR 38398

[2] 85 FR 1378

[3] For the purpose of this evaluation, we define a NEEA partner as an organization that meets the following criteria:

1) Having a shared goal to influence the adoption of the standard *and* 2) Had direct and intentional communication with NEEA about the standard (emails, meetings, documented conversations, etc.). *or* 3) Had taken specific actions with NEEA to influence the standard (submitted joint comments, commissioned a study, spoke at meetings, press releases, etc.).

To evaluate NEEA and its partners' influence on this standard, Michaels Energy reviewed DOE's analyses and comments submitted by interested parties to the portable AC standard rulemaking (EERE-2013-BT-STD-0033) and the rulemaking to establish portable AC test procedures (EERE–2014–BT–TP—0014). The evaluation team also interviewed interested parties who participated in the rulemaking process; this aspect of the evaluation was constrained, however, by the lengthy time lapse between the NOPR (2016) and this evaluation, as well as respondent lack of recall.

The adopted standard for all single-duct and dual-duct portable ACs is defined as the minimum combined energy efficiency ratio (CEER, Btu/Wh), which is a function of the seasonal adjusted cooling capacity (SACC, Btu/h), as follows:[4]

$$Minimum\ CEER\ \left(\frac{Btu}{Wh}\right) = 1.04\ x\ \frac{SACC}{(3.7177\ x\ SACC^{0.6384})}$$

The relationship between CEER and SACC for the standard was determined from DOE's technical analyses of viable technology options for increasing portable AC efficiency. DOE analyzed test data of a sample of units to define the baseline CEER efficiency level and three incremental efficiency improvements, following the adopted test procedure. DOE also defined a fourth efficiency level from modeled performance data, representing the maximum technologically feasible efficiency. These four incremental efficiency levels correspond to the four trial standard levels (TSLs) proposed for the standard. The adopted standard corresponds to TSL 2.

The evaluation team identified three barriers to the adoption of the most stringent standard:

Manufacturer opposition to regulation or more stringent standards. The Association of Home Appliance Manufacturers (AHAM) and manufacturers opposed numerous aspects of DOE's proposed test procedure and proposed standard and advocated that DOE adopt the lowest efficiency level, represented by TSL 1. For example, manufacturers opposed a single product class for both single and dual-duct configurations. They opposed a test procedure that modified the existing industry test procedure to account for air infiltration in the measurement of SACC, a key variable calculation of the portable AC CEER. Manufacturers also opposed design options reflected in higher TSLs and opposed allowing the use of alternative refrigerants.

Lack of data with which to conduct the necessary analysis in a rulemaking. Because there was no federal test procedure or standard before the rulemakings and because the test procedure had not been adopted before the standard NOPR, manufacturers argued that they did not have sufficient time to evaluate the proposed standard using the new test procedure. Manufacturers also claimed that DOE did not have sufficient test data on portable AC performance to support adoption of a standard.

Insufficient market adoption of more efficient product models prior to when the standards process begins. Manufacturers opposed DOE's analysis, stating that portable ACs that meet the highest efficiency level from DOE's analysis (represented by TSL 4) did not yet exist in the market. DOE also noted that higher capacity compressors that would be required to meet TSL 3 and TSL 4 are also required for room ACs and a standard based on TSL 3 or TSL 4 could require

[4] 85 FR 1378

manufacturers to remove some product lines from production due to insufficient supply of the required compressors.

The evaluation team identified the following activities by NEEA and its partners to influence the test procedure and standard:

- Attending and making oral comments in all public meetings, and
- Analyzing DOE's analysis and documents for the test procedure and standard rulemakings and submitting written comments.

The evaluation team concludes that these activities were somewhat effective in addressing manufacturer opposition and influencing the outcome of the adopted standard. DOE adopted some but not all of NEEA and its partners' recommendations but ultimately adopted TSL 2 instead of TSL 3. Further, NEEA and its partners' efforts did not directly address some of the key points of manufacturer opposition and did not provide data or research to substantiate the adoption of TSL 3 or TSL 4.

The evaluation team estimates that the total share of savings influenced by NEEA and its partners' activities associated with the adoption of the portable AC standard is 9.1%.

1 Introduction

1.1 Purpose of Study

NEEA's Codes and Standards team supports developing and adopting efficiency standards and test procedures by advocating for the most stringent, technologically feasible, and economically justified standards to maximize energy savings.

This report presents the evaluation team's independent evaluation of NEEA and its partners' efforts to influence the inaugural federal energy conservation standard for portable air conditioners (ACs). This evaluation pertains to the Notice of Proposed Rulemaking (NOPR) published on June 13, 2016, in Docket EERE-2013-BT-STD-0033 through which the U.S. Department of Energy (DOE) proposed the standard.[5] Before the NOPR, DOE had not conducted an energy conservation standards rulemaking for portable ACs, and there were no Federal energy conservation standards for portable ACs.

The Final Rule (published in the Federal Register on January 10, 2020) adopted the first energy conservation standard for portable ACs, based upon a combined energy efficiency ratio (CEER) metric, that applies to all single-duct and dual-duct portable ACs manufactured in, or imported into, the U.S.[6] Compliance with the standard is required on and after January 10, 2025.

This study assessed the influence of NEEA and its partner organizations on this standard and estimated the share of savings influenced by their efforts. The evaluation team investigated the challenges and barriers to adopting the most stringent, technologically feasible, and economically justified standard and conducted two assessments:

1. A qualitative assessment of NEEA and its partners' influence on the standard using NEEA's Standards Logic Model (Appendix A) as a framework, and
2. A quantitative determination of the proportion of total energy savings from the standard that resulted from NEEA and its partners' influence.

This report summarizes the evaluation team's assessment, including 1) the barriers to the most stringent, technologically feasible, and economically justified standard,[7] 2) the effectiveness of the activities of NEEA and its partners during the rulemaking in overcoming the identified barriers, and 3) the role of NEEA and its partners in each identified activity relative to other stakeholders.

[5] 81 FR 38398
[6] 85 FR 1378
[7] It is important to note that barriers to the adoption of a standard are distinctly different from market barriers that market transformation programs are intended to address (and are typically documented in NEEA's logic models). The NEEA Standards Logic Model represents the rationale of activities and the and intended outcomes of NEEA's investment in influencing codes and standards and serves as the framework for evaluation.

1.2 Portable Air Conditioner Standard Procedural History and Scope Considered for this Study

This section summarizes the history of the portable AC test procedure and energy conservation standard rulemakings, both of which will be referred to throughout this report (Figure 1). While the focus of this study is the influence of activities to address barriers to DOE adopting the most stringent energy conservation standard (Docket EERE-2013-BT-STD-0033), the evaluation team expanded the scope to include the test procedure rulemaking (Docket EERE–2014–BT–TP–0014). Including the test procedure rulemaking was important for three reasons:

- First, test procedure rulemakings, in general, define the products and product classes and address many technical issues and questions regarding the measurement of energy use that are fundamental (and required) for establishing an energy conservation standard.
- Second, the first test procedure and standard will serve as the starting point for future amendments and therefore could have considerable influence on savings from a subsequent standard.
- Third, as shown in Figure 1, the test procedure and energy conservation standard rulemakings overlapped and many topics that were raised by interested parties in the test procedure rulemaking were also raised in the energy conservation standard rulemaking. The overlap of the test procedure and the standard rulemakings shown in Figure 1 is atypical of DOE's process to develop federal energy conservation standards; DOE's standard process is to adopt a test procedure prior to issuing a NOPR for an energy conservation standard. The fact that the test procedure was not adopted before the NOPR for the standard was cited by interested parties and identified as a key barrier by the evaluation team.

Energy Conservation Standard Rulemaking

Notice of Proposed Determination (NOPD, 7/5/2013):[8] DOE issued the proposed NOPD to classify portable ACs as consumer products covered under the Energy Policy and Conservation Act of 1975 (EPCA).[9] This is the first milestone of the process to develop energy conservation standards for a new covered product. The NOPD presented DOE's proposed definition of a portable AC to establish the scope of products that would be subject to the standard.

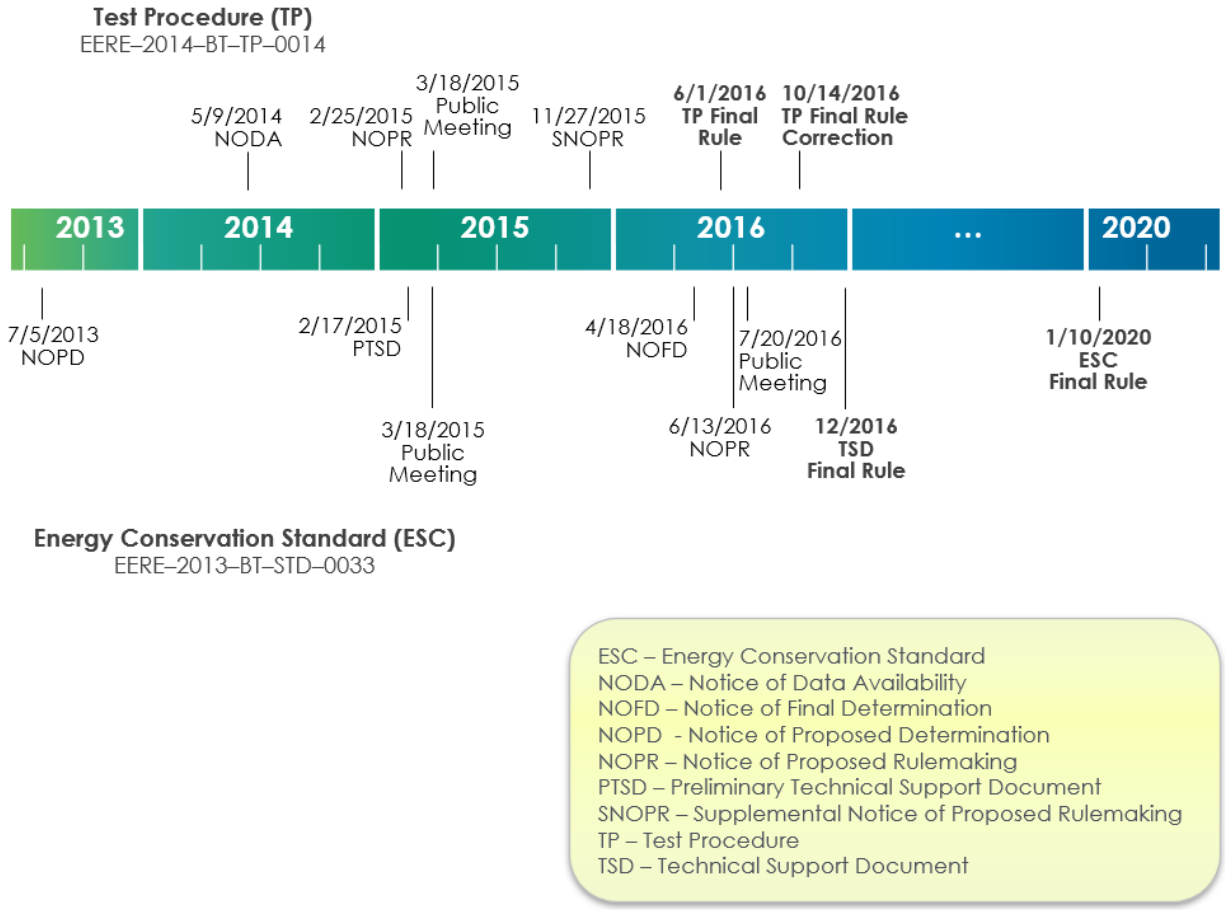
Notice of Final Determination (NOFD, 4/18/2016):[10] DOE issued the NOFD to classify portable ACs as a covered product under EPCA. This NOFD finalized the definition of products to be subject to the future standard as:

> *A portable encased assembly, other than a ''packaged terminal air conditioner,'' ''room air conditioner,'' or ''dehumidifier,'' that delivers cooled, conditioned air to an enclosed space, and is powered by single-phase electric current. It includes a source of refrigeration and may include additional means for air circulation and heating. (81 FR 22516)*

[8] 78 FR 40403
[9] 42 U.S.C. 6291–6309
[10] 81 FR 22514

The NOFD determined that portable ACs met the criteria to be a covered product under EPCA and that "the average annual per-household energy use by products of such type is likely to exceed 100 kWh (or its Btu equivalent) per year."[11]

Figure 1. Portable Air Conditioner Federal Standard Procedural History



Preliminary Technical Support Document (PTSD, 2/17/15):[12] The PTSD presents the methodology and results of DOE's preliminary technical analysis and the potential efficiency levels to consider for portable ACs. DOE solicited comments on the PTSD from interested parties through written comments and from a public meeting held on March 18, 2015.

Technical Support Document (TSD, 4/29/2016):[13] DOE posted a revised TSD that presented results of DOE's updated analyses as the basis for the proposed energy conservation standard.

[11] Ibid.
[12] U.S. Department of Energy (2015, February). *Technical Support Document: Energy Efficiency Program for Consumer Products and Commercial and Industrial Equipment: Portable Air Conditioners.*
[13] U.S. Department of Energy (2016, April). *Technical Support Document: Energy Efficiency Program for Consumer Products and Commercial and Industrial Equipment: Portable Air Conditioners.*

Notice of Proposed Rulemaking (NOPR) for Energy Conservation Standards (6/13/2016):[14] DOE issued the NOPR that proposed new standard for portable ACs. DOE solicited comments from interested parties through written comments and from a public meeting held on July 20, 2016.

TSD Final Rule (December 2016):[15] After receiving comments and collecting additional information, DOE revised its analysis to establish the standard. This is the final TSD upon which the adopted standard is based. (See Section 1.3.)

Energy Conservation Standard Final Rule (January 20, 2020):[16] This Final Rule established the energy conservation standard for portable ACs. The adopted standard is based upon TSL 2.

The duration of time between the TSD Final Rule and the Energy Conservation Standard Final Rule is worth highlighting. This Final Rule was published as the result of legal action against the DOE for its failure to publish the standard in the Federal Register after the 45-day error correction period after finalizing the standard in December 2016. After the error correction period expired in early 2017 and the DOE failed to publish the standard, a coalition led by the Natural Resources Defense Council (NRDC) issued a 60-day "Notice of Intent to Sue". The DOE did not heed the notice and the coalition filed a suit against the DOE on June 13, 2017. A separate lawsuit was also filed by a coalition of 11 states, led by Attorneys General for California and New York. The Energy Conservation Standard Final Rule was published to the Federal Register five years after the TSD Final Rule in response to a court order.[17]

Test Procedure Rulemaking

Notice of Data Availability (NODA, 5/9/2014):[18] DOE initiated the test procedure rulemaking with the NODA, which presented its initial review of available industry test procedures and results of its testing of a range of portable AC models based upon the existing industry test procedures. The NODA also addressed comments submitted in response to the NOPD.

NOPR for Test Procedures (5/25/2015): [19] DOE issued the NOPR through which it proposed test procedures to determine capacities and energy efficiency metrics for portable ACs.

Supplemental Notice of Proposed Rulemaking (SNOPR, 11/27/2015):[20] DOE issued a SNOPR to revise its proposed test procedures. This SNOPR modified the cooling and heating mode test requirements and revised the seasonally adjusted cooling capacity (SACC) and CEER metrics.[21]

---

[14] 81 FR 38398
[15] U.S. Department of Energy (2016, December). *Technical Support Document: Energy Efficiency Program for Consumer Products and Commercial and Industrial Equipment: Portable Air Conditioners.*
[16] 85 FR 1378
[17] Pursuant to an order from the U.S. District Court for the Northern District of California in the consolidated cases of *Natural Resources Defense Council, et al.* v. *Perry* and *People of the State of California et al.* v. *Perry,* Case No. 17–cv–03404–VC, as affirmed by the U.S. Court of Appeals for the Ninth Circuit in the consolidated cases Nos. 18–15380 and 18–15475.
[18] 79 FR 26639
[19] 80 FR 10211
[20] 80 FR 74020
[21] 81 FR 35242

Final Rule for Test Procedures (6/1/2016):[22] This Final Rule adopted the new test procedure to be used to determine the SACC and CEER for portable ACs.

1.3 Summary of the Trial Standard Levels and Adopted Standard

The Final TSD presents DOE's technical analyses and results that support the Final Rule for the portable AC standard.[23] The TSD identifies viable technology options for increasing portable AC efficiency that the DOE included in its engineering analysis to define efficiency levels considered for the standard (Table 1).

Table 1. Design Options for Portable ACs

Increased heat-transfer surface area	**Component Improvements**
1. Increased frontal coil area	9. Improved compressor efficiency
2. Increased depth of coil (add tube rows)	10 Improved blower/fan efficiency
3. Increased fin density	11. Low-standby-power electronic controls
4. Add subcooler to condenser coil	12. Improved duct connections
Increased heat-transfer coefficients	13. Case insulation
5. Improved fin design	**Part-load technology improvements**
6. Improved tube design	14. Variable-speed compressors
7. Spray condensate onto condenser coil	15. Thermostatic or electronic expansion valves
8. Microchannel heat exchangers	**Reduced infiltration air**
	16. Airflow optimization
	Alternative refrigerants
	17. R-32

Source: U.S. Department of Energy (2016, December). *Technical Support Document: Energy Efficiency Program for Consumer Products and Commercial and Industrial Equipment: Portable Air Conditioners.* (p. 4-4).

DOE's analysis defined the baseline efficiency and four incremental efficiency levels that correspond to the four TSLs considered for the standard (Table 2). Three efficiency levels were derived from DOE's analysis of test data from a sample of units that reflected various viable technology options. A fourth level was defined as the maximum achievable efficiency from modeled data.

In the Final Rule, DOE adopted TSL 2 for the portable AC standard.

[22] 81 FR 35242

[23] U.S. Department of Energy (2016, December). *Technical Support Document: Energy Efficiency Program for Consumer Products and Commercial and Industrial Equipment: Portable Air Conditioners.*

Table 2. Trial Standard Levels for Portable ACs

Trial Standard Level (TSL)	Efficiency Level (EL)	Average EER (Btu/Wh)	Average CEER (Btu/Wh)	Description
-	Baseline			Minimum observed
1	1	6.05	5.95	Intermediate level between baseline and EL 2
2	2	7.15	7.13	Maximum available for all capacities
3	3	8.48	8.46	Maximum observed
4	4	10.75	10.73	Maximum of modeled component improvements

Source: 85 FR 1427

1.4 NEEA Partners

For the purpose of this evaluation, the evaluation team defines a NEEA partner as an organization that meets the following criteria:

1) Had a shared goal to influence the standard

and

2) Had direct and intentional communication with NEEA about the standard (emails, meetings, documented conversations, etc.).

or

3) Took specific actions with NEEA to influence the standard (submitted joint comments, commissioned a study, spoke at meetings, press releases, etc.).

The evaluation team identified the following organizations as NEEA partners in the test procedure and energy conservation standard rulemakings:

- Appliance Standards Awareness Project (ASAP)
- Alliance to Save Energy (ASE)
- National Consumer Law Center (NCLC)
- Consumers Union
- American Council for an Energy-Efficient Economy (ACEEE)
- Natural Resources Defense Council (NRDC)
- Northeast Energy Efficiency Partnerships (NEEP)

1.5 Recent Developments

Since the Final Rule was published in January 2020, there have been procedural developments that could impact the energy conservation standard for portable ACs. On May 12, 2025, DOE issued a proposal to withdraw the determination of portable ACs as covered equipment.[1] DOE held a public webinar on May 29, 2025, and is not expected to issue a ruling until after this evaluation report is published.

If DOE were to withdraw the determination of portable Acs as covered equipment, DOE would also withdraw the applicable energy conservation standards for portable Acs:

[1] 90 FR 20876

> *[I]f DOE proceeds with issuing a final withdrawal of the coverage determination for portable ACs, then DOE subsequently lacks the authority to prescribe energy conservation standards for portable ACs. See 42 U.S.C. 6295(o)(2)(A) and (o)(3)(B). For this reason, DOE is also proposing to withdraw the applicable energy conservations standards for portable ACs. (90 FR 20876, 20877)*

As a result, no savings would result from the adoption of the Federal standard, as evaluated in this report.

1.6 State Standards

In general, once a federal standard is established for a product, states cannot set their own standard for that product.[24] In the absence of a federal standard for portable ACs due to DOE's delay in publishing the standards to the Federal Register and subsequent litigation, several states established energy conservation standards for portable ACs. California, Colorado, Vermont, and Washington adopted the federal standard that was adopted on December 5, 2016 but not published to the Federal Register. By doing so, these states increased the minimum efficiency standards for portable ACs during the period when the federal standard was delayed. The Washington State standard, in particular, was adopted in May 2019 and effective on January 1, 2022. This state standard also requires that manufacturers follow the federal test procedure adopted in June 2016 and applies to all portable air conditioners manufactured on or after February 1, 2022, through January 9, 2025.[25]

Although out of the scope of this evaluation, the influence of NEEA and its partners' efforts on the adopted federal standard, as described in this report, can be construed as influenced on the Washington state standard, because the Washington State standard referenced the federal standard and test procedure.

[24] 10 CFR §430.33
[25] WAC 194-24-190

2 Methodology

This section describes the methodology used to evaluate NEEA and its partners' influence on the federal portable AC standard. The data collection approach and its limitations are described first, followed by the methodologies for the qualitative and quantitative assessments.

2.1 Data Collection Approach

To estimate NEEA and its partners' share of savings associated with the portable AC standard, the evaluation team reviewed documents and comments in the dockets for the test procedure and the standard rulemakings and interviewed a sample of stakeholders who participated in the rulemaking processes.

Document Review & Analysis

The evaluation team reviewed the following rulemaking documents associated with the test procedure and the standard rulemakings:

- Test procedure Final Rule
- TSD Final Rule
- Portable AC Final Rule
- Transcripts of public meetings for the test procedure and the standard rulemakings
- Written comments by interested parties submitted to the dockets for the test procedure and the standard rulemakings
- Other publicly available information relating to the standard

For each document reviewed, the evaluation team aimed to answer three key research questions:

1. Which interested parties were most active in the rulemakings and what were their stances regarding the proposed test procedure and standard?
2. What were the key issues to adopting the most stringent standard?
3. What activities did NEEA and its partners undertake to address the key issues?

In-depth Interviews

To understand perspectives of interested parties of the rulemakings, the evaluation team developed a purposive (that is, non-probability) interview sample based on the participation reflected in the dockets, primarily manufacturer associations and energy-efficiency organizations engaged in the standard rulemaking process. The sample was compiled from various sources, including the document review, public meeting attendee lists and transcripts, and recommendations from NEEA staff.

The sample included 41 individuals representing 28 companies and organizations. The 41 individuals in the sample were assigned a high, medium, or low priority based on their involvement in the rulemaking process. Individuals in the high-priority group were contacted first.

After a maximum of five unsuccessful outreach attempts, the evaluation team removed the individual from the sample.

As summarized in Table 3, the evaluation team interviewed eight individuals from seven different organizations. Collectively, the interview respondents represent a cross-section of types of stakeholders who provided insight from different perspectives on the rulemakings. Table 4 summarizes the interviews according to the evaluation team's priority level assignment.

Table 3. Completed In-depth Interviews, by Category

Category	Count in Sample	Completed Interviews
Efficiency or Environmental Organization	16	4
Industry Trade Organization	5	0
Manufacturer, Distributor, Supply Chain	7	2
Utility or Other	13	2
Total Individuals	**41**	**8**
Total Organizations	**28**	**7**

Table 4. Completed In-depth Interviews, by Priority

Priority	Count in Sample	Completed Interviews
High	16	7
Medium	16	1
Low	9	0
Total Individuals	**41**	**8**

The in-depth interview guide included structured and unstructured questions to gather qualitative insights and quantitative ratings of barriers and NEEA activities identified in the document review. In-depth interviews enabled the evaluation team to explore topics raised by the respondent, gather contextual information, and ask clarifying questions.

2.2 Limitations

As with any evaluation, it is important to acknowledge the study limitations that might affect its results. The limitations associated with the in-depth interviews was the primary driver for the evaluation team to rely almost completely on the analysis of rulemaking documents for this evaluation, as summarized in Sections 2.3 and 2.4.

Interview sample. It is important to acknowledge that nearly a decade has passed since the portable AC standard was finalized (2016) and this evaluation effort (2025). This limited the evaluation team's ability to recruit respondents for in-depth interviews because many of the individuals have since retired, changed their employment, and/or their current contact information could not be located.

Another factor is the lack of representation of trade industry associations that were highly engaged in the standard rulemaking in the in-depth interview sample. Representatives of

industry trade associations would have provided an important perspective in the identification of barriers and the effectiveness of activities by NEEA and its partners. Because industry trade associations are not included in the completed interviews for this evaluation (because of nonresponse/refusal to participate, they have since retired or changed their employment, and/or their current contact information could not be located), that perspective is not reflected in the analysis.

Similarly, the interview sample is dominated by representatives of energy efficiency organizations that were NEEA partners, specifically. While their perspective is highly valuable, their recollections may not be representative of others who participated in the rulemakings.

Interview respondent recall. During the interviews, most respondents could not recall details to identify specific barriers and key issues raised through the test procedure or standard rulemakings, nor could they provide ratings of significance of barriers or the effectiveness of NEEA and its partners' activities.[26]

The information learned from the in-depth interviews provided valuable context for this evaluation. However, due to respondent lack of recall, the evaluation team relied completely on the document review for the quantitative analysis and share of savings computation. The shift in the evaluation approach is summarized in Section 2.4. To minimize any researcher bias in the assessment of barrier significance or activity effectiveness, the evaluation approach included a validation process through which the qualitative and quantitative analyses were reviewed by a team member who was familiar with the Final Rule but not involved in the analysis.

2.3 Methodology to Assess NEEA and Partners' Influence

To determine NEEA and its partners' influence on the standard, the evaluation team used the NEEA Standards Initiative Logic Model (Appendix A) as a framework.

As a result of the document review, the evaluation team identified barriers in the logic model that were present in the portable AC standard development process. Additionally, the evaluation team identified activities undertaken by NEEA and its partners, then aligned each activity to one or more identified barriers. Finally, the evaluation team determined the extent to which those activities resulted in the outputs and outcomes shown in the logic model.

This qualitative assessment was primarily based on the detailed review of documents in the dockets. Due to a lack of recall of the interview respondents, information provided during in-depth interviews provided contextual information rather than specific details that supported the analysis.

2.4 Methodology to Estimate Share of Energy Savings from NEEA and Partners' Efforts

To quantitatively estimate the share of savings influenced by NEEA and its partners' activities, the evaluation team followed the framework developed by NEEA and its stakeholders, which has

[26] To assist with recall, the evaluation team provided some respondents with comments they co-signed that were submitted to the docket prior to the scheduled interview.

been used for past standards evaluations. This framework involves identifying barriers to the adoption of the most stringent, technologically feasible, and economically justified standard, then developing a quantitative estimate of the percentage of savings from the standard that each barrier represents; this is referred to as the barrier significance. Adjustment factors that account for the relative significance and effectiveness of activities in reducing each barrier and the role of NEEA and its partners in those activities are then applied to the barrier significance percentage to compute the share of savings influenced by NEEA and its partners.

The key inputs created through the framework to calculate the share of savings are:

a. Significance of the Barrier
b. Relative Significance of Each Activity in Addressing Each Barrier
c. Effectiveness of Activity Relative to All Barriers *(= a x b)*
d. NEEA and its Partners' Role in the Activity
e. Relative Savings Influenced by the Activity *(= c x d)*

The steps the evaluation team took to develop these inputs and compute the share of savings are summarized below.

Identify Barriers and Rate the Significance of Each Barrier

Through the document analysis, the evaluation team identified all barriers to adoption of the most stringent achievable standard, including the barriers not addressed by NEEA and its partners. All identified barriers aligned with the NEEA Standards Initiative Logic Model. Because most interview respondents could not comment on specific issues or opposition due to lack of recall, the evaluation team identified barriers as a result of the detailed document review. The list of barriers was validated by an evaluation team member who was familiar with the Final Rule but not involved in the analysis.

Based on the document analysis, the evaluation team rated the significance of each barrier as "high," "medium," or "low" and a corresponding percentage to represent the significance of the energy savings associated with each barrier. The sum of the percentages for all barriers equals 100%.

Because ratings for barriers were not provided by interview respondents due to lack of recall, the evaluation team considered the following factors to rate the significance of each identified barrier:

- Issue or opposition was mentioned by an interview respondent, in a statement made in a public meeting, or in written comments submitted to the docket
- Issue or opposition was raised by more than one interested party
- An interested party requested additional data or analysis to support or refute an issue or opposition
- DOE requested or required additional data or analysis to support or refute an issue or opposition
- An interested party requested extension of the comment period to further investigate an issue or opposition.

The ratings and percentages of barrier significance were assigned by the evaluation team member who conducted the document review and were validated by an evaluation team member who reviewed the Final Rule but who did not participate in the analysis process.

Identify Activities and Rate the Relative Significance of Each Activity for Each Barrier

Using information gathered from the interviews and the document review, the evaluation team identified the activities that NEEA and its partners undertook to overcome the identified barriers. The evaluation team then assigned a percentage to each activity to represent its significance relative to other activities associated with the same barrier. If there was only one barrier, the percentage of significance of the activity would be set equal to the significance percentage of the barrier. If there was more than one activity associated with the same barrier, the evaluation assigned a percentage to each activity such that the sum of the percentages of all activities for the same barrier equals the percent significance of the barrier.

Rate the Effectiveness of All Activities

The evaluation team used the document analysis and professional judgment to rate the effectiveness of each activity on addressing the barriers, using the rubric in in Table 5.

Table 5. Activity Effectiveness Designations

Activity Effectiveness	Percent Assigned	Description
High	60%	Achieved the desired outcome(s).
Medium	40%	Achieved some of the desired outcomes, but not all.
Low	20%	Achieved very little of the desired outcome(s) or achieved outcomes with little impact on energy savings.
Not effective	0%	Did not achieve any of the desired outcomes during this rulemaking.

The evaluation team determined if the action resulted in the desired outcome in the Final TSD and the Final Rule. Evidence of activity effectiveness was determined as a result of the analysis of rulemaking documents and other documentation provided by NEEA. The evaluation team considered the following factors to rate the significance of each identified activity:

- NEEA and its partners' position on a particular aspect of the analysis standard was reflected in Final TSD or the Final Rule (i.e., DOE adopted NEEA and its partners' recommendations)
- NEEA or its partners were cited in Final Rule
- The evaluation team identified evidence of non-public engagement (strategy emails, meetings, etc. that were not submitted to the docket)

The assigned percentages were consistently used for each rating across standards evaluations conducted for NEEA, with exceptions made for activities that may have had a much larger or much smaller influence on overcoming the intended barrier. Rationale is provided if the percentages deviate from this standard.

Rate the Role of NEEA and its Partners in Each Activity

The evaluation team used the document analysis and professional judgment to determine the role of NEEA and its partners in each activity, following the rubric in Table 6. The assigned percentages were consistently used for each role across standards evaluations conducted for NEEA, with exceptions made only if other interested parties played a much greater or smaller role in the activity to influence the standard. The rationale is provided if the percentages deviated from this standard in the analysis for this standard.

Table 6. Role of NEEA and its Partner's Designations

Role of NEEA and Partners	Percent Assigned	Description
Primary	50%	NEEA and its partners either led the effort themselves or led an effort to support the standard.
Major	30%	NEEA and its partners did not lead but contributed significantly to an activity.
Minor	15%	NEEA and its partners contributed, but not significantly, to an activity.

Compute the Share of Savings from NEEA and Partners' Activities

The evaluation team computed the share of savings as a result of each activity by multiplying the barrier significance of each activity by the effectiveness of each activity and the relative role of NEEA and partners. This calculation estimated the savings from each activity as a percentage of total savings from the standard. Summing these percentages results in the share of total savings (as a percentage) influenced by NEEA and its partners' activities.

The significance of each barrier as we as the number of barriers and activities strongly impacts the resultant share of savings percentage. Lower-rated barriers and/or fewer barriers or activities will lead to lower activity effectiveness relative to all barriers, and the relative savings influenced by the activity scores. For example, a barrier rated with a 10% significance, high-rated effectiveness (60%), and a primary role (50%) for the activity will account for less of the total share of savings compared to a barrier with a 20% significance with the same effectiveness and role percentages. The significance of the barrier is the key driver of the share of energy savings influenced by the activity.

3 Results

3.1 Qualitative Assessment of NEEA and Partners' Influence

This section presents the results of the qualitative assessment conducted by the evaluation team following the approach described in Section 2.

Table 7 through Table 10 present the qualitative assessment of NEEA and its partners' influence on the portable AC standard using NEEA's Standards Initiative Logic Model as a framework. NEEA and its partners exerted their most significant influence by analyzing the DOE's proposed test procedure and standard documents and participating in DOE's public meetings for both rulemakings.

This analysis reveals that NEEA and its partners partially impacted the portable AC standard. Among many detailed technical comments and recommendations, NEEA and its partners urged DOE to incorporate alternative refrigerants (R-32 and propane) and recommended design considerations to increase the energy efficiency of higher TSLs in DOE's analysis. DOE incorporated some of NEEA and its partners' recommendations, including allowing R-32 as a refrigerant, which is estimated to increase the efficiency of a related product, packaged terminal AC (PTACs). Ultimately, DOE adopted TSL 2 as the standard, a lower level than NEEA and its partners recommended, but higher than what the manufacturers and industry trade associations advocated.

The fact that the rulemakings covered by this evaluation developed the inaugural test procedure and standard for portable ACs is important, but it may not be reflected well in the analysis framework; the NEEA Standards Logic Model spans a single rulemaking cycle. While striving to influence the adoption of the most stringent, technologically feasible, and economically justified standard is the objective of NEEA and its partners, much of their work has a long-term horizon beyond that of a single rulemaking. As such, the influence of their work is cumulative from the initial standard through future test procedures and standard amendments.

> "The indirect impact of all of these players is undervalued. The regulatory agencies tend to want to [evaluate] it by direct cause and effect indicators.
>
> … The effect is over a much longer time and much broader.
>
> *- Interview respondent (utility representative)*

In-depth interview respondents explained that part of the underlying strategy for influencing the product's first standard is establishing an acceptable test procedure and standard that will provide a solid foundation for future revisions. Indeed, some of the efforts for a first standard are to acclimate the industry to the regulation and continue to progress through future standards. Evaluations of the influence of NEEA and its partners on future standards amendments should reference and incorporate the findings of this evaluation to qualitatively characterize persistence of barriers and longevity of NEEA and partner engagement over time.

Table 7. Qualitative Analysis of NEEA and its Partners' Influence **- Activities**

Box # in Logic Model	Activity Description (From the NEEA Standards Logic Model)	Did NEEA and partners have a role in the activity?	Findings
1	Negotiate with manufacturers	No	There is no evidence that NEEA and its partners negotiated with manufacturers for the standard.
2	Attend public meetings held by DOE	Yes	A representative of ASAP, a partner of NEEA, attended and made oral comments at all public meetings held by DOE for the Test Procedure and the Energy Conservation Standard rulemakings on 3/18/2015 and 7/20/2016. Additionally, representatives of ACEEE and NRDC, partners of NEEA, attended the public meeting on 7/20/2016. The NRDC representative made oral comments at this meeting in support of ASAP's comments.
3	Analyze and comment on advocate and manufacturer comments and rulemaking documents	Yes	NEEA and its partners analyzed DOE's analysis and other documents in the dockets for the Test Procedure and the Energy Conservation Standard rulemakings. ASAP, ASE, Consumers Union, and NEEA submitted joint comments on the Preliminary TSD on 4/28/2015. ASAP, ASE, ACEEE, NRDC, NEEP, and NEEA submitted joint comments on the NOPR on 9/27/2016
4	Conduct primary research to create data for standards	No	There is no evidence that NEEA and its partners conducted primary research or collected data for this standard.
5	Provide savings and economic analyses based on Northwest data	No	There is no evidence that NEEA and its partners provided savings or analyses based on Northwest data for this standard.
6	Collaborate with other advocates	No	There is no evidence that NEEA and its partners collaborated with other advocates for this standard.
7	Encourage utilities to provide data and support for standards	No	There was no evidence that NEEA and its partners collaborated with utilities to participate in or provide data for the rulemaking process.
8	Work with NEEA initiatives to increase market penetration and create paths from voluntary to mandatory requirements	No	There was no NEEA initiative for portable ACs prior to or during the Test Procedure or Energy Conservation Standard rulemakings.

Table 8. Qualitative Analysis of NEEA and its Partners' Influence **- Outputs**

Box # in Logic Model	Output Description	Did NEEA and its partners provide any outputs?	Findings
9	Consensus-based proposals to submit to DOE or better general understanding of manufacturer positions and concern	No	There were no consensus-based proposals or joint statements made by NEEA and its partners with manufacturers.
10	Written comments and each opportunity during a rulemaking Participation and oral comments during public meetings	Yes	Transcripts of the public meetings held by DOE verify attendance by representatives of ASAP (on 3/18/2015) and of ASAP, ACEEE, and NRDC (on 7/20/2016). ASAP made oral comments at all meetings. NRDC made oral comments during the 7/20/2016 meeting. NEEA and its partners submitted joint comments for the Test Procedure and the Energy Conservation Standard rulemakings.
11	Initiative logic models refer to the creation of standards	No	There was no NEEA initiative for portable ACs during the rulemaking process.

Table 9. Qualitative Analysis of NEEA and its Partners' Influence **- Outcomes**

Box # in Logic Model	Outcome Description	Is there evidence that NEEA and its partners influenced these outcomes?	Findings
12	Disparity in positions between parties is decreased	No	Despite the general consensus among interested parties in support of a test procedure and federal standard for portable ACs, AHAM and manufacturers opposed specific aspects of DOE's proposed test procedure and analysis for the proposed standard. This opposition was largely due to a lack of performance and market data. DOE requested data from interested parties, and manufacturers tested additional units (following the new test procedure) and provided test data to DOE. There is no evidence that NEEA and its partners provided data or analysis. AHAM and manufacturers advocated for the lowest standard possible (TSL 1) to minimize product re-design and opposed aspects of the standard that were associated with higher TSLs. There is no available evidence that NEEA and its partners provided information or analysis that reduced manufacturer opposition to higher TSL levels.

Box # in Logic Model	Outcome Description	Is there evidence that NEEA and its partners influenced these outcomes?	Findings
13	NEEA and its partners add valuable information or analysis at each stage of the rulemaking process	Yes	NEEA and its partners submitted comments to the docket at all opportunities during the rulemaking. (See above) NEEA and partners attended all public meetings held by DOE. (See above)
14	NEEA and its partners' information or analysis is referenced in rulemaking documentation	Yes	In the Final Rule, DOE cited ASAP and its partners' written comments pertaining to numerous aspects of the DOE's analysis for test procedure and the standard.
15	Utilities are present at hearings or publicly support new standards	No	No utility representatives are listed in attendance at the 3/18/2015 or 7/20/2016 public meetings. While representatives of the California investor-owned utilities (IOUs) submitted written comments to the standard rulemaking, the California IOUs submitted separate comments of their own rather than co-signing comments with NEEA and its partners. The evaluation team did not find evidence to consider the California IOUs as partners with NEEA for this standard.

Table 10. Qualitative Analysis of NEEA and its Partners' Influence **- Impact**

Box # in Logic Model	Impact Description	Is there evidence that NEEA and partners impacted the adoption of the standard?	Findings
16	Adoption of the highest standards that are technologically feasible and economically justified	Partial	DOE accepted some, but not all, of the recommendations set forth by NEEA and its partners in oral and written comments submitted to the Energy Conservation Standard rulemaking docket. DOE did not adopt the most stringent standard (TSL 4). NEEA and its partners recommended that DOE adopt TSL 3 for the standard, but DOE adopted TSL 2 in its Final Rule.

3.2 Share of Energy Savings from NEEA and Partners' Efforts

This section presents the quantitative analysis of the significance of barriers to adopting the most stringent, technologically feasible and economically justified standard, the effectiveness of the activities in which NEEA and its partners participated, and their respective roles in each activity.

Table 11 presents the share of savings influenced by NEEA and its partners' activities during the inaugural standard rulemaking for portable ACs. **The evaluation team estimates that the total share of savings influenced by NEEA and its partners' activities for portable ACs is 9.1%.**

Additionally, this section summarizes the rationale for quantifying the barrier significance, each activity's effectiveness, and NEEA and its partners' role.

Table 11. Estimated Share of Savings

		Barriers								
Share of Savings Inputs		Manufacturer Opposition		Lack of Data		Lack of common interest among stakeholders	Insufficient funding/staff DOE	Insufficient market adoption of more efficient options		Cyclical political opposition
a	Relative significance for energy savings	Medium		High		N/A	N/A	Medium		N/A
	Significance of barrier (%)	27.5%		45.0%		N/A	N/A	27.5%		N/A
	Significance of activity relative to the barrier (%)	9.2%	18.3%	15.0%	30.0%	N/A	N/A	9.2%	18.3%	N/A
b	Activity	NEEA and partners attended public meetings for the Test Procedure and the Energy Conservation Standard	NEEA and partners analyzed Test Procedure and Energy Conservation Standard rulemaking documents	NEEA and partners attended public meetings for the Test Procedure and the Energy Conservation Standard	NEEA and partners analyzed Test Procedure and Energy Conservation Standard rulemaking documents	N/A	N/A	NEEA and partners attended public meetings for the Test Procedure and the Energy Conservation Standard	NEEA and partners analyzed Test Procedure and Energy Conservation Standard rulemaking documents	N/A
	Outcome	Record of attendance and oral comments during public meetings	NEEA and partners submitted written comments to the dockets	Record of attendance and oral comments during public meetings	NEEA and partners submitted written comments to the dockets	N/A	N/A	Record of attendance and oral comments during public meetings	NEEA and partners submitted written comments to the dockets	N/A
	Effectiveness of activity in addressing barrier	Low	Medium	Low	Low	N/A	N/A	Not effective	Not effective	N/A
	Effectiveness of activity in addressing barrier (%)	20.0%	40.0%	20.0%	20.0%	N/A	N/A	0%	0%	N/A
c	Effectiveness of activity relative to ALL barriers (a x b) (%)	1.8%	7.3%	3.0%	6.0%	N/A	N/A	0%	0%	N/A
d	NEEA and its partners' role compared to other stakeholders	Primary	Primary	Primary	Primary	N/A	N/A	N/A	N/A	N/A
	NEEA and its partners' relative role in activity (%)	50.0%	50.0%	50.0%	50.0%	N/A	N/A	50.0%	50.0%	N/A
e	Relative savings influenced by the activity (c x d) (%)	0.9%	3.7%	1.5%	3.0%	N/A	N/A	0.0%	0.0%	N/A
									Total Share of Savings	**9.1%**

Barrier 1: Manufacturer opposition to regulation or more stringent standards

Significance of Barrier: **Medium (27.5%)**

As evident from comments submitted to the dockets and summarized in the January 2020 Final Rule, AHAM and manufacturers opposed various aspects of DOE's analysis for the proposed test procedure and standard. Some of the most prevalent comments in opposition to the proposed standard include:

- AHAM and manufacturers advocated that DOE adopt the lowest efficiency level for the standard (TSL 1).
- AHAM and manufacturers opposed a single product class in the standard that would set the same minimum efficiency requirement for single- and dual-duct configurations. AHAM and manufacturers advocated for separate product classes because single- and dual-duct units have different utilities and may have different applications. Further, they claimed that a single product class will push single-duct units out of the market.
- AHAM opposed DOE's proposed test procedure because it modified the existing industry standard test procedure to incorporate air infiltration in the SACC measurement.
- AHAM argued that third-party testing labs needed more time to understand and implement the new test procedure and requested that DOE extend the comment period for the proposed standard to allow time for manufacturers to test their products to evaluate DOE's proposed standard.
- AHAM opposed allowing alternative refrigerants to comply with the proposed standard. AHAM stated that DOE's analysis should evaluate refrigerant alternatives under the Significant New Alternative Policy (SNAP)[27] and their relative impact on efficiency and capacity.

Activity 1-1: NEEA and partners attended public meetings for the test procedure and the standard rulemakings

Effectiveness of Activity: **Low**
NEEA & Partners Role: **Primary**
Share of Savings: **0.9%**

A representative of ASAP, a partner of NEEA, attended and made oral comments during the public meetings held by DOE for the Test Procedure and the Energy Conservation Standard rulemakings on 3/18/2015 and 7/20/2016. Additionally, representatives of ACEEE and NRDC, partners of NEEA, attended the public meeting on 7/20/2016.

The effectiveness of this activity is low because ASAP's oral comments and questions during public meetings pertained to some, but not all, key aspects of the standard related to higher TSLs. Further, ASAP's comments did not address all the issues raised by AHAM and manufacturers.

[27] SNAP is a program administered by the U.S. Environmental Protection Agency that evaluates alternatives to ozone-depleting chemicals, including refrigerants. According to the portable AC standard Final Rule published on January 10, 2020, the SNAP final rule "limits the maximum allowable charge of alternative refrigerants in portable ACs." (85 FR 1394)

ASAP's oral comments pertained to the following:

- ASAP strongly supported a single product class for the standard covering both single- and dual-duct configurations. ASAP agreed with DOE's assessment that multiple product classes were not justified. DOE's proposed standard specified a single product class, which was adopted in the final standard.
- ASAP urged DOE to adopt TSL 3 and to consider additional ways to improve portable AC efficiency that were not reflected in DOE's analysis. Most notably, ASAP disagreed with DOE's decision to screen out alternative refrigerants and urged DOE to consider R-32 as an alternative refrigerant. ASAP cited one manufacturer's claim of a 10% reduction in energy use with R-32 in PTACs, a similar product to portable ACs. DOE did not consider R-32 as a refrigerant, even though manufacturers could use R-32 to meet a TSL 3 standard.
- ASAP advocated that DOE consider variable speed compressors, emphasizing that they improve both part load and full load efficiency. DOE included variable speed compressors in the final analysis of the standard.

Activity 1-2: NEEA and partners analyzed Test Procedure and Energy Conservation Standard rulemaking documents

As noted previously, ASAP, ASE, Consumers Union, and NEEA submitted joint comments on the Preliminary TSD. ASAP, ASE, ACEEE, NRDC, NEEP, and NEEA submitted joint comments on the NOPR.

The joint comments addressed numerous aspects of the standard related to increased portable AC efficiency. The comments recommended that DOE adopt TSL 3 for the standard. Even though DOE did not adopt TSL 3, the final standard reflected some of the input and recommendations provided in the written comments.

The joint comments addressed numerous technical issues, including the following:

- Supported a single product class for the standard that covers both single- and dual-duct configurations. DOE's proposed standard specified a single product class, which was adopted in the final standard.
- Disagreed that DOE's analysis screened out alternative refrigerants and urged DOE to consider alternative refrigerants, such as R-32 and propane. The joint comments emphasized that several portable ACs in the market use R-32 and, therefore, use of R-32 refrigerants is technologically feasible. The comments cited a manufacturer's claim of a reduction in energy use of 10% from using R-32 in PTACs. DOE incorporated this recommendation and allowed R-32 as an alternative refrigerant in the final standard.
- Recommended that DOE consider several design options that had been excluded from the analysis to increase portable AC efficiency, such as microchannel heat exchangers and duct connection improvements. DOE screened out insulated ducts and microchannel heat exchangers as design options in the final analysis.
- Supported other efficiency improvements for DOE's analysis, such as variable speed compressors and additional heat exchanger area. DOE included variable speed compressors in the final analysis.

Barrier 2: Lack of data with which to conduct the necessary analysis in a rulemaking

Significance of Barrier: **High (45%)**

As evident from comments submitted to the dockets and summarized in the January 2020 Final Rule, AHAM and some manufacturers opposed DOE's analysis for the portable AC standard, stating that DOE's analysis was based on "insufficient and inaccurate data."[28] This barrier is rated as "high" significance because AHAM's comments relating to lack of data were prominent in both the test procedure and standard rulemakings. AHAM submitted multiple requests to DOE, including requests to extend the NOPR comment period, a request for clarification of the test procedure protocols, and a request that DOE provide its test data and specific portable AC models tested for DOE's analysis.

- AHAM and manufacturers opposed DOE's proposed standard primarily due to the lack of data on portable AC performance according to the new test procedure. The test procedure Final Rule was issued on 6/1/2016, giving manufacturers insufficient time to understand the new procedure and contract with third-party labs to conduct testing. "[the proposed standard] is based on a very recently finalized test procedure with which stakeholders have little experience and have not been able to use to fully vet the analysis."[29]
- AHAM and manufacturers opposed the use of room AC data as a proxy for cooling mode hours of use in DOE's analysis.
- AHAM opposed DOE's analysis for the NOPR, stating it must be based on "product-specific data, not assumptions and estimates."[30] For example, AHAM opposed DOE's proposed modifications of the existing industry test procedure to account for the effects of infiltration air, stating that the proposed modifications were based on assumptions rather than data.

Activity 2-1: NEEA and partners attended public meetings for the Test Procedure and the Energy Conservation Standard

Effectiveness of Activity: **Low**
NEEA & Partners Role: **Primary**
Share of Savings: **1.5%**

During the July 20, 2015, public meeting, a representative of ASAP, a partner of NEEA, expressed support for using room AC or dehumidifier lifetime data in DOE's analysis, "given the similarities of the products and the components that make up those products."[31] Even though ASAP addressed one of AHAM's points, highlighting the lack of sufficient data, the effectiveness of this activity is "low"

[28] Association of Home Appliance Manufacturers (2015, April 28). "AHAM Comments on DOE's Preliminary Technical Support Document for Energy Conservation Standards for Portable Air Conditioners; Docket No. EERE-2013-BT-STD-0033; RIN 1904-AD02." p.5.
[29] Association of Home Appliance Manufacturers (2016, Sept 26). "AHAM Comments on DOE's NOPR for Energy Conservation Standards for Portable Air Conditioners; Docket No. EERE-2013-BT-STD-0033; RIN 1904-AD02." p.2.
[30] Association of Home Appliance Manufacturers (2015, April 28). "AHAM Comments on DOE's Preliminary Technical Support Document for Energy Conservation Standards for Portable Air Conditioners; Docket No. EERE-2013-BT-STD-0033; RIN 1904-AD02." p.1.
[31] U.S. Department of Energy (2016, July 20) Portable Air Conditioners Energy Conservation Standards Meeting.

because ASAP's oral comments did not address other concerns about the lack of data presented by AHAM and manufacturers.

Activity 2-2: NEEA and partners analyzed Test Procedure and Energy Conservation Standard rulemaking documents

ASAP, ASE, Consumers Union, and NEEA submitted joint comments on the Preliminary TSD and ASAP, ASE, ACEEE, NRDC, NEEP, and NEEA submitted joint comments on the NOPR.

Effectiveness of Activity: **Low**
NEEA & Partners Role: **Primary**
Share of Savings: **3.0%**

The effectiveness of this activity is "low" because the joint comments did not address the lack of data issue raised by AHAM and manufacturers.

- The joint comments reiterated oral comments that supported DOE's use of room AC data as a proxy for portable AC lifetime and cooling capacity hours of use. NEEA and its partners did not provide research or primary data to support this stance.
- NEEA and its partners did not provide data to DOE to address AHAM's concerns. AHAM, however, eventually submitted test data from some of its members to be included in DOE's analysis.

Barrier 3: Lack of common interest among certain stakeholders

There was no evidence that a lack of common interest among certain stakeholders was a barrier to adopting the standard. As such, this barrier is excluded from the share of savings analysis.

Barrier 4: Insufficient funding/staff for U.S. DOE to run standards processes

There was no evidence that insufficient DOE staffing or funding was a barrier to adopting the standard. As such, this barrier is excluded from the share of savings analysis.

Barrier 5: Insufficient market adoption of more efficient product models prior to when the standards process begins

Significance of Barrier: **Medium (27.5%)**

As evident from comments submitted to the docket and summarized in the January 2020 Final Rule, AHAM, and some manufacturers opposed DOE's analysis for the portable AC standard because DOE's analysis was based upon products that were not available in the market and therefore should not be represented in the analysis.

AHAM claimed that 17% of the units in DOE's test data, which included the additional test data provided by AHAM, would meet TSL 2. Therefore, TSL 2 and higher were not economically justified or technically feasible because most products must be redesigned to meet TSL 2. Indeed, in the Final Rule, DOE acknowledged that the highest efficiency level (max-tech) would require a significant redesign of all products in the market at the time.

Further, in the proposed standard, DOE noted that compressor availability for portable ACs is driven by the room AC industry and that the most efficient compressors may not be available over the range of capacities for all portable AC products. As a result, DOE posited that adopting

TSL 3 or TSL 4 could result in manufacturers removing certain portable AC cooling capacities from the market due to an insufficient supply of compressors.

This barrier's significance is rated "medium" because this opposition was part of AHAM and the manufacturer's argument to DOE to adopt TSL 1, the lowest proposed standard.

Activity 5-1: NEEA and partners attended public meetings for the Test Procedure and the Energy Conservation Standard

The oral comments by the representative of ASAP, a NEEA partner, on July 20, 2016, refuted DOE's concerns that manufacturers lack the availability of high-efficiency compressors to produce units that will meet higher TSLs. ASAP stated that manufacturers would have enough time (five years) and enough "market momentum" to meet the standards.

ASAP's comments also highlighted that compressor efficiencies and availability are not static. "It is reasonable to expect that the available efficiencies of both single-speed and variable-speed compressors will increase in the years before the standard takes effect."[32]

ASAP's comments were ineffective because DOE did not adopt TSL 3, and NEEA and its partners did not provide data or research to substantiate them.

Activity 5-2: NEEA and partners analyzed Test Procedure and Energy Conservation Standard rulemaking documents

The joint comments on the NOPR submitted by ASAP, ASE, ACEEE, NRDC, NEEP, and NEEA posited that DOE's concerns about the lack of available products and higher efficiency compressors were unfounded. The comments countered DOE's logic:

- Because this is a new standard, manufacturers will have five years before compliance is required. Therefore, manufacturers and component suppliers will have adequate time to develop new products and ensure an adequate supply of high efficiency compressors.
- DOE claimed that the room AC production would impact compressor availability for portable ACs; however, ASAP noted that the high-volume market for room AC will likely increase the production of high-efficiency compressors rather than create a shortage.

Again, the joint written comments were ineffective because DOE did not adopt TSL 3, and NEEA and its partners did not provide data or research to substantiate their comments.

[32] ASAP et. al. (2016, September 26) "Docket Number EERE-2013-BT-STD-0033/RIN 1904-AD02: Notice of Proposed Rulemaking of Portable Air Conditioners."

Barrier 6: Cyclical political opposition to regulation

There was no evidence that cyclical political opposition to regulation was a barrier to adopting the standard. As such, this barrier is excluded from the share of savings analysis.

As mentioned in Section 1.2 and shown in Figure 1, the length of time between the TSD Final Rule (December 2016) and when the standard Final Rule was published in the Federal Register (January 2020) is not typical for DOE's federal standard development process. After DOE adopted the standard in its TSD Final Rule, the mandatory 45-day correction period extended into early 2017, which coincided with the transition from the Obama administration to the Trump administration. However, under the new Trump administration, DOE did not publish the Final Rule, preventing the standard from being enacted. Two separate lawsuits – one led by NRDC and one by California and New York - were filed against the DOE for not publishing the standard. After several years of litigation, DOE published the Final Rule in the Federal Register in response to a court order.

The adopted standard in the Final Rule published on January 10, 2020, was unchanged from the standard adopted in the TSD Final Rule in December 2016. The evaluation team, therefore, concludes that cyclical political opposition due to the transition to the Trump administration was not a barrier to establishing the most stringent standard possible because it occurred after the standard rulemaking was complete and ultimately did not change the final adopted standard. Finally, even though NRDC is considered a NEEA partner during the standards rulemaking process, NEEA does not participate in any legal procedures after the standard is complete, as was the case for the portable AC standard.

4 Savings Duration

Currently, NEEA assumes the savings resulting from its work on a standard to be ten years long. This duration of savings assumes that the market would have independently arrived at the same efficiency specified in the standard ten years after the standards compliance date. In 2019, a third-party analysis was conducted for NEEA's internal use. This review did not identify any compelling evidence supporting using a different savings duration. Likewise, no evidence was found in the present research to suggest that a different duration of savings should be used for the portable AC standard. The evaluation team supports ten years as a reasonable duration for the savings from these standards.

5 Future Energy Savings

Insofar as the rulemakings covered by this evaluation adopted the first test procedure and standard for portable ACs, NEEA and its partners have a significant opportunity to influence future standards.

In fact, on May 15, 2023, DOE issued a Final Rule for a new test procedure in EERE-2020-BT-TP-0029.[33] This new test procedure "provides more representative measures of cooling capacity and energy consumption."[34] NEEA, the Northwest Power and Conservation Council, and a separate coalition of other efficiency organizations participated in the rulemaking.

There is an opportunity for future savings through a more stringent future standard, should DOE issue a NOPR to amend the energy conservation standard of portable ACs. Interview respondents emphasized that the value and influence of NEEA in the standard development process is by providing market data and field research that substantiates DOE's analysis or is incorporated in DOE's analysis to support adoption of the highest TSL. Doing so for future standards amendments could influence future portable AC baseline efficiency as a result of the standard, and therefore savings.

[33] 88 FR 31102
[34] Ibid.

6 Conclusions and Recommendations

6.1 Conclusions

As a result of a detailed review of documents in the test procedure and standards rulemaking dockets, this evaluation concludes that NEEA and its partner organizations somewhat influenced the portable AC standard adopted by the January 10, 2020, Final Rule.

The evaluation team identified three barriers to the adoption of the most stringent standard:

Manufacturer opposition to regulation or more stringent standards. AHAM and Manufacturers opposed numerous aspects of DOE's proposed test procedure and standard and advocated that DOE adopt the lowest efficiency level (TSL 1). For example, manufacturers opposed a single product class for both single- and dual-duct configurations. They opposed a test procedure that modified the industry standard procedure to account for air infiltration in the measurement of SACC. Manufacturers also opposed design options in higher TSLs and opposed allowing alternative refrigerants.

Lack of data with which to conduct the necessary analysis in a rulemaking. Because there was no federal test procedure or standard before the rulemakings and the test procedure had not been adopted before the standard NOPR, manufacturers argued that they did not have sufficient time to evaluate the proposed standard using the new test procedure. Manufacturers also claimed that DOE did not have sufficient test data on portable AC performance to support adopting a standard.

Insufficient market adoption of more efficient product models prior to when the standards process begins. Manufacturers opposed DOE's analysis, stating that portable ACs to meet TSL 4 did not yet exist in the market. DOE also noted that compressors are required to meet TSL 3 and TSL 4.

The key activities by NEEA and its partners to influence the test procedure and standard included:

- A representative of ASAP, a NEEA partner, attended and made oral comments at all public meetings regarding the proposed test procedure and standards. Representatives of ACEEE and NRDC, also NEEA partners, attended the public meeting regarding the proposed standard.
- NEEA and its partners analyzed DOE's analysis and documents for the test procedure and standard rulemakings. As a result, ASAP submitted written comments co-signed by NEEA and other partners.

The evaluation team concludes that NEEA and its partners had a lead role in influencing a more stringent standard because ASAP was the most active and prominent "efficiency advocate" among the interested parties represented at DOE's public meetings and that submitted written comments.

Table 12 summarizes activities conducted by NEEA and its partners to overcome the identified barriers, along with the evaluation team's assessment of their effectiveness. The evaluation team concludes that these activities were somewhat effective. DOE adopted some but not all of NEEA and its partners' recommendations, but ultimately adopted TSL 2 instead of TSL 3. Further, NEEA and its partners' efforts did not directly address some of the key points of manufacturer opposition and did not provide data or research to substantiate the adoption of TSL 3 or TSL 4.

Table 12. Summary of Activities to Address Barriers

Barrier	Activity	Effectiveness
Manufacturer opposition to regulation or more stringent standards.	NEEA and partners attended public meetings for the test procedure and the standard rulemakings	Low
	NEEA and partners analyzed Test Procedure and Energy Conservation Standard rulemaking documents	Medium
Lack of data with which to conduct the necessary analysis in a rulemaking.	NEEA and partners attended public meetings for the test procedure and the standard rulemakings	Low
	NEEA and partners analyzed Test Procedure and Energy Conservation Standard rulemaking documents	Low
Insufficient market adoption of more efficient product models prior to when the standards process begins.	NEEA and partners attended public meetings for the test procedure and the standard rulemakings	None
	NEEA and partners analyzed Test Procedure and Energy Conservation Standard rulemaking documents	None

Overall, the total share of savings from the portable AC standard due to NEEA and its partners' activities is 9.1%.

6.2 Recommendations

The evaluation team offers three recommendations for NEEA to consider:

State Standards for Portable ACs. If DOE proceeds with rescinding the coverage determination, then DOE would lack the authority to require test procedures, compliance, reporting, and enforcement of a federal energy conservation standard and test procedure for portable ACs. The withdrawal of the federal standard would create an opportunity for a standard at the state level. The evaluation team recommends that NEEA and its partners pivot efforts to extend the effective date of, ensure the availability of a referenceable test procedure, potentially amend the portable AC standard in Washington, and to engage with key stakeholders to influence the adoption of the standard in other Northwest states. In the absence of a federal standard and test procedure, the adoption and alignment of state standards could create regional influence with manufacturers to continue to supply higher-efficiency models in the Northwest market.

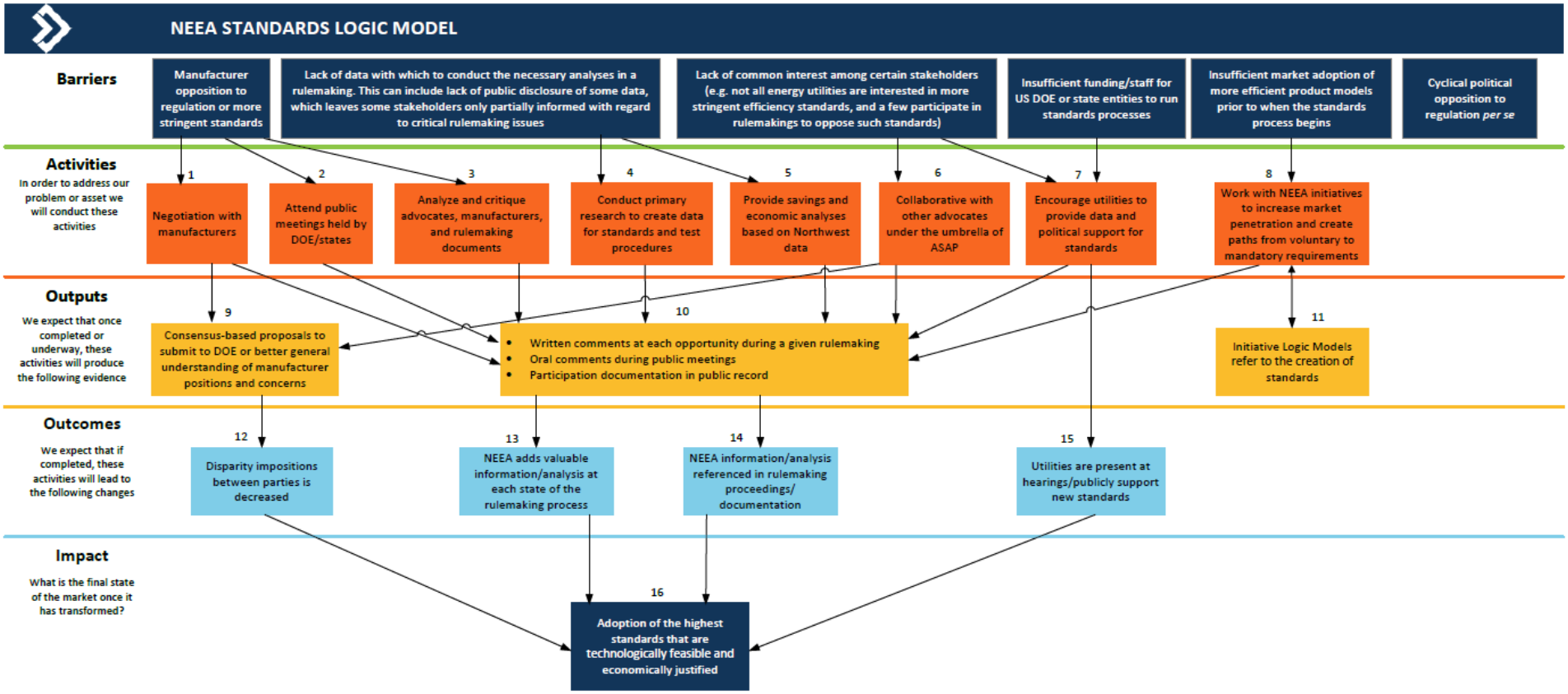
The most significant barrier identified in this evaluation is the lack of data to support adoption of a higher TSL and NEEA's efforts to influence the adoption of state standards can leverage the body of research on residential heating and cooling equipment use and energy consumption that has grown significantly since the federal rulemaking (such as the most recent RBSA and RECS datasets). NEEA and its partners should also conduct primary research as needed to address gaps in research and data that will substantiate claims and assumptions in DOE's analysis in the federal rulemaking, such as (but not limited to) hours of use and time of use in cooling mode, unit lifetime, and other market and demographic data.

Considerations for Incorporating Cumulative Influence of NEEA and its Partners. The NEEA Standards Logic Model represents a single standards development cycle and the current framework does not reflect the *cumulative* impact of NEEA and its partners' influence through multiple test procedures and standards rulemakings. Evaluations of the influence of NEEA and its partners on future portable AC standards amendments, at a minimum, should reference and incorporate the findings of this evaluation to qualitatively characterize the persistence of barriers and the longevity of NEEA and partner engagement over time.

Aside from the portable AC standard specifically, the evaluation team recommends that NEEA consider if the Standards Logic Model should and can be modified to reflect the longer-term cumulative influence across multiple standards revisions rather than a single rulemaking. This may better align with the long-term rationale of NEEA and its partners' efforts.

Contemporaneous Documentation of Activities and Engagement. DOE's standards rulemakings are typically completed within three years. To ensure the evaluation accurately accounts for all activities of NEEA and its partners, including engagement with manufacturers and industry associations, the evaluation team recommends that NEEA Codes and Standards staff maintain contemporaneous notes to be available as documentation for the evaluation. The evaluation team understands that NEEA has adopted a process for NEEA staff to document their efforts and encourages NEEA to continue that practice. Doing so will be particularly valuable to reflect engagement with manufacturers and trade associations, as they have declined to participate in this and other similar standards evaluations.

Appendix A | NEEA Standard Logic Model


NEEA STANDARDS LOGIC MODEL
Barriers
Manufacturer opposition to regulation or more stringent standards
Lack of data with which to conduct the necessary analyses in a rulemaking. This can include lack of public disclosure of some data, which leaves some stakeholders only partially informed with regard to critical rulemaking issues
Lack of common interest among certain stakeholders (e.g. not all energy utilities are interested in more stringent efficiency standards, and a few participate in rulemakings to oppose such standards)
Insufficient funding/staff for US DOE or state entities to run standards processes
Insufficient market adoption of more efficient product models prior to when the standards process begins
Cyclical political opposition to regulation per se
Activities
In order to address our problem or asset we will conduct these activities
1 Negotiation with manufacturers
2 Attend public meetings held by DOE/states
3 Analyze and critique advocates, manufacturers, and rulemaking documents
4 Conduct primary research to create data for standards and test procedures
5 Provide savings and economic analyses based on Northwest data
6 Collaborative with other advocates under the umbrella of ASAP
7 Encourage utilities to provide data and political support for standards
8 Work with NEEA initiatives to increase market penetration and create paths from voluntary to mandatory requirements
Outputs
We expect that once completed or underway, these activities will produce the following evidence
9 Consensus-based proposals to submit to DOE or better general understanding of manufacturer positions and concerns
10
Written comments at each opportunity during a given rulemaking
Oral comments during public meetings
Participation documentation in public record
11 Initiative Logic Models refer to the creation of standards
Outcomes
We expect that if completed, these activities will lead to the following changes
12 Disparity impositions between parties is decreased
13 NEEA adds valuable information/analysis at each state of the rulemaking process
14 NEEA information/analysis referenced in rulemaking proceedings/ documentation
15 Utilities are present at hearings/publicly support new standards
Impact
What is the final state of the market once it has transformed?
16 Adoption of the highest standards that are technologically feasible and economically justified