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# NEEA Fluorescent Lamp Ballast Standard Evaluation: Final Report

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## 1 EXECUTIVE SUMMARY

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On behalf of the Northwest Energy Efficiency Alliance (NEEA), TRC Energy Services (TRC) conducted an evaluation to investigate the effectiveness of NEEA's efforts to help establish the federal fluorescent lamp ballast standard and perform an assessment of the level of NEEA's influence. TRC used a literature review and interviews with a variety of stakeholders that were involved in the adoption of this standard to conduct this evaluation. NEEA also requested that TRC estimate the combined influence of all efficiency stakeholders on the adoption of this standard.

**NEEA's share of influence:** TRC estimated that NEEA's impact as a fraction of all efficiency stakeholder organizations' efforts for this standard was 23%. This value of 23% reflects NEEA's role as the second most important efficiency stakeholder in the adoption of this standard. The California Investor Owned Utilities (CA IOUs) were the most influential, and various other organizations played a tertiary role in the development and adoption of this standard.

**Effect of All Efficiency Stakeholder Efforts:** Based on our data collection, TRC believes that efficiency stakeholders had a "moderate to low" effect on this standard, and TRC translates this influence of all efficiency stakeholder efforts into a range between 12% and 24% of all energy savings from the standard. TRC cannot accurately provide a specific value within this range, due to data limitations, but our best estimate would be the midpoint – 18%.

TRC also provides recommendations for NEEA's activities supporting the adoption and development of standards, and for NEEA's future evaluations of these efforts, based on findings from this study.

## 2 INTRODUCTION

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### 2.1 Study Purpose

On November 14, 2011, the U.S. Department of Energy (DOE) published its final rule to adopt the "Energy Conservation Standards for Fluorescent Lamp Ballasts," which took effect January 13, 2012, with a compliance date of November 14, 2014. This standard set a new test procedure for fluorescent lamp ballasts and a new energy conservation standard for fluorescent lamp ballasts. As part of its standards program, NEEA supported this standard's development and adoption.

The scope of TRC's evaluation was to investigate the barriers to adoption for this standard, the activities that NEEA conducted, the activities that other energy efficiency stakeholders conducted, and the effectiveness of these activities. Based on the results, TRC provided two estimates: 1) NEEA's share of influence for the fluorescent lamp ballast standard – i.e., the percent of NEEA influence compared to that of all efficiency stakeholders and 2) the total share of influence on energy savings from the efforts of all efficiency stakeholders, including NEEA.

### 2.2 Description of DOE Adoption Process

The DOE is the government agency responsible for developing and adopting national appliance energy standards. During the standard development process, the DOE seeks input from

stakeholders, including comments regarding the feasibility of the proposed standard and its impact on consumers, manufacturers, and other stakeholders. Stakeholders can provide input during public meetings and comment periods, both of which occur after the public release of rulemaking documents. The DOE must address stakeholder comments and demonstrate that the benefit of a new or revised standard will exceed any burden that it may impose (e.g., that the energy savings [in dollars] from the new standard will exceed costs for implementation).

Although DOE seeks input throughout the development process, TRC’s literature review and interviews with efficiency stakeholders found that comments received at the initial stages are more likely to affect the direction of the development process and the final standard adopted. Two representatives from efficiency stakeholder organizations reported that comments provided to DOE earlier in the development process are more likely to have greater influence on the final standard, because the DOE has not performed extensive analysis at this point and is more open to input and changes in standard direction. The DOE has a set timeline and limited resources, so it does not have opportunity to make significant changes to the standard or perform additional analysis in the latter stages of the process. Therefore, it is advantageous for stakeholders to be active during public meetings and comment periods between release of the rulemaking framework document and release of the Notice of Proposed Rulemaking (NOPR), rather than when the DOE releases the Notice of Data Availability (NODA). TRC developed Figure 1 to illustrate the general DOE standard development process and opportunities for stakeholder input.

**Figure 1. DOE Standard Development Process and Opportunities for Stakeholders’ Influence**



### 3 METHODOLOGY

#### 3.1 Data Collection Approach

To gather data, TRC reviewed literature – primarily from the DOE – and gathered feedback from stakeholders involved in the rulemaking process for this standard.

TRC’s literature review included:

- ◆ DOE docketed comments from stakeholders
- ◆ DOE Notice of Proposed Rulemaking (NOPR) and Supplemental Notice of Proposed Rulemaking (SNOPR) for the proposed test standard
- ◆ DOE Final Rule for the energy conservation standard and test standard
- ◆ DOE Preliminary and Final Technical Support Documents (TSDs)

- ◆ DOE Public meeting transcripts
- ◆ NEEA meeting notes

TRC conducted phone interviews with staff at various organizations that were active in the adoption of this standard, including one of the two lead DOE staff members, the NEEA staff member that led NEEA's support of this standard, and staff members from efficiency stakeholder organizations that played a prominent role in supporting this standard's development. TRC also gathered feedback from lamp ballast and luminaire manufactures via email<sup>1</sup>. Figure 2 summarizes the interview dispositions.

**Figure 2. Number of Target and Completed Interviews by Stakeholder Category**

| Stakeholder Category   | Target Interviews | Candidates Contacted | Completed Interviews |
|--|-------------------|----------------------|----------------------|
| NEEA Codes and Standards (C&S) Staff   | 1-2               | 1                    | 1                    |
| DOE Staff and Consultants  | 1-2               | 6                    | 1                    |
| Fluorescent Lamp Ballast Manufacturers   | 2-4               | 6                    | 3                    |
| Efficiency Stakeholder Groups Active in Adoption of this Standard <sup>a</sup> | 2-3               | 7                    | 3                    |
| <b>Total Interviews</b>  | <b>6-10</b>       | <b>20</b>            | <b>8</b>             |

<sup>a</sup>TRC contacted staff from Energy Solutions, a contractor for the California Investor Owned Utilities (IOUs); Appliance Standard Awareness Project (ASAP); Natural Resources Defense Council (NRDC); Northeast Energy Efficiency Partnership (NEEP); Northwest Power and Conservation Council (NPCC); and Alliance to Save Energy (ASE).

### 3.2 Limitations of Data Collection Efforts and Analysis

In general, one limitation in this study was that the DOE adopted this standard in 2011, so efficiency stakeholders (including NEEA) conducted their efforts in 2011 and earlier. TRC repeatedly heard from interviewees that it was difficult to recall details regarding the barriers to the standard adoption and the work of individual efficiency stakeholders. TRC also had difficulty reaching two individuals who played a key role because of the time lag, since one had retired and another had changed companies, as described below. Several candidates also declined interviews. TRC provides specific limitations for each interviewee type below.

- ◆ **Manufacturers:** For this standard, the National Electrical Manufacturers Association (NEMA) provided almost all comments on behalf of lamp ballast and luminaire manufacturers, rather than the individual manufacturers providing comments. The NEMA staff member that had been most involved with this standard has since left NEMA. TRC made multiple efforts to obtain updated contact information (e.g., searched the internet, and sent messages through LinkedIn) but was unable to obtain a response. In addition, manufacturers were generally hesitant to respond to interview requests due to the large amount of time that has passed since the rulemaking process, and manufacturers

<sup>1</sup> TRC made multiple attempts (two phone calls and one email) to obtain phone interviews with manufacturers. Three preferred to respond via email, and three did not respond to repeated requests.

who did respond to requests for interviews were not always the manufacturers who were most directly involved in the rulemaking process. As a result, feedback from the manufacturers did not significantly inform the analysis.

- ◆ DOE: The DOE staff member that led the development of this standard in its early stages had since retired and did not wish to participate in an interview. TRC interviewed the replacement lead at DOE, but she could not provide a comprehensive description of details such as efficiency stakeholders' activities because she joined the process midway. In addition, DOE's consultant for this standard development, Navigant, declined interviews. To help address this limitation, TRC relied on DOE rulemaking documents in which DOE addressed stakeholder comments to better understand the impact of efficiency stakeholders' activities.
- ◆ Efficiency stakeholders: TRC reached out to candidates from each of the identified efficiency stakeholder groups. Some did not respond at all to repeated requests, while others responded that they were not highly involved in this particular standard development and could not provide informative feedback. However, TRC was able to interview several of the key efficiency stakeholders for this standard, so the limitation from these interview declines was relatively small.

The limitations from the manufacturer interviews were the most significant for TRC's estimate of NEEA's share of influence. The DOE interview limitations were the most significant for TRC's estimate of the influence of all efficiency stakeholders' efforts.

Despite these limitations, TRC met the interview target and collected feedback from a variety of different stakeholders – including many that played a major role in the development of this standard. In addition, TRC's literature review helped address these limitations, because documents such as docketed comments and meeting transcripts provided insights into barriers (e.g., concerns from NEMA), activities (e.g., who helped address these barriers and how), and the role of efficiency stakeholder organizations in these activities.

### 3.3 Impact Assessment Analysis: Methodology to Estimate NEEA's Share of Influence

As an overview of the analysis, to estimate NEEA's share of total influence separate from those of other efficiency stakeholders, TRC developed an analytical framework that used a weighting method to quantitatively represent the importance of barriers, influential activities, and NEEA's role in each activity. TRC first identified barriers to the adoption of this standard and the relative significance of each barrier. For each barrier, TRC identified influential activities that addressed the barrier, the relative impact of those activities, and the role of NEEA compared with other efficiency stakeholders for each activity.

The following section provides a more detailed description of the method TRC used to estimate NEEA's share of influence. Figure 3 presents the results. TRC:

- a. **Identified and estimated the relative significance of the barriers** to adoption of the standard. TRC identified three barriers that were all highly significant:

- i. Need for an Accurate Test Standard and Metric,
- ii. Manufacturer Opposition to More Stringent Standard, and
- iii. Lack of Data Availability and Accuracy.

TRC weighted each of these barriers equally: 33% to each.

- b. **Identified and estimated the significance of each efficiency stakeholder activity** to overcome each barrier. For example, TRC found that the first activity, “Proposed alternatives test methods and metrics to DOE's initial proposal”, was appropriate and effectively applied in addressing the first barrier (“Need for an Accurate Test Standard and Metric”), and estimated its significance as 50% for addressing the first barrier.
- c. **Estimated the effectiveness of each activity relative to all activities.** Using our example of the first activity (“Proposed alternative test methods...”), because TRC rated it as 50% of significance in addressing the first barrier, and this first barrier was rated as 33% of significance for all barriers, TRC estimated that the relative significance of the first activity relative to all activities was  $50\% \times 33\% = 17\%$ .
- d. **Identified the total number of efficiency stakeholder organizations that were involved in each activity, and the relative contribution of each organization for each activity** (e.g., lead, main support, minor support). Based on data collection results, TRC estimated the overall significance of NEEA’s efforts relative to all efficiency stakeholders for each activity. In the example of the first activity, NEEA was one of three organizations that took a leading role, and two organizations played minor supporting roles. TRC estimated 80% for all leading organizations, or  $80\% / 3 = 27\%$  for each; and 20% for the supporting organizations, or  $20\% / 2 = 10\%$  for each. This totaled 100% for all organizations.
- e. **Estimated the total impact of NEEA’s activities relative to all efficiency stakeholders.** TRC first estimated the impact of each of NEEA’s activities by multiplying the significance of this activity by NEEA’s relative role. In the example of the first activity, NEEA’s impact was  $17\% \times 27\% = 4\%$ . TRC then summed across the significance of all activities to estimate NEEA’s total impact: 23%.

### 3.4 Methodology to Estimate Energy Savings from All Efficiency Stakeholders

To estimate savings from all influential efforts in support of the standard, TRC first developed a qualitative assessment of the impact of all these efforts based on our literature review and our interviews. In particular, TRC relied on literature and interviews indicating how the DOE used the analysis and comments provided to the DOE, and what the DOE would have done in the absence of the efficiency stakeholders’ analysis and comments.

TRC then translated this qualitative assessment into energy savings based on the incremental savings difference between trial standard levels (TSL)<sup>1</sup> that DOE considered. TRC used incremental savings differences between TSLs to recognize that the efficiency stakeholders had an impact in the final standard adopted (so savings attributable to efficiency stakeholders should be greater than zero), but that other factors beyond the work of efficiency stakeholders affected the DOE's final decision, so savings attributable to efficiency stakeholders should be a fraction of total energy savings.

For this standard evaluation, TRC found that developing the “counterfactual” scenario (i.e., identifying what would have happened in the absence of efficiency stakeholders) was challenging, particularly given the data collection limitations of DOE staff interviews. As described in Section 3.2, Limitations of Data Collection Efforts and Analysis, TRC was unable to reach the DOE staff member that was involved in the early parts of the standard development because she had retired, and the DOE's consultant declined interview requests. TRC completed one interview with a DOE staff member that was involved in the later development of the standard, and used literature to help understand how efficiency stakeholders' efforts influenced the DOE. However, TRC could not build a rigorous assessment of the counterfactual without more input from DOE staff or consultants. Consequently, TRC estimated the influence of efficiency stakeholders as a range, rather than a specific value. Section 4.2 presents results of this analysis.

## 4 FINDINGS

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This section:

1. Begins with the results of TRC's impact assessment of NEEA's share of influence, followed by the rationale for each input of the impact assessment, including interview and literature review results supporting each input;
2. Provides TRC's findings of the overall impact of all efficiency stakeholders' efforts;
3. Presents manufacturer feedback that did not relate to either analysis finding, but that could inform NEEA's future support of federal standard development.

### 4.1 Impact Assessment Results: NEEA's Share of Influential Efforts

Figure 3 summarizes the results of TRC's impact assessment to estimate the share of NEEA's influential efforts relative to all efficiency stakeholders. In the next section (Section 4.1.2), TRC provides supporting rationale for each input in this figure.

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<sup>1</sup> A TSL designates an efficiency level (EL) for a product, or each product class (if the standard will break out products into categories). Different TSLs have different ELs. As part of the standard development process, the DOE chooses which TSL to adopt based on energy savings, cost effectiveness analysis, market feasibility, and other criteria.



### 4.1.1 Summary Impact Assessment Table

**Figure 3. Impact Assessment of NEEA’s Share of Influence on for the Fluorescent Lamp Ballast Standard**

| Analysis Step  | Barrier   | 1. Need for an Accurate Test Standard and Metric   |  |   | 2. Manufacturer Opposition to More Stringent Standard   |  | 3. Lack of Data Availability and Accuracy  |   | Total if applicable |
|--|---|--|--|---|---|--|--|---|---------------------|
| a: Estimate significance each barrier                            | Significance  | High   |  |   | High  |  | High   |   | -                   |
|  | Significance (%)                                    | 33%  |  |   | 33%   |  | 33%  |   | 100%                |
| b: Estimate significance of each efficiency stakeholder activity |   | Activities to Address Barrier 1  |  |   | Activities to Address Barrier 2   |  | Activities to Address Barrier 3  |   |                     |
|  | Activities Conducted by All Efficiency Stakeholders | Proposed alternatives test methods and metrics to DOE's initial proposal.  | Urged DOE to account for varying light output associated with ballast operating frequency.   | Submitted comments to support DOE proposal for lamp-based ballast efficiency instead of resistor-based test procedure | Provided comments on NEMA* and DOE documents. Supported DOE proposal and scope, especially against including additional exemptions.                             | Attended public meetings to support DOE efficiency levels, scope, and product classes. | Analyzed and compared NEMA and DOE data, met with NEMA, and identified possible reasons for data discrepancy between DOE and NEMA. | Provided comments in support of DOE for using DOE’s (not NEMA’s) test results to establish efficiency levels. | -                   |
|  | Results – i.e., DOE response                        | DOE revised proposed test standard from resistor-based to lamp-based due to comments from efficiency stakeholders. | DOE adjusted proposed ballast efficiency (BE) metric to the ballast luminous efficiency (BLE) metric to account for ballast operating frequency. | DOE adopted the reference lamp-and-ballast based test method.   | DOE ultimately made some additional ballast exemptions and changes to product classes, but maintained the majority of the scope and proposed efficiency levels. |  | Heightened DOE’s awareness of the discrepancies, and contributed to DOE conducting its own comparative analysis.                   | DOE maintained proposed efficiency levels based on its own test results.                                      | -                   |
|  | Effectiveness of activity for addressing barrier    | High   | Medium   | Low   | Medium  | Medium   | Medium   | Low   | -                   |

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|  |   |              |              |              |              |   |              |   |                                 |
|--|---|--------------|--------------|--------------|--------------|---|--------------|---|---------------------------------|
|  | Significance for each barrier (%)   | 50%          | 33%          | 17%          | 50%          | 50%                                       | 67%          | 33%                                     | Sum of 100% across each barrier |
| c: Estimate significance across all barriers (a x b) | Significance across <u>all</u> barriers (%)                                 | 17%          | 11%          | 6%           | 17%          | 17%                                       | 22%          | 11%                                     | 100%                            |
| d: Estimate NEEA's involvement in activity           | Total Number of Efficiency Stakeholders Involved                            | 5            | 3            | 3            | 10           | 7   | 4            | 7                                       | -                               |
|  | NEEA's role (lead, main support, minor support)                             | 1 of 3 leads | Main Support | 1 of 2 leads | 1 of 3 leads | 1 of several, and NEEA particularly vocal | Main Support | 1 or 3 that led development of comments | -                               |
|  | NEEA's Relative Role in Activity  | 27%          | 30%          | 40%          | 13%          | 20%                                       | 30%          | 20%                                     | -                               |
| e: Estimate NEEA's relative contribution             | Significance of all NEEA activities relative to all efficiency stakeholders | 4%           | 3%           | 2%           | 2%           | 3%  | 6%           | 2%                                      | <b>23%</b>                      |

\*NEMA = National Electrical Manufacturers Association. This industry group represents lighting related equipment and product manufacturers and played a key role in providing comments on behalf of its members for this standard.

## 4.1.2 Supporting Findings and Rationale for Impact Assessment

This section provides a description of each barrier and activity, NEEA's role in each activity, and a rationale for TRC's estimate of the significance of each assessment parameter.

### 4.1.2.1 Barriers

To identify barriers, TRC began with the barriers in the NEEA Standards Development Logic Model, presented in the Appendix (Section 6.1). Because this is the general logic model that applies to all of NEEA's standards development efforts, TRC revised this list of barriers based on the specific challenges of this standard. TRC identified two of the barriers in the NEEA logic model for standards rulemaking as significant – manufacturer opposition, and lack of data – and added a third barrier based on the specifics of this standard (lack of test standard). Based on the data collection, TRC concluded that three of the barriers from the codes and standards logic model were not significant for this standard<sup>1</sup>.

#### **Barrier 1: Need for an Accurate Test Standard and Metric**

Significance: High

Rationale and Findings: In conjunction with the new and amended energy conservation standard, DOE intended to improve the test standard and metric used to certify fluorescent lamp ballasts. The previously approved test method was unsatisfactory because it resulted in testing variation outside the range that manufacturers deemed acceptable and required multiple test procedures, which manufacturers viewed as burdensome.

In response to these concerns, DOE proposed a new test standard – a resistor-based method that focused on determining ballast efficiency (BE). The proposed metric did not account for varying light output associated with high and low frequency ballasts. Under the BE metric, a high and low frequency ballast could have the same value, but different light output based on the ballast's operating frequency. Efficiency stakeholders, particularly the California Investor Owned Utilities (CA IOUs, with some support from NEEA), commented that the market is primarily concerned with light output, rather than the efficiency of the ballast independent of a lamp, so the proposed standard was not market-friendly. Additionally, the proposed method would not have streamlined the test procedure for manufacturers.

Consequently, almost all organizations, including manufacturers, the CA IOUs, and NEEA, opposed this initially proposed test standard. Public comments and interview results indicated that the problems of the initially proposed test standard were a major challenge that the DOE and stakeholders needed to overcome before the DOE could adopt this standard.

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<sup>1</sup> TRC concluded that the following were not significant barriers for this standard: Lack of common interest among certain stakeholders; Insufficient funding/staff for US DOE to run standards process; and Cyclical political opposition to regulation per se.

## **Barrier 2: Manufacturer Opposition to More Stringent Standard**

Significance: High

Rationale and Findings: NEMA opposed the proposed efficiency levels in the NOPR for three reasons. NEMA’s primary reason for opposing the standard was the cost for manufacturers to meet the standard. NEMA has a labeling tier called “NEMA Premium” for its high performance products that meet higher efficiency criteria than what current federal standards require. NEMA presented test data results showing that eighty-eight percent of its high efficiency products – including those that met the NEMA Premium levels – would not meet the proposed efficiency level. NEMA argued that the NEMA Premium levels were “max tech” – i.e., achieving the maximum efficiency that was technically feasible – and that the new standard should be consistent with NEMA Premium levels. Because the analysis found that only one or a few product lines available would meet the proposed standard, NEMA argued that the additional costs to develop an array of ballasts above the standard efficiency level would impose a substantial burden on manufacturers, especially small manufacturers.

Additionally, NEMA and other manufacturer representatives commented that the proposed standard would impose a burden on low-income residential customers, and that the DOE did not accurately represent residential customers in its analysis. (Residential ballasts have additional requirements not related to efficiency, and meeting these requirements would have been more costly to manufacturers under the proposed standard.)

Lastly, NEMA and manufacturers opposed the DOE’s product classes under the original proposal, because of the inclusion of certain ballast types within the scope of this standard. For example, NEMA did not want the DOE to include residential ballasts in the standard. In addition, NEMA opposed the grouping of some ballast types together and proposed that the DOE exempt some ballasts or move some ballasts to separate product classes.

## **Barrier 3: Lack of Data Availability and Accuracy**

Significance: High

Rationale and Findings: Due to the recent establishment of a new test standard, DOE had limited data available to inform and support a new test standard. As described above, NEMA conducted testing and found that eighty-eight percent of its most efficient products, as well as almost all of total products available at that time, would not meet the proposed standard. DOE conducted its own testing according to the new test standard, and found that significantly more of NEMA products met the proposed standard than what NEMA reported. In addition, the NEMA data did not include information such as make and model due to manufacturer anonymity requirements. Consequently, efficiency stakeholder groups and the DOE could not make conclusive comparisons between the NEMA and DOE analysis to understand the reason for the discrepancy in NEMA versus DOE performance data.

Note that Barriers 2 and 3 were related. The lack of available data (Barrier 3) contributed significantly to opposition from manufacturers (Barrier 2), because the manufacturers reported they did not have enough products to meet the proposed standard. However, the fraction of products that met the proposed standard depended on the product performance analysis.

#### 4.1.2.2 Activities

This section describes each efficiency stakeholder activity taken to overcome each barrier, the relative effectiveness of each activity for overcoming the barrier, and TRC's rationale for its estimate of each activity's effectiveness.

##### Activities to Address Barrier 1: Need for an Accurate Test Standard and Metric

**Barrier 1, Activity 1: Proposed alternatives test methods:** NEEA and other efficiency stakeholders opposed the DOE's proposed resistor-based test standard and advocated for alternative methods. NEMA, NEEA, and other efficiency stakeholder organizations recommended that the DOE consider: 1) improving the current test standard method and 2) supporting the creation of a new test standard method and metric using a lamp-and-ballast method. The CA IOUs also proposed a relative system efficiency (RSE) test standard.

Relative Effectiveness to Address Barrier: High

Rationale and Findings: DOE revised its proposed test standard to a lamp-and-ballast based method in response to comments from NEMA, NEEA, the Northwest Power and Conservation Council (NPCC), and the CA IOUs. Manufacturers could use the lamp-and-ballast method for all ballast types, and this new standard allowed for an easier comparison among different ballast types. Consequently, manufacturers and efficiency stakeholders were much more supportive of the revised standard. The efficiency stakeholders' proposed lamp-and-ballast method led to an improved standard that reduced manufacture opposition; therefore, TRC ranked this activity as high in effectiveness.

Note that the DOE did not adopt the RSE method that the CA IOUs proposed.

**Barrier 1, Activity 2: Urged DOE to account for light output:** The CA IOUs, NEEA, and NPCC urged the DOE to account for varying light output associated with ballast operating frequency in the proposed test metric. In particular, these efficiency stakeholders urged the DOE to account for the increased light output from ballasts that operate at higher frequency. The efficiency stakeholders argued that including this benefit in the metric would benefit customers and lighting designers, because these market actors are concerned with light output.

Relative Effectiveness to Address Barrier: Medium

Rationale and Findings: DOE adjusted the proposed metric from Ballast Efficiency (BE) to Ballast Luminous Efficiency (BLE) – a metric that includes light output. Because of this adjustment, stakeholders (including manufacturers) viewed the revised metric as an improvement and were more receptive of the newly adjusted standard. However, this adjustment did not appear to be as critical as the lamp-and-ballast method proposed in Activity 1. Consequently, TRC ranked Activity 2 as medium.

**Barrier 1, Activity 3: Submitted comments supporting test standard:** Efficiency stakeholder groups submitted comments to support DOE's revised proposal for a lamp-based test procedure instead of a resistor-based test procedure.

## Relative Effectiveness to Address Barrier: Low

Rationale and Findings: DOE acknowledged the support of efficiency stakeholder groups for a revised test standard and proceeded through rulemaking without further opposition. Once the DOE released the SNOPR with the revised test standard proposal based on the BLE metric, stakeholder groups – including manufacturers – generally accepted the test standard. The DOE acknowledged the support provided for the revised test standard, but the most influential comments came at the time of the NOPR, before the DOE released the revised test standard. Consequently, TRC ranked this activity as low.

Activities to Address Barrier 2: Manufacturer opposition to regulation or more stringent standards

**Barrier 2, Activity 1: Submitted comments supporting DOE proposed standard:** Efficiency stakeholder groups provided docketed comments throughout the development process in support of DOE’s proposed efficiency levels. NEEA and other efficiency stakeholders reviewed and submitted comments on NEMA and DOE documents, supported DOE’s proposed efficiency levels, and advocated for DOE to adopt the proposed expanded scope. Efficiency stakeholder groups responded to DOE’s request for input, including feedback and data on the feasibility of ballasts to meet the efficiency levels.

## Relative Effectiveness to Address Barrier: Medium

Rationale and Findings: The efficiency stakeholders’ supporting comments strengthened DOE’s position against manufacturer opposition to the proposed standard efficiency levels. In particular, efficiency stakeholder groups including NEEA provided comments that challenged the manufacturing groups’ claims regarding technical feasibility and the proposed standard’s burden on manufacturers and consumers. As a result, DOE did not adjust its proposed efficiency levels and maintained the majority of the ballasts within the proposed scope. The final ruling provided exemptions for a few ballasts where it was not technically feasible to reach the proposed efficiency levels, and provided separate product classes and efficiency standards for some ballast types – including those intended for residential applications.

TRC ranked this activity as medium because efficiency stakeholder efforts appeared to help enable the DOE to maintain the efficiency level and scope of the proposed standard.

**Barrier 2, Activity 2: Participated in public meetings:** Similar to providing written comments through the development process, efficiency stakeholder groups attended public meetings to support DOE’s proposal and provided response to manufacturer opposition and questions.

## Relative Effectiveness to Address Barrier: Medium

Rationale and Findings: NEEA and other efficiency stakeholder groups were present at public meetings to hear and respond to manufacturer and other stakeholder questions and positions. These efforts assisted DOE in maintaining the majority of the proposed efficiency levels and scope. The final ruling provided exemptions for a few ballasts where it was not technically feasible to reach the proposed efficiency levels.

Similar to Barrier 2, Activity 1, TRC ranked this activity as medium, because it provided support to the DOE to “hold its ground” with the proposed standard and scope.

Activities to Address Barrier 3: Lack of data with which to conduct the necessary analyses in the rulemaking.

**Barrier 3, Activity 1: Sought resolution to data discrepancy:** As described above, the product performance data that the manufacturers provided showed that a much lower fraction of products would meet the proposed standard than the performance data that DOE provided. The CA IOUs, NEEA, and other groups met with NEMA representatives and compared NEMA and DOE data to identify potential causes for the data discrepancy. Due to manufacturer anonymity requirements, efficiency stakeholders did not have full disclosure of NEMA data details, so the comparative analysis results were more speculative than conclusive. The findings of the analysis, which the CA IOUs and NEEA provided to DOE in docketed comments, suggested that NEMA may have misinterpreted the reporting requirements, because of the use of incorrect input values. For example, the manufacturers may have conducted its analysis using rated power instead of measured power, and they may have included a “manufacturing tolerance” factor that was not permissible under DOE rules. This misinterpretation led to ballast performance data that underreported the level of efficiency achieved, and helped explain the discrepancies between NEMA and DOE product performance analysis.

Relative Effectiveness to Address Barrier: Medium

Rationale and Findings: Many efficiency stakeholders stated in comments that determining a cause and resolution for the discrepancy between data was important in allowing the standard to move forward. However, interviews and DOE documents suggest that the DOE was already working with NEMA and consultants to address the discrepancies. Rather than rely on the information received from efficiency stakeholder groups, DOE conducted its own comparative analysis using more detailed data from manufacturers. TRC ranked this activity as medium because the overall resolution of this discrepancy was critical, but the efficiency stakeholders’ efforts appeared to support (but not form the basis of) the resolution between the manufacturers and DOE.

**Barrier 3, Activity 2: Urged DOE to maintain use of their data results:** After reviewing the data results from NEMA, but prior to determining the cause of the product performance data discrepancy, efficiency stakeholder groups provided comments to support DOE using its own test results to establish efficiency levels.

Relative Effectiveness to Address Barrier: Low

Rationale and Findings: The DOE analysis showed that DOE’s proposed efficiency levels were achievable and many products that were available at the time met the standard. As observed in DOE documents and docketed comments, the test method that the DOE used was accurate and confirmed by the testing labs, whereas the NEMA test results and method were not transparent. Therefore, efficiency stakeholder groups felt there was higher confidence in DOE’s data and supported the use of DOE data. However, DOE was already in discussion with NEMA regarding data and continued to use its own test results, as well as integrated NEMA test data after DOE



identified the cause of the discrepancy and remedied the issue. Because the DOE appeared to have largely resolved this issue with the manufacturers on its own, TRC ranked this activity as low.

#### **4.1.2.3 NEEA's role in activities**

TRC determined NEEA's role through interviews, docketed comments, and DOE rulemaking documents.

One of the primary methods for efficiency stakeholders to provide support for a standard is through submitting comments – sometimes individually, or sometimes in joint comments with other efficiency stakeholder groups in a Technical Advisory Group (TAG). Interviewees reported that there are no set rules for when a group should lend its signature to joint comments or submit its own; there is sometimes a benefit to having a greater quantity of individual comments and other times it is better to have more support on a single document. An interviewee mentioned that there is significance when a group submits independent comments because they have usually performed work beyond that of the TAG or have regionally specific information. If a certain group has performed work, that group is more likely to submit independent comments because the group has more autonomy of the content and can take credit for the work. For joint comments, the lead member typically signs first, and then the signatures follow in descending order of contribution.

Based on this feedback, TRC applied a higher weighting to NEEA's role when NEEA's signature was higher in the list of comments with multiple efficiency stakeholders' signatures. TRC also generally assigned a higher weighting if NEEA provided independent comments.

### Activities to Address Barrier 1: Need for an Accurate Test Standard and Metric

#### **Barrier 1, Activity 1: Proposed alternatives test methods**

NEEA's Relative Role: One of three leads

Rationale and Findings: NEEA acted as one of three leads for this activity. NEEA developed and submitted comments with NPCC independent of joint TAG comments, suggesting that NEEA had considered the alternative test methods and had specific suggestions for DOE. NEEA submitted unique comments rather than stating that they supported the comments from other efficiency stakeholder groups, such as the CA IOUs. Other lead organizations were the CA IOUs and Appliance Standards Awareness Project (ASAP) on behalf of the TAG.

#### **Barrier 1, Activity 2: Urged DOE to account for light output**

NEEA's Relative Role: Main Support

Rationale and Findings: The CA IOUs provided the original suggestion to include varying light output in the metric. NEEA was in close discussion with the CA IOU representatives throughout the process, and supported this recommendation to DOE in comments submitted in conjunction with NPCC. No other parties were involved.



**Barrier 1, Activity 3: Submitted comments supporting test standard**

NEEA's Relative Role: One of two leads

Rationale and Findings: NEEA developed and submitted separate comments from the TAG and other organizations. This shows that NEEA reviewed the proposal and provided independent support to the DOE. Additionally, the CA IOUs took a lead role in this activity.

Activities to Address Barrier 2: Manufacturer opposition to regulation or more stringent standards

**Barrier 2, Activity 1: Submitted comments supporting DOE proposed standard.**

NEEA's Relative Role: One of three leads

Rationale and Findings: Although almost every efficiency stakeholder group submitted comments, NEEA developed and submitted separate comments from the TAG, sometimes in conjunction with the Northwest Energy Efficiency Partnership (NEEP). NEEA reviewed DOE released documents and provided independent feedback. Other lead organizations were the CA IOUs and ASAP on behalf of the TAG.

**Barrier 2, Activity 2: Participated in public meetings.**

NEEA's Relative Role: One of several, but NEEA was particularly vocal

Rationale and Findings: NEEA representatives attended and actively participated in every public meeting to provide support for DOE's proposal, as evident in the public meeting transcripts. Nine other organizations also attended and participated in meetings, although NEEA was particularly active in discussions.

Activities to Address Barrier 3: Lack of data with which to conduct the necessary analyses in the rulemaking.

**Barrier 3, Activity 1: Sought resolution to data discrepancy.**

NEEA's Relative Role: Main Support

Rationale and Findings: Based on interview feedback and docketed comments, the CA IOUs led this activity. NEEA was active and highly involved in discussions and provided support to the CA IOUs during the comparative analysis. ASAP and NPCC also provided support for this activity.

**Barrier 3, Activity 2: Urged DOE to use its own data results.**

NEEA's Relative Role: One of three leads

Rationale and Findings: NEEA developed and submitted separate comments from the TAG based on the results of discussions with NEMA and review of NEMA data. Other lead organizations were the CA IOUs and ASAP on behalf of the TAG.

## 4.2 Impact of All Efficiency Stakeholders

Based on the data collection, TRC’s assessment was that efficiency stakeholders had a moderate to low impact<sup>1</sup> on this standard. This is because, as shown in **Figure 3**, some of the efficiency stakeholders’ main activities, and their impact on the DOE standard development process, included the following:

- Efficiency stakeholders provided comments that assisted the DOE with developing an improved test standard, including one that was lamp-based (instead of resistor-based) to account for varying light output associated with ballast operating frequency. This reduced manufacturer opposition to the standard in general, although manufacturers still raised opposition to the efficiency levels proposed for some product classes.
- Manufacturers opposed the initially proposed standard for some, but not all, product classes. For the product classes where there was more resistance, efficiency stakeholders helped counter their opposition through data analysis and general support. The support of efficiency stakeholders helped the DOE maintain its original scope and proposed efficiency levels for these product classes, but their support did not increase the proposed efficiency levels.
- Efficiency stakeholders identified possible reasons for the data discrepancy (of existing product efficiency) between DOE and NEMA data. This heightened DOE’s awareness of the discrepancies, but the DOE ultimately used its own analysis – rather than using the analysis that efficiency stakeholders provided – for comparative analysis.

Overall, this evidence suggests that the efficiency stakeholders played a supportive role, but not a central role, in the development of this standard.

TRC then considered how this qualitative assessment of a moderate to low impact should translate into energy savings. As described above, given the data limitations for this estimate, TRC believed that a range of values, rather than a single point estimate, was more appropriate. TRC developed a range of energy savings as follows:

- ◆ **Top end of influence range: 24% of total energy savings from the standard.** TRC identified 24% by taking the incremental savings between TSL 3a (the standard adopted) and the next lowest standard (TSL 2). TRC based this upper bound on the incremental savings between TSL 2 and TSL 3a (rather than between TSL 1 and TSL 3a) to recognize that other factors beyond the work of efficiency stakeholders affected the DOE’s final decision.
- ◆ **Bottom end of influence range: 12% of total energy savings from the standard.** TRC identified 12% by taking *half* of the incremental savings between TSL 3a (the standard adopted) and the next lowest standard (TSL 2). Similar to the upper bound, TRC based this lower on the incremental savings between TSL 2 and TSL 3a (rather than between

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<sup>1</sup> By “low-moderate”, TRC refers to an impact that is between low and medium. This would correspond to approximately a 2 on a ranked scale of 1 to 5, where 0 is no impact, 1 is low impact, and 5 is extremely high impact.

TSL 1 and TSL 3a) to recognize that other factors beyond the work of efficiency stakeholders affected the DOE’s final decision. TRC took half of this savings, to reflect that, for some product classes, DOE’s proposed standard met with almost no resistance and would likely have passed without efficiency stakeholder support; while for other product classes, efficiency stakeholder efforts were critical in enabling DOE to counter opposition from manufacturers.

TRC could not accurately identify a specific value within this range because:

1. This would require estimating the impact of efficiency stakeholder for each product class, and the impact of this product class on overall energy savings each product class on overall. This would require more data collection – including more input from DOE staff and their consultants, which was not obtainable; and
2. In addition to supporting the standard for specific product classes, the efficiency stakeholders provided comments that supported development of all product classes, including recommendations for the proposed test procedure. This benefited all product classes, although it is difficult to estimate *how much* this work benefited all product classes.

Given the limitations of the data, TRC’s best estimate of the influence of efficiency stakeholders on total energy savings derived from this standard is the midpoint of the range, or 18%.

TRC developed these estimates assuming that the total energy savings from the standard would follow DOE’s “roll-up” analysis for predicted energy savings. Under the roll-up analysis assumption, manufacturers do not change the efficiency levels of products that meet the proposed standard, and they improve the efficiency of other products so that they meet (but not exceed) the regulations. In addition, the roll-up analysis assumes a high, naturally occurring penetration of emerging technologies. The other DOE analysis assumption is “shift analysis,” in which the efficiency of all products shifts up so that some products meet the standard while others exceed the standard. In addition, the shift analysis assumes a low penetration of naturally occurring emerging technologies. TRC believes that the roll-up savings is more appropriate for this standard, because manufacturers generally met, but did not exceed, the standard; and because adoption of emerging technologies – in this case linear LEDs – was more rapid than originally anticipated.

### 4.3 Additional Results from Manufacturers

The information that manufacturers provided did not significantly inform the impact assessment, primarily because the manufacturers interviewed could not recall the role that efficiency stakeholder organizations played. (As described in the Section 3.2, this may be because TRC was not able to reach the manufacturer representative that was most involved with this standard, and because of the time lag between the standard development process and this evaluation). However, the manufacturers provided other feedback that could help inform future NEEA efficiency stakeholder work or future evaluations. TRC presents that feedback here.

Three manufacturers (two ballast manufacturers and one luminaire manufacturer) provided written (emailed) responses to interview questions. All three respondents stressed that the

amount of time since rulemaking limited their recollection of events. However, all three manufacturers noted that they felt the initially proposed standard was too stringent, and two noted that there were specific challenges to the data that DOE presented, although they did not elaborate on what those challenges were. One manufacturer specifically mentioned that they were opposed to proposed tests that included photometric tests because they felt those tests were not easily replicable.

The manufacturer respondents generally did not recall other organizations beyond the DOE that were involved in the rulemaking. Two manufacturers mentioned the involvement of NEMA, who represented the manufacturers as a group during the rulemaking, and one mentioned Navigant (the DOE consultant). None of the manufacturers could recall the role that efficiency stakeholder organizations played or the specific organizations involved with this standard (besides NEMA). However, this may be because NEMA provided most comments from manufacturers and conducted the bulk of manufacturer's activities. Individual manufacturer organizations generally did not provide many comments on this standard.

The three manufacturers represented a range of views on the overall DOE rulemaking process, and the outcome of this standard in general.

- ◆ One expressed outright opposition to appliance standards generally
- ◆ One was skeptical that the DOE rulemaking processes accurately accounts for the full economic impact of the proposed regulations on manufacturers, such as product redesign, testing, changes to internal processes, and changes to marketing and information materials. For this standard, the manufacturer reported that the DOE did not fully account for the declining market share for fluorescent products.
- ◆ One felt that the DOE adequately responded to manufacturer concerns during the standard development process and ultimately struck a balanced compromise with this standard.

## 5 CONCLUSIONS AND RECOMMENDATIONS

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### 5.1 Overall Findings

Overall, TRC found that NEEA's share of influential efforts was approximately one-quarter (23%) of all influential efforts. While TRC identified over ten stakeholders involved in the adoption of this standard, TRC identified the relative significance of efficiency stakeholders for supporting this standard as the following, in order of descending significance:

1. The California IOUs (including their consultant) played the most influential role.
2. NEEA played the second most important role.
3. All other efficiency stakeholders influenced this standard at a lower level.

This is because TRC found that the primary barriers were technical, including the need for an accurate and market-friendly test standard, and the need to understand and resolve the

discrepancy between data provided by NEMA and DOE. Both of these factors increased manufacturer opposition to the originally proposed standard. The CA IOUs and NEEA helped address these barriers by providing technical comments for how to improve the test standard and why there may be a discrepancy between the analysis that NEMA and the DOE provided. In contrast, the other efficiency stakeholder organizations played more of a supporting role to the IOUs and NEEA in developing these technical comments. In addition, many efficiency stakeholders provided support (through meeting attendance and comments) for DOE's proposed efficiency standard and scope, but NEEA was particularly vocal.

TRC notes that this result is specific to the evaluation of this standard. Interviewees commented that the key efficiency stakeholders for a standard can change depending on the type of barriers. For the fluorescent lamp ballast standard, the barriers were all technical in nature, and NEEA and the CA IOUs led the technical analysis and commentary. Other standards may have different challenges that serve as the primary barriers (e.g., political opposition or legal issues). Consequently, other efficiency stakeholder organizations may play a more primary role for other standards – particularly those where non-technical barriers are significant.

TRC further estimated that 12-24% of energy savings from the standard were attributable to the cumulative efforts of all efficiency stakeholders. This is based on the finding that efficiency stakeholders played a significant supporting role, but not a central role, in the development of this standard, so they had a moderate to low impact overall. Due to data limitations, TRC could not provide an accurate point estimate within this range. However, TRC's best estimate is 18%, because it is the midpoint of this range.

## 5.2 Recommendations

While it was beyond the scope of this evaluation to identify a full, vetted set of recommendations, TRC provides the following suggestions and lessons learned based on our findings.

### 5.2.1 Evaluation recommendations

**Continue to use multiple data sources to estimate impacts.** TRC used a combination of a literature review and interviews with stakeholders to conduct this evaluation.

The literature review provided important documentation of stakeholder comments and activities, as well as DOE's response to comments. The docket is critical in documenting activities and specific details that stakeholders and DOE staff may forget over time, as was the case with this evaluation. TRC received informative feedback from interviews, but due to a lack of input from key players such as DOE and their consultants, TRC relied significantly on the literature review. The DOE rulemaking docket provides a sufficient trail of documents to review input from all parties. TRC was able to review DOE's response to stakeholder comments, both written and verbal, in the rulemaking documents such as the NOPR and the Final Rule. Additionally, the meeting notes were useful to identify key individuals participating in the rulemaking process.

However, the literature did not always sufficiently capture work done behind the scenes. TRC's interviews with stakeholders were important in identifying activities that the DOE did not docket, such as direct meetings between efficiency stakeholders and manufacturers. In addition,

the interviews provided critical insight into the role of each advocate in developing TAG comments. While the order of efficiency stakeholders' signatures offered a clue, the interviews were important to identify whether (for example) the organization listed second played a "main support" role or was one of several organization that provided a minor supporting role.

Consequently, TRC recommends that future standard evaluations include both a literature review and interviews with stakeholders.

**Conduct evaluations soon after standard adoption, if possible.** As described in Section 3.2, one challenge to this evaluation was that some of the key players in the development of the standard had left their positions and were unavailable for interview, while others reported difficulty in recalling details of the standard development and adoption process. NEEA could reduce both of these challenges if they conduct (or hire a contractor to conduct) evaluations soon after the DOE adopts the final standard.

If a full evaluation is not feasible under this proposed timeframe, NEEA or its contractor could conduct key stakeholder interviews shortly after the DOE adopts the standard, so that stakeholders can provide information while they are more likely to be available and able to remember details of the standard development process. NEEA or its evaluator could use this data whenever the full evaluation takes place.

**Make minor adjustment to NEEA logic model.** NEEA has an existing logic model for its standard rulemaking process activities, shown in Section 6.1. Overall, TRC found that this logic model captured the main barriers and activities for this standard. Although there were some barriers and activities that were not relevant for this particular standard, they are likely applicable for other standards. For example, political opposition was not a major barrier here, but many other standards may face more political opposition. Consequently, TRC does not recommend removing any barriers in the current NEEA logic model.

A barrier that TRC found to be important, but that the NEEA logic model does not currently show, is the lack of an existing and suitable test standard. As stated in DOE's rulemaking framework, DOE cannot develop a performance standard without an acceptable test method in place. Currently, NEEA's logic model only mentions test standard development as part of activities to address a lack of sufficient data to inform development of a performance standard. Based on TRC's industry experience, a lack of a suitable test standard is likely to be a barrier for many standards. Consequently, TRC recommends that NEEA add "No existing or suitable test standard" as a barrier, as well as activities meant to address this barrier, to the logic model.

### 5.2.2 Recommendations for NEEA's future support of national standard development

While this evaluation found that NEEA played a significant role in supporting the adoption of this standard, TRC identified areas where NEEA could improve its involvement and documentation of those activities during the rulemaking process.

**Increase coordination with the DOE and its consultants.** Based on feedback from efficiency stakeholders and DOE staff, there appeared to be a misalignment between DOE needs and the



support that efficiency stakeholders provided for this standard. Efficiency stakeholders (including NEEA) were willing and able to provide a high level of support to DOE on technical barriers; however, the DOE staff interviewed seemed to be generally unaware that these resources were available. The DOE's consultant, rather than DOE lead staff, typically reviews comments, so it is possible that the consultant would have been more aware of the resources that efficiency stakeholders provided. In addition, during the standard development process, NEEA and other efficiency stakeholders performed analyses and conducted meetings with manufacturers to address issues that the DOE appeared to be already addressing. DOE could possibly have taken advantage of the efficiency stakeholders' efforts and avoided time spent on analysis. Consequently, TRC recommends that the efficiency stakeholders develop a stronger working relationship and greater communication with DOE and its consultants, so that NEEA and its collaborating efficiency stakeholders are providing useful work that will not duplicate DOE efforts.

**Focus on providing input early in the standard adoption process.** Multiple efficiency stakeholders emphasized the importance of providing input during the early stages of standard development, both through comments and during public meetings, because it has a greater chance to influence the direction of the standard. Two efficiency stakeholders stated that the course of the rulemakings would likely look very different without early stakeholder input. The literature review showed that NEEA is often involved in federal standard development and stays engaged throughout the process. NEEA should continue to provide support for DOE and put greater emphasis on being involved early in the process, specifically during the framework and preliminary technical support document phases.

**Improve documentation of NEEA activities.** Interview feedback reinforced the importance of efficiency stakeholders tracking and documenting their activities. The details of these activities can get lost or forgotten in the time between the standard development and the evaluation and may be absent from the DOE docket. For instance, CA IOUs and NEEA representatives recall and have evidence (meeting notes, emails) of their individual meetings with NEMA, but the DOE docketed information does not include information regarding these direct interactions between the efficiency stakeholders and manufacturer. However, NEEA did not document all activities that they claimed. Other interviewees had difficulty recalling the details of these meetings and the meeting attendees, and this information was not available in the literature, so TRC could not always corroborate NEEA's claimed activities and their impacts.

As a separate but related recommendation as the one above for NEEA Evaluation staff to conduct evaluations soon after standard adoption, TRC recommends that NEEA C&S staff consider implementing more effective ways to document its activities and the result of these activities. NEEA could keep a table of major activities, including dates and parties involved, barriers the activity addressed, and outcomes of the activity, and regularly update this table as the standard development procedure proceeds. NEEA could model its documentation of activities off of the California IOUs' Codes and Standards Enhancement (CASE) Code Change Theory Reports, which provide the narrative behind the influential efforts and that an evaluator can use later to understand an efficiency stakeholder's actions and influence.

## 6 APPENDICES

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### 6.1 Current Logic Model

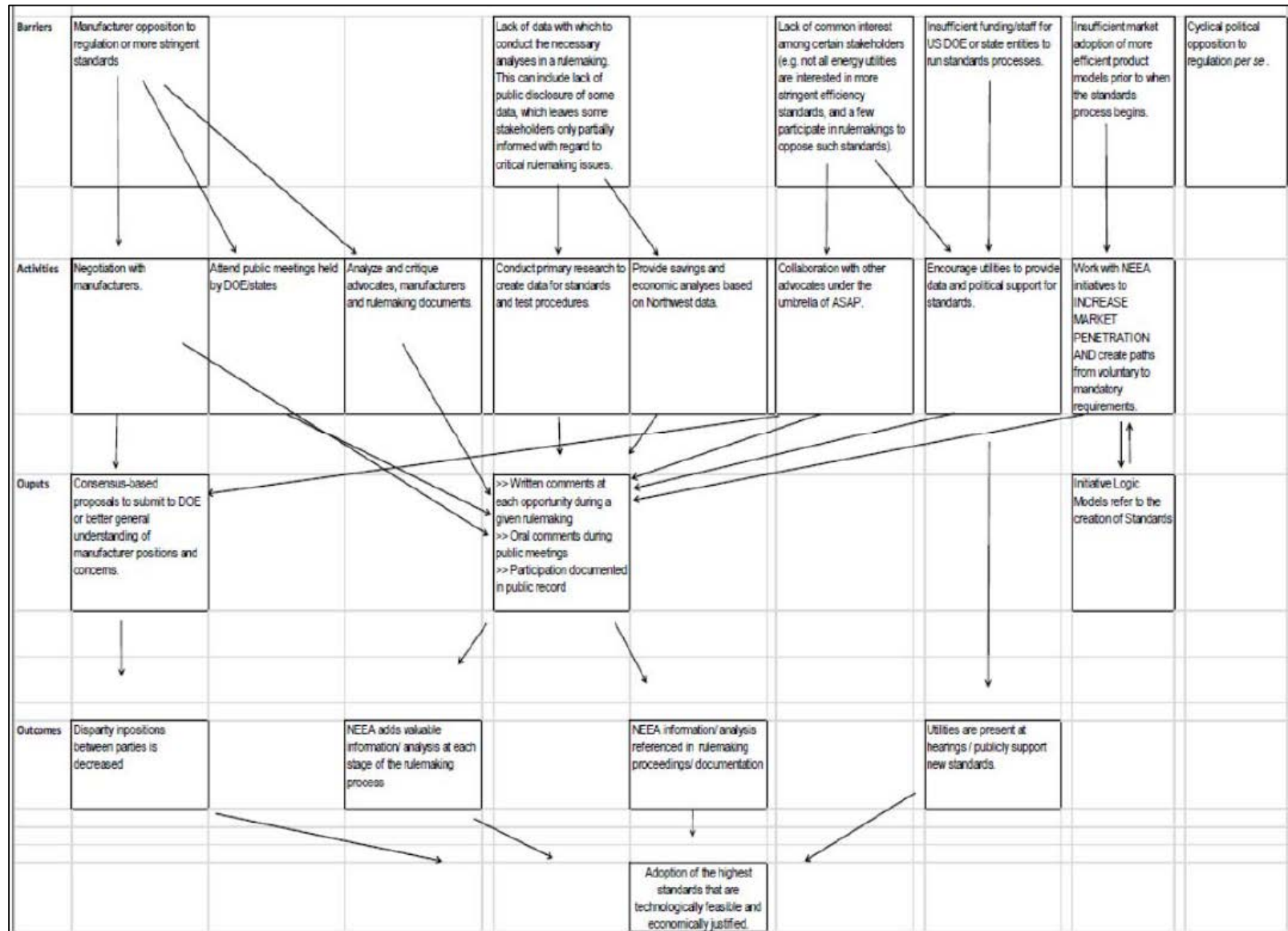
**Figure 4** shows the logic model that NEEA developed for its standards development activities. NEEA adapts its activities to suit the specific needs for each particular standard.

There were three potential barriers that TRC found were not significant. TRC describes these below, along with our rationale for identifying them as not significant for this standard.

- **Lack of common interest among certain stakeholders.** Although there was both opposition and support for the proposed standard, stakeholder groups were in coordination and held the same position on the standard. There was common interest among manufacturers to oppose the proposed standard. Likewise, there was common interest among efficiency stakeholder groups to support the new standard.
- **Lack of DOE staff and funding to support rulemaking process.** DOE enlisted an outside consultant, Navigant, to help conduct research, perform analyses, and develop recommendations for the proposed standard. Limitations in DOE staff or funding were not a significant barrier for this standard.
- **Cyclical political issues.** Based on interviews with those involved, the issues were largely technical in nature. There was no political opposition during this standard process.



Figure 4 - NEEA Logic Model for Standards Rulemaking Process



## 6.2 Interview Guides and Sampling Memo

This section provides:

- ◆ The final interview guides that TRC used to conduct interviews with NEEA staff, DOE staff, efficiency stakeholder organizations, and manufacturers.
- ◆ The sampling memo that TRC used to conduct interviews with NEEA staff, DOE staff, efficiency stakeholder organizations, and manufacturers. This memo describes the overall approach that TRC used to identify potential interviewees, and the organizations and staff titles at these organizations, that TRC targeted for interviews. For privacy concerns, TRC has removed the names of people identified for interviews. As shown in Figure 2 in Section 3.1, some stakeholders identified for interview declined the request or were not available for interviews.



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# MEMORANDUM

February 8, 2016

To: Steve Phourides (Northwest Energy Efficiency Alliance – NEEA)  
From: Marian Goebes, Megan Dawe and Cathy Chappell (TRC)  
Re: **Final Interview Guides**

## FINAL INTERVIEW GUIDES FOR NEEA FLUORESCENT LAMP BALLAST STANDARD EVALUATION

### Introduction

The Northwest Energy Efficiency Alliance (NEEA) has contracted TRC to conduct an evaluation of NEEA's role in the development of the federal fluorescent lamp ballast standard.

As part of its data collection, TRC will conduct interviews with stakeholders to discuss the role of NEEA, as well as the role of other stakeholders, in the adoption of this standard. This memo provides the interview questions for each group of interviewees.

### Interview Guides

*Introduction language [for all interviewees]*

Hello, my name is \_\_\_\_\_ and I am calling with TRC Energy Services. On behalf of the Northwest Energy Efficiency Alliance (NEEA), we are conducting interviews to understand the role that NEEA and other organizations have made in influencing the development of the DOE's fluorescent lamp ballast standard. I will be asking you questions regarding comments raised by your organization and others, activities conducted to address the issues raised, [and – for NEEA and DOE interviews] the candidate standard levels considered. Thank you very much in advance for your time.

### NEEA Staff

#### *Comments and Issues*

1. What were the main comments voiced to the standard during the proposal process?
  - a. [Probe as needed.] Please describe the main comments voiced in support of the standard, against the standard, or related to clarifications needed to the originally proposed standard.

- b. What groups or stakeholders voiced each of these main comments?
2. What were some of the concerns voiced regarding each of the following aspects of the proposed standard:
  - a. The test standard metric?
  - b. The proposed efficiency level?
  - c. The scope or product classes covered or exempted?
  - d. Data quality and data availability provided to support the proposed standard?
  - e. Issues with the timeline of the standard development. [If needed: for example, were there issues with the test standard and the proposed efficiency level being developed at the same time?]

### *Activities*

3. What activities did your organization conduct to address these issues?
4. For each of these activities:
  - a. What issues(s) did it address?
  - b. What was the relative effectiveness of the activity for overcoming the barrier (e.g. low, medium, high)?
  - c. What other organization(s) participated in this activity?
5. Did NEEA conduct any primary data collection or independent analyses to support the DOE analysis?
  - a. [If so] Please describe what your organization provided.
  - b. How effective was this data or analysis in addressing the issues raised?
  - c. Did other organizations provide primary data collection or independent analyses?
  - d. [If so] Please describe what your organization provided.
  - e. How effective was this data or analysis in addressing the issues raised?
6. Did your organization or other advocacy groups work directly with stakeholders that opposed the standard to find solutions to issues? If yes:
  - a. What stakeholders did you or other advocates work with?
  - b. What did NEEA do?
  - c. What did other advocacy organizations do?
7. Beyond the activities that NEEA was involved in, what activities did other advocacy groups conduct to address issues raised?
  - a. How effective do you think these activities were in supporting development of the standard (e.g., low, medium, high)?
  - b. What organizations conducted these activities?

### *Standard Development*

8. What were the different Candidate Standard Levels (CSLs) considered by the DOE, including significant differences in the levels of efficiency, scope, and testing procedures considered?
9. How did the DOE identify the different CSLs considered?
10. How did the DOE decide which CSL to ultimately adopt?

### *Referrals and Conclusion*

11. Who would you recommend that we speak with at the DOE regarding development of this standard?
12. Is there anything else about the fluorescent lamp ballast standard development process that you would like to add?

## **DOE Staff**

### *Comments and Issues*

1. What were the main comments voiced to the standard during the proposal process?
  - a. [Probe as needed.] Please describe the main comments voiced in support of the standard, against the standard, or related to clarifications needed to the originally proposed standard.
  - b. What groups or stakeholders voiced each of these main comments?
2. What were some of the concerns voiced regarding each of the following aspects of the proposed standard:
  - a. The test standard metric?
  - b. The proposed efficiency level?
  - c. The scope or product classes covered or exempted?
  - d. Data quality and data availability provided to support the proposed standard?
  - e. Issues with the timeline of the standard development. [If needed: for example, were there issues with the test standard and the proposed efficiency level being developed at the same time?]

### *Activities*

3. What activities did advocacy groups conduct to overcome the issues identified?
4. For each of these activities:
  - a. What issue(s) did it address?
  - b. What was the relative effectiveness of the activity for overcoming the issue (e.g. low, medium, high)?
  - c. What organization(s) participated in this activity?
5. Did the DOE receive any data or analyses from advocacy groups to address issues raised?
  - d. If so, please describe this data and the issues it tried to address.

- e. How effective was this data or analysis in addressing the issue?
- f. Which organization(s) provided it?

### *Standard Development*

- 6. What were the different CSLs considered by DOE, including significant differences in the levels of efficiency, scope, and testing procedures considered?
- 7. How did the DOE identify the different CSLs considered?
- 8. How did the DOE decide which CSL to ultimately adopt?

### *Referrals and Conclusion*

- 9. Can you recommend any resources or literature that provides insight into the energy savings of the final CSL adopted, compared to other CSLs considered?
- 10. Can you recommend any stakeholders that were particularly active in the adoption of this standard for interview, including
  - a. Staff at manufacturers?
  - b. Advocacy organization representatives?
- 11. Is there anything else about the Fluorescent Lamp Ballast standard development process that you would like to add?

## **Advocacy Organizations**

### *Comments and Issues*

- 1. What were the main comments voiced to the standard during the proposal process?
  - a. [Probe as needed.] Please describe the main comments voiced in support of the standard, against the standard, or related to clarifications needed to the originally proposed standard.
  - b. What groups or stakeholders voiced each of these main comments?
- 2. What were some of the concerns voiced regarding each of the following aspects of the proposed standard:
  - a. The test standard metric?
  - b. The proposed efficiency level?
  - c. The scope or product classes covered or exempted?
  - d. Data quality and data availability provided to support the proposed standard?
  - e. Issues with the timeline of the standard development. [If needed: for example, were there issues with the test standard and the proposed efficiency level being developed at the same time?]

### *Activities*

3. What activities did your organization conduct to overcome these barriers?
4. For each of these activities:
  - a. What issues(s) did it address?
  - b. What was the relative effectiveness of the activity for overcoming the barrier (e.g. low, medium, high)?
  - c. What other organization(s) participated in this activity?
5. Did your organization conduct any primary data collection or independent analyses to support the DOE analysis?
  - d. [If so] Please provide some examples.
  - e. How effective do you think this data was in addressing the issues raised (low, medium, high)?
6. Did your organization or other advocacy groups work directly with stakeholders that opposed the standard to find solutions to issues? If yes:
  - f. What stakeholders did you or other advocates work with?
  - g. What did your organization do?
  - h. What did other advocacy organizations do?
7. Beyond the activities that your organization was involved in, what activities did other advocacy groups conduct to address issues raised?
  - i. How effective do you think these activities were in supporting development of the standard (low, medium, high)?
  - j. What organizations conducted these activities?

### *Referrals and Conclusion*

8. Who would you recommend that we speak with at the other advocacy organizations regarding development of this standard?
9. Who would you recommend that we speak with at lighting manufacturers regarding development of this standard?
10. Is there anything else about the fluorescent lamp ballast standard development process that you would like to add?

## **Manufacturers**

### *Comments and Issues*

1. What was your organization's comments to the originally proposed standard? [Probe as needed.] What, if any, were your comments related to the following:
  - a. The test standard metric?

- b. The proposed efficiency level?
  - c. The scope or product classes covered or exempted?
  - d. Data quality and data availability provided to support the proposed standard?
  - e. Issues with the timeline of the standard development. [If needed: for example, were there issues with the test standard and the proposed efficiency level being developed at the same time?]
2. Were your comments addressed during the standard development process?
    - a. If so, how?
    - b. How effective were responses to addressing your concerns?
    - c. Who addressed your comments?
  3. What were the main comments to the standard proposal voiced by other manufacturers or manufacturer organizations?
  4. What were the main comments voiced by advocacy organizations in support of or against the standard? Advocacy organizations could include the California Investor Owned Utilities, Northwest Energy Efficiency Alliance, Natural Resources Defense Council, or other non-manufacturer advocacy groups.

#### *Activities*

5. What effect, if any, did the comments and activities of other organizations have on your initial concerns?
6. Did you work directly with any advocacy organizations to discuss the standard?
  - a. If so, which organizations? [Repeat example list if needed.]
  - b. How effective was this collaboration in addressing your concerns?

#### *Referrals and Conclusion*

7. Can you recommend any other manufacturer staff members that could provide insights into the development of the fluorescent lamp ballast standard process?
8. Is there anything else about the fluorescent lamp ballast standard development process that you would like to add?





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# MEMORANDUM

February 8, 2016

To: Steve Phourides (Northwest Energy Efficiency Alliance – NEEA)  
From: Marian Goebes, Megan Dawe, and Cathy Chappell (TRC)  
Re: **Sampling Memo**

## SAMPLING MEMO FOR NEEA FLUORESCENT LAMP BALLAST STANDARD EVALUATION

### Introduction

The Northwest Energy Efficiency Alliance (NEEA) has contracted TRC to conduct an evaluation of NEEA’s role in the development of the federal fluorescent lamp ballast standard.

As part of its data collection, TRC will conduct interviews with stakeholders to discuss the role of NEEA, as well as the role of other stakeholders, in the adoption of this standard. This memo provides the sampling plan for identifying these stakeholders, and a list of organizations and staff members at these organizations for interview.

Figure 1 provides an overview of the types of stakeholders that TRC will interview, the number of completed interviews that TRC is targeting, and the objective of each interview. TRC will provide a detailed list of interview questions for each stakeholder group in a separate document.

*Figure 1. Interviewees and Interview Topics*

| Stakeholder Category                   | No. of interviews | Objective of Interview / Interview Topics   |
|--|-------------------|---|
| NEEA C&S Staff                         | 1-2               | Barriers NEEA intended to address, relative significance of barriers, NEEA’s activities and outputs, activities taken by other advocacy groups, and NEEA’s staff’s perspective on the effectiveness each activity   |
| U.S. Department of Energy (DOE) staff  | 1-2               | Key barriers to adoption of this standard and their relative significance; activities taken to address these barriers, the effectiveness of those activities in addressing the barriers, and which advocacy organizations participated in those activities; and other CSLs considered |
| Fluorescent Lamp Ballast Manufacturers | 2-4               | Activities taken by the interviewed manufacturers and by other manufacturers, including activities to advocate for or against the standard, and the effect of other organizations’ activities on manufacturers’ comments  |

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|   |      |  |
|---|------|--|
| Advocacy Groups Active in Adoption of this Standard | 2-3  | Barriers the organization intended to address for this standard, organization's activities and outputs, activities taken by other advocacy groups, and perspective on effectiveness of each activity (those conducted by the interviewee's organization and those conducted by others) |
| Total Interviews                                    | 6-10 |  |

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## Sampling Approach

Overall, TRC used a purposive sampling method to develop its sample. Based on a review of literature, including federal standard rulemaking documentation, comments from stakeholders, and internal documents from NEEA, TRC identified stakeholders that were the most involved with or most knowledgeable about the development of the standard, including those that advocated both for and against the standard. While this is a non-random sample, based on TRC's past experience, we expect that these individuals should provide the most insight regarding this standard's barriers, advocacy activities, and the role of NEEA.

In identifying an appropriate staff member at each organization, TRC used attendance logs in meetings related to the standard, and staff members identified on comments and supporting materials. Where possible, TRC identified technical staff (e.g., engineers), rather than organization leaders (e.g., presidents or executive directors). This is both because technical staff are more likely to be knowledgeable about the technical aspects of their organization's activities with regards to the standard, and because the technical staff may be more accessible for an interview.

If a person that was highly active in the standard development process does not respond to TRC's interview requests (including multiple attempts via phone and email), TRC will contact a different person at that organization or a person from the next most active organization. TRC will also ask interviewees to recommend other stakeholders that were particularly involved in the adoption of this standard, and use these recommendations as needed to meet interview completion targets.

## Sample

Figure 2 provides a list of stakeholders that TRC plans to contact for interviews. For the advocacy interviews, TRC will use results of our continued literature review and results from initial interviews to further prioritize the interviewee list.

*Figure 2. Sample of Interviewees*

| Stakeholder Category                   | No. of interviews                  | Organization   | Staff Member   |
|--|------------------------------------|--|--|
| NEEA                                   | 1-2                                | NEEA Codes & Standards staff   | [name withheld], Senior Engineer   |
| DOE                                    | 1-2                                | DOE Codes & Standards staff  | [name withheld], DOE Program Manager<br>[name withheld], Navigant Consulting (DOE consultant), Director, or colleague            |
| Fluorescent Lamp Ballast Manufacturers | 2-4                                | Philips  | [name withheld], Director, Technical Relations, also commented on behalf of National Electrical Manufacturers Association (NEMA) |
|  |                                    | Osram Sylvania   | [name withheld], Engineering Manager   |
|  |                                    | General Electric   | [name withheld], North America Lighting Ballast Product Manager  |
|  |                                    | Lutron Electronics   | TBD*   |
| Advocacy Groups                        | 2-3**                              | Energy Solutions (on behalf of California Investor Owned Utilities - IOUs) | [name withheld], Senior Project Manager  |
|  |                                    | Natural Resources Defense Council (NRDC)                                   | [name withheld], Senior Engineer or [name withheld], Manager   |
|  |                                    | Appliance Standards Awareness Project (ASAP)                               | [name withheld], Executive Director  |
|  |                                    | American Council for an Energy Efficiency Economy (ACEEE)                  | [name withheld], Director, Buildings Program; or [name withheld], Senior Research Analyst  |
|  |                                    | Northwest Power and Conservation Council                                   | [name withheld], Conservation Manager  |
|  |                                    | Northwest Energy Efficiency Partnership (NEEP)                             | [name withheld], Executive Director  |
|  |                                    | Earthjustice   | [name withheld], Attorney  |
| Alliance to Save Energy                | [name withheld], V.P. for Programs |  |  |

\* TRC will identify the appropriate staff member(s) through further literature review and/or recommendations from other interviewees.

\*\* TRC will further refine the list of advocacy organizations to target the most involved advocates based on further literature review, and based on feedback from NEEA.