Insights into EISA 2020: A Gradual Decline or a Steep Cliff?

LIGHTING IN ENERGY EFFICIENCY PROGRAMS

November 30, 2018
AGENDA

- What EISA Is & Where Things Stand
- The Lighting Committee
- Key Findings
- Recommendations
  - Cost Effectiveness
  - Next Generation Program Evolution
Safely Evacuating a Common Area

• Now where the exits are – especially in an unfamiliar location
• Don’t panic – move out in orderly manner
• Try to connect with any colleagues you have here – ensure they have evacuated safely – after you have done so.
• Do not go looking for others. Fastest way to support officials is to get yourself out.
WHAT IS EISA?

Energy Independence and Security Act (EISA)

Signed on December 19, 2007 by President Bush

Three key provisions are enacted:

- Corporate Average Fuel Economy Standards
- Renewable Fuel Standard
- Appliance/Lighting Efficiency Standards
Defined General Service Lamps (GSL):

- General Service Incandescent Lamps (GSIL)
- Compact Fluorescent Lamps (CFLs)
- General Service Light-Emitting Diode (LED) or Organic Light-Emitting Diode (OLED) Lamps
- Any other lamps that the Secretary of the Department of Energy (DOE) determines are used to satisfy lighting applications traditionally serviced by general service incandescent lamps

In addition, general service lamps are:

- Intended for general service applications
- Medium screw-based lamps
- Designed for light output between 310 and 2600 lumens
- Capable of operating at a voltage range at least partially within 110 and 130 volts
First impacts were seen on medium (E26) screw-base incandescent lamps: 40W, 60W, 75W and 100W.

<table>
<thead>
<tr>
<th>Rated Lumen Ranges</th>
<th>Typical Current Lamp Wattage</th>
<th>Maximum Rated Wattage</th>
<th>Maximum Efficacy LPW</th>
<th>Minimum Rated Lifetime</th>
<th>Effective Date</th>
<th>CA Effective Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1490-2600</td>
<td>100</td>
<td>72</td>
<td>36.1</td>
<td>1,000 hrs</td>
<td>1/1/2012</td>
<td>1/1/2011</td>
</tr>
<tr>
<td>1050-1489</td>
<td>75</td>
<td>53</td>
<td>28.1</td>
<td>1,000 hrs</td>
<td>1/1/2013</td>
<td>1/1/2012</td>
</tr>
<tr>
<td>750-1049</td>
<td>60</td>
<td>43</td>
<td>24.4</td>
<td>1,000 hrs</td>
<td>1/1/2014</td>
<td>1/1/2013</td>
</tr>
<tr>
<td>310-749</td>
<td>40</td>
<td>29</td>
<td>25.8</td>
<td>1,000 hrs</td>
<td>1/1/2014</td>
<td>1/1/2013</td>
</tr>
</tbody>
</table>

However, 22 types of incandescent lamps are exempt from the standards. Key types include: reflector lamps, 3-way lamps and G-25 (40W or less). Remaining inventory is allowed to be sold off.
Two Rulemaking Cycles:

1. For the first rulemaking cycle, Congress instructed the DOE to initiate a rulemaking process prior to January 1, 2014 to consider two questions:
   i. Whether to amend energy conservation standards for general service lamps and
   ii. Whether “the exemptions for certain incandescent lamps should be maintained or discontinued.” (42 U.S.C. 6295 (i)(6)(A)(i))

2. Further, if the Secretary determines that the standards in effect for GSILs should be amended, EPCA provides that a final rule must be published by January 1, 2017 with a compliance date at least 3 years after which the final rule is published. (42 U.S.C. 6295 (i)(6)(A)(iii)) In developing such a rule, the DOE must consider a minimum efficacy standard of 45 lumens per watt (lm/W). (42 U.S.C. 6295 (i)(6)(A)(ii)) If the DOE fails to complete a rulemaking in accordance with 42 U.S.C. 6295 (i)(6)(A)(i)-(iv) or a final rule from the first rulemaking cycle does not produce a savings greater than or equal to the savings from a minimum efficacy standard of 45 lm/W, the statute provides a “backstop” under which the DOE must prohibit sales of GSLs that do not meet a minimum of 45 lm/W standard beginning on January 1, 2020. (42 U.S.C. 6295 (i)(6)(A)(v))

   As of this presentation, a final rule has NOT been published.
EISA Standards could reduce LED savings by 80-90% making these measures not cost-effective in EE portfolios.

Many utility residential and multifamily energy efficiency portfolios are dominated by lighting technologies that will be impacted by EISA standards to achieve desired savings levels at a cost-effective rate. A variety of these portfolios will be impacted by the changing lighting technology landscape and the impacts of the Energy Independence and Security Act (EISA) lighting portion of the legislation. The intention of this report is to shed light on the drivers of uncertainty, share what varying stakeholders anticipate will happen to lighting standards over the next five years, and discuss what plans other entities are making among this ambiguous legislative landscape.

The data gathered through market research was used to better understand how utilities have leveraged lighting baselines and research, how evaluators are assessing current impacts and cost-effectiveness of lighting measures, and how they are planning for this measure in their portfolio.

_Additionally, the challenge is to provide quality ideas and direction to help utilities navigate through the uncertainty._
We Invested In Research on the Effects of EISA

- Over the last 6 months, a team of Franklin Energy staff has dedicated time to figuring out the what, where, when, why and how of EISA.
- We have invested in a commissioned study that included literature reviews and surveys with many stakeholders (i.e. utilities, manufacturers, retailers, evaluators)
- The findings of the research, combined with the analysis and recommendations of our team, will be widely publicized in:
  - Conference presentations nationally
  - Published whitepapers, blogs and press releases
  - Individual client meetings
A **Gradual Decline** is reasonable over the next several years.

**Why?**

- Definition of General Service Lamps
- Whether or not the current administration will roll back environmental standards
- LEDs have not impacted the halogen/incandescent market share
- Lack of clarity to retail old technology sell-through dates
- Lack of federal enforcement plan or funding of enforcement
Key Research Findings:

1. Significant uncertainty regarding EISA backstop and program variation
2. LEDs are expected to become a dominant technology
3. Current uncertainty for utility lighting programs (but don’t panic!)
4. Remaining opportunities for lighting programs post-2020
5. Stakeholders should proactively influence policies

6. [https://www.franklinenergy.com/resource-library](https://www.franklinenergy.com/resource-library)
- LEDs continue to gain substantial market share, BUT have largely displaced sales of CFLs only.

- Shares of inefficient lighting (incandescent and halogen) still represent over half (59%) of the market.
RECOMMENDATIONS

- Maintain Current Lighting Programs
  - Illinois 2021 (Keeping Existing Halogen Baselines)
  - Massachusetts 2023 (Market Adoption Model Findings)
  - Arkansas 2022 (Halogen EUL of 4 Years)
  - Oklahoma (Shelf Studies)

- Educate Stakeholders
  - Regulators, Utilities, Evaluators, Implementers, Manufacturers, REEOs

- Counsel State TRMs
  - Advocate gradual reductions in claimed savings over time based on market conditions (i.e. admin, sell through, shelf space, etc.)

- Identify Other Lighting & Non-Lighting Measures
  - Portfolio Rebalancing, Measure Diversification
  - Smart Technologies & Behavior Change
  - Move Away From Retail, Focus on Residential
  - Adjust programs to create more certainty around replacement of actual halogens and incandescent

- Direct Installation Exemptions
  - Existing equipment is used as the baseline- this in place in other TRMs, IL for example.
  - Extends full savings further for DI.
In partnership with Morgan Marketing Partners who supports cost effectiveness testing for utilities across the country, we are looking to help utilities and regulators look at cost effectiveness in an EISA world.

**DESIGN DRIVERS - NEW APPROACH TO COST EFFECTIVENESS**

- **COST BENEFIT CHANGES**
  - Grid costs included at customer level – T&D Costs
  - Targeting and avoided costs determined at customer or feeder level
  - Supply Curve Changes – “Duck Curve” changes with renewables and peak supply needs shift
  - Peak Demand and control more important
  - Avoided Carbon costs should/will be considered
  - Move to SCT from TRC – environmental NEBs become critical to understanding the true value of EE/DR/DER programs

- **BATTERY STORAGE AND ELECTRIC VEHICLES WILL CHANGE THE GAME**
  - Shifting peaks must change the of value of demand savings – need to adjust peak load time considerations in programs
  - Consider alternative demand/grid optimization programs – NWA, commercial demand programs
Bottom Line is the **Avoided Cost Value** of lighting savings will be changing, so even small savings at the right time will be of value to the utility/program

For illustration:
60W LED equivalent, using MISO prices in DSMore, no coincident peak savings (operating at night)

Worst Case using **existing** Avoided Costs
- LED savings of 4 kWh year, not on peak
- Assume cost of $2.00 bulb, 15 year life

\[ UCT = 1.1 \]

If Peak Hour Changes for lighting and T&D savings double:

\[ UCT = 7.32 \]

*Also, consider savings/cost effectiveness at the project level versus measure level – fixtures/bulbs/controls*
We have gone through measure changes before, and it is truly an opportunity

**Savings based on bulb replaced**
- Bulb for bulb early replacement – savings at the socket level
- Bulb turn In

**Lighting Bundles**
- Controls
- With other measures and specialty lights
- With other programs and measures as bonus

**Whole System Design**
- Lighting Power Density change – for non-residential, evolve to an LPD reduction program incentive approach
- Whole Building Design component

**Marketing Tool – Behavior Programs with Savings measured at the meter – True Performance Programs**

# Next Generation Programs – LPD for Non-Residential

<table>
<thead>
<tr>
<th>Program Objective</th>
<th>Overall watt reductions on a space by space level using local code LPD as the baseline or calculate existing LPD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Offering</td>
<td>Programs provides lighting design consultation, fixture selection/type recommendations and provides the calculations for LPD reduction that provides the estimate of incentive dollars available. List of approved trade allies to completed the work on a referral basis.</td>
</tr>
<tr>
<td>Calculate Savings</td>
<td>Actual savings based on initial LPD and final installed LPD reduction</td>
</tr>
<tr>
<td>Incentive Approach</td>
<td>Incentives is $ per watt/sq.ft reduction</td>
</tr>
<tr>
<td>Evaluation Considerations</td>
<td>As using actual versus deemed much higher attribution levels, very high persistence for fixture; if customer utilizing controls, post inspective for persistence will be important</td>
</tr>
<tr>
<td><strong>Next Generation Programs – Behavior Change through Ongoing Customer Engagement</strong></td>
<td></td>
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<tr>
<td><strong>Program Objective</strong></td>
<td>Overall usage reduction – both kWh and/or kW. Targeted at residential.</td>
</tr>
<tr>
<td><strong>Offering</strong></td>
<td>Utilize an online engagement tool with rewards, gamification, etc. to impact how customers use energy. Key is the customer making lifestyle changes – supported by voice enabled connection (Google Alexa, etc) to the customer engagement platform and utility usage</td>
</tr>
<tr>
<td><strong>Calculate Savings</strong></td>
<td>Actual savings calculated from baseline to actual reduction at the meter</td>
</tr>
<tr>
<td><strong>Incentive Approach</strong></td>
<td>Incentives provided for standard measures: HVAC, lighting fixtures (hardwired), bulbs, weatherization, etc.</td>
</tr>
<tr>
<td><strong>Evaluation Considerations</strong></td>
<td>Implementer paid for annual actual savings reductions. Over the program cycle. Persistence is measured in actual savings.</td>
</tr>
</tbody>
</table>
## Next Generation Programs – Combined EE and DR visits to the customer (res/non-res)

| **Program Objective** | Reduce cost of program delivery by single visits to support multiple program offerings.  
*Side benefit: customer satisfaction due to limited demands on time/schedule* |
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<tr>
<td><strong>Offering</strong></td>
<td>Combine EE and DR into a single visit for switch installation and assessment/DI</td>
</tr>
<tr>
<td><strong>Calculate Savings</strong></td>
<td>Savings approach can be maintained to existing TRM</td>
</tr>
<tr>
<td><strong>Incentive Approach</strong></td>
<td>Can maintain existing incentives but delivery costs reduced</td>
</tr>
<tr>
<td><strong>Evaluation Considerations</strong></td>
<td>Need to be able to disaggregate savings and implementation costs for reporting if local regulators have not yet aggregated the programs. Some platforms have this ability with a simple algorithm agreed upon with evaluators and regulators.</td>
</tr>
</tbody>
</table>
Next Generation Programs – New Sector – Telcom/Internet Providers

<table>
<thead>
<tr>
<th>Program Objective</th>
<th>Target a historically disengaged key commercial sector where less than 1% of savings potential is lighting – majority is economization, airflow, HVAC, legacy/switch equipment, chiller/boiler. Estimated that 328 million devices being connected each month and 500 devices in each home connected by 2022 (Mobile Future 2016)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Offering</td>
<td>Provide detailed assessment and site level review of usage centers, recommendations for system changeouts. relationship based for multiple projects for a site and multiple sites per customer.</td>
</tr>
<tr>
<td>Calculate Savings</td>
<td>Actual savings calculated based on custom calculations</td>
</tr>
<tr>
<td>Incentive Approach</td>
<td>Provide custom incentives generally between $0.07 - $0.09 per kWh</td>
</tr>
<tr>
<td>Evaluation Considerations</td>
<td>As using actual versus deemed much higher attribution levels, very high persistence given nature of measures</td>
</tr>
</tbody>
</table>