From Market to Meter: Effects of Lighting Market Dynamics on Residential Energy Consumption

Presented at the 2017 ACEEE National Conference on Energy Efficiency as a Resource

Bonneville POWER ADMINISTRATION
NAVIGANT
The Market is Changing

- Cheap & Abundant LEDs
- Effective EISA Regulation
- Divestment in CFLs
- Effective Program Activity
39% decline in Northwest lighting consumption

<table>
<thead>
<tr>
<th>Year</th>
<th>MW Consumption</th>
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<tbody>
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<td>2009</td>
<td>~500 aMW less</td>
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<td>2010</td>
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<td>2015</td>
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Thinking differently about energy efficiency
Looking at the entire market
Every Lamp: 66.5 million
Every Socket: 309 million
Every Home: 5.8 million
Data Sources

- Nielsen Sales Data
- Residential Building Stock Assessment
- Retail Lighting Long-term Market Tracking
- Regional Housing Stock
- National lighting model cost and lifetime estimates
- Residential Lighting Market Research Interviews
Consumption models can tell us a lot about the market
LED > CFL > Halogen > Incandescent

**Lifetime (years)**

- Incandescent: 2 years
- Halogen: 8 years
- CFL: 12 years
- LED: 14 years

**Efficacy (lumens/Watt)**

- Incandescent: 10 lumens/Watt
- Halogen: 80 lumens/Watt
- CFL: 90 lumens/Watt
- LED: 90 lumens/Watt
Longer life = Fewer sales
Programs incented 50% of CFLs and LEDs

Incentivized Lamps/Year (Millions)

- 2010: 9.6
- 2011: 15.3
- 2012: 11.1
- 2013: 11.4
- 2014: 15.7
- 2015: 14.7
CFLs and LEDs are growing in the stock

<table>
<thead>
<tr>
<th>Year</th>
<th>Incandescent</th>
<th>Halogen</th>
<th>CFL</th>
<th>LED</th>
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<tr>
<td>2009</td>
<td>225</td>
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- 61% efficient
- 39% inefficient
LEDs are reshaping the region’s lighting stock.
Looking ahead

LEDs projected to be 58% of lighting stock by 2020

- **58%**: LED
- **22%**: CFL
- **15%**: Halogen
- **5%**: Incandescent
Market models are a resource for...
Measure Updates

Baselines

Market Shares

Costs
Program Planning

Identifying remaining opportunities by application, region, delivery channel
Regional Power Planning

More detailed than the current methodology for estimating residential lighting load; forecast to 2020
Uncertainty remains in measuring the EE resource
Conclusions

Market perspective demonstrates full effects of EE

Modeling markets provides value to programs and power planners

Wider adoption of market modeling can help refine methodology