MEMORANDUM

To: Massachusetts Electric PAs and EEAC Consultants

From: Monica Nevius and Lauren Abraham, NMR

Cc: Lisa Wilson-Wright, David Barclay, and Lynn Hoefgen, NMR

Date: February 16, 2017

Re: Study RLPNC 16-11: Second quarterly lighting market scan

Section 1 Summary of Findings

This is the second of four market scan memos that are part of the RLPNC 16-11 study. The first memo summarized information on the state of the United States (US) residential lighting market as of September 2016 and where this market might be headed. This second market scan memo presents new information on the US residential lighting market published in the fourth quarter of 2016. The market scans focus on information gained from areas outside of Massachusetts.

Since the first market scan, we identified two new estimates of future US sales (Table 1), one 2015 market share estimate for the US (Figure 1), and three additional 2015 net-to-gross (NTG) estimates for Pennsylvania (Table 2: 2015 NTG Estimates). One-half of 16 lighting suppliers (manufacturers and retailers) interviewed for the 2015-2016 Northwest lighting market tracking study expect EISA 2020 to drive consumers to choose LEDs going forward. The eleven lighting manufacturers interviewed for this study expect their CFL market share to decline and LED market share to rise more quickly than previously reported. On average, these lighting manufacturers estimated their 2015 US market share to comprise 33% LED, 24% CFL, 23% halogen, and 20% incandescent. The proportion of suppliers' 2015 LED sales that are ENERGY STAR certified ranged from 35% to 100%, with one quarter of suppliers reporting that all the bulbs they manufactured were ENERGY STAR certified. (These interviews were conducted prior to the 2016 presidential election, which introduced considerable uncertainty into the lighting market. The findings from the NEEA study should be considered with this in mind.)

Section 2 Introduction

This market scan memo builds on NMR's October 2016 summary of insights into how program administrators and consumers across the nation (outside of Massachusetts) are responding to changes in the lighting market. The October 2016 summary drew on publicly available research, reports, and evaluation results released between January 2015 and September 2016. This summary adds data from four new documents released in the fourth quarter of 2016. (These are listed in Section 5.) As with the previous scan, it addresses the following topics:

1. Where other program administrators think—and evaluation results suggest—the market is headed in terms of the implementation of EISA 2020 and response to CFLs no longer being ENERGY STAR qualified
2. Market share of various bulb types (e.g., by technology but also by ENERGY STAR status, EISA exemption)
3. Socket saturation and household penetration of various bulb types
4. Recent estimates of net-to-gross ratios for CFL and LED programs

Section 3 Where the Market is Headed

In this section, we present expectations regarding the future effects of EISA 2020 and future sales.

3.1 Effects of EISA

In the fourth quarter of 2016, NEEA released the 2015-2016 Northwest lighting market tracking study,[1] which included interviews with lighting suppliers, including eleven manufacturers and five retailers. These interviews were conducted prior to the 2016 presidential election. The unexpected outcome of the election has since introduced considerable uncertainty into the lighting market. The new administration's perspective brings into question whether or not the EISA 2020 requirements will go into effect. Even if the requirements do not change, obtaining funding for enforcement before 2020 now seems very unlikely. The findings from the NEEA study should be considered with this in mind.

Nine of the eleven manufacturers and one of the five retailers interviewed for the NEEA study were aware of EISA 2020, which requires general purpose lamps to have a minimum efficacy of 45 lumens per watt. When asked how they expected EISA 2020 to affect the Northwest, one-half of the suppliers (8 of 16) predicted that it would drive consumers to choose LEDs. One-quarter (4) of the suppliers expected EISA 2020 to result in halogens either becoming more expensive or being phased out. Two predicted that less efficient CFLs would be phased out. Two suppliers declined to comment because of the uncertainty regarding whether Tier 2 of EISA will ultimately be enforced.

[1] This study was completed before the 2016 US election and does not take into account any subsequent uncertainty about the future of the lighting market and standards.

3.2 SALES

In the first market scan memo, we presented the average of lighting suppliers' estimates of their 2018 bulb sales by technology for the Northwest from the 2014-2015 Northwest lighting market tracking study. The 2015-2016 Northwest lighting market tracking study includes lighting suppliers' estimates of their 2017 and 2019 bulb sales by technology. Table 1 shows estimates from the two studies. (The most recent information is in columns with light green headers). Recall when viewing these results, they were obtained from interviews prior to the election results or new administration. The more recent 2017 and 2019 average CFL estimates are both lower than the 2018 average CFL estimate, indicating that suppliers now expect that CFL sales will decline more quickly than they anticipated a year earlier. Similarly, the 2017 and 2019 average LED estimates are both higher than the 2018 average LED estimate, indicating that suppliers expect that LED sales will increase more quickly than they anticipated one year earlier. Suppliers expect halogen incandescent sales will comprise roughly one-sixth of sales through 2019.

Table 1: Forecasted Percentage of Sales by Technology

Lamp Technology	2017 Average*	2018 Average**	2019 Average*
CFL	15%	18%	9%
LED	54%	41%	60%
Incandescent	17%	16%	14%
Halogen	15%	25%	16%

*Source: 2015-2016 Northwest Residential Lighting Long-Term Market Tracking Study, n=7. Corrected from original based on personal communication with Geoff Barker, DNV GL, January 12, 2017.

** Source: 2014-2015 Northwest Residential Lighting Long-Term Market Tracking Study, n=9.

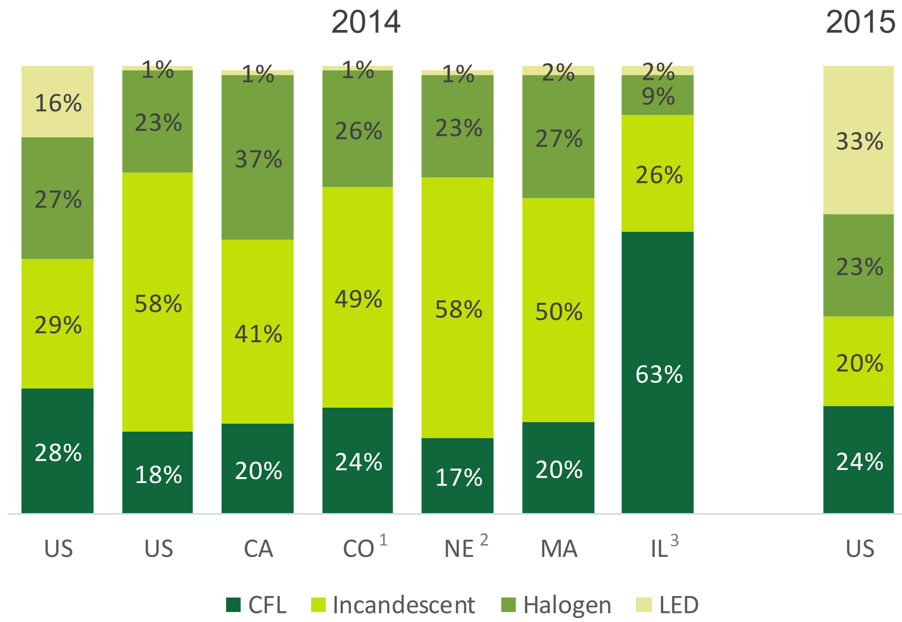
Section 4 Recent Estimates

This section summarizes recent market share and NTG findings.

4.1 MARKET SHARE

We identified one new market share estimate, also from the 2015-2016 Northwest lighting market tracking study, since the first market scan. The new data are lighting suppliers' estimates of their 2015 US market shares. The 2015 estimates are averages based on interviews with seven lighting suppliers. Figure 1 presents both the 2014 market share estimates included in the previous scan and the new 2015 market share. On average, the lighting suppliers interviewed for the study estimated their 2015 LED market share at double that of 2014 (33% versus 16%), and their incandescent market share at almost one-third less (from 29% to 20%). Their estimates of both their halogen and CFL market shares each decreased by about 14% (from 27% halogen and 28% CFL to 23% halogen and 24% CFL).

Figure 1: 2014[2] and 2015 Residential Lighting Market Share Estimates



[1] Xcel Energy territory within CO; includes Denver.
[2] Northeast and Mid-Atlantic states.
[3] Ameren territory within IL; includes southern 2/3 of IL.

4.2 ENERGY STAR CERTIFICATION

The 2015-2016 Northwest lighting market tracking study also includes lighting suppliers' estimates of the proportion of their LED sales that were ENERGY STAR certified. (This is the first of the studies we have reviewed that asks about this.) Four suppliers stated that they only sold ENERGY STAR LEDs in 2015. Among the twelve suppliers that sold both ENERGY STAR and non-ENERGY STAR LEDs in 2015, the proportion of their LED sales that were ENERGY STAR certified ranged from 35% to 98%.

4.3 NTG

We identified three new NTG estimates for lighting programs since the first market scan. All three are from 2015 upstream lighting programs in different portions of Pennsylvania, including the service territories of PPL, PECO, and FirstEnergy. The NTG ratio of 0.61 for all LEDs sold through PPL's program was derived using a demand elasticity model that estimates free-ridership but not spillover. The evaluators noted that free-ridership varied by retail channel, and was 54% for mass market stores, 44% for club stores, and 28% for DIY stores in 2015. The evaluators also noted that free-ridership for PPL's program had

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[2] Figure 3 in the October 2016 scan mislabeled the first 2014 market share estimate shown above as being for the Pacific Northwest. The estimate is actually for the entire US, as is the new 2015 estimate.

decreased from 48% in 2014 to 39% in 2015. The NTG ratios of 0.40 for CFLs, 0.66 for standard LEDs, and 0.62 for specialty LEDs incentivized through PECO's lighting program were based on store intercept surveys (n=330) and include both free-ridership and spillover. The NTG ratio of 0.68 for FirstEnergy's lighting program is based on interviews with corporate retail chain representatives (n=6) and includes free-ridership only.

Table 2: 2015 NTG Estimates

Region	Retail Channel	Standard CFL	Specialty CFL	Standard LED	Specialty LED	Overall
PA[1]	All			0.61[5]		
PA[2]	All	0.40[6]		0.66[6]	0.62[6]	
PA[3]	All					0.68[7]
NM[4]	All					0.65[6]
WI	All					0.95[5]

[1] PPL service territory in PA.
[2] PECO service territory in PA; includes Philadelphia.
[3] FirstEnergy Service Territory in PA.
[4] Public Service Company of New Mexico territory; includes Albuquerque.
[5] Free-ridership based on demand elasticity model.
[6] Free-ridership based on store intercept surveys.
[7] Free-ridership based on interviews with corporate retail chain representatives.

Section 5 Sources

"2014–2015 Northwest Residential Lighting Long-Term Market Tracking Study." Prepared for NEEA by DNV GL – Energy Oakland, California. August 20, 2015. https://neea.org/docs/default-source/reports/northwest-residential-lighting-long-term-market-tracking-study.pdf?sfvrsn=4

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"EDC PROGRAM YEAR 7 ANNUAL REPORT Program Year 7: June 1, 2015 – May 31, 2016." Prepared for PPL Electric Utilities by Cadmus. November 15, 2016. http://www.puc.pa.gov/pcdocs/1489206.pdf

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