Energy Efficiency Potential Study
Second Stakeholder Meeting

June 24, 2020

Webinar Logistics & Guidelines

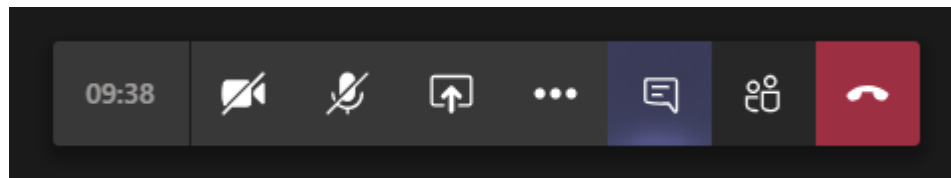All parties except presenter muted to avoid unnecessary noise distraction

If you have an immediate question, or audio or video is poor please send an instant message to the moderator

We will stop today's presentation several times to take questions

Your Settings

09:38

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Agenda

1 — Utility Data
- Customer Segmentation
- Energy Forecasts
- Demand Forecasts

2 — Achievable Potential Options
- Use / Purpose of Achievable Potential
- Review of 2016 Study Approach
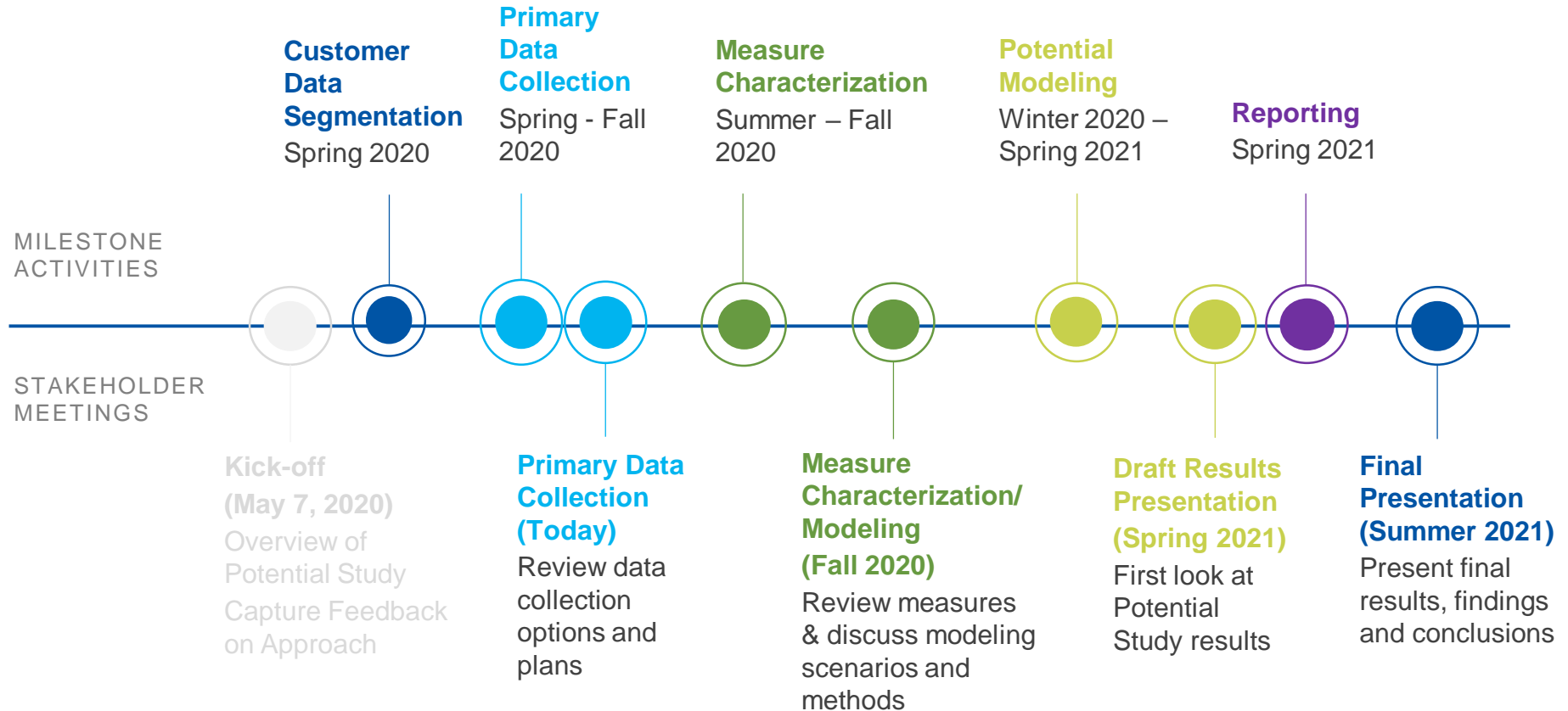- 2020 Options for Reframing

3 — Data Collection
- Overview of 2016 Data Collection Activities
- 2020 Data Collection Priorities
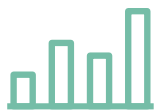- Challenges and Options: COVID-19
- Proposed Data Collection Plan

4 — Q & A

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Timeline of Milestones and Meetings

MILESTONE ACTIVITIES

STAKEHOLDER MEETINGS

Customer Data Segmentation
Spring 2020

Primary Data Collection
Spring - Fall 2020

Measure Characterization
Summer – Fall 2020

Potential Modeling
Winter 2020 – Spring 2021

Reporting
Spring 2021

Kick-off (May 7, 2020)
Overview of Potential Study Capture Feedback on Approach

Primary Data Collection (Today)
Review data collection options and plans

Measure Characterization/ Modeling (Fall 2020)
Review measures & discuss modeling scenarios and methods

Draft Results Presentation (Spring 2021)
First look at Potential Study results

Final Presentation (Summer 2021)
Present final results, findings and conclusions

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1. Utility Data

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Segmentation Overview

Purpose
Use utility-provided data to create baseline energy and customer forecasts and sampling data frames reflective of the Focus territory

Sources
Utility non-residential and residential customer billing data, energy and demand forecasts, public data, and census data

Review
All data cleaned, reviewed, and compared to historical and publicly-available data for reasonableness. Follow-up conducted with utilities as needed
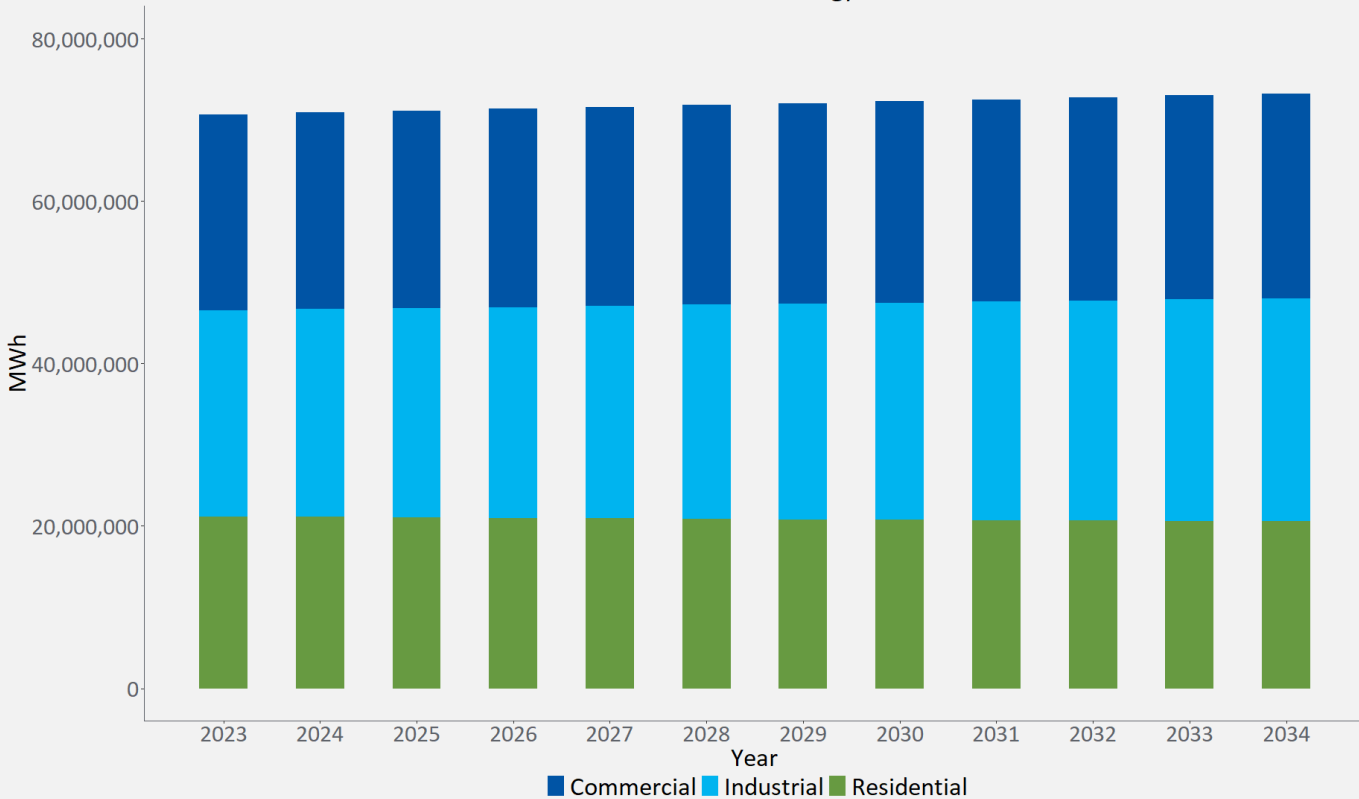
Next Steps
Utilize adjusted forecasts and segmentation data to create sampling frames and create a baseline forecast from which we estimate potential study savings

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Electric Energy Forecasts

Sector Level Electric Energy Forecast

Electric Energy Forecast

Adjusted to account for Focus participating utilities that did not provide data
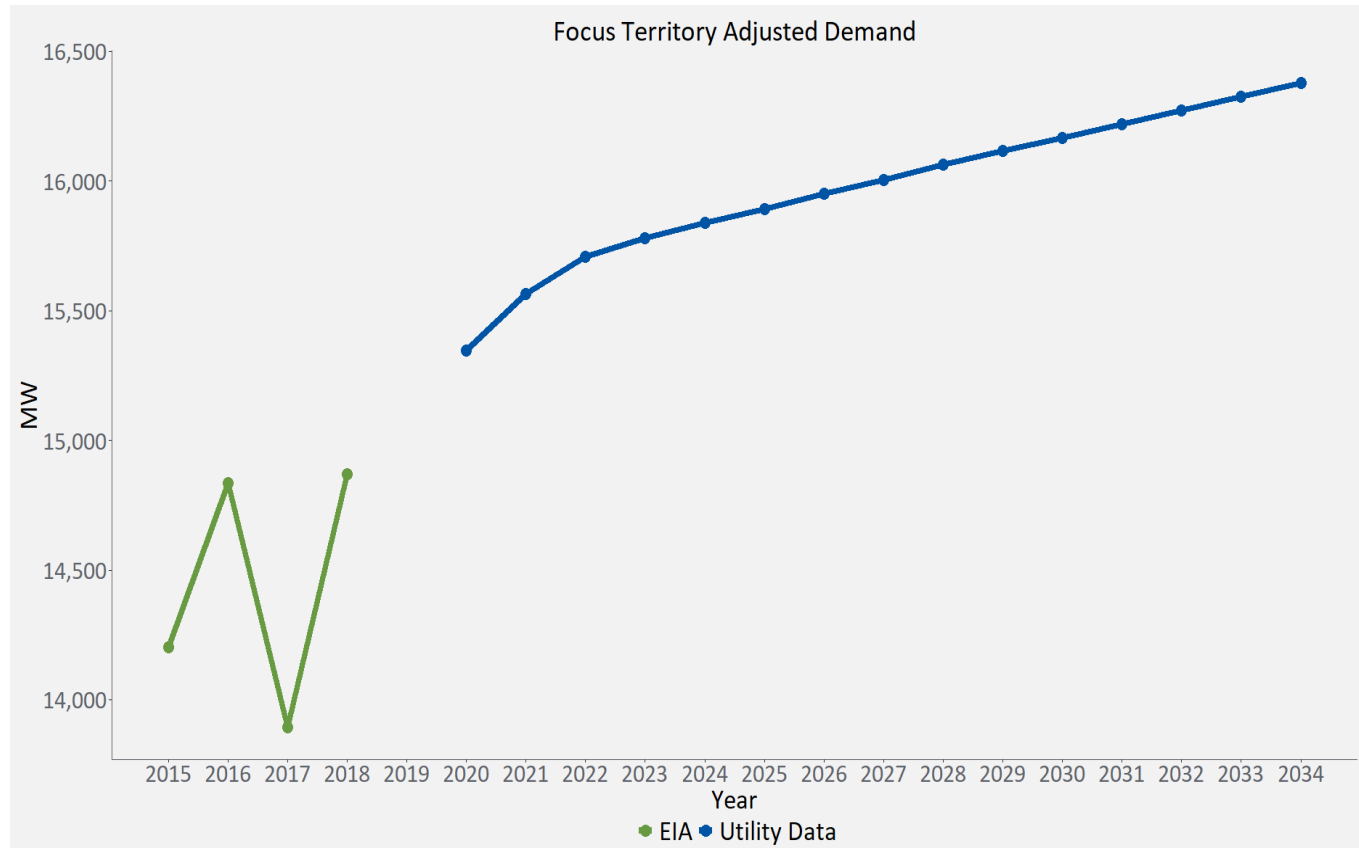
Further adjustment pending utility feedback

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Demand Forecasts

Electric Demand Forecast

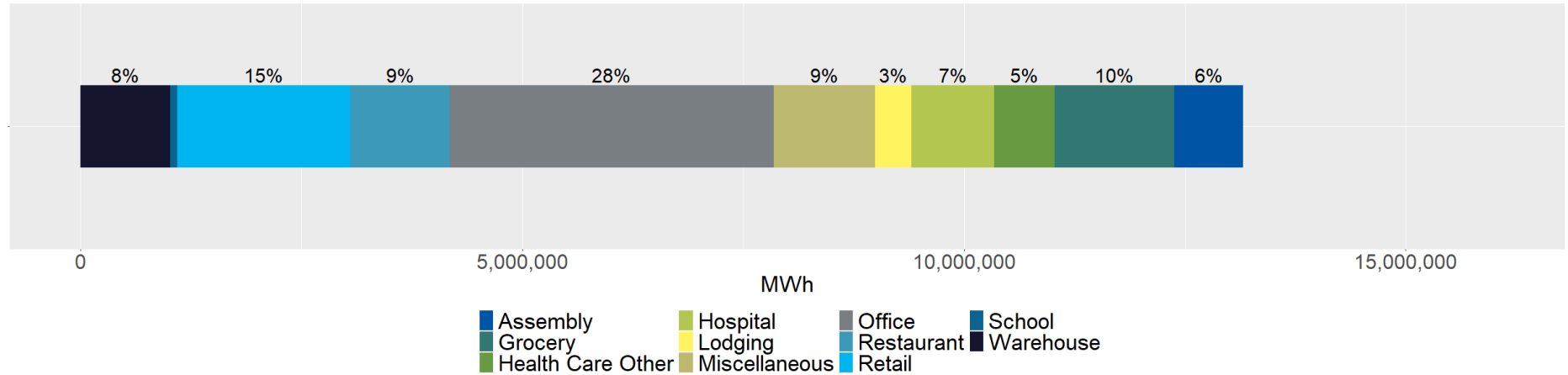Comparison to reported peak demand from U.S. EIA Form 861 Data (2015-2018)

Adjusted to account for utilities not included in data request
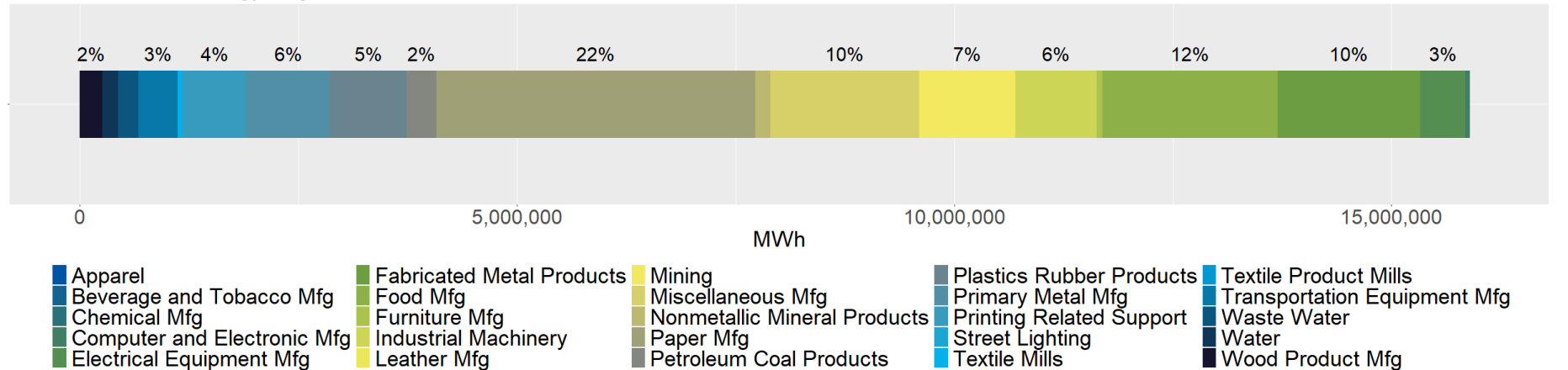
Further adjustment pending utility feedback

Focus Territory Adjusted Demand

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Electric Customer Segmentation

Commercial Electric Energy Segmentation

Legend:
- Assembly
- Grocery
- Health Care Other
- Hospital
- Lodging
- Miscellaneous
- Office
- Restaurant
- Retail
- School
- Warehouse

Industrial Electric Energy Segmentation

Legend:
- Apparel
- Beverage and Tobacco Mfg
- Chemical Mfg
- Computer and Electronic Mfg
- Electrical Equipment Mfg
- Fabricated Metal Products
- Food Mfg
- Furniture Mfg
- Industrial Machinery
- Leather Mfg
- Mining
- Miscellaneous Mfg
- Nonmetallic Mineral Products
- Paper Mfg
- Petroleum Coal Products
- Plastics Rubber Products
- Primary Metal Mfg
- Printing Related Support
- Street Lighting
- Textile Mills
- Textile Product Mills
- Transportation Equipment Mfg
- Waste Water
- Water
- Wood Product Mfg

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Electric Customer Segmentation

Public Electric Energy Segmentation
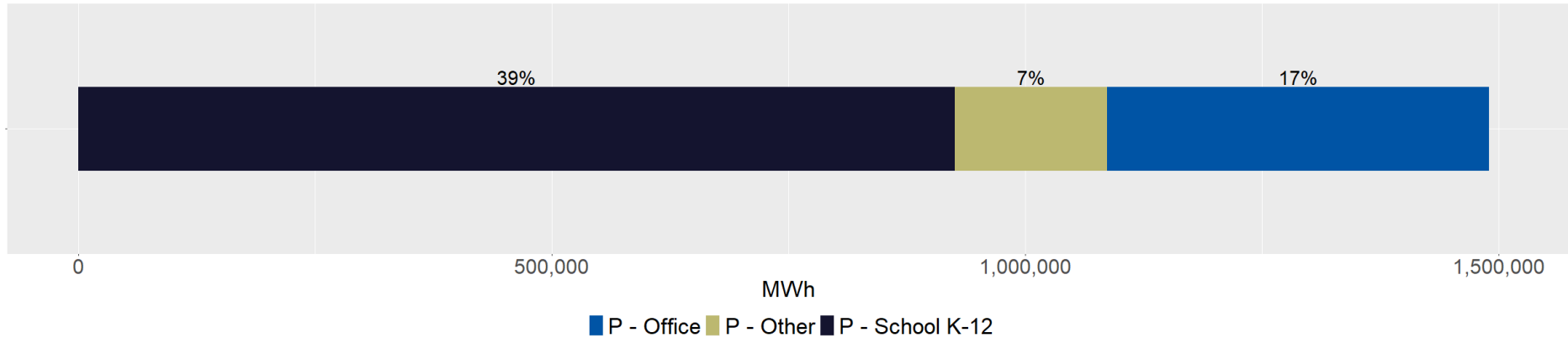
Legend: P - Office, P - Other, P - School K-12

Values shown: 39%, 7%, 17%

X-axis: MWh (0, 500,000, 1,000,000, 1,500,000)

Agricultural Electric Energy Segmentation

Legend: Dairy, Grain Handling Drying, Irrigation, Poultry, Fruit and Vegetable Production, Greenhouses, Miscellaneous Ag

Values shown: 6%, 28%, 2%, 3%, 62%

X-axis: MWh (0, 200,000, 400,000, 600,000)

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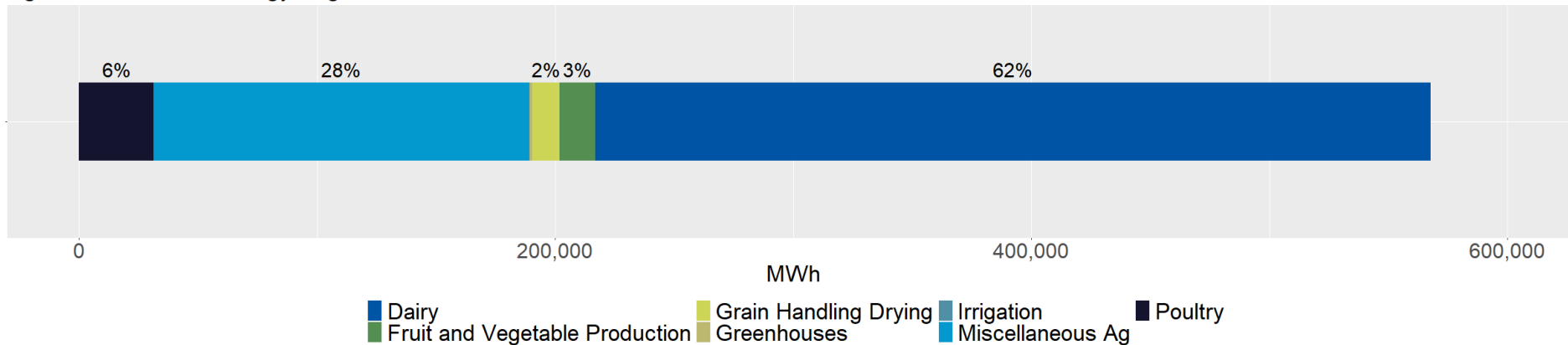
Electric Customer Segmentation

Residential Electric Energy Segmentation

Bar chart segments: 52% (Single Family Standard Income), 35% (Single Family Low Income), 3% (Multifamily Standard Income), 6% (Multifamily Low Income), 4% (Manufactured)

X-axis (MWh): 0, 5,000,000, 10,000,000, 15,000,000

Legend: ■ Manufactured ■ Multifamily Low Income ■ Multifamily Standard Income ■ Single Family Low Income ■ Single Family Standard Income

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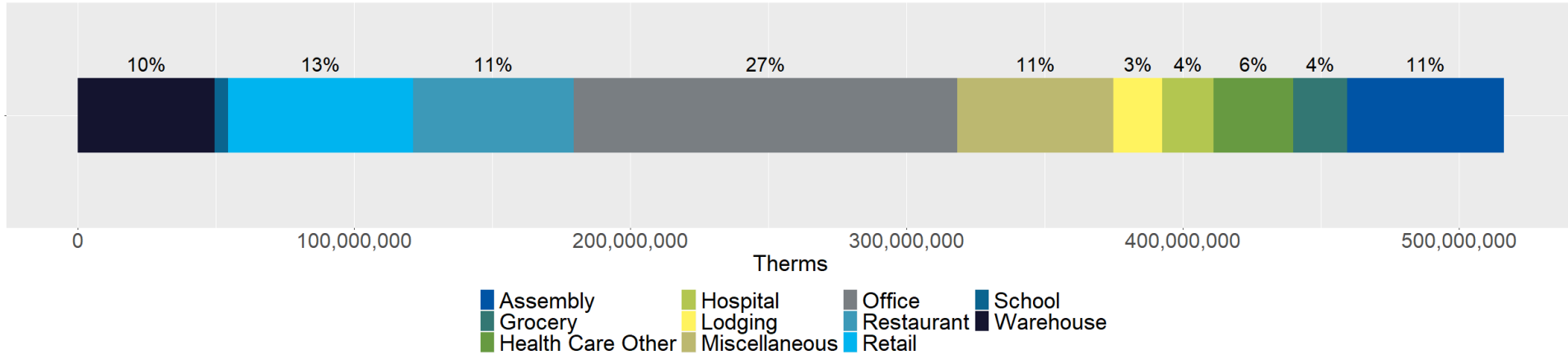
Gas Energy Forecasts
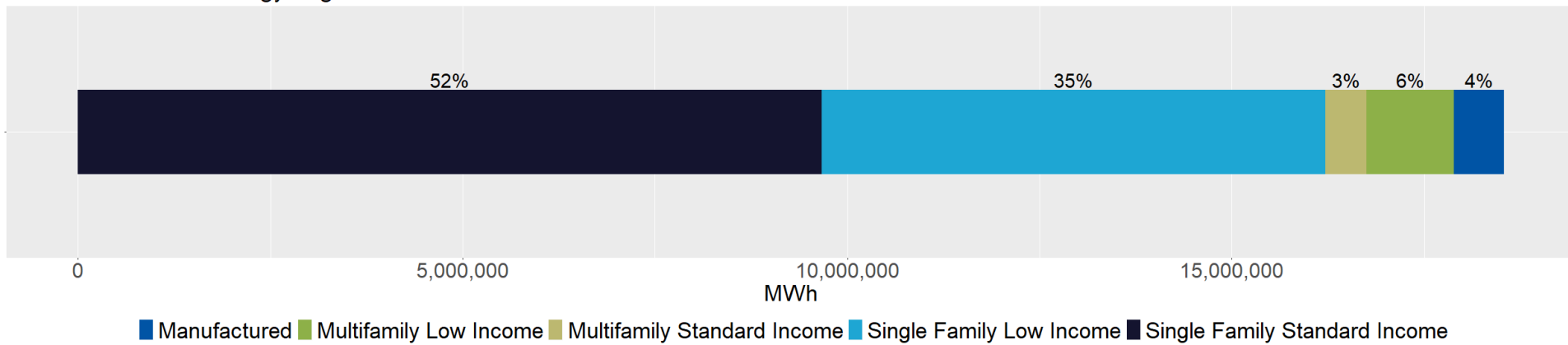
Sector Level Gas Energy Forecast
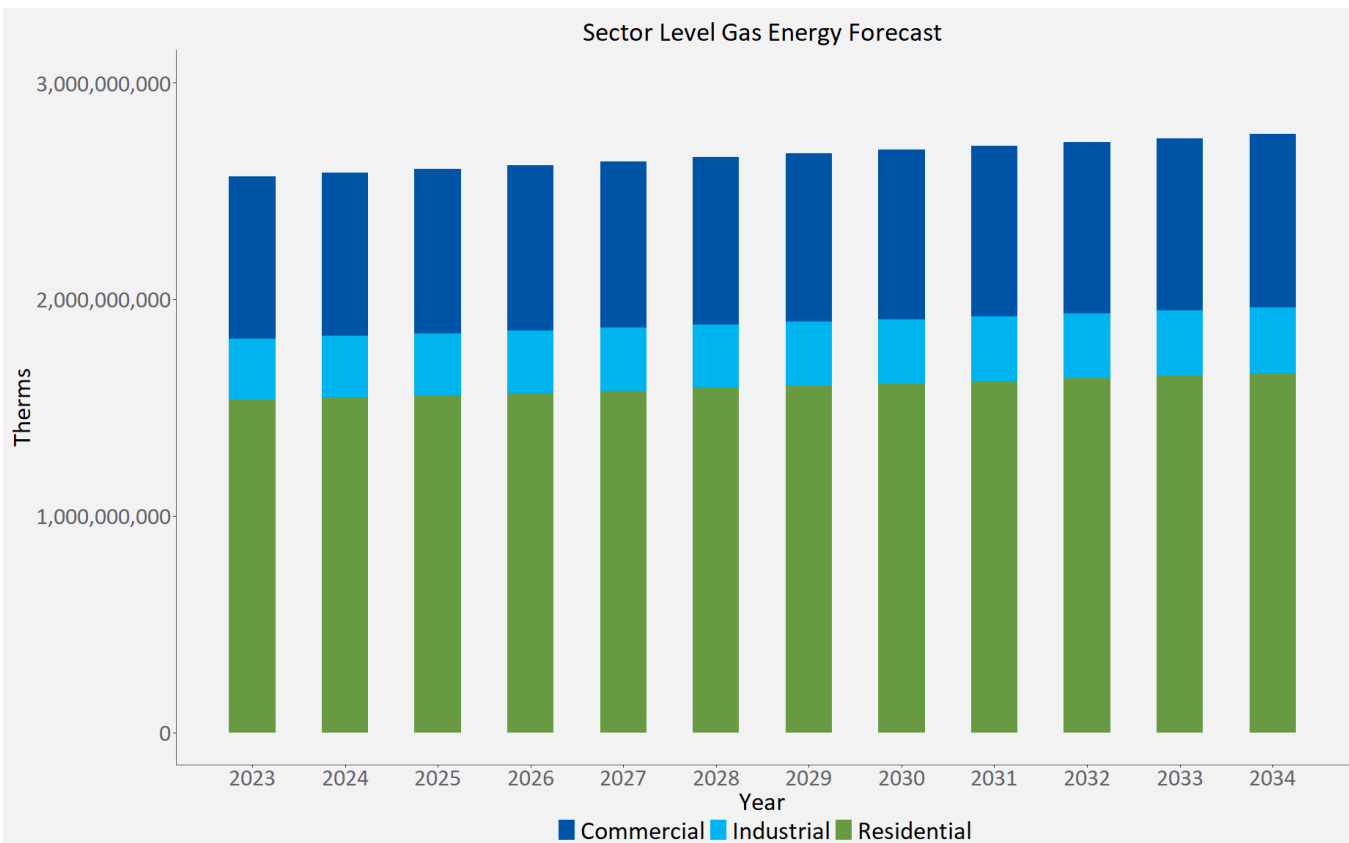
Gas Energy Forecast

Adjusted to account for Focus participating utilities not providing data

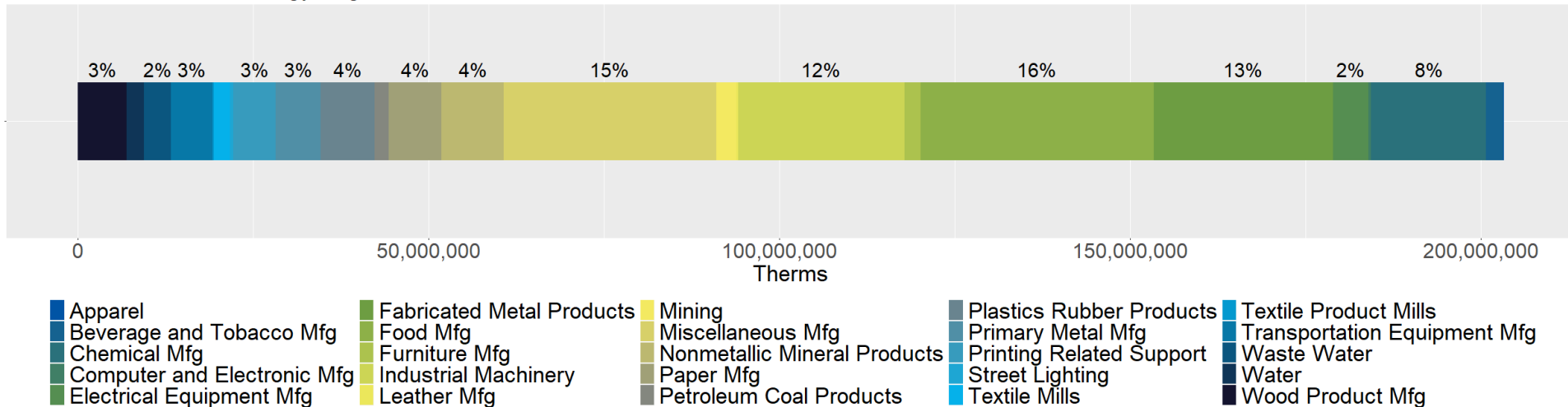Further adjustment pending utility feedback

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Gas Customer Segmentation
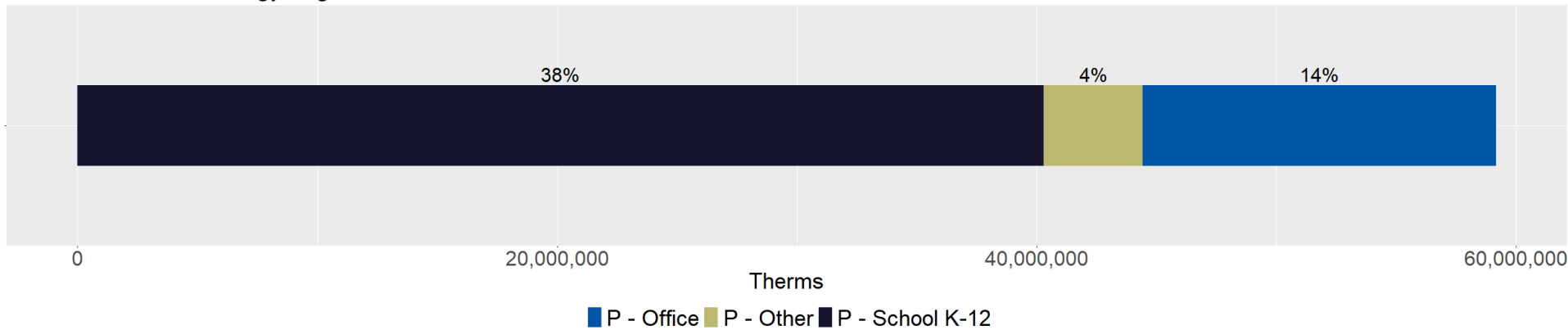
Commercial Natural Gas Energy Segmentation

Legend:
- Assembly
- Grocery
- Health Care Other
- Hospital
- Lodging
- Miscellaneous
- Office
- Restaurant
- Retail
- School
- Warehouse

Industrial Natural Gas Energy Segmentation

Legend:
- Apparel
- Beverage and Tobacco Mfg
- Chemical Mfg
- Computer and Electronic Mfg
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- Street Lighting
- Textile Mills
- Textile Product Mills
- Transportation Equipment Mfg
- Waste Water
- Water
- Wood Product Mfg

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Gas Customer Segmentation

Public Natural Gas Energy Segmentation

Horizontal stacked bar chart measured in Therms:
- P - School K-12: 38%
- P - Other: 4%
- P - Office: 14%

X-axis labels: 0, 20,000,000, 40,000,000, 60,000,000 — Therms

Legend: ■ P - Office ■ P - Other ■ P - School K-12

Agricultural Natural Gas Energy Segmentation

Horizontal stacked bar chart measured in Therms:
- Poultry: 3%
- Miscellaneous Ag: 62%
- Greenhouses: 6%
- Fruit and Vegetable Production: 4%
- Dairy: 24%

X-axis labels: 0, 5,000,000, 10,000,000, 15,000,000, 20,000,000 — Therms

Legend: ■ Dairy ■ Grain Handling Drying ■ Irrigation ■ Poultry ■ Fruit and Vegetable Production ■ Greenhouses ■ Miscellaneous Ag

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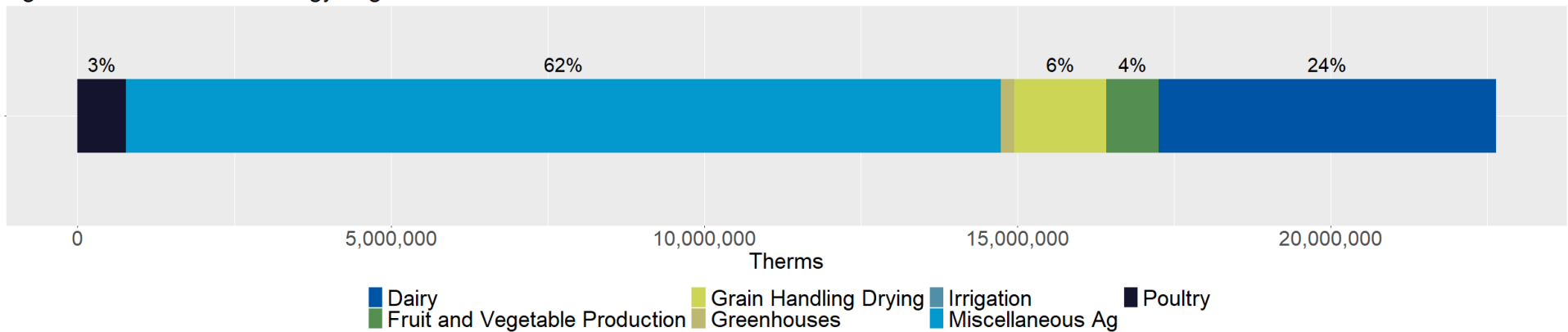
Gas Customer Segmentation

Residential Natural Gas Energy Segmentation

| 52% | 35% | 3% | 8% | 2% |

- ■ Manufactured
- ■ Multifamily Low Income
- ■ Multifamily Standard Income
- ■ Single Family Low Income
- ■ Single Family Standard Income

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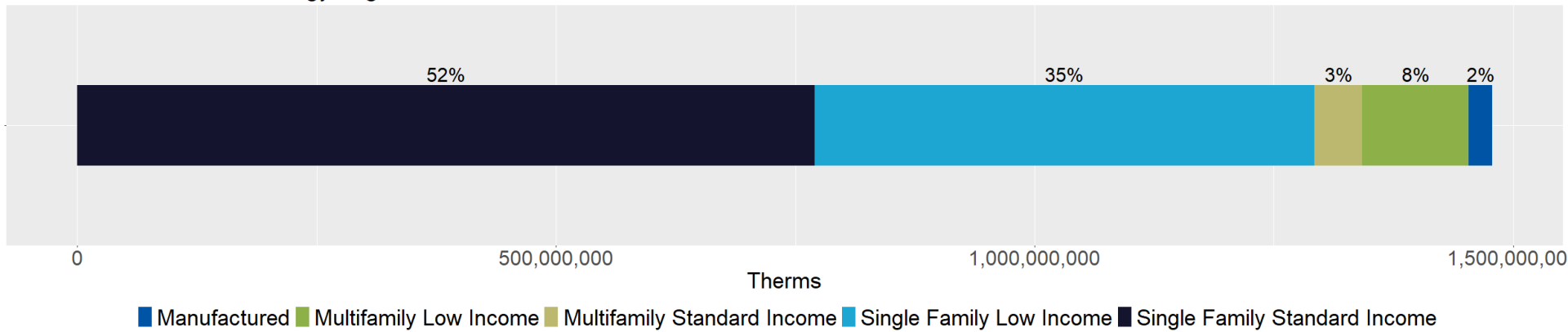
Utility Data Summary

Focused on Utility Data

Focus-participating utilities provided customer and forecast data

Data Reviewed

Checked data for reasonableness: compared utility data sets to 2016 study data and other benchmarks (EIA Form 861). Followed up with utilities to resolve questions as needed

Leveraged Secondary Sources as Needed

Used secondary data sources to fill gaps, such as not having all participating utility customer data

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2. Achievable Potential

Potential Estimated Recap

Not Technically Feasible	**Technical Potential** **Theoretical maximum** energy can displaced by efficiency		
Not Technically Feasible	Not Cost-Effective	**Economic Potential** **Economically cost-effective** compared to supply side alternatives	
Not Technically Feasible	Not Cost-Effective	Market Barriers	**Achievable Potential** Accounts for **real-world barriers and non-measure costs of delivering programs**

Program targets developed based in part on achievable potential through comprehensive planning process

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2016 Study Approach Recap

- Developed maximum measure adoption scenarios through survey research
- Scenarios based on percentage of incremental measure cost covered by incentive

- Develop adoptions ramp rates based on historical data
- Apply custom measure-specific ramp rates to adoption scenarios

Stakeholder Feedback

Surveys imperfect for estimating future customer choices

- Consumers faced with evolving options and changing context / marketplace
- Conducting willingness-to-pay research during pandemic poses additional challenges

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Achievable Potential Options

Data Driven

Willingness-to-pay (2016 method)

Strengths

Simple, relatively easy to implement and compare, data collected from Wisconsin customers

Limitations

Requires careful consideration, messaging, and communications; preference for point estimates

Pre-Determined Value(s)

Establish an achievable value equal to a percent of economic potential prior to modeling. Northwest Power and Conservation Council sets at 85%.

Minnesota relied on secondary data, based on 100% incentive (maximum achievable) and 50% incentive (program achievable) scenarios

Strengths

Simple approach, relatively easy to implement

Limitations

Simplistic and not based on customer survey or state data

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Reframing Achievable Potential

Regardless of method, reframing achievable potential should probably occur

Reframing Options

Similar to previous study

- Present maximum achievable and business as usual achievable scenario

- Emphasize that achievable potential should be viewed as a range – not a point estimate – due to inherent uncertainty

Strengths

Same as 2016 potential study but acknowledges that future is uncertain and Quad Planning should consider a range of outcomes

Limitations

Requires careful consideration, messaging, and communications; people tend to prefer point estimates

Re-frame primary reported results on economic potential

Strengths

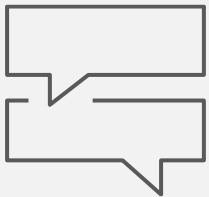Removes achievable potential subjectivity

Limitations

Departure from previous study; sets precedent for future studies

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The Floor is Open – Feedback Welcome!

Questions/Comments?

- Utility data

- Options for estimating achievable potential

- Framing achievable potential

- Other Questions?

Please add your questions to the meeting chat: we will address questions in the order that they are received & provide opportunity for clarification

Please remain muted until your question is announced

3. 2020 Study Data Collection

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Overview

Primary data collection provides accurate, local, and up-to-date inputs for potential study market and measure characteristics

Primary and Secondary Data

- Surveys: saturations, fuel shares, equipment penetrations, willingness-to-pay
- Site visits: detailed equipment characteristics
  (e.g.: commercial lighting technology types, wattages, controls, counts, lamps/fixture)
- Secondary data: equipment costs and fill gaps in primary data
  (data sources: TRM, RECS, CBECS, others)

Market Characteristics

- Baseline forecast
(equipment saturations & fuel shares)

Measure Characteristics

- Measure costs
- Measure savings

Potential Estimates

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Overview of 2016 Data Collection

Significant Focus on Site Visits

192 Residential

Single Family

Multifamily

280 Commercial

School

Office

Restaurant

Retail

42 Industrial

30 Agricultural

Phone Surveys: Segments w/ no visits and willingness to pay

172 Residential

Single Family

Multifamily

350 Commercial

Healthcare

Lodging

Grocery

Warehouse

Miscellaneous

70 Industrial

140 Agricultural

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2020 Data Collection Priorities

Due to extensive data collection in last study we can reduce scope of this activity

Ranked Data Collection Items

- Likelihood of change since 2016

- Depth of data collected in 2016

- Importance of data

Current Data Collection Priorities

- Commercial Lighting Saturations

- Commercial and Industrial Motor/Drive Applicability

- Commercial Space Heating Controls

- Residential Thermostats

Site visits essential for Commercial Lighting Saturations (low resolution in the data when captured over the phone)

Collecting equipment efficiency and capacity data is only effective during site visits

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Challenges and Options: Covid-19

Due to rapidly changing health and safety circumstances, multiple options under consideration

Conducting in-person site visits within study timeframe may not be feasible due to COVID-19

Pilot of "Virtual Site Visit" to collect critical lighting and selected equipment data

Conduct "Virtual Site Visits" for critical commercial data if pilot successful and on-site data collection not advisable
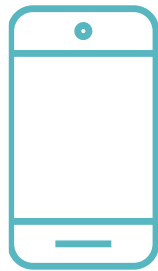
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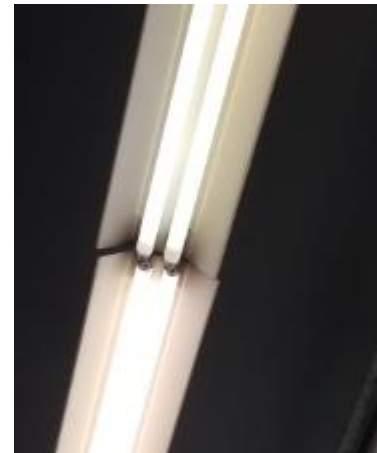
Virtual Site Visit Pilot Design

8 Visits Across 3 Business Segments: Office, Retail, Schools -- Assess Feasibility Late July

- Sites recruited from stratified sample
- Incentives offered for participation
- Data collection program for streamlined analysis

- Facility staff / manager recruited
- Use video call during walkthrough
- Data collection limited to key data (lighting, select equipment capacity and efficiency data)

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Proposed 2020 Data Collection Plan - Commercial

Option 1: Focused (Virtual) Site Visits - Recommended

	Office	Health Care	Lodging	Grocery	Warehouse	Misc.	Restaurant	Retail	School
Virtual Site Visit	68							68	68
Phone Survey	70	70	70	70	70	70	70	70	70

Benefits and Limitations

Allows for comparison for three segments over time

Updates all major commercial segments; emphasis on larger segments

Key lighting and equipment collected for only some segments at high precision and confidence

Virtual Site Visits

Lighting equipment saturations for the largest Focus segments

Detailed Phone Surveys w/ Virtual Visits

Equipment saturations &

data for achievable potential

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Option 2: Broadly Spread (Virtual) Site Visits

	Office	Health Care	Lodging	Grocery	Warehouse	Misc.	Restaurant	Retail	School
Virtual Site Visit	20	20	20	20	20	20	20	20	20
Phone Survey	70	70	70	70	70	70	70	70	70

Benefits and Limitations

Key lighting and equipment data collected across all segments

High Precision / Confidence only at the sector level

Data across multiple segments may provide useful data for program design

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Proposed 2020 Data Collection Plan - Commercial

Data Collected by Method

Virtual Site Visit

Building / business characteristics (incl. % conditioned) and operations

Detailed lighting data (lighting type, wattage, counts) / lighting power density / lighting control type

Limited motor control information

Limited heating and cooling system with control information (system efficiencies and capacities)

Detailed Phone Survey: No Site Visits and Virtual Site Visit

Building / business characteristics (incl. % conditioned) and operations

General penetrations of lighting technologies and lighting controls

General penetrations of motor controls

Saturations of heating and cooling systems by type and fuel / penetrations of HVAC controls

Saturations of water heating systems by type and fuel / age / proximate counts of showers, sinks, aerators

General penetrations of commercial refrigeration / commercial kitchen equipment

Awareness and willingness to participate in energy efficiency

Misc. topics (e.g., onsite generation)

On-Site Visit

Building / business characteristics (incl. % conditioned) and operations

Detailed lighting data (lighting type, wattage, counts) / lighting power density / lighting control type

Detailed motor control information

Detailed heating and cooling system with control information (system efficiencies and capacities)

Saturations of water heating systems by type and fuel / number of showers, sinks, aerators

General penetrations of commercial refrigeration / commercial kitchen equipment

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Proposed 2020 Data Collection Plan

Residential

	Single Family	Multifamily
Surveys	70	70

Key data regarding thermostats collected through online or phone surveys

- Thermostat type
- Lighting saturations
- Will leverage past site visit data for items with little expected change (e.g. building shell)

Industrial

	Industrial Experts
Interviews	10

Gather all data about industrial sites 10 through expert interviews

- Collect detailed information on remaining potential opportunities of key end uses or industrial improvements

Agricultural

	Dairy / Farm
Surveys	70

Gather supplemental data to complement extensive research conducted for 2016 Study

The Floor is Open – Feedback Welcome!

Questions/Comments?

- Appropriate targeting of priority segments

- Trade-offs of site visits or phone surveys

- Other Questions?
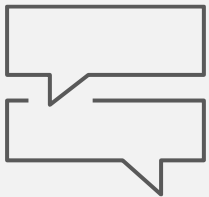
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4. Q&A and Next Steps

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Q & A and Next Steps

Please add questions and comments to the meeting chat.

Anything that we have or have not discussed today?

Next Stakeholder Meeting:

Study Measures (August/September)

Cadmus will present a draft measure list and solicit feedback for additional measures for inclusion

Your feedback and input is important, please send us feedback

Other feedback opportunities

Email **Lakin Garth** at Cadmus (Lakin.Garth@cadmusgroup.com)

or contact **Mitch Horrie** at PSC (Mitch.Horrie@wisconsin.gov)

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