Santee Cooper IRP Stakeholder Process 2024-2026

Market Potential Study Technical Meeting – Meeting Summary

Date: 5/1/2025
Time: 1:00 PM – 3:00 PM EDT
Location: Virtual Meeting via Zoom, Vanry Associates hosting

Topics and Presenters

Santee Cooper Demand Side Management Market Potential Study: Reviewing Assumptions with Stakeholders

Steven Roys, Manager Program Development, Santee Cooper

Jim Herndon, Vice President Utility Services, Resource Innovations

Steven Roys opened the meeting by describing the customers eligible to participate in the Demand Side Management (DSM) programs offered by Santee Cooper. He then went through a high-level overview of the assumptions and methodology proposed for the 2026 Market Potential Study (MPS). Jim Herndon then went into a deep dive on the MPS study plan, including assumptions and analytics. Finally, Steven covered the proposed schedule for the MPS, including stakeholder engagement. The slide deck presented at the meeting is attached for reference.

Meeting Action Items

The following is a summary of action items, with status updates if applicable, agreed to at the close of the meeting.

ACTION ITEMS	RESPONSIBLE PARTY
Santee Cooper committed to sharing the MPS measures list with stakeholders for review and feedback. The list was emailed to stakeholders after the meeting was held.	Santee Cooper Program Management
Santee Cooper requested feedback from stakeholders on the information presented and the proposed schedule by 5/16/25.	All Stakeholders
Prior to the meeting, Coastal Conservation League and Southern Alliance for Clean Energy submitted comments to Santee Cooper regarding the MPS. Santee Cooper committed to reviewing and responding to these comments.	Santee Cooper Program Management
Santee Cooper committed to the proposed schedule, as outlined in the slide deck.	Santee Cooper Program Management

Santee Cooper DSM MPS

Reviewing Assumptions with Stakeholders

May 1, 2025

Steven Roys - Manager Program Development
Jim Herndon - Vice President, Utility Services (Resource Innovations)

Agenda

- 1:00 – Introductions & overview of agenda
- 1:05 – Background of potential studies
- 1:15 – Discuss details of input assumptions
- 1:35 – Discuss methodology for technical approach
- 2:00 – Open discussion of potential studies
- 2:50 – Wrap-up and next steps

2026 DSM Market Potential Studies

EPA – National Guide for Resource Planning

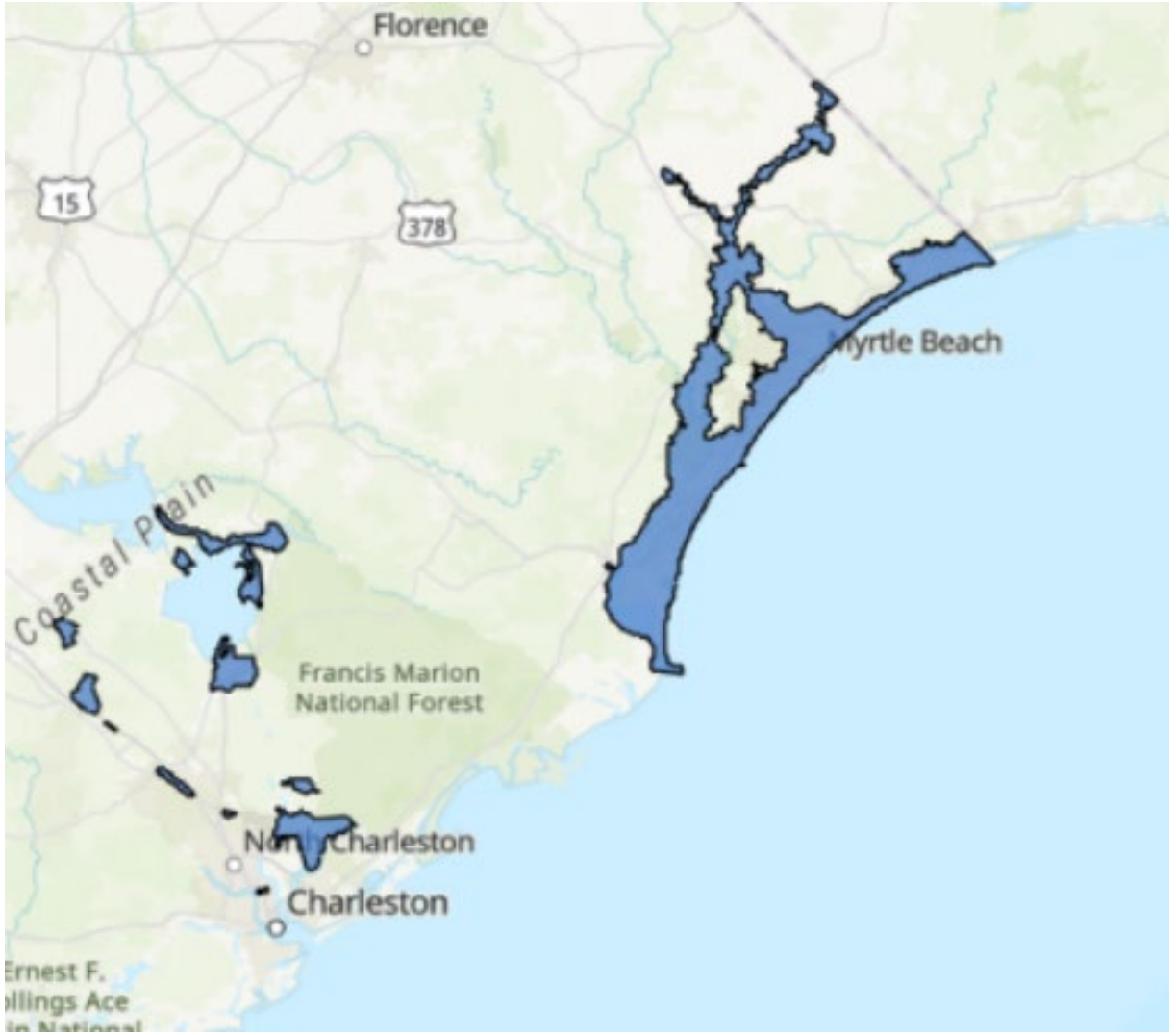
Customer Eligibility

- Eligible Customers
  - Residential Direct Serve - 186,000+ customers
  - Commercial Direct Serve - 30,000+ customers
- Ineligible Customers
  - Wholesale
    - Each cooperative has the autonomy to develop and manage DSM programs that best serve their members' needs.
  - Industrial
    - Historically, industrial customers have preferred to manage their own energy efficiency and demand-side efforts independently.
    - As a result, industrial customers are not charged for DSM programs through their rates.

4

Who We Serve

- Horry County
  - Myrtle Beach
  - North Myrtle Beach
  - Conway
  - Loris
  - ~153,000 customers
- Georgetown County
  - Garden City
  - Pawleys Island
  - ~55,000 customers
- Berkeley County
  - Moncks Corner
  - St. Stephen
  - ~8,000 customers



Key Assumptions

- Assumptions for May Technical Meeting
  - Number of scenarios
  - Cost test methodology
  - Cost-effectiveness thresholds
  - Measures
  - Incentive thresholds
  - Input data sources
  - External influences

Scenarios

- South Carolina Code 58-37-40-(B)(1)(e) states:
  - "An integrated resource plan shall include all of the following: several resource portfolios developed with the purpose of fairly evaluating the range of **demand-side**, supply-side, storage, and other technologies and services available to meet the utility's service obligations. Such portfolios and evaluations must include an evaluation of **low, medium, and high cases** for the adoption of renewable energy and cogeneration, **energy efficiency, and demand response** measures…"

- In coordination with South Carolina law, we intend to complete a low, medium, and high scenario for Energy Efficiency and Demand Response.

Cost Test Methodology

- Santee Cooper proposes using the Utility Cost Test ("UCT") also known as the Program Administrator Cost Test ("PACT").
  - Consistent with prior study
  - Provides utility perspective to inform resource planning

- We intend to review TRC, PCT, and RIM as well, but they will not be the determining factors in assessing the cost-effectiveness of the programs.

Cost-Effectiveness Thresholds

- Economic screening will be applied at the measure level
- In prior study, medium and high scenarios relaxed screening to allow non-cost-effective measures to pass as a proxy for measure bundling
- The portfolio level UCT must ultimately be > 1.0
- Plan to apply similar approach for current study

Measures

- Measure list from prior study, supplemented with measures included in more recent studies and from market research (i.e. current TRMs)
- Measure parameters developed primarily with secondary sources (TRMs, evaluation findings, etc.) and some primary research, as needed (modeling, measure cost research, etc.)
- Draft measure list being provided today for stakeholder comments
- Measure parameters to be provided when available for stakeholder comments

Scenarios & Thresholds – Prior Study

- In the low scenario measures were screened from the Utility Cost Test (UCT) perspective with a threshold of 1.0.
- The medium scenario increases incentives offered to a range of 50% of incremental measure costs and reduces the benefit-cost screening threshold for each measure to a UCT value of 0.7.
  - This approach allows some marginally cost-effective measures to be included in the portfolio and potentially boosts savings while maintaining an overall portfolio that is cost-effective from the UCT perspective.
- The high scenario increases incentives to 75% of incremental measure costs to boost participation, and the avoided marginal energy costs were increased by 50% for this scenario.

Data Sources

- Preference is Santee Cooper-specific data
  - Load forecast
  - Customer characteristic data
  - DSM program data
  - Local market data
  - Avoided cost forecast
- Supplement with available secondary data
  - EIA RECS, CBECS
  - TRMs (Illinois, Mid-Atlantic, others as needed)

External Factors That May Impact Program Savings

- Economic Conditions and Market Uncertainty
  - Economic downturns my drive customers to defer upgrades or choose lower-cost, less efficient options.
  - Significantly increased costs due to inflation, tariffs, etc. could cause a downturn in measure adoption.
- Federal or other DSM funding
  - IRA, DOE, or other incentive program may reduce utility attributable savings if customers act independently of utility programs.
  - Conversely, if savings are attributable to utilities through government funded programs, this could increase savings for Santee Cooper.
- Shifting Baselines
  - Future standards may raise baselines, reducing claimable savings for Santee Cooper.
- Technology Improvements
  - Improvements to high efficiency measures which reduce costs could increase adoption of measures.

Customer Segmentation

- MPS will focus on eligible retail customers suitable for DSM programs.

Residential*	Commercial*		
Single Family	Assembly	College and University	Grocery
Multi-Family	Healthcare	Hospitals	Institutional
Manufactured Housing	Lodging/ Hospitality	Manufacturing	Miscellaneous
	Offices	Restaurants	Retail
	School K-12	Warehouse	

*Segmentation may also incorporate additional customer characteristic factors, such as full-time vs. seasonal occupancy, dependent on sufficient data to identify portion of customer base and load

Data Sources:

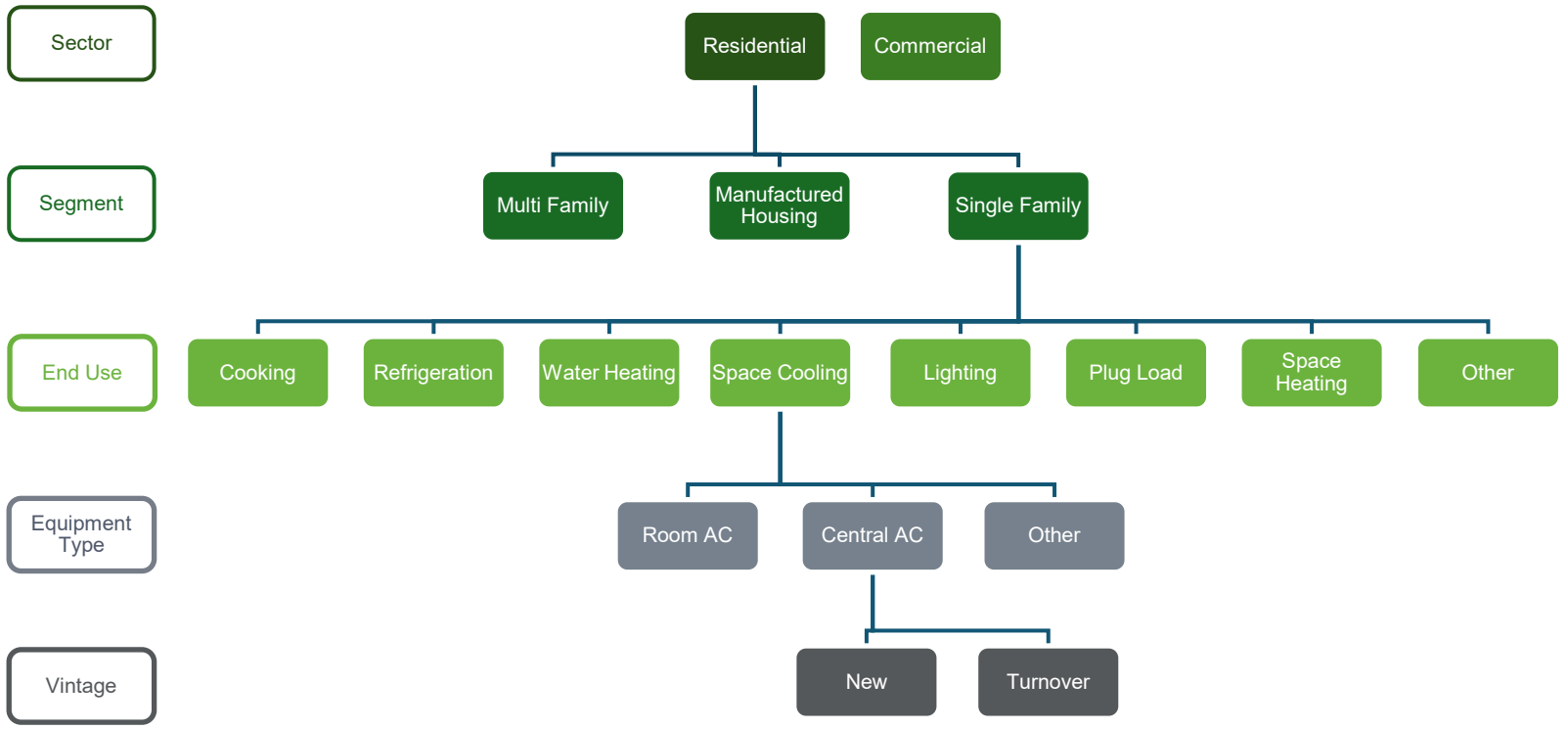
Santee Cooper-specific data

- Customer Characteristics

Supplemented with available secondary data

- RECS, CBECS for Housing or Building Characteristics

Forecast Disaggregation



Data Sources:

Santee Cooper-specific data

- Load forecast
- End use shares
- Equipment saturation

Supplemented with available secondary data

- RECS, CBECS for end use shares and equipment saturation

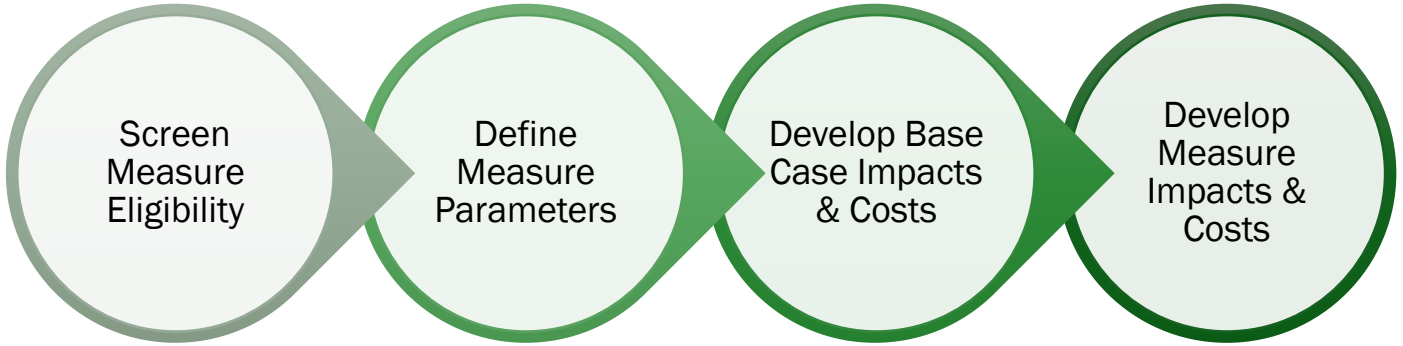
EE Measure Characterization

Measure data required:

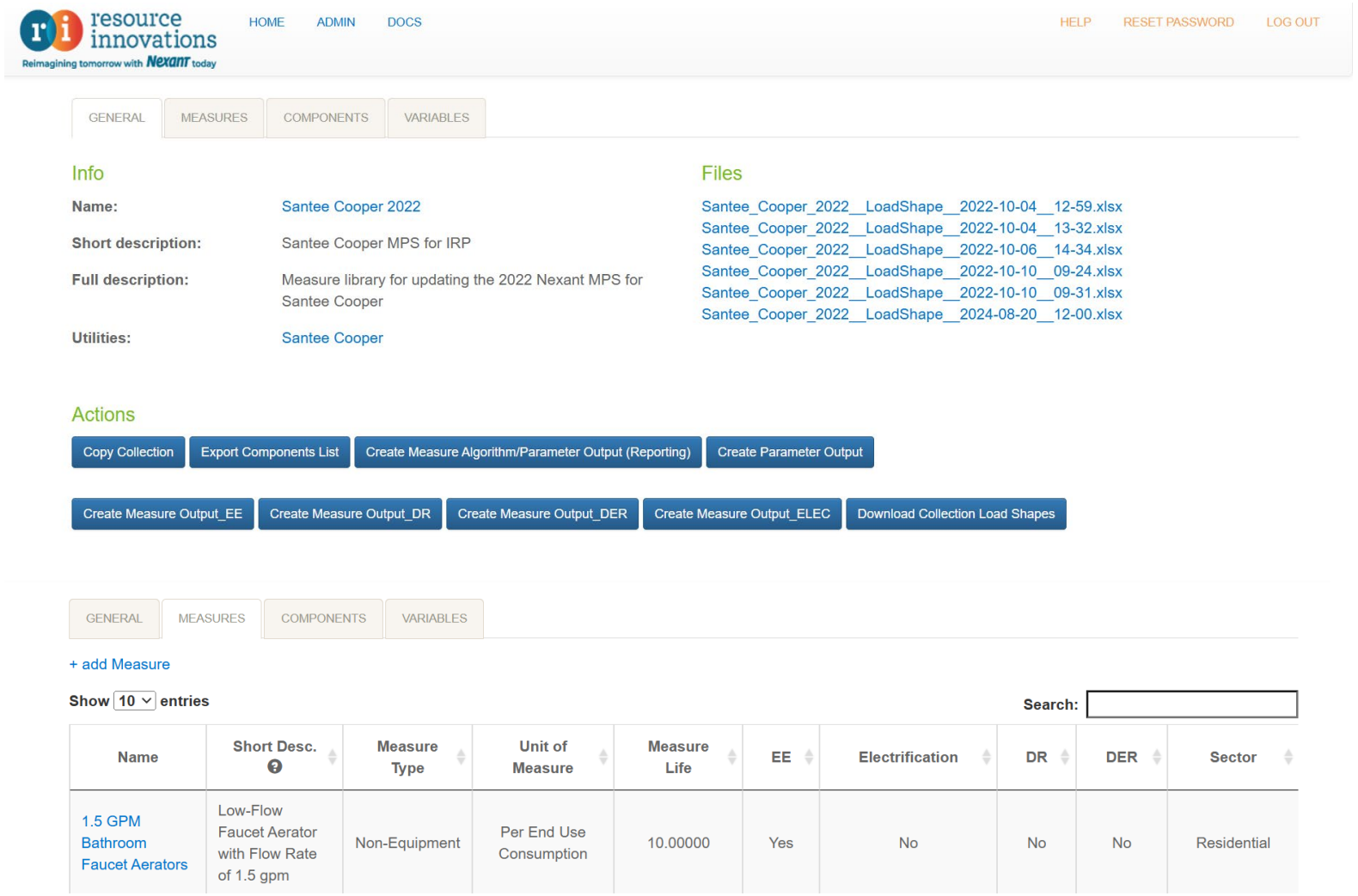
- Efficient and baseline technology characteristics
- Equipment and labor costs
- Equipment useful life
- Energy and demand savings
- Applicability and current saturation

Measure sources:

- Technical Reference Manual(s)
- RI measure library platform
- Santee Cooper customer characteristic data
- Input from stakeholders
- Market research - custom measures and new technologies



Measure Library



Measure Parameters:

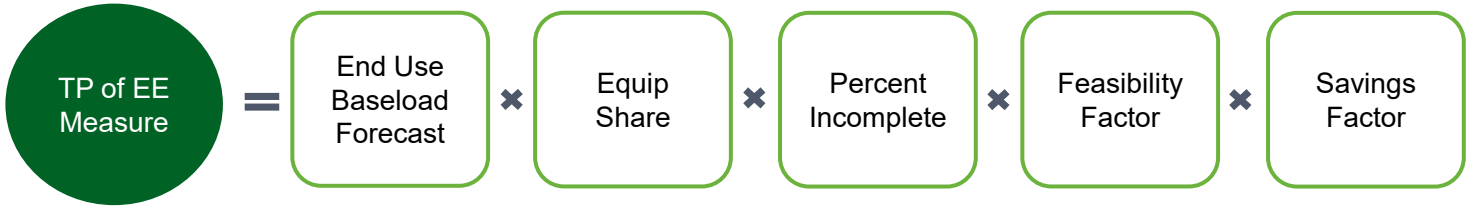
- Savings algorithms and calculations per subsector
- Input values for variables
- Measure life
- Measure costs
- Documented reference

Collection-level Variables + Add Collection-level Equation Variable

Show 10 entries Search:

Name	Value	Short Desc.
btu_kwh (delete)	3412.00000	BTUs per kilowatt hour
btu_ton (delete)	12000.00000	BTUs per cooling ton
CF_GallontokWh (delete)	33.70000	Gallon to kWh Conversion Factor

EE Technical Potential



End Use Baseload Forecast = the electricity end use consumption used per customer per year in each market segment.

Equip Share = the fraction of the electricity end use consumption that may be reduced by applying an efficient technology in each market segment.

Percent Incomplete = the fraction of equipment that is not considered to already be energy efficient.

Feasibility Factor = the fraction of the applicable units that is technically feasible for conversion to the most efficient available technology from an engineering perspective.

Savings Factor = the percentage reduction in electricity consumption resulting from the application of the efficient technology.

- Identify consumption end uses (patterns) based on representative customer segments within each sector
- Ultimately applied to baseline “equipment forecast”
- Measures ranked by savings factors
- Baseline adjusted for prior measure savings

EE Economic Potential

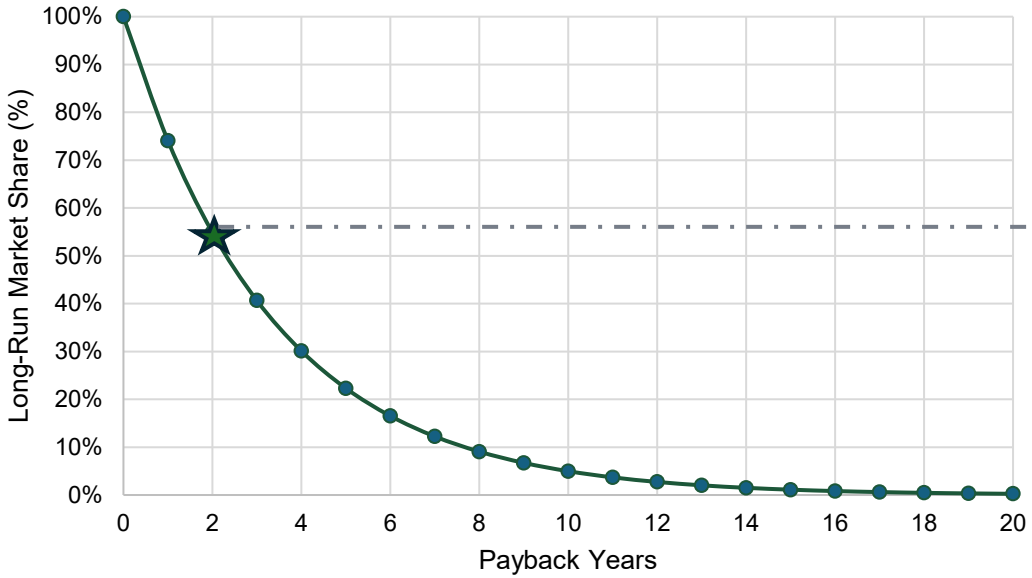
- Economic screening at measure level
  - UCT threshold of 1.0
  - Utilize avoided cost forecast consistent with other IRP analyses
  - Estimate incentive rates and program costs for each measure to screen

- Similar methodology as Technical Potential after economic screening
  - Assume 100% adoption
  - Rank measures by BCR and apply to baseline equipment forecast

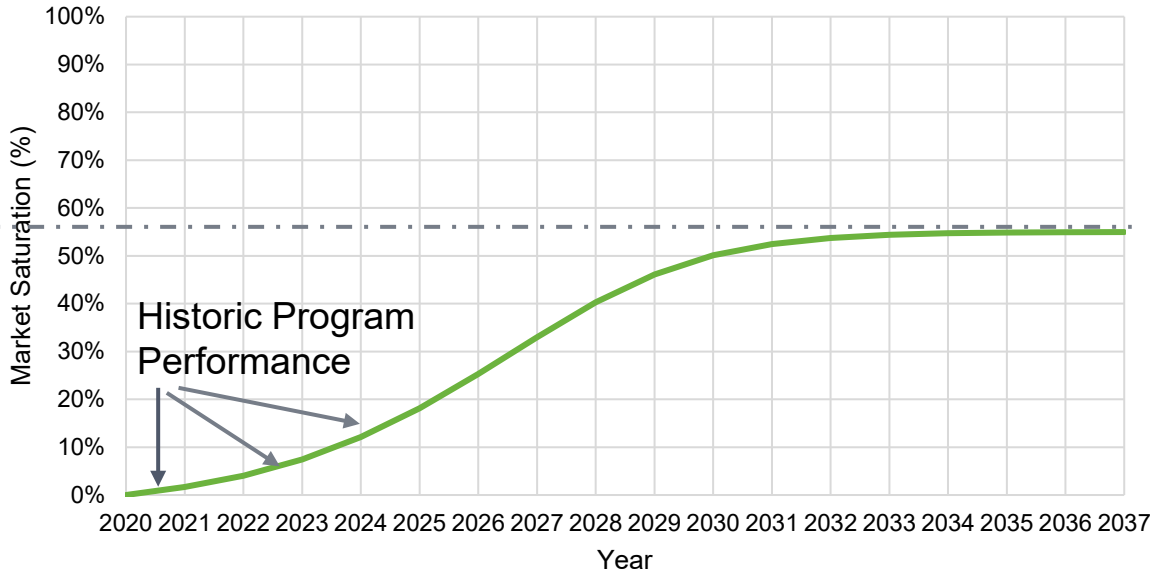
EE Achievable Potential

- We will use a payback acceptance criterion to estimate long-run market shares for measures
- Program data used to establish initial-year penetration levels for adoption curves

Payback Acceptance Curve



Market Diffusion Curve



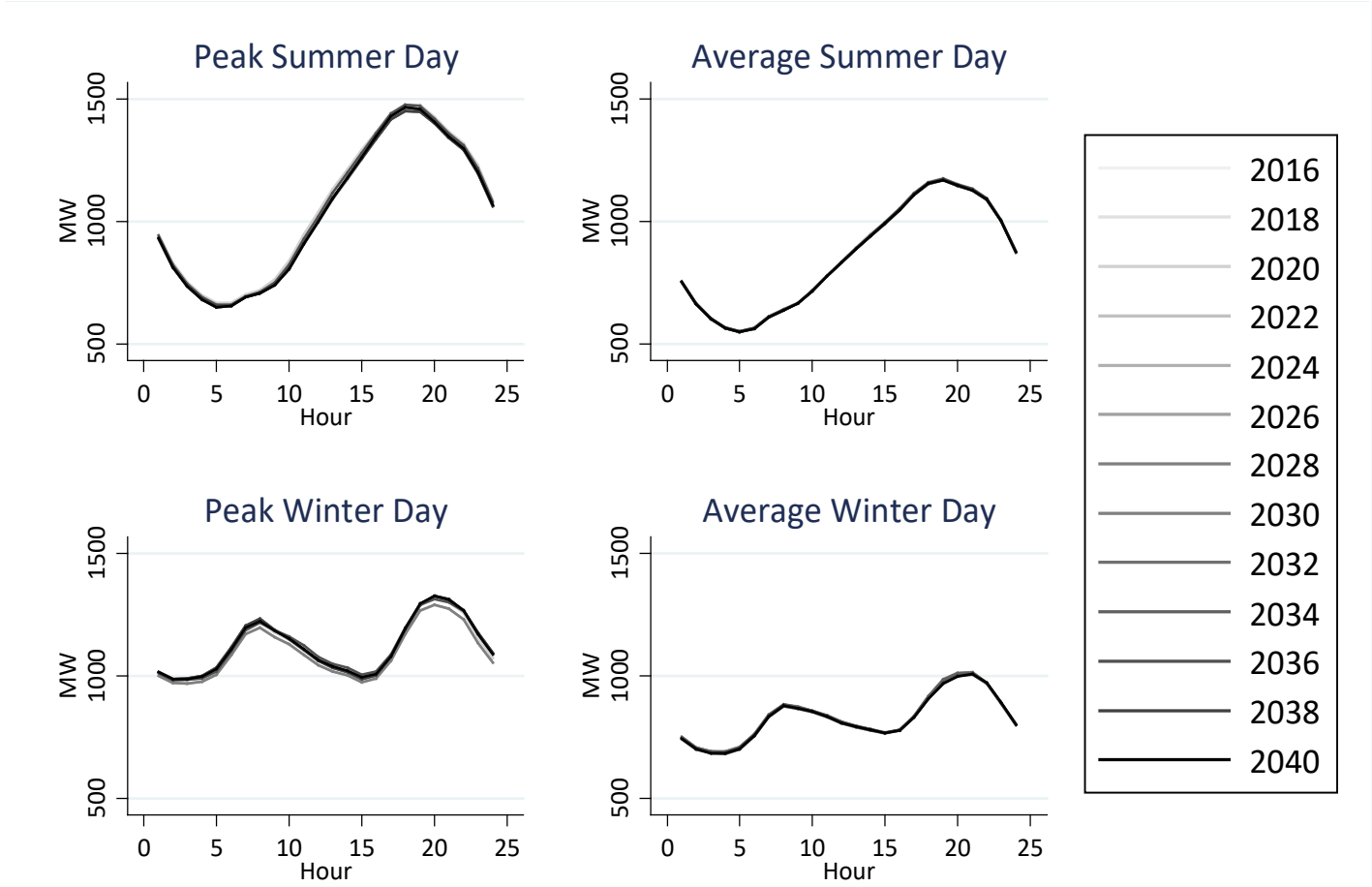
EE Achievable Potential Scenarios

- Similar to prior study
- Measures are re-screened based on scenario parameters
  - **Low scenario:**
    - Aligned with existing program incentives
    - Measures screened at UCT ≥ 1.0
  - **Medium scenario:**
    - **I**ncentives increased up to 50% of the incremental costs*
    - UCT threshold will be reduced to 0.7 as proxy for program-level screening
  - **High scenario:**
    - Incentives increased up to 75% of the incremental costs*
    - UCT threshold will be reduced to 0.7
    - Avoided marginal energy costs will be increased by 50%.

*Incentive rates for individual measures will be capped to maintain passing UCT result, if less than targeted rate.

DR Forecast Disaggregation

- Analyze hourly system load forecast to determine how the system load shape is expected to change over the study horizon
- Potential shifts include:
  - Change in peak hour
  - Change in peak season (e.g. summer to winter)
- Examine summer/winter shapes
- Additional analysis also done to determine utility “peakiness” and seasonal/hourly distribution of peak loads

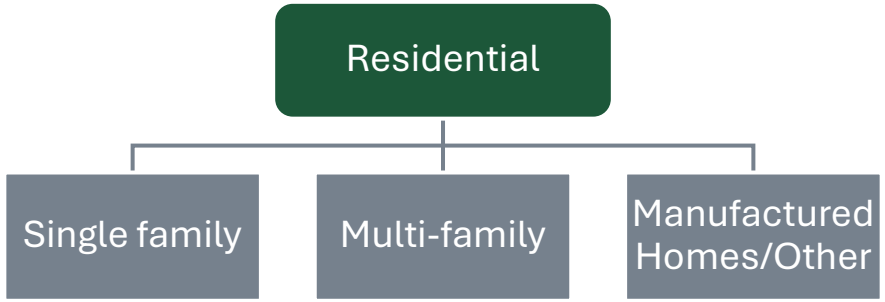


DR Segmentation

Customers are classified by **sector** and further grouped into **segments** based on account characteristics

- Potential is estimated separately for each sector and segment
- Final segmentation determined by data availability

Residential sector is split into 3 segments*



Commercial sector is split into Small/Medium Business(SMB) and Large Commercial & Industrial (LCI)

- Segments based on size/peak load*

	SMB	LCI
Segment 1	< 500 kWh	< 50 kW
Segment 2	500-1,000 kWh	50-100 kW
Segment 3	1,000-2,500 kWh	100-500 kW
Segment 4	> 2,500 kWh	> 500 kW

*Segmentation may also incorporate additional customer characteristic factors, such as full-time vs. seasonal occupancy, dependent on sufficient data to identify portion of customer base and load

DR Technical Potential

$$\textit{Technical Potential} = \textit{Curtailable Peak Load} * \textit{Number of Customers with Curtailable Load}$$

TP is equal to the total load from eligible demand response resources during system peak hour for each season:

Residential & Small Commercial

- Direct load control measures (e.g., HVAC, water heating, etc.) and rate-based
- Additional potential from battery energy storage systems (BESS) and EV charging

Large Commercial

- TP is calculated as total load (based on assumption that these customers will shed all load if you are willing to pay them enough)

Sample Measure List

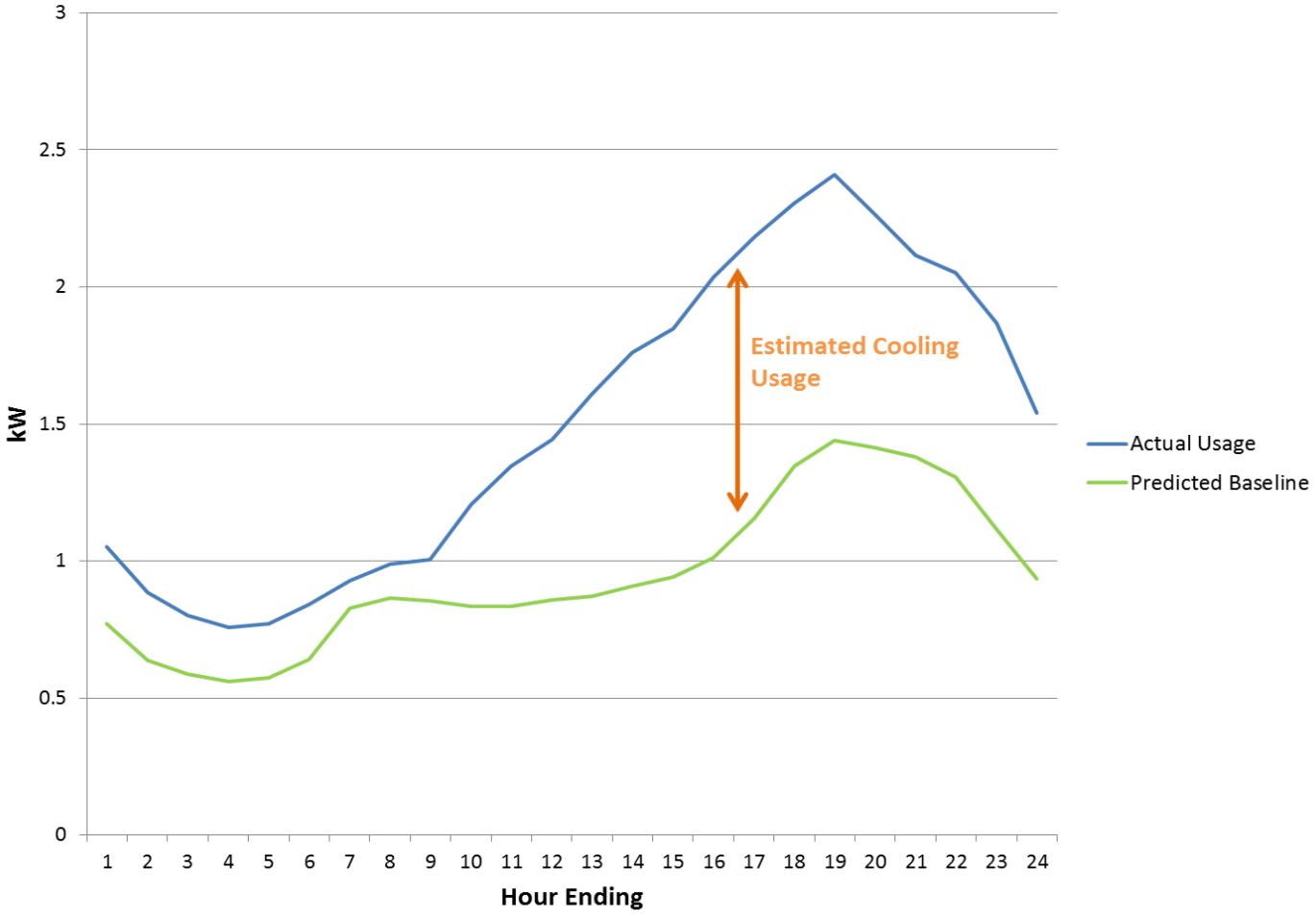
Sector	Measure Category	Measure/End-Use	Description
Com	Large C&I	3rd Party Contracts (Large C+I)	Capacity-based; incentive-based
Com	Large C&I	Automated DR	BMS; seasonal
Com	Large C&I	Emergency Load Reduction	Grid emergency events
Res + Com	DLC	Battery Storage	Load shifting; dispatchable
Res + Com	DLC	EV Telematics	Load shifting
Res + Com	DLC	HVAC - Cooling (Switch)	Load shed; % cycling
Res + Com	DLC	HVAC - Heating (Switch)	Load shed; % cycling
Res + Com	DLC	Pool Pump (Switch)	Summer-only
Res + Com	DLC	Smart Thermostat - BYOT	Varying precool & offset options
Res + Com	DLC	Smart Thermostat - Utility Install	Varying precool & offset options
Res + Com	DLC	Water Heat (Switch)	Switch
Res + Com	Pricing	Critical Peak Pricing	Event alerts
Res + Com	Pricing	Peak Time Rebates	Event alerts
Res + Com	Pricing	Real Time Pricing	Event alerts

Residential/SMB Seasonal Load

Analysis based on AMI interval usage data from each customer segment

- To estimate cooling load, develop model to predict usage based on CDD, HDD, month, hour and weekday/weekend
- Determine baseline usage without cooling for each day by setting CDD=0 and predicting usage based on estimated coefficients
- Estimate of cooling load is difference between baseline and observed usage

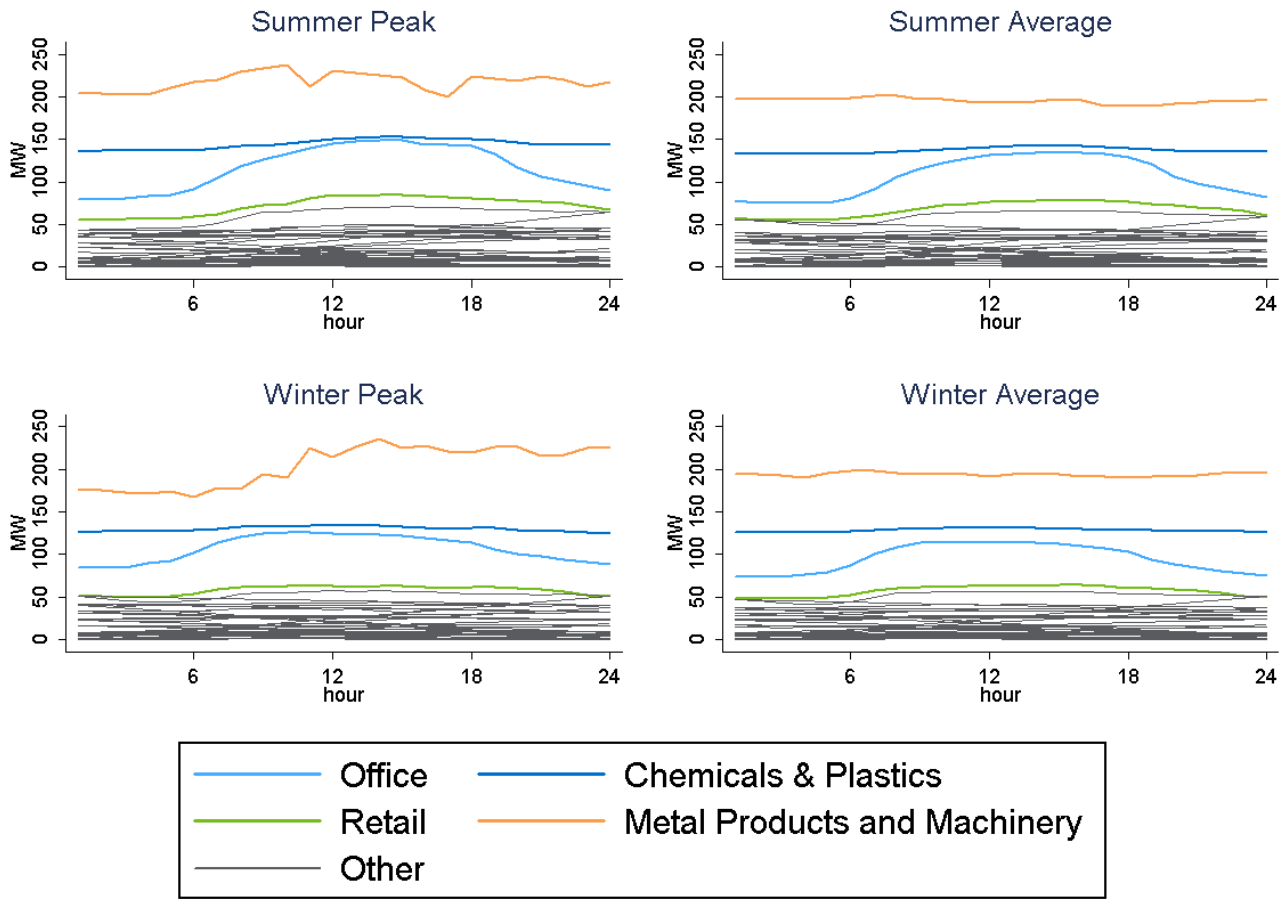
Similar methodology is used to estimate heating load



Estimating Large C&I TP

Based on AMI interval usage data

- Average load shapes not used due to large amount of variation seen with large customers
- Load aggregated into total historic load based on customer segment
- Technical potential defined as total load available for each segment during system peak



DR Economic Potential

- Similar methodology to TP
  - Theoretical limit based on load available on-peak
- Economic screening determines whether the benefits of enrolling a marginal customer into a demand response program outweigh the costs
  - Based on cost of controlling load (switch installation, thermostat, etc.) but not full program costs (marketing, customer acquisition, etc.)
- DR benefits are equal to the avoided capacity costs
  - Forecast consistent with other IRP analyses

DR Achievable Potential Scenarios

AP incorporates expected market response to cost-effective measures

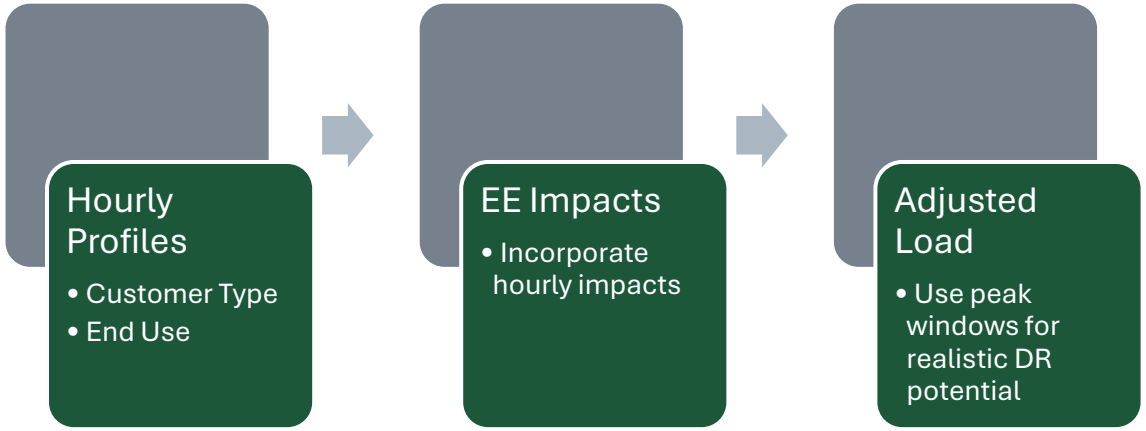
- Technology adoption, program enrollment, marketing & customer acquisition

Measures are analyzed based on scenario parameters

Low Scenario	Medium Scenario	High Scenario
• "Business as usual" • Aligned with existing programs • Residential and SMB DLC, Thermostats	• Include all economic loads/ measures • Target cost-effective customer segments • Assume medium incentives, marketing & outreach	• Include all economic loads/measures • Target all customer segments that maintain program cost-effectiveness • Enhanced incentives, marketing & outreach

EE-DR Interaction Analysis

- Interaction effect among DSM resources



Data Sources:

Santee Cooper-specific data

- End Use Hourly Profiles

Supplemented with available secondary data

- NREL's ResStock & ComStock End Use Profiles

- Mutual exclusivity of DR technologies
  - Define DR control/curtailment technologies and estimate the applicable customer base for each technology or offering

Proposed Schedule

Task	Milestone Date	Stakeholder Comments Date
Technical Stakeholder Work Session	5/1/2025	
Study Plan & Draft Measure List (provided via email)	5/1/2025	5/16/2025
Forecast Disaggregation/Customer Segmentation/Measure Parameters (provided via email)	8/1/2025	8/15/2025
Technical Stakeholder Work Session: review baseline data	8/4 – 8/8/2025	
Technical Potential (provided via email)	9/12/2025	9/26/2025
Economic Potential (provided via email)	10/3/2025	10/17/2025
Achievable Potential (provided via email)	10/31/2025	11/14/2025
Technical Stakeholder Work Session: review draft results	11/3 – 11/7/2025	
MPS Report	December 2025 or Q1 2026	
Present findings to IRP Stakeholders	Q4 2025 or Q1 2026	

Questions?

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