



# Santee Cooper Resource Planning Stakeholder General Notice Meeting #1 July 18, 2024



# Welcome and Agenda

Stewart Ramsay, Meeting Facilitator  
VANRY Associates

# Meeting Guidelines

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## Principles to guide today's session

- Respectful dialogue
- Questions and comments are public and will be shared via the IRP webpage
- Transparency of all questions & answers
- Participant email address use is limited to IRP communications
- Email list is not being shared or made public

# Why an IRP meeting now?



## **Honor our commitment to continued engagement between IRP cycles**

- 1) Provide a reminder of the IRP process, the 2023 IRP filing and the preferred portfolio
- 2) Provide updates on the current and future planning initiatives and share how you can contribute now through 2026
- 3) Confirm our statutory requirements, specifically around annual updates
- 4) Provide an update on our base assumptions from the 2023 IRP, to be used in the 2024 Update
- 5) Share the portfolios that are being studied for the 2024 Update
- 6) Give you the opportunity to comment and ask questions

**The value of this process is in your participation ...  
please ask questions!**

1. Why are we using this format?
2. Use the **Q&A** for comments or questions during the presentation – we have a team of people helping to answer your questions
3. **“Raise Hand”** if you would like the chance to speak, we will call on people in the order that they raised their hands. We will wait to call on people until the presenter has concluded their presentation.

*Note: we are not using the Chat function; it is disabled*

# Meeting Agenda

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- 1:00 pm Welcome and Agenda
- 1:15 pm Introduction
- 1:50 pm Load Forecast
- 2:20 pm Effective Load Carrying Capability Update
- 2:35 pm BREAK
- 2:45 pm Effective Load Carrying Capability Update Continued
- 3:00 pm Major Assumptions for the 2024 Annual IRP Update
- 4:00 pm BREAK
- 4:10 pm Portfolios, Sensitivities, and Metrics for the 2024 Annual IRP Update
- 4:50 pm Meeting Closeout



# Introduction

Jane Campbell, Senior Director Resource Planning  
Santee Cooper

# Today's Speakers



**Jane Campbell**  
Sr. Director Resource Planning  
Santee Cooper



**Clay Settle**  
Manager Resource Planning  
Santee Cooper



**Greg McCormack**  
Senior Manager Financial Forecast  
Santee Cooper



**Stewart Ramsay**  
Meeting Facilitator  
VANRY Associates



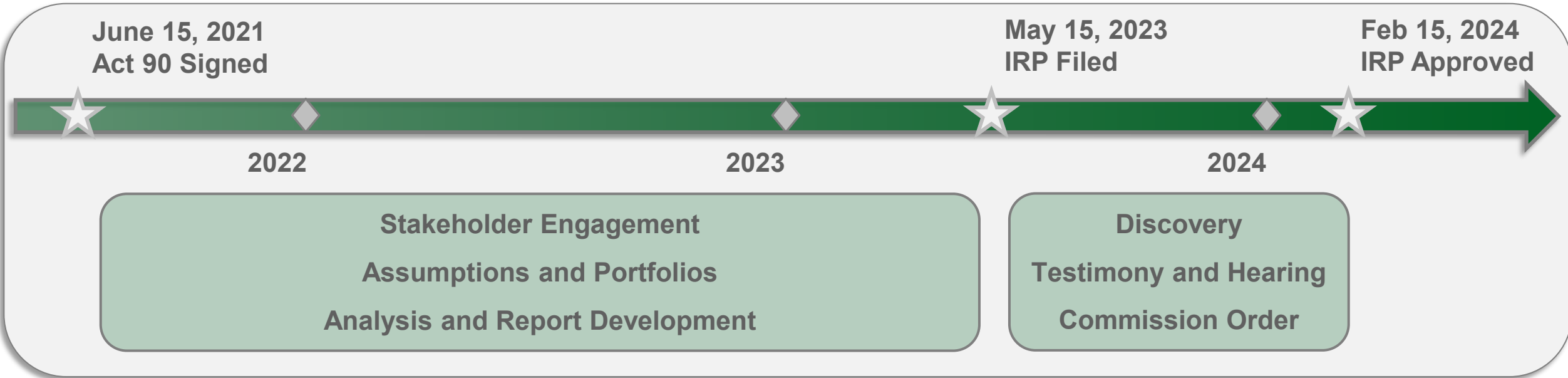
**Bob Davis**  
Executive Consultant  
nFront Consulting



**Joel Dison**  
Technical Manager  
Astrape Consulting



# 2023 Integrated Resource Plan



- Thank you to those who participated in the 2023 Integrated Resource Plan (IRP) stakeholder process and the proceeding at the Public Service Commission (PSC)
- We recognize this was a significant commitment of your time and resources
- We are committed to continued and robust engagement with stakeholders and recognize the value it adds to our ongoing planning

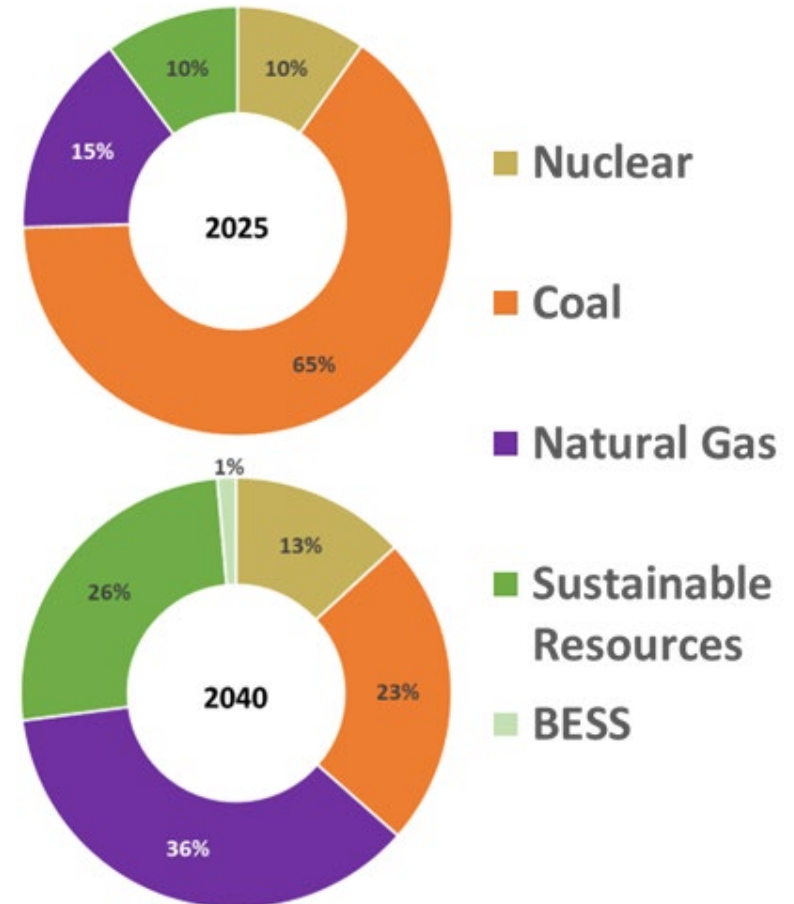
# 2023 Integrated Resource Plan



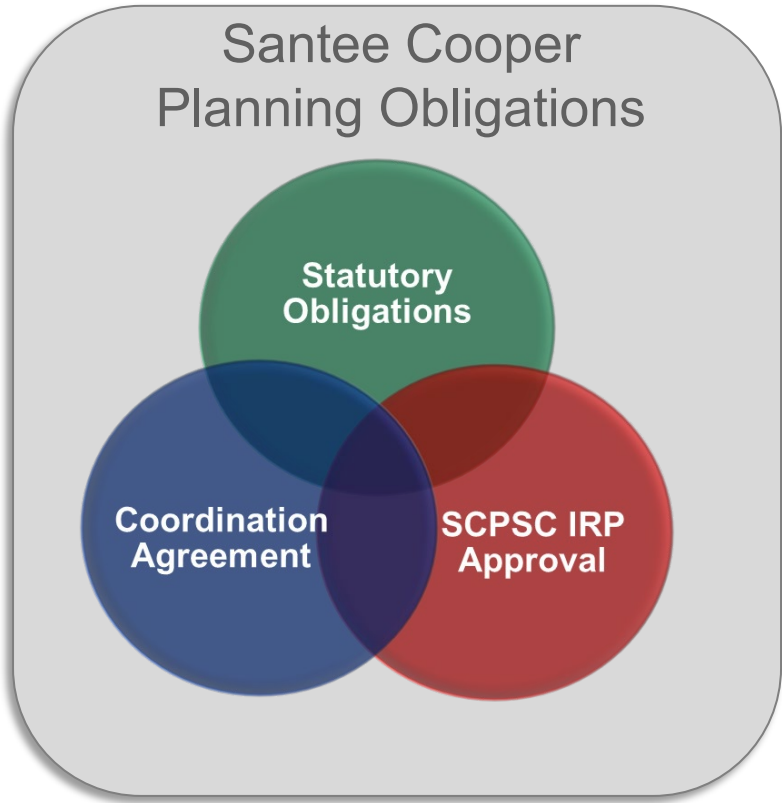
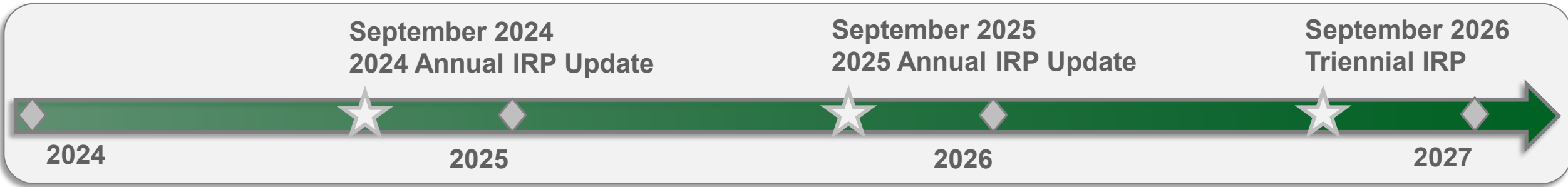
## Preferred Portfolio Summary

- Retire Winyah Generation Station year end 2030
- Includes Central's three Non-Shared Resources, Power Purchase Agreements
- Develop a large Natural Gas Combined Cycle (NGCC) resource in 2031 to coincide with the retirement of Winyah
- Adds substantial amount of solar: 1,800 MW by 2031 and 2,700 MW total by 2040
- Battery Energy Storage Systems (BESS) and peaking resources in the 2030s, as needed

Percentage of Total Generation (MWhs, Energy) by Resource Type



# Current and Future Planning Initiatives



## Fulling Santee Cooper's Planning Obligations

- Addressing requirements from the Public Service Commission Order for the 2023 IRP
- Executing the Short-Term Action Plan (STAP) and working with Central
- Continuing stakeholder engagement
- Monitoring regulatory developments
- Preparing to file the 2024 IRP Annual Update and future IRPs
- Beginning long term evaluations and studies for future IRPs

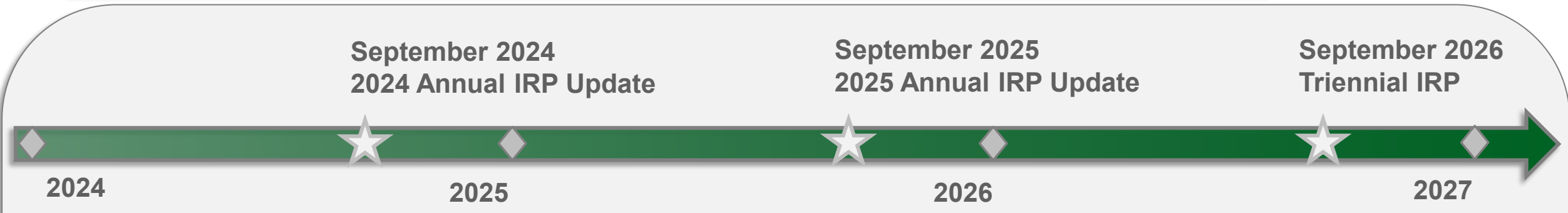
# What is an IRP Update?



## Section 58-37-40(D) of the South Carolina Code of Laws

- (1) An electrical utility and the Public Service Authority shall each **submit annual updates to its integrated resource plan to the commission**. An annual update must include **an update to the electric utility's or the Public Service Authority's base planning assumptions relative to its most recently accepted integrated resource plan**, including, but not limited to: energy and demand forecast, commodity fuel price inputs, renewable energy forecast, energy efficiency and demand-side management forecasts, changes to projected retirement dates of existing units, along with other inputs the commission deems to be for the public interest. The electrical utility's or Public Service Authority's annual update must **describe the impact of the updated base planning assumptions on the selected resource plan**.
- (2) The Office of Regulatory Staff shall review each electrical utility's or the Public Service Authority's annual update and submit a report to the commission providing a recommendation concerning the reasonableness of the annual update. After reviewing the annual update and the Office of Regulatory Staff report, the commission may accept the annual update or direct the electrical utility or the Public Service Authority to make changes to the annual update that the commission determines to be in the public interest.

# Plan for Stakeholder Engagement



## Types of Meetings

- General Notice Meetings following a similar process to the 2023 IRP
- Stakeholder Working Group Meetings with a set group of individuals
- Technical Meetings as requested

## Common Elements for All Meeting Types

- Independent Facilitator with virtual format
- IRP web page with materials
- Summaries filed with the Commission

# Plan for Stakeholder Engagement



Meeting Type	Proposed Frequency	Attendees	Materials Posted to the IRP Web Page	Topics
<b>General Notice</b>	2024 – 1 Meeting 2025 – 2 Meetings 2026 – TBD	Open to the public and anyone who registers	Presentation Video Recording Meeting Summary	High-level overview focused on inputs and results for IRP filings and supporting studies  PSC and statutory required topics
<b>Working Group</b>	Meet every 3-4 months	Set group of members	Presentation Meeting Summary	Determined by members  PSC and statutory required topics
<b>Technical Meetings</b>	As requested by any stakeholder	Those who request, will also invite working group members	Meeting Summary	In-depth technical discussion on specific topics

# IRP Web page and Materials



- Meeting materials and IRP related information are posted to the IRP web page as they are produced
  - Visit <https://www.santeecooper.com/about/integrated-resource-plan/2026-irp-stakeholder-process/>
- Stakeholders can supply feedback during the General Notice Meeting today or in future General Notice meetings
- Stakeholders can also supply feedback at any time using the Forum
  - Visit <https://www.santeecooper.com/about/integrated-resource-plan/2026-irp-stakeholder-process/feedback/>
  - Please submit feedback for the 2024 IRP Update by August 2, 2024



# Load Forecast

Greg McCormack, Senior Manager Financial Forecast  
Santee Cooper



## 2023 IRP

- Load Forecast was prepared in May 2022

## 2023 Load Forecast

- Base load forecast was prepared in May 2023
- Revised twice during 2023 to incorporate new large customer signings

## 2024 Load Forecast

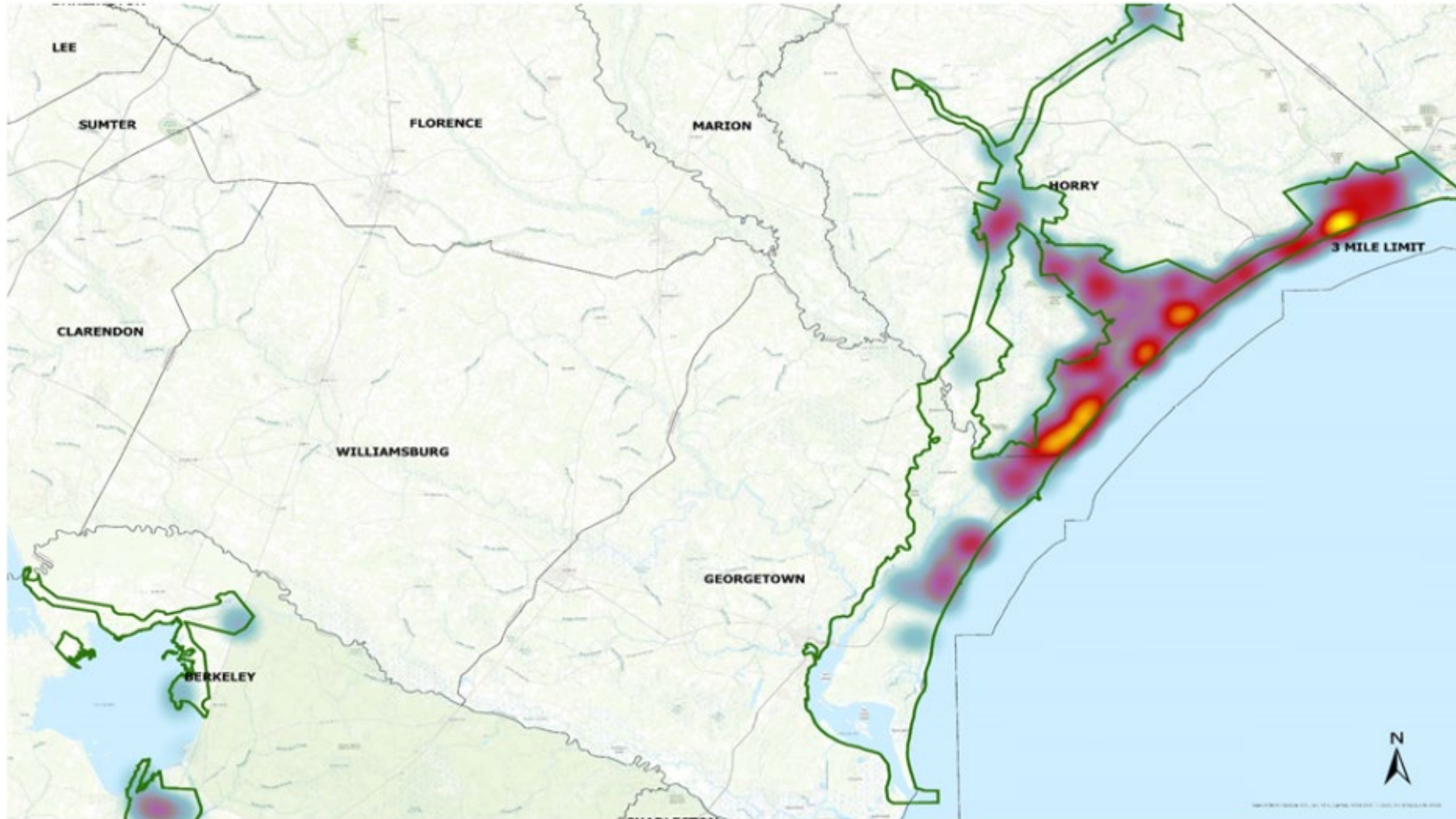
- Completed in May 2024

# Load Forecast | Customer and Forecast Method Review

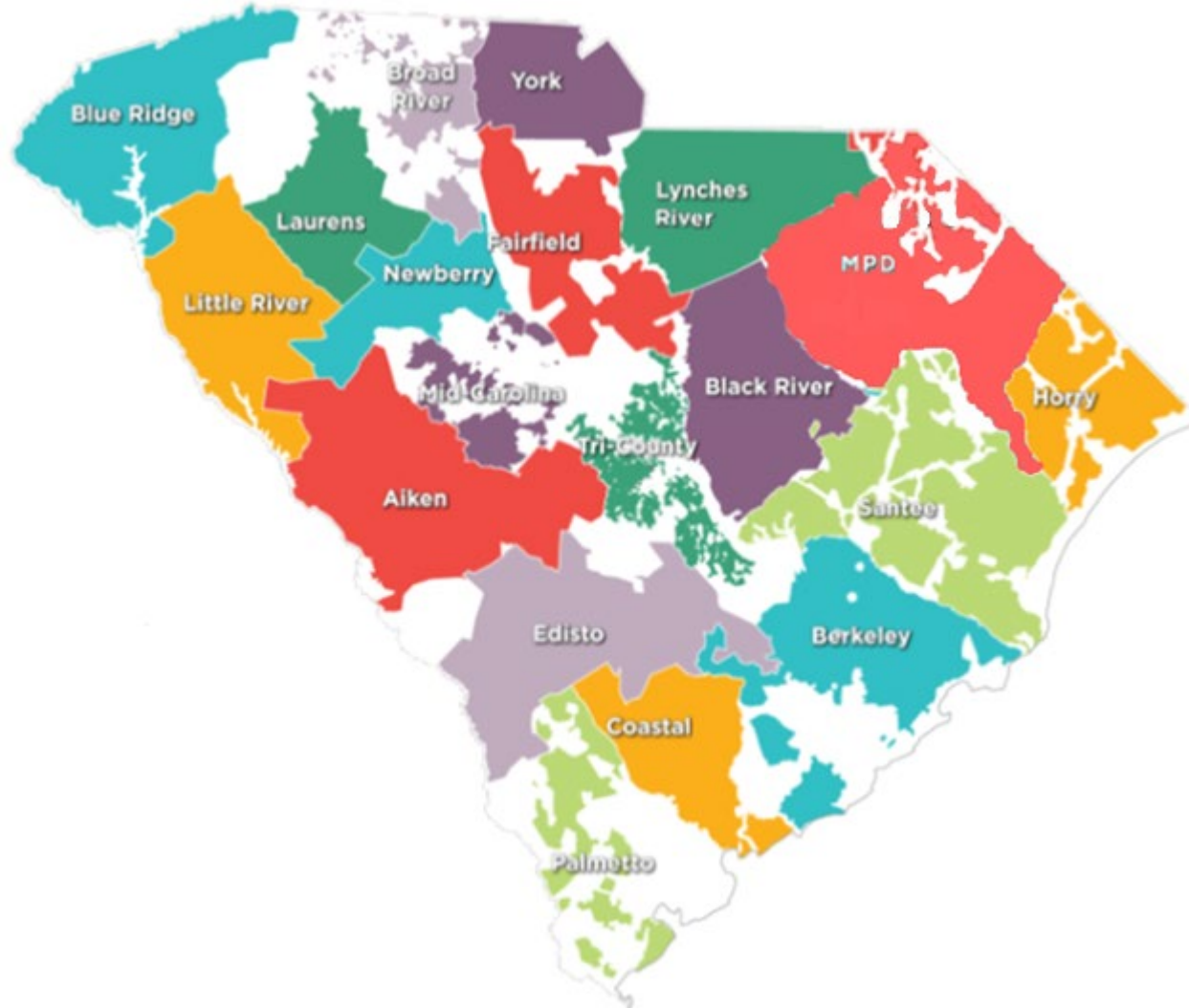


Class	Customer Segment Composition	Originator	Forecasting Method
<b>Direct Served: Residential and Commercial</b>	<ul style="list-style-type: none"> <li>Approximately 204,000 direct served accounts, comprising 15% of system energy</li> </ul>	GDS	SAE modeling, solar and EV adjustments
<b>Direct Served: Industrial</b>	<ul style="list-style-type: none"> <li>31 large industrial customers served directly by Santee Cooper, comprising 24% of the system energy</li> </ul>	Santee Cooper	contracts and historical consumption
<b>Wholesale: Central</b>	<ul style="list-style-type: none"> <li>Wholesale customer serving 19 retail cooperatives, comprising 58% of system energy</li> </ul>	Central	SAE modeling
<b>Wholesale: Off-system and Municipal Sales</b>	<ul style="list-style-type: none"> <li>Wholesale sales to Bamberg, Georgetown, PMPA, Seneca, and Waynesville (NC)</li> <li>Sales to PMPA are on a partial requirements basis</li> <li>Off-system sales comprise 3% of system energy</li> </ul>	Santee Cooper, GDS, and Customer	various

# Load Forecast | Service Territory and Customer Density



# Load Forecast | Central Electric Service Territory



*Note: Blue Ridge, Broad River, Laurens, Little River, and York are outside of Santee Cooper's Balancing Authority.*



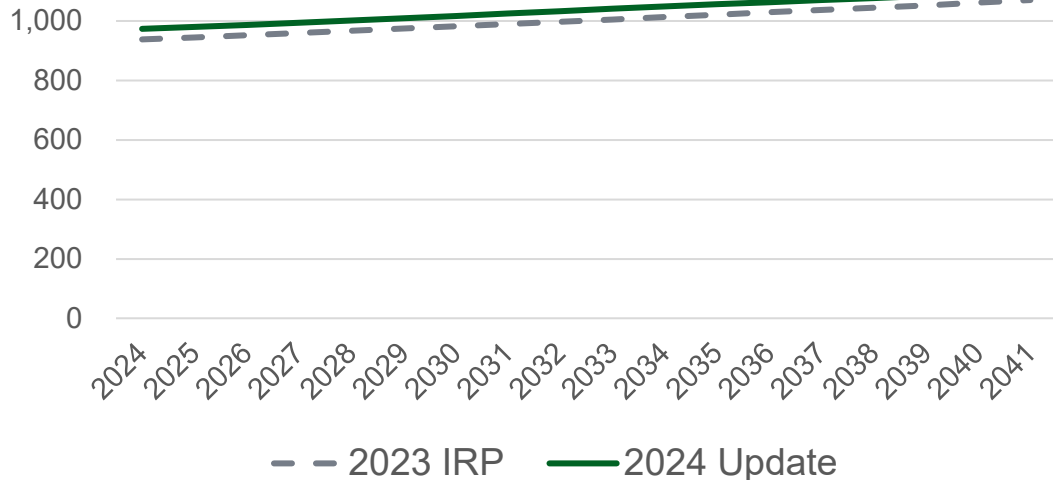


Load Forecast Results, Before Large Loads

## Residential and Commercial

- 3% more residential customers by 2040 than 2023 IRP
- Continued decrease in use per customer partially offsets customer growth
- No substantial change to electric vehicle forecast and rooftop solar forecast

Residential & Commercial CP (MW)<sup>1</sup>

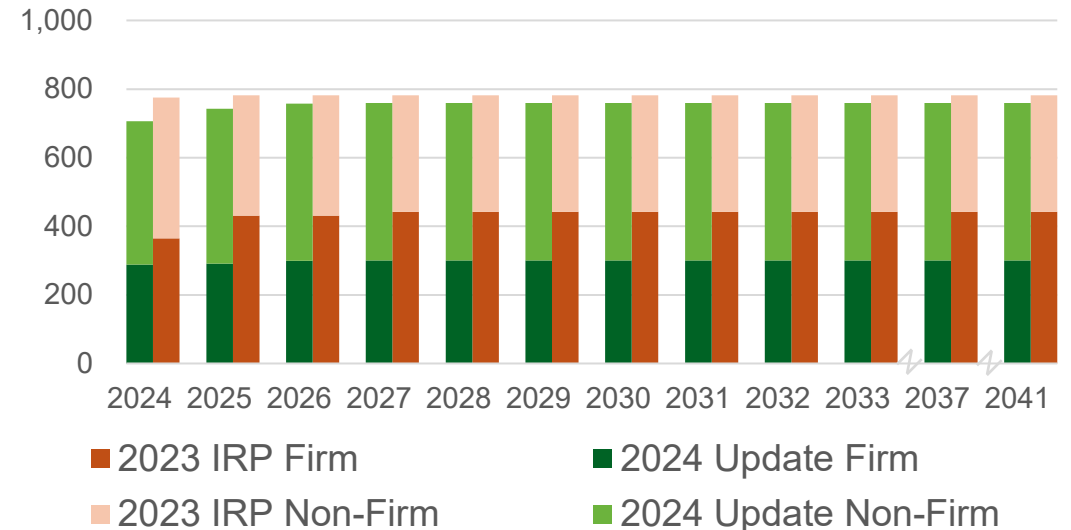


1 - Inclusive of losses and existing DSM; exclusive of future DSM

## Industrial

- Four new industrial customers
- Updates for contract changes and recent history

Industrial Winter CP (MW)

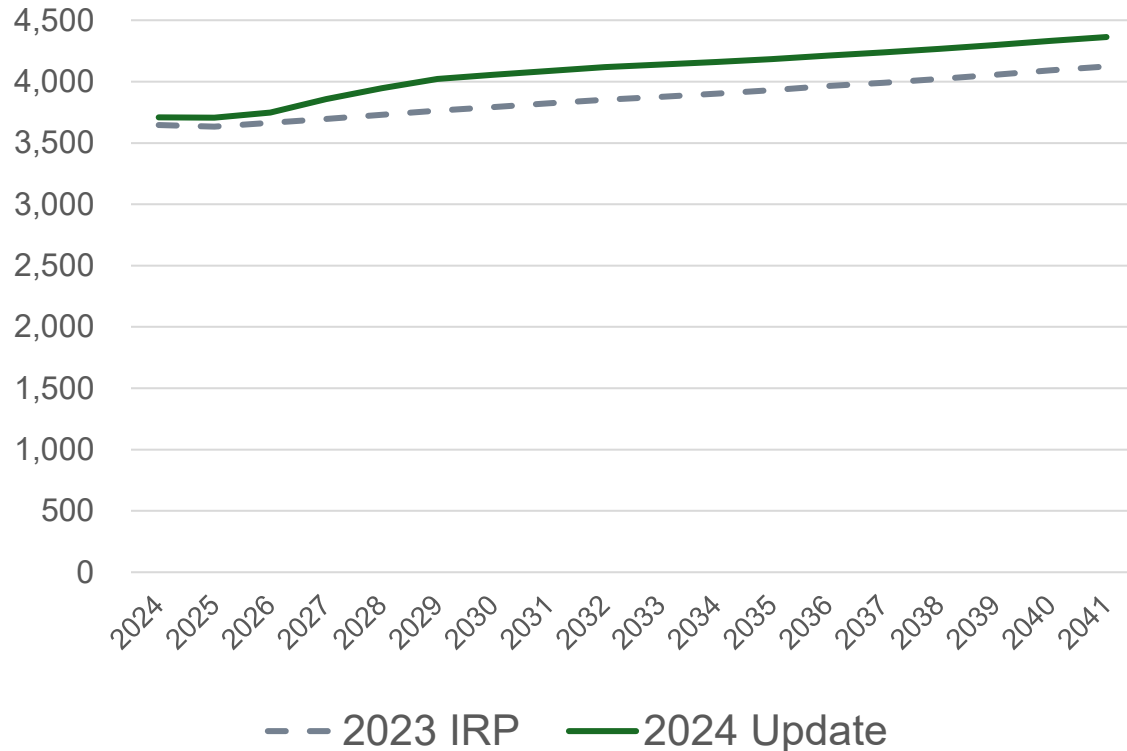


# Load Forecast | Forecast Results: Central

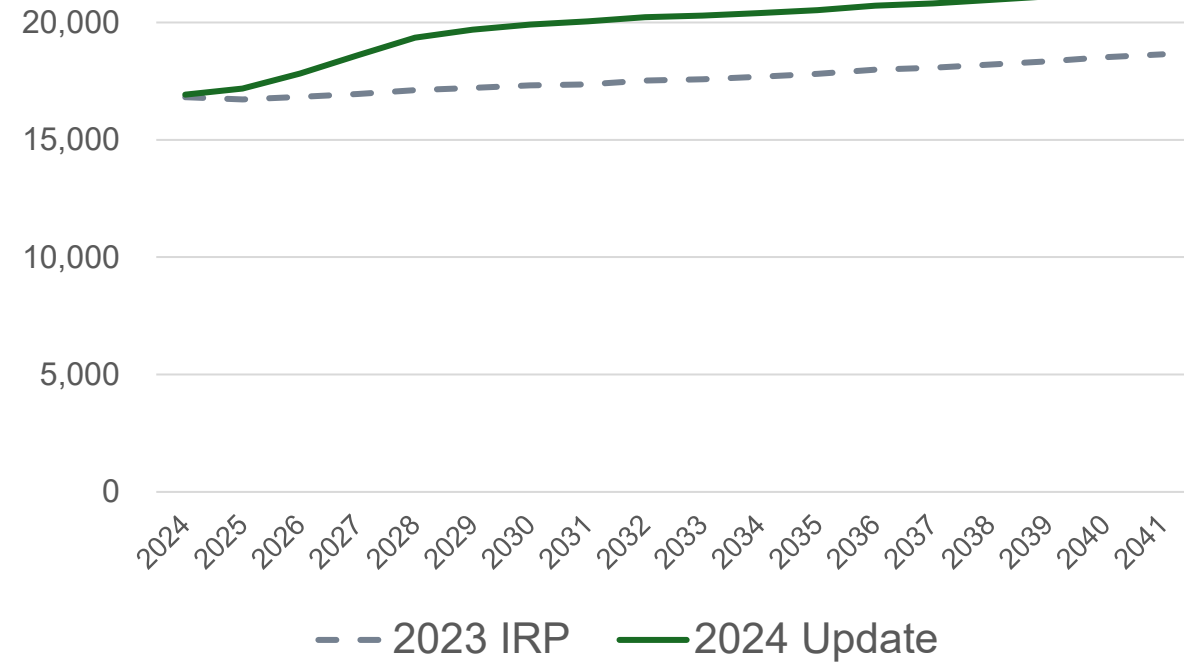


- Two large loads added to Central load forecast
- Strong residential customer growth is forecasted through the near term
- Post-model adjustment for electric vehicles

### Central Winter CP (MW)



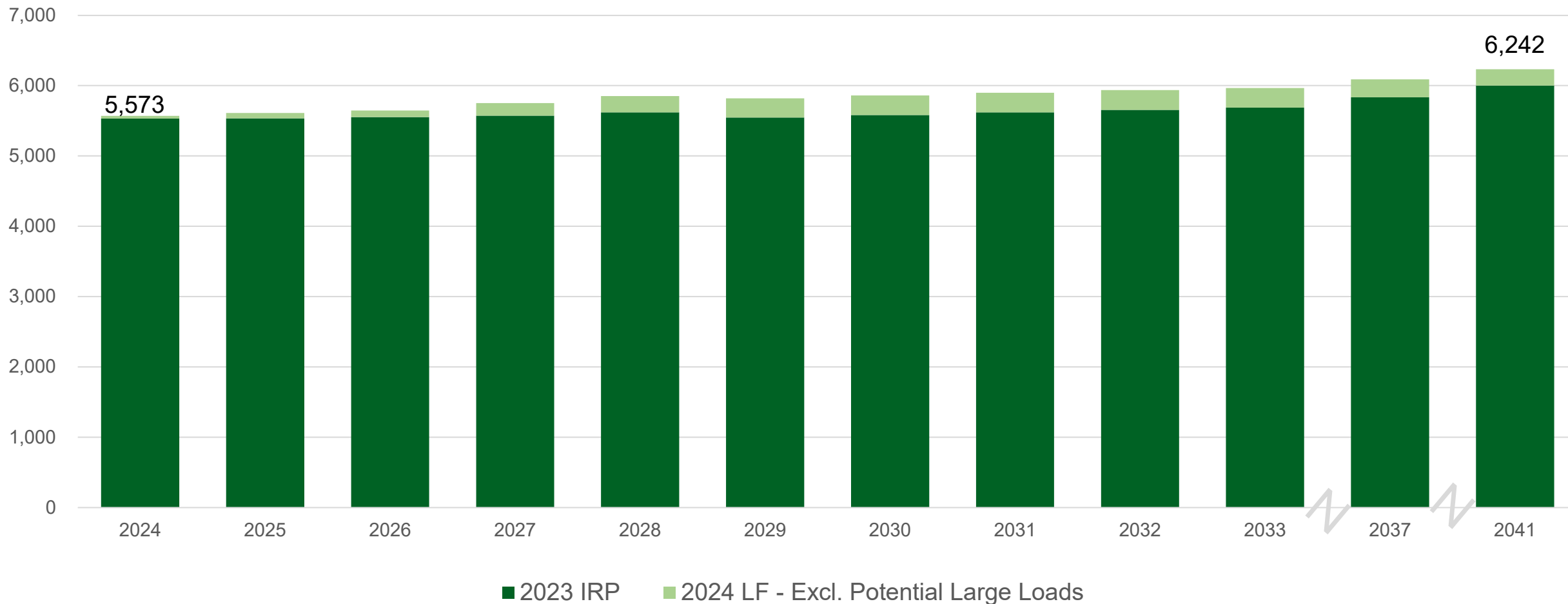
### Central Energy (GWh)



# Load Forecast | Forecast Results<sup>1</sup> Excluding Potential Large Loads



Winter CP (MW)



1 - Inclusive of losses and existing DSM; exclusive of future DSM





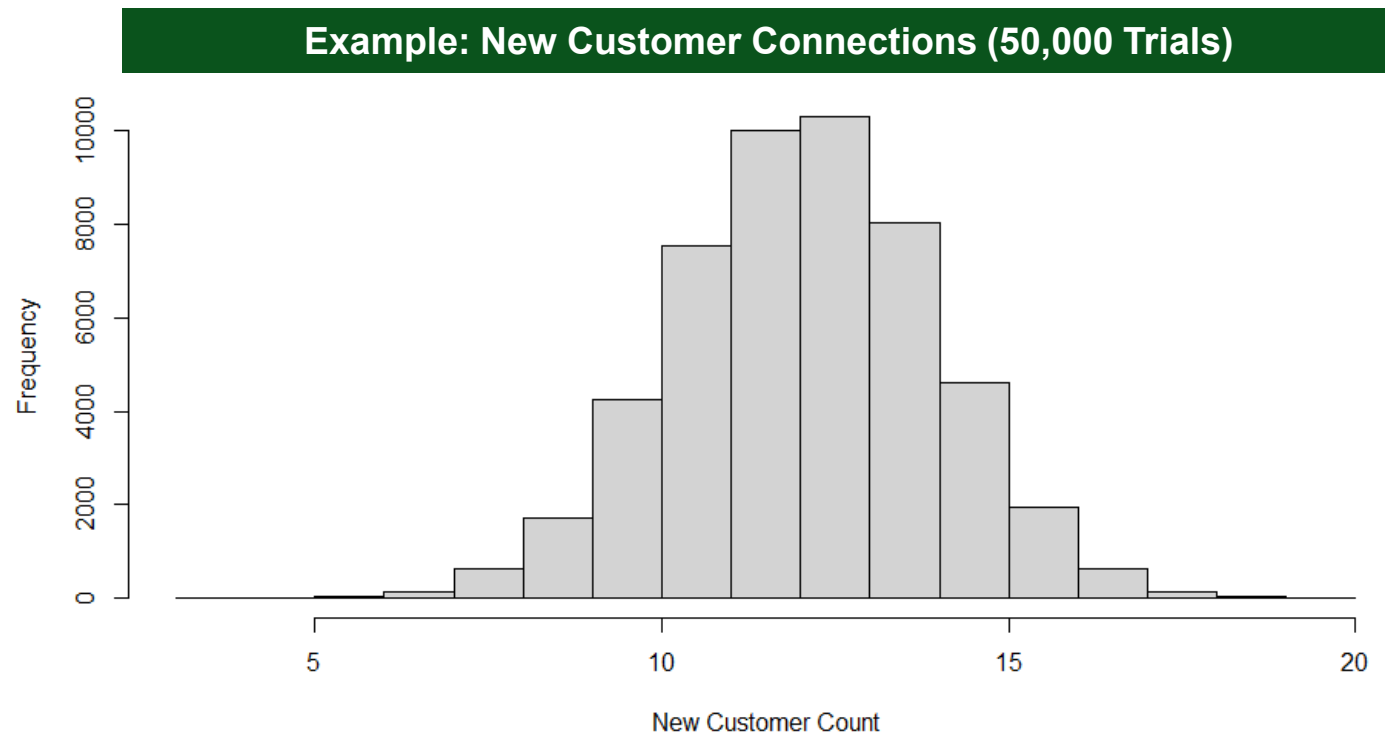
# Potential Large Load Stochastic Analysis Results

“Santee Cooper should engage stakeholders to **discuss the additional economic development in the state and how best to incorporate and anticipate new loads into its load forecast**....the Commission remains cognizant that these new loads are appearing quickly, creating additional energy and capacity constraints.” –

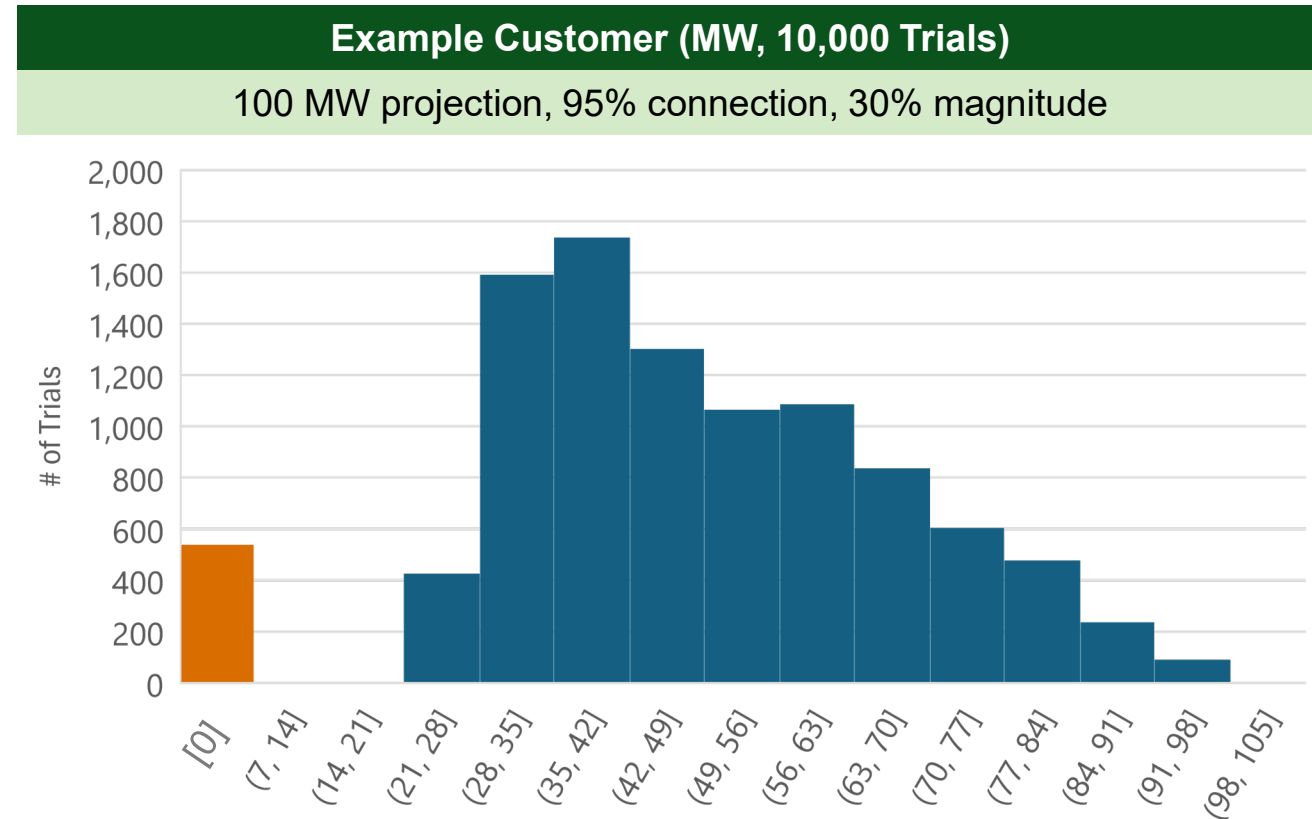
SCPSC – Docket # 2023-154-E



- Stochastic analysis is commonly used to model potential outcomes for uncertain future scenarios
- The results provide a range of outcomes and likelihood of occurrence
- Provides structure and creates a meaningful, actionable forecast from limited information



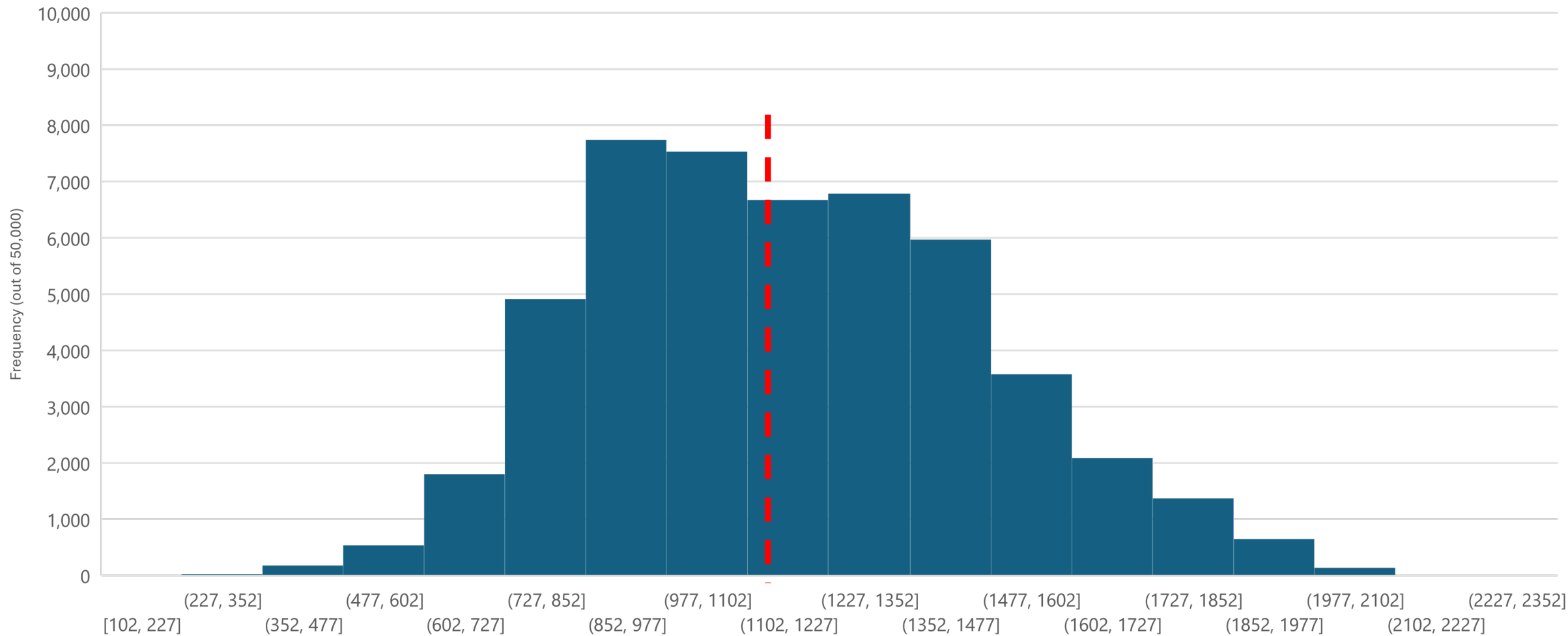
- **Likelihood of Connection**
  - Binary variable to determine if customer locates on system
  - Uniform distribution (randomized to match probability)
- **Magnitude Adjustment**
  - Adjustment to reflect lower usage than projected
  - Triangle distribution (trend to internal projection)
- **Siting Delay**
  - Potential delay in customer connection of 0-3 years
  - Left-skewed (no delay)
- **50,000 Trials**



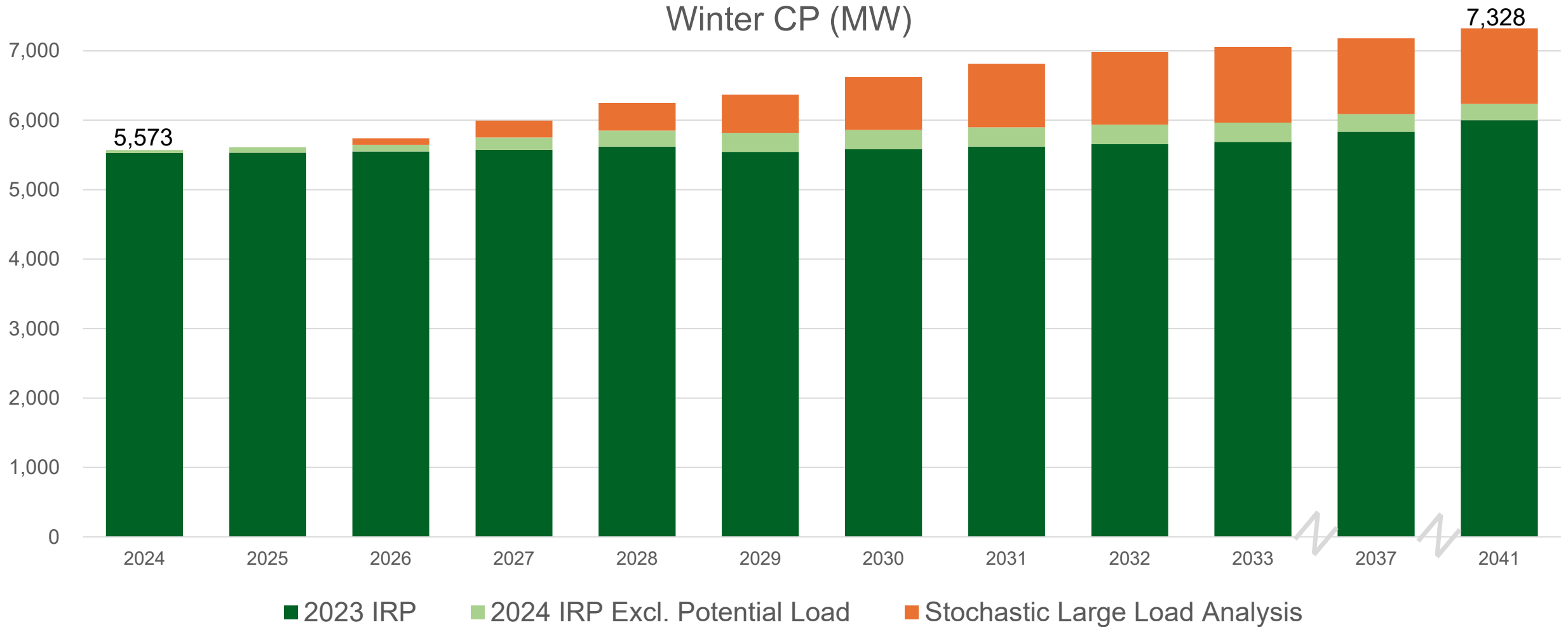
# Load Forecast | Potential Large Loads



## 2033 NCP (MW)



# Load Forecast | Forecast with Potential Large Load<sup>1</sup>



1 - Inclusive of losses and existing DSM; exclusive of future DSM



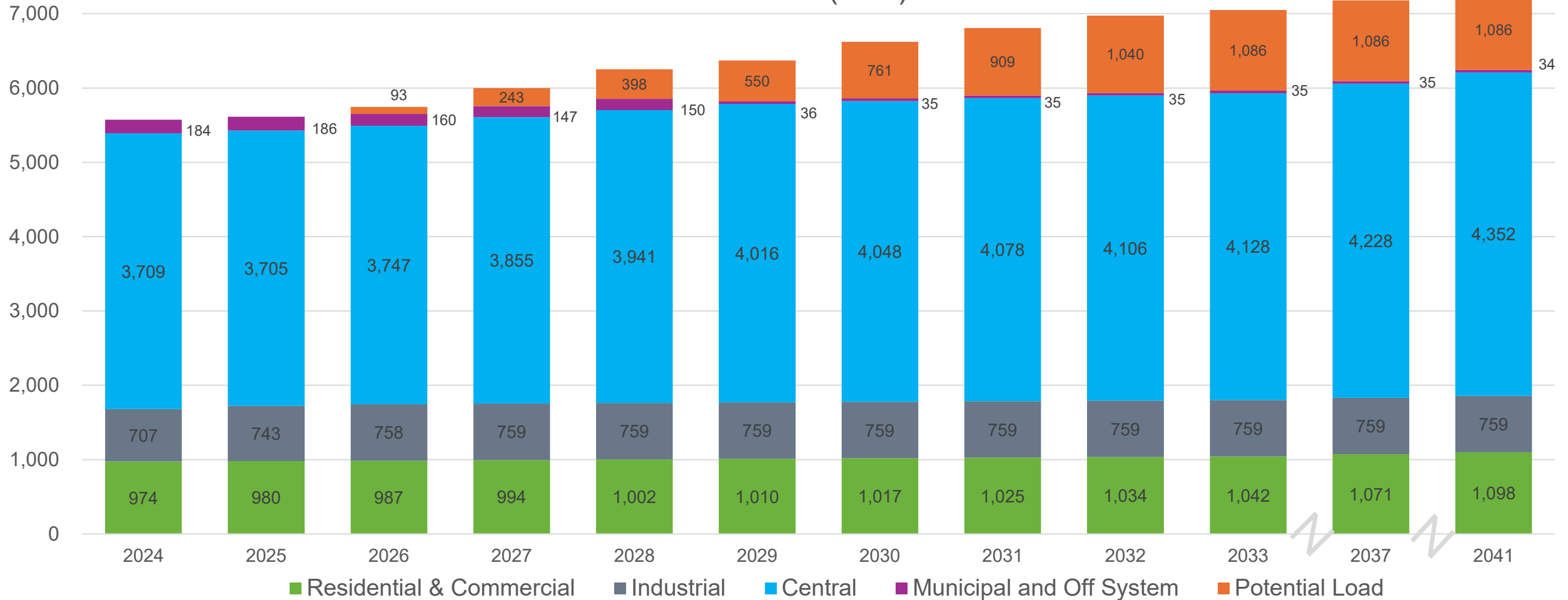


# Load Forecast Results

# Load Forecast | Forecast with Potential Large Load<sup>1</sup>



## Winter CP (MW)



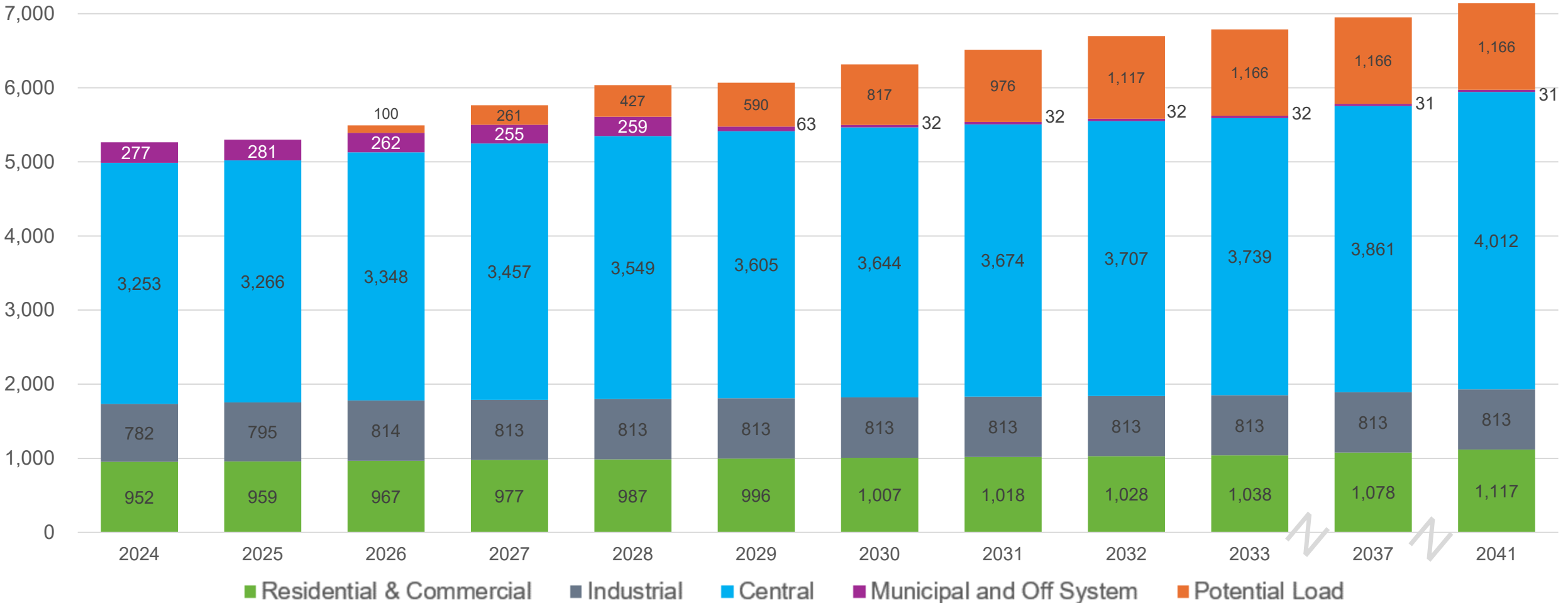
1 - Inclusive of losses and existing DSM; exclusive of future DSM



# Load Forecast | Forecast with Potential Large Load<sup>1</sup>



Summer CP (MW)

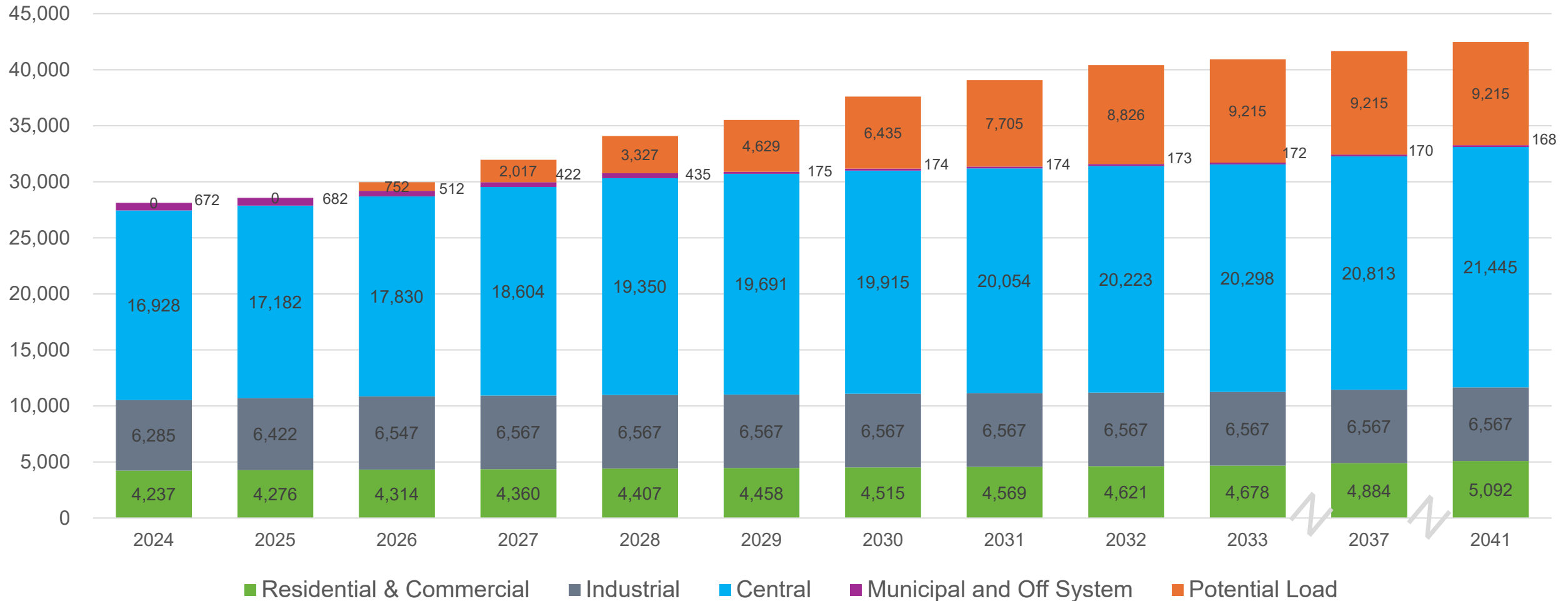


1 - Inclusive of losses and existing DSM; exclusive of future DSM

# Load Forecast | Forecast with Potential Large Load<sup>1</sup>



## Annual Energy (GWh)



1 - Inclusive of losses and existing DSM; exclusive of future DSM

## High

- Distribution system (426 MW<sup>1</sup>)
  - 95% stochastic output of residential and commercial forecast
  - High EV case
  - Low Rooftop Solar case
- Central's non-Industrial forecast adjusted using statistical analysis (772 MW<sup>1</sup>)
- 95% results from potential large load analysis (525 MW<sup>1</sup>)

## Low

- Distribution system (-31 MW<sup>1</sup>)
  - 5% stochastic output of residential and commercial forecast Low EV case
  - High Rooftop Solar case
- Central's non-Industrial forecast adjusted using statistical analysis (-561 MW<sup>1</sup>)
- 1% results from potential large load analysis (-895 MW<sup>1</sup>)
- Removal of existing industrial load from the combined system (-400 MW<sup>1</sup>)

1. Reflects 2041 winter demand incremental to System Load Forecast



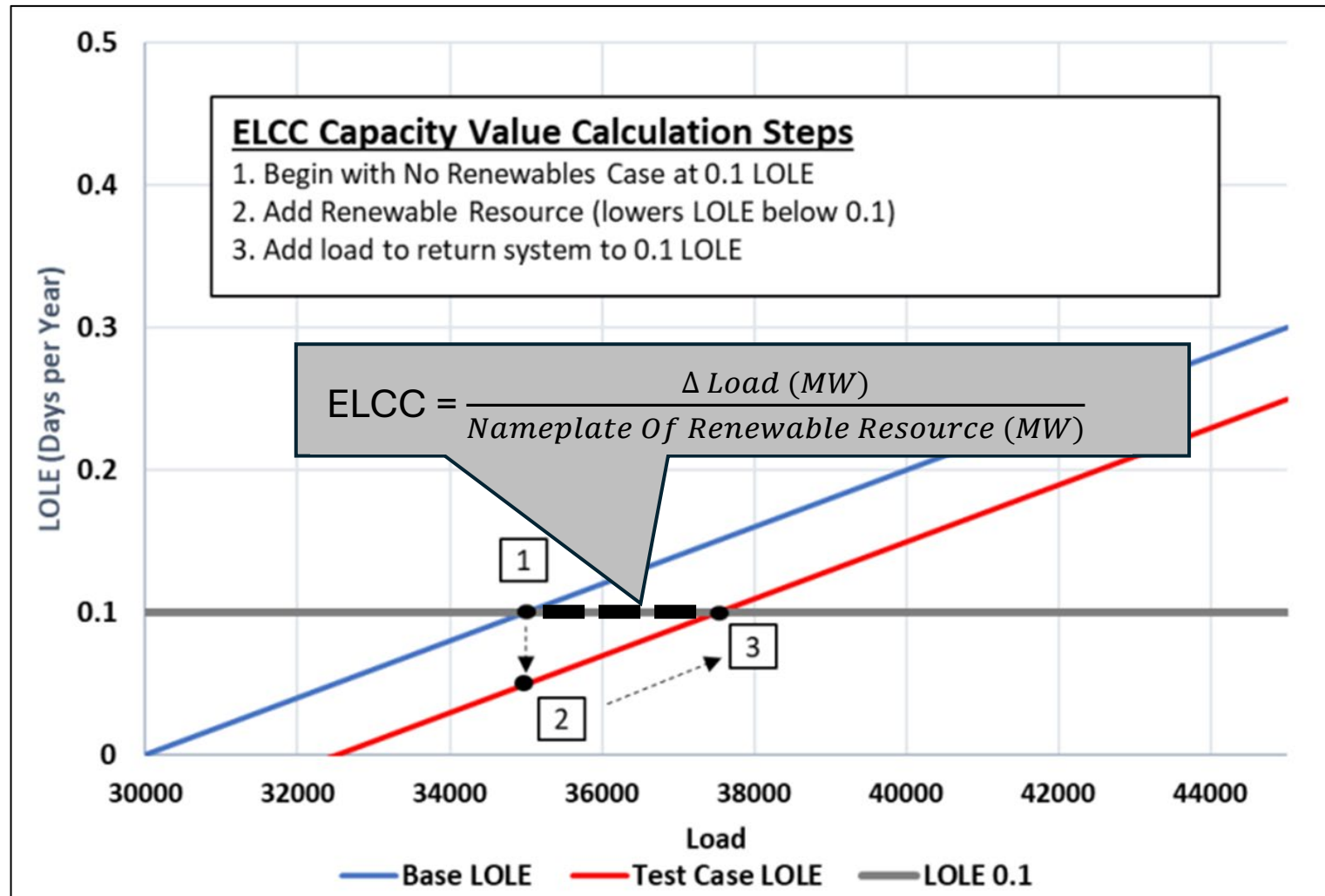
# Effective Load Carry Capability Update

Joel Dison, Technical Manager  
Astrape Consulting

- Astrapé Consulting – owner of Strategic Energy Risk Valuation Model and provides expertise in resource adequacy and resource planning
- SERVM
  - Multi-area reliability and economic simulation tool for the bulk electric system
  - Originally developed/patented in 1980s by Southern Company
  - Owned/licensed by Astrapé Consulting with 15+ years of ongoing development
  - Capable of hourly and sub-hourly chronological resource commitment and dispatch
- Used by ISOs/RTOs/Utilities across the U.S.
  - Neighboring entities such as Duke Energy, Dominion Energy South Carolina, Southern Company, and TVA all use SERVM for resource adequacy analysis

- **Effective Load Carrying Capability (ELCC)**
  - ELCC compares the reliability contribution of variable energy resources and energy limited resources to perfect capacity/load
- **Calculation Method**
  - Winter ELCC
    - Santee Cooper resource adequacy risk is in the winter
    - Capacity value is determined for a given test resource by iteratively adding load until LOLE reliability metric returns the system to its prior state without the test resource

# ELCC Methodology



# Marginal vs. Average ELCC

## Average ELCC

Performed as part of Monte Carlo simulation

**Resource Class** is added to system at 0.1 LOLE

Load is added until system returns to 0.1 LOLE

$ELCC = \text{Resource MW} / \text{Load Added}$

**Summary:**  
Measures reliability value of entire resource class to meeting total demand

## Marginal ELCC

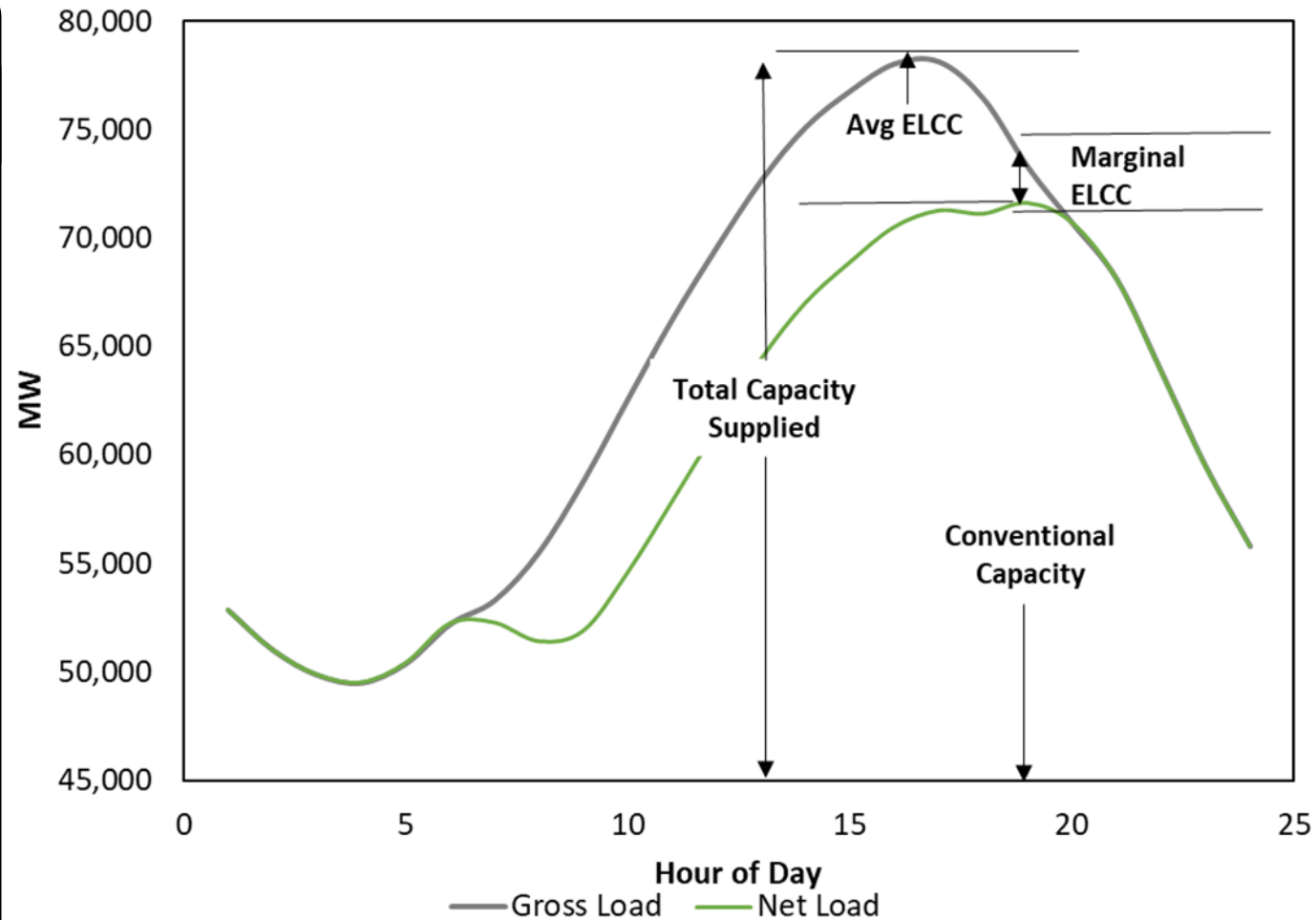
Performed as part of Monte Carlo simulation

**Single Resource** is added to system at 0.1 LOLE

Load is added until system returns to 0.1 LOLE

$ELCC = \text{Resource MW} / \text{Load Added}$

**Summary:**  
Measures reliability value of single resource to meeting net demand (after all other resources)

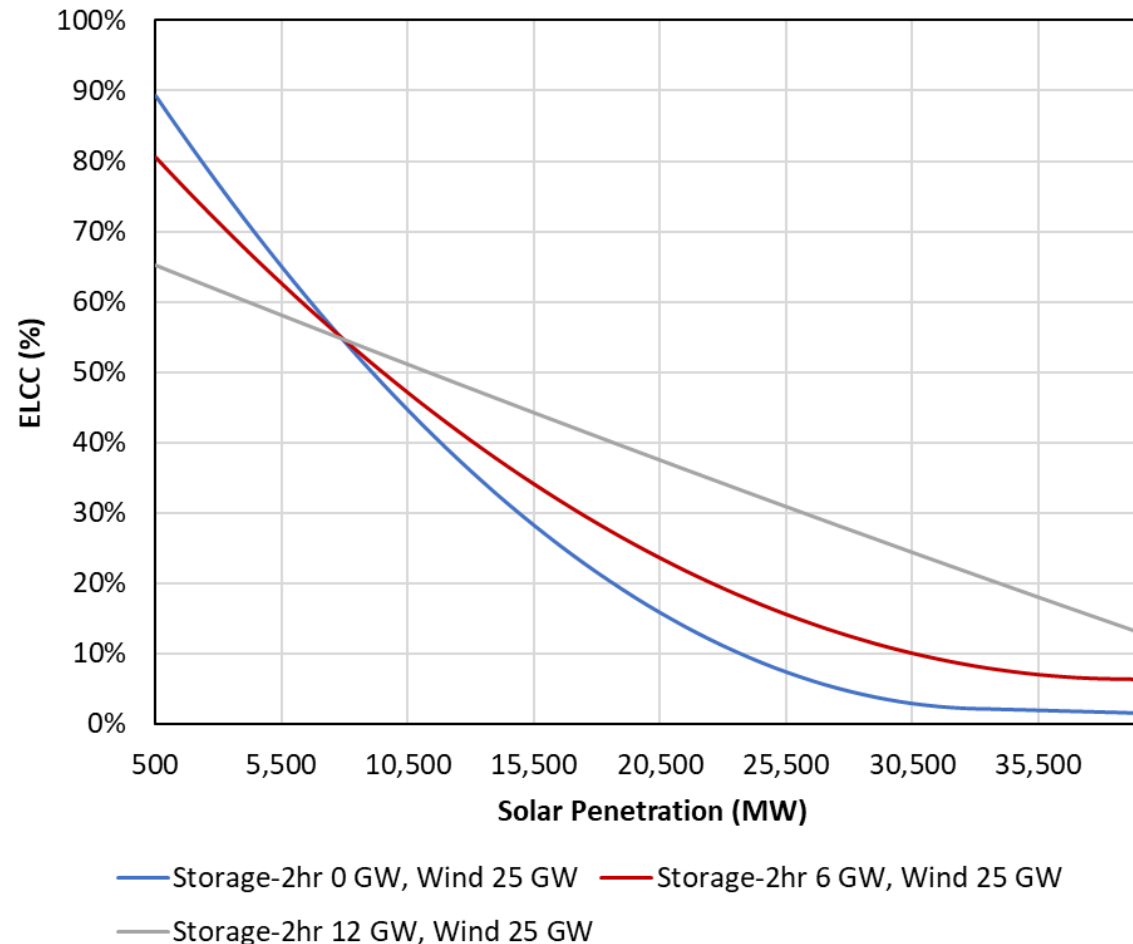




## Synergy Between Resources

- In this illustrative example, the solar marginal ELCC increases as 2hr storage is added in tranches.
- Indicates that solar gets increasing value as more storage is added to the system.
- Needs to be accounted for in the IRP process.
- Our ELCC surface methodology allows for this to be analyzed.

Solar Marginal ELCCs



\*Illustrative



**BREAK**

Returning at 2:45 pm



# Effective Load Carry Capability Update Continued

Joel Dison, Technical Manager  
Astrape Consulting

# Scope of Work

- Focus was to expand solar/storage ELCC work compared to 2023 IRP
  - Simulate the following solar/storage matrix to determine ELCC of given portfolio.
  - Use the results to calculate any resource mix within the bound of the matrix using Astrapé's interpolation/integration method.
  - Ensures synergistic value between solar and storage is captured
  - Allows calculation of both average and marginal ELCC for any desired portfolio

0 MW Wind		Installed 4hr					
		0 MW	250 MW	500 MW	1,000 MW	1,500 MW	2,000 MW
Installed Solar	0 MW		X	X	X	X	X
	500 MW	X	X		X		X
	1,000 MW	X		X		X	
	2,000 MW	X	X		X		X
	3,000 MW	X		X		X	
	4,000 MW	X	X		X		X

- Similar methodology will be used to develop ELCC values for 8-hr battery and wind

# Illustrative Example of Results

- Indicative results for **Solar Average Winter ELCC** values and are subject to change

Solar Avg ELCC Values		Installed 4hr					
		0 MW	250 MW	500 MW	1,000 MW	1,500 MW	2,000 MW
Installed Solar	0 MW						
	500 MW	3.5%	4.1%	4.8%	6.2%	7.7%	9.2%
	1,000 MW	2.9%	3.3%	3.8%	4.9%	5.9%	6.8%
	2,000 MW	2.0%	2.3%	2.6%	3.1%	3.6%	4.1%
	3,000 MW	1.6%	1.8%	1.9%	2.3%	2.6%	3.0%
	4,000 MW	1.3%	1.4%	1.5%	1.8%	2.0%	2.2%

- Similar tables will exist for 4-hr battery, 8-hr battery, and wind



# Major Assumptions for the 2024 Annual IRP Update

Bob Davis, Executive Consultant  
nFront Consulting

# Economic and Financial

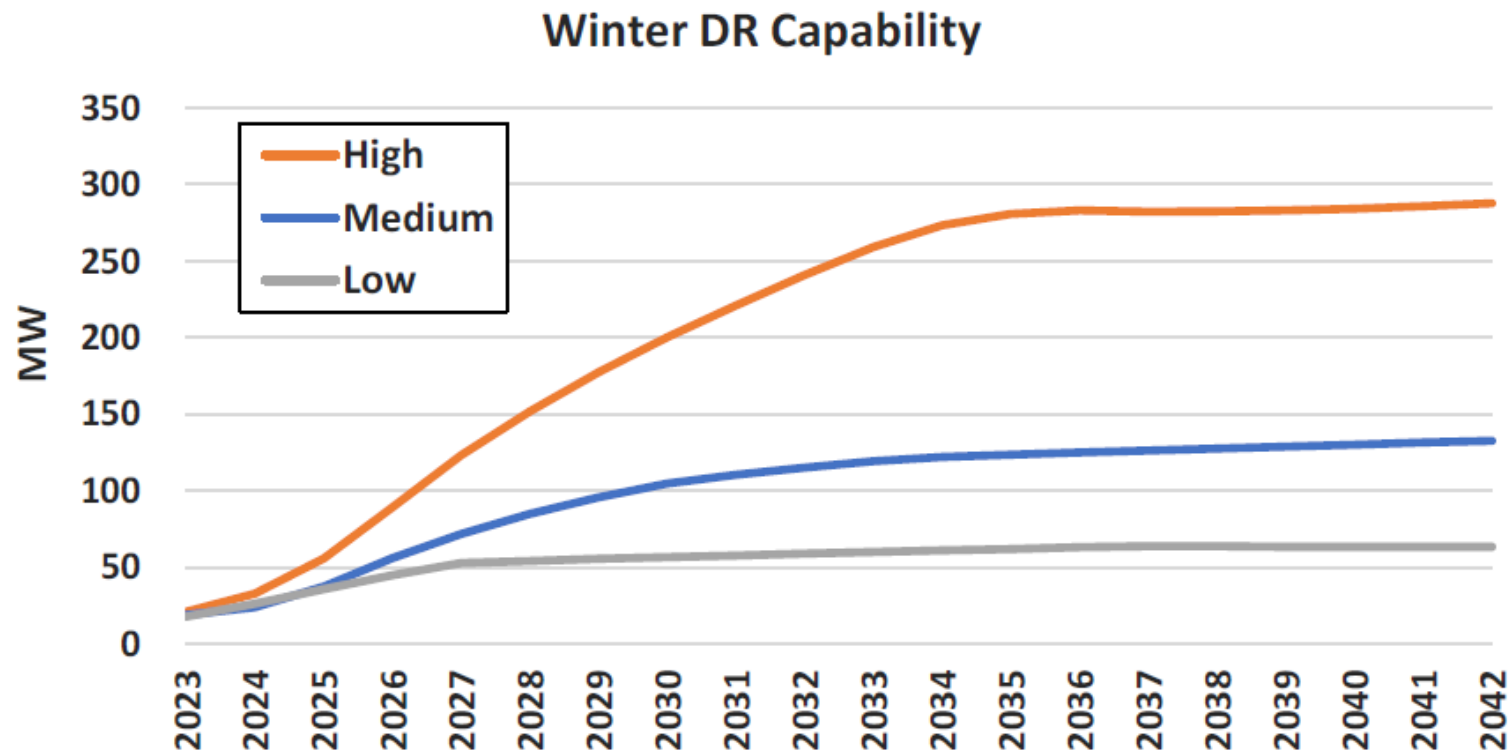


Assumption	Annual Rate	Source
Santee Cooper Weighted Cost of Debt	5.00%	Santee Cooper's financial advisor
Weighted Cost of Short-term Commercial Paper	5.00%	Santee Cooper's financial advisor
Santee Cooper Discount Rate	5.00%	Same as weighted cost of debt
General Inflation Rate	2.30%	Philly Fed survey



# Demand Side Management

- Utilizing the same projections assumed in the 2023 IRP from the 2022 Demand Response (DR) and Energy Efficiency (EE) Market Potential Studies (MPS)



# Planning and Operating Reserves

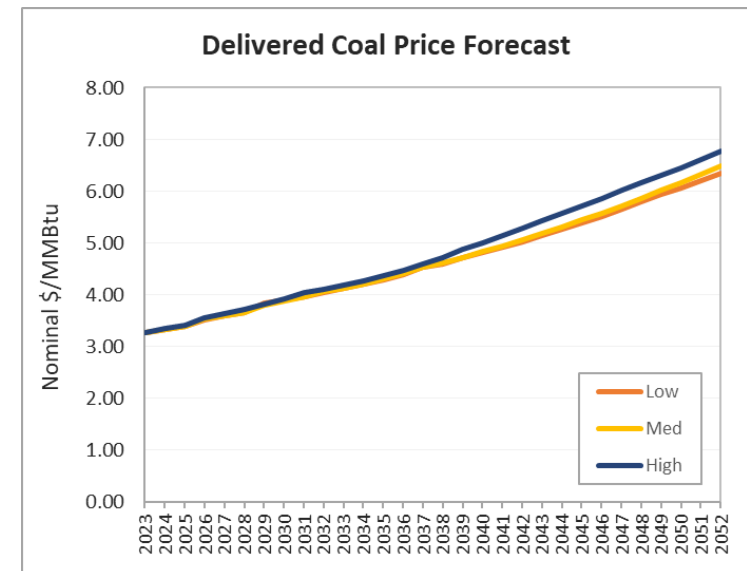
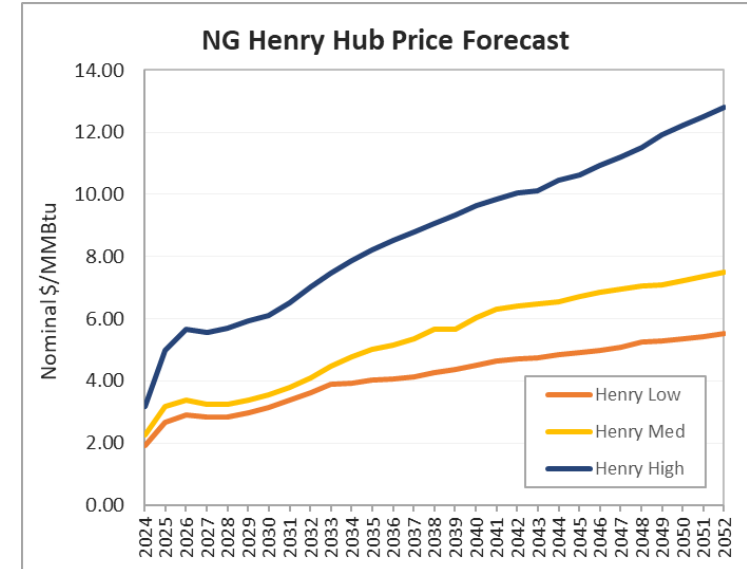


- Utilizing the Planning Reserve margins from the 2023 IRP of 18% Winter and 15% Summer
- Santee Cooper is part of the Carolinas Reserve Sharing Group (“CRSG”) along with Duke Energy Carolina, Duke Energy Progress, and Dominion Energy South Carolina
  - Contingency reserves are recalculated annually or when there is a material change to the Most Severe Single Contingency (MSSC)
  - Each participating member is required to carry its load ratio share of the total contingency reserve requirement for the combined systems based on the previous year’s peak load
  - Currently, Santee Cooper is required to carry 235 MW of contingency reserves as part of the CRSG agreement

Operating Reserves	MW
CRSG Requirement	235
Spin Reserves	117.5
Non-Spin Reserves	117.5

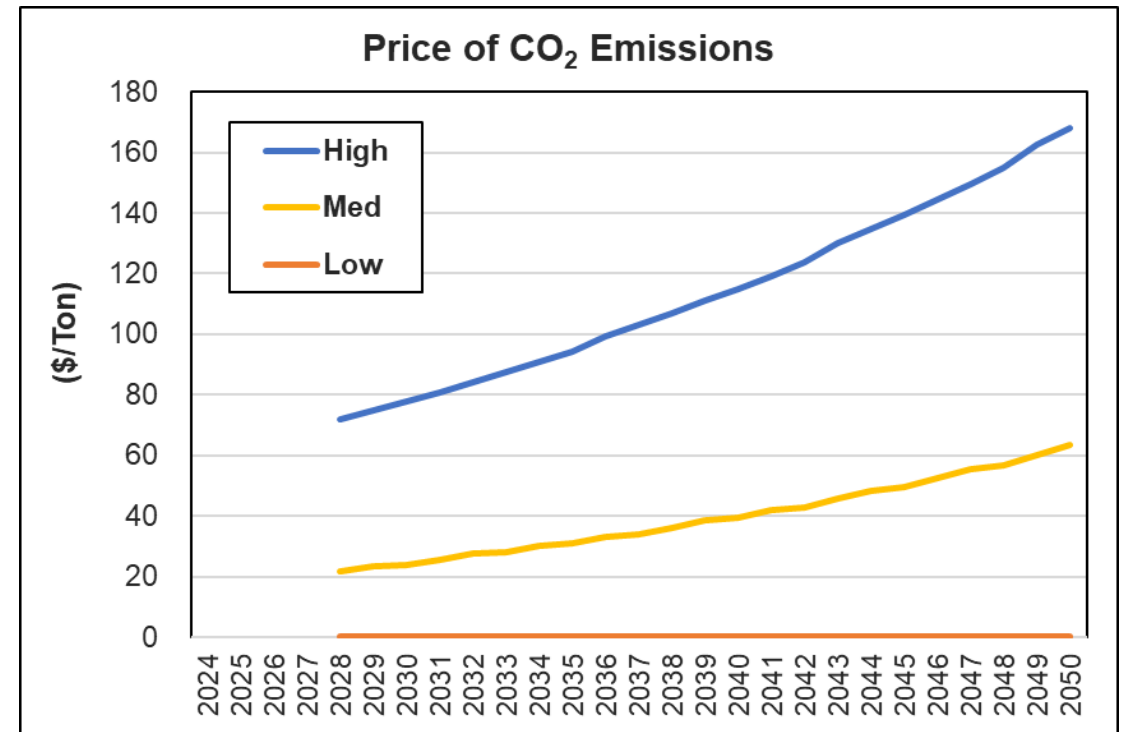
# Fuel Price Forecasts

- Fuel Price Forecast for 2024 IRP Update
  - Similar process as used for 2023 IRP
  - Fundamental long-term price forecasts for Natural Gas (NG) and coal derived from Energy Information Administration (EIA) Annual Energy Outlook
  - NG prices for 2024-2026 based on CME/NYMEX forward prices
  - NG hub basis from S&P Platts forecast
  - VC Summer nuclear price based on official DESC forecast
- Updated Fuel Prices Compared to 2023 IRP
  - NG medium price forecast
    - Initially lower through 2034
    - Similar 2035 - 2039
    - Slightly higher for 2035-2052 (avg. \$0.27 higher)
  - Coal prices are lower over the study period (avg. \$0.92) lower












# CO<sub>2</sub> Pricing

- Assumptions for price of CO<sub>2</sub> emissions are unchanged from 2023 IRP
  - No CO<sub>2</sub> Cost assumption used in the Reference Case
  - Medium and High CO<sub>2</sub> price assumptions are based on estimates of the social cost of CO<sub>2</sub> released in February 2021 by the Interagency Working Group on Social Cost of Greenhouse Gases established by Executive Order of the President



# Existing Resources

Generating Station	Unit #	Service Date	Fuel Type	Technology	Winter Rating (MW)
 <b>Cross</b> Pineville, SC	1	1995	Coal	ST	585
	2	1983	Coal	ST	570
	3	2007	Coal	ST	580
	4	2008	Coal	ST	595
 <b>Rainey</b> Iva, SC	1	2002	NG	CC	520
	2A, 2B, 3-5	2002 - 2004	NG	CT	630
 <b>Winyah</b> Georgetown, SC	1	1975	Coal	ST	280
	2	1977	Coal	ST	290
	3	1980	Coal	ST	290
	4	1981	Coal	ST	290
 <b>Cherokee</b> Gaffney, SC	1	1998	NG	CC	98
 <b>Summer Nuclear Unit 1</b> Jenkinsville, SC	1	1983	Uranium	NUC	322
 <b>Jefferies</b> , Lake Moultrie	1-4, 6	1942	Water	Hydro	140
 <b>Spillway</b> , Lake Marion	-	1950	Water	Hydro	2
 <b>Landfill Gas</b> (multiple sites)	-	2001 - 2011	LFG	CT, IC	26
 <b>Myrtle Beach</b>	1,2,3,5	1962 - 1976	Oil/NG	CT	65
<b>Hilton Head</b>	1-3	1973 - 1979	Oil	CT	100
<b>Total Capacity</b>					5,383

# Existing Power Purchase Agreements



Generating Facilities	Term	Nameplate Capacity (MW)	Winter Rating (MW)	Energy Source
<b><u>Hydro and Renewable Resources</u></b>				
Domtar	Through 2028	38	38	Biomass
EDF Renewables	Through 2043	36	36	Biomass
Southeastern Power Administration (SEPA)	Indefinite	305	305	Hydro
St. Stephen Hydro <sup>1</sup>	Indefinite	84	84	Hydro
Solar Power Purchase Agreements <sup>2,3</sup>	Various	287	12	Solar
Solar RFP <sup>3</sup>	2026-2046	200	8	Solar
<b><u>PPAs</u></b>				
PPA 1	2024-2028	200	200	System
PPA 2	2024-2028	50	50	NGCC
PPA 3	2025-2028	150	150	Nuclear
PPA 4	2024 -2052	47	47	Peaking
<b><u>Central PPAs</u></b>				
Baseload	2029+	-	150	Nuclear
Intermediate	2029+	-	230	NGCC
Peaking	2029+	-	292	NGCT

<sup>1</sup> Santee Cooper anticipates taking ownership of St. Stephens by 2035.

<sup>2</sup> Solar QF contracts of varying lengths.

<sup>3</sup> Winter capacity ratings based on ELCC.

# Resource Options Near-Term



- Rainey Generating Station Power Block 1, 3/4/5 Combustion Turbine Upgrades and 2A/2B Heat Recovery Steam Generator (HRSG)
- Power Purchase Agreements (PPA) Extensions
  - Offered as resource options for 2029-2030
- No Cherokee Retirement
  - Incremental capital expenditure (CapEx) and fixed Operation & Maintenance (O&M) assumed
- Additional Near-term Capacity Options
  - Additional capacity could be met with battery energy storage systems (BESS), LM6000, or PPAs



# Resource Options Conventional & Nuclear

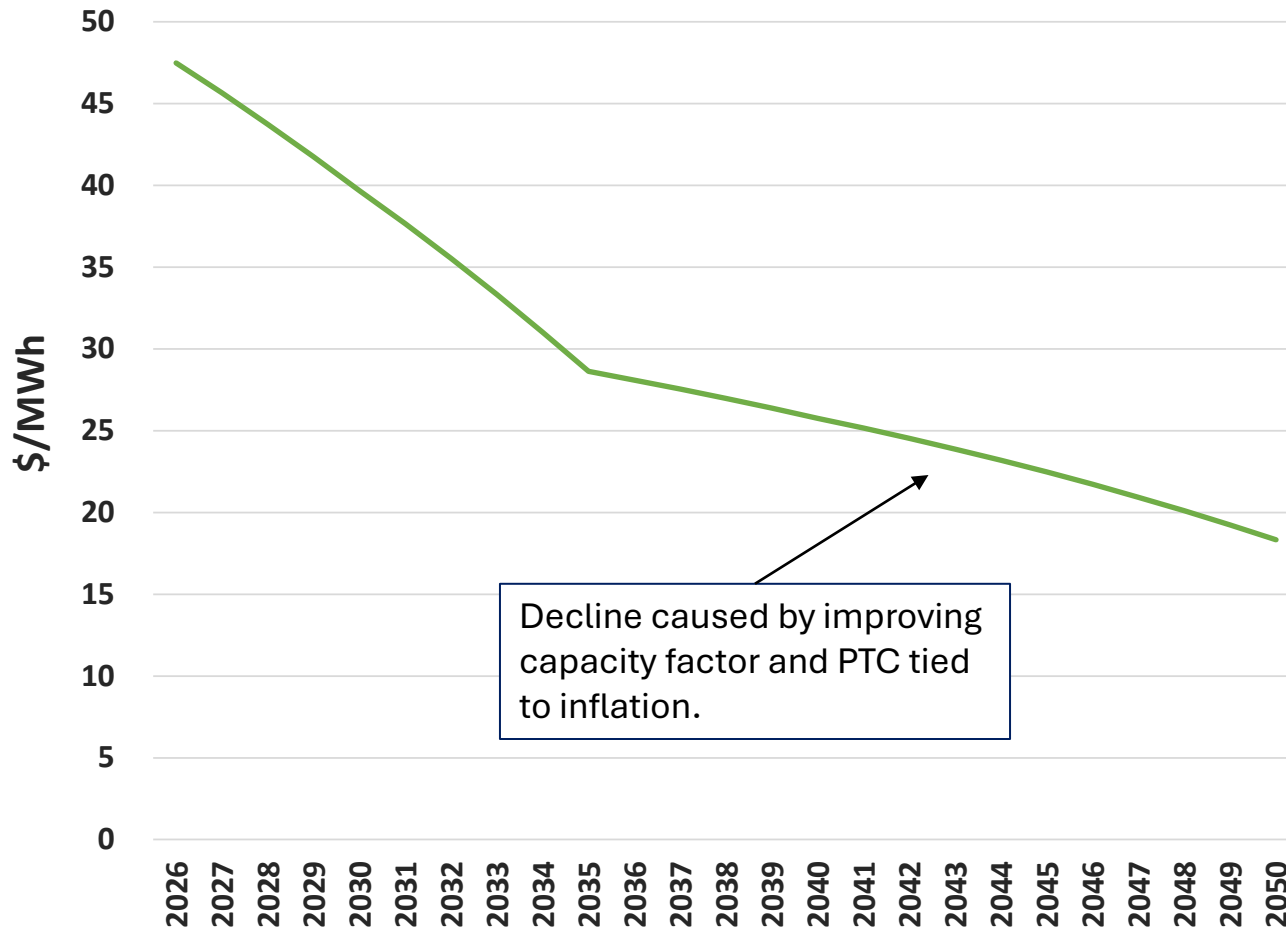


- Operating characteristics and O&M costs are consistent with 2023 IRP
  - Sources: EPRI TAGWeb, Black and Veatch Front End Engineering and Design (FEED) Study, Santee Cooper engineering estimates
- Capital Cost
  - Per-unit capital cost originally developed for use in the 2023 IRP have been adjusted to be generally consistent with per-unit costs used for the DESC 2024 IRP Annual Update
- Cost of Transmission Upgrades
  - Costs for transmission upgrades are estimated to range from approximately \$280 million to \$1.9 billion (2024\$s).

Technology	Net Capacity (MW; Avg. Ambient)	Capital Costs (\$/kW)	Fixed O&M Cost (\$/kW-yr)	Variable O&M Cost (\$/MWh)	Full Load Heat Rate (Btu/kWh)	Year First Available
Combined Cycle (2x1; H-class)	1,264	1,278	5.16	2.85	6,116	2031
Combined Cycle (2x1; H-class) Shared Resource	632	1,278	5.16	2.85	6,116	2031
Combined Cycle (1x1; H-class)	630	1,627	7.77	2.85	6,136	2031
Combined Cycle (1x1; F-class)	357	2,512	11.75	3.30	6,668	2031
Combustion Turbine (H-class)	402	1,569	5.10	9.80	9,386	2031
Combustion Turbine (F-class)	230	1,732	8.18	8.97	10,188	2031
Aeroderivative Turbine (LM6000)	40	2,484	46.55	11.30	9,346	2028
Small Modular Nuclear Reactors	683	6,681	101.51	12.38	10,900	2040

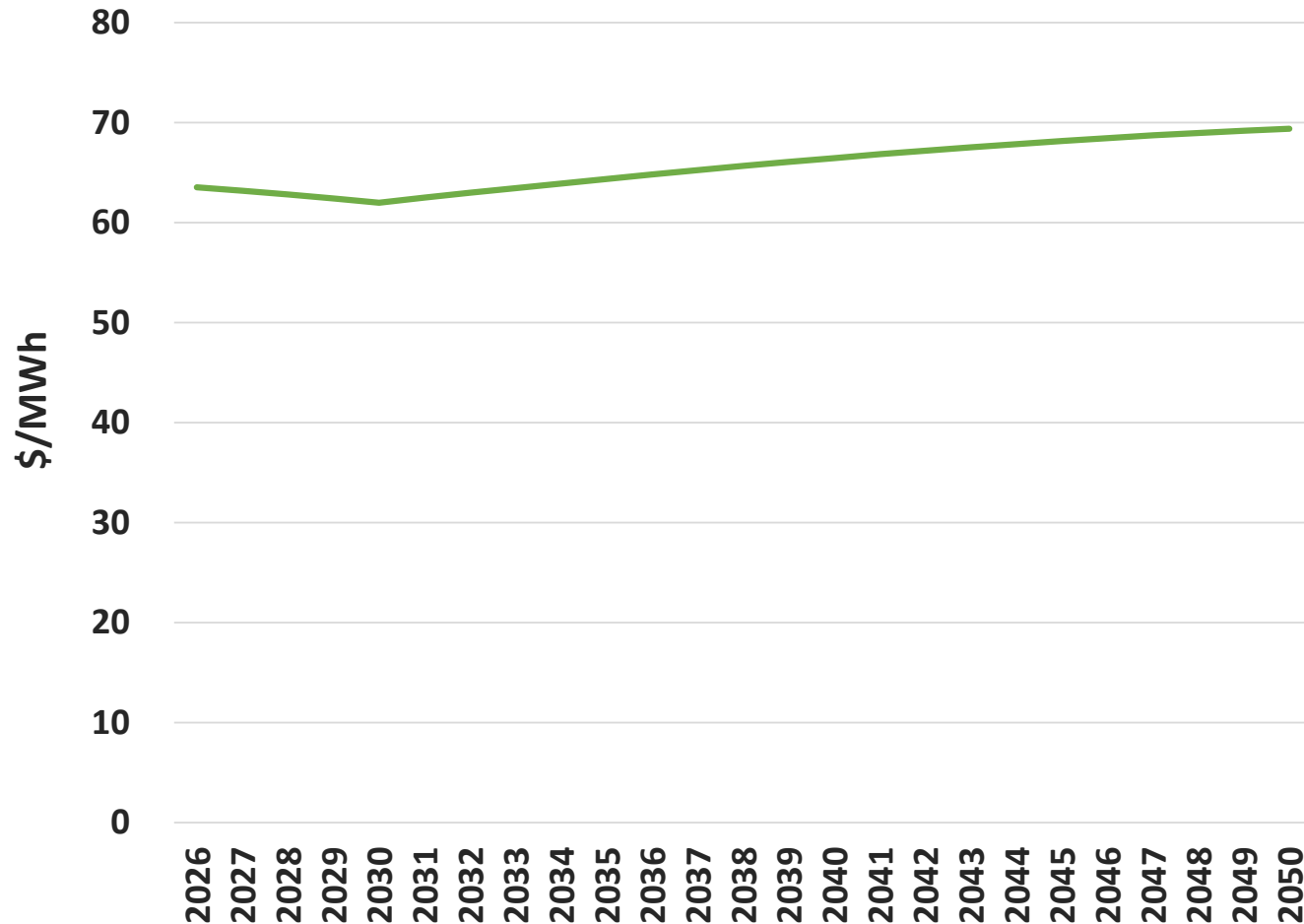
\* Capital and O&M costs in 2024 \$s.  
 \*\* Capital costs include costs for land; interconnections for transmission, natural gas, and water; and financing issuance costs and interest during construction.

# Utility-Scale Solar PV (Class 5)



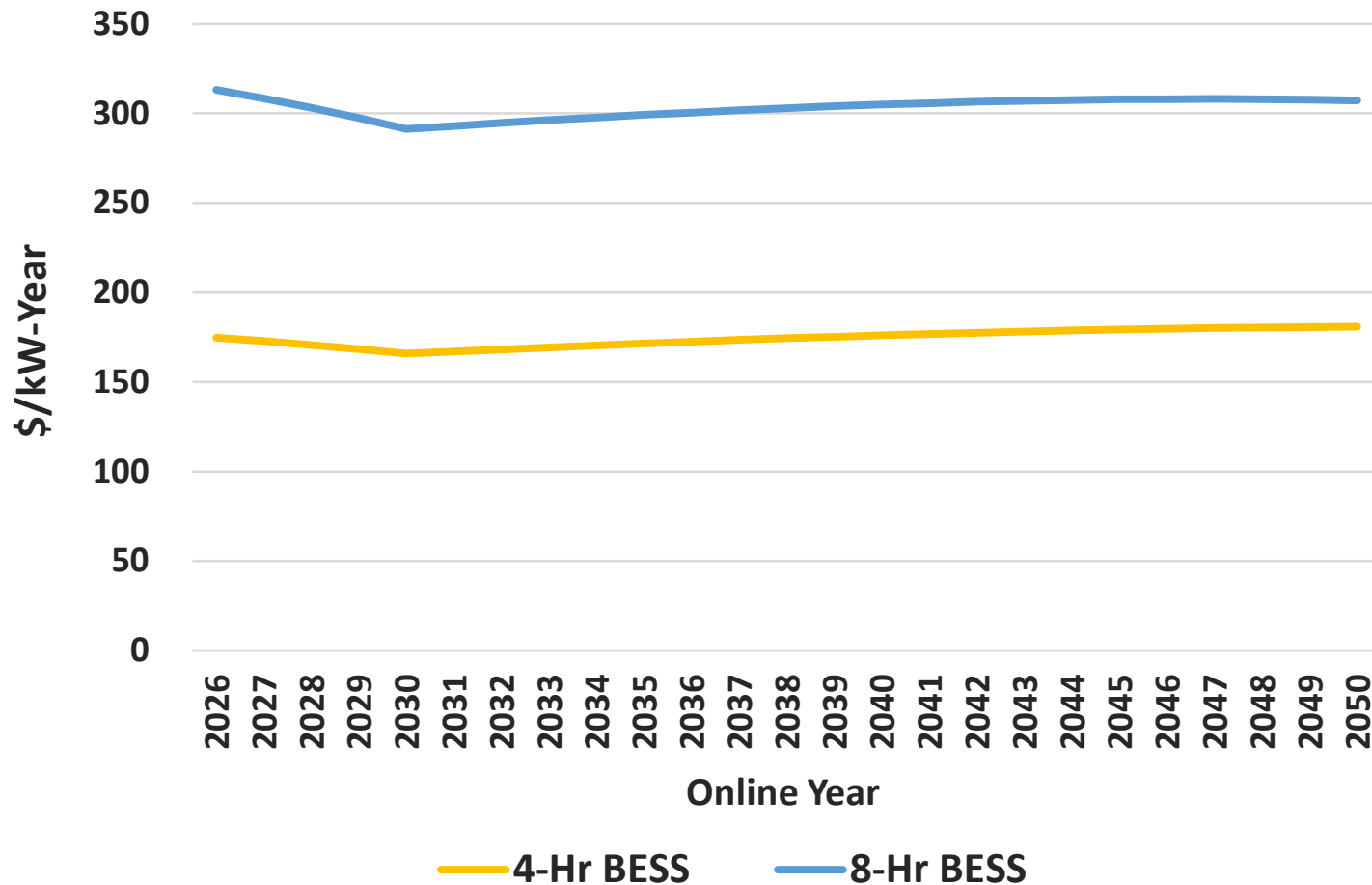
- Updated for National Renewable Energy Lab (NREL) 2023 Annual Technology Baseline (ATB), reflecting:
  - More gradual cost decline through 2035
  - Higher capacity factor
- Levelized Cost of Energy (LCOE) assumes Inflation Reduction Act (IRA) will continue through end of IRP study period
  - 2023 ATB reflects IRA phase out in early 2040s
  - Latest indications from NREL is that 2024 ATB will reflect a phase-out no earlier than late 2040s
- Capital costs reflect 10% cost adder based on NREL 2023Q1 Benchmark
- Production tax credits (PTC) assumed for all years
- LCOE reflects tax credit sale at 90% of tax credit value

# Onshore Wind (Class 9)



- Updated for 2023 ATB, reflecting:
  - Capacity factor increase for wind resource classes 8-10
  - Cost decline in 2024 with shallower cost decline curve through 2030
- Capital and O&M costs adjusted upward by 34% and 14%, respectively, based on EPRI TAGWeb estimates for wind installations in the Southeast U.S. and uncertainty allowance for facilities in S.C. (consistent with assumptions used for 2023 IRP)
- Production tax credit is assumed for all years (PTC yields lower LCOE than ITC)
- LCOE reflects tax credit sale at 90% of tax credit value

# Battery Energy Storage Systems



- Updated for 2023 ATB, reflecting 10%+ higher cost than used for 2023 IRP
- Battery Energy Storage Systems (BESS) facilities assumed to have 20-year life
- 90% of facility cost is assumed to be eligible for investment tax credit
- Levelized Cost of Capacity (LCOC) reflects tax credit sale at 90% of tax credit value

# Resource Availability Assumptions



## Year First Available by Resource Option

Resource Option	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041+
Utility-Scale Solar PV <sup>1</sup>	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
Battery Energy Storage System	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
Rainey Upgrades			█	█	█	█	█	█	█	█	█	█	█	█	█	█
Aeroderivative Turbine			█	█	█	█	█	█	█	█	█	█	█	█	█	█
Onshore Wind <sup>2</sup>				█	█	█	█	█	█	█	█	█	█	█	█	█
Combined Cycle						█	█	█	█	█	█	█	█	█	█	█
Combustion Turbine						█	█	█	█	█	█	█	█	█	█	█
Offshore Wind															█	█
Small Modular Reactor															█	█

<sup>1</sup> Utility-scale solar PV resources can be added in increments of up to 300 MWs per year.

<sup>2</sup> Onshore wind resources can be added in increments of up to 100 MWs per year.



**BREAK**

Returning at 4:10 pm





# Portfolios, Sensitivities, and Metrics for the 2024 Annual IRP Update

Clay Settle, Manager Resource Planning  
Santee Cooper

# Modeling Strategy Summary



## 2024 IRP Update

Update the Commission about how recent changes in market conditions and modeling assumptions affect the Preferred Portfolio recommended through the 2023 IRP

### Portfolios

- 2023 IRP Preferred Portfolio (updated for new market conditions and assumptions)
- Newly Optimized Portfolio (derived under new market conditions and assumptions)
- GHG Portfolio (meeting requirements of the recently filed EPA GHG Rule)

### Portfolio Side Case

- Self-build NGCC

## Reference Case

A business-as-usual case that assumes the EPA's recent Greenhouse Gas (GHG) regulation is stayed

- Retire Winyah as planned by 2031
- Retire MB and HH CTs by 2034

## EPA GHG Case

Assume EPA's recent GHG Rule is implemented as currently filed

- Retire Winyah and MB/HH consistent with Reference Case
- Retire Cross by 2032
- Limit new CCs and H-class CTs to 40% CF
- Limit other new CTs to 20% CF

## Sensitivity Analyses

- Load Forecast
- Fuel Prices

# Portfolio Evaluation Metrics



- Metrics evaluated for the 2023 IRP
  - Net Present Value (NPV) Power Costs
  - Mini-max Regret
  - Reliability Uncertainty
  - Fixed Cost Obligations
  - Fuel Cost Resiliency
  - CO2 Emissions
  - Generation Diversity
  - Clean Energy
  - Load Uncertainty
  - Average Cost / Rate Impact
- For the 2024 IRP Update, Santee Cooper will continue to evaluate and report on these metrics when possible

# Modeling the Greenhouse Gas Rule



- Final version effective July 8, 2024 for the greenhouse gas rule (GHG) under Section 111(b) of the Clean Air Act to regulate CO<sub>2</sub> emissions from new and reconstructed combustion turbines
- Existing coal combustion units
  - Retire by end of year 2031 to be exempt
  - Operation beyond 2032 through end of year 2038
    - Requires a 40% co-fire with natural gas
    - New NG pipeline construction and reservation for approximately 560 kDT to serve the Cross plant is not currently viewed as practical
  - Operation beyond 2039 requires carbon capture and sequestration (CCS) technology
- New or reconstructed combustion turbine units (simple and combined cycle)
  - Base Load (CF >40%) - CCS by 2032 (currently unavailable in South Carolina)
  - Intermediate Load (CF 20% to 40%) - Highly efficient CC/CT (< 1,170 lb CO<sub>2</sub>/MWh)
  - Low Load (CF less than 20%) - Use of low-emitting fuel (< 160 lb CO<sub>2</sub>/MMBtu)
- Existing combustion turbines (simple and combined cycle) are not addressed in the final rule



# Meeting Closeout

Stewart Ramsay, Meeting Facilitator  
VANRY Associates

## Any questions we haven't answered today?

- Comments can be provided:
  - IRP Stakeholder Forum - provide comments, feedback, and post documents at [www.santeecooper.com/IRP](http://www.santeecooper.com/IRP)
  - [SanteeCooperIRP@vanry.com](mailto:SanteeCooperIRP@vanry.com) - for thoughts and input on meeting structure and engagement
- Meeting summaries and other materials will be posted and made available at [www.santeecooper.com/IRP](http://www.santeecooper.com/IRP)



# Were Meeting Outcomes Achieved?



- Provide a reminder of the IRP process, the 2023 IRP filing, and the preferred portfolio
- Provide updates on current and future planning initiatives and share how you can contribute now through 2026
- Confirm our statutory requirements, specifically around annual updates
- Provide an update on our base assumptions from the 2023 IRP, to be used in the 2024 Update
- Share the portfolios that are being studied for the 2024 Update
- Give you the opportunity to comment and ask questions

We would like to hear from you about  
your experience at this session.

**Please complete our survey**  
that will appear in your browser as you leave the meeting

**Thank you!**

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