CenterPoint Energy

IRP Public Stakeholder Meeting

October 11, 2022

Welcome and Safety Share

Richard Leger
Senior Vice President Indiana Electric

Safety share

Tips to Avoid Distractions While Driving

- Make adjustments before your get underway. Address vehicle systems like your GPS, seats, mirrors, climate controls and sound systems before hitting the road. Decide on your route, and check traffic conditions ahead of time.
- Secure children and pets before getting underway. If they need your attention, pull off the road safely to care for them. Reaching into the backseat can cause you to lose control of the vehicle.
- Put aside your electronic distractions. Don't use cell phones while driving – handheld or handsfree – except in absolute emergencies. Never use text messaging, email functions, video games or the internet with a wireless device, including those built into the vehicle, while driving.
- If another activity demands your attention, instead of trying to attempt it while driving, pull off the road and stop your vehicle in a safe place. To avoid temptation, power down or stow devices before heading out.
- As a general rule, if you cannot devote your full attention to driving because of some other activity, it's a distraction. Take care of it before or after your trip, not while behind the wheel.

CenterPoint Energy

Follow Up Information From First IRP Stakeholder Meeting

Matt Rice
Director, Regulatory and Rates

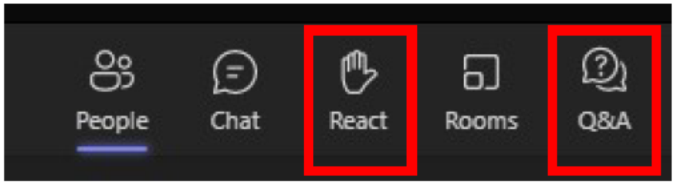
Agenda

Time		
8:30 a.m.	Sign-in/Refreshments	
9:30 a.m.	Welcome, Safety Message	Richard Leger, CenterPoint Energy Senior Vice President Indiana Electric
9:40 a.m.	Follow Up Information From First IRP Stakeholder Meeting	Matt Rice, CenterPoint Energy Director Regulatory & Rates
10:20 a.m.	All-Source RFP Update	Drew Burczyk, Consultant, Resource Planning & Market Assessments, 1898 & Co.
10:50 a.m.	Break	
11:05 a.m.	Draft Resource Inputs	Kyle Combes, Project Manager, Resource Planning & Market Assessments, 1898 & Co.
11:40 a.m.	Lunch	
12:20 p.m.	Final Load Forecast	Michael Russo, Forecast Consultant - Itron
1:05 p.m.	Probabilistic Modeling Approach and Assumptions	Brian Despard, Project Manager, Resource Planning & Market Assessments, 1898 & Co.
1:50 p.m.	Break	
2:05 p.m.	Portfolio Development	Matt Lind, Director, Resource Planning & Market Assessments, 1898 & Co.
2:35 p.m.	Draft Reference Case Modeling Update	Matt Lind, Director, Resource Planning & Market Assessments, 1898 & Co.
2:45 p.m.	Stakeholder Questions and Feedback	Moderated by Matt Lind, Director, Resource Planning & Market Assessments, 1898 & Co.
3:15 p.m.	Adjourn	

Meeting Guidelines

CenterPoint Energy

1. Please hold most questions until the end of each presentation. Time will be allotted for questions following each presentation. (Clarifying questions about the slides are fine throughout)
2. For those on the webinar, please use the "React" feature in Microsoft Teams (shown at the bottom of this page) to raise your hand if you have a question and we will open your (currently muted) phone line for questions within the allotted time frame. You may also type in questions in the Q&A feature in Microsoft Teams.
3. The conversation today will focus on resource planning. To the extent that you wish to talk with us about other topics we will be happy to speak with you in a different forum.
4. At the end of the presentation, we will open up the floor for "clarifying questions," thoughts, ideas, and suggestions.
5. There will be a parking lot for items to be addressed at a later time.
6. CenterPoint Energy does not authorize the use of cameras or video recording devices of any kind during this meeting.
7. Questions asked at this meeting will be answered here or later.
8. We will do our best to capture notes but request that you provide written feedback (concepts, inputs, methodology, etc.) at IRP@CenterPointEnergy.com following the meeting. Additional questions can also be sent to this e-mail address. **We appreciate written feedback within 10 days of the stakeholder meeting.**
9. The Teams meeting will be recorded only to ensure that we have accurately captured notes and questions from the meeting. The public meetings are not transcribed, and the recordings will not be posted to the website. However, Q&A summaries of our public meetings will be posted on www.CenterPointEnergy.com/irp.



Commitments for 2022/2023 IRP

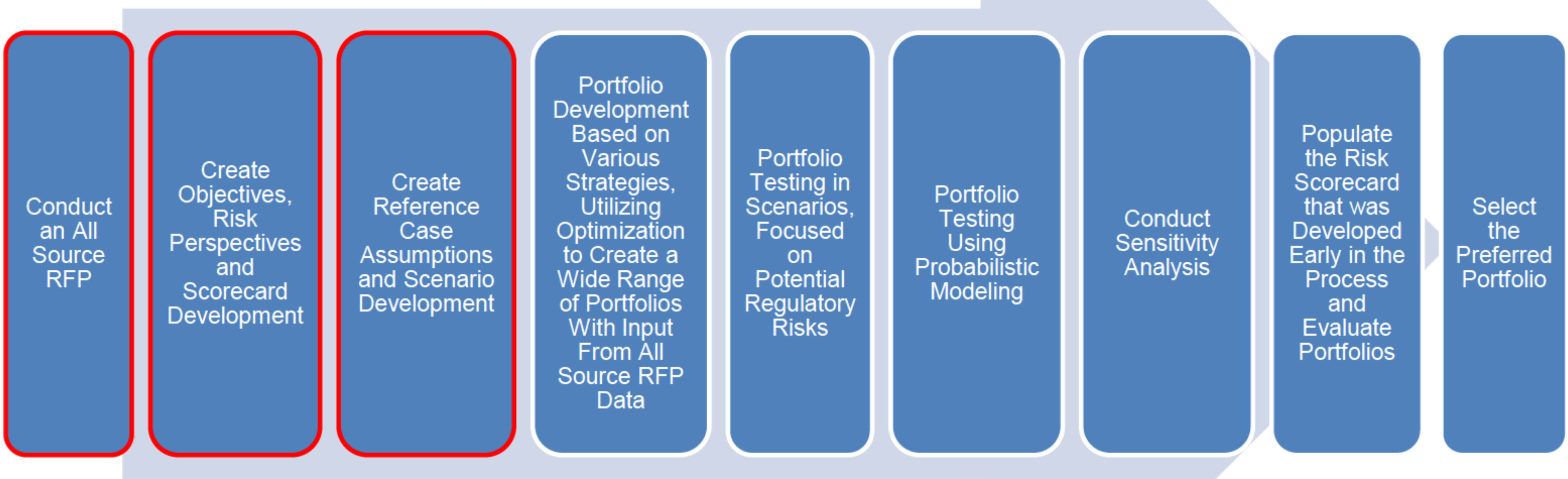
CenterPoint Energy

- ✓ Utilize an All-Source RFP to gather market pricing & availability data
- ✓ Utilize EnCompass software to improve visibility of model inputs and outputs
- ✓ Will include a balanced risk score card. Draft to be shared at the first public stakeholder meeting
- Will strive to make every encounter meaningful for stakeholders and for us
- The IRP process informs the selection of the preferred portfolio
- Work with stakeholders on portfolio development
- Will test a wide range of portfolios in scenario modeling and ultimately in the risk analysis
- Will conduct a sensitivity analysis
- Will conduct technical meetings with interested stakeholders who sign an NDA
- Evaluate options for existing resources
- The IRP will include information presented for multiple audiences (technical and non-technical)
- Will provide modeling data to stakeholders as soon as possible
  - Draft Reference Case results – October 4th to October 31st
  - Draft Scenario results – December 6th to December 20th
  - Full set of final modeling results - March 7th to March 31st

Proposed 2022/2023 IRP Process

CenterPoint Energy

Stakeholder input is provided on a timely basis throughout the process, with meetings held in August, October, December, and March



2022/2023 Stakeholder Process

CenterPoint Energy

August 18, 2022	October 11, 2022	December 13, 2022	March 14, 2023
• 2022/2023 IRP Process • Objectives and Measures • Encompass Software • All-Source RFP • MISO Update • Environmental Update • Draft Reference Case Market Inputs & Scenarios • Load Forecast Methodology • DSM MPS/ Modeling Inputs • Resource Options	• All-Source RFP Results and Final Modeling Inputs • Draft Resource Inputs • Final Load Forecast • Scenario Modeling Inputs • Portfolio Development • Probabilistic Modeling Approach and Assumptions • Draft Reference Case Modeling Results[1]	• Draft Scenario Optimization Results • Draft Portfolios • Final Scorecard and Risk Analysis • Final Resource Inputs	• Final Reference Case Modeling • Probabilistic Modeling Results • Risk Analysis Results • Preview the Preferred Portfolio

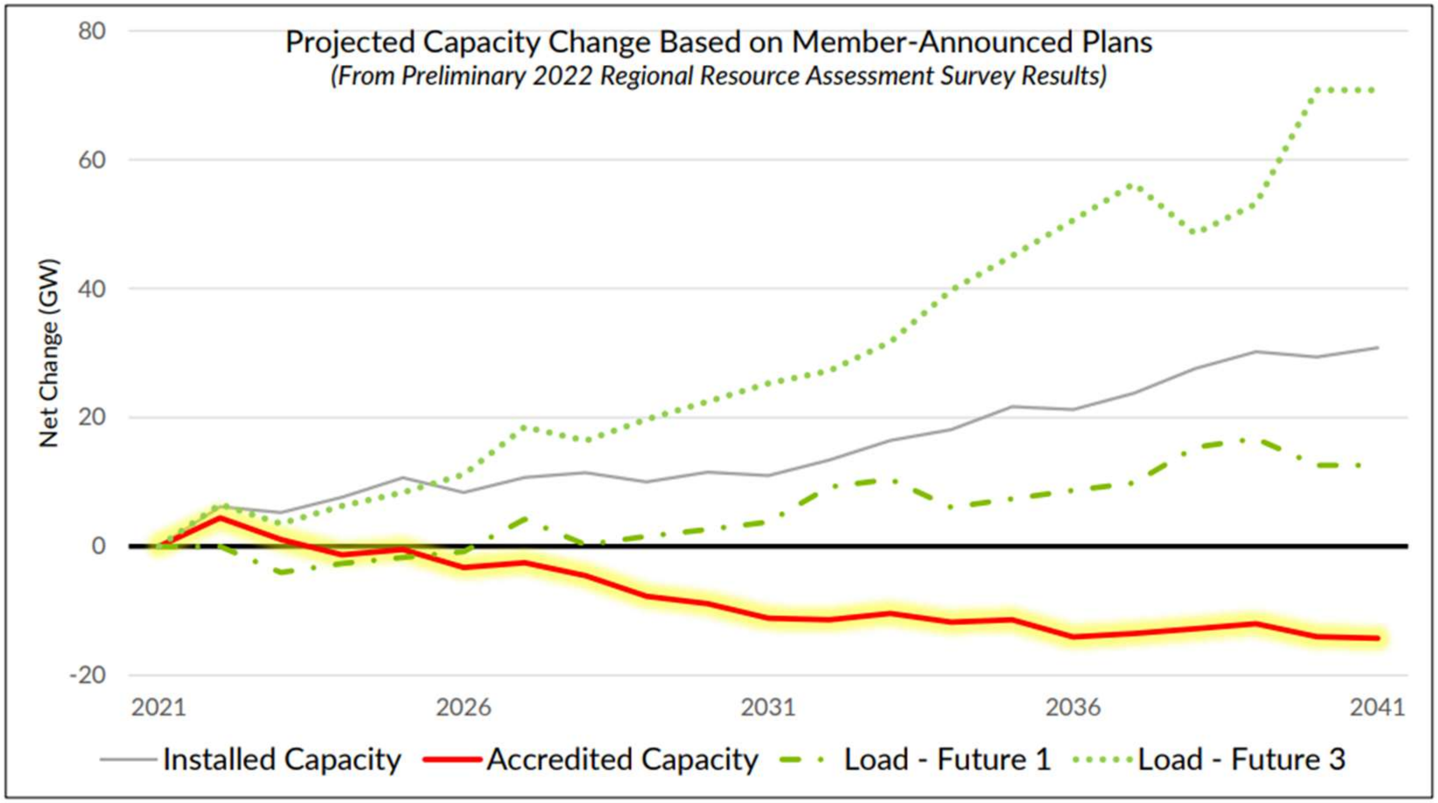
[1] Draft modeling results will be shared on a CenterPoint Energy Technical modeling call on October 31, 2022 and supplemental slides will be posted to www.centerpointenergy.com/irp.

CEI South Expects Capacity Value to Remain High,
Based on Recent MISO Communications

CenterPoint Energy

- Aggressive decarbonization strategies and accelerated policies are driving rapid change in our region
- As the evolution of the resource fleet accelerates, variability is increasing, and attributes required to reliably operate the system are diminishing
- Increased complexity is leading to an expanded scope and reprioritization across the elements of MISO's Reliability Imperative
- [MISO] must develop a coordinated transition plan to reliably navigate from the present to the future

A survey of member plans indicates accredited capacity will continue to decline, combined with increasing intermittent resources and demand



*Future projections calculated as change from Future 1 2022 load assumption

Estimated accredited capacity: 16.6% for wind; 35% for solar, 87.5% for battery, 90% for coal, 90% for gas, and 95% for nuclear

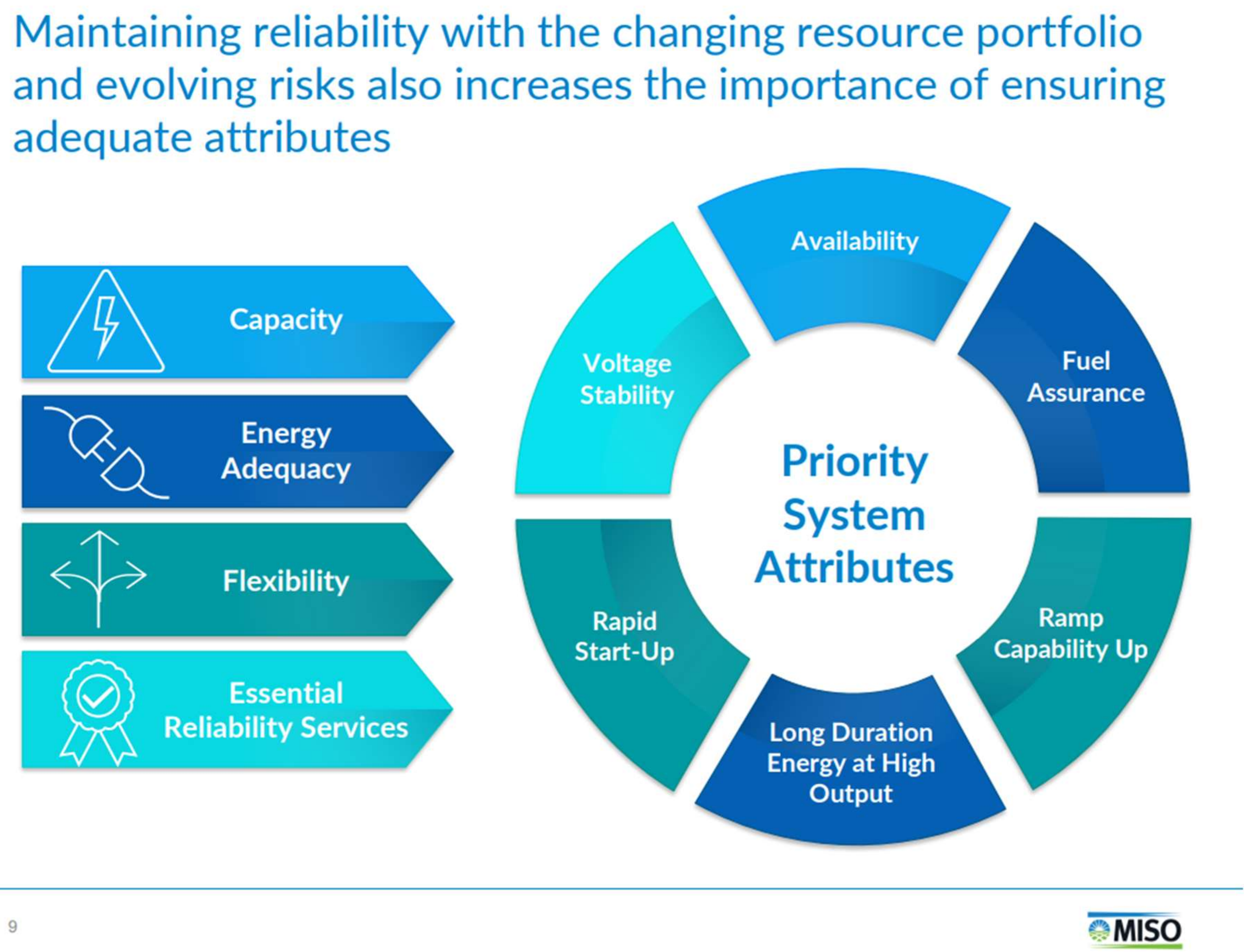
4

MISO

CTs Provide the Priority System Attributes MISO is Seeking

The region's energy landscape is evolving and will continue to evolve toward a more complex, less predictable future

- Primarily weather-dependent resources
- Risk-adjusted reserve margin requirements
- Less predictable resource outages or unavailability
- Less predictable weather
- Increasing scarcity of essential reliability attributes
- Increasing electric load
- Increasing importance of accurate load and renewable forecasting
- Focus on providing energy for the worst week in each season



Stakeholder Feedback - Resources

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Request	Response
Re-evaluate the CT's (combustion turbines) selected in the preferred portfolio of the 2019/2020 IRP	The CTs are the best resource available to ensure the reliability of the CenterPoint system, and the IURC approved their construction for that reason. CenterPoint will move forward with their construction to ensure its system remains reliable during the transition to renewables. Re-evaluating the CTs in this IRP would be a poor use of resources that CenterPoint believes could be better redirected to most efficiently perform the IRP
Allow the IRP to determine if Culley 2 retires in 2023 vs 2025	Culley 2 extension is contingent on IDEM NPDES approval. The capacity value Culley 2 is approximately $8 million at MISO Cost of New Entry (CONE). The unit is not expected to run much but helps CEIS to meet its MISO capacity obligation while new solar projects and CTs are brought online

Stakeholder Feedback - Resources cont.

Stakeholder Request	Response
Allow RFP respondents to update their proposals to account for the Inflation Reduction Act (IRA)	RFP respondents were given the opportunity to update their bids (updated results will be incorporated into the IRP)
Recommend that tax credits outlined in the Inflation Reduction Act are reflected in modeling assumptions	Updated RFP responses will be used to inform IRP assumptions
The MISO capacity price forecast only averages two vendors that converge over the planning period. Suggest scenario analysis rather than averaging the two forecasts so capacity price doesn't influence the resource build	Capacity prices are expected to remain high. During the portfolio development and capacity expansion phases of the modeling, the model will not allow revenues for excess capacity sales.
Provide stakeholders with access to RFP bid information	RFP bids will be shared using a process similar to past RFPs (requires NDA)
Provide a better understanding of how ACE proxy will be included	BAU Culley 3 assumes about $30M in efficiency upgrades. Based on efficiency studies conducted for the 2019/2020 IRP

Stakeholder Feedback - Resources cont.

CenterPoint Energy

Stakeholder Request	Response
Incorporate MISO's seasonal construct into the modeling analysis	The seasonal construct will be the basis for resource adequacy requirements, including seasonal accreditation for resources and seasonal planning reserve margin requirement
Consider the resource screening analysis to determine if some thermal options (supercritical and ultra-supercritical coal) should be removed as resource options to the model	CenterPoint will consider pending additional feedback from other stakeholders and model runtime. Screening may include more than coal resources
Consider modeling longer duration lithium ion (longer than 4 hours)	The tech assessment includes a long duration storage option. Also, the model will have the ability to select multiple blocks of 4-hour lithium-ion storage. There are limited economies of scale associated with moving from 4-hour to longer duration lithium-ion

Stakeholder Feedback - Resources cont.

Stakeholder Request	Response
Provide a better understanding of how ACE proxy will be included	BAU Culley 3 assumes about $30M in efficiency upgrades. Based on efficiency studies conducted for the 2019/2020 IRP

Stakeholder Feedback - Score Card

Stakeholder Request	Response
Use cumulative CO_2 equivalent emissions as a measure of environmental sustainability	CO_2 equivalent (stack emissions) will be added to the scorecard along with CO_2 intensity
Include a metric on the scorecard that quantifies whether resources in each portfolio are located in low-income or communities of color	New generation resources in the IRP analysis are not typically location specific; This is outside the scope of the IRP analysis
Add a fuel cost risk measure and objective to the scorecard	Cost Risk will be included in the scorecard, including both fuel risk and 95% percentile cost risk

Stakeholder Feedback - Score Card cont.

Request	Response
Add a metric to the scorecard that looks at the cost burden by census tract and could account for the bill impacts of community solar projects that could be placed in those communities	The IRP does consider energy cost by evaluating PVRR and fuel cost risk. Project location is generally outside the scope of the IRP analysis but is considered during project selection during which site-specific benefits are vetted. While outside the scope of the IRP, community solar should be compared with other potential assistance programs to determine which is more effective for providing bill assistance to low-income customers. Note that RFP responses did not include any community solar bids

Updated IRP Draft Objectives & Measures

Updates from the last meeting are shown in red

Objective	Potential Measures	Unit
Affordability	20 Year NPVRR	$
Cost Risk	Proportion of Energy Generated by Resources With Exposure to Coal and Gas Markets and Market Purchases 95% Value of NPVRR	% $
Environmental Sustainability	CO_2 Intensity CO_2 Equivalent Emissions (Stack Emissions)	Tons CO_2e/kwh Tons CO_2e
Reliability	Must Meet MISO Planning Reserve Margin Requirement in All Seasons Spinning Reserve\Fast Start Capability	UCAP MWs % of Portfolio MW's That Offer Spinning Reserve\Fast Start
Market Risk Minimization	Energy Market Purchases or Sales	%
	Capacity Market Purchases or Sales	%
Execution	Assess Challenges of Implementing Each Portfolio	Qualitative

Stakeholder Feedback - DSM

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Request	Response
In the high regulatory scenario EE costs shouldn't increase but should be equal to the reference case or go down and additional EE should be available to select	A high regulatory scenario in which either codes & standards or carbon prices increase, this erodes away savings and increases the acquisition costs of energy efficiency savings. Decarbonization / Electrification scenario will potentially capture high-cost EE bins
Several questions regarding MPS and DSM	Will be addressed in separate meetings with CAC
Incorporate more than proposed 10-20 MWs of Industrial DR	CEI South will include 25 MWs of industrial DR as a resource. Currently, CEI South does not have any industrial DR customers.

Stakeholder Feedback - DSM cont.

Request	Response
MPS was inconsistent with the IRP in that the avoided cost of carbon regulation was not included which results in lower savings	Although including carbon cost in cost-effectiveness test may increase the savings potential, Indiana only recognizes the TRC (Total Resource Cost) as the cost-effectiveness test to implement non-low-income programs.
CenterPoint has not made available MPS & IRP modeling files	All modeling files were provided after incorporating feedback from CAC on 9/23/22
CenterPoint should include EE bundles that included an "enhanced RAP"	CenterPoint has now included an "enhanced RAP" for commercial

Stakeholder Feedback - DSM cont.

Request	Response
CenterPoint should adjust inflation for low-income bundles to allow this non-selectable bundle to include higher short-term inflation rates	CenterPoint has made this adjustment
CenterPoint should include more emerging technology in MPS similar to Consumers Energy	CenterPoint MPS does include emerging technology and will also leverage flex funding to capture emerging technology in future action plans
CenterPoint should include demand response using the same methodology as AES	CenterPoint has adopted the AES methodology and DR is now aligned with peers to incorporate indicative TOU pilots
Implement residential rate programs (critical peak piecing, TOU, etc.) soon	Plan to evaluate in the future through a pilot

Stakeholder Feedback - Inputs

Stakeholder Request	Response
Several questions regarding load forecast	Will be addressed later in this presentation
Provide data inputs and modeling files to stakeholders	CenterPoint is targeting to provide modeling information according to the schedule outlined in the first stakeholder meeting
Stakeholder concern that the reference case forecasts for natural gas and coal prices are underestimating the cost of these fuels and their potential volatility	The stochastic analysis will vary coal and natural gas prices to capture potential volatility
The reference case forecasts for coal and natural gas prices show a decline in the near term	These assumptions will be updated as new forecasts are available. Included in appendix
Recommendation to utilize Henry Hub futures in the near term to better align with current market conditions	CenterPoint is considering using NYMEX futures in the near term and will adjust long-term forecasts as available. See appendix for forecast schedule and NYMEX.

Stakeholder Feedback - Inputs cont.

Stakeholder Request	Response
In future meetings discuss resource constraints applied to the EnCompass model and ELCC curves for renewables and battery storage resources	Development of ELCC curves will be discussed in this meeting along with constraints
Coal prices should be higher than the reference case in the high regulatory scenario (not the same as the reference case)	Coal prices will be updated to be higher than reference case in the high regulatory scenario
Stakeholder concern that sustained high fuel costs are possible but the reference case does not take this into consideration	This will be captured in the scenario analysis. The Continued High Inflation & Supply Chain Issues scenario includes a coal and natural gas price forecast higher than the reference case

Stakeholder Feedback - Analysis

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Stakeholder Request	Response
Several questions were asked around stochastic modeling	Will be discussed later in today's presentation
Implement distribution system planning (FERC Order 2222) into IRP modeling	CenterPoint continues to monitor the level of distributed resources on its distribution system. The current level of penetration does not warrant this level of detailed analysis at this time but could be evaluated in a future IRP analysis. Additionally, MISO is currently planning to incorporate FERC Order 2222 into its processes in 2030 pending FERC approval. As more information becomes available from MISO it can help shape how this analysis should be performed

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Q&A

All-Source RFP Update

Drew Burczyk
Consultant, Resource Planning & Market Assessments
1898 & Co.

RFP IRA Updates

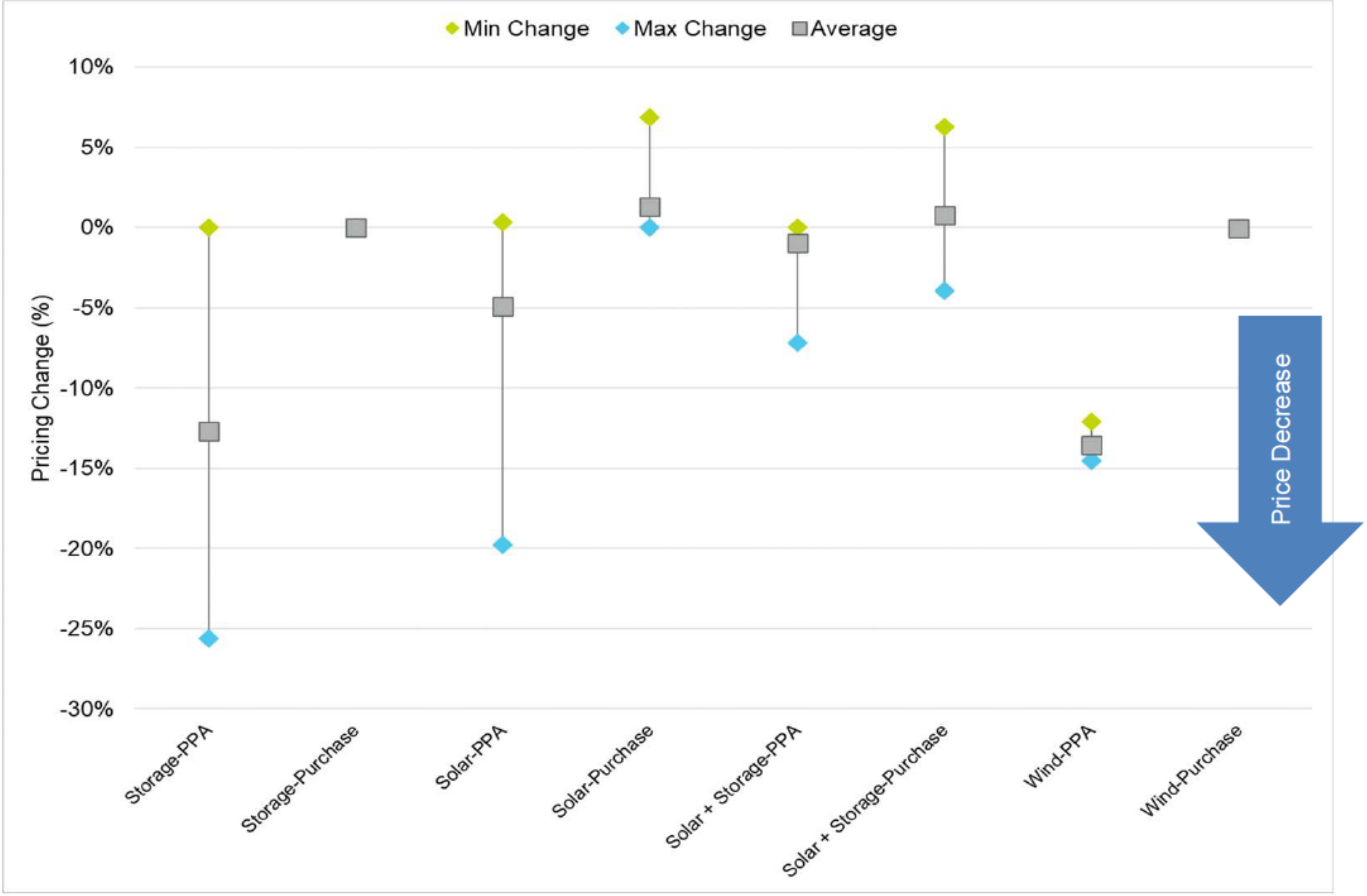
- The Inflation Reduction Act was signed into law August 16th.
- Stakeholder Meeting 1 occurred August 18th.
- Agreed with feedback and comments made during the Stakeholder meeting that updated costs from IRA could impact IRP modeling.
- August 23rd reached back out to bidders asking for updated pricing.
- This has delayed draft modeling results; A technical call to discuss draft results has been scheduled for October 31st with those that have signed a NDA. Supplemental slides will be posted to the www.CenterPointEnergy.com/irp

RFP IRA Updates

- 9 of 27 bidders submitted updated pricing to account for IRA changes.
- 77 Bids were returned with updated pricing.
  - 22 Solar bids
  - 46 Storage bids
  - 4 Wind bids
  - 5 Solar + Storage bids
- Example reasoning from bidders who did not update pricing:
  - Not applicable to proposal technology
  - Proposal pricing remains the same, offer was a BTA, tax credit would be monetized by CenterPoint
  - Benefits of IRA are offset by inflation and shortage in labor market

Pre vs Post IRA Pricing

Wide range of changes within certain technology groups. At a high level, the updated pricing received is not a 1:1 equivalent of IRA tax credit qualification.



Purchase prices do not account for tax benefits

Q&A

CenterPoint Energy

Draft Resource Inputs

Kyle Combes
Project Manager, Resource Planning & Market Assessments
1898 & Co.

MISO Seasonal Resource Adequacy

CenterPoint Energy

- MISO is moving to a seasonal resource adequacy construct.
  - Winter - December, January, February
  - Spring - March, April, May
  - Summer - June, July, August
  - Fall - September, October, November
- Implementation beginning in MISO Planning Year 2023/24.
- This is new, and dynamic, we are working through these impacts and changes as more information becomes available.

MISO Renewable Penetration Trends

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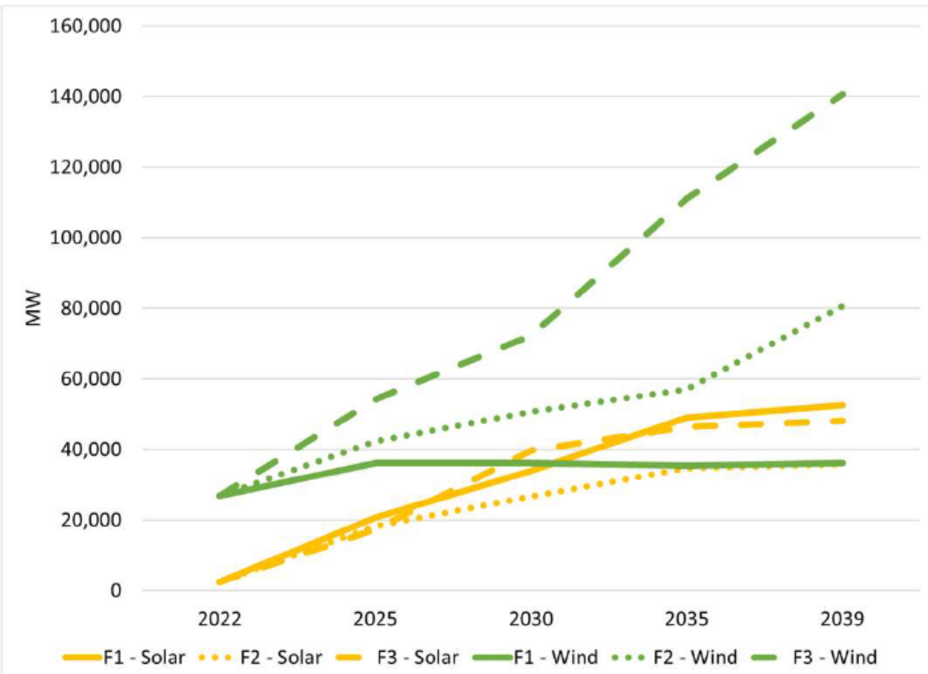
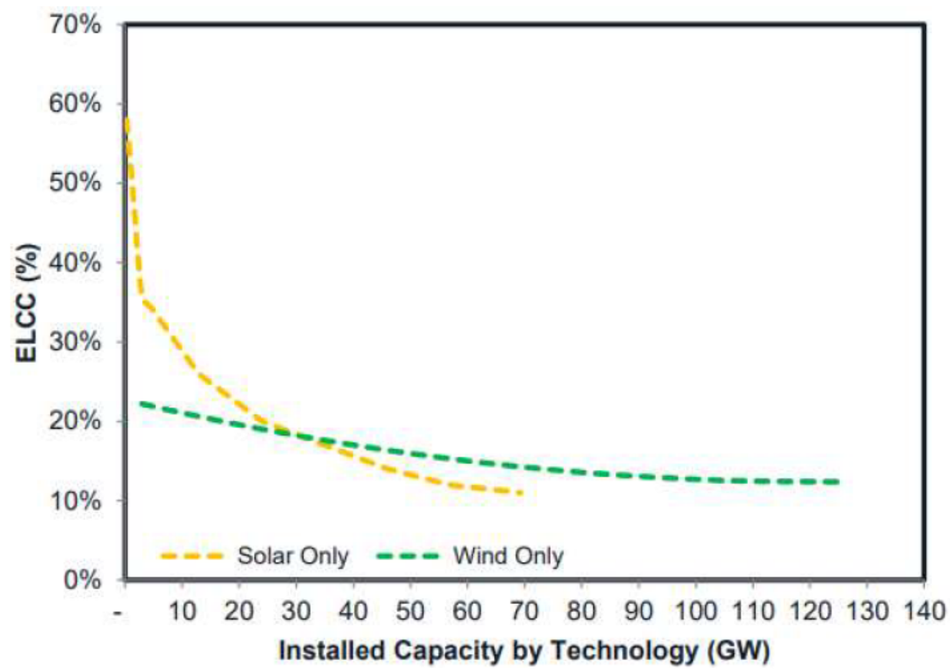
MISO Installed Renewable Capacity



https://cdn.misoenergy.org/MISO%20Futures%20Report538224.pdf

Effects of increasing installations

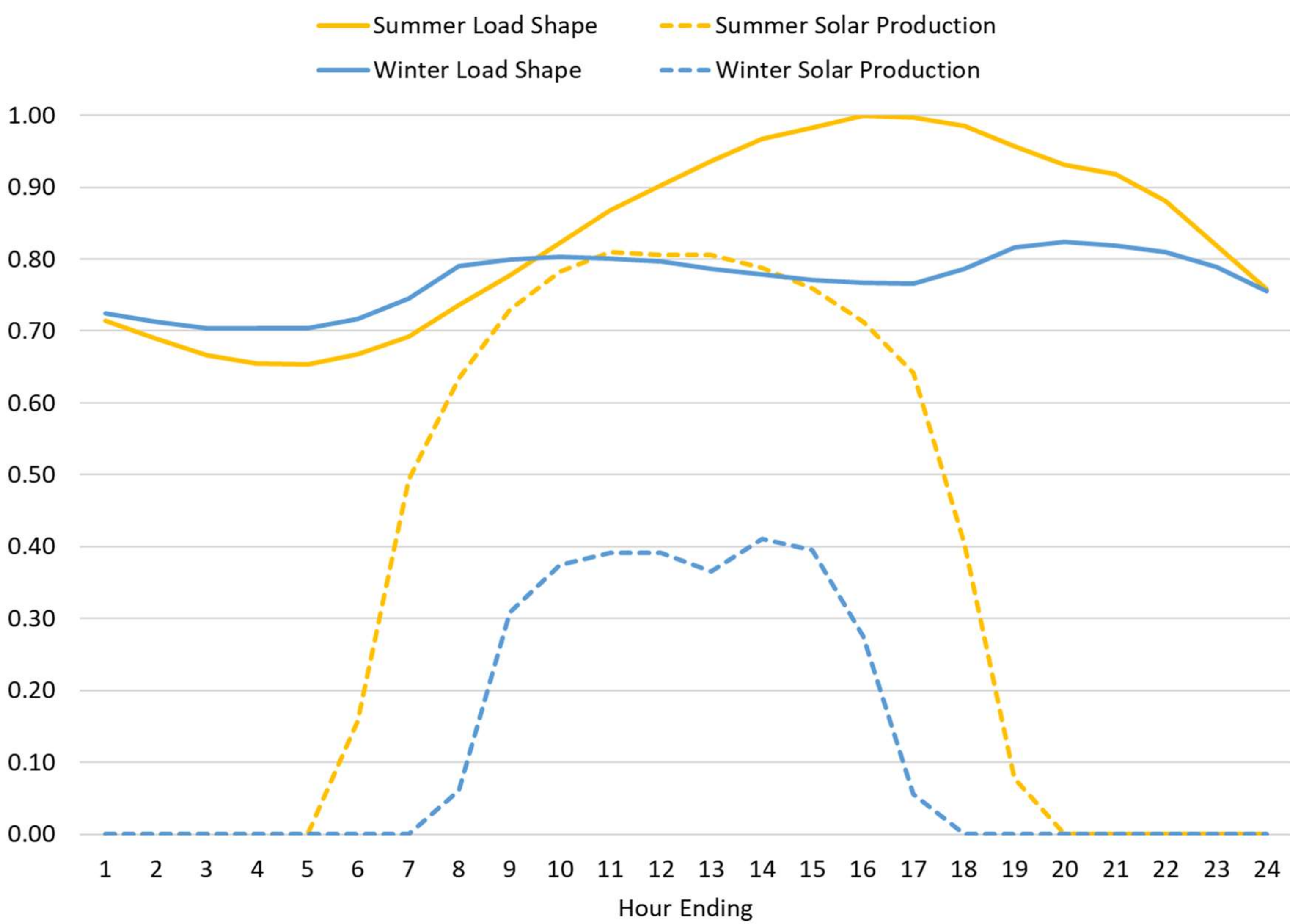


https://cdn.misoenergy.org/RIIA%20Summary%20Report520051.pdf

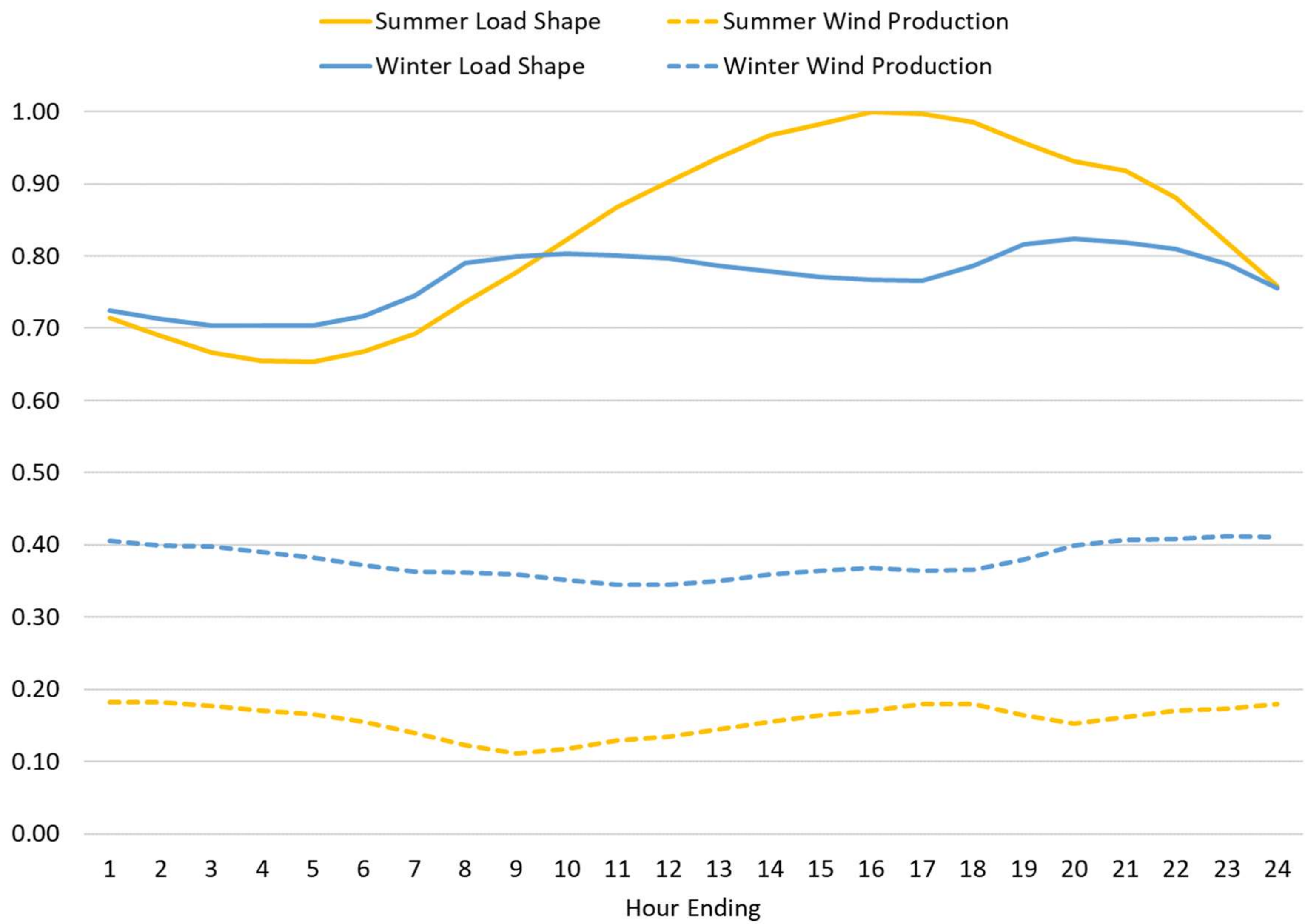
As installed capacity (ICAP) goes ⬆… Accreditable capacity (UCAP) goes ⬇

ELCC – Effective Load Carrying Capability

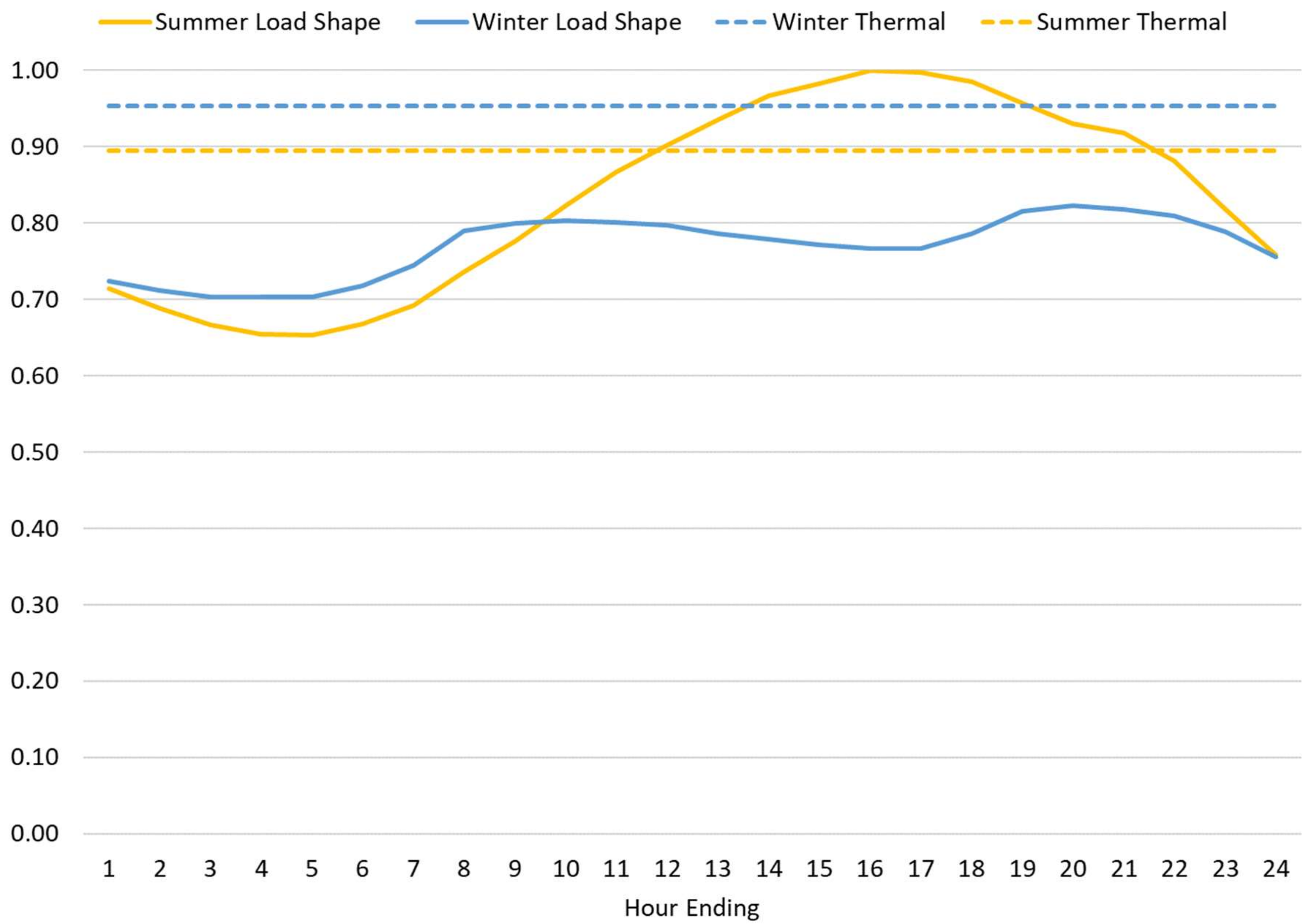
Solar Seasonal Differences



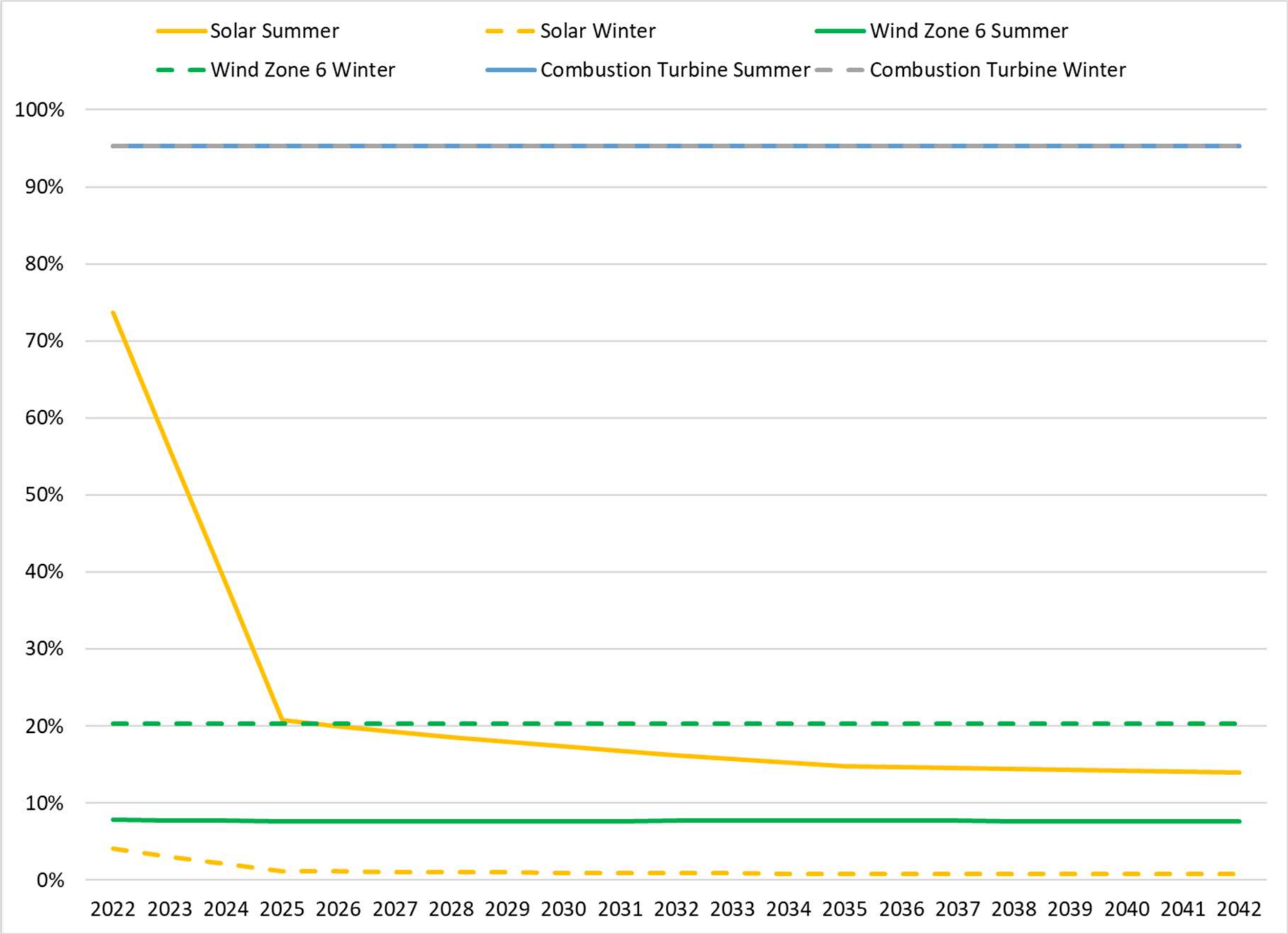
Wind Seasonal Differences



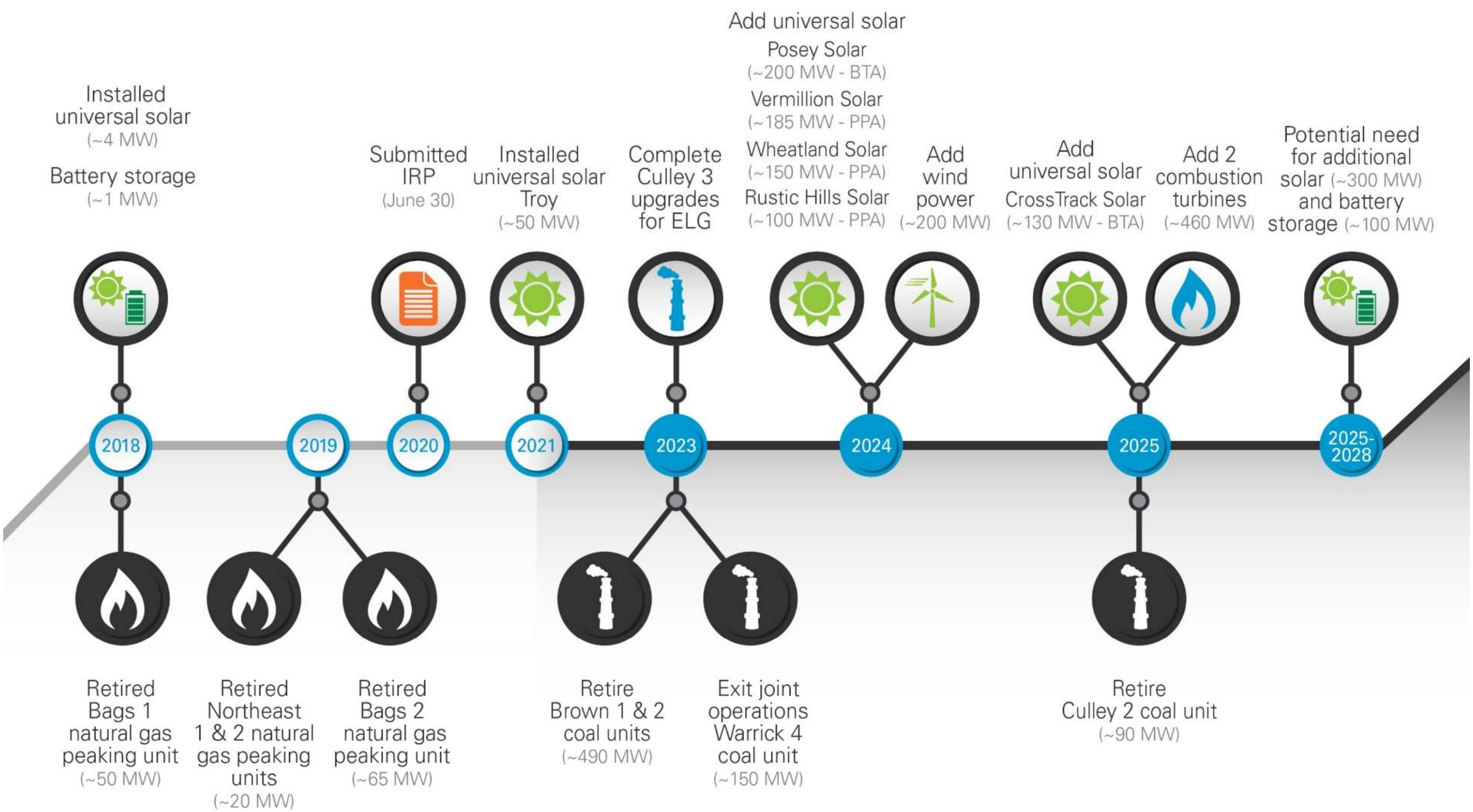
Thermal Seasonal Differences



Draft Projected Seasonal Accreditation

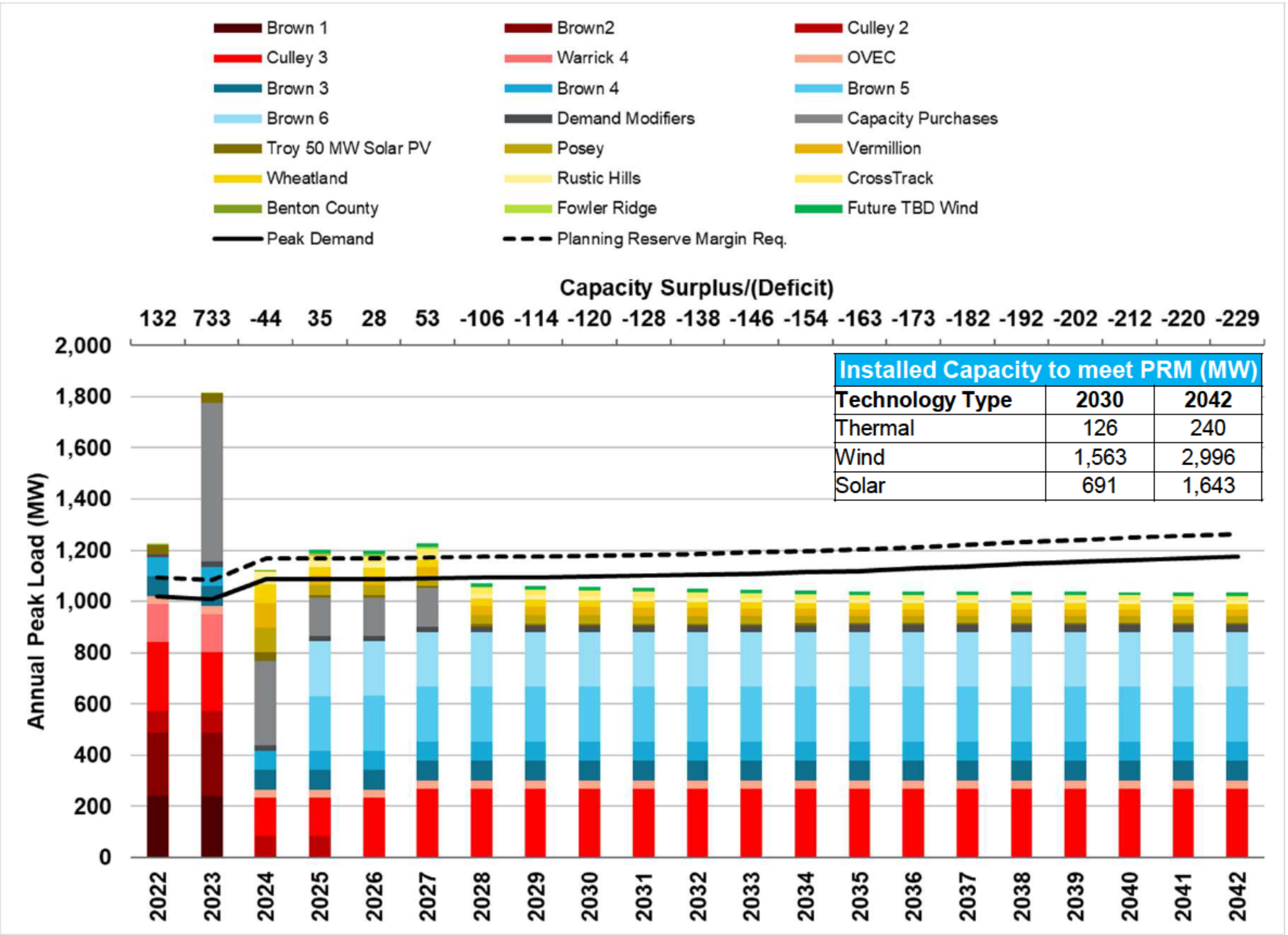


Generation Transition Timeline



Bags = Broadway Avenue Gas Turbines
BTA = Build Transfer Agreement/Utility Ownership
ELG = Effluent Limitations Guidelines
MW = Megawatt
PPA = Power Purchase Agreement
IRP = Integrated Resource Plan

Balance of Loads and Existing & Planned Resources Summer



Balance of Loads and Existing & Planned Resources Fall

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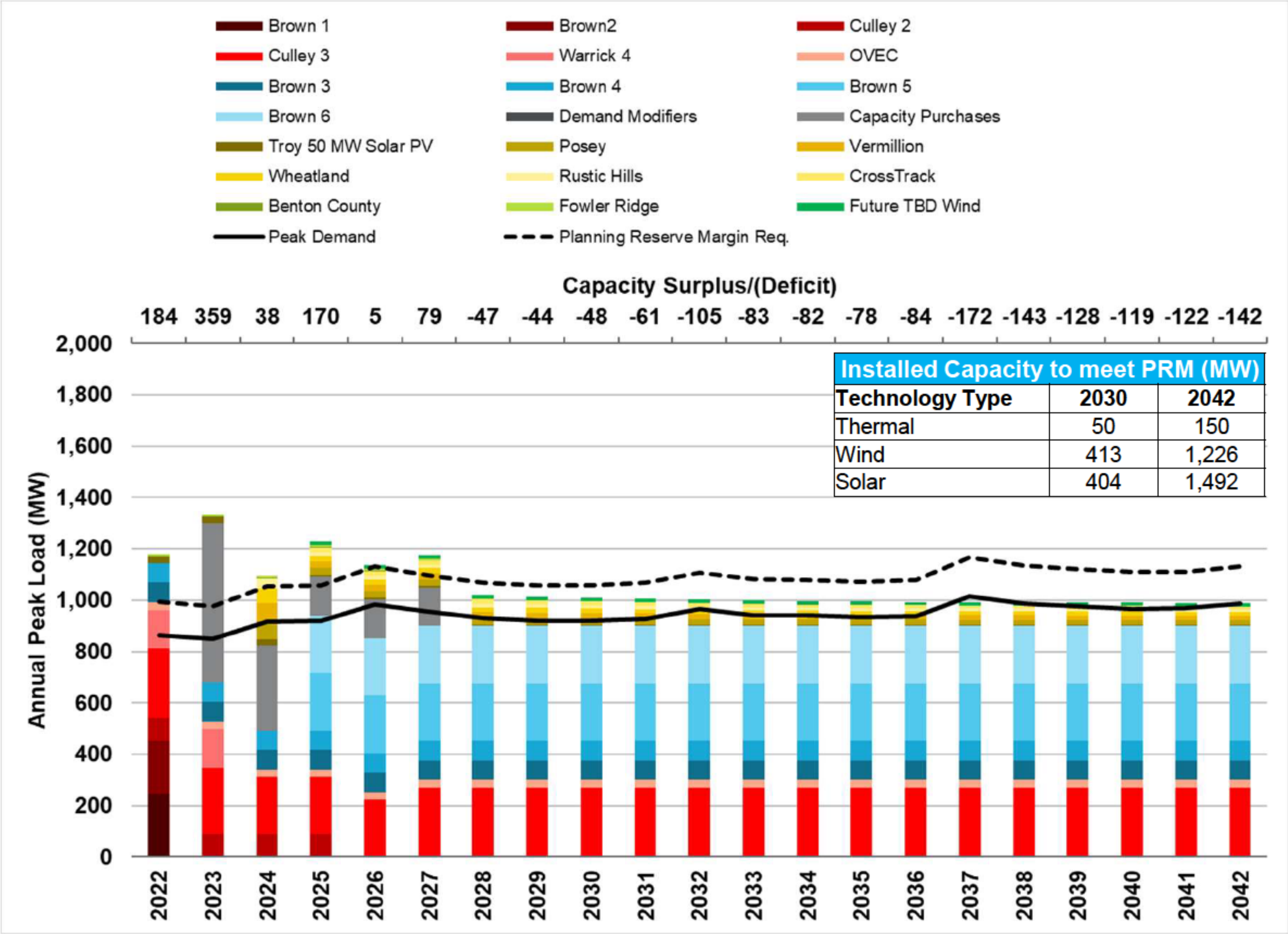
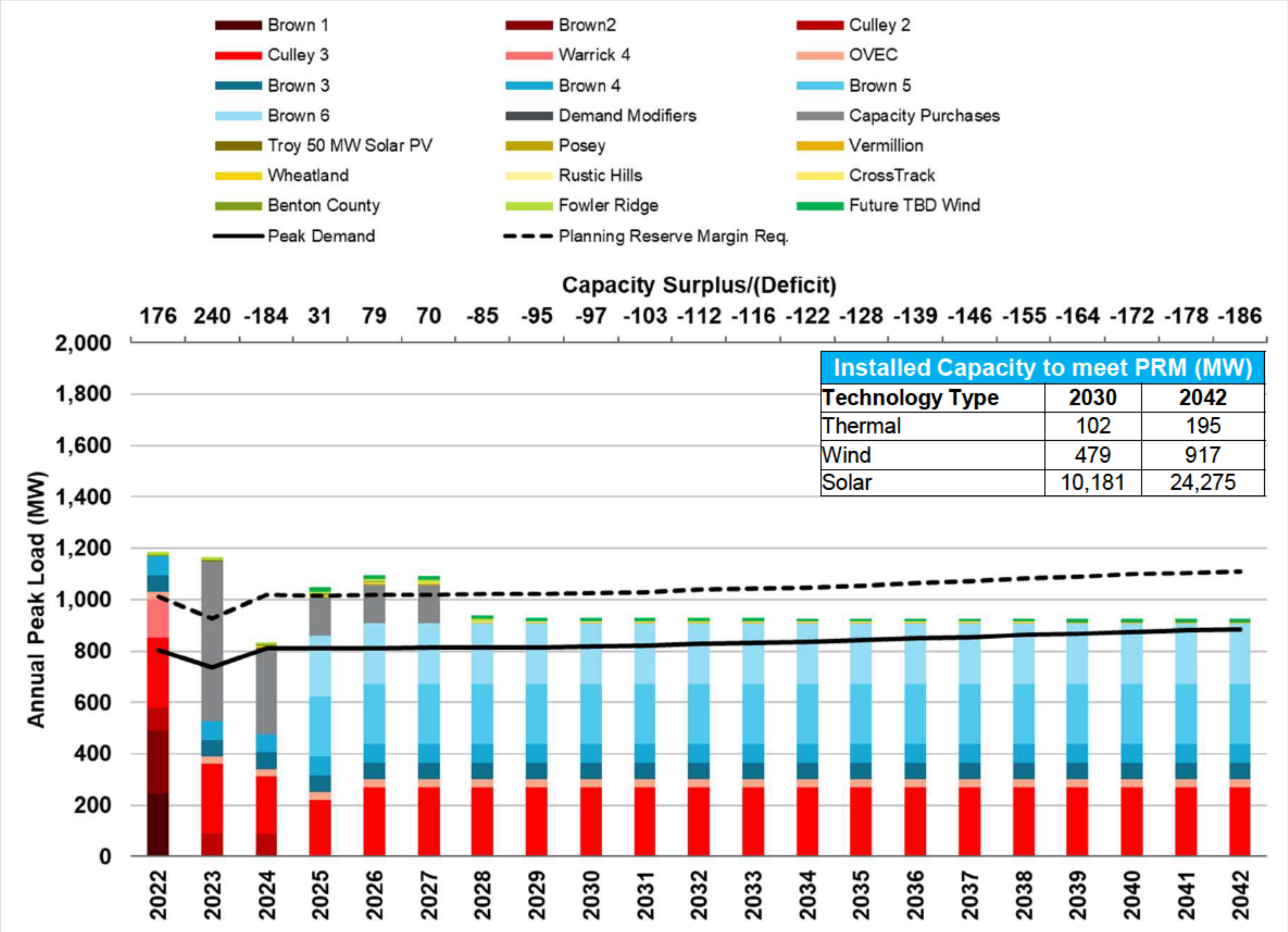


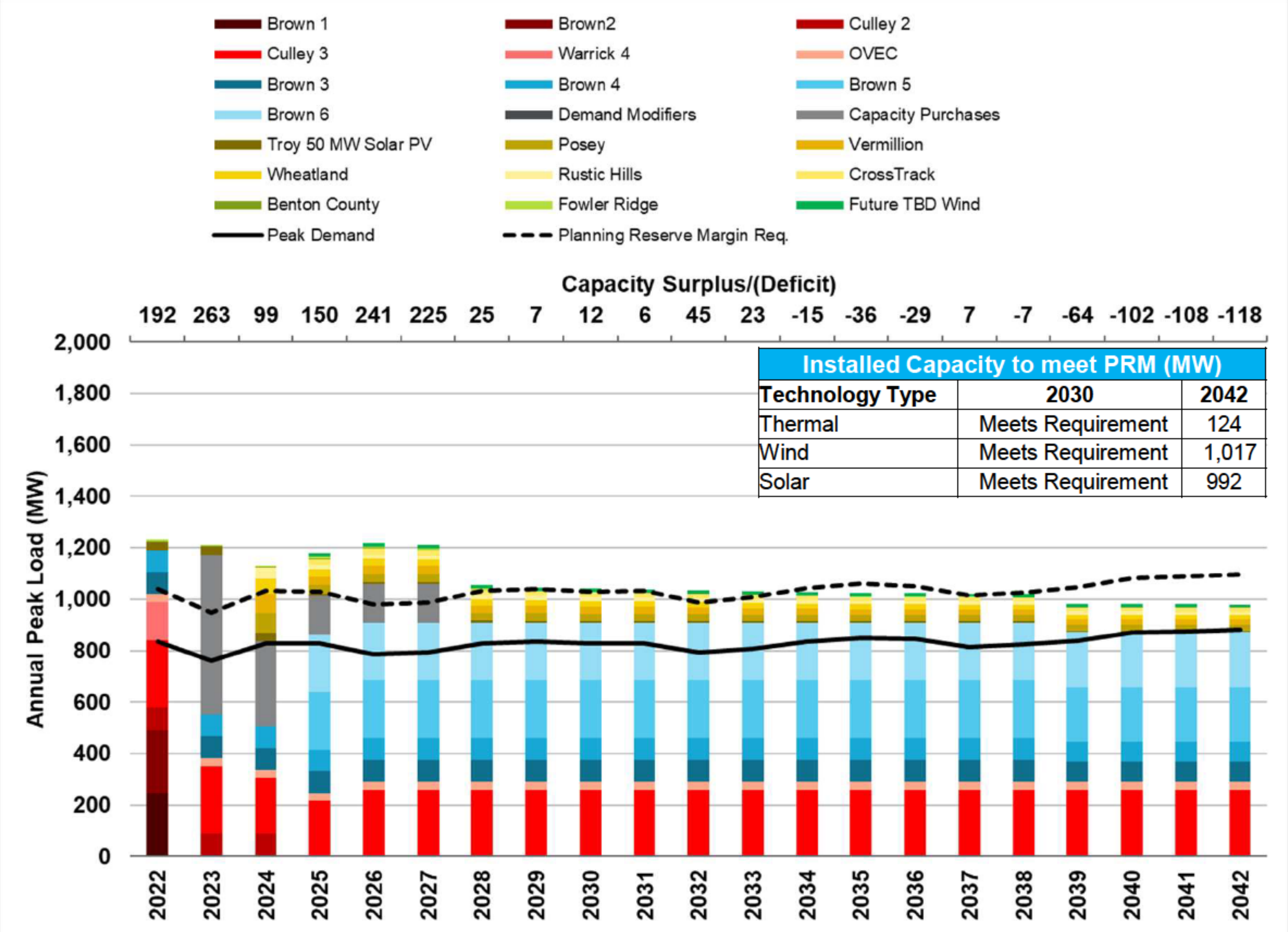
Installed Capacity to meet PRM (MW)		
Technology Type	**2030**	**2042**
Thermal	50	150
Wind	413	1,226
Solar	404	1,492

Balance of Loads and Existing & Planned Resources Winter



Installed Capacity to meet PRM (MW)		
Technology Type	2030	2042
Thermal	102	195
Wind	479	917
Solar	10,181	24,275

Balance of Loads and Existing & Planned Resources Spring



Installed Capacity to meet PRM (MW)		
Technology Type	**2030**	**2042**
Thermal	Meets Requirement	124
Wind	Meets Requirement	1,017
Solar	Meets Requirement	992

Technology Assessment

CenterPoint Energy

- RFP bids were used to inform cost assumptions for near term resources.
- Technology Assessment was developed for future generation options.
- The costs from the Technology Assessment in combination with cost curve estimates are used for modeling resources out beyond the period where we have RFP bid data available.
- If no bid was received for a resource, TA costs are used as the default.

Technology Assessment Details

CenterPoint Energy

Examples of candidates for natural gas peaking generation:

Peaking	F-Class SCGT	G/H-Class SCGT	J-Class SCGT	6 x 9 MW Recip Engines	6 x 18 MW Recip Engines
Capacity (MW)	238	295	384	54	110
Fixed O&M (2022 $/kW-Yr)	$8	$7	$5	$28	$18
Total Project Costs (2022 $/kW)	$712	$699	$569	$1,756	$1,561

Examples of candidates for natural gas combined cycle generation:

Combined Cycle - Unfired	1x1 F-Class[1]	1x1 G/H-Class[1]	1x1 J-Class[1]
Capacity (MW)	363	431	551
Fixed O&M (2022 $/kW-Yr)	$12	$11	$8
Total Project Costs (2022 $/kW)	$1,278	$1,162	$962

Combined Cycle - Fired	1x1 F-Class[1]	1x1 G/H-Class[1]	2x1 J-Class[1]
Capacity (MW)	419	508	1,307
Fixed O&M (2022 $/kW-Yr)	$11	$9	$4
Total Project Costs (2022 $/kW)	$1,146	$1,036	$641

[1] 1x1 Combined Cycle Plant is one combustion turbine with heat recovery steam generator and one steam turbine utilizing the unused exhaust heat. 2x1 is two combustion turbines and 1 steam turbine.

Technology Assessment Details

CenterPoint Energy

Examples of candidate for nuclear generation:

Nuclear	Small Modular Reactor
Size (MW)	TBD
Fixed O&M (2022 $/kW-Yr)	TBD
Total Project Costs (2022 $/kW)	TBD

Examples of candidate for coal fired generation:

Coal	Supercritical Pulverized Coal with 90% Carbon Capture	Ultra-Supercritical Pulverized Coal with 90% Carbon Capture
Size (MW)	506	747
Fixed O&M (2022 $MM/kW-Yr)	$32	$32
Total Project Costs (2022 $/kW)	$6,659	$6,024

Examples of other thermal:

Other Thermal	Co-Gen Steam Turbine	2x1 F-Class CCGT Conversion	FB Culley 2 Gas Conversion	FB Culley 3 Gas Conversion
Size (MW)	22	717 / 257 incremental	100 / 0 incremental	287 / 0 incremental
Fixed O&M (2022 $/kW-Yr)	$323	$12	TBD	TBD
Total Project Costs (2022 $/kW)	$2,832	$691 / $1,990	$247	$107

Technology Assessment Details

CenterPoint Energy

Examples of candidate for wind generation:

Wind	Indiana Wind Energy	Indiana Wind + Storage
Base Load Net Output	200 MW	50 MW + 10 MW / 40 MWh
Fixed O&M (2022 $/kW-Yr)	$48	$49
Total Project Costs (2022 $/kW)	$1,845	$2,107

Examples of candidate for solar generation:

Solar	Solar Photovoltaic	Solar Photovoltaic	Solar Photovoltaic	Solar PV + Storage
Base Load Net Output	10 MW	50 MW	100 MW	50 MW + 10 MW / 40 MWh
Fixed O&M (2022 $/kW-Yr)	$60	$16	$11	$19
Total Project Costs (2022 $/kW)	$2,560	$1,856	$1,779	$1,910

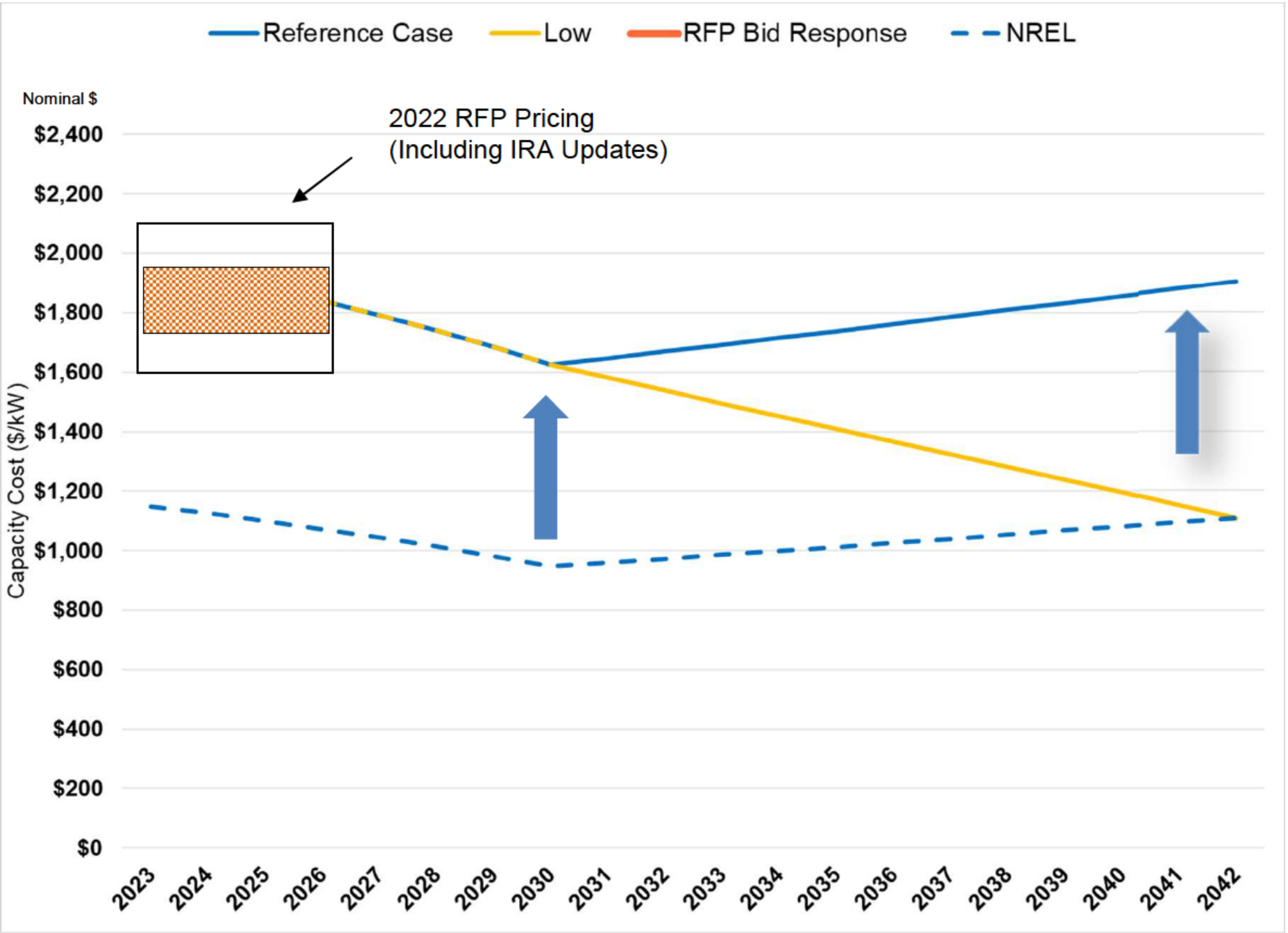
Examples of storage:

Storage	Lithium-Ion Battery Storage	Lithium-Ion Battery Storage	Lithium-Ion Battery Storage	Long Duration Storage
Base Load Net Output	10 MW / 200 MWh	50 MW / 200 MWh	100 MW / 400 MWh	300 MW / 3,000 MWh
Fixed O&M (2022 $/kW-Yr)	$40	$38	$35	$19
Total Project Costs (2022 $/kW)	$2,500	$2,160	$2,020	$2,590

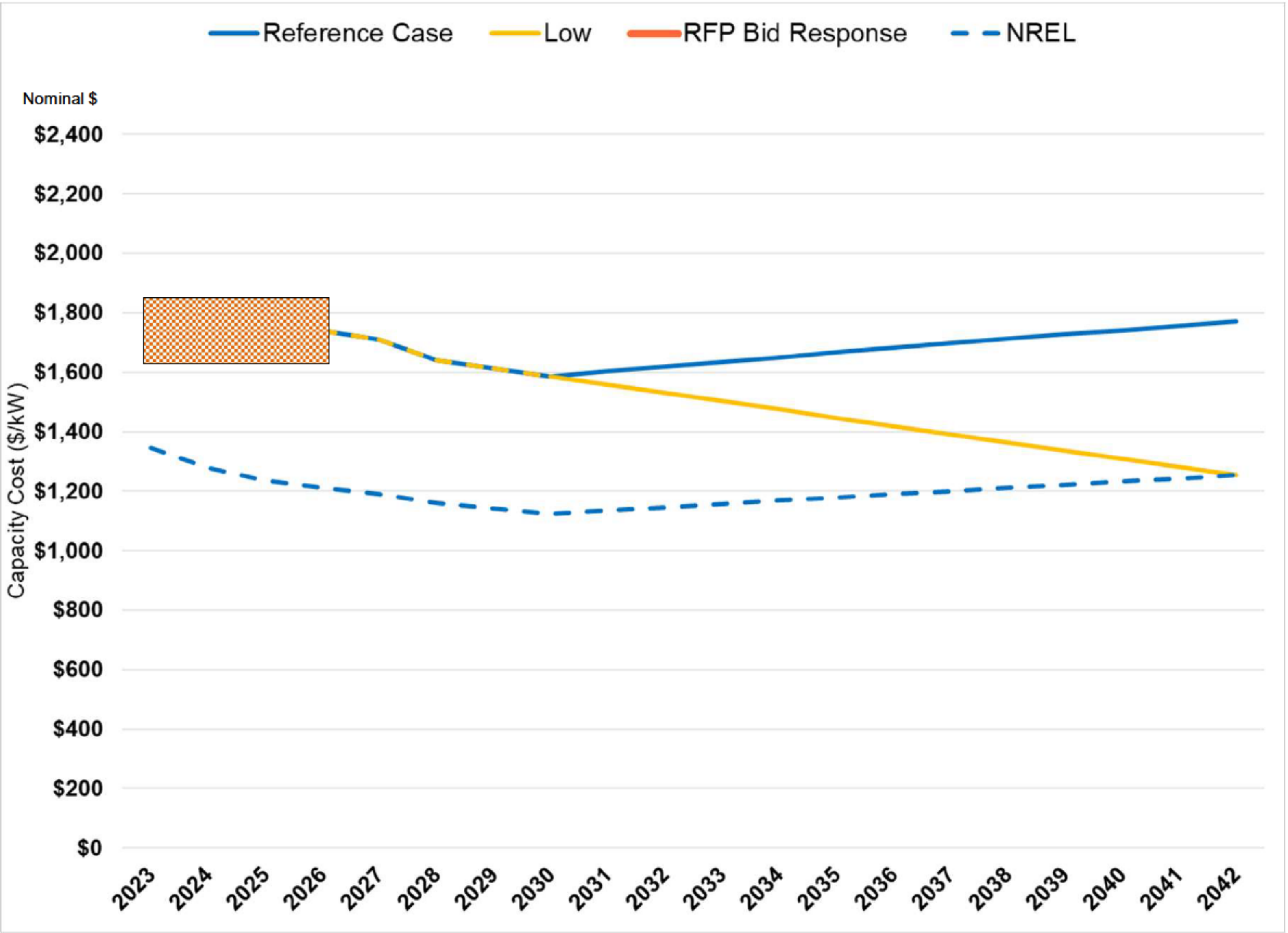
Capacity Cost Curve Summary

- Initial curve modeled from 2022 Annual Technology Baseline from NREL.
- Pricing of all RFP purchase options taken per technology type.
  - Pricing includes updates from the Inflation Reduction Act.
- Reference case follows the NREL curve shifted to match the aggregate bid pricing.
- The 'Low' curve is the interpolation from the reference case to the moderate NREL curve.

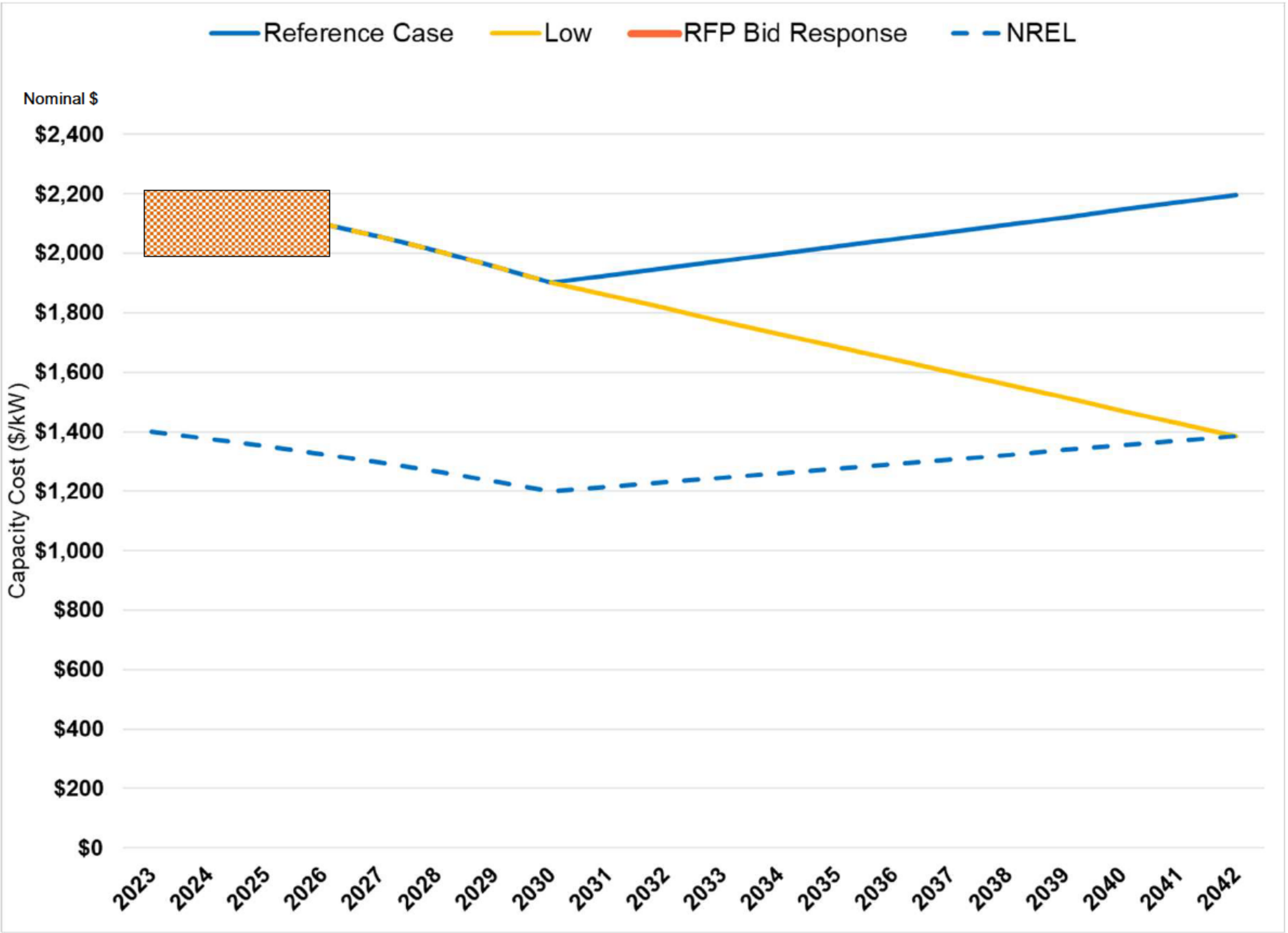
Capacity Cost Curves - Solar



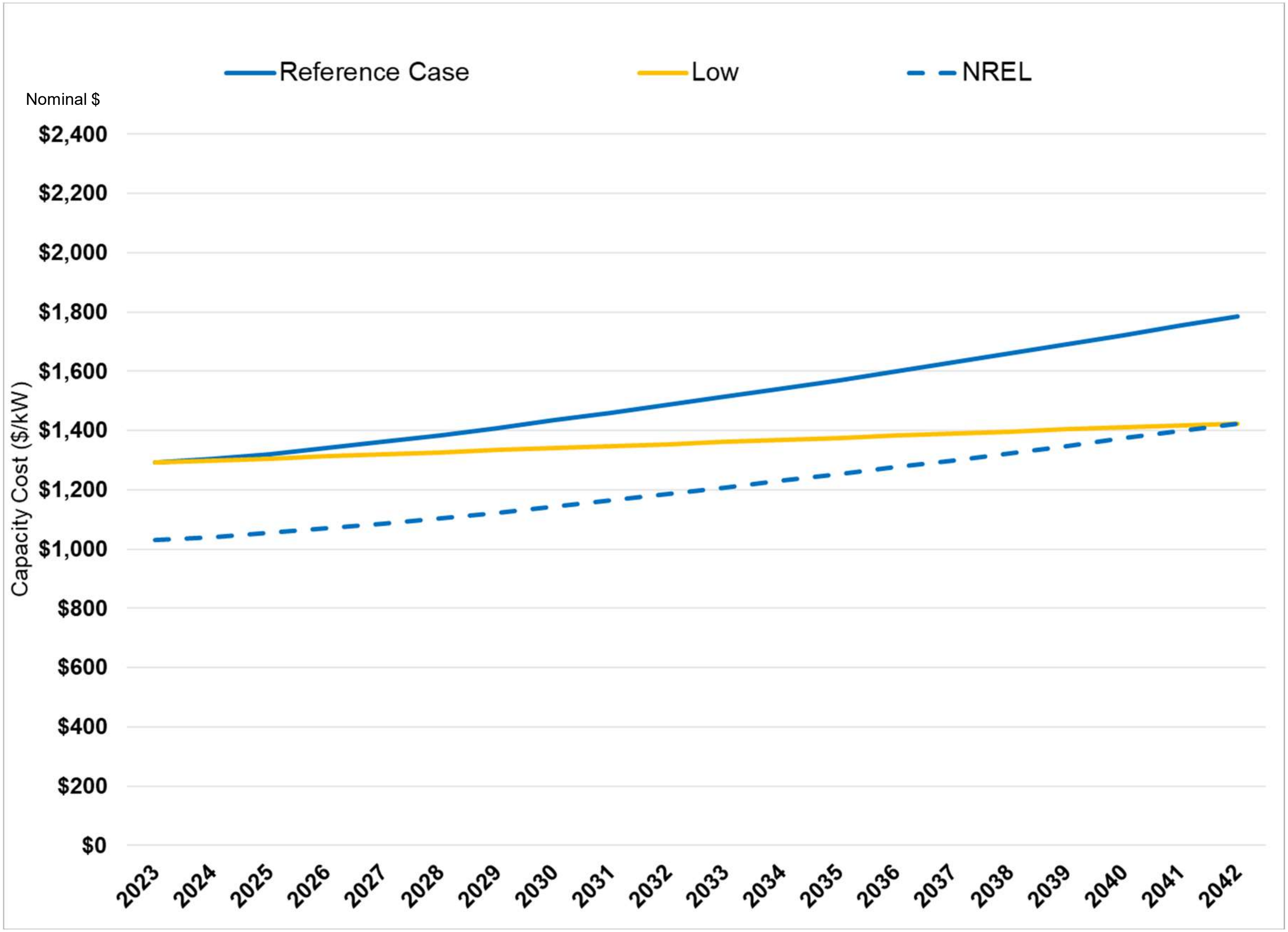
Capacity Cost Curves - Storage



Capacity Cost Curves – Wind



Capacity Cost Curves – Combined Cycle



CenterPoint Energy

Q&A

Final Load Forecast

Michael Russo
Senior Forecast Consultant - Itron

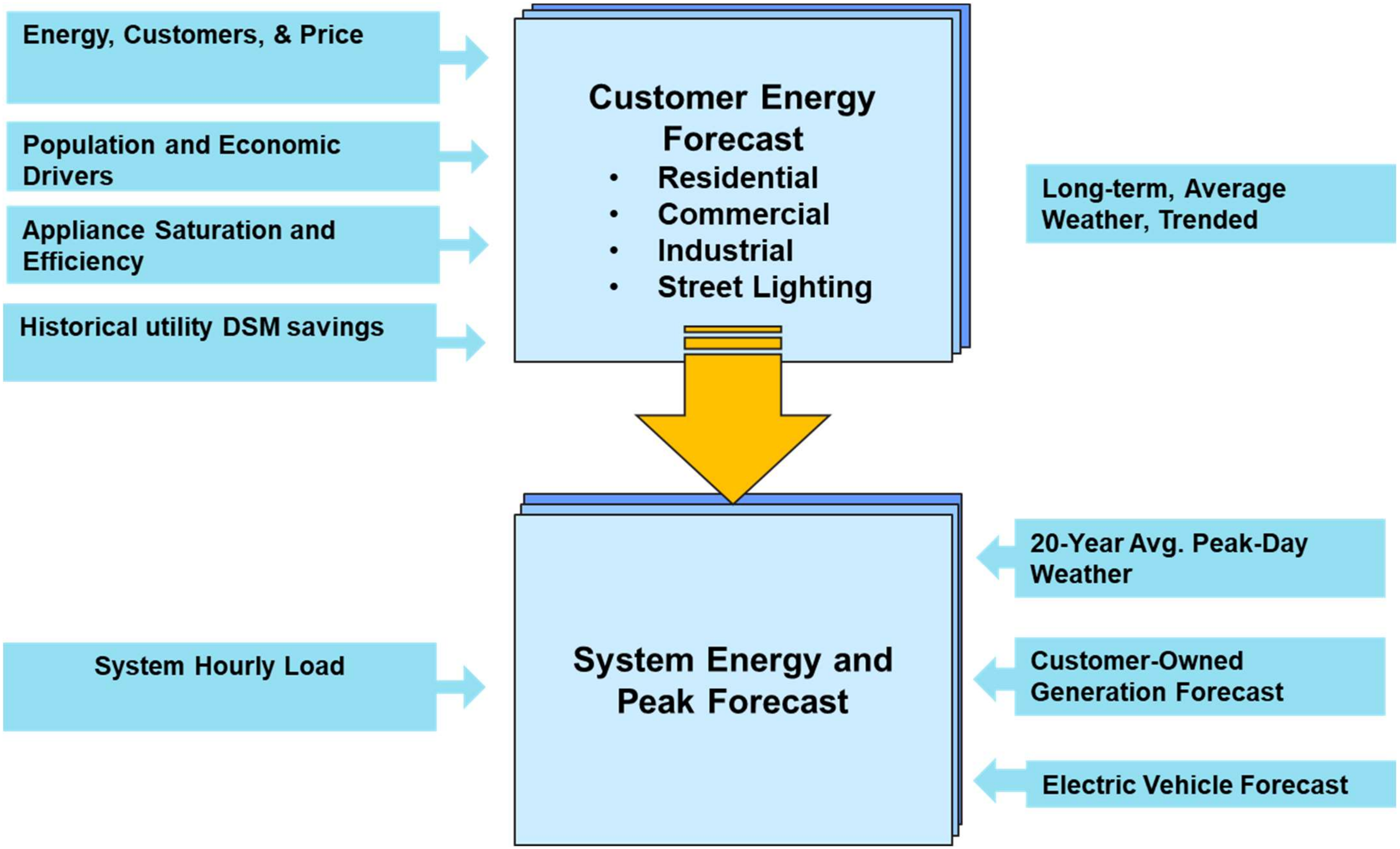
Forecast Summary

- Forecast excludes the impact of additional CenterPoint sponsored energy efficiency program savings

- Forecast includes the impact of customer owned photovoltaics and electric vehicles

- Average annual growth of 0.7% on energy and peaks, over the 2022-2042 forecast period
  - Includes the addition of a large industrial customer in 2024
  - Excluding this addition, average annual growth would be 0.3% on energy and 0.4% on peaks.

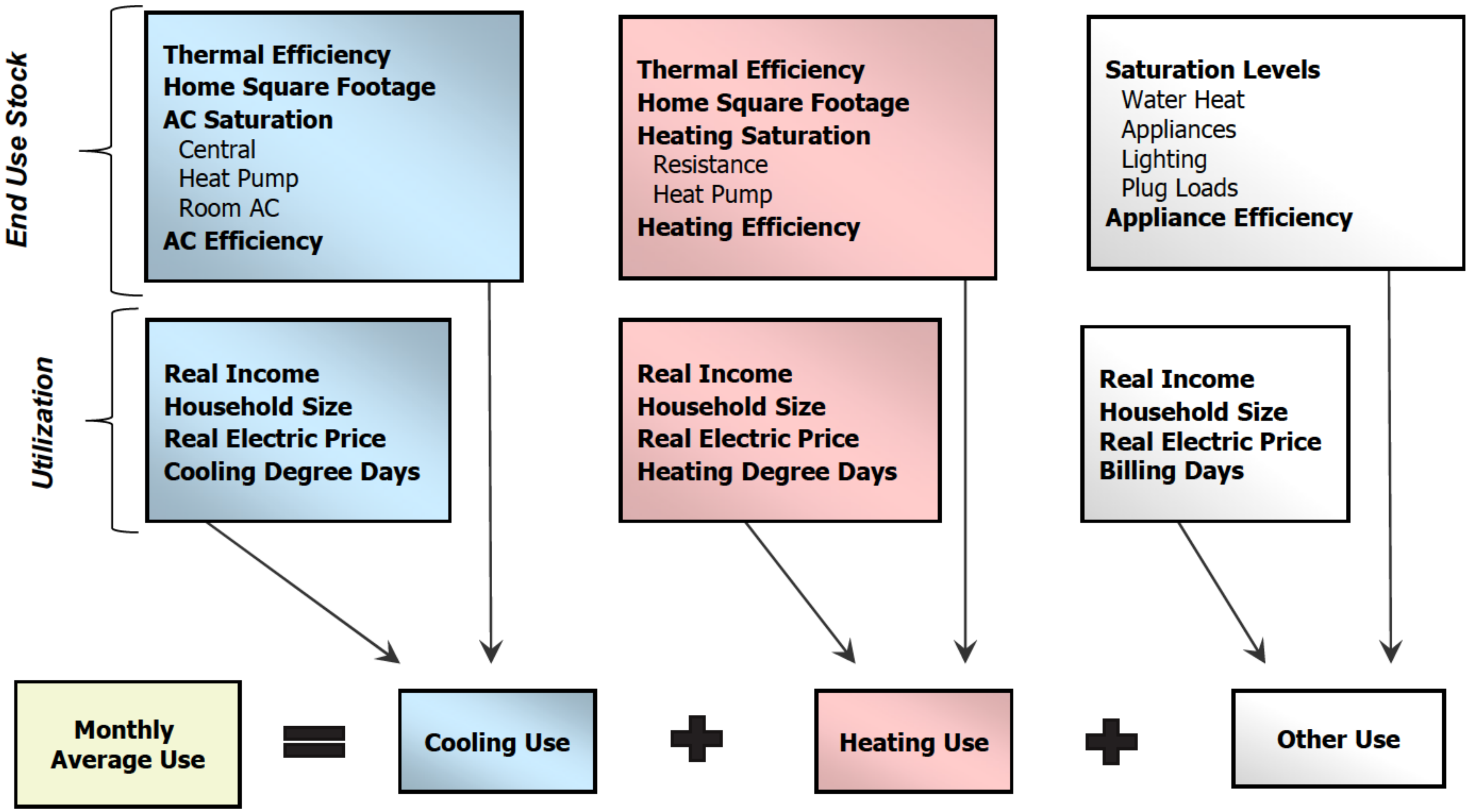
Baseline Bottom-Up Forecast Approach



Model Estimation

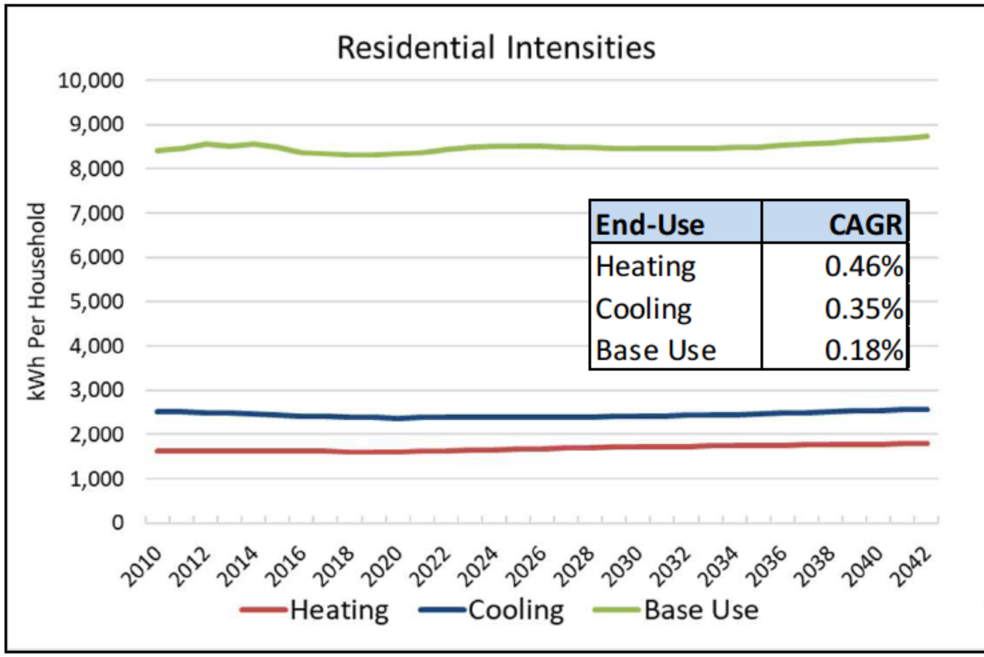
- Models estimated using rate class billed sales and customer data
- Monthly models, estimated for the period January 2011 to June 2022
- Rate class models:
  - Residential average use
  - Residential customers
  - Commercial total sales
  - Industrial total sales
  - Street lighting total sales (estimated from January 2014)
  - System peak

Residential Average Use model



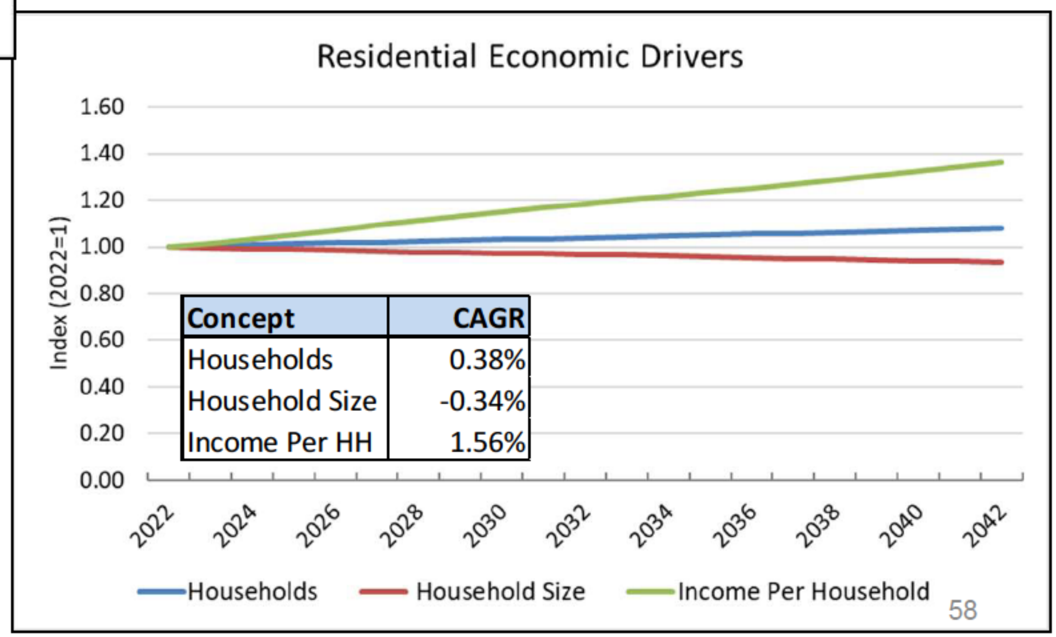
Residential Forecast Drivers

CenterPoint Energy

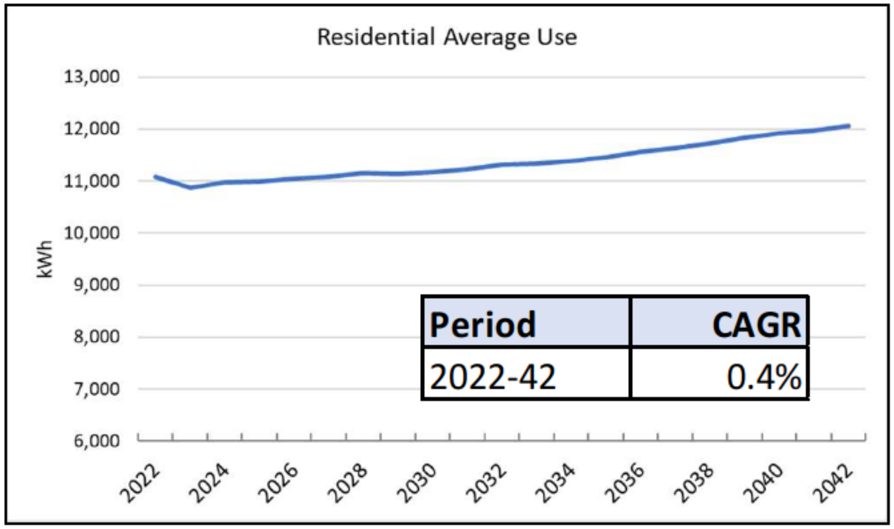


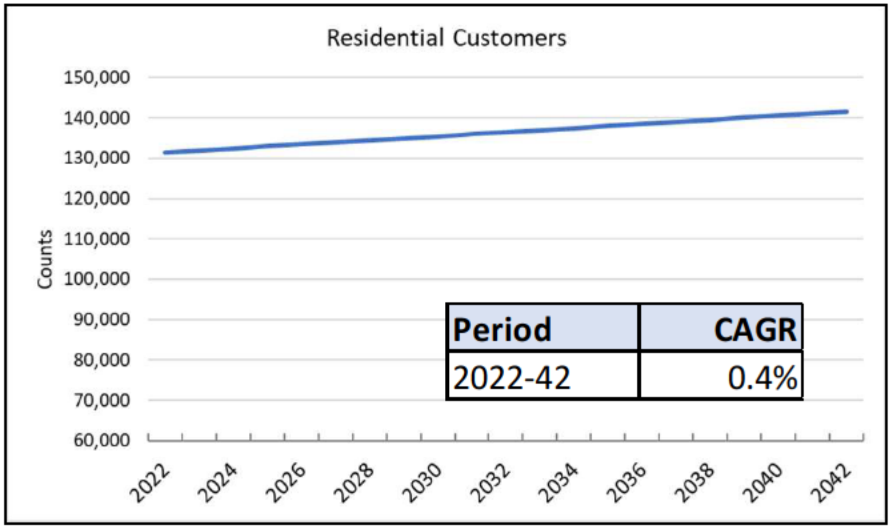
- Residential intensities based on the 2022 Annual Energy Outlook from the Energy Information Administration (EIA)
  - Reflects changes in end-use ownership, efficiency trends, and home thermal shell efficiency
  - Calibrated to CenterPoint's service territory using end-use saturations from 2016 study

- Economic drivers from IHS Markit for Evansville MSA

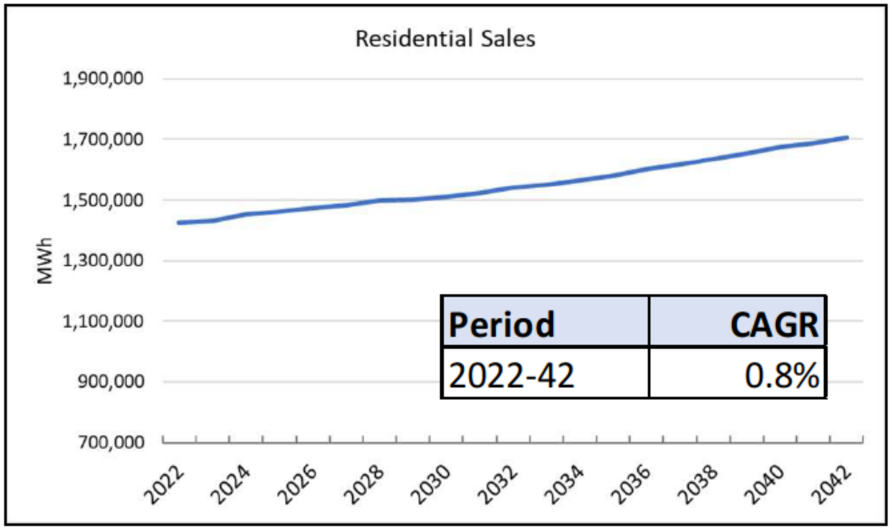


Residential Class Forecast



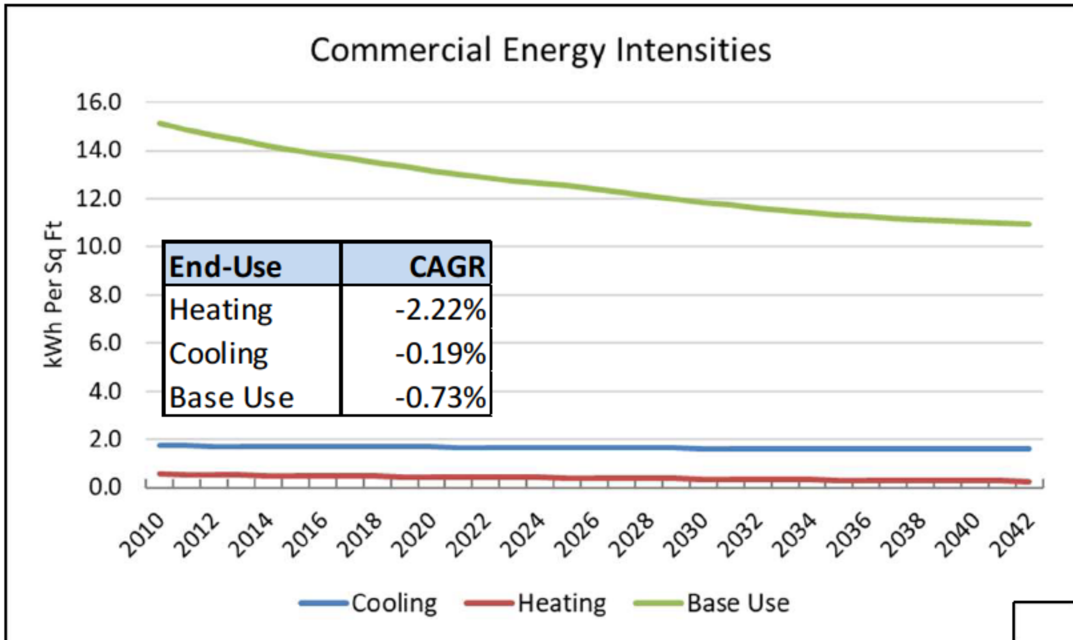


- Does not include the impact of future CenterPoint efficiency program savings
- Flattening of federal efficiency improvements results in average use growth over the forecast period



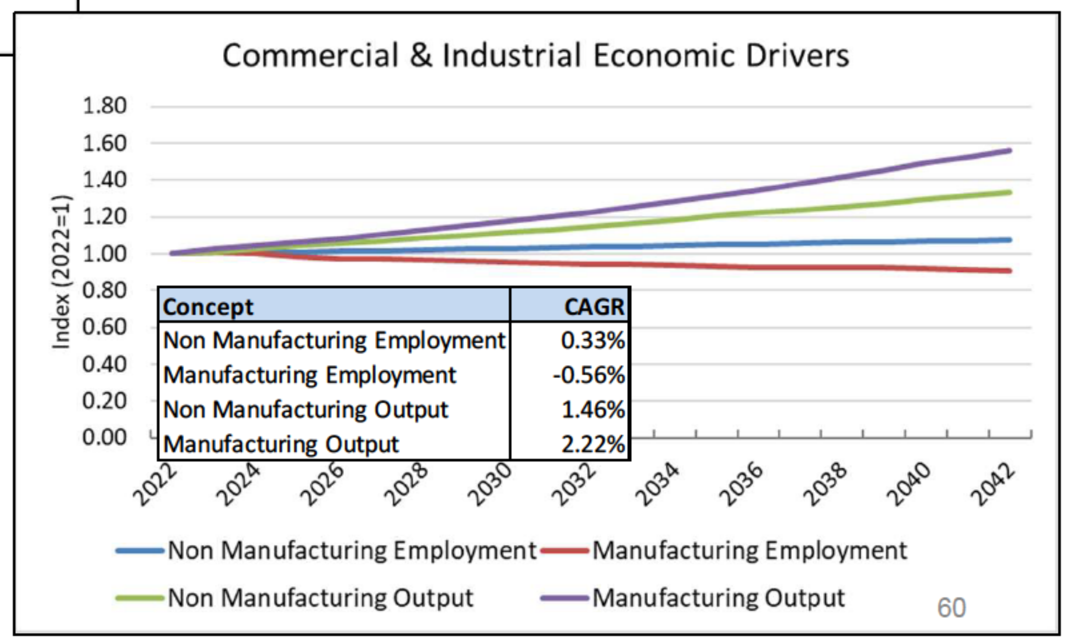
Commercial & Industrial Class Forecast Driver

CenterPoint Energy

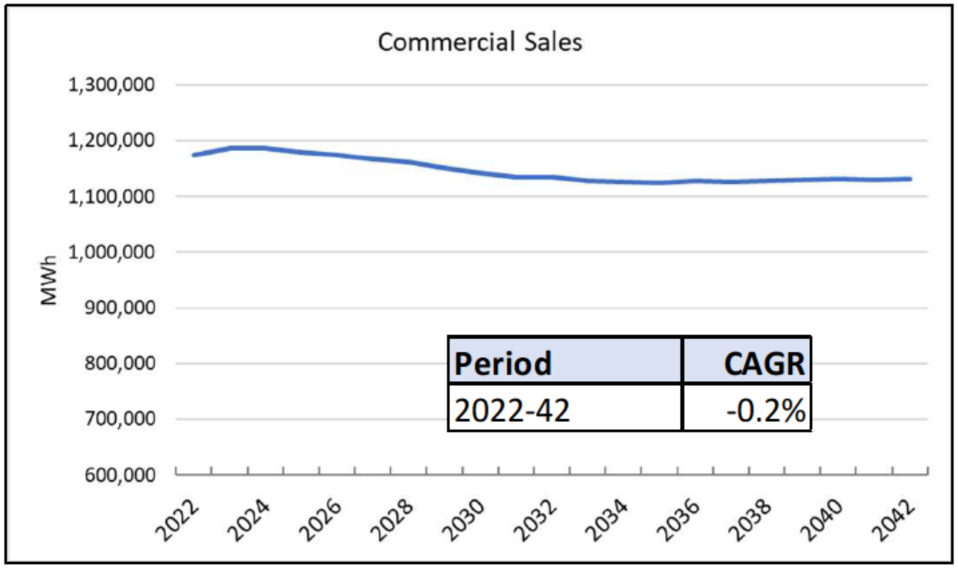


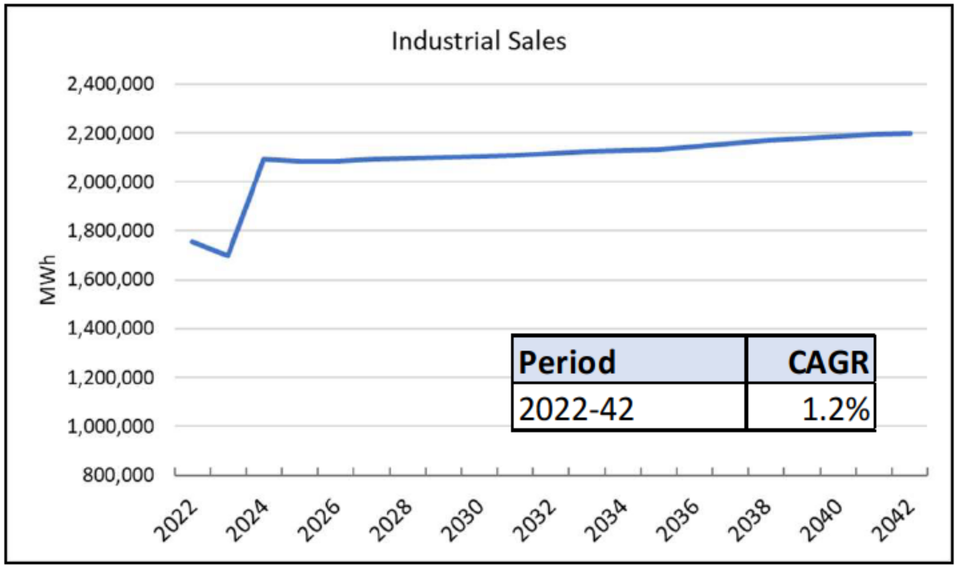
- Commercial intensities based on the 2022 Annual Energy Outlook from the Energy Information Administration (EIA)
  - Reflects efficiency trends and square footage estimates by building type and end-use
  - Calibrated to CenterPoint's annual commercial sales

- Economic drivers from IHS Markit for Evansville MSA and Indiana



Commercial & Industrial Class Forecast

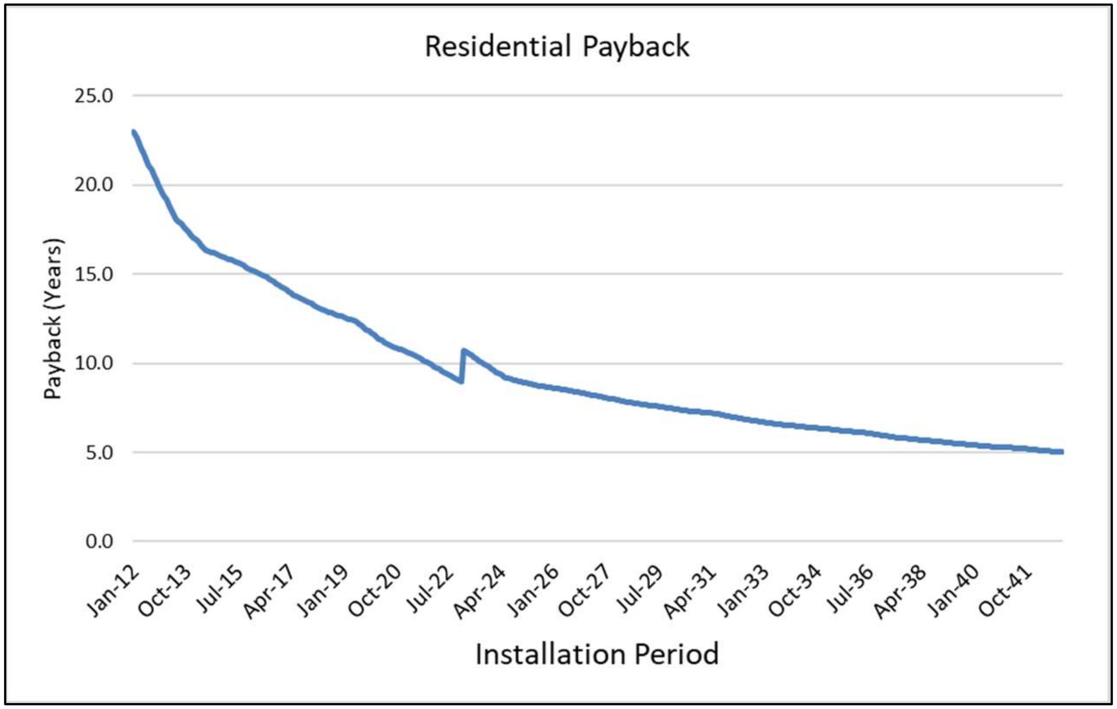




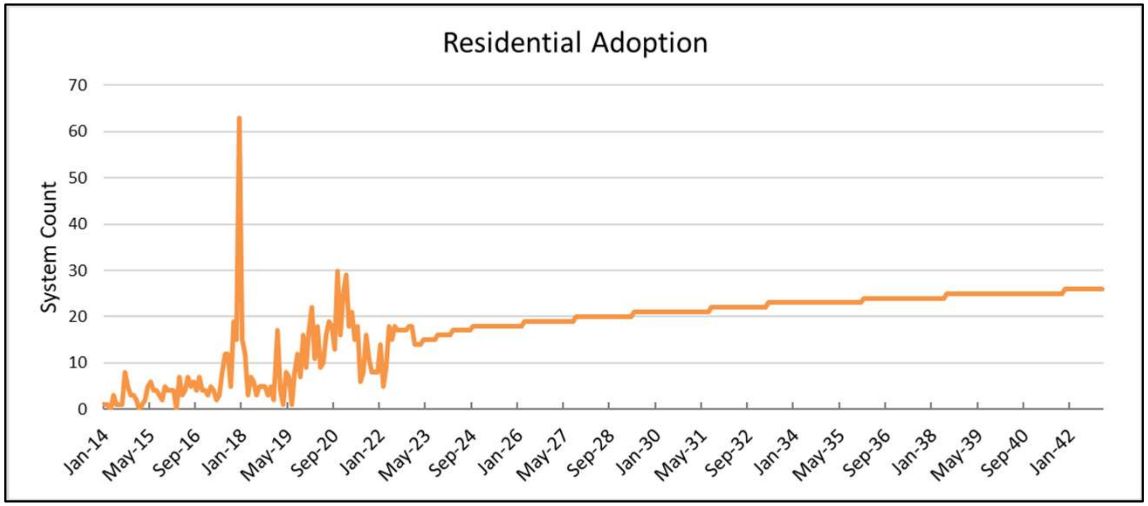
- Does not include the impact of future CenterPoint efficiency program savings
- Strong continued federal efficiency gains in commercial buildings, driven by lighting and ventilation
- Large new industrial customer will be added in 2024

Customer Owned Photovoltaics: Customer Economics

- Monthly adoption modeled as a function of simple payback
  - Incorporates declining solar system costs, electric price projections, changes in net metering laws, and federal incentives
    - Switch from net metering to Excess Distributed Generation (EDG)
    - Continuation of ITC under the Inflation Reduction Act (IRA)
    - Continued decline in solar costs

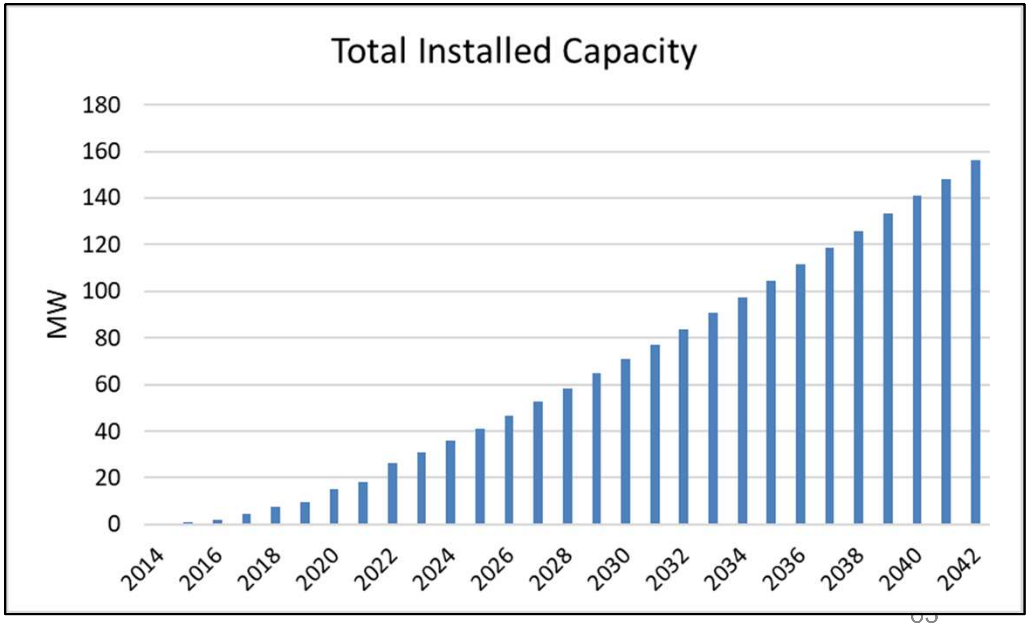


Customer Owned Photovoltaics: Forecast



- Commercial adoption based on historical relationship between residential and commercial installations.

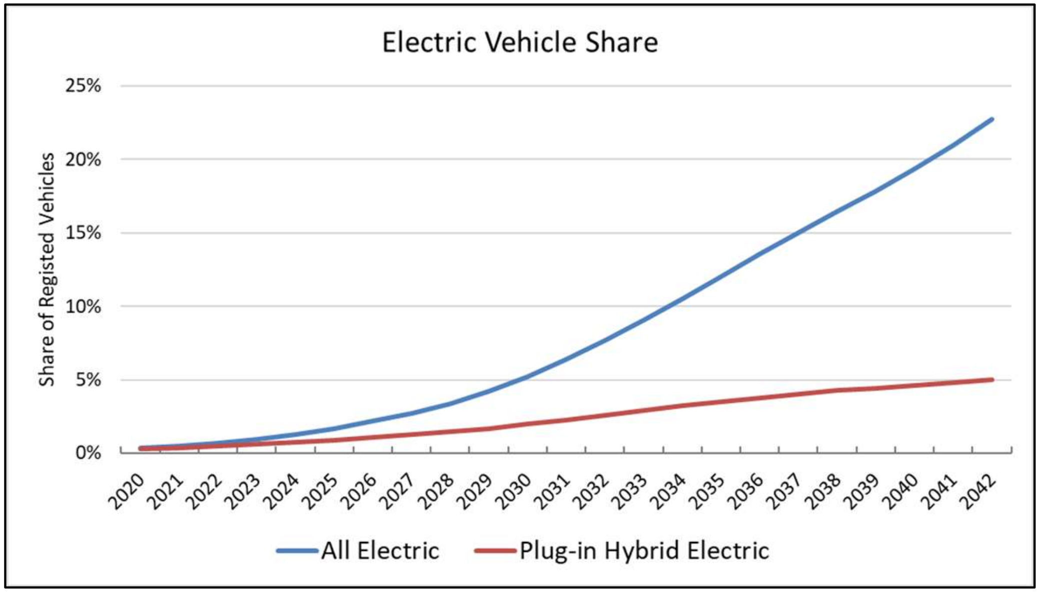
- Total installed capacity derived by combining monthly adoptions with average (kW) system size
- NREL PVWatts hourly solar profile is used to calculate monthly load factors and estimate monthly solar generation
- The load forecast is only adjusted for incremental new solar capacity



Electric Vehicle Forecast:

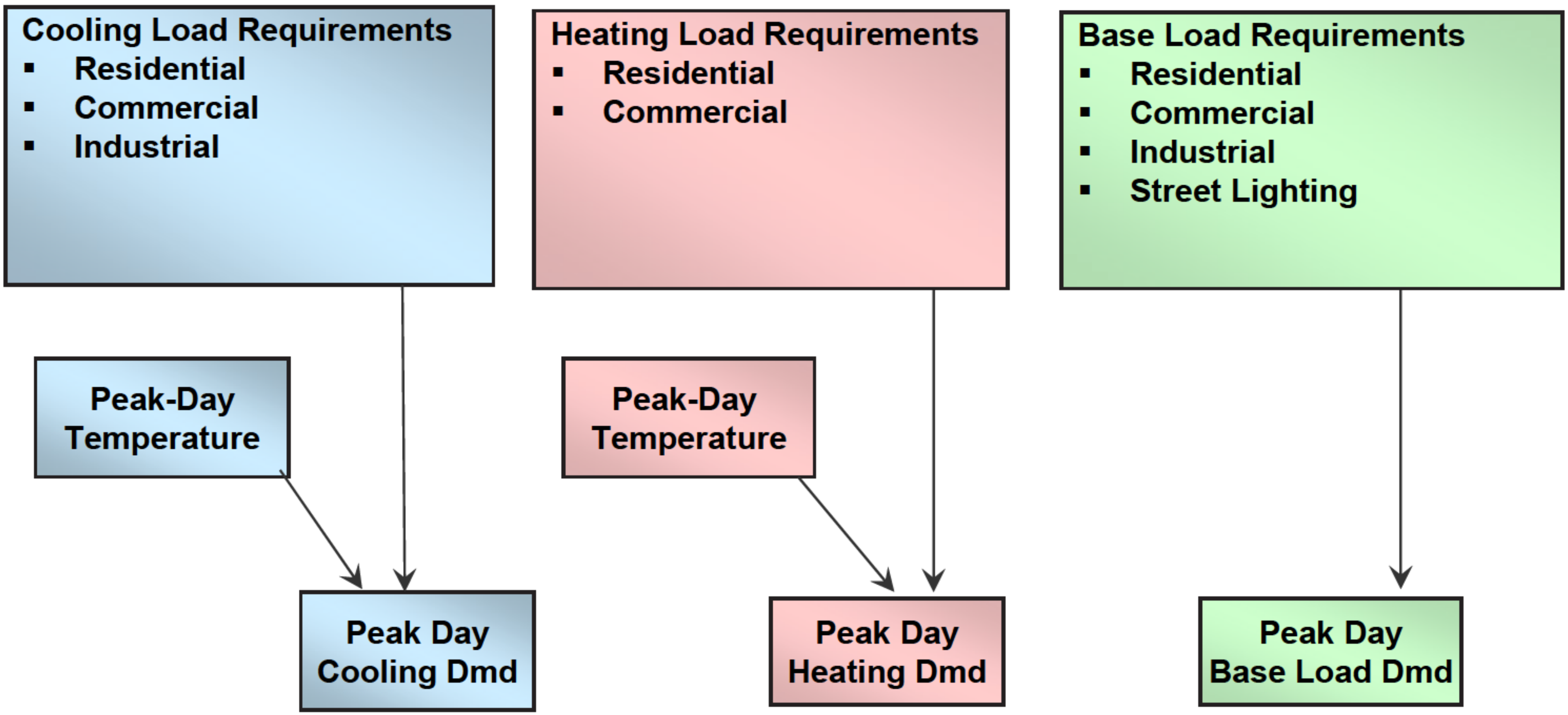
CenterPoint Energy

- There are approximately 700 electric vehicles currently registered in CenterPoint's service territory.
  - This is below the implied number of electric vehicles based on U.S. average electric vehicle share which would be approximately 2,200 electric vehicles.
- The forecast is based on the average of the Energy Information Administration and BloombergNEF forecasts
- The forecast is calibrated into the number of electric vehicles in CenterPoint's territory
- Incorporates assumptions regarding vehicles per household and miles traveled per year



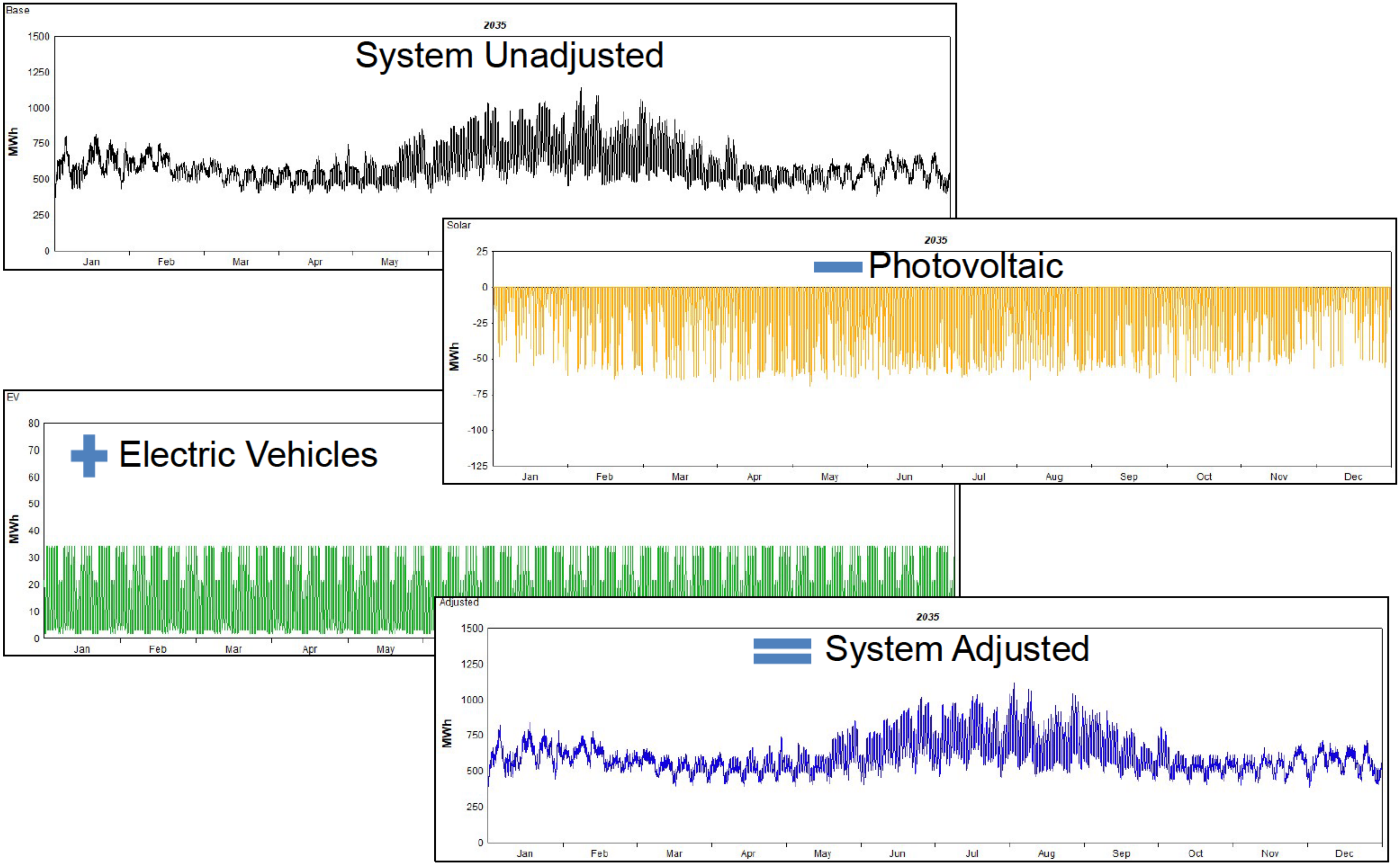
Peak Demand Model Forecast

- Peak demand is driven by heating, cooling, and base load requirements derived from the customer class forecasts

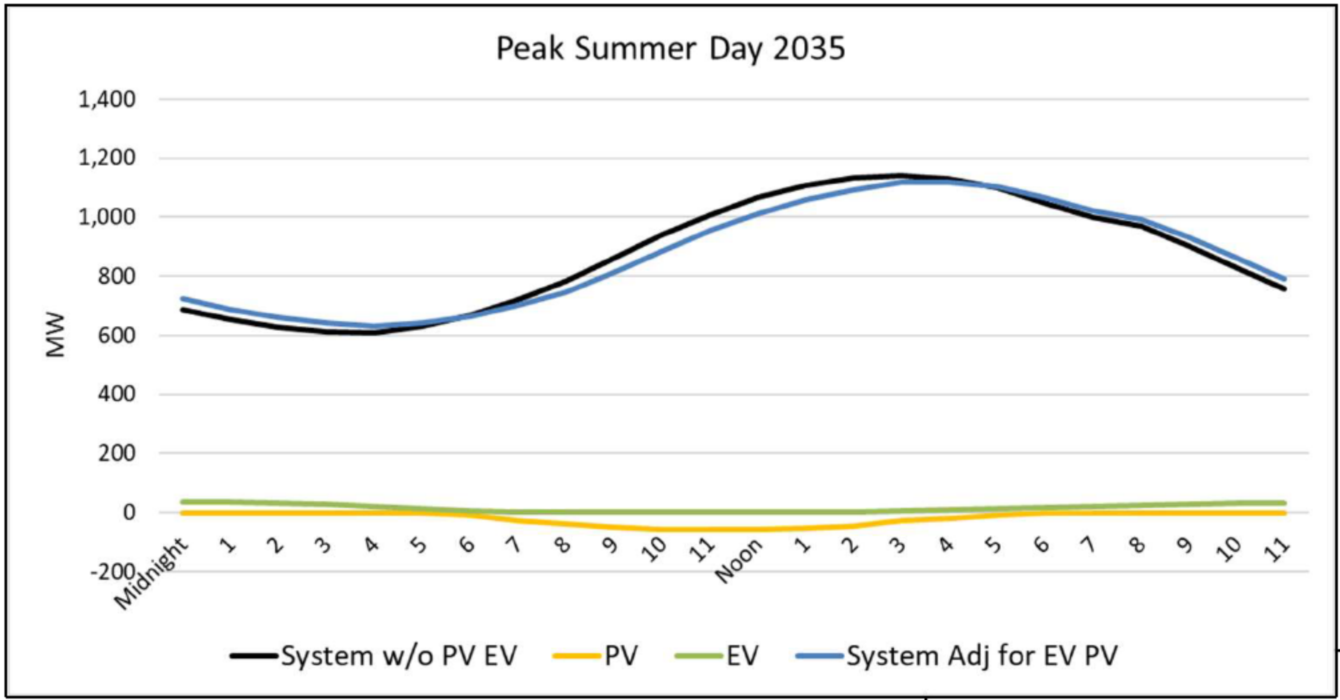


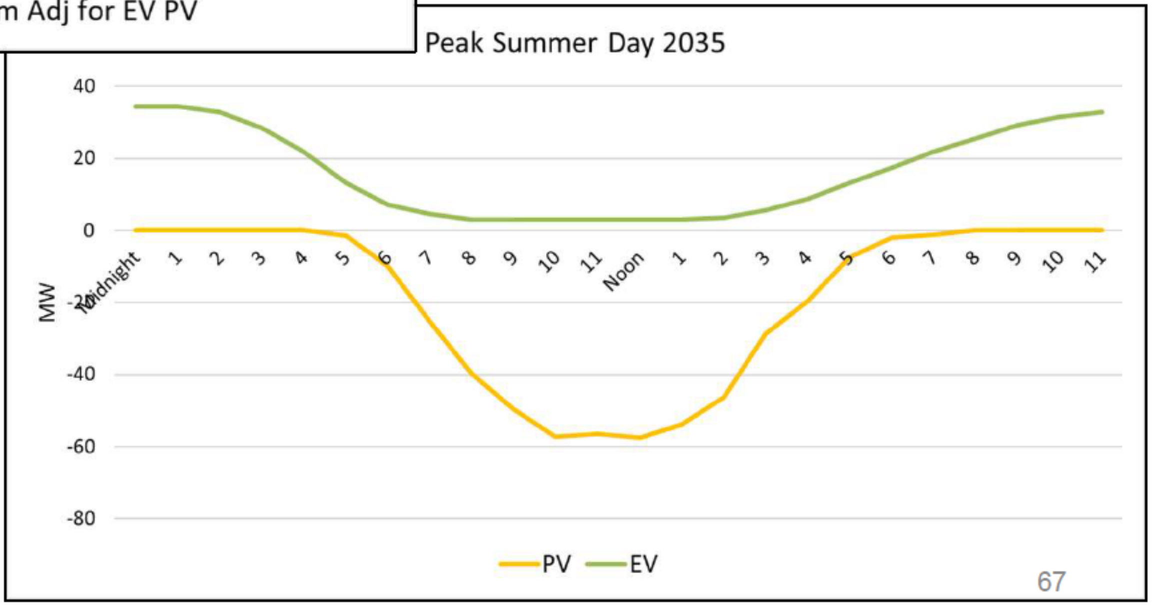
Combine Energy and Hourly Profiles

CenterPoint Energy



Hourly Shapes: Impact on Peak

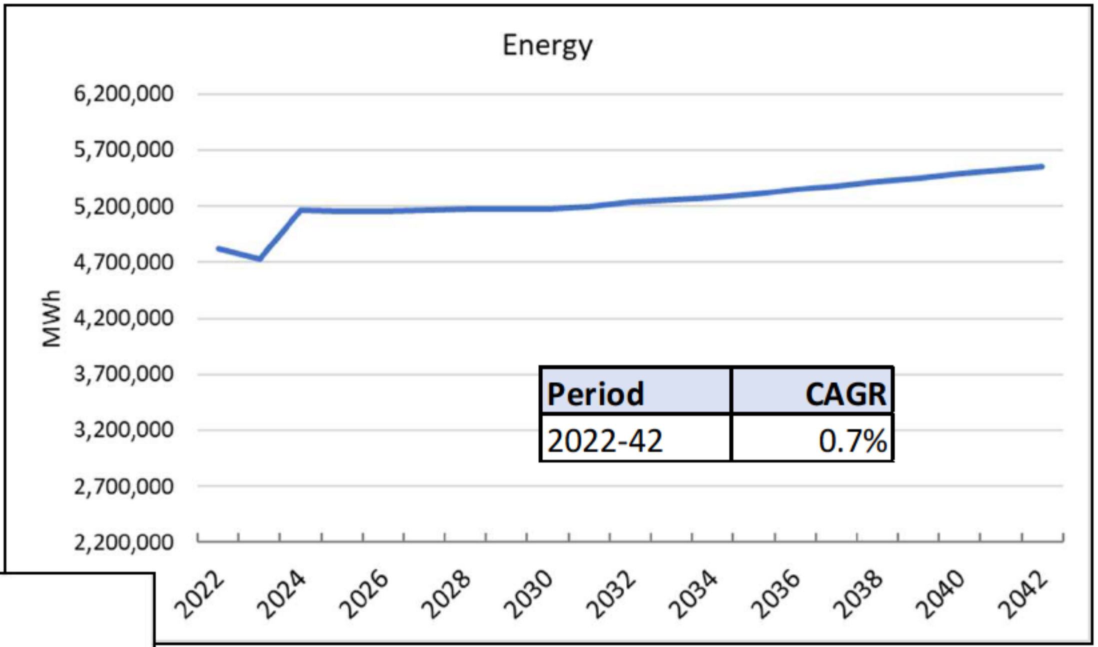


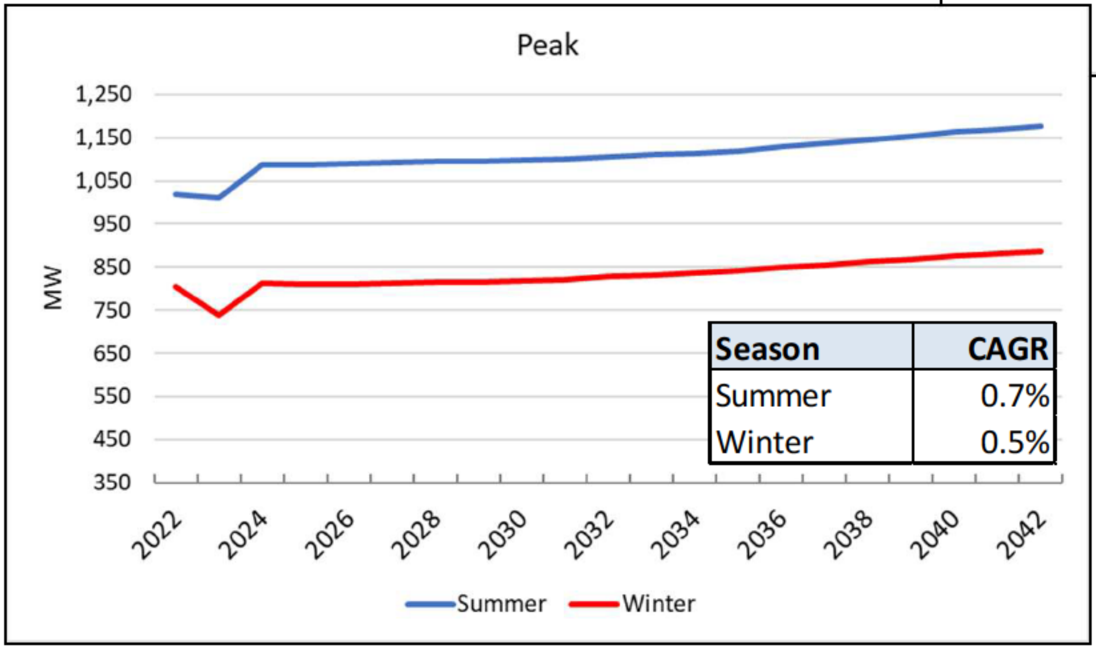


- PV and EV adoption will reshape system load over time
- Timing and level of peak impacted by change in system hourly load profile

Energy and Peak Forecast

- Does not include the impact of future CenterPoint efficiency program savings
- Includes the impact of photovoltaics and electric vehicles





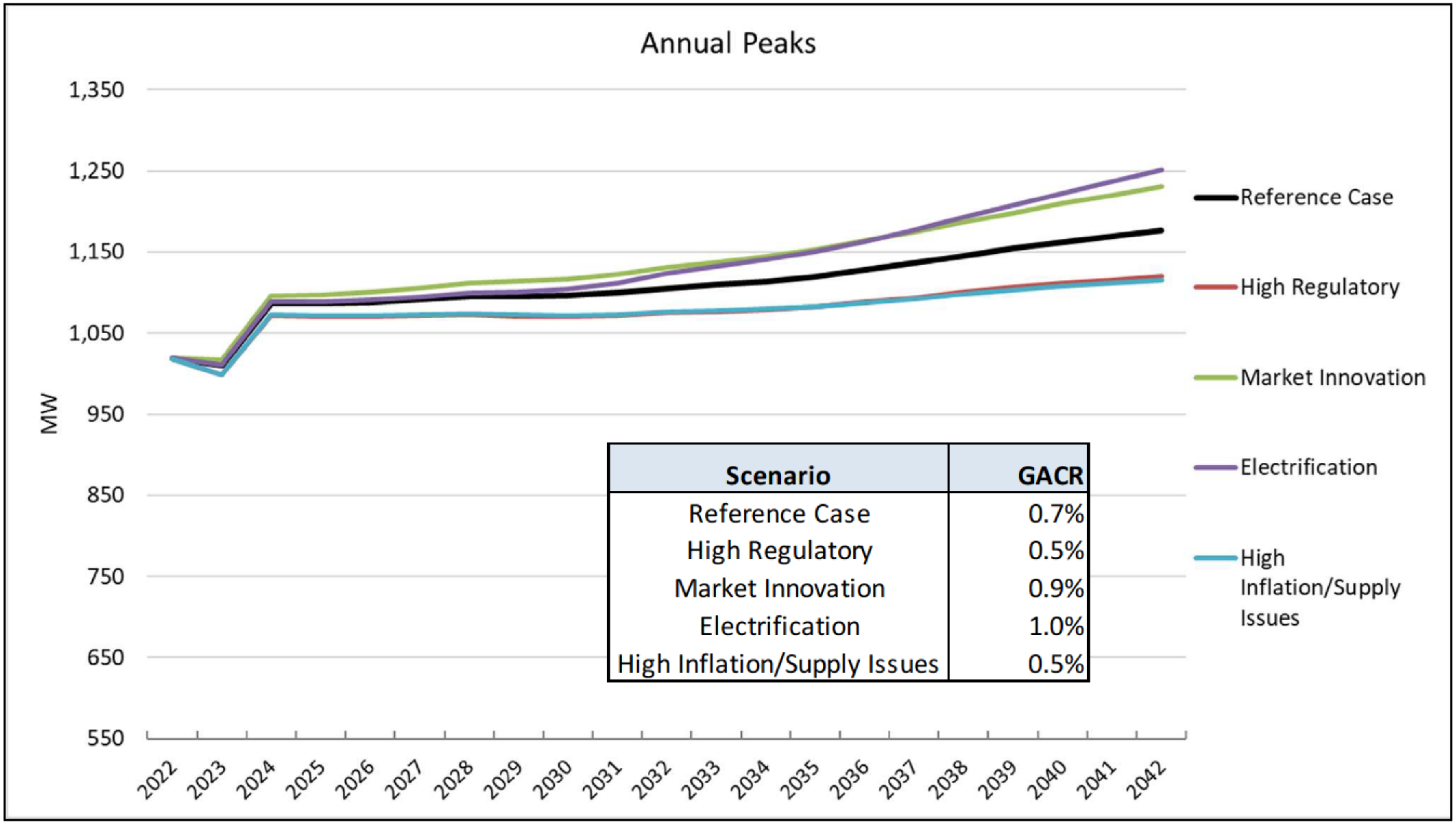
Scenario Assumptions

CenterPoint Energy

- **High Regulatory**= Lower load forecast driven by lower economic forecast
- **Market Driven Innovation**= Higher load forecast driven by higher economic forecast
- **Decarbonization\Electrification**= Higher load driven by increased adoption of electric water heaters, clothes dryers, and heat-pump heaters. Higher electric vehicle and solar forecast.
- **High Inflation & Supply Chain Issue**= Lower load forecast driven by lower economic forecast, lower electric vehicles and solar forecasts.

Scenario Peak Load Forecast

CenterPoint Energy



Scenario	GACR
Reference Case	0.7%
High Regulatory	0.5%
Market Innovation	0.9%
Electrification	1.0%
High Inflation/Supply Issues	0.5%

Q&A

CenterPoint Energy

Scenario and Probabilistic Modeling Approach and Assumptions

Brian Despard
Project Manager, Resource Planning & Market Assessments
1898 & Co.

Approach Overview

CenterPoint Energy

Objective: Utilize stochastic analysis around key IRP inputs to measure uncertainty around power supply portfolio costs.

<u>Two Purposes:</u>

1. Evaluate results of stochastic inputs analysis to inform on what inputs to use for various scenarios; and
2. Stochastically develop 200 “families” of correlated inputs to run through PCM – result will be probability distribution around power supply costs.

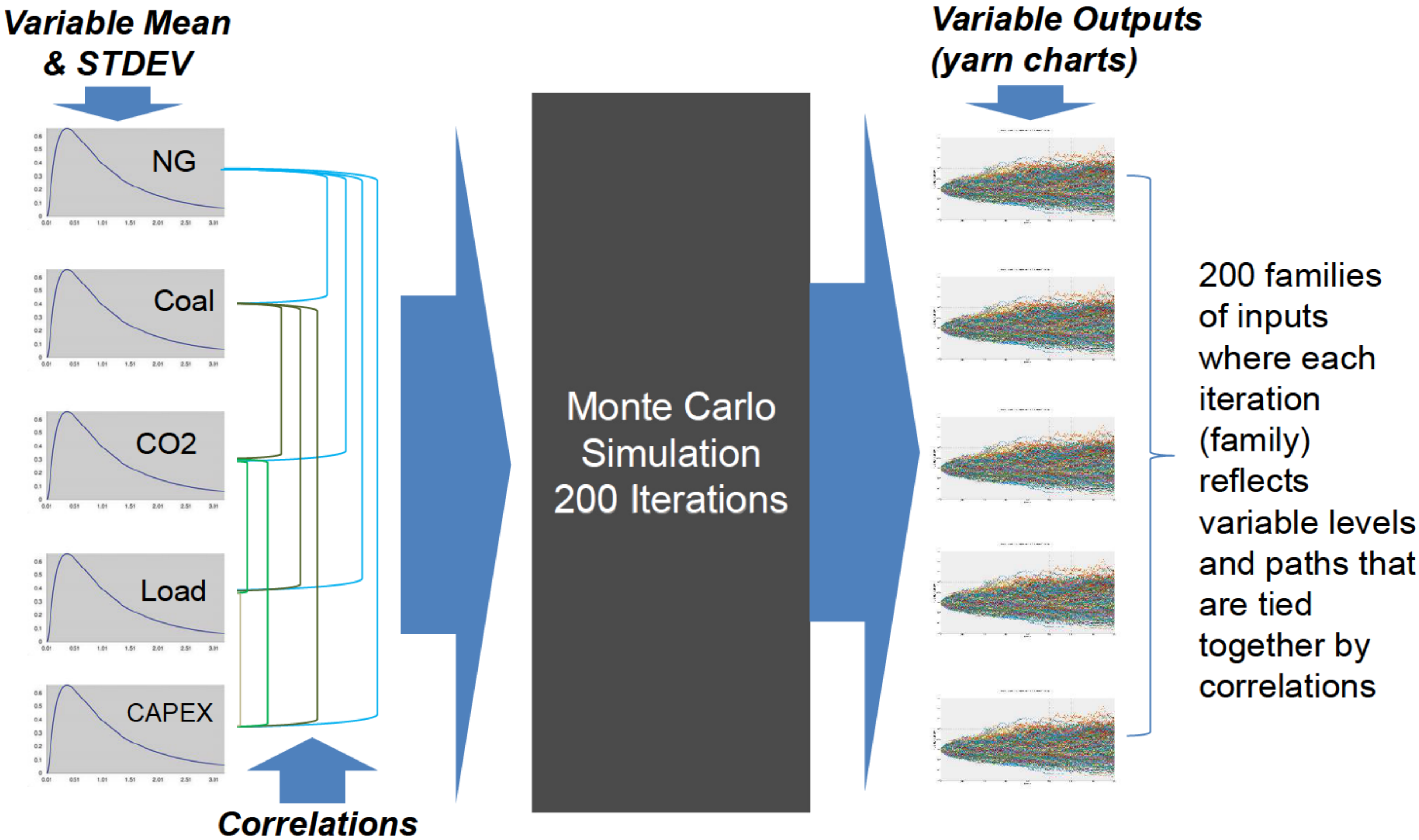
Uncertainty Variables

- Peak Demand
- Natural Gas (NG) Prices
- Coal Prices
- CO_2 Costs
- Renewable Development Costs

Stochastics Process Overview

1. Develop uncertainty variable parameters by month – expected value, volatility, correlations
2. Input variables into Monte Carlo simulation model
3. Run simulations with uncertainty variables being the output
4. Evaluate output implied distributions for each variable
5. Identify 200 sets of uncertainty variable "families"

Stochastics Process Overview



Uncertainty Variable Parameters Expected Values & Volatilities

CenterPoint Energy

Expected values (mean values): Reference Case forecasts for each variable

Volatilities (standard deviations):

- **Demand:** From various Itron demand scenarios
- **Natural gas pricing:** From ABB forecast Base/High/Low forecast
- **Coal pricing:** From variation in consensus forecasts
- **CO_2 Costs:** Reference case of zero and 2 high cases
- **Newbuild CAPEX**: NREL ATB range of costs

Uncertainty Variable Parameters Expected Correlations

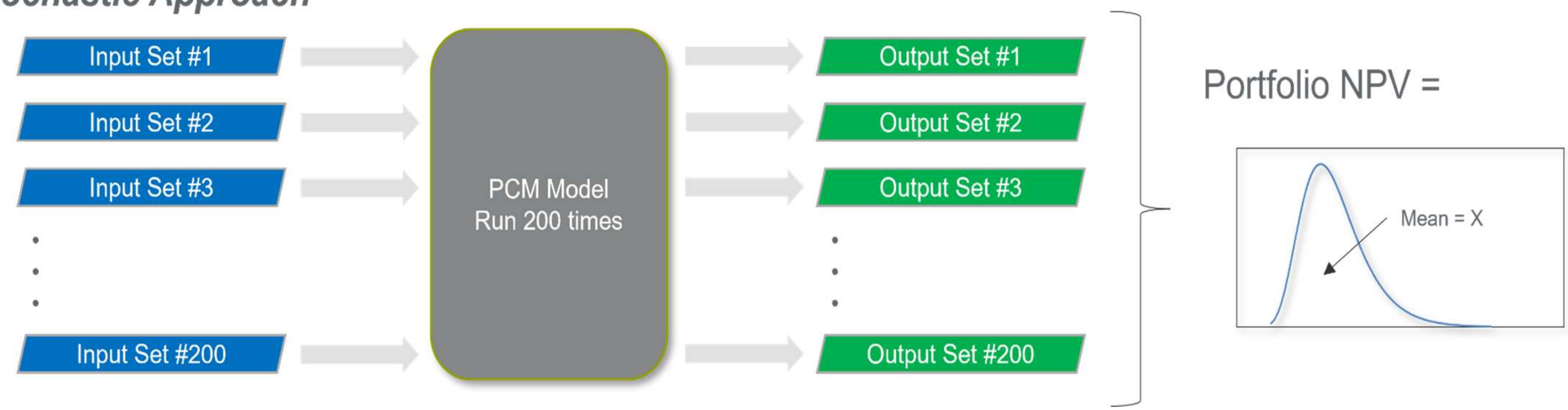
CenterPoint Energy

Variable	Demand	NG Price	Coal Price	CO_2 Cost	Dev CAPEX
Demand		Slightly Positive	Zero	Zero	Zero
NG Price	Slightly Positive		Slightly Negative	Negative	Positive
Coal Price	Zero	Slightly Negative		Negative	Zero
CO_2 Cost	Zero	Negative	Negative		Positive
Dev CAPEX	Zero	Positive	Zero	Positive	

Production Cost Modeling Stochastics Process Overview

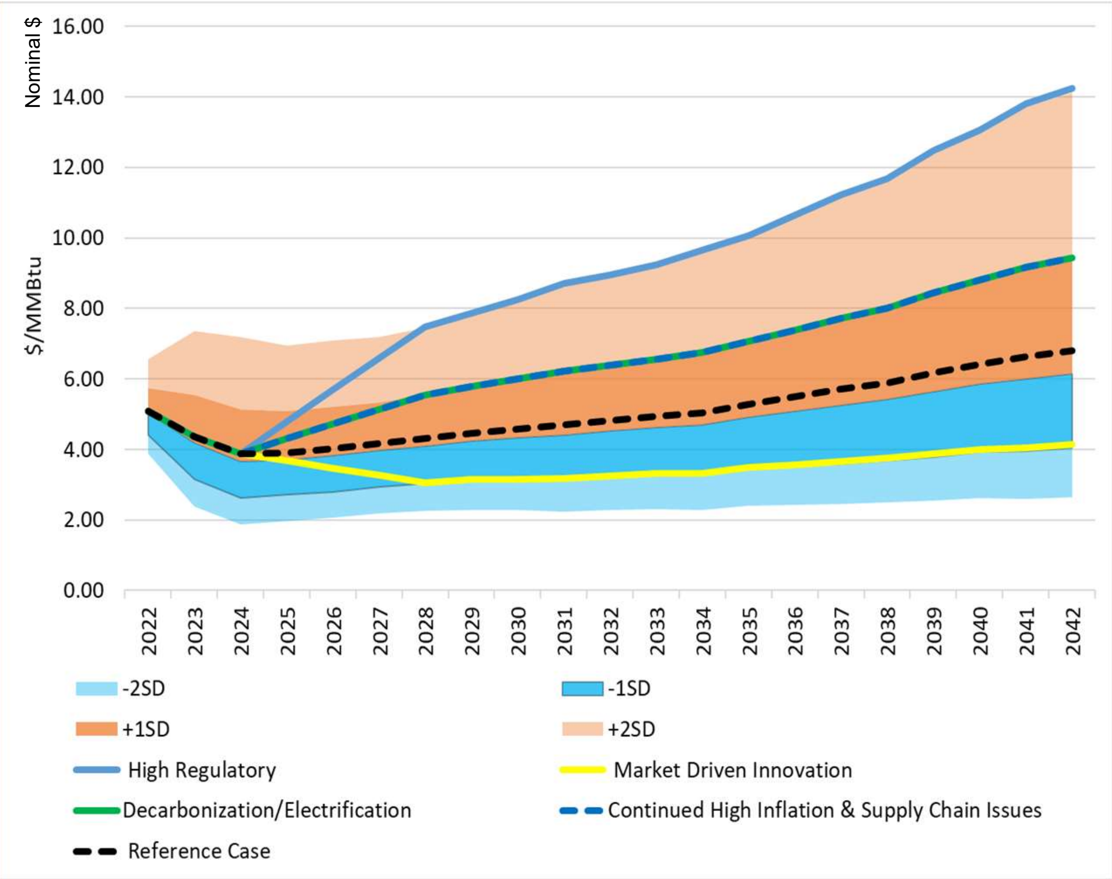
Typical Deterministic Approach

Stochastic Approach



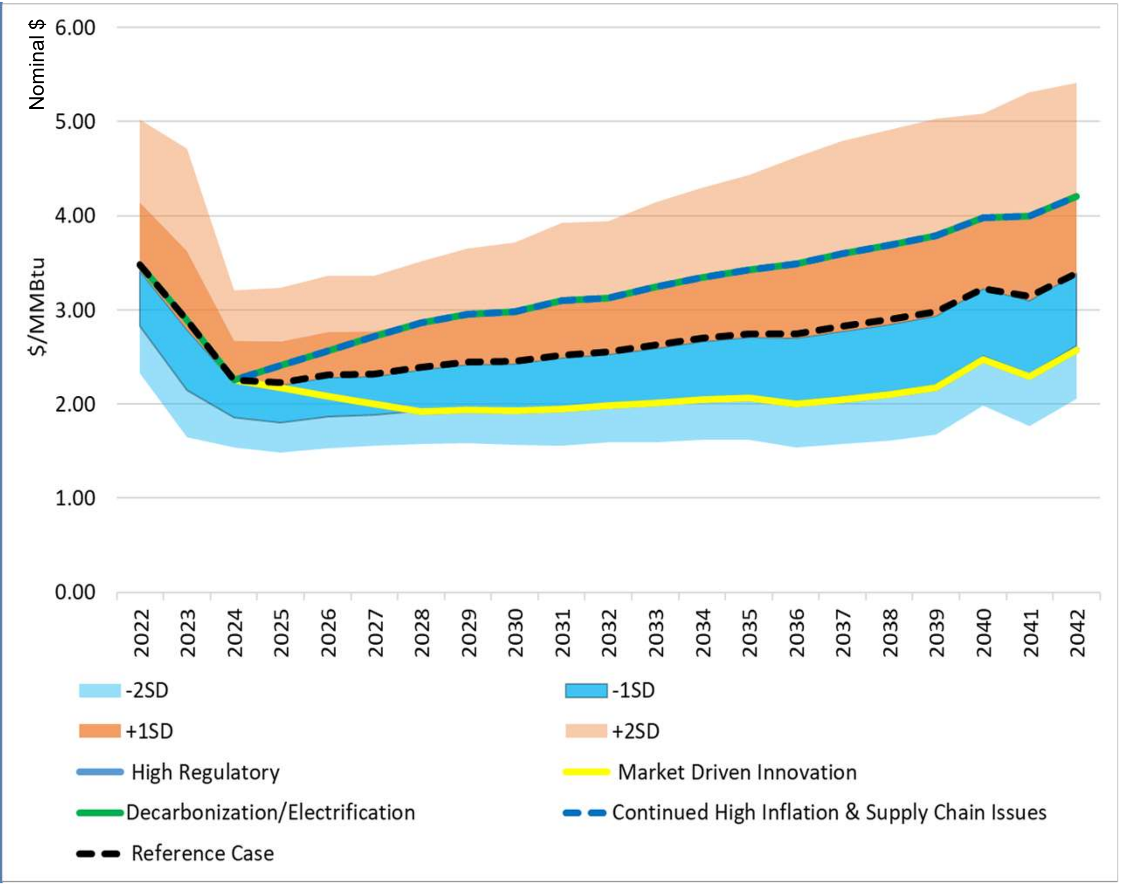
Scenario Inputs: Natural Gas Henry Hub ($/MMBtu)

Year	Reference Case	High Regulatory	Market Driven Innovation	Decarbonization/ Electrification	Continued High Inflation & Supply Chain Issues
2022	$5.08	$5.08	$5.08	$5.08	$5.08
2023	$4.36	$4.36	$4.36	$4.36	$4.36
2024	$3.89	$3.89	$3.89	$3.89	$3.89
2025	$3.90	$4.78	$3.68	$4.30	$4.30
2026	$4.02	$5.68	$3.47	$4.72	$4.72
2027	$4.16	$6.58	$3.27	$5.14	$5.14
2028	$4.31	$7.48	$3.06	$5.55	$5.55
2029	$4.47	$7.85	$3.14	$5.79	$5.79
2030	$4.58	$8.25	$3.16	$5.99	$5.99
2031	$4.71	$8.70	$3.18	$6.22	$6.22
2032	$4.83	$8.95	$3.26	$6.39	$6.39
2033	$4.94	$9.23	$3.32	$6.56	$6.56
2034	$5.05	$9.64	$3.32	$6.76	$6.76
2035	$5.29	$10.07	$3.49	$7.07	$7.07
2036	$5.49	$10.63	$3.57	$7.39	$7.39
2037	$5.70	$11.22	$3.66	$7.73	$7.73
2038	$5.89	$11.68	$3.76	$8.01	$8.01
2039	$6.17	$12.49	$3.87	$8.45	$8.45
2040	$6.42	$13.06	$4.00	$8.81	$8.81
2041	$6.63	$13.81	$4.05	$9.18	$9.18
2042	$6.81	$14.23	$4.15	$9.44	$9.44



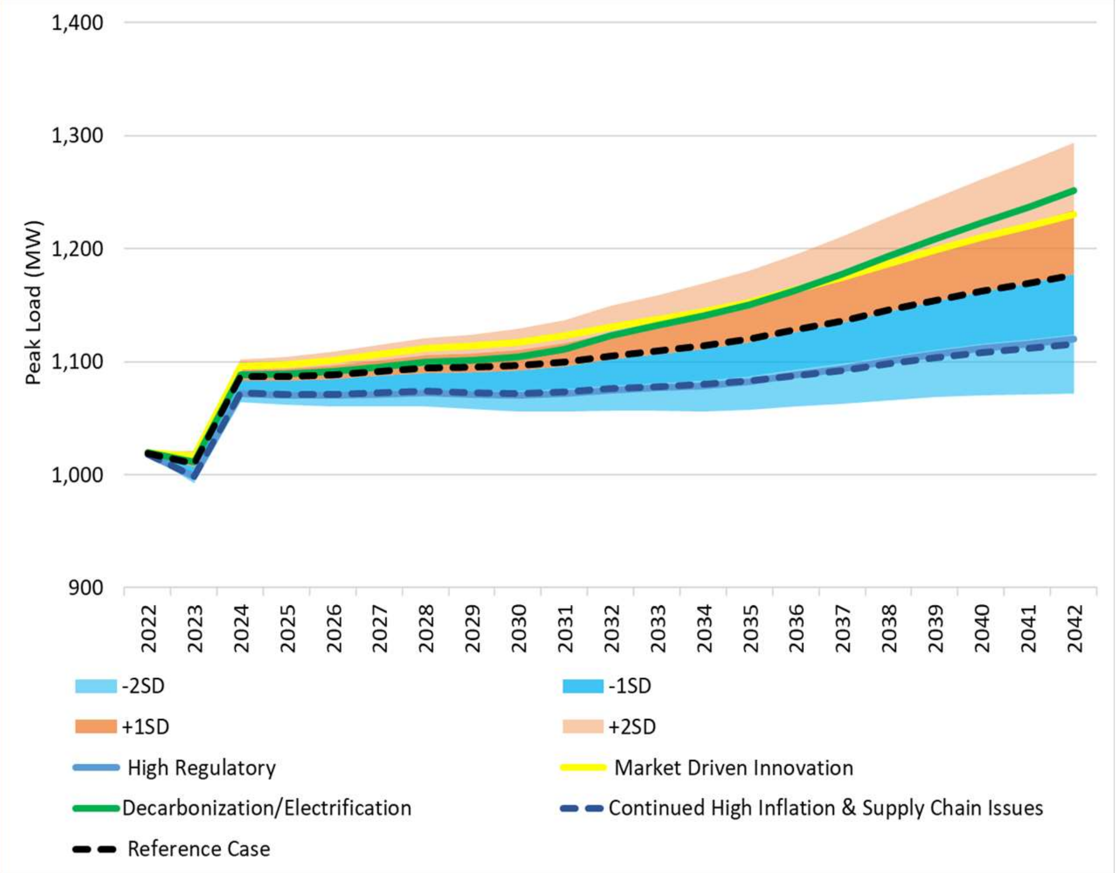
Scenario Inputs: Coal Illinois Basin fob Mine ($/MMBtu)

Year	Reference Case	High Regulatory	Market Driven Innovation	Decarbonization/ Electrification	Continued High Inflation & Supply Chain Issues
2022	$3.48	$3.48	$3.48	$3.48	$3.48
2023	$2.89	$2.89	$2.89	$2.89	$2.89
2024	$2.26	$2.26	$2.26	$2.26	$2.26
2025	$2.23	$2.41	$2.17	$2.41	$2.41
2026	$2.31	$2.56	$2.09	$2.56	$2.56
2027	$2.32	$2.71	$2.00	$2.71	$2.71
2028	$2.39	$2.87	$1.91	$2.87	$2.87
2029	$2.44	$2.95	$1.94	$2.95	$2.95
2030	$2.46	$2.98	$1.93	$2.98	$2.98
2031	$2.52	$3.10	$1.94	$3.10	$3.10
2032	$2.56	$3.13	$1.98	$3.13	$3.13
2033	$2.63	$3.25	$2.01	$3.25	$3.25
2034	$2.70	$3.34	$2.04	$3.34	$3.34
2035	$2.75	$3.43	$2.06	$3.43	$3.43
2036	$2.75	$3.49	$2.00	$3.49	$3.49
2037	$2.83	$3.60	$2.05	$3.60	$3.60
2038	$2.90	$3.69	$2.10	$3.69	$3.69
2039	$2.98	$3.79	$2.18	$3.79	$3.79
2040	$3.23	$3.98	$2.48	$3.98	$3.98
2041	$3.14	$4.00	$2.29	$4.00	$4.00
2042	$3.39	$4.21	$2.58	$4.21	$4.21



Scenario Inputs: Peak Load

Year	Reference Case	High Regulatory	Market Driven Innovation	Decarbonization/ Electrification	Continued High Inflation & Supply Chain Issues
2022	1,019	1,018	1,020	1,019	1,018
2023	1,010	999	1,017	1,011	999
2024	1,087	1,072	1,096	1,088	1,072
2025	1,087	1,070	1,097	1,089	1,071
2026	1,088	1,070	1,101	1,091	1,071
2027	1,092	1,071	1,106	1,095	1,073
2028	1,095	1,072	1,111	1,099	1,074
2029	1,095	1,071	1,114	1,101	1,073
2030	1,096	1,070	1,117	1,104	1,072
2031	1,100	1,072	1,123	1,111	1,073
2032	1,105	1,075	1,131	1,123	1,076
2033	1,110	1,077	1,137	1,132	1,078
2034	1,114	1,079	1,144	1,141	1,080
2035	1,120	1,082	1,153	1,151	1,083
2036	1,128	1,088	1,164	1,163	1,088
2037	1,136	1,094	1,174	1,178	1,092
2038	1,145	1,100	1,187	1,193	1,098
2039	1,154	1,106	1,198	1,208	1,103
2040	1,162	1,112	1,210	1,223	1,108
2041	1,169	1,116	1,220	1,237	1,112
2042	1,177	1,120	1,230	1,252	1,116

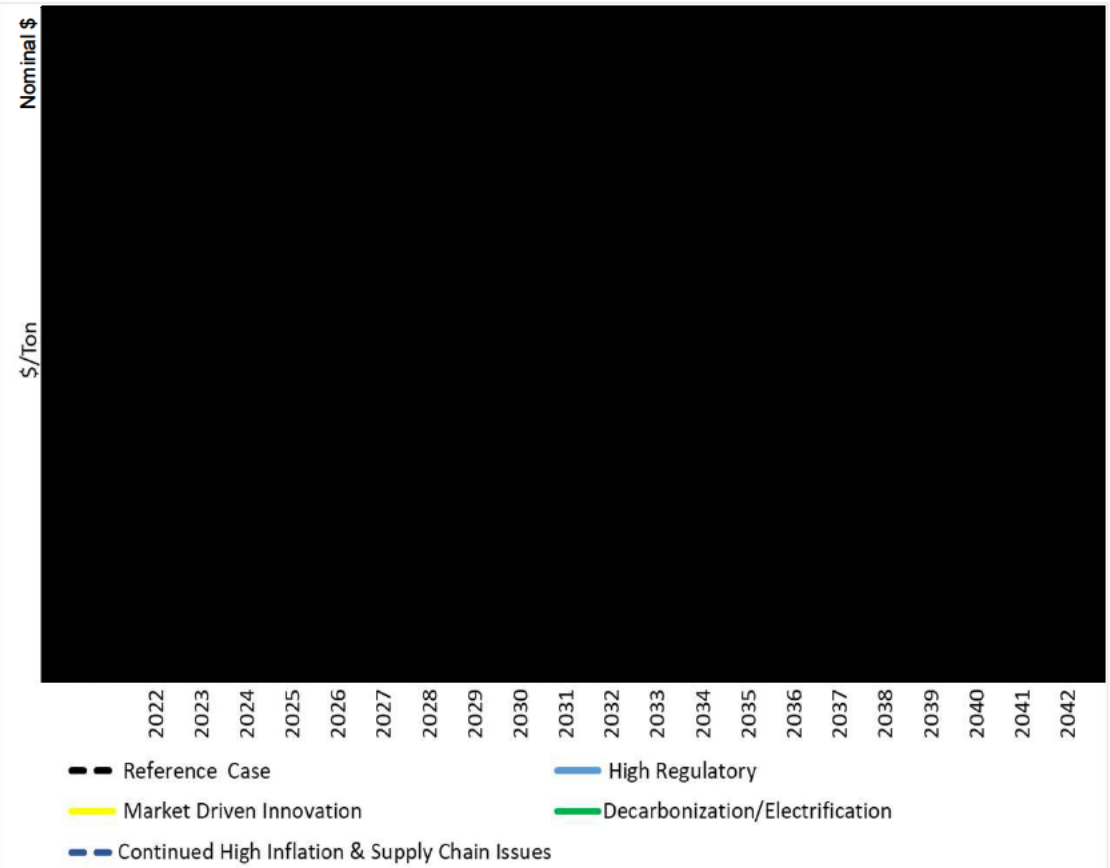


Confidential
Scenario Inputs: CO2 Price ($/TON)

CenterPoint Energy

Based on Confidential ABB Forecast

Year	Reference Case	High Regulatory	Market Driven Innovation	Decarbonization/ Electrification	Continued High Inflation & Supply Chain Issues
2022	$0	[redacted]	$0	[redacted]	$0
2023	$0	[redacted]	$0	[redacted]	$0
2024	$0	[redacted]	$0	[redacted]	$0
2025	$0	[redacted]	$0	[redacted]	$0
2026	$0	[redacted]	$0	[redacted]	$0
2027	$0	[redacted]	$0	[redacted]	$0
2028	$0	[redacted]	$0	[redacted]	$0
2029	$0	[redacted]	$0	[redacted]	$0
2030	$0	[redacted]	$0	[redacted]	$0
2031	$0	[redacted]	$0	[redacted]	$0
2032	$0	[redacted]	$0	[redacted]	$0
2033	$0	[redacted]	$0	[redacted]	$0
2034	$0	[redacted]	$0	[redacted]	$0
2035	$0	[redacted]	$0	[redacted]	$0
2036	$0	[redacted]	$0	[redacted]	$0
2037	$0	[redacted]	$0	[redacted]	$0
2038	$0	[redacted]	$0	[redacted]	$0
2039	$0	[redacted]	$0	[redacted]	$0
2040	$0	[redacted]	$0	[redacted]	$0
2041	$0	[redacted]	$0	[redacted]	$0
2042	$0	[redacted]	$0	[redacted]	$0



Q&A

CenterPoint Energy

Portfolio Development

Matt Lind
Director, Resource Planning & Market Assessments
1898 & Co.

Existing Resource Options

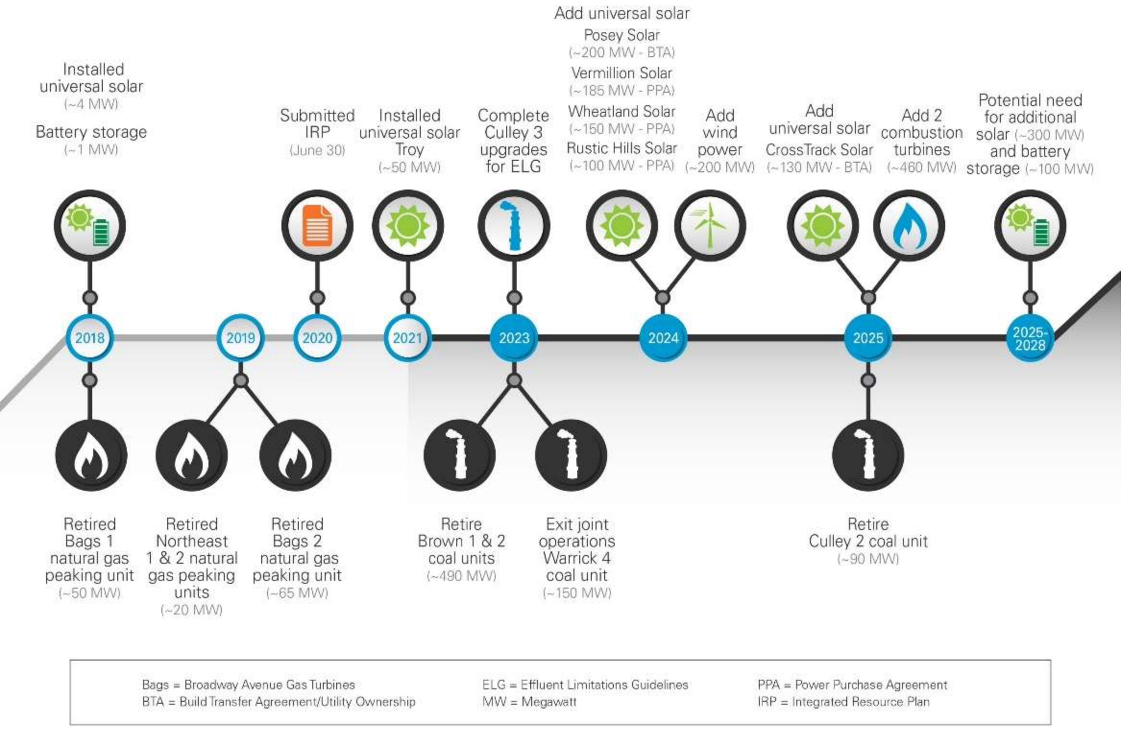
	Unit	Fuel	Retire 2023	Retire 2025	Retire 2030	Retire 2034	Natural Gas Conversion	BAU	PPA Expires 2028	PPA Expires 2030	PPA Expires 2038
Owned Resources	A.B. Brown 1	Coal	X								
	A.B. Brown 2	Coal	X								
	F.B. Culley 2	Coal		X*			X				
	F.B. Culley 3	Coal			X	X	X	X			
	Warrick 4	Coal	X	X							
	OVEC	Coal						X			
	A.B. Brown 3	Natural Gas			X	X		X			
	A.B. Brown 4	Natural Gas			X	X		X			
	A.B. Brown 5	Natural Gas						X			
	A.B. Brown 6	Natural Gas						X			
	Troy Solar	Solar						X			
	Posey Solar - BTA	Solar						X			
	Crosstrack Solar - BTA	Solar						X			
	Future Wind (200 MW) - BTA	Wind						X			
PPA's	Rustic Hills Solar -PPA	Solar						X			
	Knox County Solar - PPA	Solar						X			
	Vermillion County Solar - PPA	Solar									X
	Benton County Wind	Wind							X		
	Fowler Ridge Wind	Wind								X	

*Pending Indiana Department of Environmental Management approval

Draft Reference Case New Resource Options

Type	Resource	Start year	Model Starting Point Limitations	Installed Capacity
RE and Storage	Hydroelectric	TBD	2 units	
	Wind	2026	600 MW per year	200 MW
	Wind Plus Storage	2026	600 MW per year	50 MW wind (10 MW/40 MWh Battery)
	Solar Photovoltaic	2025	600 MW per year	10,50,100 MW
	Solar Plus Storage	2025	600 MW per year	50 MW PV (10 MW/40 MWh Battery)
	Lithium-Ion Battery Storage	2025	600 MW per year	10 MW / 40 MWh, 50 MW / 200 MWh, 100 MW / 400 MWh
	Long Duration Storage	2027	600 MW per year	300 MW / 3,000 MWh
Demand Side Management	V1 - Bundles broken by sector	2025-2027		
	V2 - Bundles broken by sector	2028-2030		
	V3 - Bundles broken by sector	2031-2042		
Coal	Supercritical with CCS	2030	Max 1 unit	500 MW
	Ultra supercritical with CCS	2030	Max 1 unit	750 MW
Combined Cycle	1x1 F Class CCGT Unfired	2027	Max 2 units	365 MW
	1x1 F Class CCGT Fired	2027	Max 2 units	363 MW
	1x1 G/H Class CCGT Unfired	2027	Max 2 units	431 MW
	1x1 G/H Class CCGT Fired	2027	Max 2 units	428 MW
	1x1 J Class CCGT Unfired	2027	Max 1 unit	551 MW
	2x1 J Class CCGT Fired	2027	Max 1 unit	1,101 MW
	Brown 5 & 6 Retrofit	2027	Max 1 unit	257 MW
Gas Turbine	1x F Class Frame SCGT	2026	Max 3 units	229 MW
	1x G/H Class Frame SCGT	2026		287 MW
	1x J-Class Frame SCGT	2026		372 MW
	Wartsila 20V34SG	2026	Max 3 units	54 MW
	Wartsila 18V50SG	2026	Max 3 units	108 MW
Co-Gen	22 MW Cogen	2026	Max 1 unit	22 MW
Nuclear	Small Modular Reactor	2029	TBD	TBD

IRP Portfolio Decisions



- FB Culley 2 & 3 conversion or retirement decision is a key part of this IRP.
- With MISO’s shift to seasonal construct there is a capacity shortfall in 2024 prior to the CTs coming online and then in 2028 into the future.
- Will analyze a wide range of portfolios that provide insights around the FB Culley decision and the future resource mix.

Range of IRP Portfolios

- Business as Usual (Continue to run FB Culley 3 through 2042)
- Scenario Based Portfolios
  - Reference Case
  - High Regulatory
  - Market Driven Innovation
  - Decarbonization/Electrification
  - Continued High Inflation & Supply Chain Issues
- Replacement of FB Culley 2 & 3
  - Retire FB Culley 3 by 2030
    - Replace with non-thermal (Wind, Solar, Storage)
    - Replace with thermal (CCGT, CT)
  - Retire FB Culley 3 by 2034
    - Replace with non-thermal (Wind, Solar, Storage)
    - Replace with thermal (CCGT, CT)
  - FB Culley 2 or 3 gas conversion
  - FB Culley 2 & 3 gas conversion

CenterPoint Energy

Q&A

CenterPoint Energy

Draft Reference Case Modeling Results

Matt Lind
Director, Resource Planning & Market Assessments
1898 & Co.

Draft Modeling Results

CenterPoint Energy

- The incorporation of the IRA has delayed draft modeling results.
- A technical call has been scheduled for October 31st with those that have signed a NDA.
- Supplemental slides will be posted to the www.CenterPointEnergy.com/irp

Q&A

Appendix

Definitions

CenterPoint Energy

Term	Definition
ACE	Affordable Clean Energy (ACE) Rule, establishes emission guidelines for states to develop plans to address greenhouse gas emissions from existing coal-fired power plants
All-Source RFP	Request for proposals, regardless of source (renewable, thermal, storage, demand response)
BAGS	Broadway Avenue Gas Turbine
BTA	Build Transfer Agreement/Utility Ownership
C&I	Commercial and Industrial
CAA	Clean Air Act
CAGR	Compound Annual Growth Rate
Capacity	The maximum output of electricity that a generator can produce under ideal conditions (megawatts)
CCGT	A combined-cycle power plant uses both a gas and a steam turbine together to produce up to 50 percent more electricity from the same fuel than a traditional simple-cycle plant. The waste heat from the gas turbine is routed to the nearby steam turbine, which generates extra power
CCR Rule	Coal Combustion Residuals Rule
CCS	Carbon Capture and Storage
CDD	Cooling Degree Day
CEI South	CenterPoint Energy Indiana South
CO_2	Carbon dioxide

Definitions Cont.

Term	Definition
CONE	Cost of New Entry
CPCN	A Certificate of Public Convenience and Necessity is required to be granted by the Commission for significant generation projects
CSAPR	Cross State Air Pollution Rule
DER	Distributed Energy Resource
Deterministic Modeling	Simulated dispatch of a portfolio in a determined future. Often computer generated portfolios are created by optimizing on cost to the customer
DLC	Direct Load Control
DR	Demand Response
DSM	Demand side management includes both Energy Efficiency and Demand Response programs to reduce customer demand for electricity
EE	Energy Efficiency
ELCC	Effective Load Carrying Capability
ELG	Effluent Limitation Guidelines are U.S. national standards for wastewater discharges to surface waters and publicly owned treatment works
EnCompass	Electric modeling forecasting and analysis software
Energy	Amount of electricity (megawatt-hours) produced over a specific time period

Definitions Cont.

CenterPoint Energy

Term	Definition
EPA	Environmental Protection Agency
FERC	Federal Energy Regulatory Commission
GW	Gigawatt (1,000 million watt), unit of electric power
GWh	Gigawatt Hour
HDD	Heating Degree Day
Henry Hub	Point of interconnection of interstate and intrastate natural gas pipelines as well as other related infrastructure in Erath, Louisiana
IDEM	Indiana Department of Environmental Management
Installed Capacity (ICAP)	Refers to generating capacity after ambient weather adjustments and before forced outages adjustments
Intermittent	An intermittent energy source is any source of energy that is not continuously available for conversion into electricity and outside direct control
IRP	Integrated Resource Plan is a comprehensive plan to meet customer load expectations
IURC	The Indiana Utility Regulatory Commission is the public utilities commission of the State of Indiana. The commission regulates electric, natural gas, telecommunications, steam, water and sewer utilities
KWh	Kilowatt Hour

Definitions Cont.

Term	Definition
LCOE	Levelized Cost of Energy, A measure that looks at cost and energy production over the life of an asset so different resources can be compared. Does not account for capacity value.
LMR	Load Modifying Resource
Local Clearing Requirement (LCR)	Capacity needs to be fulfilled by local resource zone
LRZ6	MISO Local Resource Zone 6
MATS	Mercury and Air Toxics Standard
Mine Mouth	At the mine location
MISO	Midcontinent Independent System Operator, an Independent System Operator (ISO) and Regional Transmission Organization(RTO) providing open-access transmission service and monitoring the high-voltage transmission system in the Midwest United States and Manitoba, Canada and a southern United States region which includes much of Arkansas, Mississippi, and Louisiana. MISO also operates one of the world's largest real-time energy markets
MMBTU	Million British Thermal Units
MPS	Market potential study - Determines the total market size (value/volume) for a DSM at a given period of time
MSA	Metropolitan Statistical Area
MW	Megawatt (million watt), unit of electric power
NAAQS	National Ambient Air Quality Standards

Definitions Cont.

CenterPoint Energy

Term	Definition
Name Plate Capacity	The intended full-load sustained output of a generation facility
NDA	Non-Disclosure Agreement
NOI	Notice of Intent
NO_x	Nitrogen Oxides
NPDES	National Pollutant Discharge Elimination System
NPVRR	Net Present Value Revenue Requirement
NSPS	New Source Performance Standards
OMS	Organization of MISO States, was established to represent the collective interests of state and local utility regulators in the Midcontinent Independent System Operator (MISO) region and facilitate informed and efficient participation in related issues.
Peaking	Power plants that generally run only when there is a high demand, known as peak demand, for electricity
Planning Reserve Margin Requirement (PRMR)	Total capacity obligation each load serving entity needs to meet
Portfolio	A group of resources to meet customer load
PPA	Purchase Power Agreement

Definitions Cont.

Term	Definition
Preferred Portfolio	The IRP rule requires that utilities select the portfolio that performs the best, with consideration for cost, risk, reliability, and sustainability
Probabilistic modeling	Simulate dispatch of portfolios for a number of randomly generated potential future states, capturing performance measures
PV	Photovoltaic
RA (Resource Adequacy)	RA is a regulatory construct developed to ensure that there will be sufficient resources available to serve electric demand under all but the most extreme conditions
RAP	Realistic Achievable Potential
Resource	Supply side (generation) or demand side (Energy Efficiency, Demand Response, Load Shifting programs) to meet planning reserve margin requirements
SAC	Seasonal Accredited Capacity
Scenario	Potential future State-of-the-World designed to test portfolio performance in key risk areas important to management and stakeholders alike
SDE	Spray Dryer Evaporator
Sensitivity Analysis	Analysis to determine what risk factors portfolios are most sensitive to
SIP	State Implementation Plan
Spinning Reserve	Generation that is online and can quickly respond to changes in system load

Definitions Cont.

Term	Definition
T&D	Transmission and Distribution
Technology Assessment	An analysis that provides overnight and all-in costs and technical specifications for generation and storage resources
Unforced Capacity (UCAP)	A unit's generating capacity adjusted down for forced outage rates (thermal resources) or expected output during peak load (intermittent resources)
VAR Support	Unit by which reactive power is expressed in an AC electric power system
ZLD	Zero Liquid Discharge

Timeline for Updating Forecasts

- CEI South will incorporate updates into the modeling that are received by mid November. Additionally, CEI South is considering updating near term gas costs based on NYMEX per stakeholder feedback.

Vendor Name	Future Updates
ABB Hitachi	Hitachi is currently targeting a mid-Nov release for the Fall 2022 Power Reference Case that will incorporate major clean energy and transportation related provisions under the Inflation Reduction Act of 2022.
EVA Inc	Updates were delivered in September.
S&P Global	The Q3 2022 Power Forecast will be available on October 19^{th}, 2022.
Wood Mac	The next LTO will be in November 2022.

NYMEX Futures as of 10/3/22