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BROWNSVILLE PUBLIC UTILITIES BOARD

Integrated Resource Plan Workshop #1

DECEMBER 18, 2024

Agenda

1. Introduction to Integrated Resource Planning
2. Megatrends
3. Workshop Plan
4. Key Tasks of Integrated Resource Plan
5. Load Forecast
6. Base Case
7. Scenarios
8. Project Schedule

What is an IRP?

An Integrated Resource Plan (IRP) is a strategic, long-term roadmap that utilities develop to meet their customers' energy needs reliably, cost-effectively, and sustainably over a specific time horizon (5-20 years). Key components include:

1. Demand Forecasting
2. Supply-Side Resources
3. Demand-Side Management (DSM)
4. Environmental and Regulatory Considerations
5. Economic Analysis
6. Risk Management

Why Do We Conduct IRPs?

1. Reliability: To ensure uninterrupted service.
2. Cost-Effectiveness: To find the least-cost resource mix.
3. Sustainability: To incorporate renewable energy and reduce emissions.
4. Regulatory Compliance: To meet legal and policy requirements.
5. Stakeholder Engagement: To include diverse perspectives.
6. Strategic Planning: To address future uncertainties.

BPUB Integrated Resource Plan

- BPUB's last IRP was conducted in 2020
- Significant changes in the ERCOT market, federal and state legislation, technology, local economy, and BPUB's existing generation fleet compel the development of a new IRP
- BPUB is conducting an IRP in 2024
- BPUB and the Board request that PUBCAP provide a public process and serve as the "voice of the customer"
- Approval of a new IRP by the Board is expected in early 2025

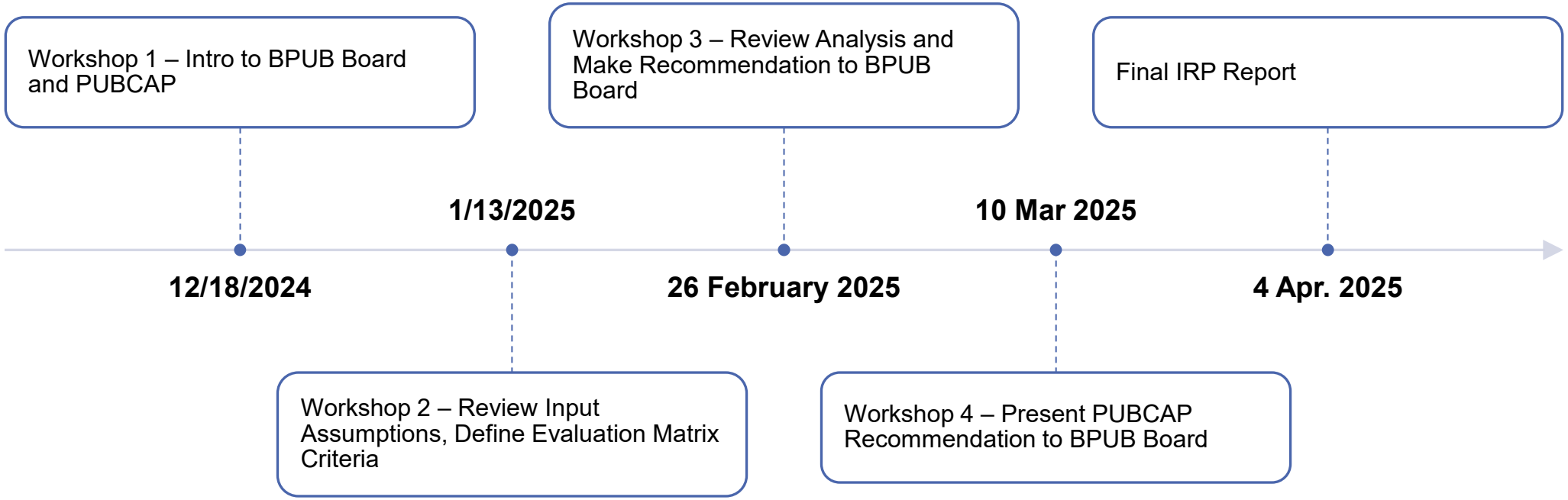
BPUB Board and PUBCAP Contributions

- Establish Goals and Evaluation Criteria
  - Economic: Least cost per MWh, fuel source
  - Efficiency and/or Renewable Energy: Wind, solar, percentage of renewables
  - Innovative Options: Distributed generation
  - Rate Stability: Stable rate vs. lowest possible rate
- Assist throughout the IRP in reviewing the methodology and assumptions
  - Review and provide input on assumptions
  - Review the resource plan analysis methodology to be used
- Provide Input on resource planning results
  - All information is confidential

Electric Utility Industry Transformations Driven by Megatrends

- **Electrification Across Sectors**: There's a substantial shift towards electrifying transportation, buildings, and industrial processes. This transition is projected to potentially triple U.S. electricity demand by 2050, necessitating substantial upgrades to grid infrastructure to ensure reliability and capacity.
- **Integration of Renewable Energy**: Utilities are increasingly incorporating renewable energy sources like solar and wind into the grid. This integration requires advanced grid management strategies to handle the variability of these energy sources and to maintain grid stability.
- **Advancements in Digitalization and Smart Grids**: The deployment of smart grid technologies enables real-time monitoring and control of the electricity network. This digital transformation enhances operational efficiency, supports the integration of distributed energy resources, and improves customer engagement.
- **Rising Energy Demand from AI and Data Centers**: The proliferation of artificial intelligence applications and data centers is significantly increasing electricity consumption. Utilities are adapting by expanding capacity and exploring sustainable energy solutions to meet this growing demand.
- **Focus on Grid Resilience and Reliability**: In response to extreme weather events and cybersecurity threats, there's an intensified focus on enhancing grid resilience. Investments are directed towards modernizing infrastructure to ensure a reliable and secure energy supply.
- **Regulatory and Policy Changes**: Government initiatives, such as the Inflation Reduction Act, are influencing utility operations by promoting clean energy investments and setting decarbonization targets. Utilities must navigate these policies while balancing affordability and reliability for consumers.

Workshop Plan



Workshop #1 – IRP Introduction to Board and PUBCAP

- Date: 12/18/2024 – 2 Hr. Mtg.
- Introduction to IRP
- Electric utility industry mega trends
- Review workshop plan
- Overview of IRP Process
- Introduction to scenarios

Workshop #2 with PUBCAP – Assumptions, Evaluation Matrix

- Date: 1/13/2024 – 3 Hr. Mtg.
- Introduction to IRP variables and assumptions
  - Load forecast
  - DSM
  - EE
  - Fuel costs
  - Environmental regulations
  - Energy prices
  - Emerging generation technologies
  - New resource options
- Evaluation Matrix
  - Select non-price evaluation criteria and define
  - Develop non-price evaluation criteria weightings

Workshop #3 with PUBCAP – Review Analysis

- Date: February 26, 2025 – 3 Hr. Mtg.
- Review analysis of candidate resource plans
- PUBCAP recommends preferred plan to the BPUB Board

Workshop #4 – BPUB Board to Review PUBCAP recommendation

- Date: 3/10/2025 Board meeting – 1.5 Hr. Mtg
- Present PUBCAP preferred plan to the BPUB Board
  - Review PUBCAP discussion and analysis in determining preferred plan
- Final IRP Report delivered electronically 4/4/2025

Key Tasks of the IRP Process

- **Kickoff Meeting**
  - Establish projects goals.
  - Request, review and analyze historical data
- **Load Forecast Development**
  - Forecast for BPUB load zone under 3 scenarios:
    - High weather impact
    - Low weather impact
    - Base case with weighted commercial/industrial load
- **Load and Resource Balancing**
  - Analyze load against available resources for optimal alignment.
  - Review and analyze historical data
- **Base Case Development**
  - Incorporate: Existing generation resources, Power Purchase Agreements (PPAs), Demand-Side Management/Energy Efficiency (DSM/EE) programs

Key Tasks of the IRP Process

- **Reference Case for ERCOT South Market**
  - Establish a status quo scenario.
- **Scenario Planning**
  - Establish 8 scenarios for the ERCOT South Market:
    - Stress-test various future conditions.
- **Resource Characterization**
  - Define unit characteristics for potential resources:
    - Fossil
    - Renewable
    - DSM/EE
- **Workshop #1:**
  - Present IRP Process and Project Update to BPUB and PUBCAP.

Key Tasks of the IRP Process

- **Evaluate Base Case Generation:**
  - Analyze BPUB's current generation resources against the reference case.
- **Workshop #2:**
  - Review assumptions, evaluation matrix, and load forecast.
- **Expansion Planning and Production Cost Modeling:**
  - Test existing and candidate resource plans against the reference case and scenarios.
  - Calculate Net Present Value (NPV) for a 25-year operation across base case and scenarios.
  - Assess impact of risk across scenarios.
  - Develop evaluation matrix to incorporate price and non-price factors

Key Tasks of the IRP Process

- **Workshop #3**
  - Share production cost modeling and analysis with PUBCAP
  - PUBCAP selects the best or optimal portfolio considering price and non-price factors to recommend preferred plan to the BPUB Board.
- **Refine Analysis**
  - Develop presentation to present PUBCAP preferred plan to the BPUB Board.
  - Work to finalize the IRP Report by 4/4/2024.
- **Workshop #4**
  - Present PUBCAP preferred plan to the BPUB Board.
  - Board considers the PUBCAP preferred resource plan and makes final recommendation.
  - Finalize IRP Report by 4/4/2024

IRP Load Forecast

Forecast Objective: To understand potential demand scenarios based on key uncertainty drivers.

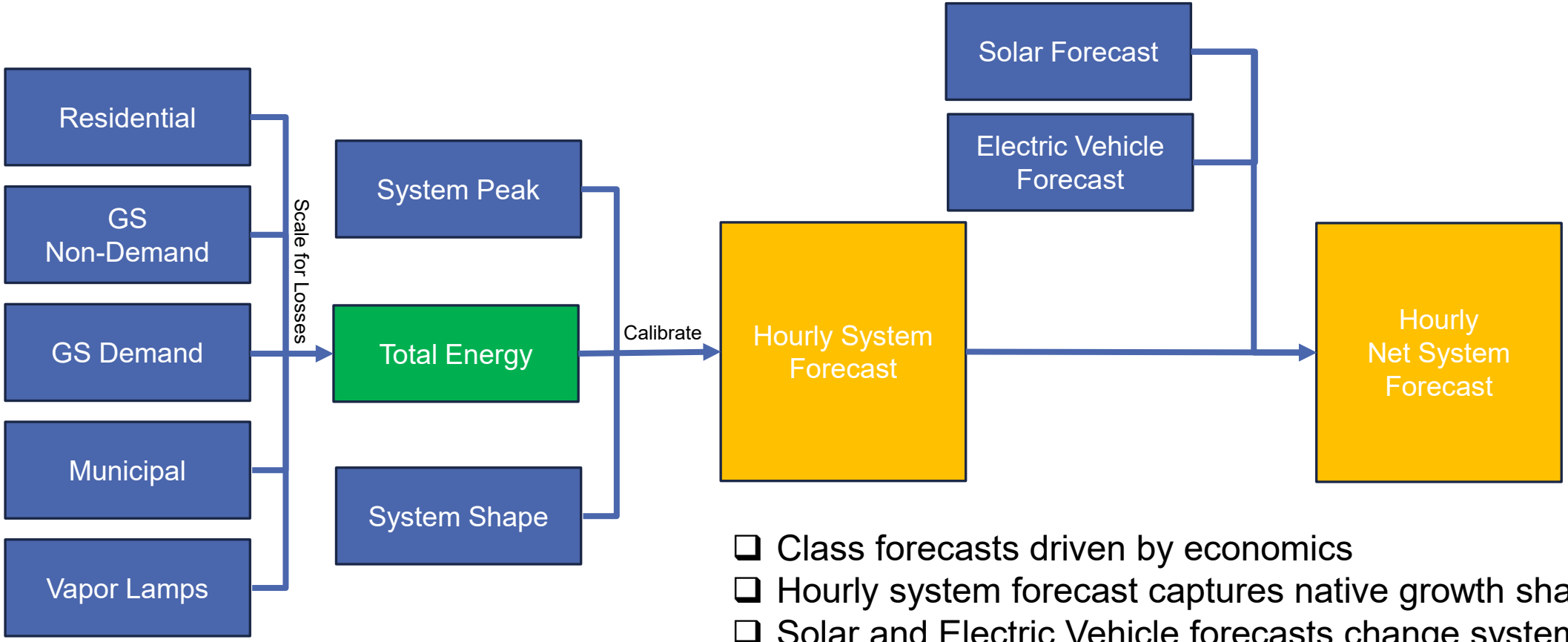
Key Assumptions:

- Woods & Poole's 2024 Forecast for Cameron County.
- 20-Year Normal Weather.
- Electric Vehicle and Behind-the-Meter Solar forecasts based on EIA forecasted growth.
- Includes nationally adopted energy efficiency codes and standards.
- Excludes large customer additions.

Scenarios:

- Base Case (Native growth)
- Base Case / Extreme Weather
- Base Case / Mild Weather
- High Case / Normal Weather
- Low Case / Normal Weather
- Base Case / Normal Weather / Large Customer

Forecast Method

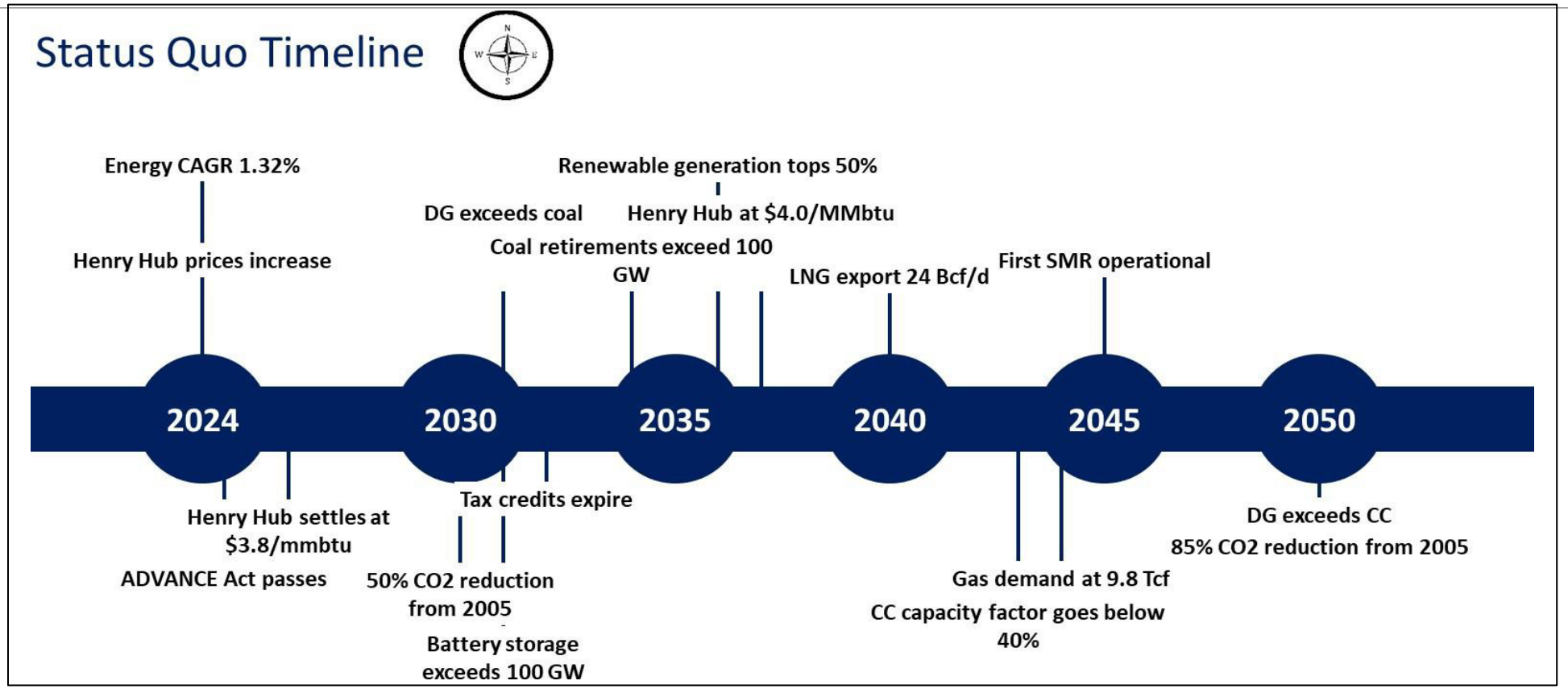


- ❑ Class forecasts driven by economics
- ❑ Hourly system forecast captures native growth shape
- ❑ Solar and Electric Vehicle forecasts change system shape

BPUB IRP Scenarios

- Leverage Horizons Energy Spring 2024 Reference Case and Scenarios
- Reference Case or Status Quo, eight additional scenarios
- These scenarios purposely include variations to many market drivers from the Reference Case such as demand, fuel, emissions and cost of new resources.
- Given these plausible futures, ERCOT South hub pricing is impacted as a result, and these scenarios reflect the resulting changes in the ERCOT South energy market.

NATIONAL BASE CASE ASSUMPTIONS



BPUB IRP
Scenario Assumptions

- Reference Case – Status Quo or Business as Usual

- National Carbon Tax

  This scenario assumes a $15 federal carbon tax increases by 5% above inflation through 2030; thereafter, the carbon tax increase adjusts to an annual rate equal to 2.5% above inflation. Due to the introduction of carbon and its impact on natural gas generation a lower Henry Hub price is also introduced. Coal prices are increased to include the price of carbon on coal production costs.

- Zero Carbon Additions

  This scenario assumes a nationwide emission reduction exclusively through renewable generation, demand response, and energy efficiency; no fossil-fired resources may be built to meet demand. The nationwide goal seeks to achieve a 100% clean energy economy by 2050. Results in a CAGR of 0.16%. This case allows for transmission expansion to address the addition of intermittent zero carbon resources, the addition of 12 GW of nuclear power plants, and is consistent with the current administration's goal of achieving a 100 percent clean energy economy by 2050.

BPUB IRP
SCENARIO ASSUMPTIONS

- High Natural Gas: This scenario represents a high natural gas case and reflects a nationwide tight oil and gas market, and shale gas is assumed to be 50% lower than the Reference Case. Technology to reduce fuel costs and increase production also assumed to be 50% lower than the Reference case. The result is an increase in the per-unit cost of crude oil and natural gas; High Henry Hub prices average over $7/MMBtu in nominal $ over the forecast horizon compared to $4.24/MMBtu in Reference.

- High Demand: This scenario addresses a demand impacted by widespread electrification, including sub-sectors with lower barriers. The basis is NREL's Medium electrification with nationwide assumptions; this level of electrification does not result in transformational change. The base economic data includes a population growth of 0.6% and real GDP growth of 2.4%. The combination of higher economic growth rate associated with electrification and EIA growth results in a CAGR of 2.85% and reflects the uncertainty that, nationwide, the ISOs and utilities are addressing with electric vehicles, electric heating and data center demand.

- High Natural Gas with Carbon Limit: This scenario represents a high natural gas case coinciding with a federal carbon limit imposed. In this scenario, the Federal government imposes a limit on nationwide carbon emissions level to reflect an 80% reduction in emission levels from 2005. This limit is applied to the High Natural Gas case.

BPUB IRP
Scenario Assumptions

- Low Natural Gas

  This scenario for ERCOT assumes the low natural gas forecast from the EIA's short-term outlook. The base assumption includes Henry Hub pricing at $2.00/MMBtu growing slightly higher than the rate of inflation for a nominal $ average of $2.58/MMBtu.

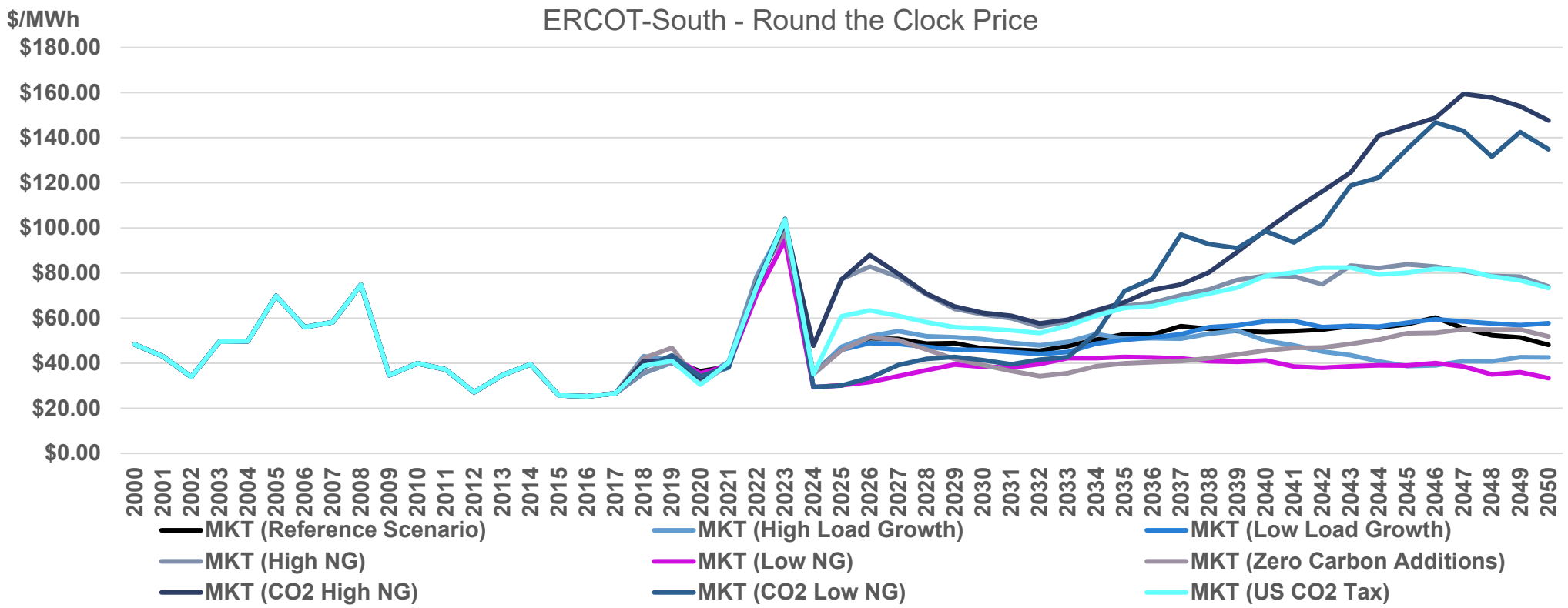
- Low Demand

  This scenario reflects EIA's Lower Economic Growth case on a nationwide basis. Lower population growth at 0.2% and reflects higher prices and interest rates, resulting in a CAGR of 0.67%.

- Low Natural Gas with Carbon Limit

  This scenario represents a low natural gas case coinciding with a federal carbon limit imposed nationally. In this scenario, the Federal government imposes a limit on nationwide carbon emissions level to reflect an 80% reduction in emission levels from 2005. This limit is applied to the Low Natural Gas case.

Reference Case and Scenario Prices



Integrated Resource Plan Schedule

BPUB IRP Project Plan	Progress (1)	Start	End
Kickoff Meeting	100%	7/31/2024	8/16/2024
Develop Long Term BPUB Load Forecast (PM oversite)	71%	7/31/2024	11/6/2024
Develop Long-Term Market Price Forecast	100%	7/31/2024	10/2/2024
Develop Nodal Price Forecasts	72%	7/31/2024	12/18/2024
Assess existing Generation Resources	45%	7/31/2024	12/6/2024
Identify and Characterize New Potential Resources	50%	7/31/2024	12/6/2024
Workshop #1	47%	7/31/2024	12/18/2024
Base Case & Production Cost Modeling	30%	7/31/2024	1/10/2025
Workshop #2	28%	7/31/2024	1/13/2025
Supplemental Analysis & Load Forecast Report	33%	7/31/2024	2/19/2025
Assessment of Demand-Side Management Opportunities	24%	7/31/2024	2/19/2025
Assessment of Distributed Generation Opportunities	25%	7/31/2024	2/19/2025
Workshop #3	25%	7/31/2024	2/26/2025
Workshop #4	20%	7/31/2024	3/10/2024
Prepare Draft and Final IRP Report	16%	7/31/2024	4/4/2025

Aug-24					Sep-24				Oct-24					Nov-24				Dec-24				Jan-24					Feb-24				Mar-24				Apr-24			
29-Jul	5-Aug	12-Aug	19-Aug	26-Aug	2-Sep	9-Sep	16-Sep	23-Sep	30-Sep	7-Oct	14-Oct	21-Oct	28-Oct	4-Nov	11-Nov	18-Nov	25-Nov	2-Dec	9-Dec	16-Dec	23-Dec	30-Dec	6-Jan	13-Jan	20-Jan	27-Jan	3-Feb	10-Feb	17-Feb	24-Feb	3-Mar	10-Mar	17-Mar	24-Mar	31-Mar	7-Apr	14-Apr	21-Apr

Questions

- Discussion
- Next Meeting January 13, 2025