Electric Long Term Average Rate Forecasting Tool

Outline

- Affordability Overview
  - 2023 California Rate Analysis
- Model Description & Base Case
- Base Case Results
- Scenario Modeling
- Conclusions

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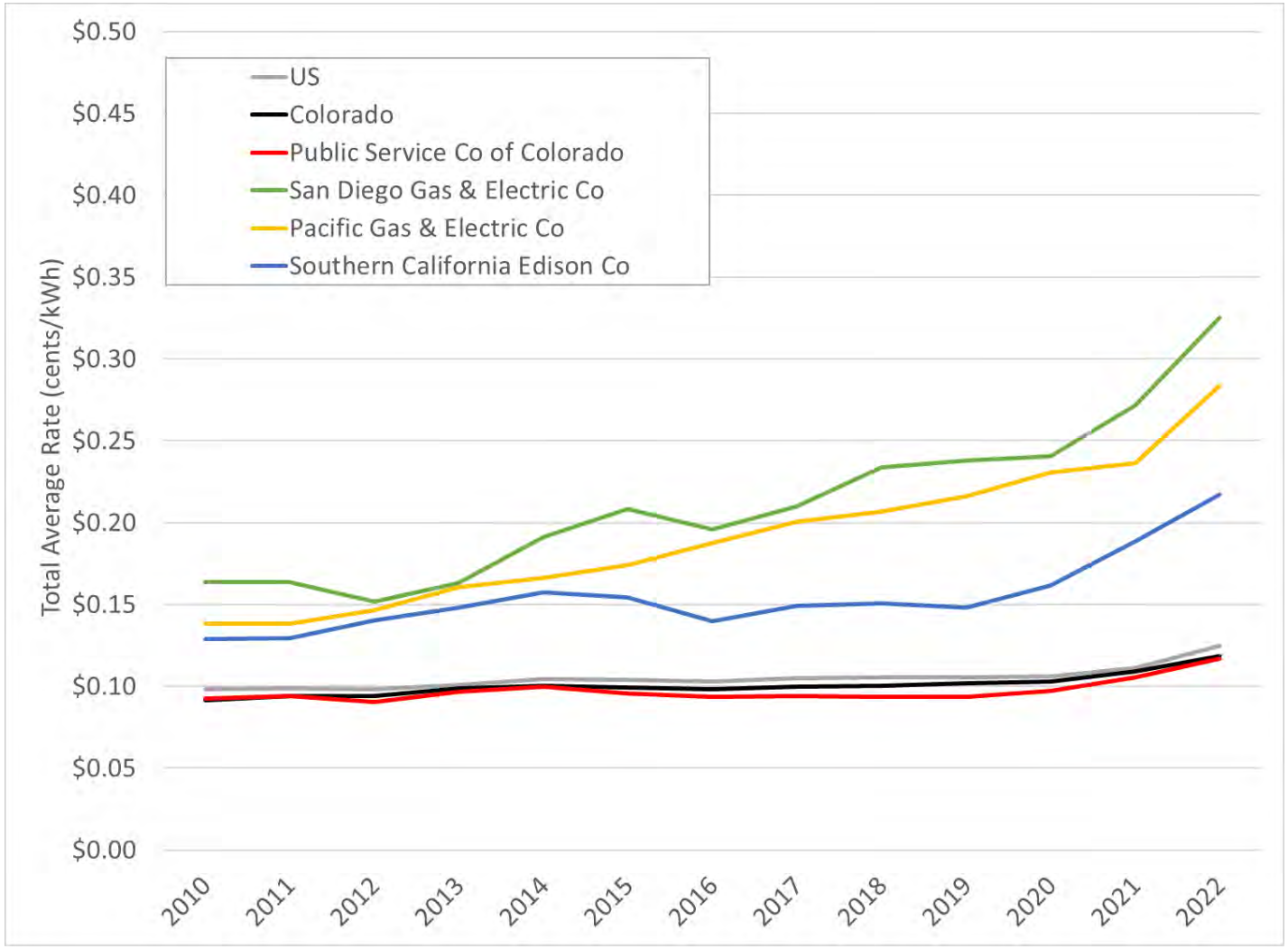
20+ Years of Energy

Affordability Overview

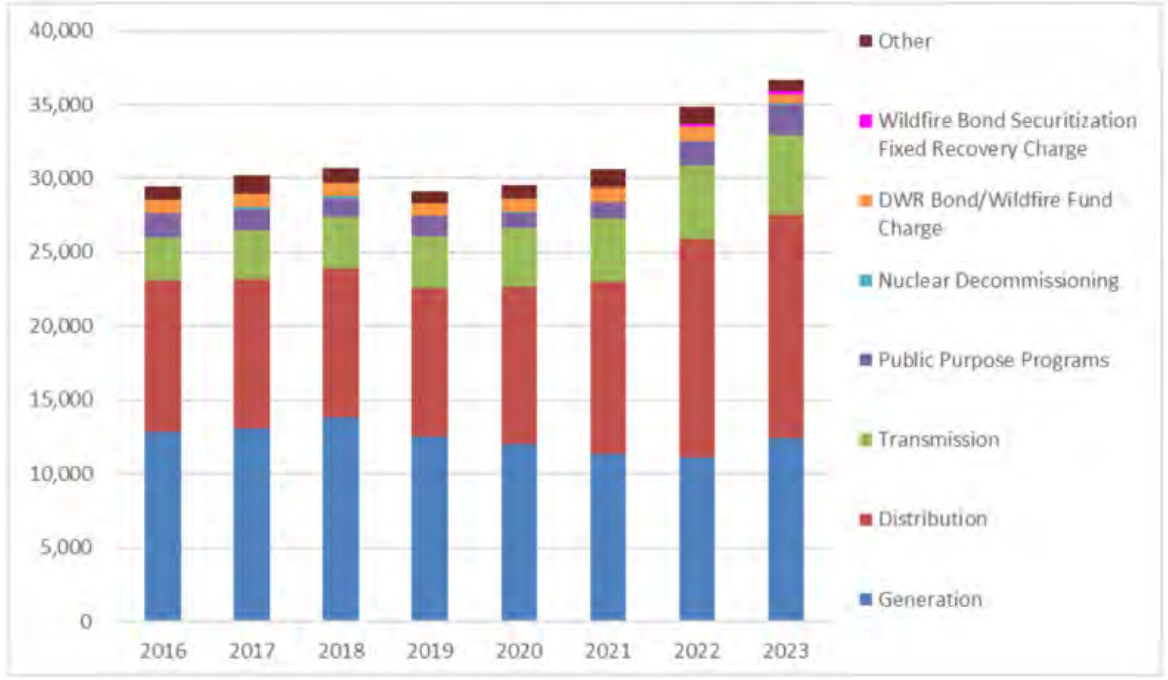
Affordability Overview

- Colorado's average electric rates were historically lower than US average electric rates, but are recently trending upward
- It is helpful to compare rate trends to California - the state with the highest electric rates
- A 2023 CA PUC report identified three major causes of rate increases:
  - Wildfire risk mitigation spending (transmission & distribution)
  - Natural gas commodity prices
  - Fixed cost & volumetric rate design (net metering)



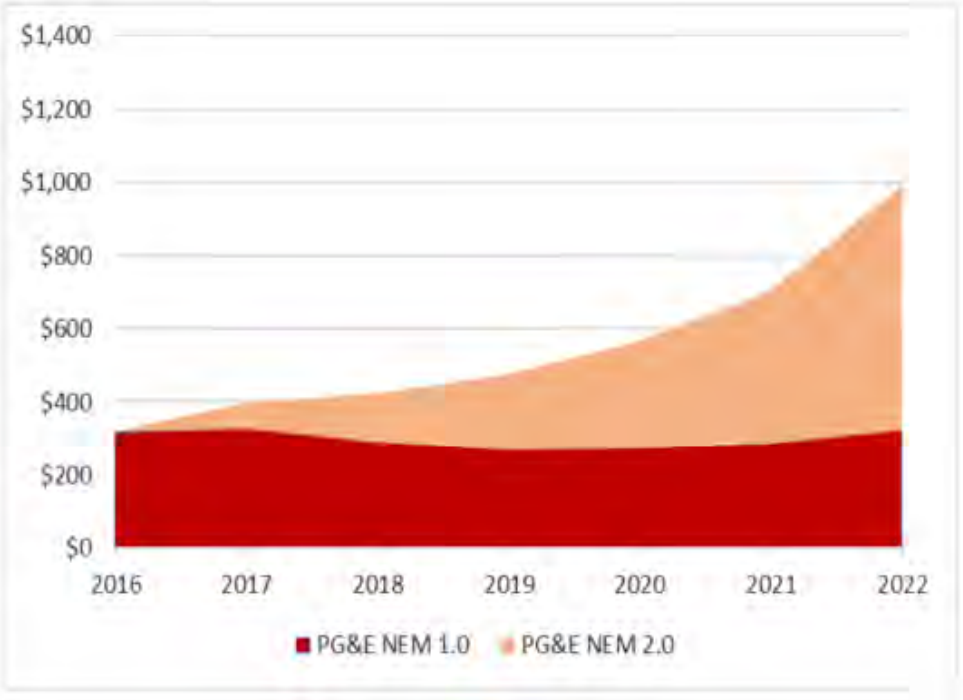
California - 2023 SENATE BILL 695 REPORT

Figure 4: PG&E, SCE, and SDG&E Revenue Requirement by Rate Component Category (January 1, $ millions)



Growth in distribution & transmission revenue requirements are the largest drivers for California

Figure 14: PG&E Annual Historical NEM Cost Shift, Bundled Residential Customers (2016 – 2022, $ millions)



Cost shifts from net metering exist and are not insignificant. But precise quantification is difficult. PG&E estimated a $1B cost shift in 2022

Model Description and Base Case

Long Term Average Rate Modeling

SCOPE OF WORK

The objective of this project is to provide a working model to the Colorado PUC, that can be adapted to changing circumstances, to help the Commission and the broader stakeholder community understand the impact of future utility decisions on Colorado customer electric rates

Develop a 30-year model showing 10-year electric rate history and 15-year detailed electric rate inputs and projections for PSCo with a general baseline forecast for the final 15 years to help examine the impacts on future rate projections.

1. Different types of capital investments including:
    a. New generating resources
    b. Retirement of fossil resources
    c. Wildfire mitigation measures
    d. Transmission
    e. Distribution
    f. Other expenses (i.e. IT with short depreciation lives)
2. Forecast of future fuel costs including a high and low forecast as well as the potential cost of Purchase Power Agreements
3. Different approaches for cost recovery of capital investments including:
    a. Regulatory asset
    b. Financing at the long-term cost of debt
    c. Accelerated depreciation
    d. Securitization
4. Different drivers of demand changes including:
    a. Population growth
    b. Beneficial electrification
    c. Demand side management
    d. Innovative rate design – TOU and DR
    e. EV adoption
5. Financial levers including:
    a. Debt to equity ratio -
    b. WACC

Long Term Average Rate Modeling

MODEL DESCRIPTION

- Spreadsheet based model
- Capital, O&M, and fuel/purchased energy costs
- Simplified dispatch simulation
- User defined expansion plan
- Simple average rate calculations – not class specific
- Can be used to model any electric utility
- Populated with publicly available data from PSCo
- Approximately 70 tabs plus a separate 100MB dispatch simulation
- **Not as accurate as a utility's capital asset accounting, tax, and revenue requirement personnel and systems, but flexible enough to run robust comparative analyses**

MODEL INPUTS

- Load & fuel forecasts – 2021 resource plan, November 2022 inputs update
- Capital forecast from March 2024 investor presentation
- O&M forecast based on trend analysis of historical data
- New unit costs assumptions from EIA Annual Energy Outlook
- Owned unit cost and performance & purchased power data from FERC Form 1 and EPR assumptions documentation
- Load, wind, and solar hourly profiles from EIA Grid Monitor

Model Structure

- User defined inputs are designated with light blue shading
- Model includes a “General Inputs” tab that provides several high-level inputs for fast scenario modeling
- Base case can be saved for comparison to alternate scenarios

General Inputs Tab

Base Year	2024	
O&M Escalation	2.5%	
Purchased Power Escalation	2.5%	
Generation Capital Escalation	2.5%	
Transmission Capital Escalation	2.5%	
Distribution Capital Escalation	2.5%	
Wildfire ,Resiliency, Other	2.5%	
Baseline Inflation Rate	2.5%	- Used for simple baseline rate

Cost of Capital	Weight	Rate	WACC
Debt	41.78%	4.40%	1.84%
Equity	58.22%	9.20%	5.36%
Weighted			7.19%

Tax Rates		
State Income Tax Rate	4.55%	
Federal Income Tax Rate	21.00%	
Combined Tax Rate	24.59%	

Taxes Other Than Income	1.70%	Applied to Net Plant

Depreciation	Current Average	Modified Average
Production	40 years	40 years
Transmission	50 years	50 years
Distribution	50 years	50 years

Average Availability	
Coal	75%
Gas Intermediate	75%
Gas Peaking	100%
Hydro	50%
Wind	95%
Solar	95%
Storage	95%

First Year PTC	$27.50/MWh	
Escalation	2.5%	

Annual Energy Escalator	
Default Growth Rate	1.9%
Modified Growth Rate	1.9%

Peak Demand Escalator	
Default Growth Rate	1.0%
Modified Growth Rate	1.0%

Gas Price Escalator	
Default Growth Rate	2.2%
Modified Growth Rate	2.2%

Post 2028 Generic Capital
Annual Capital (Excluding Production) Based on 2020-2022 Plant Additions
$615,310,000
2024-2028 Annual Average Capital Spend (Excluding Production) Based on March 2024 Investor Presentation
$2,835,000,000
2029 Capital (Excluding Production)
$2,800,000,000

Securitization	
Total Amount	$0
Start Year	2029
Book Life	35
Tax Life	15 years
Securitization Term	35
Securitization Rate	3%
Issuance Fees Fixed	$10,000,000
Issuance Fees Rate	0.74%
Ongoing Securitization Fe	$1,000,000

Behind The Meter Solar	
Default Growth	93MW
Default Growth Rate	6%
Modified Growth	93MW
Modified Growth Rate	6%

Base Case – Capital Forecast (through 2028)

- $16.6 Billion 2024-2028
  - Investor presentation includes natural gas
  - Generation investments in 2024-2028 do not exactly match the investor presentation due to slight difference in cost assumptions for new units ($17B vs $16.6B)
  - 2023 Appendix A filing listed Net Original Cost Rate Base of $12.6 billion compared to $9.4 billion 5 years prior (2019)

March 2024

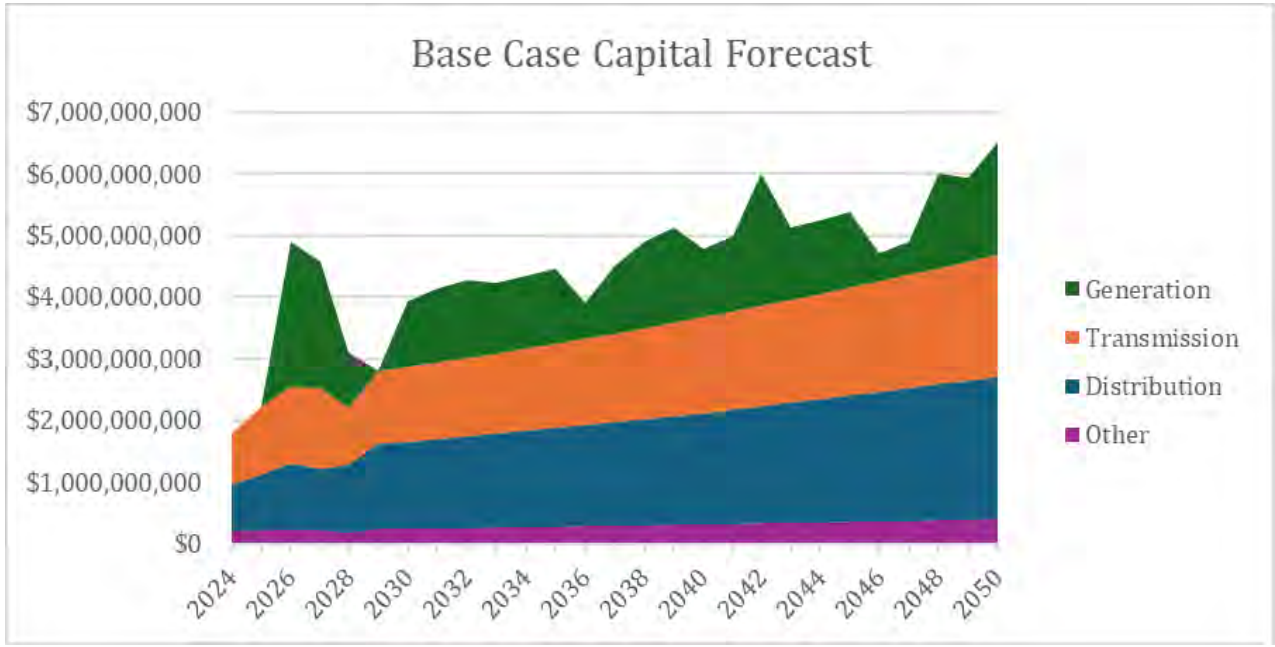
PSCo Base Capital Expenditures by Function

$ Millions

	2024	2025	2026	2027	2028	Total
Electric Transmission	$820	$1,110	$1,260	$1,320	$930	$5,440
Electric Distribution	$760	$910	$1,080	$1,000	$1,090	$4,840
Natural Gas	$460	$450	$450	$450	$410	$2,220
Other	$220	$210	$220	$220	$190	$1,060
Electric Generation	$190	$330	$390	$400	$100	$1,410
Renewables	$850	$2,220	$920	$230	$10	$4,230
Total	**$3,300**	**$5,230**	**$4,320**	**$3,620**	**$2,730**	**$19,200**

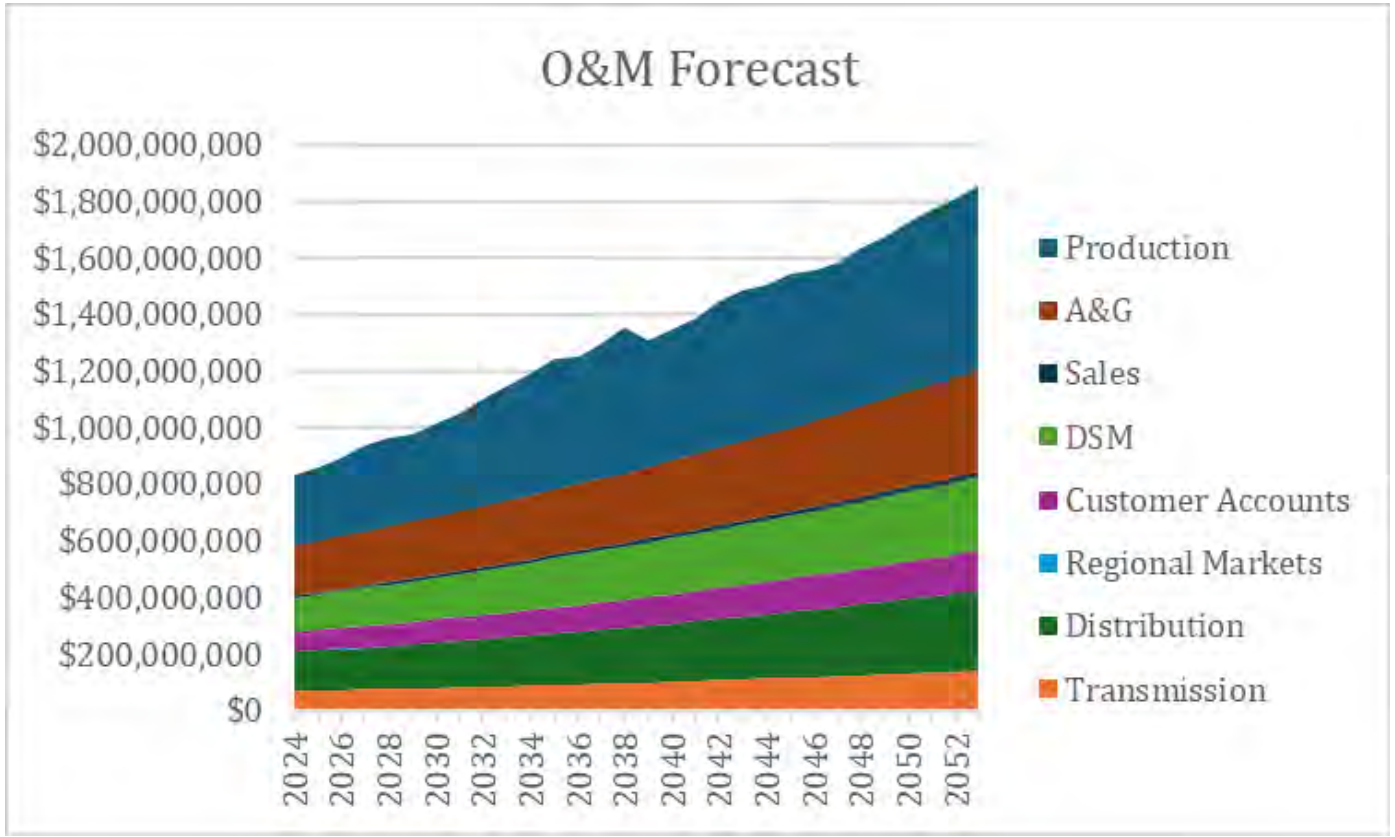
Base Case – Capital Forecast (Long Term)

- Post 2028 transmission, distribution, and other capital categories (excluding generation) are assumed to continue at levels similar to March 2024 investor presentation
- "Lumpy" generation investment profile is reflective of periodic additions of new units needed to meet growing peak demand, retirement of existing units, and addition of renewable generation for energy/emissions reductions
- Long term capital growth assumption of 5% per year based on investor presentation growth of 5% EPS



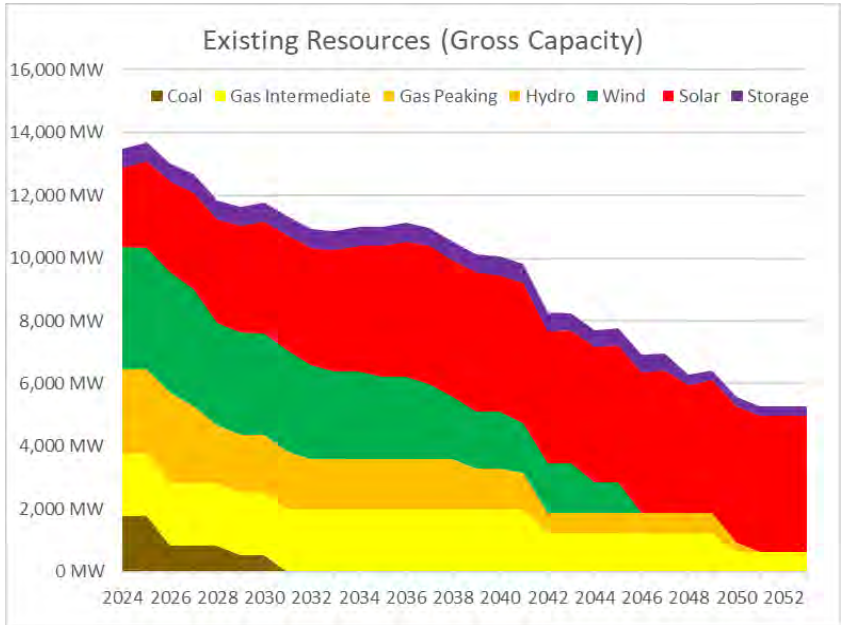
Base Case – O&M Forecast

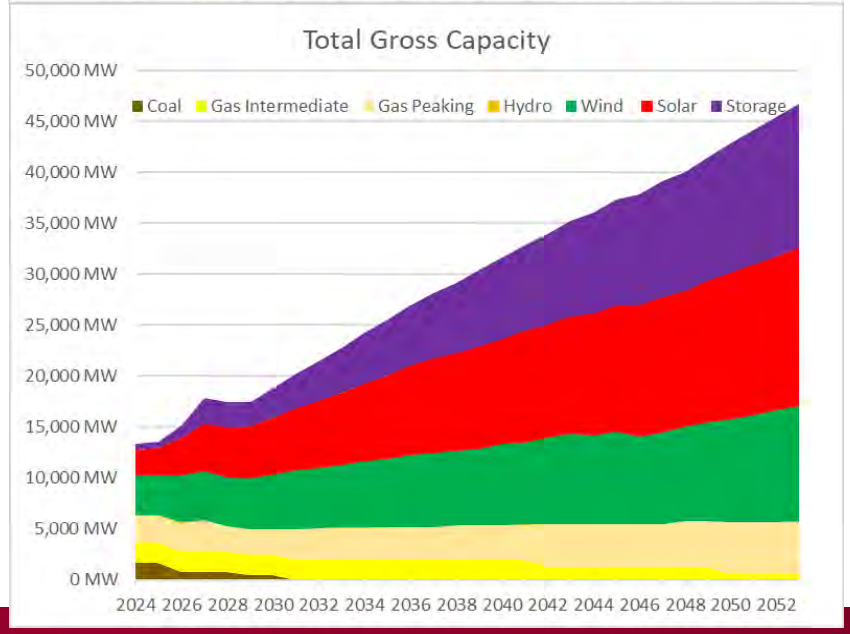
- Forecast uses simple escalation factors for most categories (2.5%)
- Generation O&M tied to retirement and additions of generating units.
- 2023 Appendix A listed $750 million in O&M, including DSM expenses



Base Case – Expansion Plan & Energy Mix

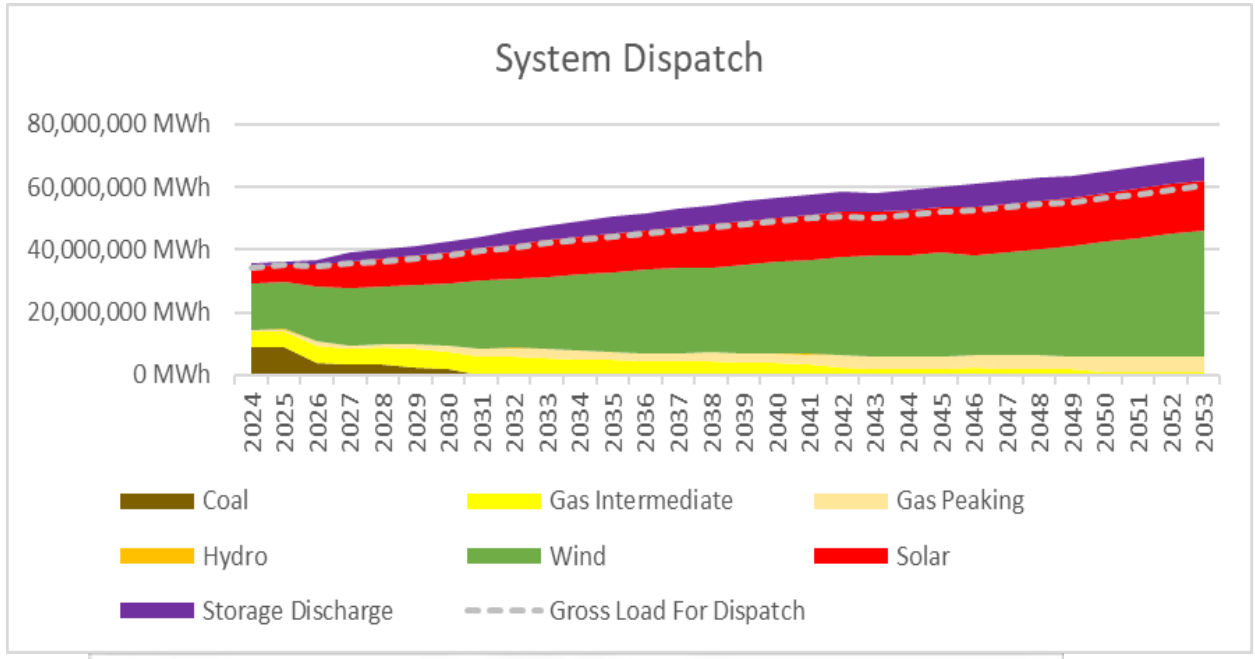
- Long term expansion uses average capacity additions from recent IRP
- Model cannot optimize for least cost expansion plan
- Annual Additions - 50% Owned 50% Purchased
  - 400MW Wind
  - 400MW Solar
  - 500MW Storage
- Model fills in capacity shortfalls with generic gas CTs
- Expansion plan assumptions can be modified by user

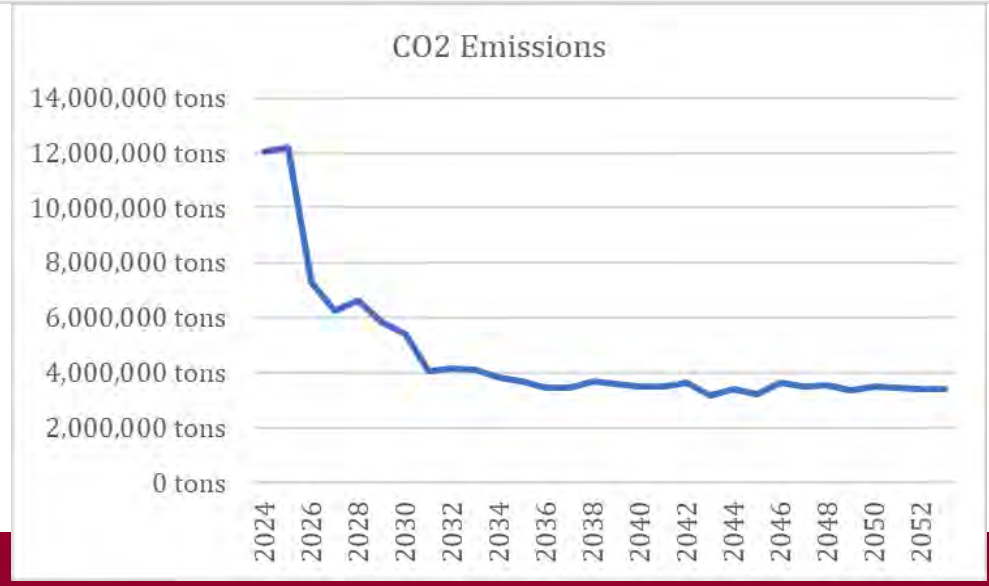




Base Case – Expansion Plan & Energy Mix

- Wind continues to grow as a larger portion of the dispatch over time
- Model cannot implement a CO2 emissions constraint, but emissions are an output based on the dispatched energy
- This emissions trend does not consider the impacts of any future climate legislation

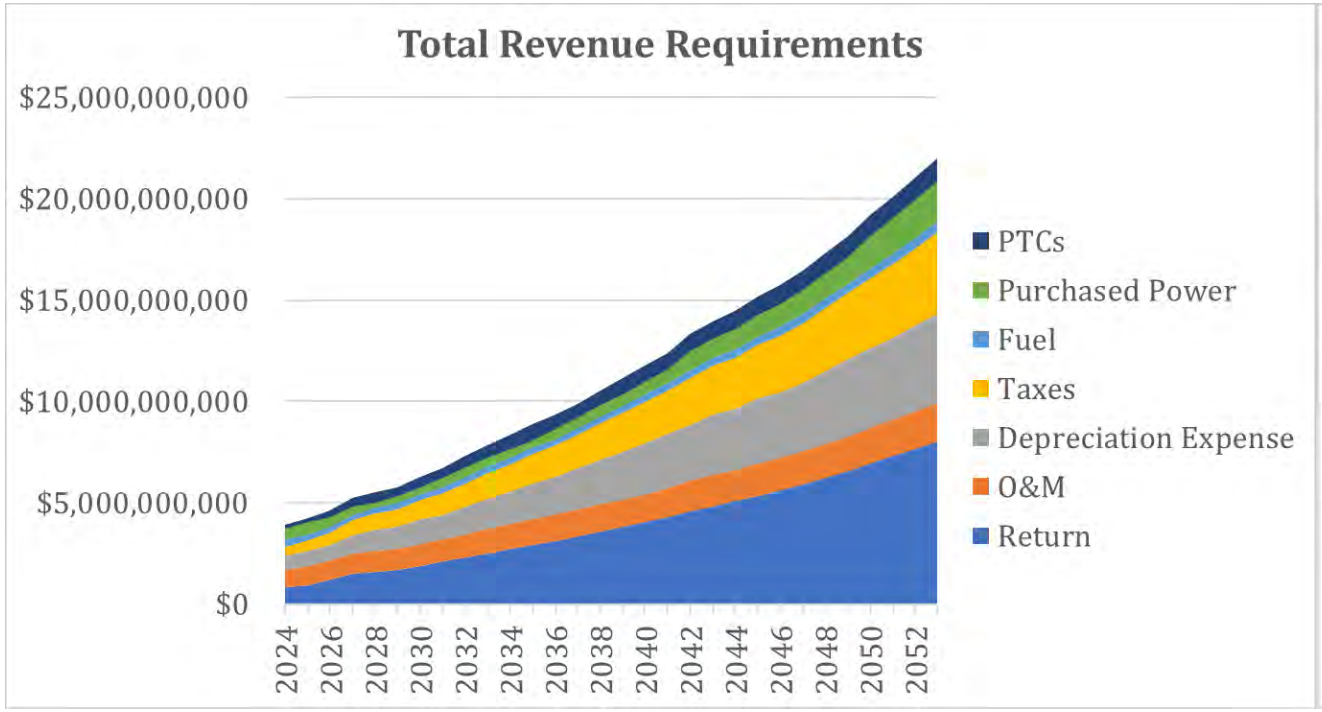


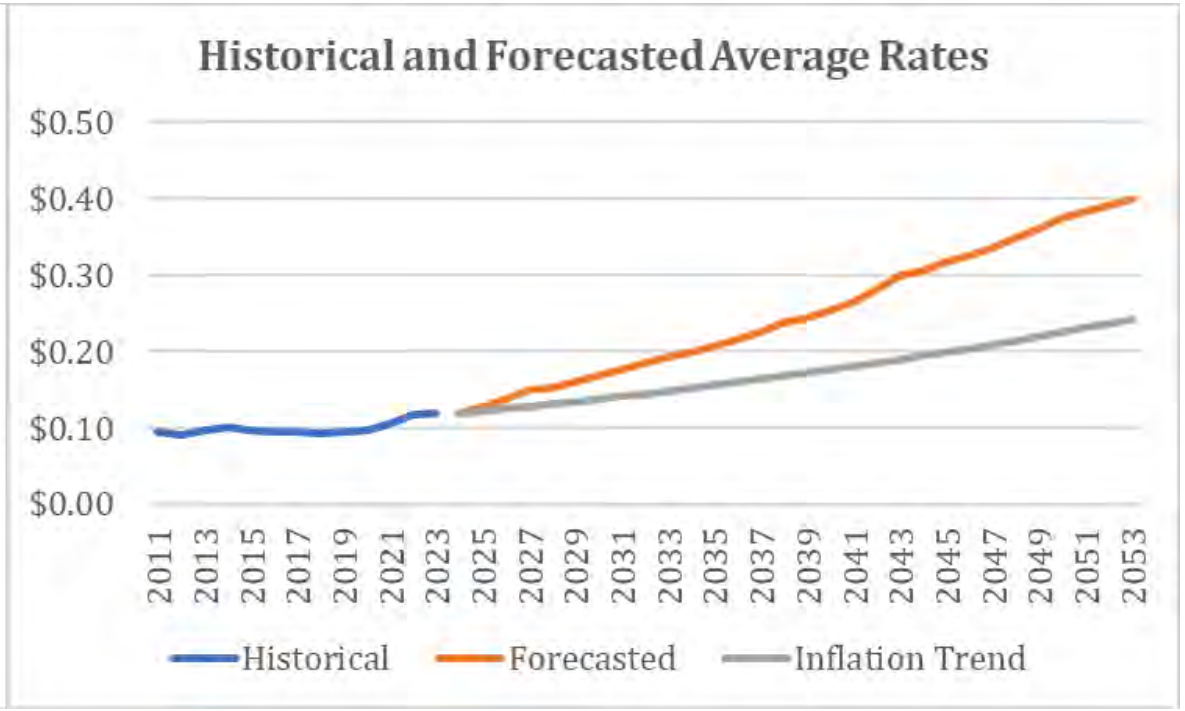


Base Case Results

Base Case Outputs

- 2011-2023 Average Rate CAGR: 1.9%
- 2024-2030 Average Rate CAGR: 6.0%
- 2030-2053 Average Rate CAGR: 3.8%
- 2024-2053 Average Rate CAGR: 4.3%





Base Case Results - Long term rate trends are dominated by capital spending

- Over the last 5 years plant in-service has increased approximately $5 billion, including the impact of plant retirements

	Total Plant In-Service	Year Over Year Change
2018	$14,562,459,869	
2019	$15,404,742,996	+ $842,283,127
2020	$16,238,393,109	+ $833,650,113
2021	$17,904,080,911	+ $1,665,687,802
2022	$18,080,252,714	+ $176,171,803
2023	$19,402,254,697	+ $1,322,001,983
	Five Year Total	**$4,839,794,828**

Source: Appendix A Filings
Electric Plant In-Service Data

Base Case Results - Long term rate trends are dominated by capital spending

- The 5-year electric budget increased from $8.7B in February 2023 to $17B in March 2024

PSCo Base Capital Expenditures by Function
February 2023

$ Millions

	2023	2024	2025	2026	2027	Total
Electric Distribution	$640	$650	$670	$740	$1,010	$3,710
Electric Transmission	$590	$880	$940	$500	$410	$3,320
Electric Generation	$140	$140	$190	$90	$90	$650
Natural Gas	$510	$520	$570	$480	$510	$2,590
Other	$260	$250	$180	$170	$170	$1,030
Total	**$2,140**	**$2,440**	**$2,550**	**$1,980**	**$2,190**	**$11,300**

March 2024

$ Millions

	2024	2025	2026	2027	2028	Total
Electric Transmission	$820	$1,110	$1,260	$1,320	$930	$5,440
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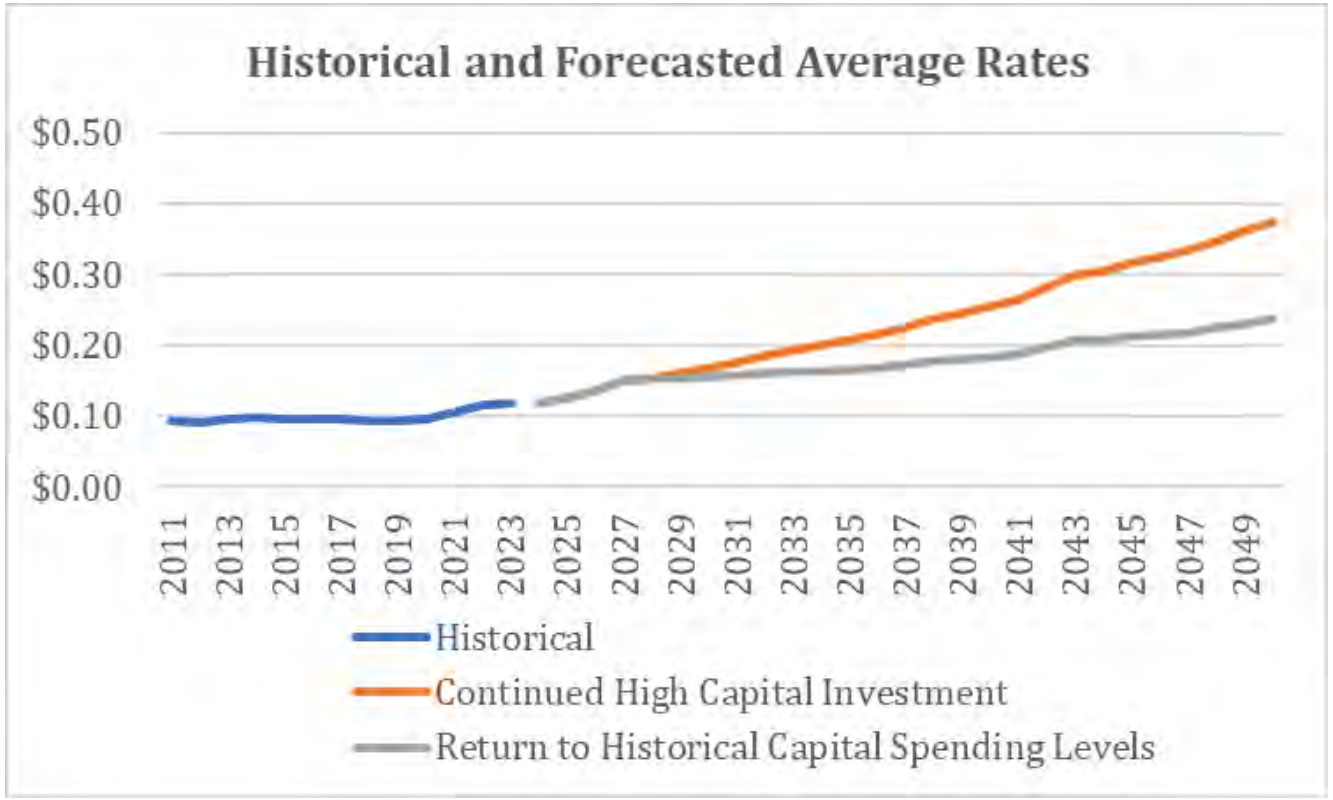
Total	**$3,300**	**$5,230**	**$4,320**	**$3,620**	**$2,730**	**$19,200**

Base Case Results - Long term rate trends are dominated by capital spending

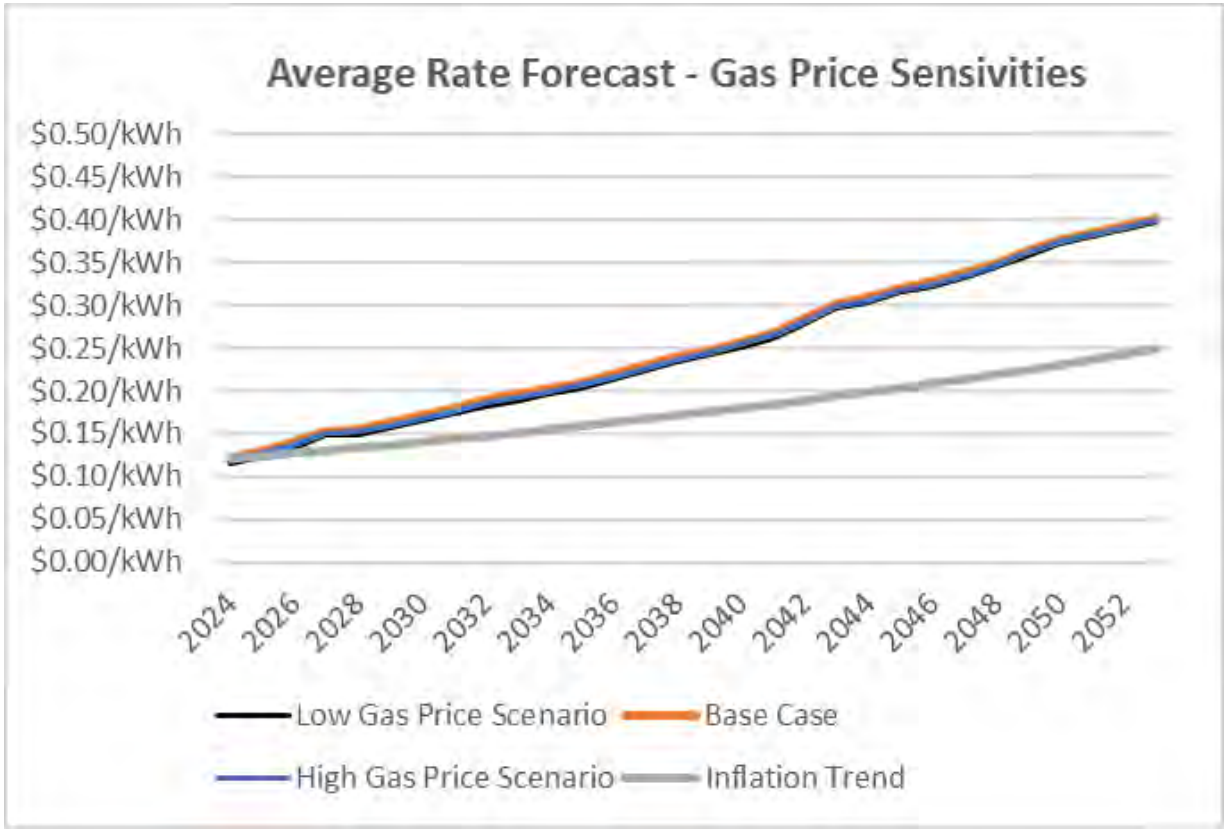
- If capital spending returned to near 2019-2023 levels after 2028, rates would be expected to stabilize at an average growth of 2.6%[1] per year
- However, if spending remains at the level contemplated in the March 2024 investor presentation, rates will continue to grow at an average 4.3%[1] per year



1. 2024-2035 Average rate growth

Base Case Results - Importance of California Divers for Colorado

- Natural gas commodity prices are less impactful on long term rate trends
  - A sensitivity analysis lowering gas prices by $2 shifts down the average rate by about 2%
  - Fuel is a small portion of the overall revenue requirement
- The impact of net metering is discussed below, but Colorado's net metering penetration rate is currently substantially lower than California's
- Long term rate trends in Colorado are dominated by capital spending



Scenario Modeling

Scenario Modeling

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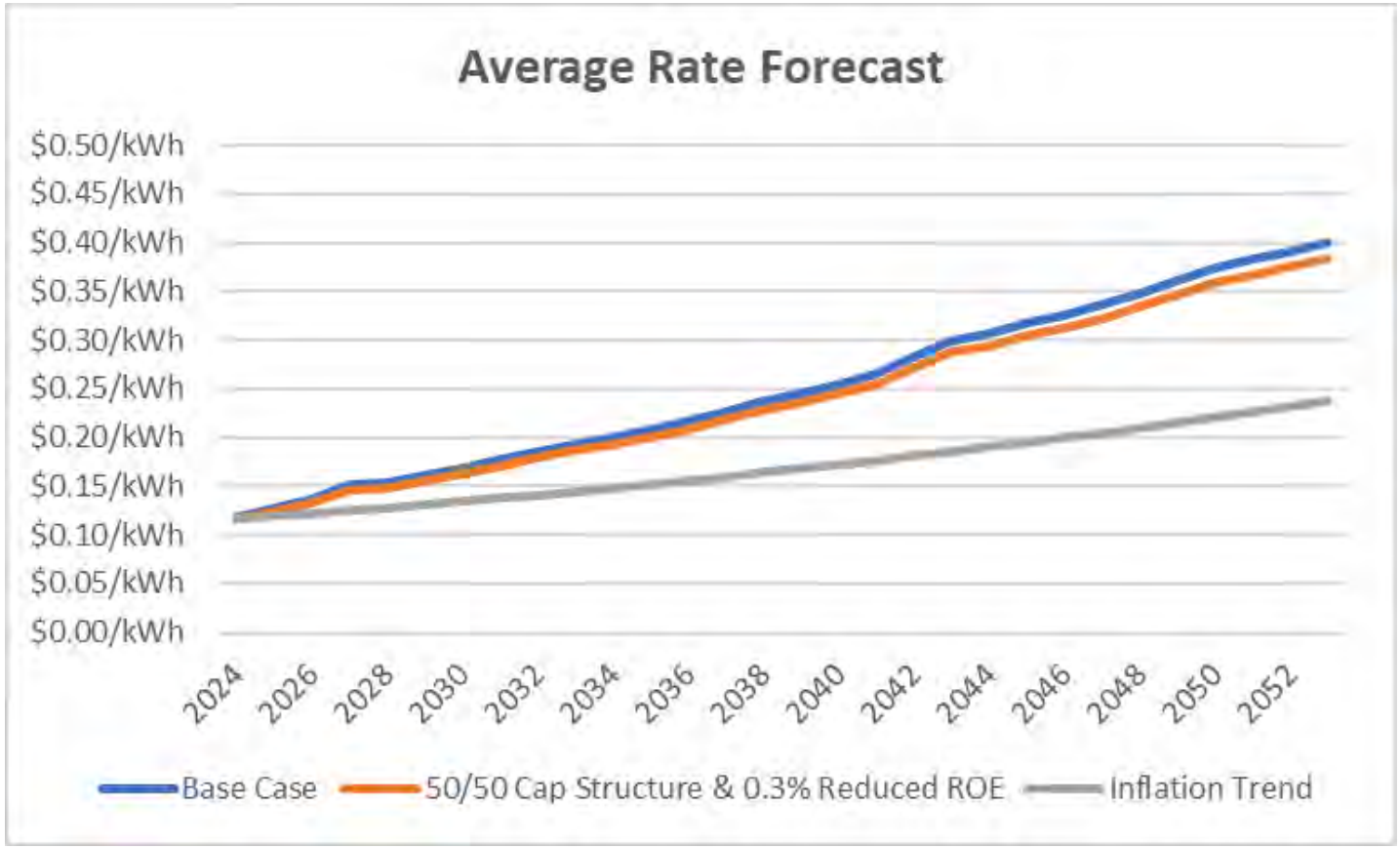
- The Commission has direct influence over some levers that impact rate projections including:
  - ROE & capital structure
  - Securitization of rate base
  - Discounted rate offerings
- Levers that the Commission more indirect influence over include:
  - Capital spending
  - Load modifiers (EV programs, clean heat, net metering, DSM, demand response)
- The scenario analyses that follow demonstrate the model's capability for comparative modeling and explore the impact of some of these levers.

Scenario Example 1 – Weighted Average Cost of Capital (WACC) Adjustment

- **Base case**
  - 55.69/44.31 capital structure
  - 9.3% ROE
  - WACC 6.96%
- **Test scenario**
  - 50/50 capital structure
  - 9.0% ROE
  - 6.51 WACC

Scenario Example 1 – WACC Adjustment

- **Result**
  - Minor impacts to overall rates
  - 2024-2053 average annual rate growth
    - Base Case: 4.3%
    - WACC Adjustment: 4.2%
  - Average rates in 2030 are 3.3% lower

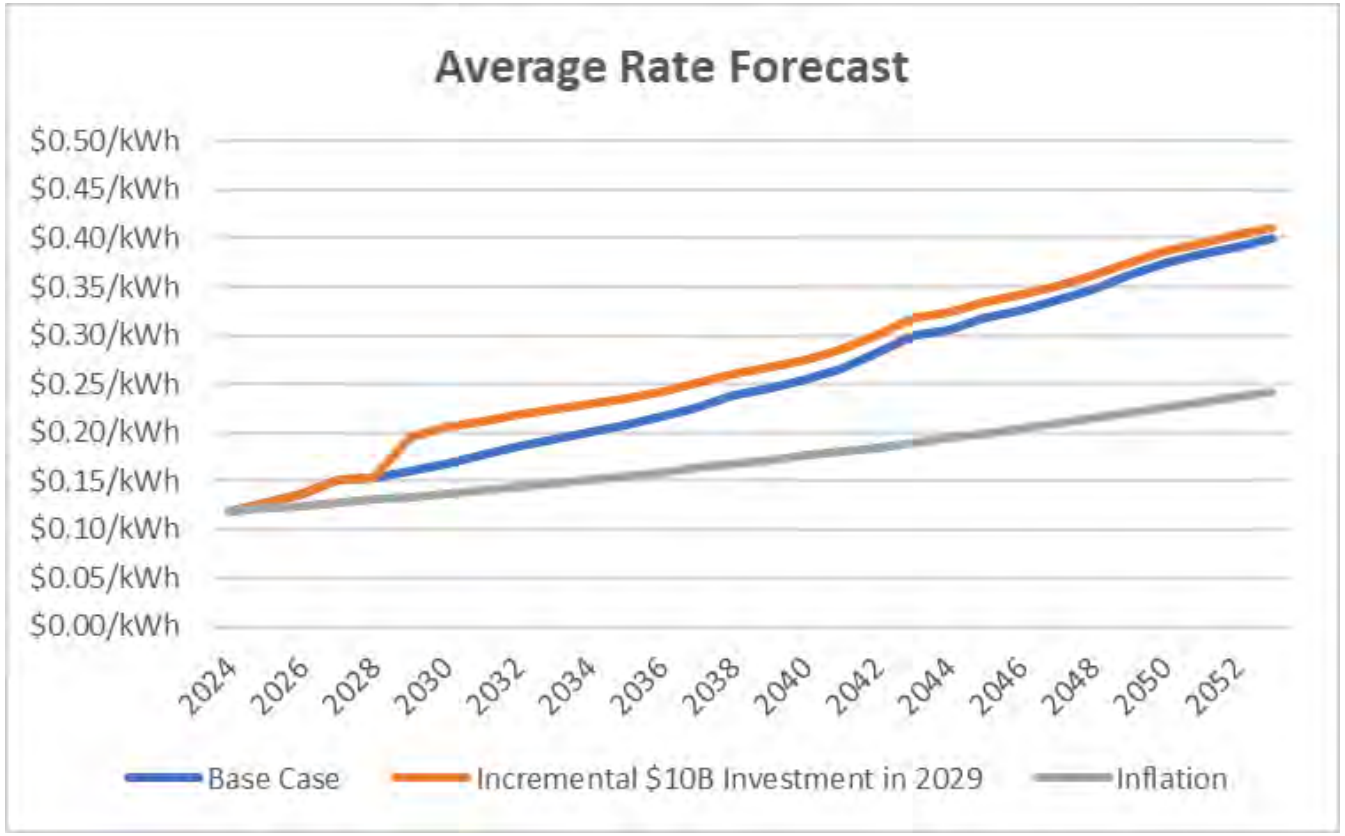


Scenario Example 2 – $10B Incremental Capital Investment

- Some capital investments increase revenues through increased sales or reduced O&M or fuel costs
- A “non-revenue generating” investment like wildfire mitigation or transmission investments do not result in increased sales or reduced costs
- "Revenue generating investments" are expected to increase sales like distribution system, EV, and clean heat investments
- **Test Scenarios**
  - Scenario 2a - $10B non-revenue generating investment in 2029
  - Scenario 2b - $10B revenue generating investment in 2029

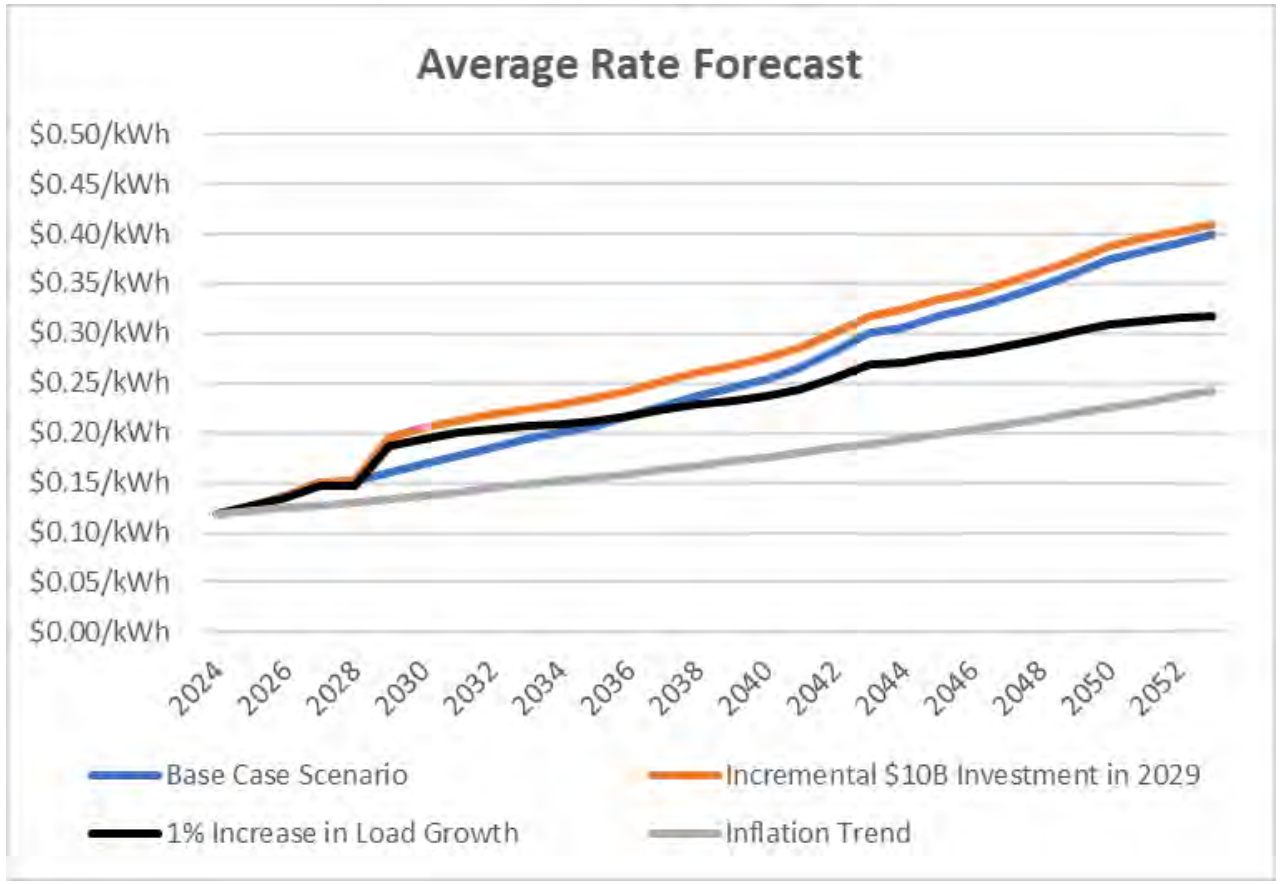
Scenario Example 2a – $10B "Non-Revenue Generating" Capital Investment

- **Test Scenario**
  - $10B non-revenue generating investment in 2029
- **Result**
  - Immediate 22% increase in average 2030 rates
  - Rate impact would decline over time as the investment depreciates
  - 2024-2053 average annual rate growth:
    - Base Case: 4.3%
    - $10B investment: 4.4%



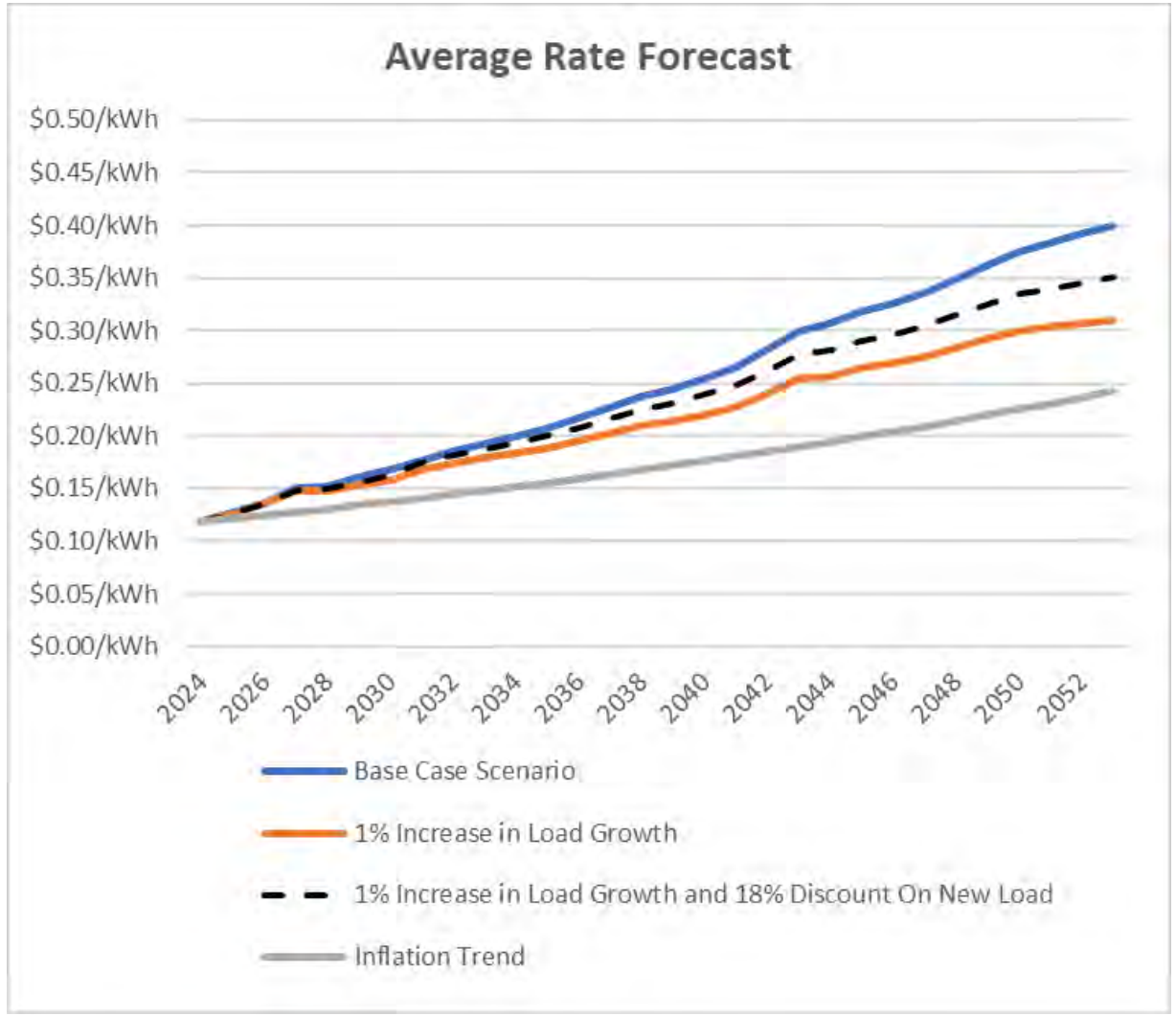
Scenario Example 2b – $10B "Revenue Generating" Capital Investment

- **Test Scenario**
  - $10B revenue generating investment in 2029
  - Sales growth increases from 1.9% to 2.9% annually
  - Peak demand growth increases from 1% to 2% annually
- **Result**
  - 2024-2053 average annual rate growth:
    - Base Case: 4.3%
    - $10B investment with sales growth: 3.5%
  - Higher sales volumes help offset the cost of the capital investments and lower average rates



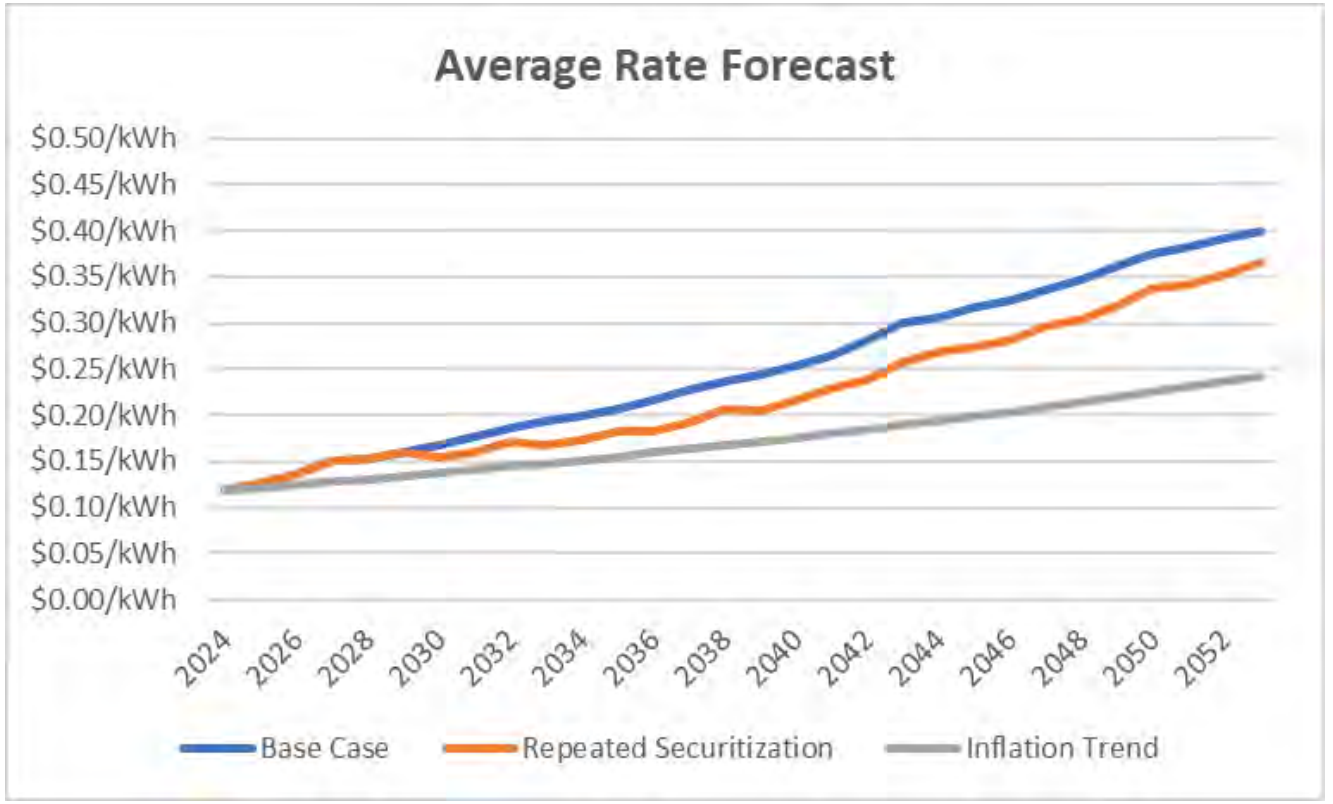
Scenario Example 3 – Additional Load Growth with Rate Discounts

- **Test Scenario**
  - Sales growth increases from 1.9% to 2.9% annually
  - All sales growth above 1.9% are industrial rates discounted by 18%
  - Transmission and distribution capital forecasts have not been adjusted to reflect higher load
- **Result**
  - The benefit of revenue generating investments lessened if the revenues are discounted
  - 2024-2053 average annual rate growth:
    - Base Case: 4.3%
    - 1% load increase: 3.4%
    - Discounted rate for new load: 3.8%



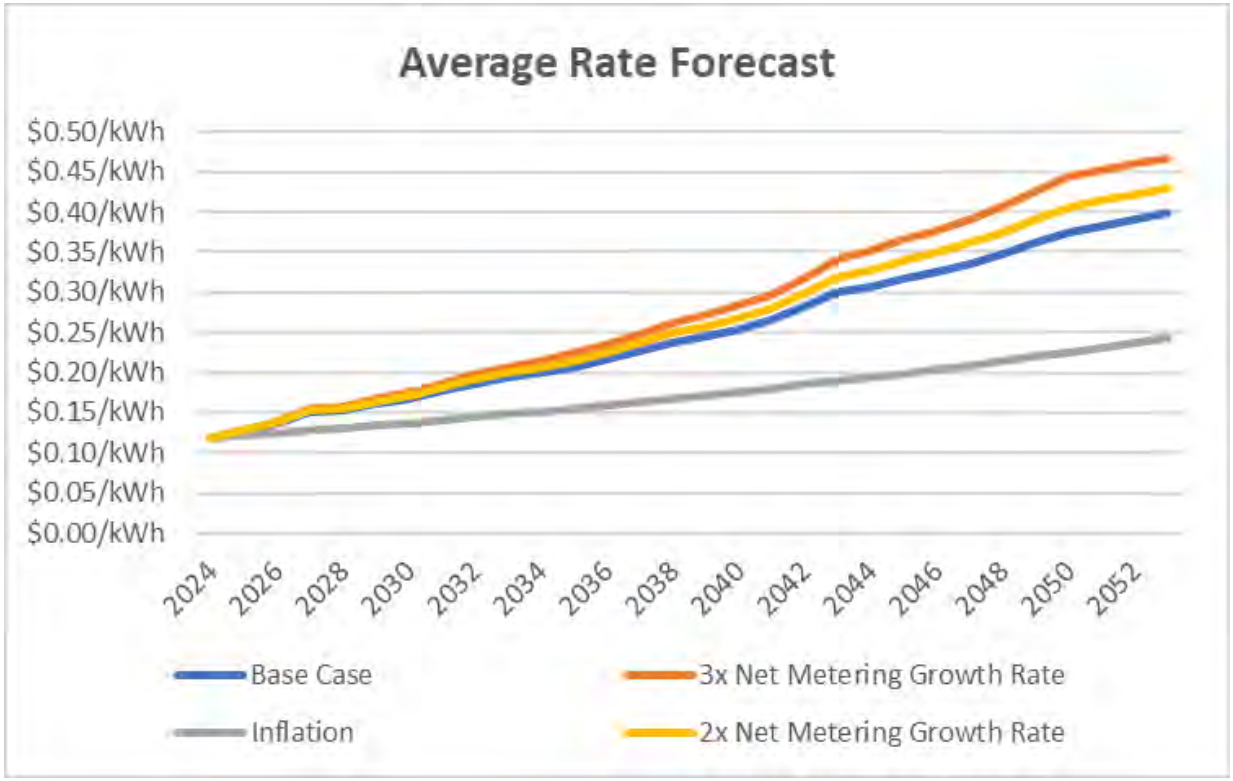
Scenario Example 4 – Repeated Securitization of $10B Investments

- **Test Scenario**
  - $10B securitization every 4 years starting in 2030
  - 4% financing costs
- **Result**
  - Securitization must be done at a large scale to have a meaningful impact on rates
  - This level of securitization may require additional statutory authority
  - 2024-2053 average annual rate growth:
    - Base Case: 4.3%
    - Repeated Securitization: 4.0%



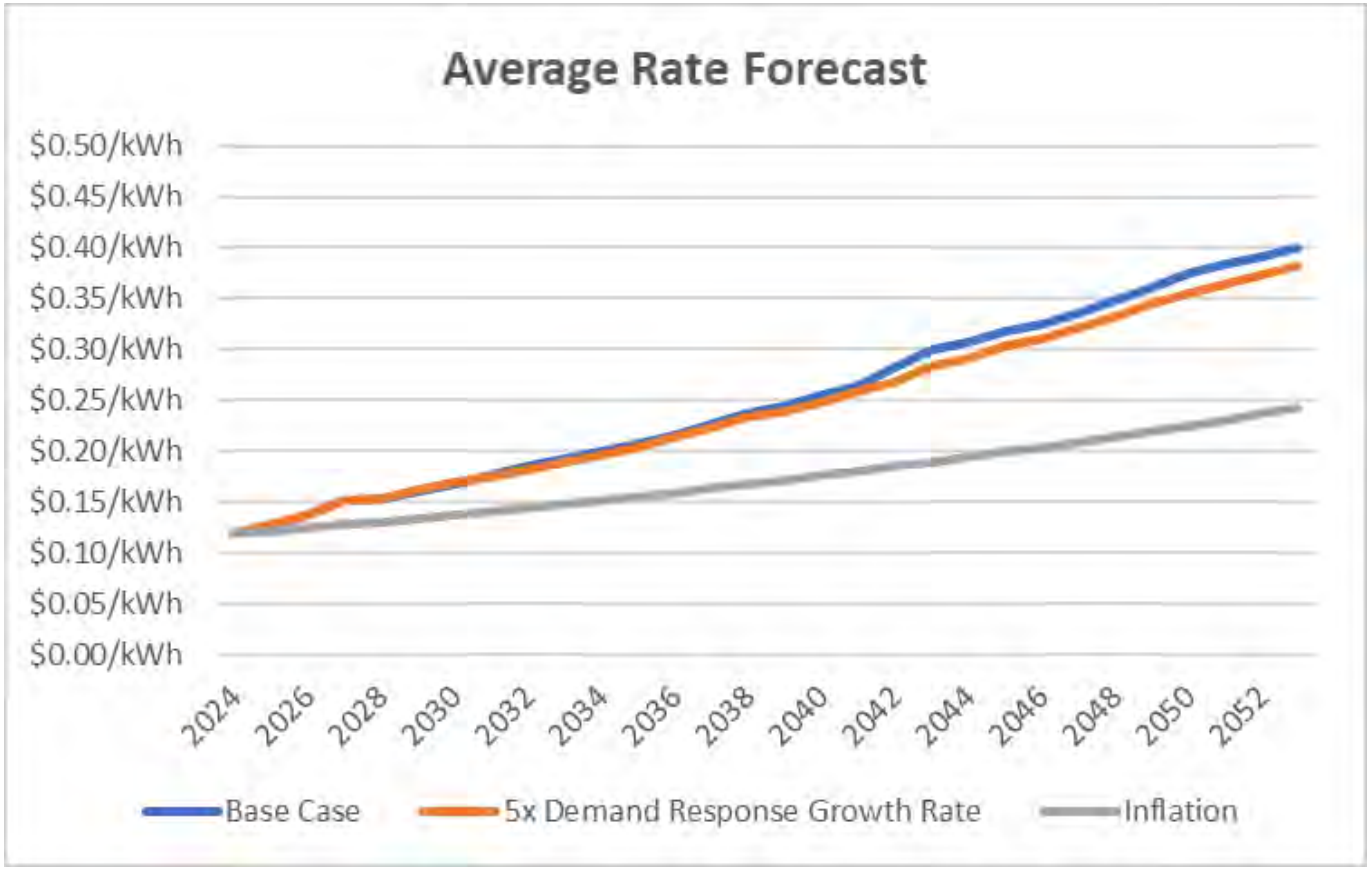
Scenario Example 5 – Net Metering Increase

- The California affordability analysis identified net metered solar as a contributing factor to rate increases
- When net metering (solar without storage) is increased, the model simulates changes in fuel and energy cost and avoided capital investments associated with new company owned generation
- **Test Scenario**
  - Net metering growth rate doubles (12% of total sales by 2034)
  - Net metering growth rate triples (16% of total sales by 2034)
- **Result**
  - Revenue loss due to decreases sales results in an increase in the average rate forecast
  - 2024-2053 average annual rate growth:
    - Base Case: 4.3%
    - 2x net metering growth: 4.6%
    - 3x net metering growth: 4.8%



Scenario Example 6 – Demand Response Increase

- **Test Scenario**
  - Demand response growth rate is 5x higher annually
  - Does not include impacts to transmission or distribution costs
- **Result**
  - 2024-2053 average annual rate growth:
    - Base Case: 4.3%
    - Increased demand response: 4.1%



Conclusions

Conclusions

- Model is good/powerful to look at comparisons – don't get hung up on exact rates
- Base case driven by input assumptions

- The levers with the most impact on rates are capital spending and load growth
- Other levers including securitization, capital structure, ROE, and demand response do have an impact, but that impact is more moderate when paired with such high levels of capital investment
- Distributed solar with net metering has modest impacts until it gets to higher levels like those seen in California
- In order to mitigate the impacts of rate increases, the Commission will likely need to use multiple tools in the proverbial toolbelt