

2021 Integrated Resource Plan

June 1, 2021

POWER

Welcome

2021 El Paso Electric Company Integrated Resource Plan Public Participation June 2021 Meeting

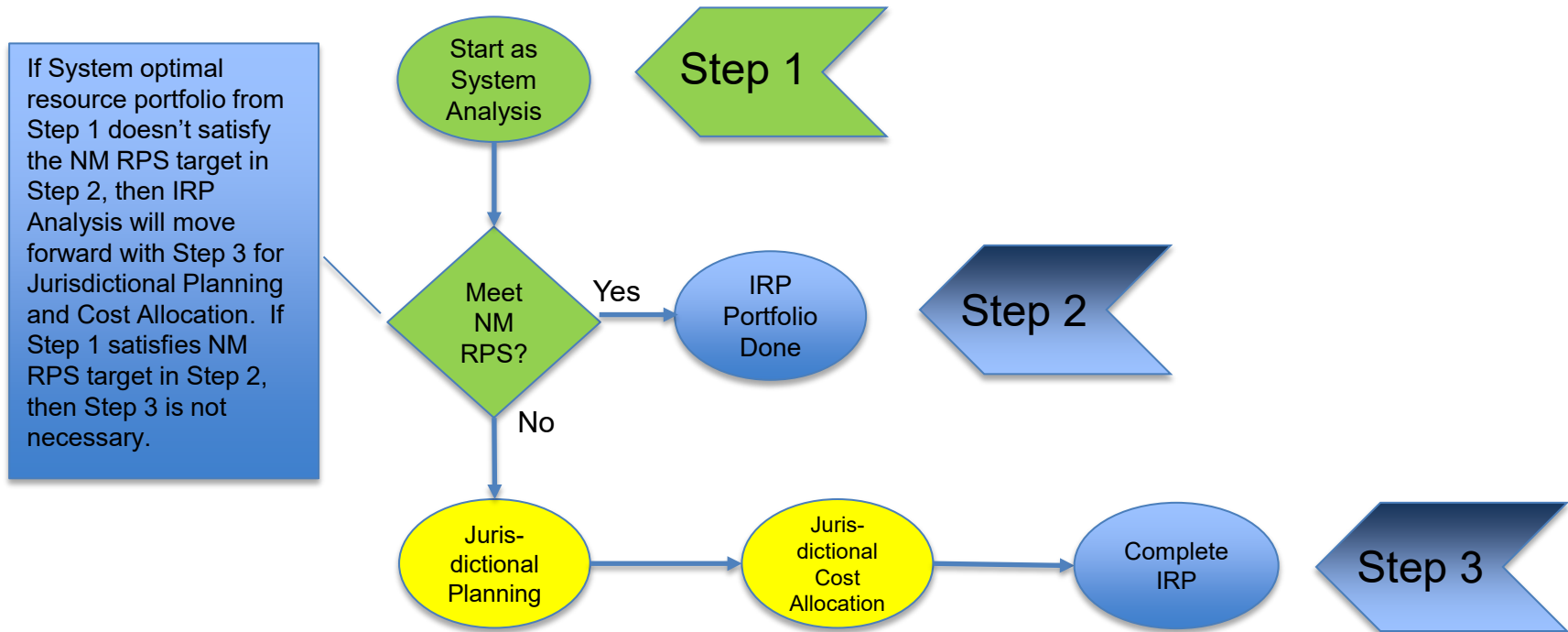
Agenda

- 1) Introduction summary of presentation material
- 2) 2021 Load Forecast Update
- 3) Modeling results for system and jurisdictional modeling
- 4) Next steps

Meeting Format and Guidelines

- **Presentations will be by EPE staff and invited speakers.**
 - Presenters will complete presentation prior to answering questions.
- **Participants may submit questions through the WebEx Q&A box.**
- **Please use the Chat box for technical issues/questions.**
- **Communications should be respectful, to the point and on topic.**
- **Written questions submitted after the meeting will be responded to in writing within 10 days.**

Process Map for IRP Analysis



- Completed initial system analysis and additional carbon reduction sensitivities for system
- Completed jurisdictional allocation scenarios and New Mexico portfolios associated with those scenarios – sharing results for input

IRP Modeling Efforts

Jurisdictional Analysis

- Identified various options for specifically addressing New Mexico Renewable Energy Act requirements
- Various combinations of system and jurisdictional planning approaches modeled and evaluated
- EPE has not finalized its recommendation on which approach to utilize for the final recommended New Mexico portfolio
- Presenting and soliciting feedback and input

Renewable Energy Act

IRP Modeling

- **EPE, along with E3, have developed a broad spectrum of jurisdictional scenarios to allow for review of impacts for various approaches**
- **Solicit and welcome input on the information presented today**

Demand Side Management Resources

High DSM Scenario

- **EPE evaluated the availability of DSM for customer load; however, do not see a high potential**
 - Refrigerated Air – 50.9% already pursuing and modeled
 - Pool pumps – only 7.9% penetration
 - Electric Water Heaters – only 15.3% penetration
- **This may change as electrification evolves, already considering**
 - Managed EV charging in load profiles
- **Opted to model a high DSM case without identifying programs, but rather to assess portfolio impact**
 - Values are at or greater than a comparable regional utility

IRP Goals

- **IRP process to be informative for all stakeholders**
 - Continue to solicit input
 - Input on 2040 REA scenarios
- **IRP will...**
 - Provide alternatives for meeting the NM REA renewable energy and carbon free requirements
 - Identify cost differentials for alternatives to meet the REA requirements
 - Make a recommendation on optimal portfolio to meet the NM REA



2021 Long-Term Forecast

INTEGRATED RESOURCE PLANNING



El Paso Electric





2021 Energy Forecast

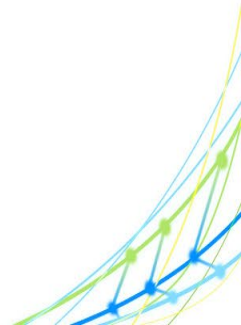


El Paso Electric



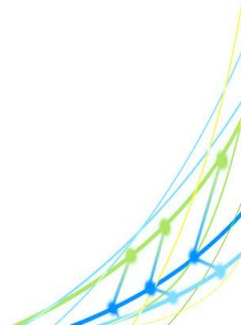
Energy Forecast Methodology

- The 2021 Energy Forecast:
 - Employs monthly and annual methodologies to develop its models.
 - Models are estimated based on an econometric methodology
 - All econometric models are estimated using Ordinary Least Squares (OLS) as a function of weather, economic, and demographic variables. Residential energy sales are estimated using a use per customer (UPC) methodology
 - The final models are selected based on various key statistical measures
 - Load research data and statistical analysis are employed to estimate sales and demand that don't lend themselves to econometric modeling.



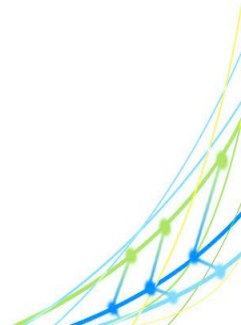
NM Energy Forecast Model

- All of the energy models for NM are econometric models with the exception of street lighting.
 - Street lighting is forecasted to grow at the same rate as total households in Las Cruces.
- Residential is the only Revenue Class that has a UPC energy model methodology.
- All of the customer models for NM are econometric models with the exception of Large C&I and Street Lighting.
 - The non econometric models assume the year ending 2020 customer count to remain constant.
- TX Energy Forecast Model is derived in a similar manner.



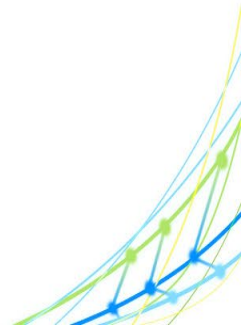
Weather

- Because weather can sometimes change dramatically from year to year, EPE averages weather over several years to smooth out the annual variability of weather in the forecasting equation.
- For the purpose of generation the energy forecast, ten-year average weather for El Paso and La Cruces is used.
- We use HDD's and CDD's to analyze weather.
 - HDD measure the fluctuations in daily average temperature below the designated base temperature (65 degrees Fahrenheit)
 - CDD measures the fluctuations in daily average temperature above the designated base temperature (65 degrees Fahrenheit)

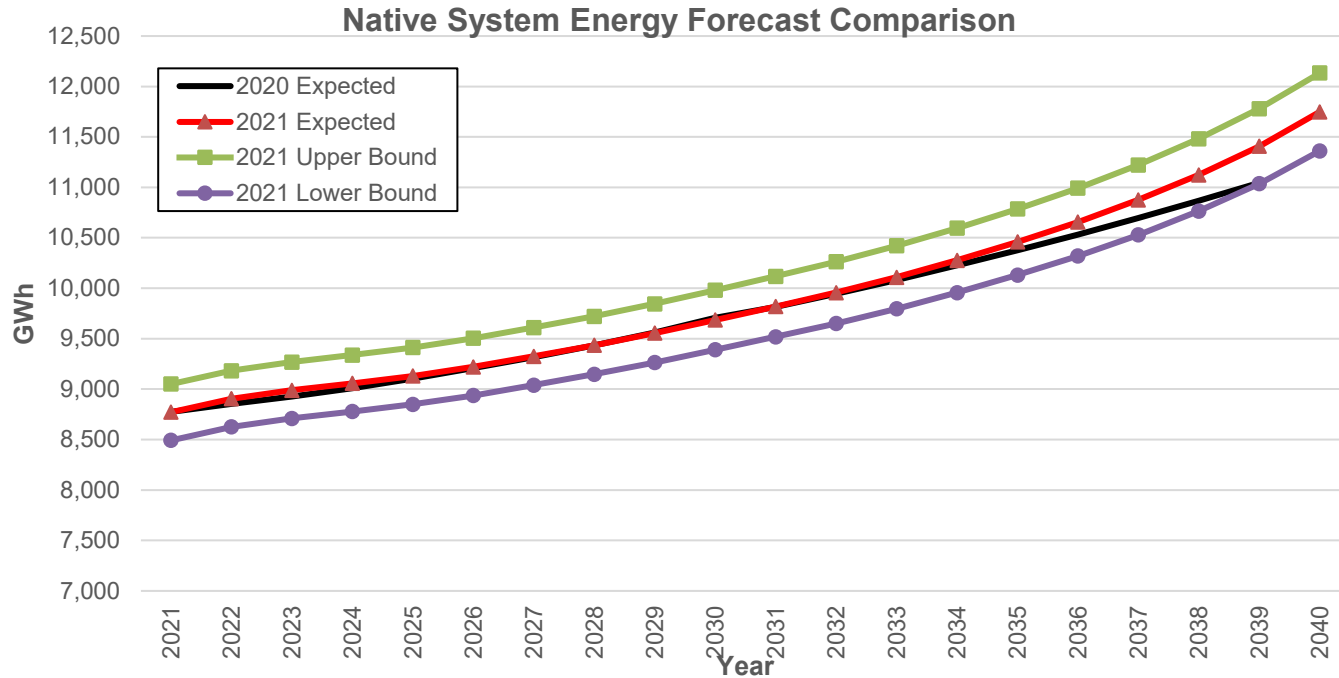


Out-of-Model Adjustments

- Losses
- Rio Grande Electric Cooperative
- Energy Efficiency
- Distributed Solar Generation
- Light-Duty Electric Vehicle



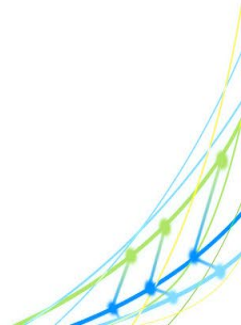
Energy Forecast Comparison



Energy Forecast Summary

- The table below, shows 10- and 20-year average annual growth rates for the native system energy from the 2020 and 2021 Forecasts.

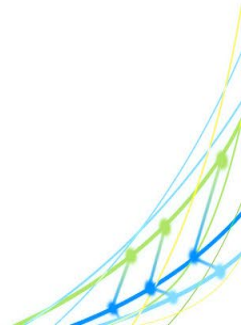
Native System Energy Growth Rates (CAGR)			
	Historical	2020 Forecast	2021 Forecast
10-Year	0.8%	1.1%	1.1%
20-Year	1.3%	1.3%	1.5%



COVID-19

- COVID-19 closures led to a shift in usage patterns
- Native System Peak increased by 9.5% or 188 MW
- Native System Energy increased by 1.7%
- Load Factor dropped by 7.4%
- Independent variables to model the changes due to the pandemic were added to the residential forecast model
- Table shows the differences in usage patterns

Comparison of Retail Sales by Revenue Class			
	2019	2020	% Change
Residential	2,983,363,099	3,319,343,367	11.26%
Small C&I	2,395,761,834	2,314,980,556	-3.37%
Large C&I	1,022,347,511	976,260,622	-4.51%
OPA	1,554,606,781	1,493,873,571	-3.91%
Total	7,956,079,225	8,104,458,116	1.86%



2021 Demand Forecast

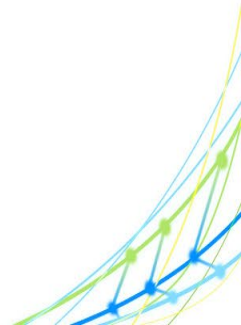


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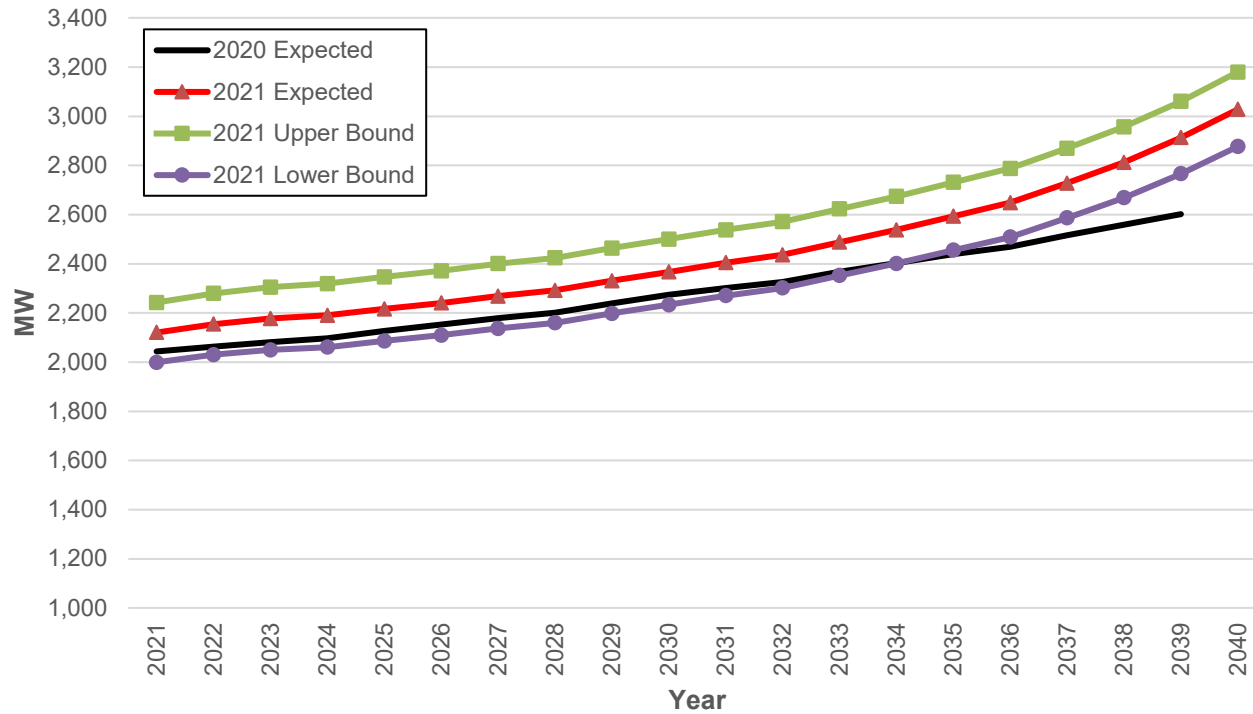
System Load Factor

- Historically, annual forecasts use an average system load factor to project demand.
- In the 2021 forecast, a two-year load factor of 0.473 is used to forecast peak demand. This load factor is obtained from 2020 and 2019 historical data.



Demand Forecast Comparison

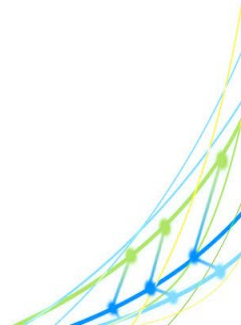
Native System Demand Forecast Comparison



Demand Forecast Summary

- The table below compares 10- and 20- year average growth for the native system demand from the 2020 and 2021 Forecast.

Native System Peak Demand Growth Rates (CAGR)			
	Historical	2020 Forecast	2021 Forecast
10-Year	3.0%	1.2%	0.9%
20-Year	3.2%	1.4%	1.7%



Emergent Technologies

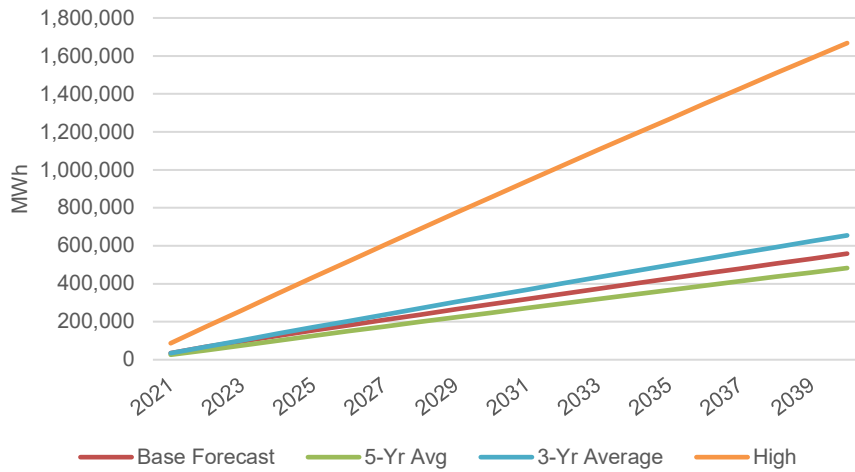


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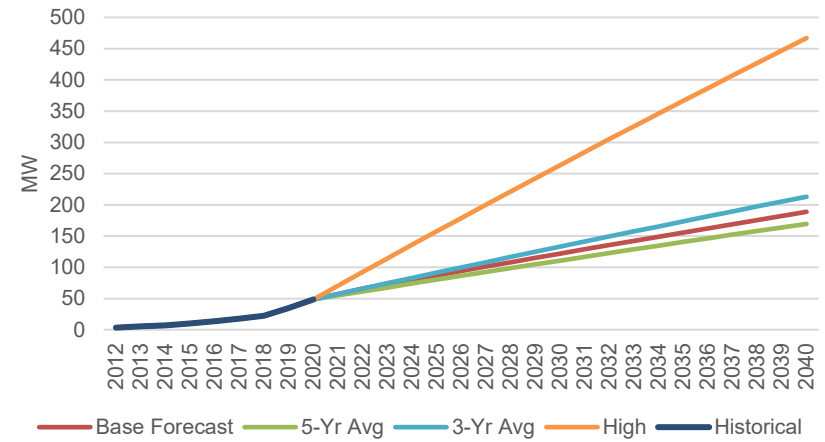


Distributed Generation

Total DG Forecasted Energy



Based on Actual 2020 Demand: Forecasted Coincident Demand After Degradation

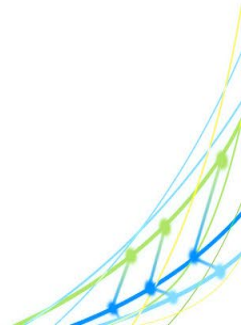


Light-Duty Electric Vehicle Impact

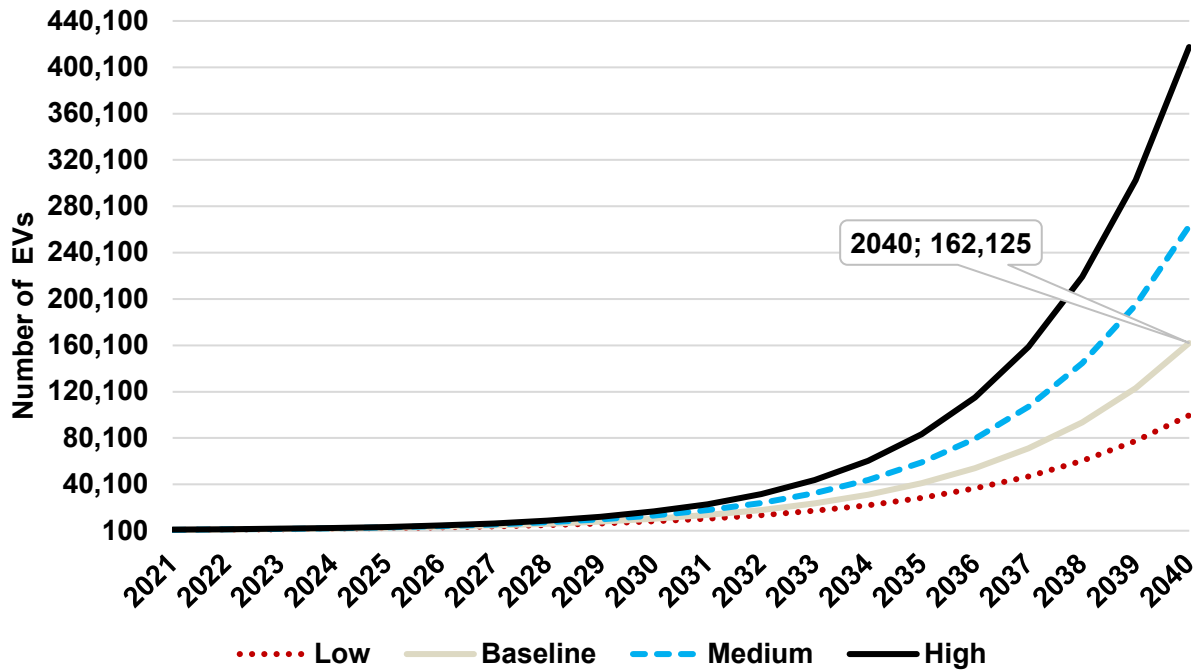
Year	No. of Vehicles	Demand * (MW)	Energy ** (MWh)
2021	754	5	3,387
2022	991	7	4,458
2023	1,302	9	5,869
2024	1,711	12	7,725
2025	2,248	16	10,168
2026	2,953	21	13,384
2027	3,880	28	17,618
2028	5,098	37	23,190
2029	6,697	48	30,525
2030	8,799	63	40,180

* Forecasted Maximum Non-Coincident Peak Demand considering 7.2 kW level-2 charger

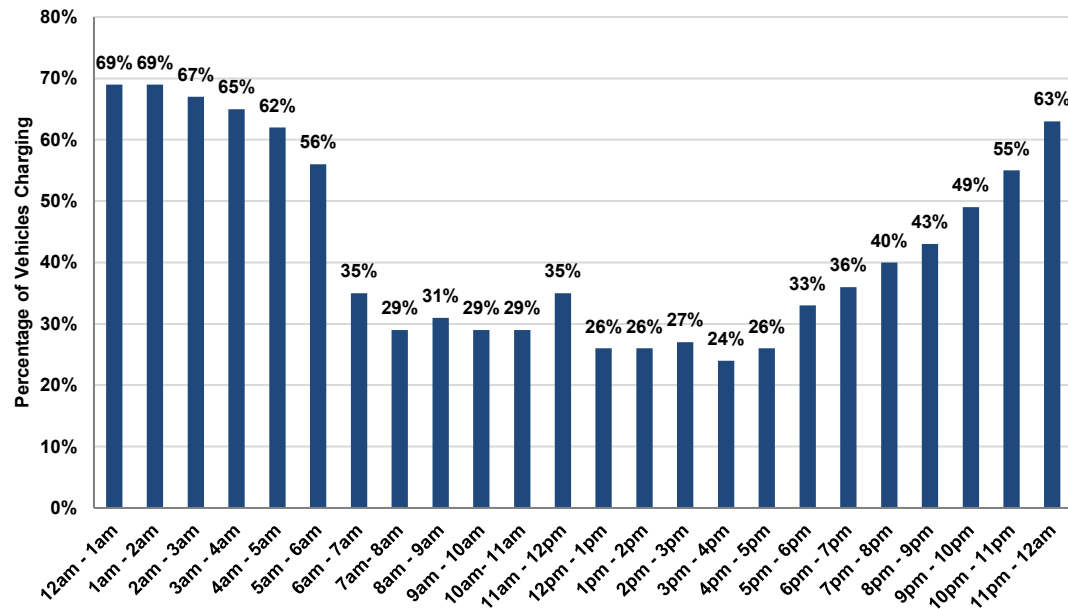
** Forecasted Energy considering average yearly commute



Light-Duty Electric Vehicle Forecast



Typical Charging Demand Profile for Residential Customers



California Energy Commission, 2015-2017 California Vehicle Survey, May 2018, CEC-200-2018-006. (Additional information: www.energy.ca.gov/data-reports/surveys/california-vehicle-survey)

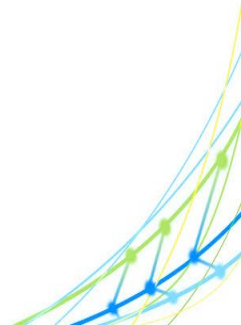
Medium-Duty Commercial Battery Electric Vehicle Impact

➤ Energy Impacts

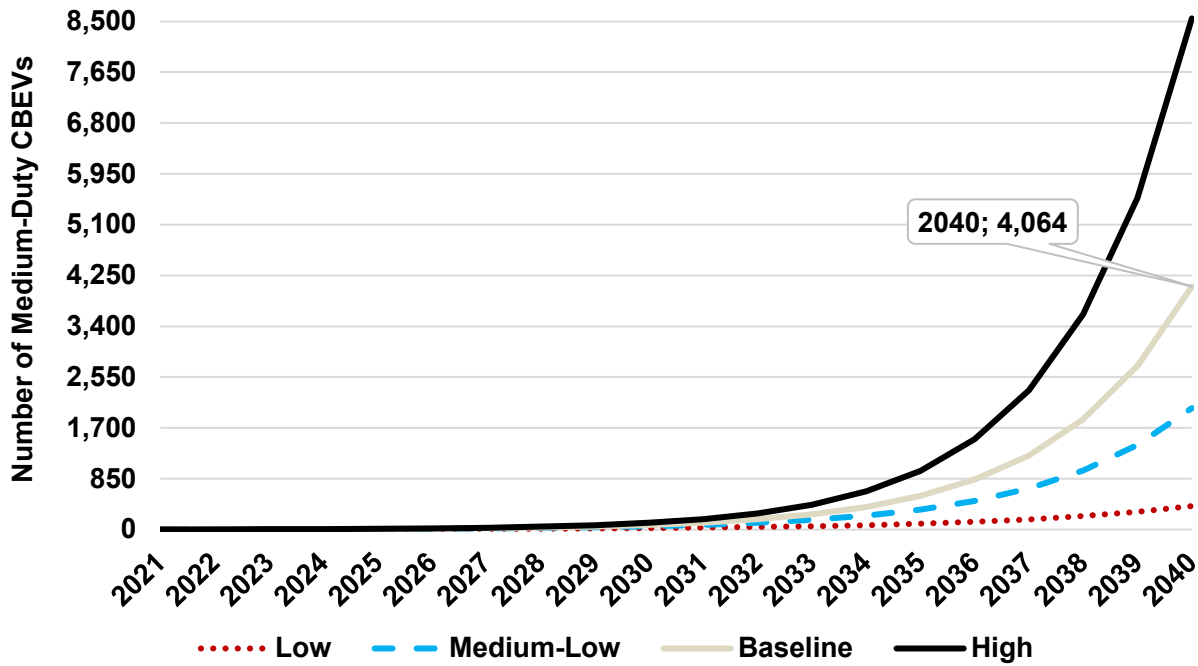
- Estimates indicate a single medium-duty CBEV could consume an average of 18,155 kWh per year .
- Equivalent average annual energy consumption of 2 residential customers in EPE's service territory.
- Compared to light-duty BEVs, medium-duty CBEV energy consumption is on average 5 times greater.

➤ Demand Impacts

- Medium-duty CBEV charging can create demand spikes as high as 150 kW per vehicle.
- Charging demand is similar to light-duty BEVs.



Medium-Duty Commercial Battery Electric Vehicle Forecast



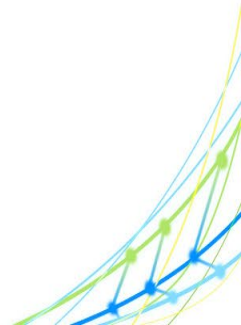
Heavy-Duty Commercial Battery Electric Vehicle Impact

➤ Energy Impacts

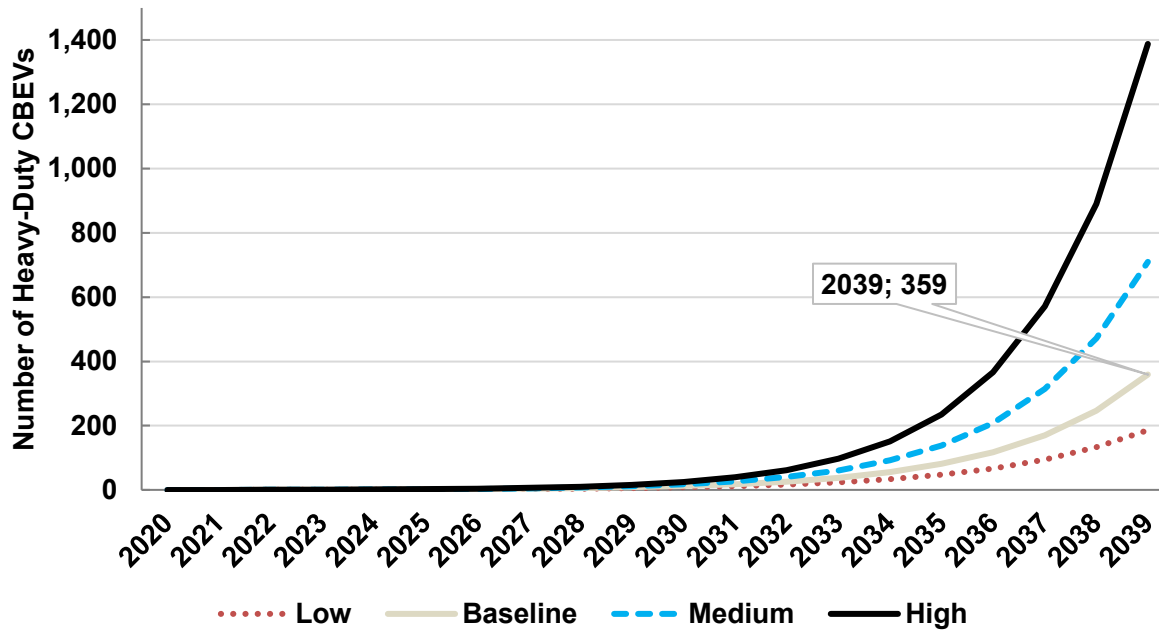
- Estimates indicate a single heavy-duty CBEV could consume an average of 131,778 kWh per year.
- Equivalent average annual energy consumption of 17 residential customers or 2 small commercial customers in EPE's service territory.
- Compared to light-duty BEVs, heavy-duty CBEV energy consumption is on average 35 times greater.

➤ Demand Impacts

- Heavy-duty CBEV charging can create demand spikes as high as 2 MW per vehicle.
- Compared to light-duty BEVs, charging demand can be between 2-17 times higher per vehicle.

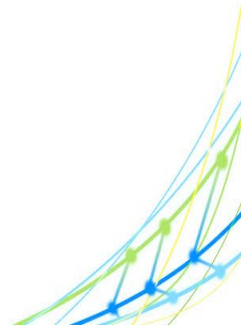


Heavy-Duty Commercial Battery Electric Vehicle Forecast



Key Drivers to Future Load

- Growth in:
 - Distributed Generation
 - Battery Technology
 - Electric Vehicles
 - Energy Efficiency (UPC reductions)
- Changes to rate design/offers
 - Three part rates
 - Fixed charges
 - Demand charges
 - Time varying energy charges
 - Critical Peak Pricing
 - Demand Response
- COVID-19 Pandemic
 - Energy vs Demand impact
 - Changes in consumption due to continued full-time work-from-home or hybrid work-from-home





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El Paso Electric IRP Modeling Update

Portfolio Analysis Results

6/1/2021

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Joe Hooker, Senior Managing Consultant

Huai Jiang, Senior Consultant

Manu Mogadali, Senior Consultant

Chen Zhang, Consultant



Agenda

- + Assumption updates
- + Updated Reference Case results
- + High DSM sensitivity results
- + New Mexico REA Requirements
- + New Mexico REA Scenario Results



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Assumption Updates



Unit Lifetime Extensions

- + E3 modeled unit lifetime extensions for the following units that are currently scheduled to retire prior to 2030

Resource	Planned Retirement Year	Extension Period	Capital + Fixed O&M (2021 \$/kW-yr)
Rio Grande 7	2022	5 years	\$113.73
Newman 1	2022	5 years	\$78.59
Newman 2	2022	5 years	\$79.98
Newman 3	2026	5 years	\$58.12
Newman 4	2026	5 years	\$47.44

- + In the modeling, unit extensions for Rio Grande 7 and Newman 2 are not selected, but the other unit extensions are



Planning Reserve Margin

- + The modeling assumes a 2-day-in-10-year reliability standard for 2025 as a transition to the more common 1-day-in-10-year reliability standard starting in 2030

Metric	2025	2030+
Reliability Target	Two days with outages every ten years on average (0.2 LOLE)	One day with outages every ten years on average (0.1 LOLE)
Target PCAP PRM	10.1%	12.9%

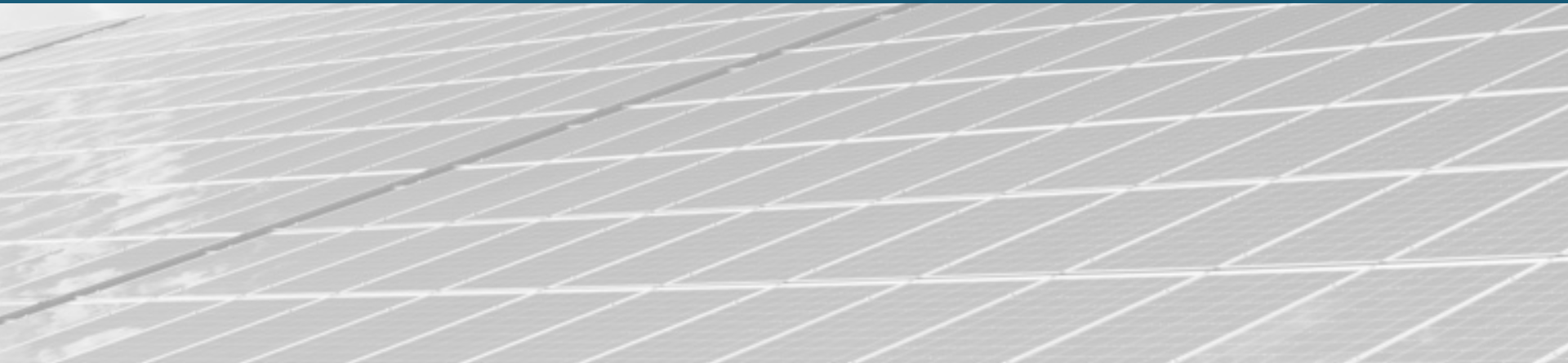
LOLE = Loss-of-Load Expectation; PCAP = Perfect Capacity

- + Under this PRM, all generators count toward the PRM based on their effective load carrying capability (ELCC)



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Updated Reference Case Results





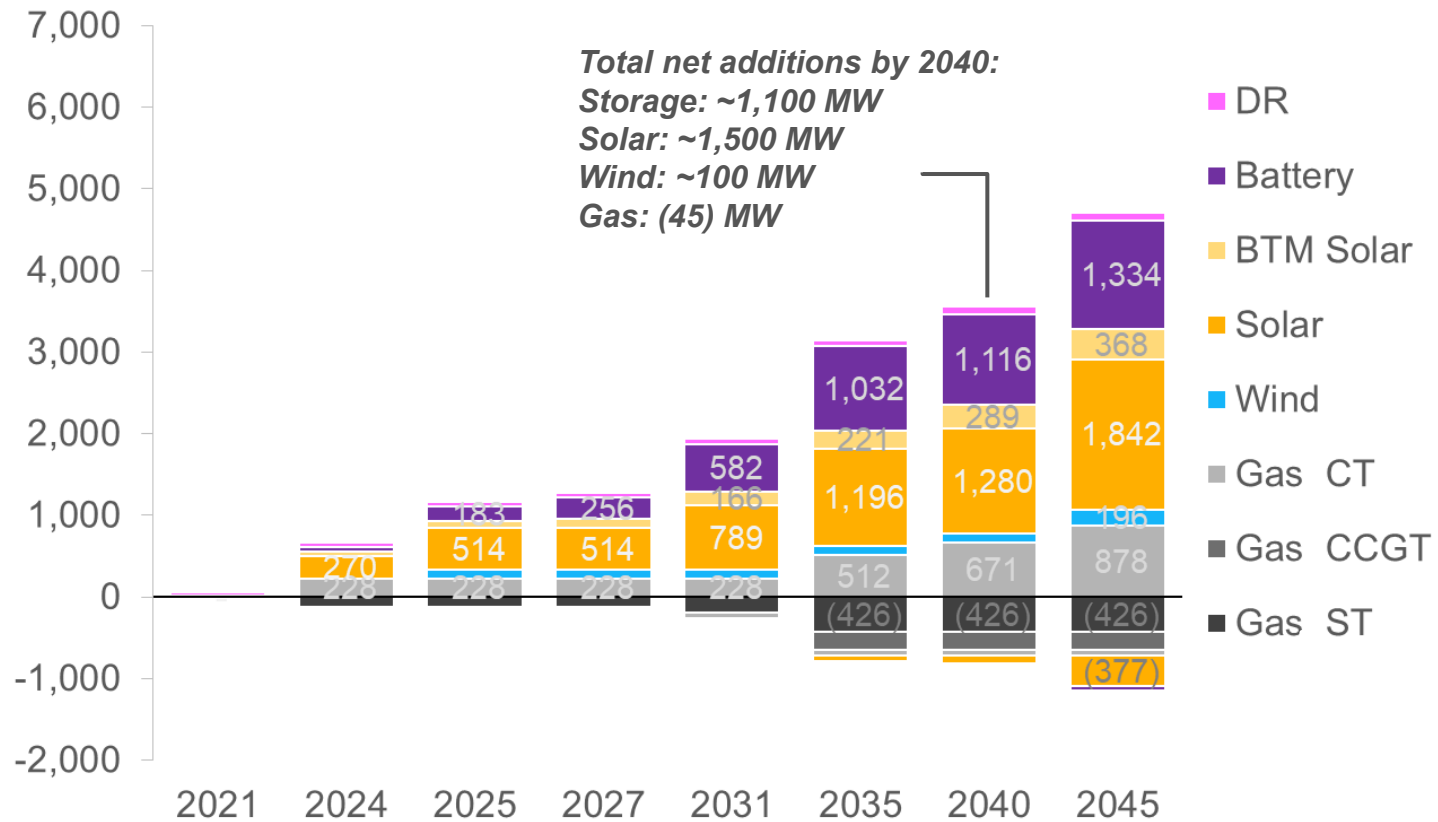
Scenarios and Sensitivities

Run	Note	Presented Previously	Presented Today
Least-Cost (Reference Case)	Least-cost optimization used as reference case for all sensitivities	✓	✓
Least-Cost Case + REA Resources	Additional resources added to Least-Cost Case for New Mexico REA		✓
Separate System Planning	New Mexico system planned separately for purposes of satisfying REA		✓
Low Load Growth	3-4% higher native system load forecast		
High Load Growth	3-4% lower native system load forecast		
High DG	High DG forecast		
High DSM	More smart thermostats, doubling of energy efficiency		✓
No New Gas	No new gas after Newman 6		
No Lifetime Extensions	All plants retire as scheduled		
High Gas Price	Gas prices 15% higher		
Low Carbon Price	\$8 per metric ton of CO ₂ in 2010, rising at 2.5% per year		
Medium Carbon Price	\$20 per metric ton of CO ₂ in 2010, rising at 2.5% per year		
High Carbon Price	\$40 per metric ton of CO ₂ in 2010, rising at 2.5% per year		
80% Clean by 2035	80% zero-carbon energy	✓	
20% CO₂ Red. by 2040	20% reduction in CO ₂ emissions	✓	
40% CO₂ Red. by 2040	40% reduction in CO ₂ emissions	✓	
60% CO₂ Red. by 2040	60% reduction in CO ₂ emissions	✓	
80% CO₂ Red. by 2040	80% reduction in CO ₂ emissions	✓	
90% CO₂ Red. by 2040	90% reduction in CO ₂ emissions	✓	
100% CO₂ Red. by 2040	100% reduction in CO ₂ emissions	✓	
100% CO₂ Red. by 2040 (w/ H₂)	100% reduction in CO ₂ emissions with hydrogen	✓	



Reference Case: Additions and Retirements

Cumulative New & Retired Capacity (Installed MW)

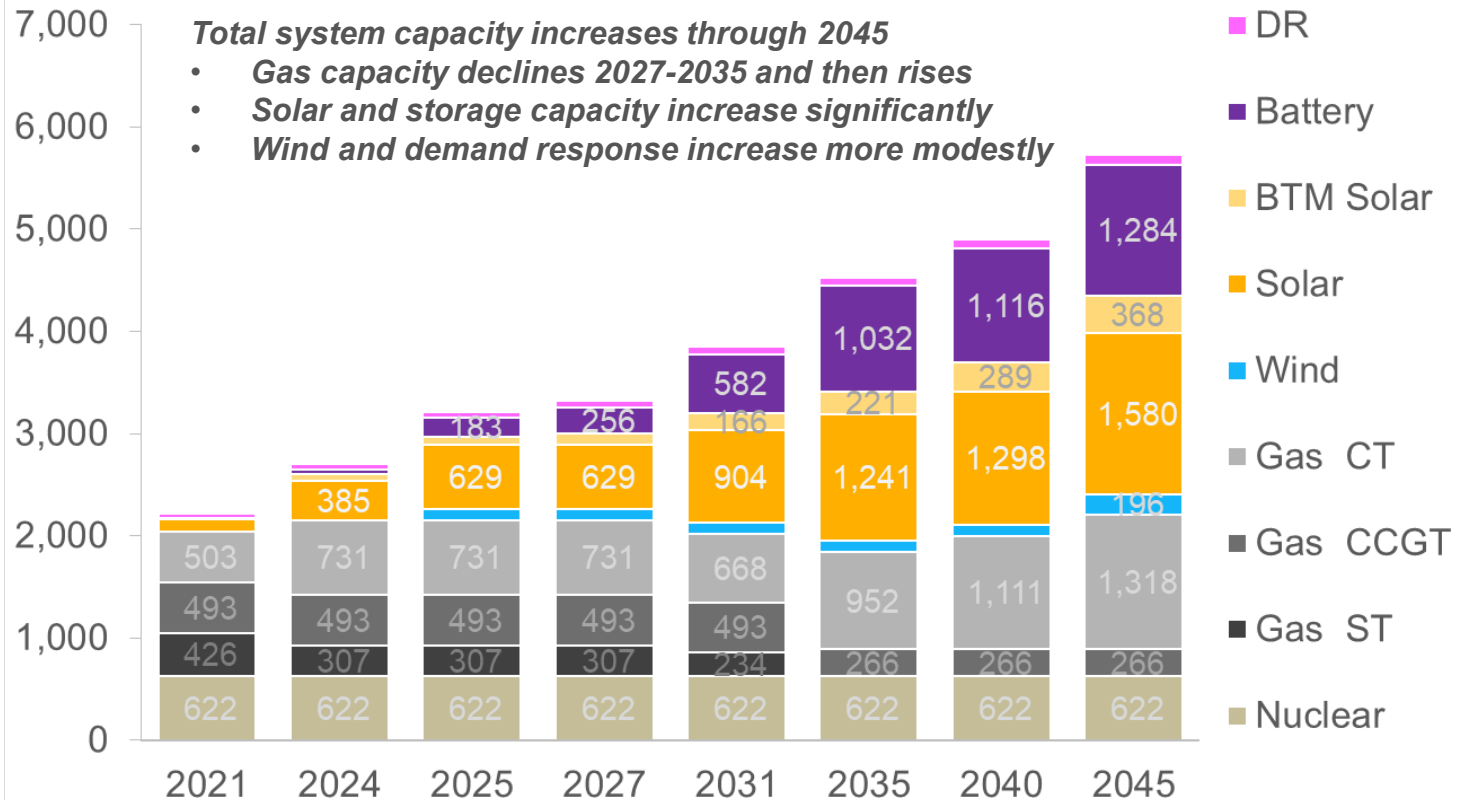


DR = demand response; BTM Solar = behind-the-meter solar



Reference Case: Total Capacity

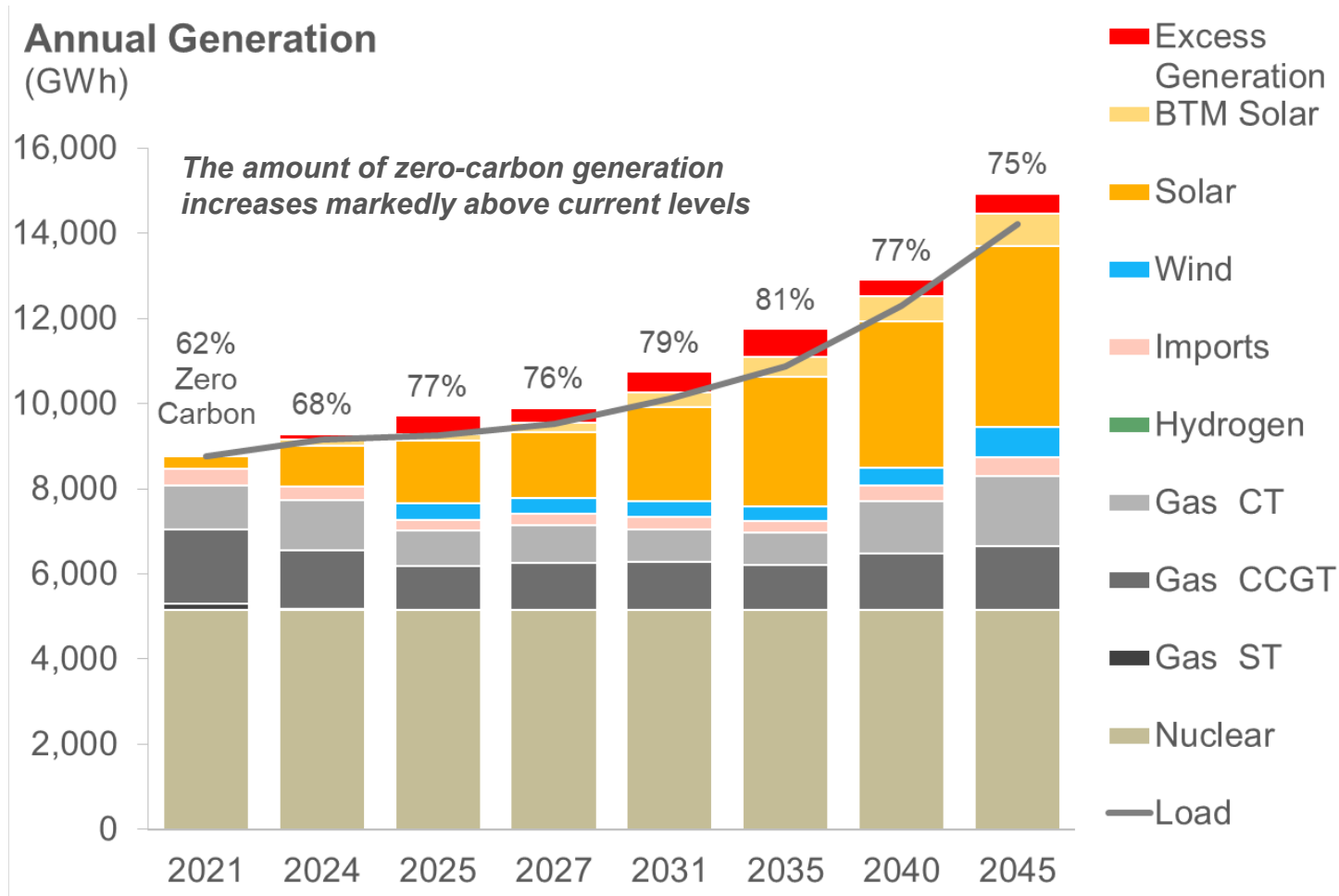
Total Installed Capacity (MW)



DR = demand response; BTM Solar = behind-the-meter solar



Reference Case: Annual Generation

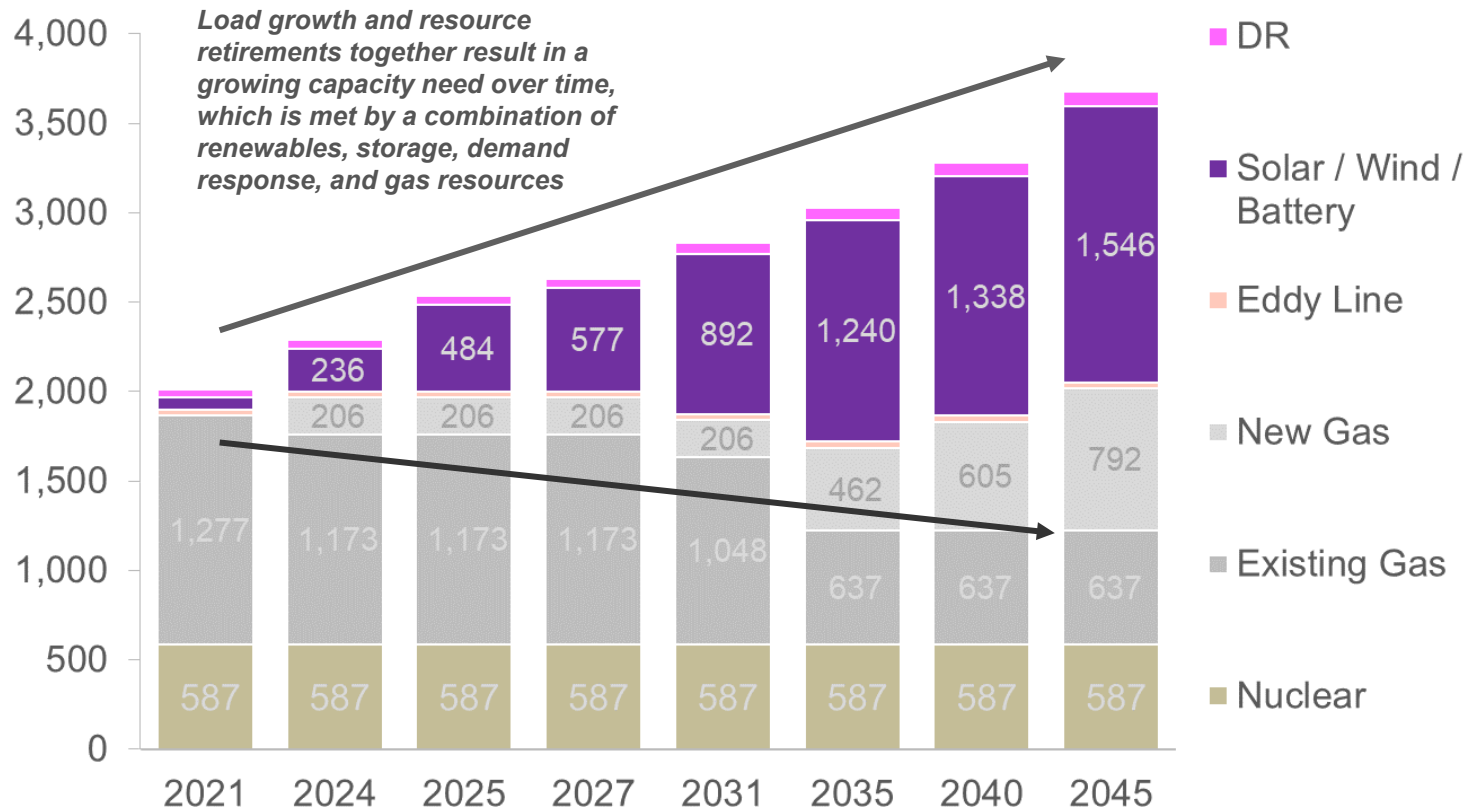


BTM Solar = behind-the-meter solar



Reference Case: Effective Capacity

Effective Capacity (MW)



Effective capacity is the amount of capacity that can be counted towards the PRM



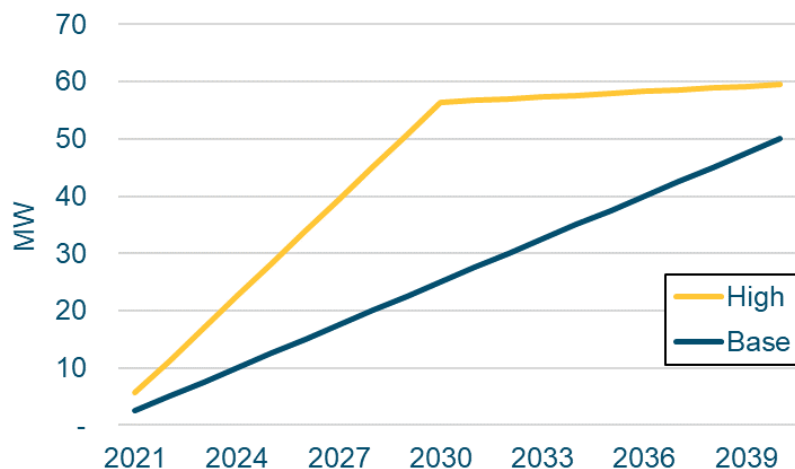
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High DSM Sensitivity Results



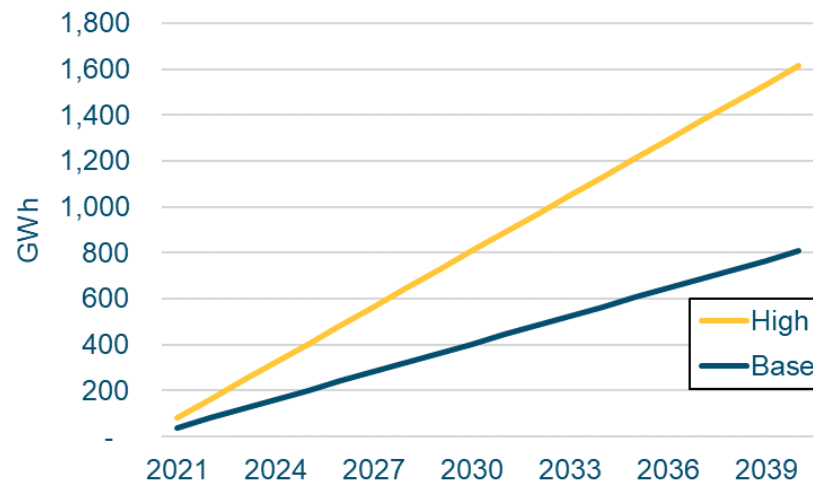
High DSM Sensitivity Assumptions

Smart Thermostats



- + Base: 50MW by 2040
- + High: 60MW by 2040

Energy Efficiency



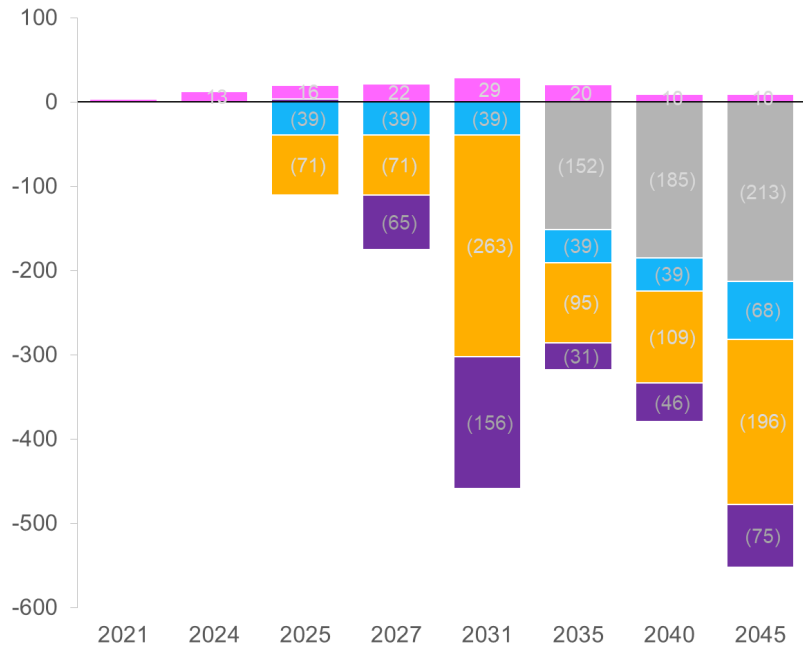
- + Base: 6.5% of native system load in 2040
- + High: 13% of native system load in 2040
- + An incremental ~800 GWh in 2040
Corresponds to ~90 MW of savings on average throughout the year



High DSM Scenario Results

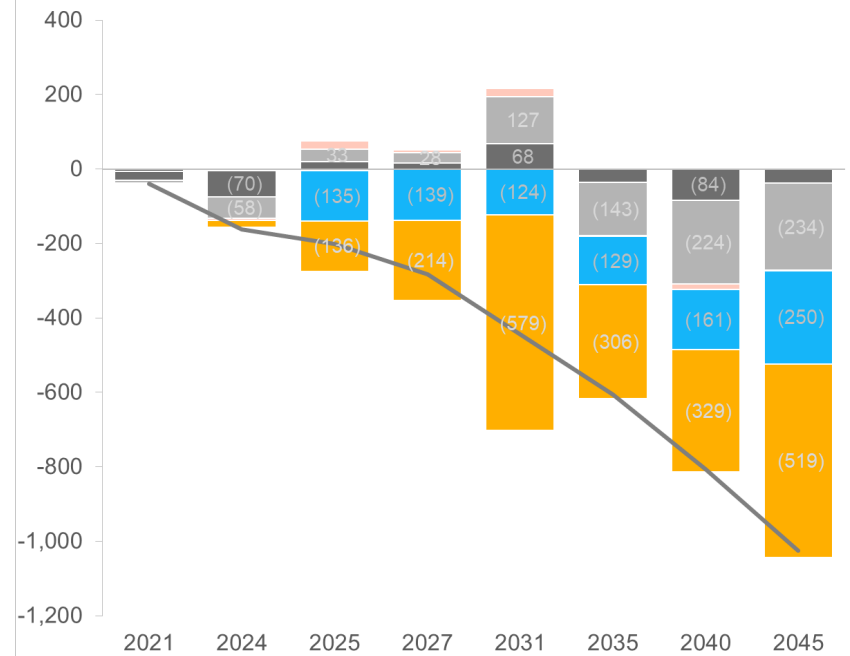
Change in Capacity

Change in Cumulative New & Retired Capacity vs. Reference Case (Installed MW)



Generation Mix

Change in Annual Generation vs. Reference Case (GWh)

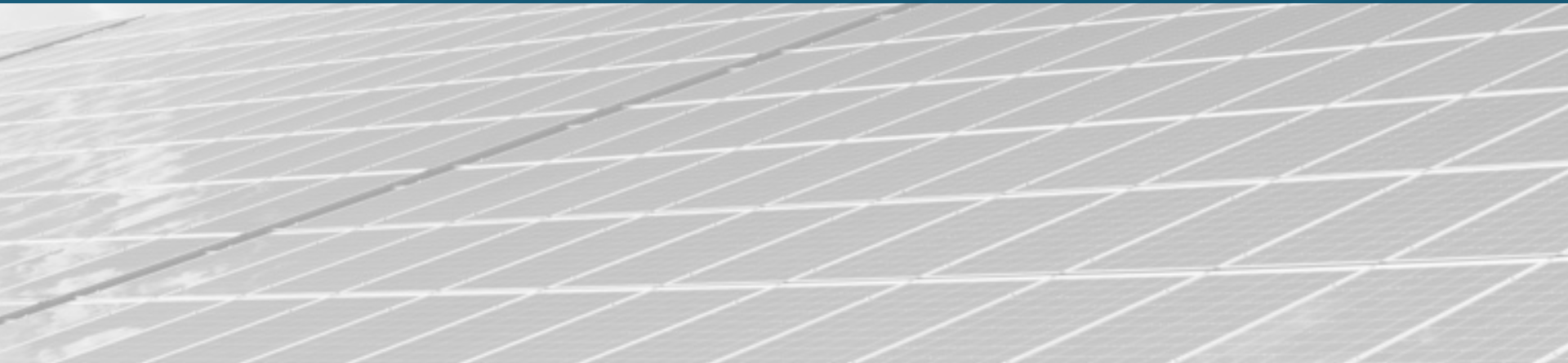


■ Nuclear
 ■ Gas ST
 ■ Gas CCGT
 ■ Gas CT
 ■ Imports
 ■ Wind
 ■ Solar
 ■ BTM Solar
 ■ Battery
 ■ DR
 ■ Excess Generation
 — Load



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New Mexico REA Requirements





New Mexico Renewable Energy Act

+ There are key requirements in the statutory language setting renewable energy and zero carbon requirements in New Mexico (emphasis added):

“A public utility shall meet the renewable portfolio standard requirements, as provided in this section, to include renewable energy in its electric energy supply portfolio as demonstrated by its retirement of renewable energy certificates; *provided that the associated **renewable energy is delivered** to the public utility and assigned to the public utility's New Mexico customers...*

(5) no later than January 1, 2040, renewable energy resources shall supply no less than eighty percent of all retail sales of electricity in New Mexico; provided that compliance with this standard until December 31, 2047 shall not require the public utility to displace zero carbon resources in the utility's generation portfolio on the effective date of this 2019 act; and

(6) no later than January 1, 2045, zero carbon resources shall supply one hundred percent of all retail sales of electricity in New Mexico. Reasonable and consistent progress shall be made over time toward this requirement.”

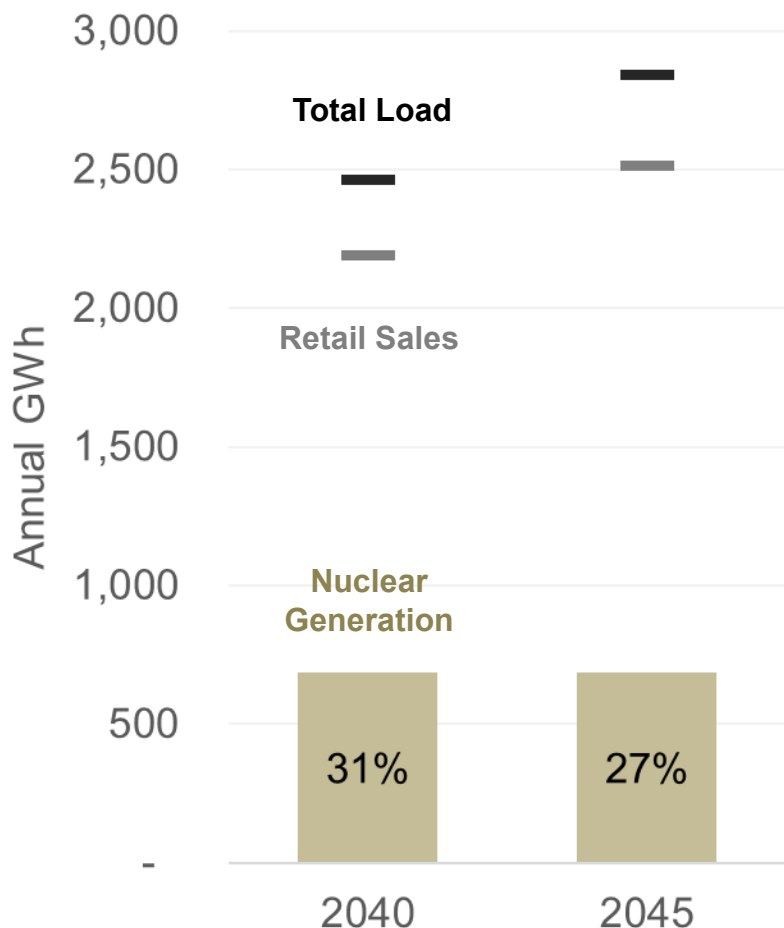
+ The scenarios analyzed consider multiple approaches for REA implementation

- Share of NM load served with renewable energy, given that El Paso Electric serves NM load with greater than 20% non-renewable zero-carbon resources (i.e. Palo Verde)
- Annual vs. hourly balancing periods for 100% zero-carbon generation
- Whether combustion resources may be utilized to ensure reliability for NM customers



New Mexico REA Requirements in 2040+

New Mexico Nuclear Generation & Load



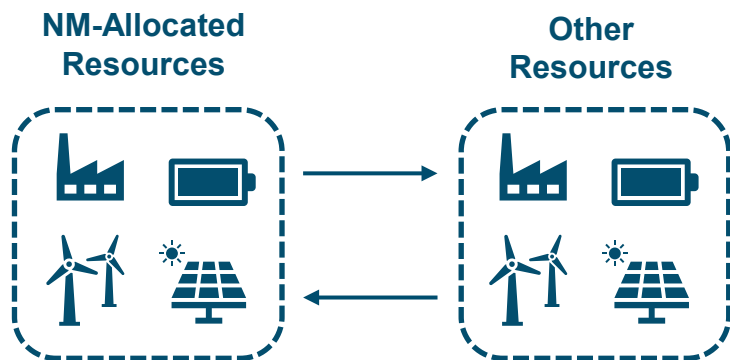
- + The REA requires 80% RPS by 2040, unless doing so would require displacing existing zero-carbon generation
- + New Mexico's share of Palo Verde 1 and 2 supplies 31% of New Mexico's retail sales in 2040 and 27% in 2045
- + For purposes of IRP modeling, El Paso Electric has directed E3 to require New Mexico zero-carbon generation (renewables + nuclear) to equal or exceed 100% of New Mexico retail sales or load starting in 2040



Two Approaches for Modeling Zero-Carbon Generation Balancing

Annual Balancing

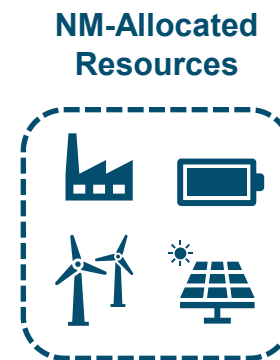
- New Mexico-allocated zero-carbon resources must generate enough energy on an annual basis to match the REA NM retail sales target
- Natural gas resources and/or imports can serve New Mexico's energy needs in some hours if that generation is offset by additional zero-carbon generation in other hours
- Annual balancing allows New Mexico customers to reap the benefits of being served by a larger system



NM customers can be served by gas resources and unspecified imports if offset in other hours

Hourly Balancing

- New Mexico cannot receive power from gas resources or unspecified imports in any hour
- Zero-carbon generation from New Mexico-allocated resources must serve New Mexico energy demand in all hours of the year
- This would be a more stringent zero-carbon requirement, as it would not allow for balancing between New Mexico and Texas resources



NM customers cannot be served by gas resources or unspecified imports in any hour



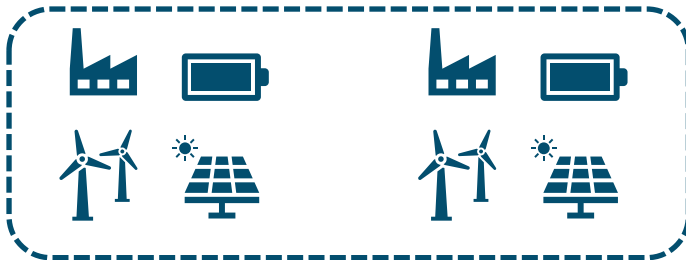
Two Approaches for Modeling Capacity Pooling to Ensure Reliability

Capacity Pooling Allowed

- For reliability planning purposes, NM and TX loads can be served by NM resources, TX resources, and/or system resources
 - If the NM jurisdiction doesn't have enough resources to satisfy load in an hour, then it can rely on TX resources, and vice versa
- NM and TX customers must still pay for enough resources to satisfy their share of system reliability needs

NM-Allocated Resources

TX-Allocated Resources



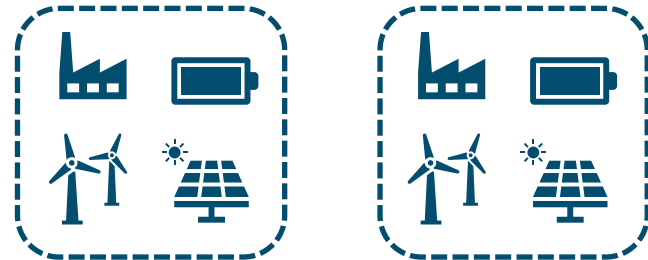
All resources together ensure systemwide reliability across all hours, subject to the reliability standard

Capacity Pooling NOT Allowed

- For planning purposes, TX and NM must each have enough resources to ensure reliability across a range of potential conditions without relying on the other jurisdiction (i.e. on a standalone basis)
- This would be a more stringent planning approach; NM would need to plan to have enough resources without falling back on TX gas resources in some hours

NM-Allocated Resources

TX-Allocated Resources



For planning purposes, each jurisdiction ensures reliability on its own across all hours, subject to the reliability standard



New Mexico REA Scenarios and Jurisdictional Allocation

+ E3 modeled a few scenarios with different approaches for how to satisfy the REA requirements

- Different approaches of the REA requirements have meaningful implications on how planning is performed for New Mexico customers
- The more stringent approaches of the REA requirements will result in higher system costs relative to less stringent approaches
- To ensure equitable treatment of customers across jurisdictions, any incremental costs of satisfying the REA requirements would be allocated to New Mexico customers

+ For each scenario, resources and costs are allocated between the New Mexico and Texas jurisdictions

- The allocation of resources follows directly from a particular approach to modeling REA compliance. If a particular approach requires more resources to be added versus the least-cost case, then those resources are allocated to the New Mexico jurisdiction
- Capacity, generation, and cost for the New Mexico jurisdiction are presented for each scenario



New Mexico REA Scenarios

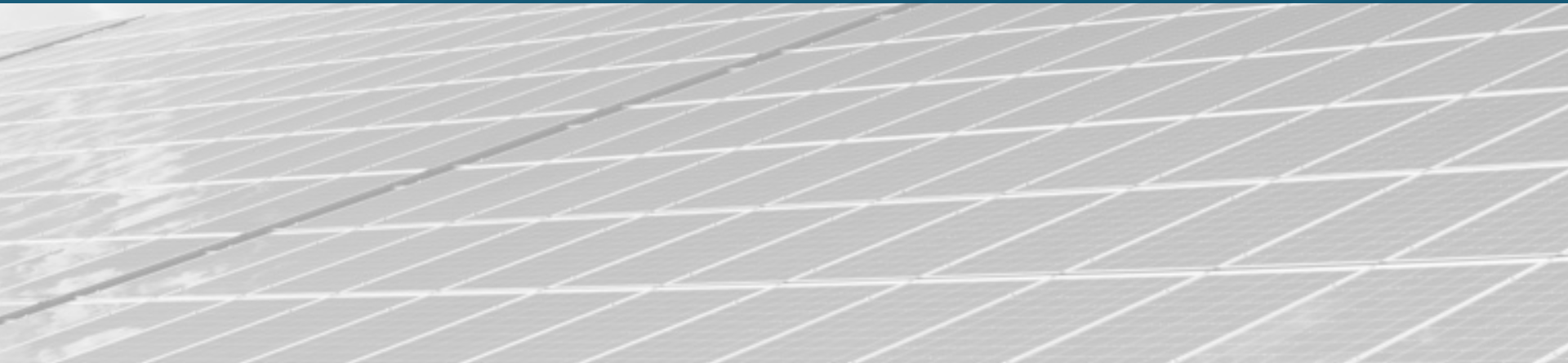
	Least Cost ("LC")	Least Cost + REA Resources ("LC+REA")	Separate System Planning ("SSP")
Portfolio optimization	Least-cost system optimization	Reoptimize Least Cost to add additional renewables & storage dedicated to NM to satisfy REA requirements	Optimize NM and TX systems independently without modeling interactions between them
NM zero-carbon generation balancing period	Annual	Annual	Hourly
NM and TX capacity pooling to ensure reliability	✓	✓	✗
Resource allocation	Resources allocated proportionally; more RECs allocated to NM	Incremental resources are allocated to New Mexico	Optimization identifies resources specifically for NM and TX jurisdictions
NM allocated new gas capacity	✓	✗	✗





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New Mexico REA Scenario Results





New Mexico REA Scenarios

Least Cost ("LC")

Portfolio optimization

Least-cost system optimization

NM zero-carbon generation balancing period

Annual

NM and TX capacity pooling to ensure reliability



Resource allocation

Resources allocated proportionally; more RECs allocated to NM

NM allocated new gas capacity



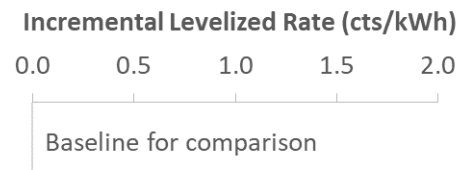
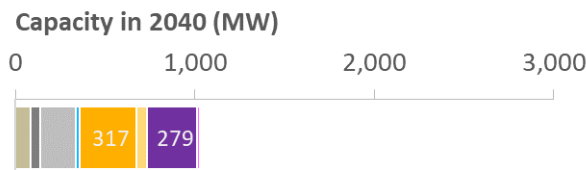
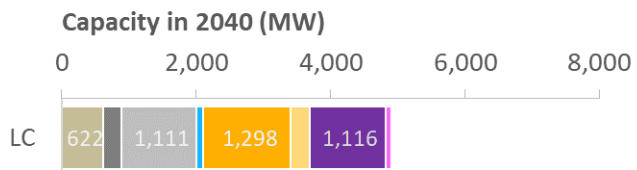


Resource Portfolios and Costs by Scenario

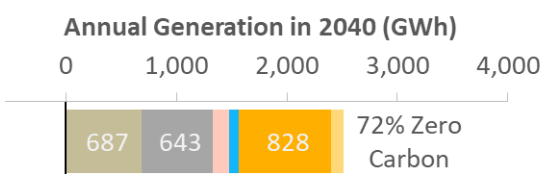
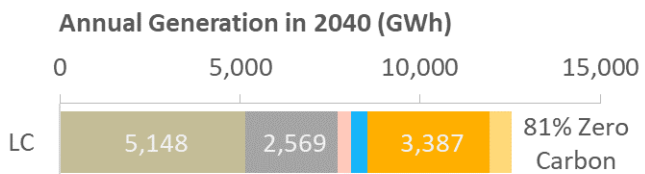
Least Cost Scenario

Total System

New Mexico



112 MW of new gas capacity is allocated to New Mexico customers by 2040



This analysis does not assume Palo Verde 3 generation is allocated to New Mexico, resulting in a lower zero-carbon generation share than the rest of the system

This scenario allocates a share of new gas capacity to NM customers. This capacity could be converted to run on a higher share of hydrogen fuel in the future. More RECs would be allocated to NM customers to satisfy the REA.

- Nuclear
- Gas ST
- Gas CCGT
- Gas CT
- Hydrogen
- Net Purchases (Sales)
- Wind
- Solar
- BTM Solar
- Geothermal
- Battery
- DR



New Mexico REA Scenarios

	Least Cost ("LC")	Least Cost + REA Resources ("LC+REA")
Portfolio optimization	Least-cost system optimization	Reoptimize Least Cost to add additional renewables & storage dedicated to NM to satisfy REA requirements
NM zero-carbon generation balancing period	Annual	Annual
NM and TX capacity pooling to ensure reliability	✓	✓
Resource allocation	Resources allocated proportionally; more RECs allocated to NM	Incremental resources are allocated to New Mexico
NM allocated new gas capacity	✓	✗

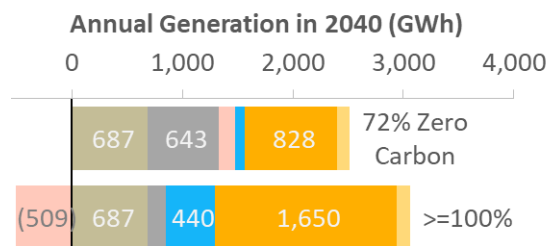
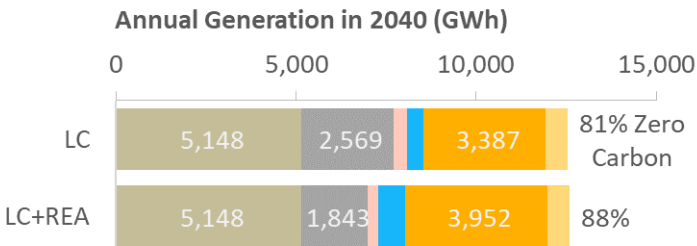
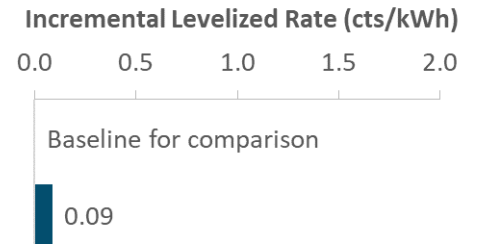
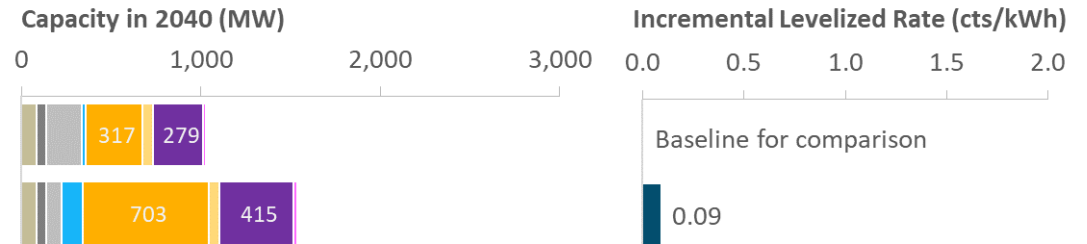
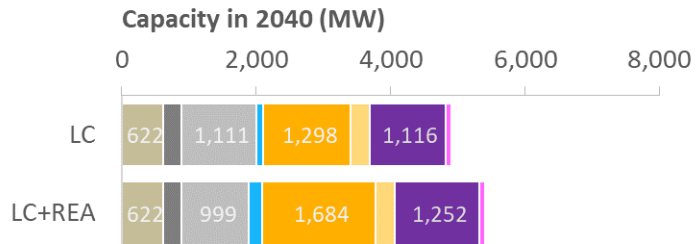


Resource Portfolios and Costs by Scenario

Least Cost + REA Scenario

Total System

New Mexico



Gas generation serves a portion of New Mexico customers' energy needs in some hours, but that is more than offset by

This scenario adds more solar and storage capacity for NM customers to satisfy the RPS/REA targets, while not allocating any new gas to NM customers. This results in a modest cost increase vs. Least Cost scenario.

- Nuclear
- Gas ST
- Gas CCGT
- Gas CT
- Hydrogen
- Net Purchases (Sales)
- Wind
- Solar
- BTM Solar
- Geothermal
- Battery
- DR



New Mexico REA Scenarios

	Least Cost ("LC")	Least Cost + REA Resources ("LC+REA")	Separate System Planning ("SSP")
Portfolio optimization	Least-cost system optimization	Reoptimize Least Cost to add additional renewables & storage dedicated to NM to satisfy REA requirements	Optimize NM and TX systems independently without modeling interactions between them
NM zero-carbon generation balancing period	Annual	Annual	Hourly
NM and TX capacity pooling to ensure reliability	✓	✓	✗
Resource allocation	Resources allocated proportionally; more RECs allocated to NM	Incremental resources are allocated to New Mexico	Optimization identifies resources specifically for NM and TX jurisdictions
NM allocated new gas capacity	✓	✗	✗



Resource Portfolios and Costs by Scenario

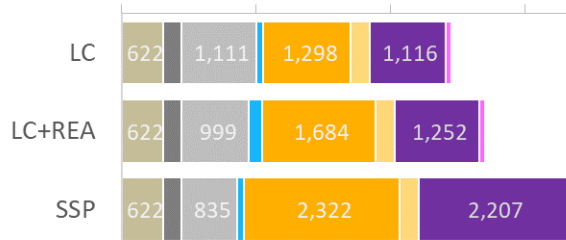
Separate System Planning Scenario

Total System

New Mexico

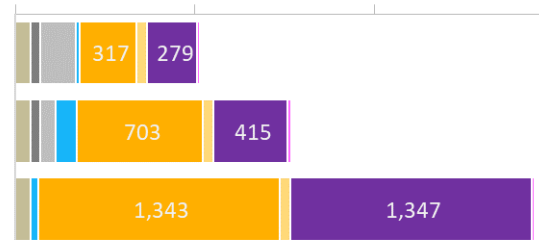
Capacity in 2040 (MW)

0 2,000 4,000 6,000 8,000



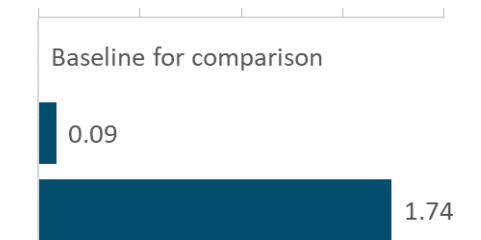
Capacity in 2040 (MW)

0 1,000 2,000 3,000



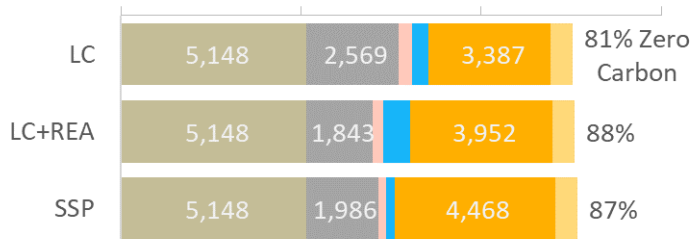
Incremental Levelized Rate (cts/kWh)

0.0 0.5 1.0 1.5 2.0



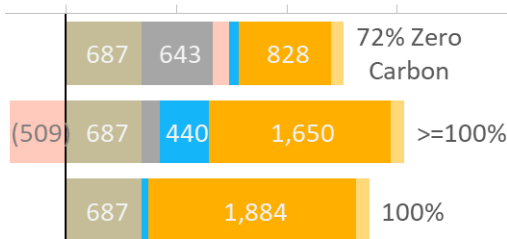
Annual Generation in 2040 (GWh)

0 5,000 10,000 15,000



Annual Generation in 2040 (GWh)

0 1,000 2,000 3,000 4,000



This scenario requires significantly more resources for New Mexico to reach 100% absolute zero carbon and ensure reliability. This results in a significant cost increase relative to the Least Cost scenario.

■ Nuclear ■ Gas ST ■ Gas CCGT ■ Gas CT ■ Hydrogen ■ Net Purchases (Sales) ■ Wind ■ Solar ■ BTM Solar ■ Geothermal ■ Battery ■ DR



Resource Portfolios and Costs by Scenario

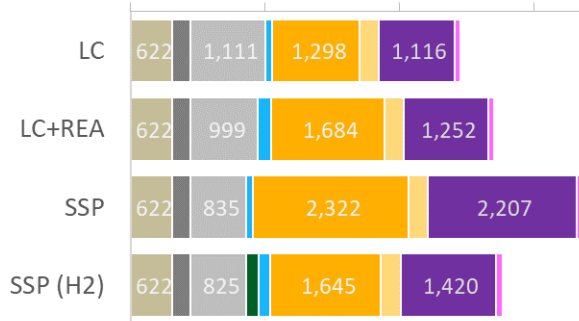
Separate System Planning (H₂) Scenario

Total System

New Mexico

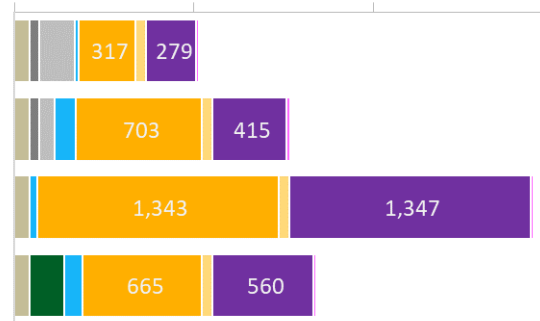
Capacity in 2040 (MW)

0 2,000 4,000 6,000 8,000



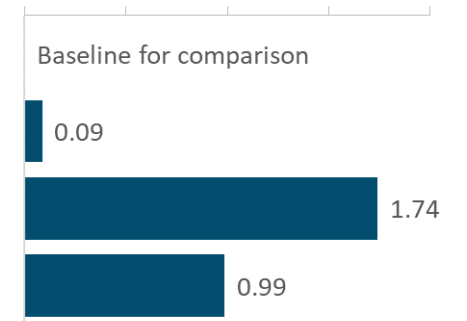
Capacity in 2040 (MW)

0 1,000 2,000 3,000



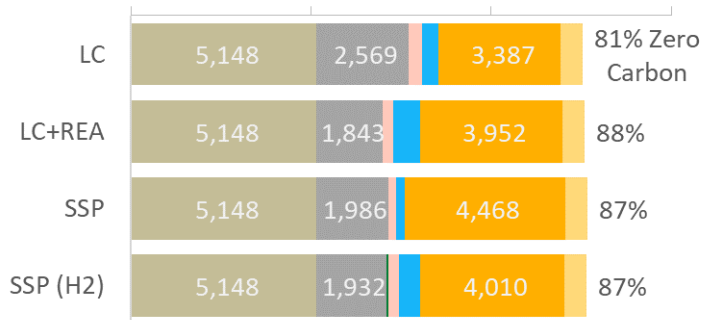
Incremental Levelized Rate (cts/kWh)

0.0 0.5 1.0 1.5 2.0



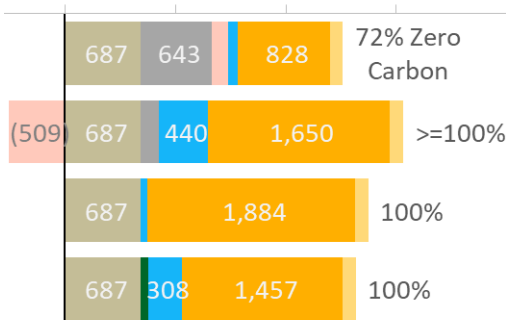
Annual Generation in 2040 (GWh)

0 5,000 10,000 15,000



Annual Generation in 2040 (GWh)

0 1,000 2,000 3,000 4,000



Adding H₂ capacity ensures reliability while significantly reducing solar and storage additions. This mitigates cost impacts of achieving absolute zero carbon and planning to ensure reliability independently.

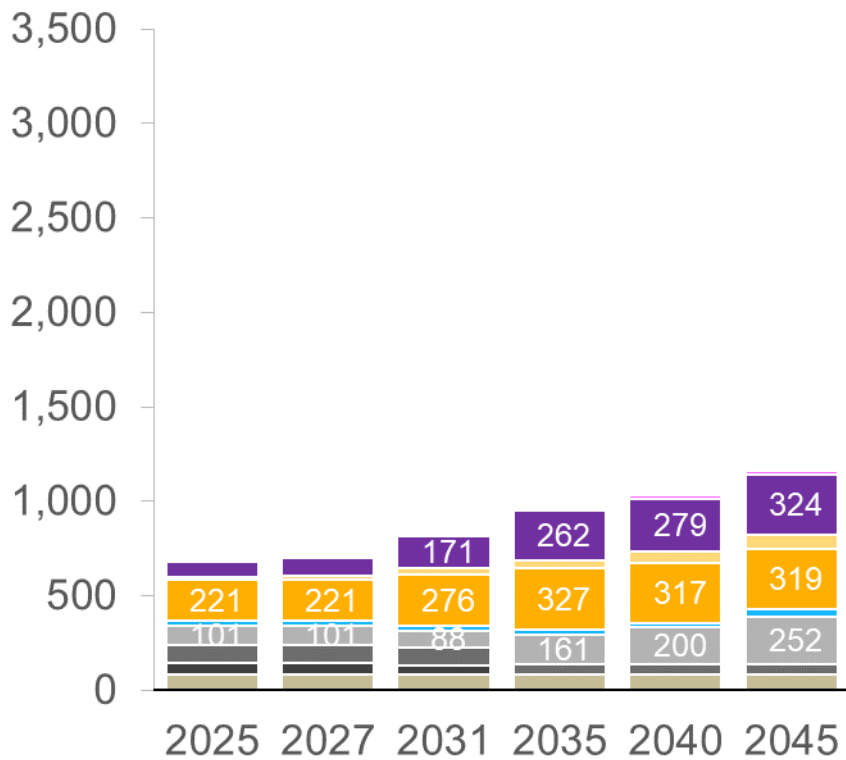
■ Nuclear ■ Gas ST ■ Gas CCGT ■ Gas CT ■ Hydrogen ■ Net Purchases (Sales) ■ Wind ■ Solar ■ BTM Solar ■ Geothermal ■ Battery ■ DR



New Mexico Capacity and Cost Least Cost Scenario

Least Cost

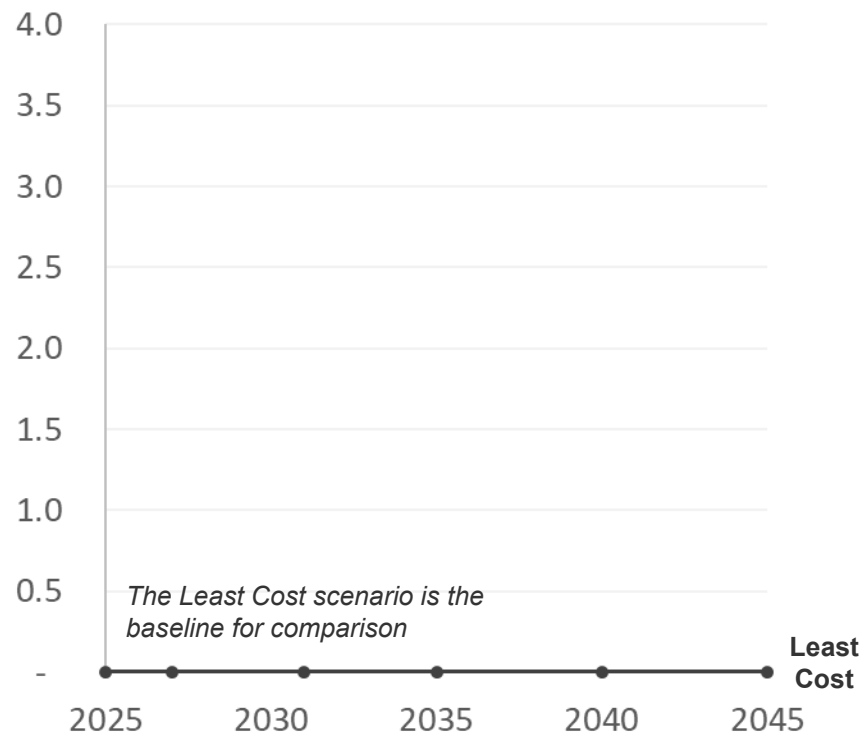
Total Installed Capacity (MW)



■ Nuclear ■ Gas ST ■ Gas CCGT ■ Gas CT ■ Hydrogen ■ Wind ■ Solar ■ BTM Solar ■ Geothermal ■ Battery ■ DR

Cost Impact vs. Least Cost Scenario

Incremental Rate vs. Least Cost (cts/kWh)



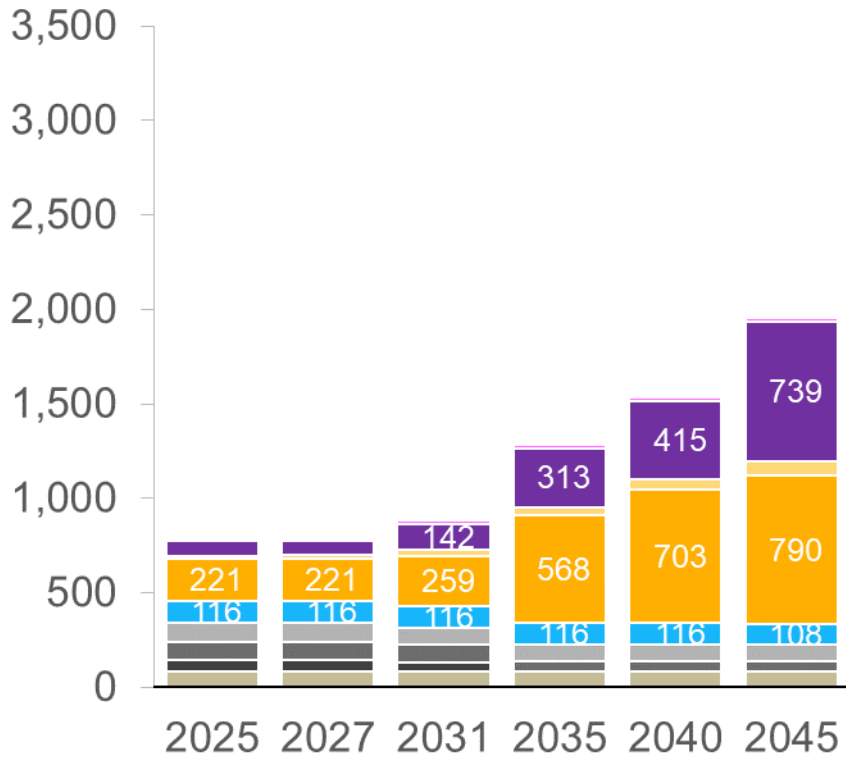


New Mexico Capacity and Cost

Least Cost + REA Resources Scenario

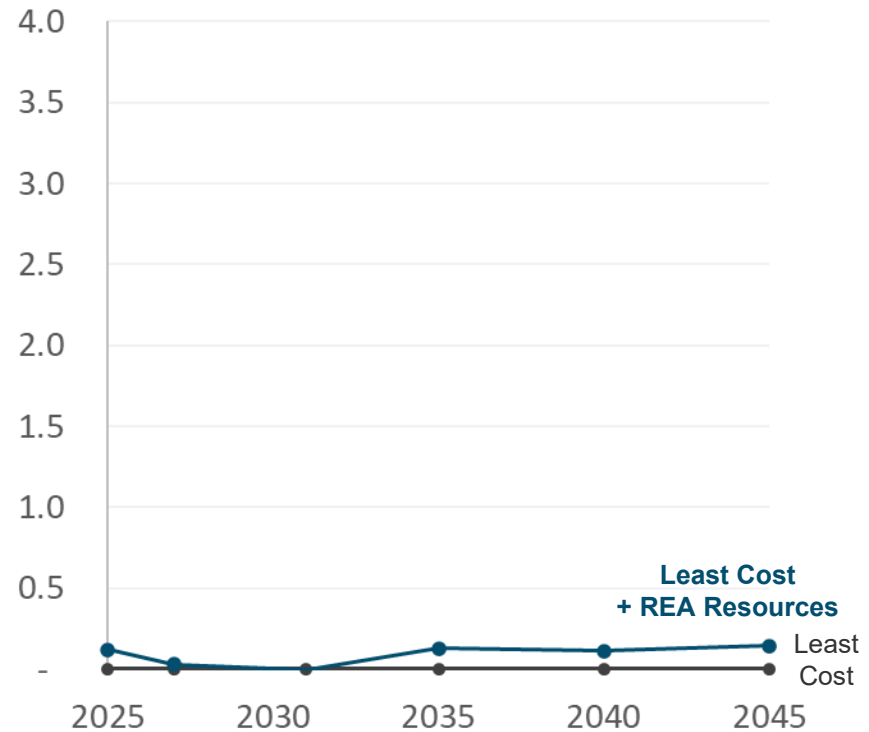
Least Cost + REA Resources

Total Installed Capacity (MW)



Cost Impact vs. Least Cost Scenario

Incremental Rate vs. Least Cost (cts/kWh)



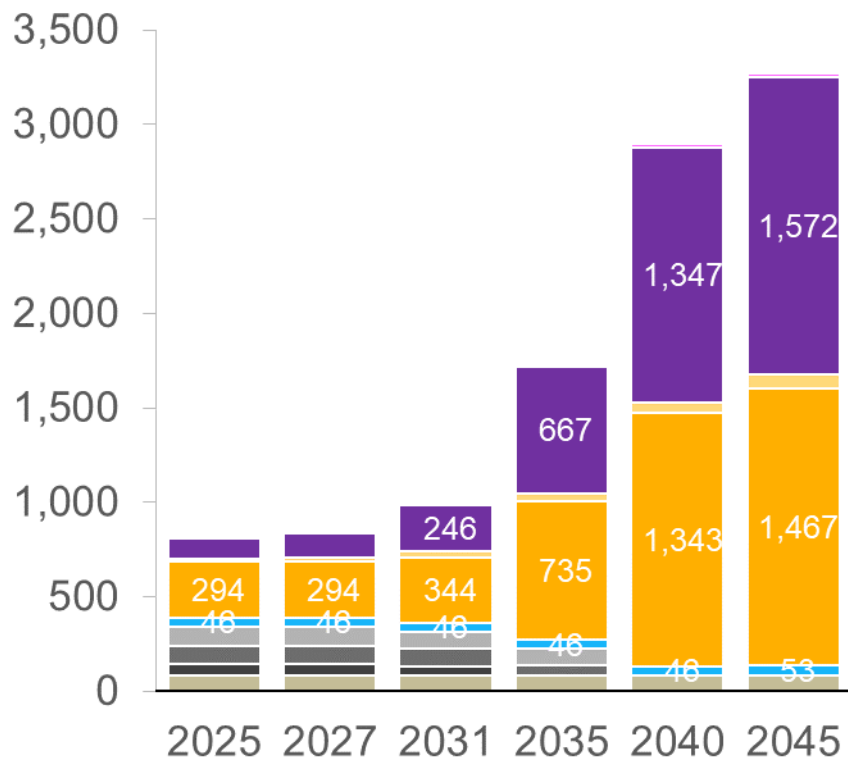
■ Nuclear
 ■ Gas ST
 ■ Gas CCGT
 ■ Gas CT
 ■ Hydrogen
 ■ Wind
 ■ Solar
 ■ BTM Solar
 ■ Geothermal
 ■ Battery
 ■ DR



New Mexico Capacity and Cost Separate System Planning Scenario

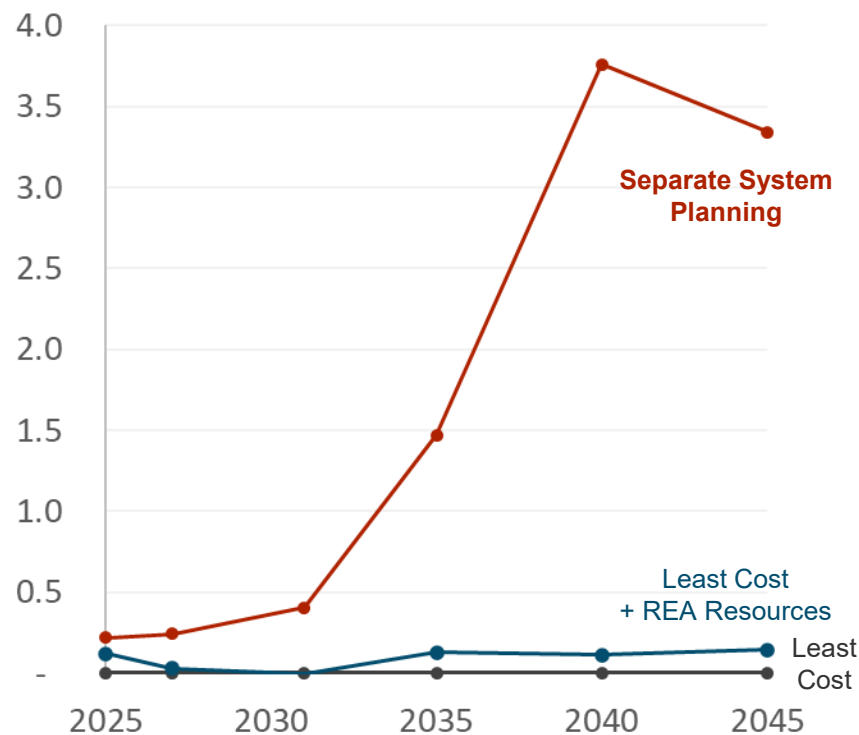
Separate System Planning

Total Installed Capacity
(MW)



Cost Impact vs. Least Cost Scenario

Incremental Rate vs. Least Cost
(cts/kWh)



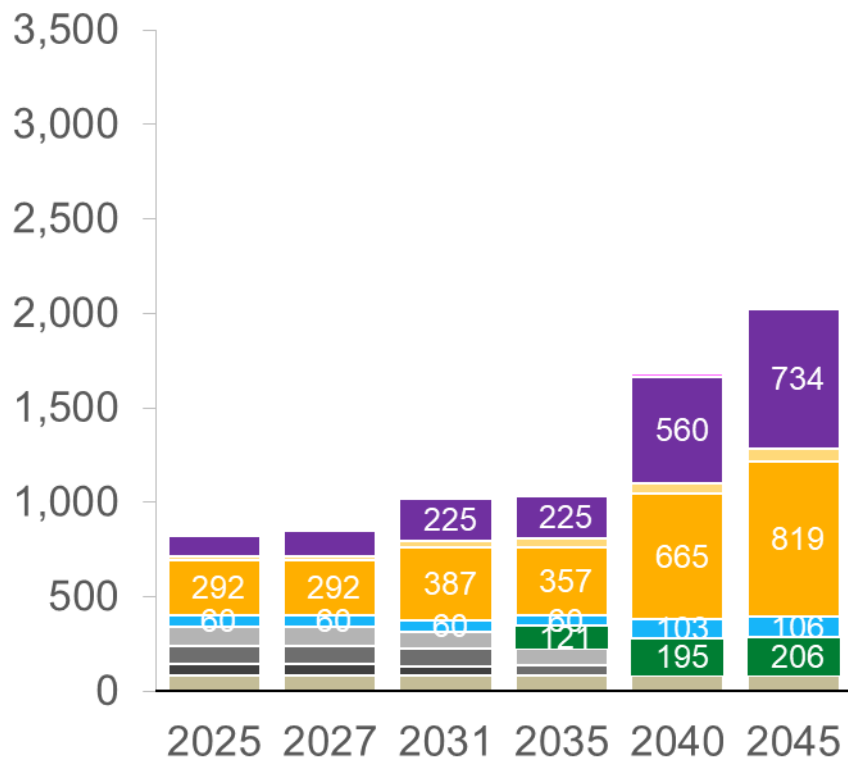
■ Nuclear
 ■ Gas ST
 ■ Gas CCGT
 ■ Gas CT
 ■ Hydrogen
 ■ Wind
 ■ Solar
 ■ BTM Solar
 ■ Geothermal
 ■ Battery
 ■ DR



New Mexico Capacity and Cost Separate System Planning (H₂) Scenario

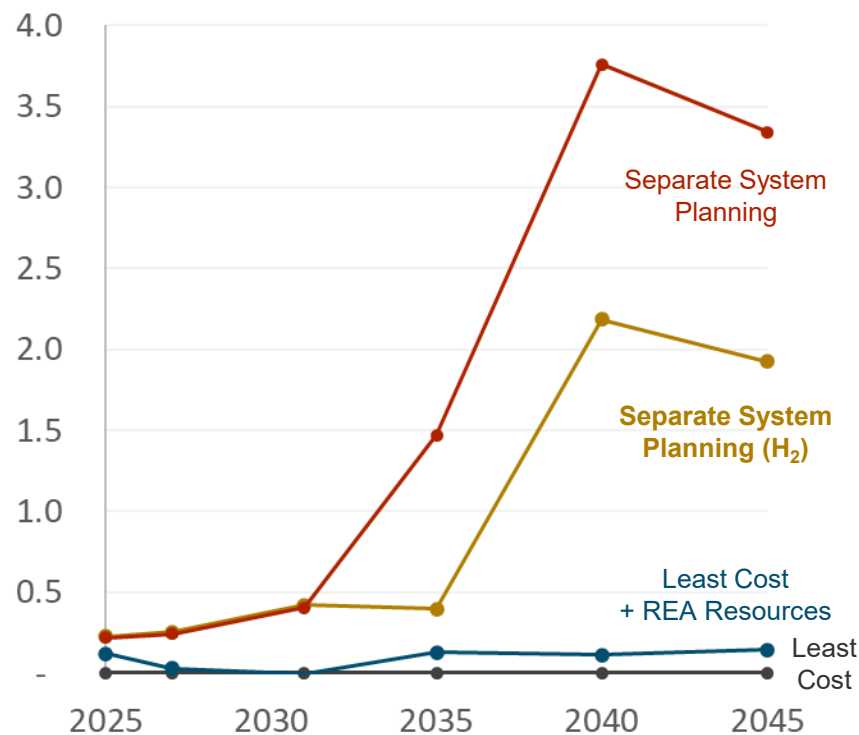
Separate System Planning (H₂)

Total Installed Capacity
(MW)



Cost Impact vs. Least Cost Scenario

Incremental Rate vs. Least Cost
(cts/kWh)

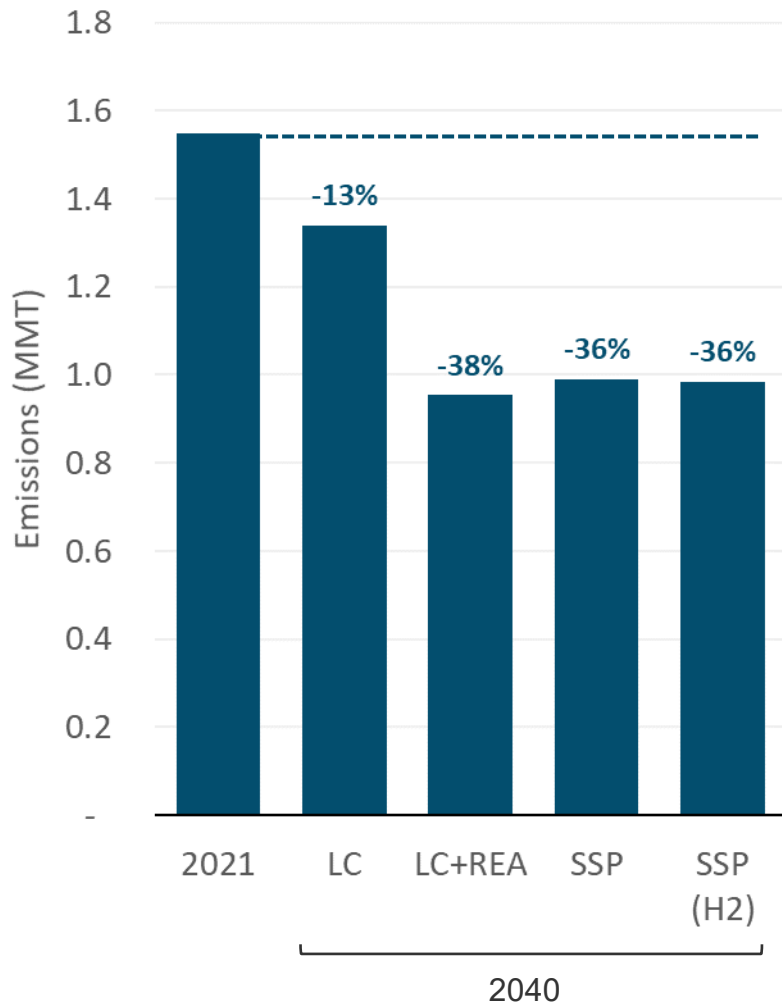


■ Nuclear ■ Gas ST ■ Gas CCGT ■ Gas CT ■ Hydrogen ■ Wind ■ Solar ■ BTM Solar ■ Geothermal ■ Battery ■ DR



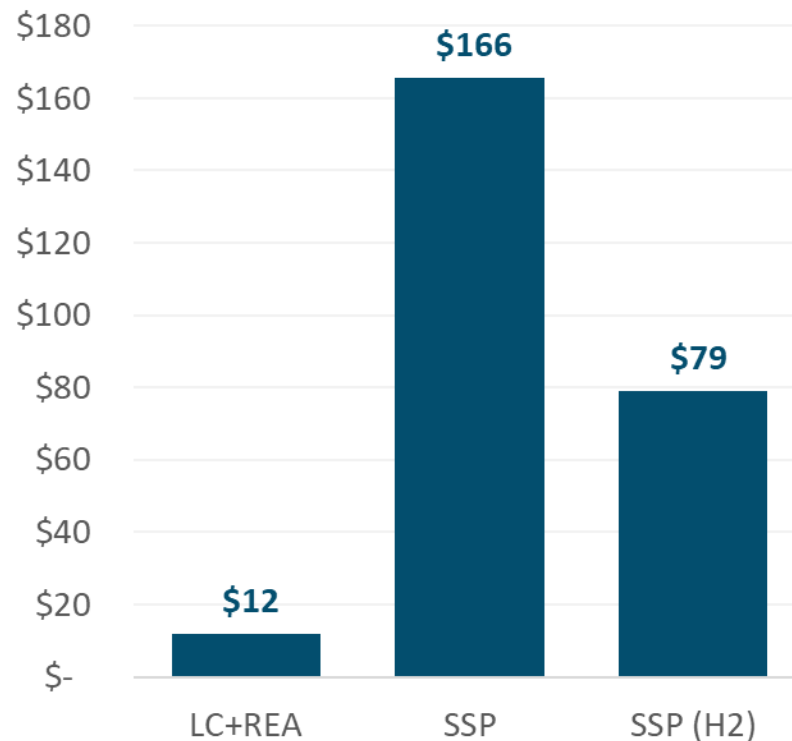
Carbon Emissions Across Scenarios

CO₂ Emissions in 2021 and 2040



Average Abatement Cost 2025-2040

Average Abatement Cost vs. Least Cost (\$ per metric ton)



Note: emissions include emissions at company-owned facilities and emissions ascribed to imports



Energy+Environmental Economics

Thank You



Energy+Environmental Economics

Appendix

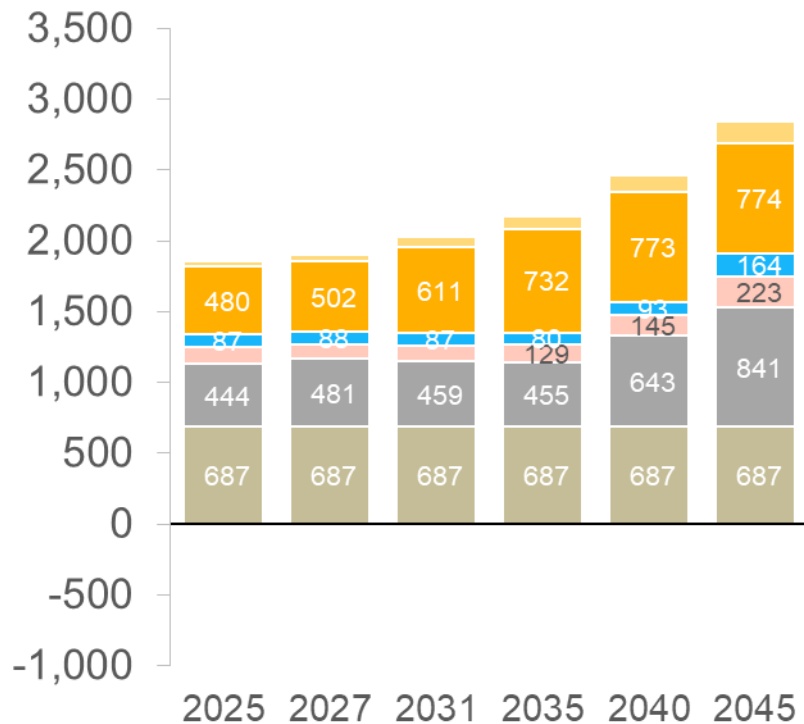


New Mexico Generation Mix

Least Cost and Least Cost + REA Scenarios

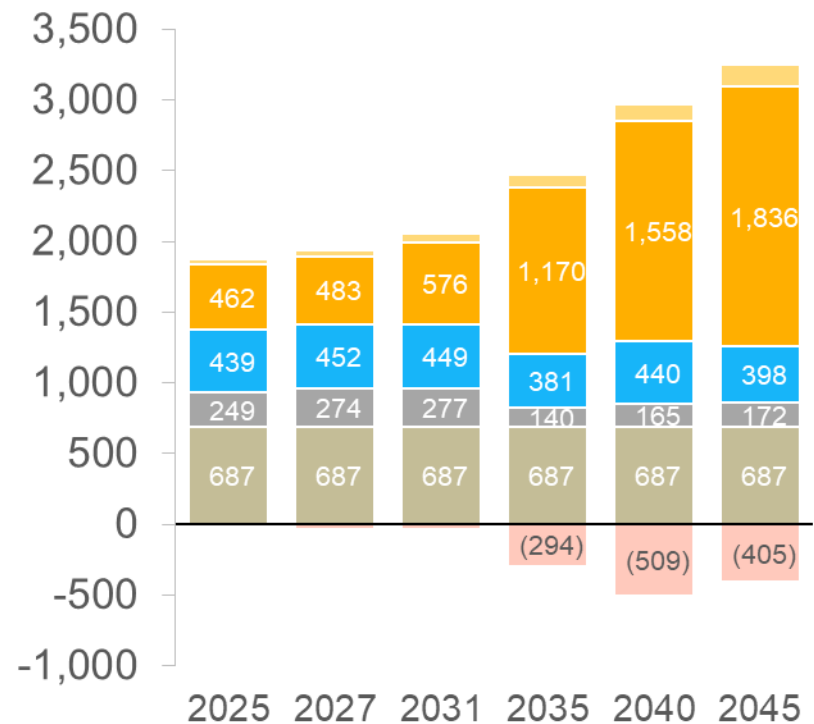
Least Cost

Annual Generation (GWh)



Least Cost + REA Resources

Annual Generation (GWh)



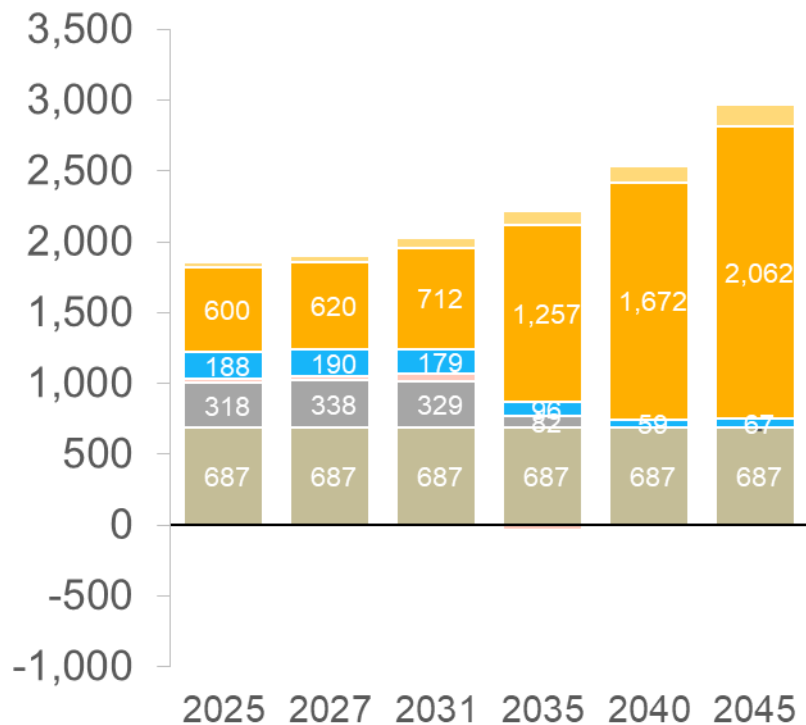
■ Nuclear ■ Gas ■ Hydrogen ■ Net Purchases ■ Wind ■ Solar ■ BTM Solar



New Mexico Generation Mix Separate System Planning Scenarios

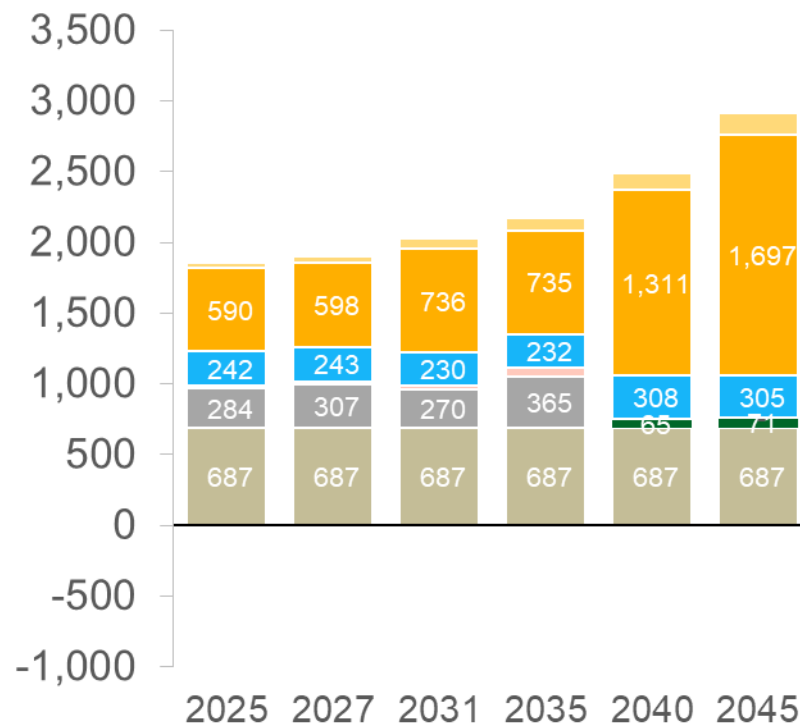
Separate System Planning

Annual Generation
(GWh)



Separate System Planning (H₂)

Annual Generation
(GWh)



■ Nuclear ■ Gas ■ Hydrogen ■ Net Purchases ■ Wind ■ Solar ■ BTM Solar



Existing/Planned Dedicated Resources

New Mexico

- Holloman, 5 MW, solar
- Hatch, 5 MW, solar
- Chaparral, 10 MW, solar
- Airport, 12 MW, solar
- Roadrunner, 20 MW, solar
- Hecate 2, 50 MW, solar
- Buena Vista 2, 20 MW, solar

Texas

- TX Community Solar, 3 MW, solar
- Newman Solar, 10 MW, solar
- Newman 6, 228 MW, gas CT
- Palo Verde 3, 207 MW, nuclear



Existing/Planned System Resources

System

- Macho Springs
- Hecate 1
- Buena Vista 1
- Buena Vista Storage
- Newman 1-4
- Rio Grande 7-9
- Copper
- Montana 1-4
- Palo Verde 1-2
- Demand response



Candidate Resources

System

- Solar PV
- BTM Solar
- Wind
- Biomass
- Geothermal
- Gas CT
- Hydrogen

Closing Comments

Thank You!

POWER