

# Utility Planning Approaches Under Increased Volatility

## PNM Statement of Need and Action Plan

Workshop #7

6/17/2026



Energy+Environmental Economics

# The Paradigm Shift in Utility Planning

New drivers, evolving technologies, and heightened uncertainty require a new approach



## Historical Planning Approach

Linear planning based on historical regression models and centralized generation supply

- **Flat Load Growth:** Load forecasts were stable and relatively easily projected years in advance.
- **Thermal Only Baseline:** Central thermal plants with standardized dispatch and regulatory clarity.
- **Standard Lead Times:** Simple interconnection processes, predictable supply chains, and low equipment competition.

Current Environment



## The Modern Era

A highly volatile, multi-directional grid that requires flexibility.

- **Unprecedented Load Growth:** Historic surges driven by AI data centers and rapid electrification.
- **Available Technologies:** Navigating increasing renewables, the introduction of storage, and emerging technologies.
- **Equipment Uncertainty:** Backlogged supply chains, inflationary pressures, import tariffs, and interconnection queue bottlenecks.

# Key Drivers of Modern Planning Volatility

How intersecting demand, policy, grid, and macro risks are breaking legacy planning models.



## Load & Alternatives

**Unprecedented Load Growth:** Rapidly shifting from flat historical baselines to massive load surges, paired with active, dynamic demand-side resources like DERs and DR.

1



## Technology & Policy

**Resource Transition:** Moving away from traditional thermal generation to navigate a complex mix of renewables, utility storage, emerging clean tech, and aggressive carbon-free mandates.

2



## Grid Headroom Limits

**Infrastructure Bottlenecks:** Severe delays in regional interconnection queues compounded by severe physical constraints on existing transmission capacity.

3



## Macro Capital Risk

**Supply & Supply-Chain Shock:** Managing volatile federal policy shifts, changing import tariffs, and historic lead times for critical equipment procurement.

4



Compounding uncertainties make static, single-portfolio planning obsolete; utilities must transition to a **flexible, least-regrets framework** that preserves the optionality to adapt.

# The Focus Period

Why a standard 3-year action plan must be driven by the realities of a longer Focus Period



## The 2033-2036 Timeline

- **Beyond the 3-Year Window:** Near-term action plans can no longer look just 3 years out; they must be anchored in a longer-term "Focus Period" to account for current project lead times.
- **Proactive Resource Positioning:** Near-term actions must be designed to clear the path for the mid-decade reliability and resource needs identified in the long-term modeling.



## The Challenge: Less Cost Certainty

- **The Long-Term Blindspot:** Planning for a distant Focus Period naturally introduces heavy cost uncertainty due to shifting market, policy, and supply-chain dynamics.
- **The Solution: Flexibility:** The action plan resolves this by focusing on least-regrets process steps — such as firming up volatile load forecasts, issuing competitive RFPs, and evaluating demand side alternatives — allowing PNM to test real market pricing before selecting a fixed portfolio.

# Modern Planning Volatility Drives Need for Least-Regrets Framework

De-risking future resource decisions through competitive procurements



## Transitioning to Least-Regrets

Pivoting away from "picking a single winning portfolio" to identifying robust common denominators.

- **Extract Common Themes:** Model diverse economic futures and advance resource types that are repeatedly selected across all plausible sensitivities.
- **Retain Ultimate Flexibility:** Avoid committing too early to rigid technologies; prioritize resources that leave PNM the room to adapt as market parameters solidify.



## Next Steps

Mitigating risk through market-based, competitive procurement structures.

- **All-Source Supply & Demand-Side RFPs:** Use multi-resource competitive RFPs to solicit real-world market bids, allowing market pricing to guide procurement decisions.
- **Targeted Resource Vetting:** Focus the near-term action plan on low-cost procedural steps — such as firming up the load forecast and evaluating demand side alternatives — to remove risk before capital deployment.

# PNM IRP Results



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# Current Trends & Policy – Core Insights Across Modeling Sensitivities

Identifying “least-regrets” resource themes consistently selected across all sensitivities



## Focus Period (2033–2036)

- **Scalable Demand-Side Resources:** Increased deployment of cost-effective energy efficiency and demand response.
- **Renewable Procurement:** Each case confirms a non-discretionary need for new solar generation to meet state RPS targets at lowest cost.
- **Battery Storage (BESS) Expansion:** Dynamic balancing resources are consistently selected across sensitivities



## Remainder of Planning Period

- **Long-Term Firm & Dispatchable Capacity:** As variable energy penetration increases, all portfolios converge on firm capacity to meet system reliability .
- **Optionality for Emerging Clean Tech:** Portfolios consistently maintain a strategic need for next-generation, carbon-free alternatives as technology costs decline.



**The Strategic Imperative:** Because these core resource needs appear consistently across all modeled futures, they represent least-regrets actions. The next steps include a competitive process to procure them at the lowest risk and best price.

# Core Insights Across Other Futures

Evaluating “least-regrets” resource themes across the sensitivities modeled for other futures

## Low Economic Growth

- **Minimal Additions Needed:** Minimal generic supply-side resource additions are required through 2040
- **DSM Still Needed:** DSM, especially lower-cost energy efficiency, are still added across all LEG sensitivities to optimally manage the system

## High Economic Growth

- **Incremental Resources Needed in Focus Period:** In 2033-2036, incremental carbon-free, dynamic balancing, and firm dispatchable resources are needed relative to CTP
- **Greater Long-Term Incremental Needs:** Even greater incremental resources are needed through 2045

## Extreme Economic Development Sensitivity

- **Significant Incremental Resource Need in Focus Period and Long-Term:** In both the focus period and through 2045, significant incremental carbon-free, dynamic balancing, and firm dispatchable resource build is needed



**The Strategic Imperative:** Comparison across different futures provides an additional layer of robustness

# High-Value Alternative Sensitivities

Exploring sensitivities that show promise in shifting the generation mix and lowering costs



## Promising Pathways

- **Demand Flexibility (TOU/TOD):** Modeling indicates aggressive peak-pricing could alter load shapes and defer expensive firm capacity.
- **Accelerated DER Integration:** High-DER sensitivity cases look favorable, potentially deferring major centralized asset builds.
- **Strategic Transmission Expansion:** Targeted grid expansion shows potential to unlock access to regional markets.



## Feasibility & Cost

- **Adoption & Behavioral Uncertainty:** Customer subscription and real-world response to TOU/TOD structures remain uncertain.
- **Operational Verification Needed:** Although models signal promising cost-reductions, actual integration feasibility has not yet been proven.

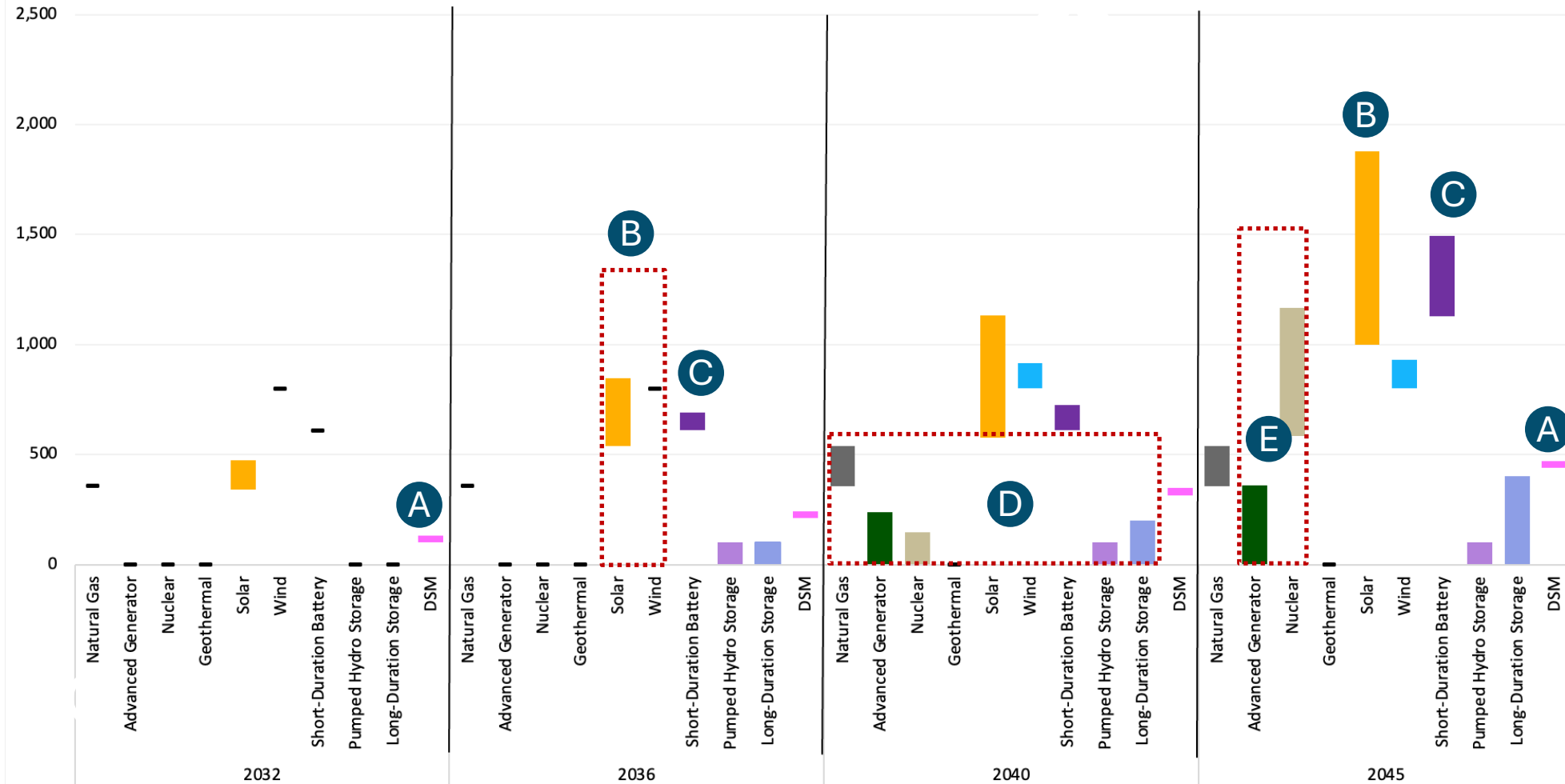


**The Action Plan Priority:** Because these pathways are promising but unproven, they are not locked into the baseline modeling. The near-term Action Plan details specific tasks to firm up these assumptions so PNM can dynamically pivot as risks clear.

# Current Trends & Policy – Resource Additions

Modeling results reveal a highly consistent baseline for near-term solar and storage, while long-term technology paths diverge across sensitivities

Range of New Capacity by Resource Type (MW)



## Key Findings

- A** Demand-side resources are selected across all cases, in both the near- and long-term
- B** Across all sensitivities, significant amounts of solar and wind are selected
- C** Short-duration battery is the most selected storage resource across all sensitivities
- D** By 2040, a diverse range of firm and longer-duration storage resources are selected
- E** By 2045, clean firm resources are necessary to meet ETA requirements

■ Range Across Cases

■ Selected in All Cases

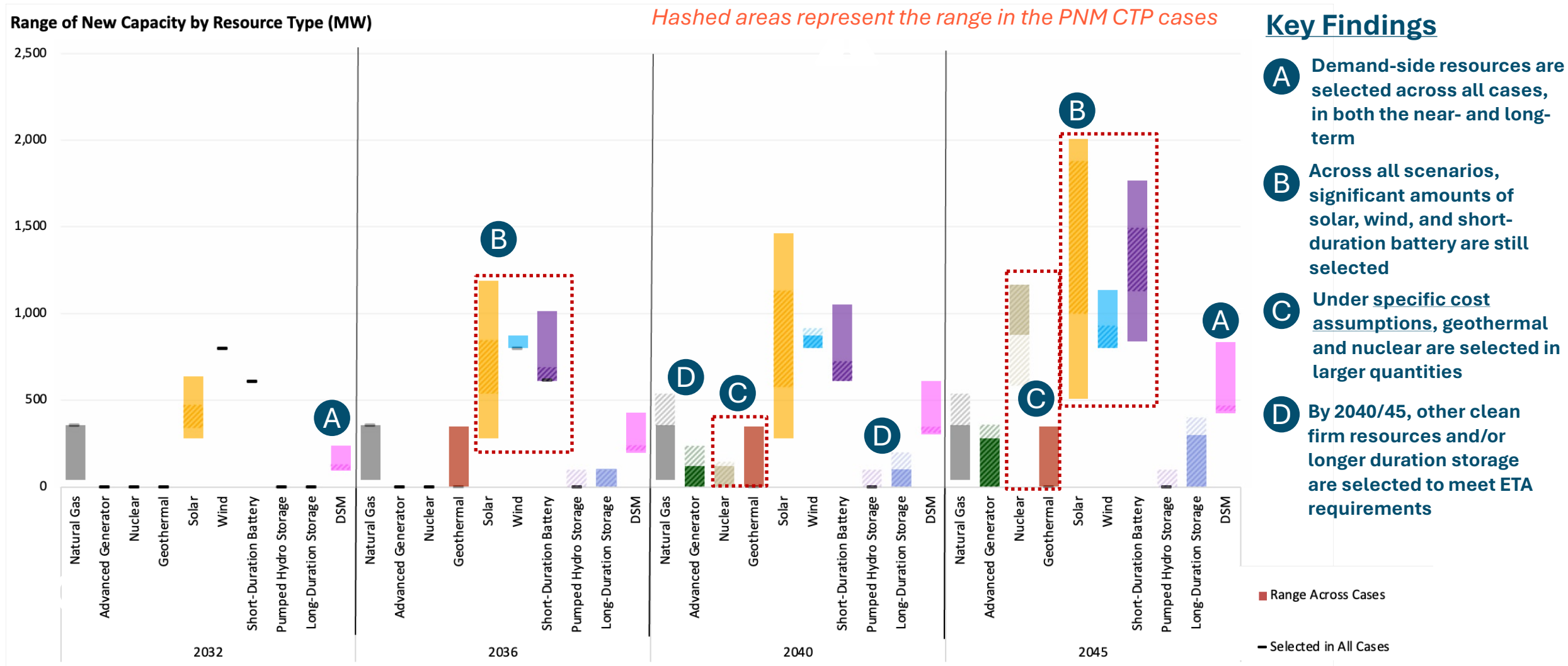
By 2045, all natural gas resources convert to use Hydrogen fuel

# Current Trends & Policy – Resource Additions

Resources	2029 - 2032 System Resources	2029 - 2032 Supplement Procurements	2032		2036		2040		2045	
			Min	Max	Min	Max	Min	Max	Min	Max
Solar	240	0	101	234	297	608	338	891	758	1,638
Wind	800	0	0	0	0	0	0	114	0	129
Energy Efficiency	0	0	93	93	196	196	298	298	420	420
<b>Carbon Free</b>	<b>1,040</b>	<b>0</b>	<b>194</b>	<b>327</b>	<b>493</b>	<b>804</b>	<b>636</b>	<b>1,303</b>	<b>1,178</b>	<b>2,187</b>
Short-Duration Battery	610	0	0	0	0	80	0	115	517	883
Demand Response	0	0	10	40	15	45	16	49	19	52
<b>Dynamic Balancing</b>	<b>610</b>	<b>0</b>	<b>10</b>	<b>40</b>	<b>15</b>	<b>125</b>	<b>16</b>	<b>164</b>	<b>536</b>	<b>935</b>
Natural Gas	186	172	0	0	0	0	0	179	0	179
Advanced Generator	0	0	0	0	0	0	0	240	0	360
Nuclear	0	0	0	0	0	0	0	146	584	1,168
Geothermal	0	0	0	0	0	0	0	0	0	0
Pumped Hydro Storage	0	0	0	0	0	100	0	100	0	100
Long-Duration Storage	0	0	0	0	0	100	0	200	0	400
<b>Firm Dispatchable</b>	<b>186</b>	<b>172</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>200</b>	<b>0</b>	<b>865</b>	<b>584</b>	<b>2,208</b>

# Current Trends & Policy (Stakeholder Scenarios) – Resource Additions

Modeling results reveal a highly consistent baseline for near-term solar and storage, while long-term technology paths diverge across sensitivities



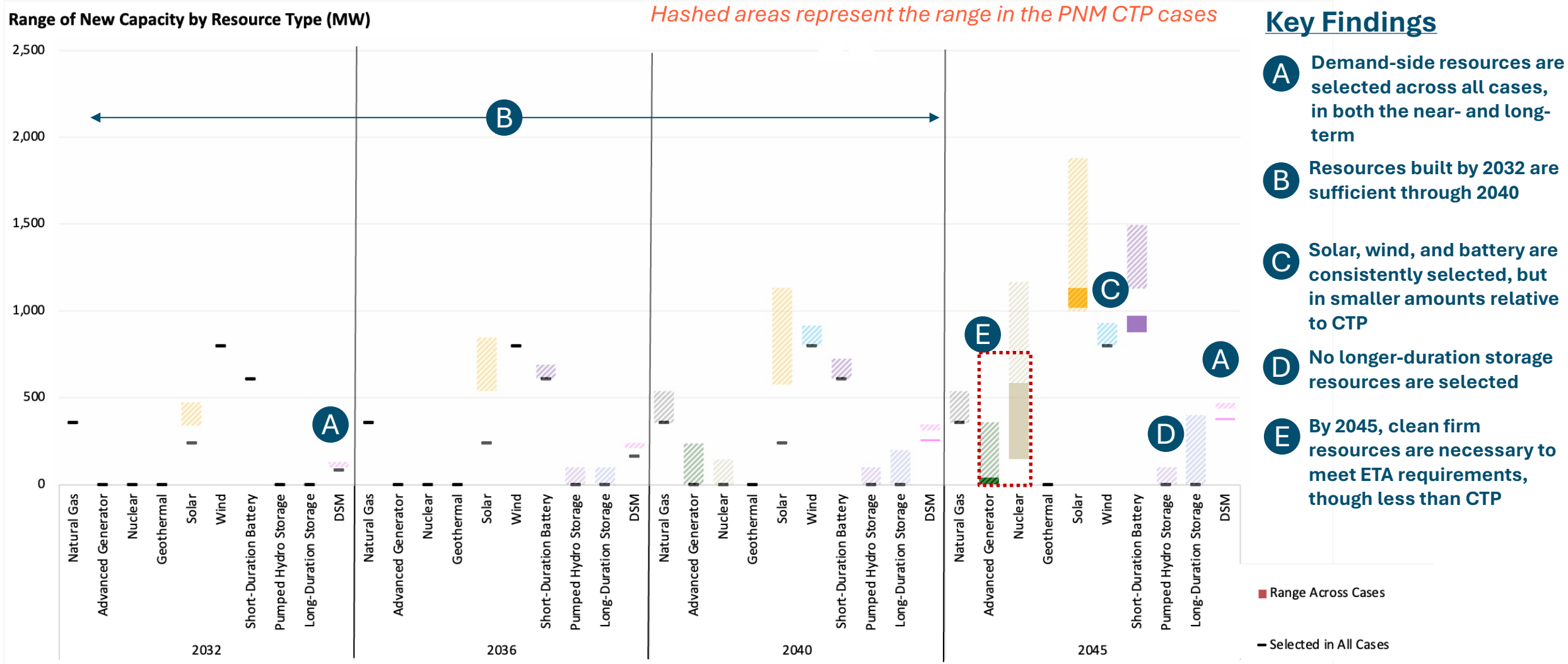
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# Current Trends & Policy (Stakeholder Scenarios) – Resource Additions

Resources	2029 - 2032 System Resources	2029 - 2032 Supplement Procurements	2032		2036		2040		2045	
			Min	Max	Min	Max	Min	Max	Min	Max
Solar	240	0	41	397	41	951	41	1225	268	1,769
Wind	800	0	0	0	0	75	0	75	0	337
EE	0	0	93	93	196	196	298	298	420	420
<b>Carbon Free</b>	<b>1,040</b>	<b>0</b>	<b>134</b>	<b>490</b>	<b>237</b>	<b>1,222</b>	<b>339</b>	<b>1,598</b>	<b>688</b>	<b>2,526</b>
Short-Duration Battery	610	0	0	23	0	429	0	464	230	1,182
DR	0	0	0	147	0	230	3	312	6	417
<b>Dynamic Balancing</b>	<b>610</b>	<b>0</b>	<b>0</b>	<b>170</b>	<b>0</b>	<b>659</b>	<b>3</b>	<b>776</b>	<b>236</b>	<b>1,599</b>
Natural Gas	186	172	0	0	0	0	0	0	0	0
Advanced Generator	0	0	0	0	0	0	0	120	0	280
Nuclear	0	0	0	0	0	0	0	146	876	1,168
Geothermal	0	0	0	0	0	350	0	350	0	350
Pumped Hydro Storage	0	0	0	0	0	0	0	0	0	0
Long-Duration Storage	0	0	0	0	0	100	0	100	0	300
<b>Firm Dispatchable</b>	<b>186</b>	<b>172</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>450</b>	<b>0</b>	<b>716</b>	<b>876</b>	<b>2,098</b>

# Low Economic Growth – Resource Additions

## CTP Resource Mix Meets Low Economic Growth Demands Through 2040



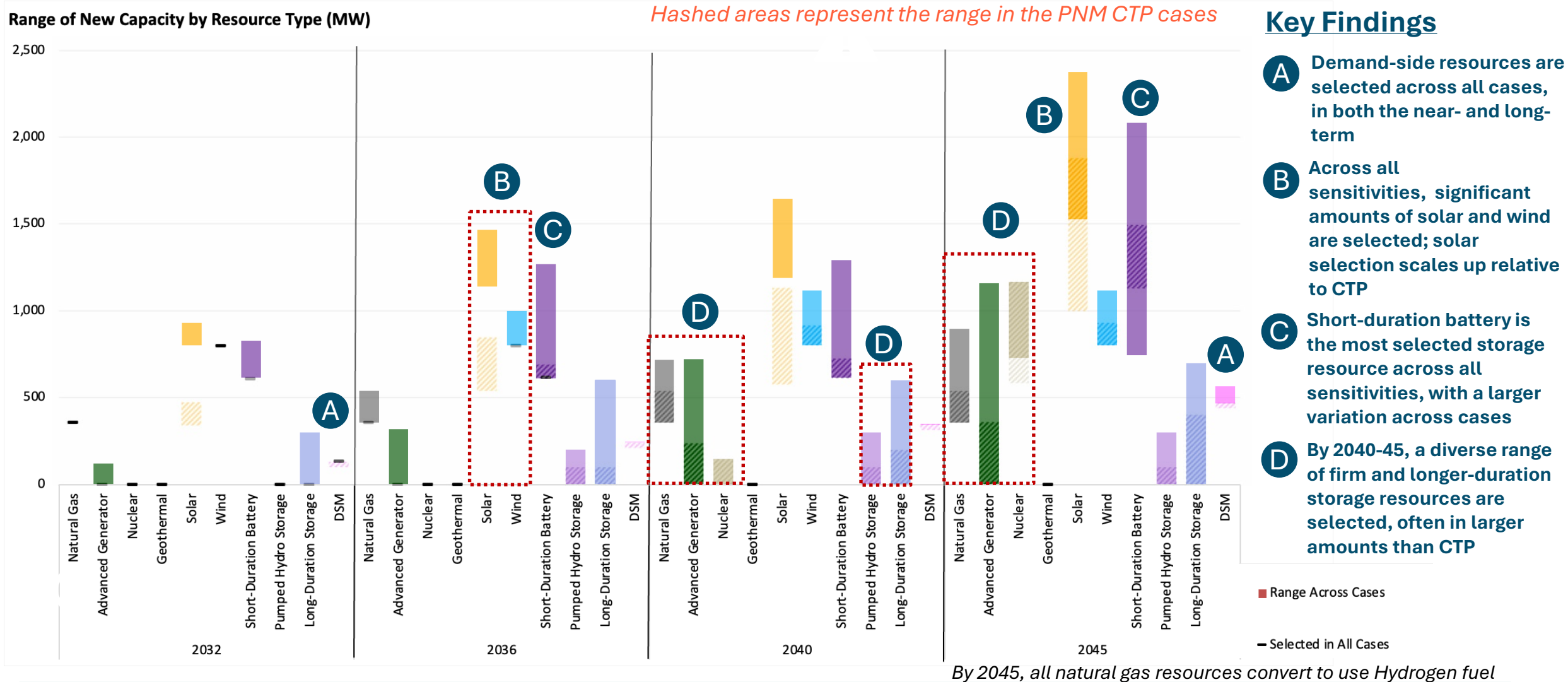
By 2045, all natural gas resources convert to use Hydrogen fuel

# Low Economic Growth – Resource Additions

Resources	2029 - 2032 System Resources	2029 - 2032 Supplement Procurements	2032		2036		2040		2045	
			Min	Max	Min	Max	Min	Max	Min	Max
Solar	240	0	0	0	0	0	0	0	778	894
Wind	800	0	0	0	0	0	0	0	0	0
EE	0	0	82	82	163	163	247	259	369	381
<b>Carbon Free</b>	<b>1,040</b>	<b>0</b>	<b>82</b>	<b>82</b>	<b>163</b>	<b>163</b>	<b>247</b>	<b>259</b>	<b>1,147</b>	<b>1,275</b>
Short-Duration Battery	610	0	0	0	0	0	0	0	268	364
DR	0	0	5	5	9	9	12	12	18	20
<b>Dynamic Balancing</b>	<b>610</b>	<b>0</b>	<b>5</b>	<b>5</b>	<b>9</b>	<b>9</b>	<b>12</b>	<b>12</b>	<b>286</b>	<b>384</b>
Natural Gas	186	172	0	0	0	0	0	0	0	0
Advanced Generator	0	0	0	0	0	0	0	0	0	40
Nuclear	0	0	0	0	0	0	0	0	146	584
Geothermal	0	0	0	0	0	0	0	0	0	0
Pumped Hydro Storage	0	0	0	0	0	0	0	0	0	0
Long-Duration Storage	0	0	0	0	0	0	0	0	0	0
<b>Firm Dispatchable</b>	<b>186</b>	<b>172</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>146</b>	<b>624</b>

# High Economic Growth – Resource Additions

High Growth Demands Accelerated Buildouts of Renewables and Diverse Storage Relative to CTP



# High Economic Growth – Resource Additions

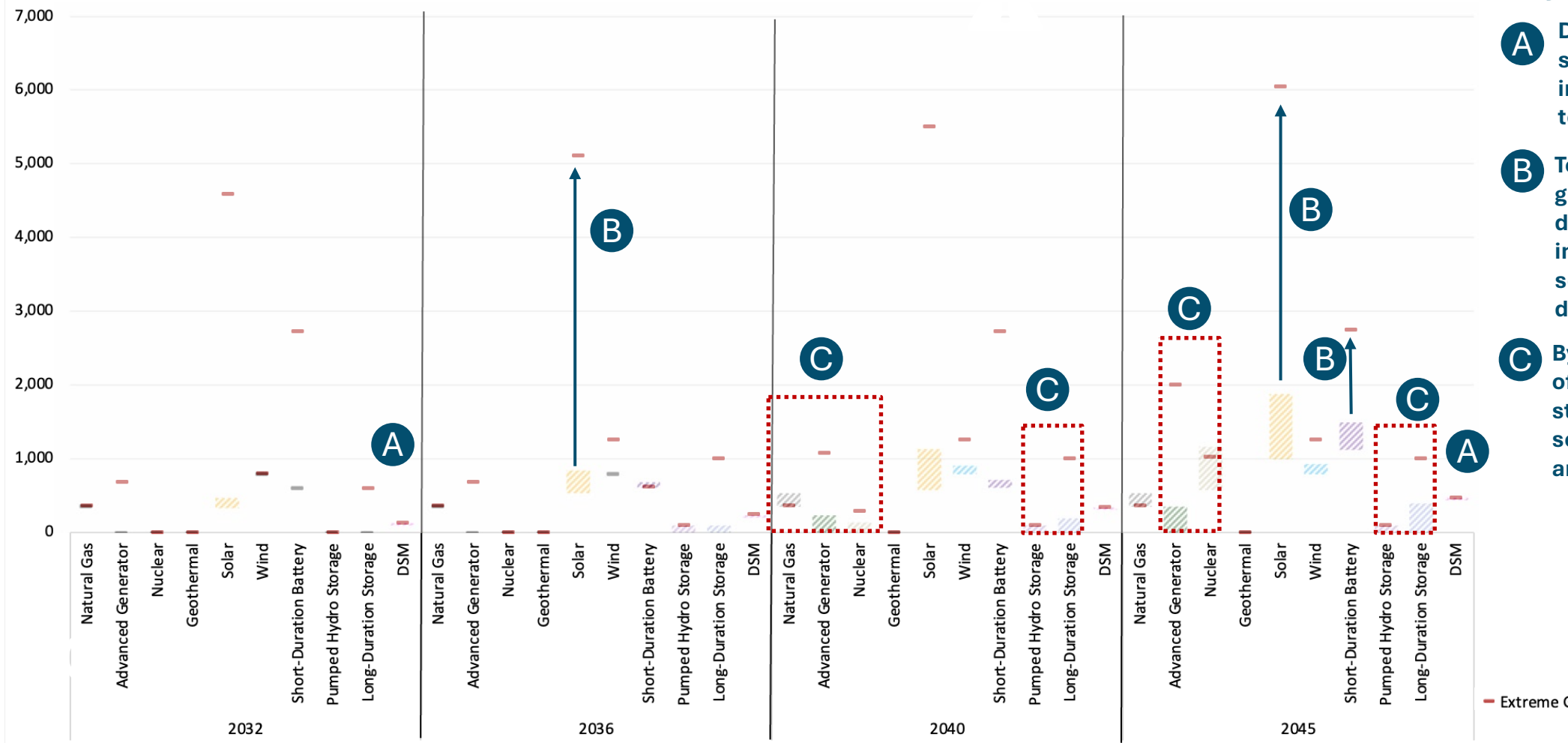
Resources	2029 - 2032 System Resources	2029 - 2032 Supplement Procurements	2032		2036		2040		2045	
			Min	Max	Min	Max	Min	Max	Min	Max
Solar	240	0	561	692	901	1,226	948	1,407	1290	2,138
Wind	800	0	0	0	0	199	0	317	0	317
EE	0	0	93	93	196	196	298	298	420	513
<b>Carbon Free</b>	<b>1,040</b>	<b>0</b>	<b>654</b>	<b>785</b>	<b>1,097</b>	<b>1,621</b>	<b>1,246</b>	<b>2,022</b>	<b>1,710</b>	<b>2,968</b>
Short-Duration Battery	610	0	5	218	5	661	5	683	133	1472
DR	0	0	40	40	45	46	46	50	48	54
<b>Dynamic Balancing</b>	<b>610</b>	<b>0</b>	<b>45</b>	<b>258</b>	<b>50</b>	<b>707</b>	<b>51</b>	<b>733</b>	<b>181</b>	<b>1,526</b>
Natural Gas	186	172	0	0	0	179	0	358	0	537
Advanced Generator	0	0	0	120	0	320	0	720	0	1,160
Nuclear	0	0	0	0	0	0	0	146	730	1,168
Geothermal	0	0	0	0	0	0	0	0	0	0
Pumped Hydro Storage	0	0	0	0	0	200	0	300	0	300
Long-Duration Storage	0	0	0	300	0	600	0	600	0	700
<b>Firm Dispatchable</b>	<b>186</b>	<b>172</b>	<b>0</b>	<b>420</b>	<b>0</b>	<b>1,299</b>	<b>0</b>	<b>2,124</b>	<b>730</b>	<b>3,865</b>

# Extreme Economic Development Sensitivity – Resource Additions

Modeling results show a vast increase in solar and battery selection to meet extreme economic development, with further increases in firm and longer-duration storage resources

Range of New Capacity by Resource Type (MW)

Hashed areas represent the range in the CTP cases



## Key Findings

- A** Demand-side resources are selected across all cases, in both the near- and long-term
- B** To meet extreme load growth, solar and short-duration battery selection increase significantly, sometimes more than double CTP
- C** By 2040-45, a diverse range of firm and longer-duration storage resources are selected, often in larger amounts than CTP

Extreme Growth Case

# Extreme Economic Development Sensitivity – Resource Additions

Resources	2029 - 2032 System Resources	2029 - 2032 Supplement Procurements	2032	2036	2040	2045
Solar	240	0	4,358	4,880	5,274	5,815
Wind	800	0	0	462	462	462
EE	0	0	93	196	298	420
<b>Carbon Free</b>	<b>1,040</b>	<b>0</b>	<b>4,451</b>	<b>5,539</b>	<b>6,035</b>	<b>6,698</b>
Short-Duration Battery	610	0	2,123	2,123	2,123	2,143
DR	0	0	40	45	48	51
<b>Dynamic Balancing</b>	<b>610</b>	<b>0</b>	<b>2,163</b>	<b>2,168</b>	<b>2,171</b>	<b>2,194</b>
Natural Gas	186	172	0	0	0	0
Advanced Generator	0	0	680	680	1,080	2,000
Nuclear	0	0	0	0	292	1022
Geothermal	0	0	0	0	0	0
Pumped Hydro Storage	0	0	0	100	100	100
Long-Duration Storage	0	0	600	1,000	1,000	1,000
<b>Firm Dispatchable</b>	<b>186</b>	<b>172</b>	<b>1,280</b>	<b>1,780</b>	<b>2,472</b>	<b>4,122</b>

# Statement of Need

Category	2032		2036		2040		2045	
	Low	High	Low	High	Low	High	Low	High
<b>Baseline Resources (MW)</b>								
Carbon Free	1,040		1,040		1,040		1,040	
Dynamic Balancing	610		610		610		610	
Firm Dispatchable	358		358		358		358	
<b>CTP Incremental Generic Resource Need (MW)</b>								
Carbon Free	194	327	493	804	636	1,303	1,178	2,187
Dynamic Balancing	10	40	15	125	16	164	536	935
Firm Dispatchable	0	0	0	200	0	865	584	2,208
<b>HEG Incremental Generic Resource Need (MW) - Above the CTP Case</b>								
Carbon Free	458	460	604	817	610	719	532	781
Dynamic Balancing	35	218	35	582	35	569	0	591
Firm Dispatchable	0	420	0	1,099	0	1,259	146	1,658
<b>XEG Generic Resource Need (MW) - Above the Baseline Resources</b>								
Carbon Free	4,451		5,539		6,035		6,698	
Dynamic Balancing	2,163		2,168		2,171		2,194	
Firm Dispatchable	1,280		1,780		2,472		4,122	