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# Resource Planning Advisory Council

## IRP Preliminary Portfolio Review

June 4, 2026

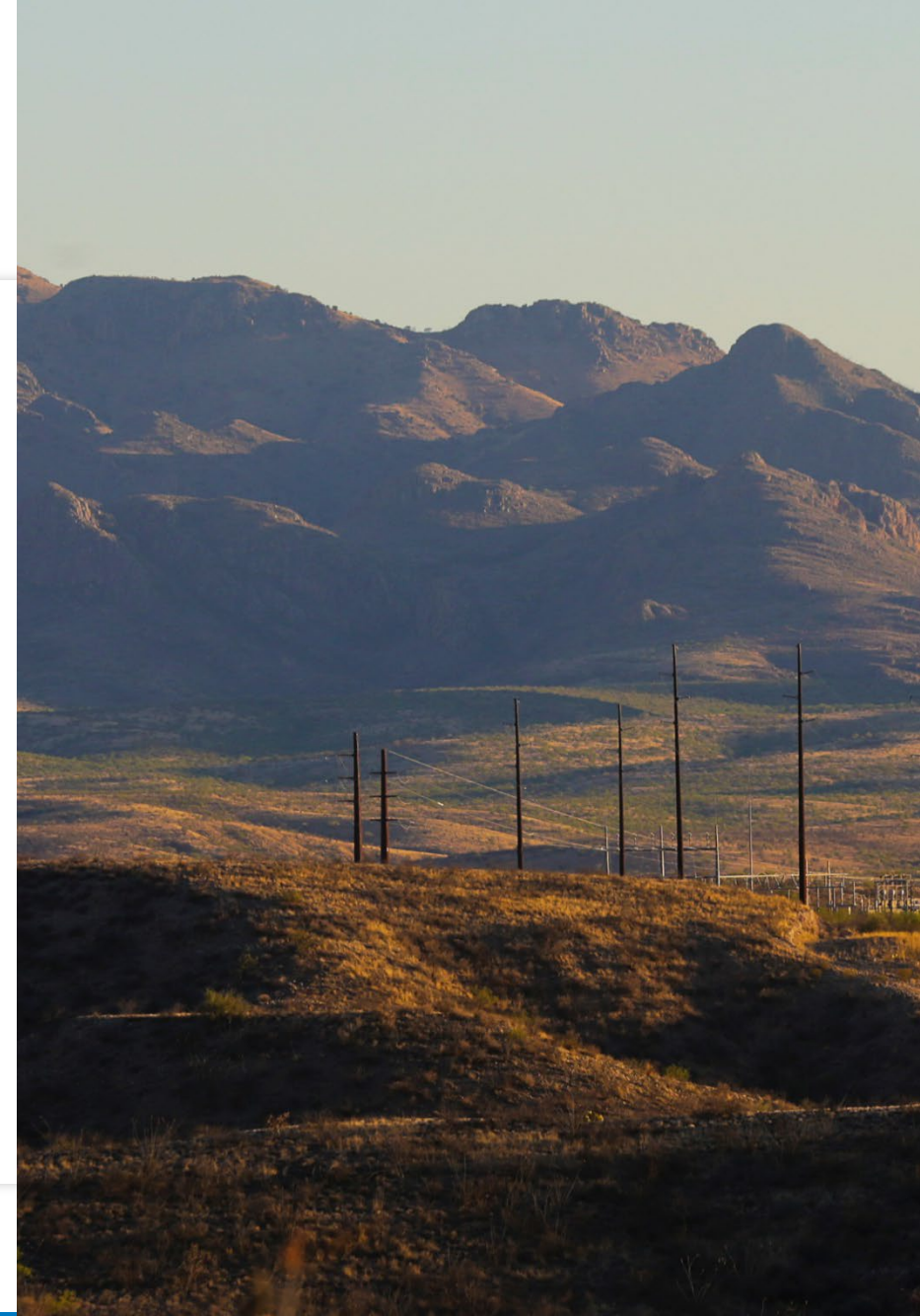
# Agenda

- 1** Safety Minute/Introductions
- 2** Looking Ahead
- 3** Customer Energy Optimization Programs
- 4** IRP Preliminary Base Case Results
- 5** Wrap-Up

# Safety minute & logistics

- In case of emergency, proceed down the stairs, out the doors, and gather on the lawn of the Children's Museum just to the south
- Restrooms
- Cafe

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# Introductions

**-Your name**

**-Your organization**



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# Looking Ahead

# Looking ahead

- APS has filed an extension request with the ACC. While this has not yet been approved, the proposed dates are:

<b>IRP Process Step</b>	<b>Current Deadline</b>	<b>Proposed Deadline</b>
IRP submission	August 3, 2026	October 30, 2026
Stakeholder comments due	October 30, 2026	January 28, 2027
Response to stakeholder comments	February 26, 2027	May 27, 2027
Staff Assessment and proposed order	May 31, 2027	August 30, 2027

- See [tep.com/rpac](http://tep.com/rpac) for links to the ACC's IRP docket
- See [azcc.gov](http://azcc.gov) > Meetings & Cases > Make a Public Comment in a Docket if you would like to file stakeholder comments
- TEP plans to hold another RPAC meeting in August to review portfolio results



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# Customer Energy Optimization Programs

**Where grid and customer needs align.**

# Customer Energy Optimization Programs



## Energy Efficiency

### Programs to reduce energy use

- Rebates for HVAC upgrades or tune-ups for single family, multi-family and business customers.
- Rebates for products that help reduce energy use.
- Incentives for construction of new high energy efficient single family and manufactured homes.
- Discounted, desert-adaptive shade trees for homes and local businesses.
- Custom energy efficiency projects for schools and local businesses.
- Low-income energy efficiency programs.



## Demand Response

### Programs to reduce or manage peak demand

- Smart Rewards – Thermostat adjustments by 1 to 3 degrees to reduce energy use during peak periods.
- Storage Rewards - Residential battery discharge during identified grid opportunities.
- Commercial Demand Response – medium and large commercial customer load reduction through automated or manual actions. Program in re-design and relaunching end of 2025.



## Transportation Electrification

### Programs to manage load

- Residential managed charging for daily off-peak charging.
- Residential and commercial incentives for installation of EV charging stations.
- Fleet electrification advisory services
- Electric school bus vehicle-to-grid pilot.



## Innovation, Education and Outreach

- Pilot programs to test new technologies or implementation pathways that help customers manage energy use.
- Community workshops to inform customers of energy efficiency actions and available programs.
- School educational workshops to educate students on energy safety and energy efficiency.



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# Market Potential Study

# What is a Market Potential Study?

“A **quantitative assessment** of the total opportunity (i.e., potential) for **adoption** of a defined set of **clean energy technologies** in a **particular area** over a **specific time period** (subject to certain **conditions or constraints**)”

Results are typically reported in a few key categories:

**Technical**: the theoretical limit

**Economic**: the cost-effective limit

**Achievable**: accounts for real-world factors

**Achievable scenarios**: the program limits



# Study Parameters

**Study Period:** 2026-2040

**Geography:** TEP & UNSE territories

**Fuels:** Electricity (energy and peak demand)

**Study Components:**

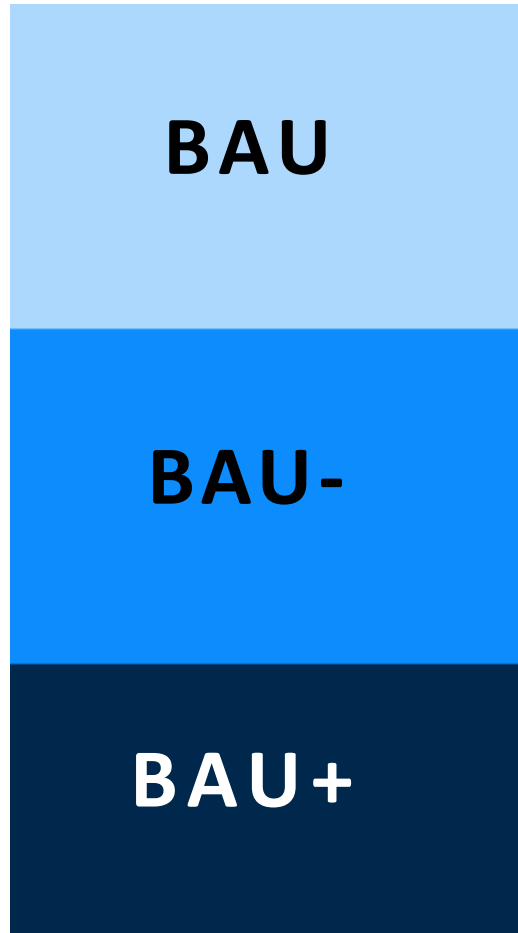


Energy  
Efficiency



Demand  
Response

# Scenarios Studied



## Business As Usual

Emulates TEP/UNSE's **incentive levels** to simulate business as usual (includes existing and complementary measures).

## Business As Usual –Reduced Spending

Emulates decreased DSM efforts, primarily through **decreased incentives** below the levels in the BAU scenario.

## Business As Usual –Enhanced Spending

Emulates increased DSM efforts, through **increased enabling activities** and **increased incentives** above the BAU scenario.

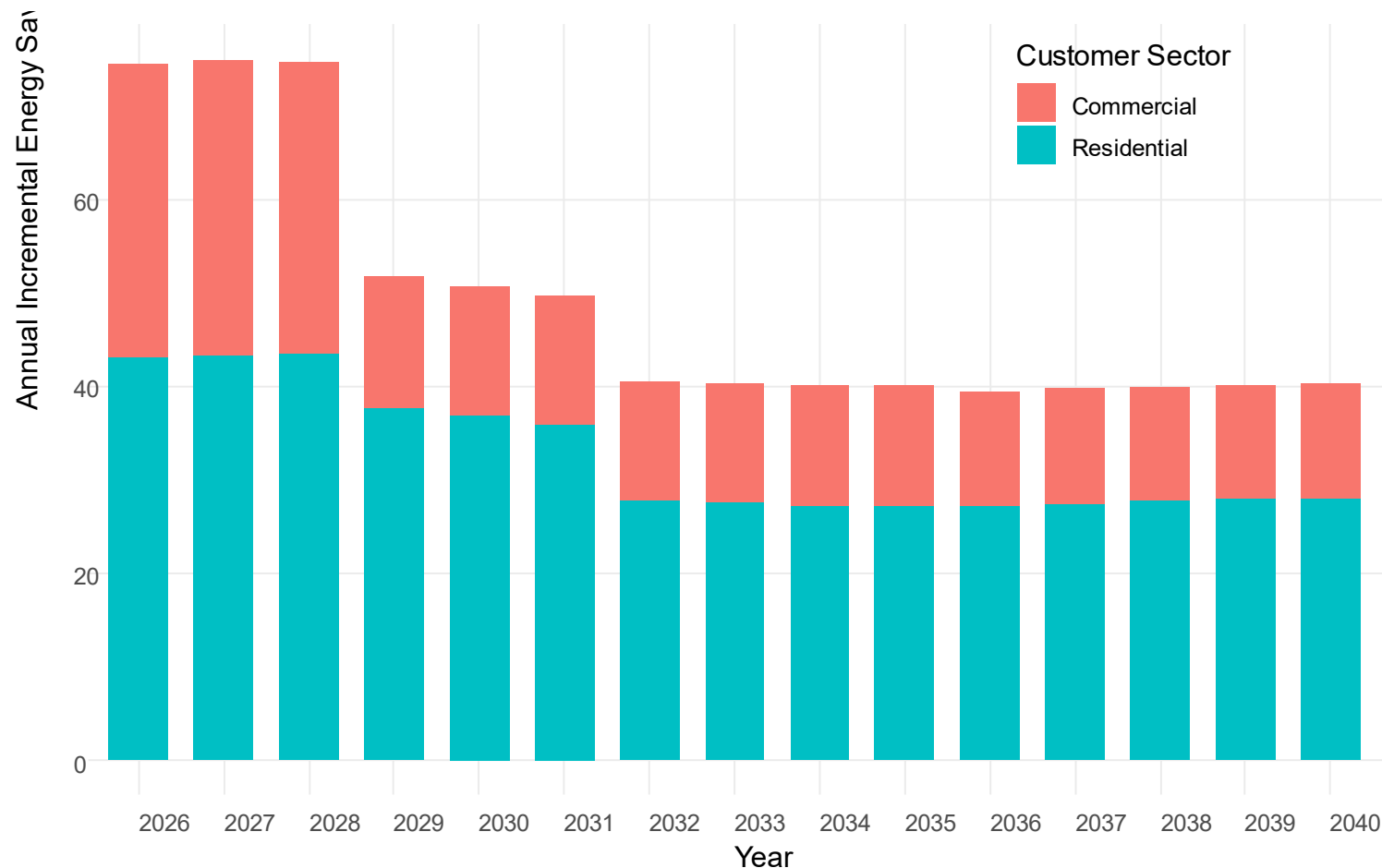
# New Measures Considered in the Study



Low potential in our service territories.

<b>New Measures Included in Study</b>	<b>Segment</b>
<b>Variable Speed Drive (VSD) Pool Pump Calibration</b>	<b>Residential</b>
<b>Window Shade Screens</b>	<b>Residential + Commercial</b>
<b>Combined Direct/Indirect Evaporative Cooling</b>	<b>Residential</b>
<b>New Measures Not Included in Study</b>	<b>Segment</b>
<b>Cool Roofs</b>	<b>Residential + Commercial</b>
<b>Storm Shutters</b>	<b>Residential</b>
<b>Deeply Buried Ducts</b>	<b>Residential</b>
<b>Combined Direct/Indirect Evaporative Cooling</b>	<b>Commercial</b>

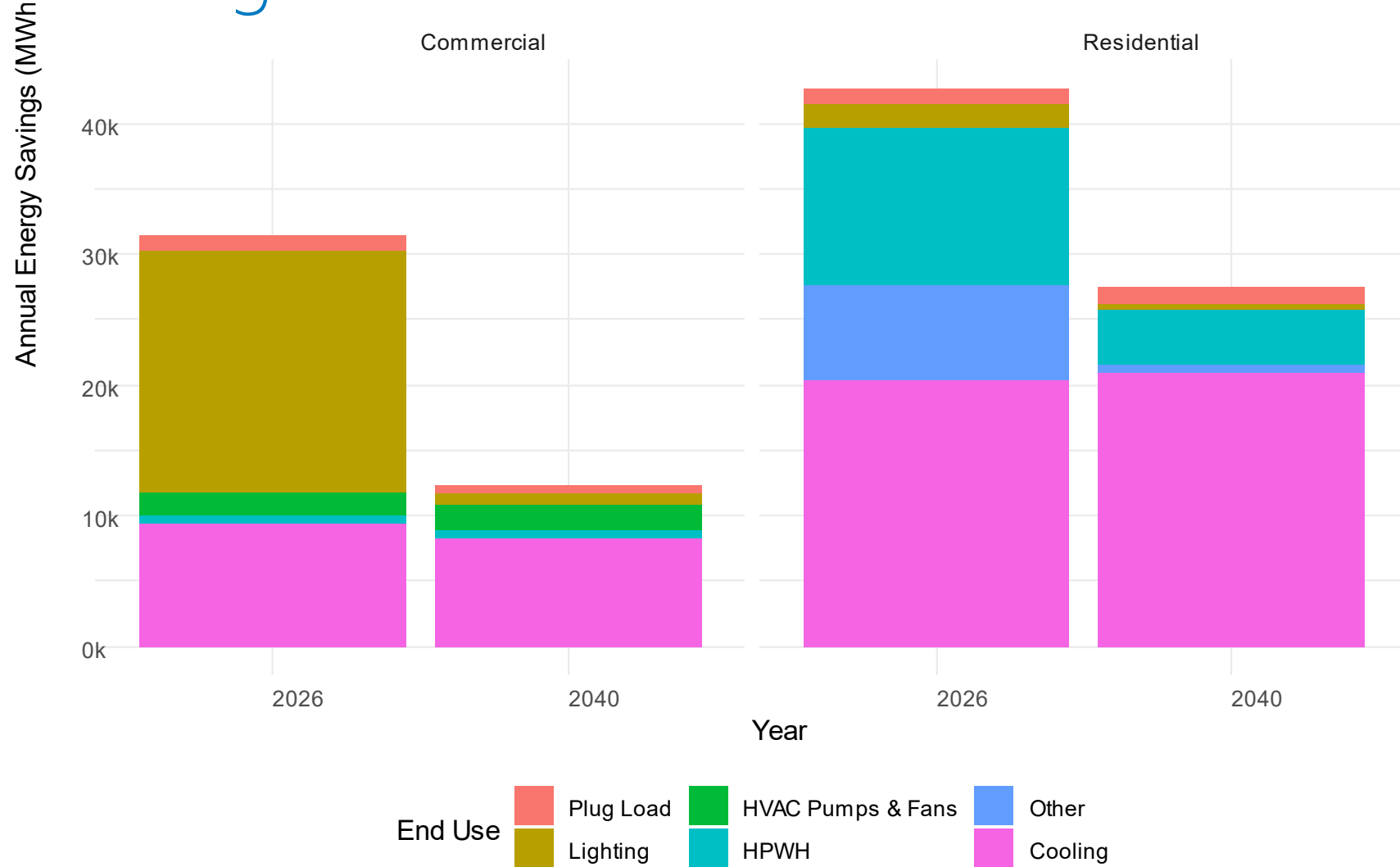
# L-T Trends – Annual Incremental Savings – TEP



- Expand adoption of high-efficiency HVAC systems, heat pumps, smart thermostats, and building envelope improvements such as air sealing, duct sealing, insulation, and weatherization measures that reduce cooling demand.
- Continue expanding participation in multifamily housing, manufactured housing, and low-to-moderate income customer segments.
- Evaluate additional delivery models that improve customer participation while reducing administrative complexity.

BAU Scenario

# Drivers of Savings - TEP



BAU Scenario

# Top EE Measures 2026 TEP

- The **top measures** for TEP’s energy efficiency opportunity **align with prior expectations** and experience elsewhere
- Across both sectors, **tune-up measures are pronounced**, reflecting recent program experience and expected continued support
- **Lighting opportunities are the central theme of Commercial** efficiency potential, though HVAC, controls, and SEM are notable inclusions
- In a post-lighting world, **HVAC, hot water, & envelope dominate residential potential**
  - **LED nightlights** are a notable exception, though Dunsky has identified some potential concerns with current program implementation and claimable savings

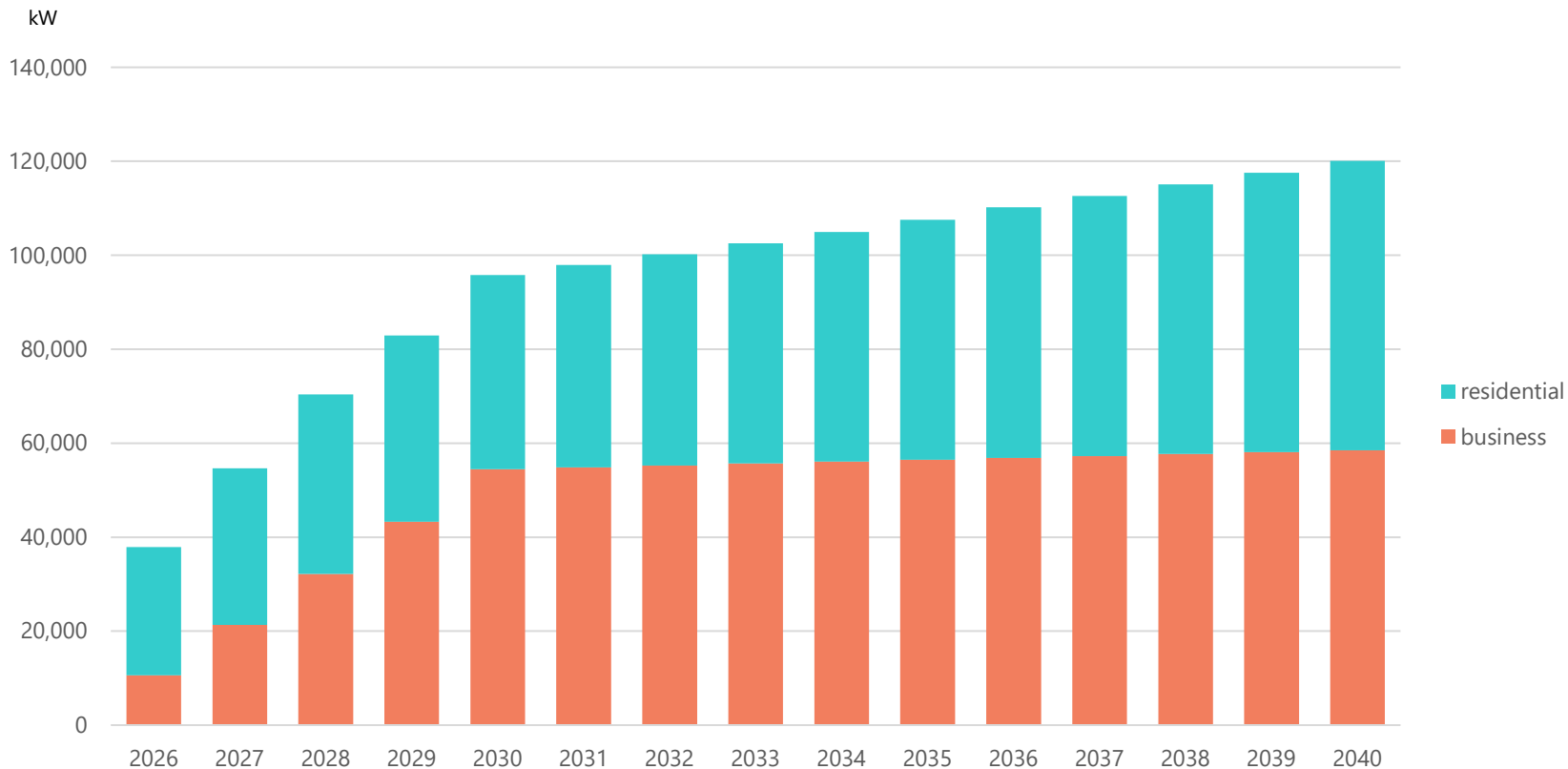
Residential EE	Commercial EE
Home Energy Report	LED Linear Luminaire
Heat Pump Water Heater (HPWH)	LED High Bay
Central Air Conditioning (CAC)	Wi-Fi Thermostat
New Home Construction	LED Parking Garage (Exterior)
Central Air Conditioning Tune Up	Dual Enthalpy Economizer Controls
Air Source Heat Pump (ASHP)	Unitary Air Conditioner
Low Flow Shower Head	HVAC Variable Frequency Drive - Fan
Air Source Heat Pump (ASHP) Tune Up	Retro-commissioning Strategic Energy Manager (RCx SEM)
Night Light	Air Conditioner Tune-up
Efficient Windows	LED Pole Mounted (Exterior)

**Note:** Top 10 measures sorted and arranged by savings under BAU scenario.

# Electric Energy Savings Key Takeaways

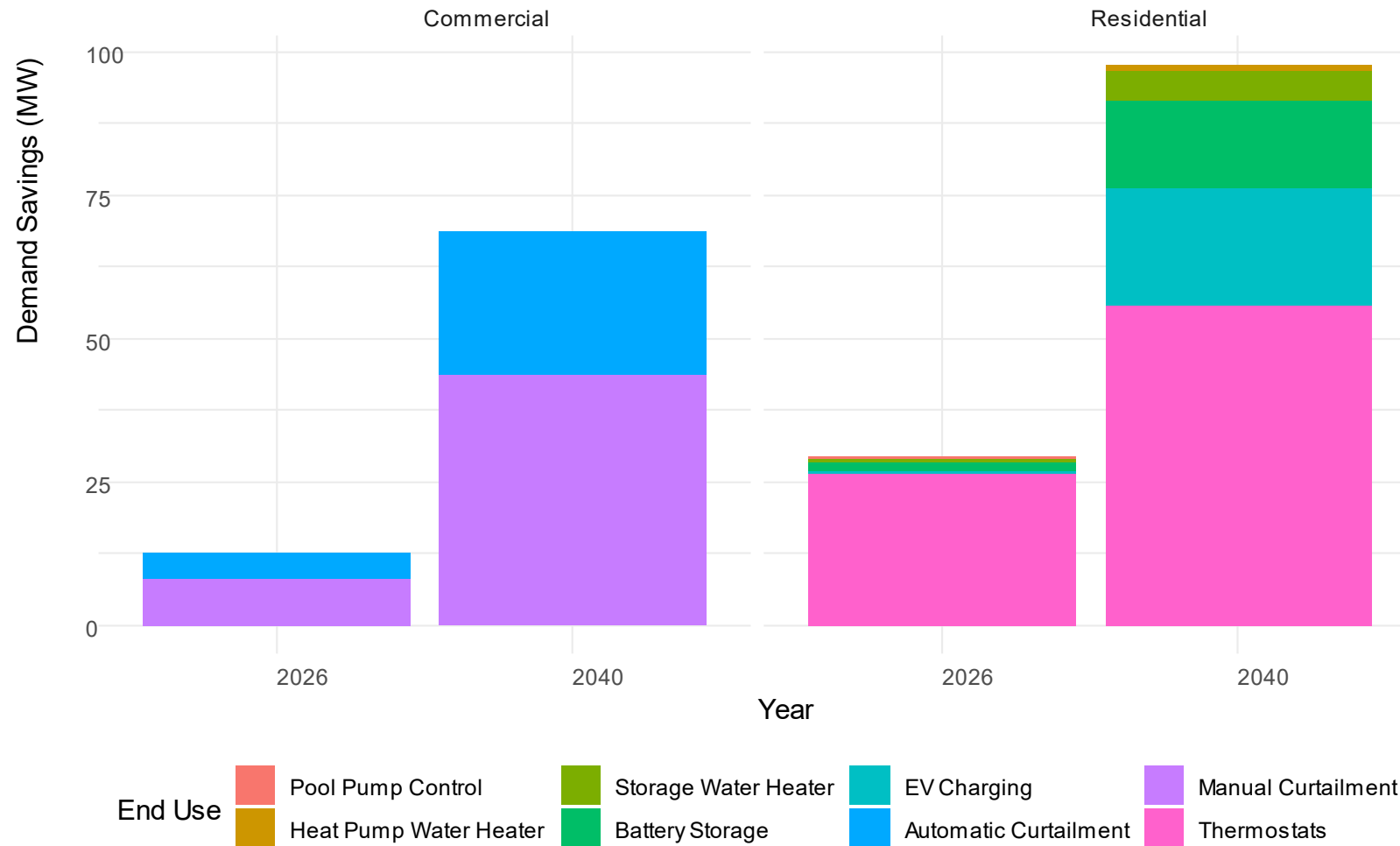
- The combined impact of efficiency and distributed generation adoption can have a notable impact on future electricity consumption
- Top-line energy efficiency trends are dominated by the loss of residential lighting savings, as well as some adjustments to past offerings such as UNSE ramping down behavioral and kit programs
- C&I lighting opportunities are expected to roll off within the next few years, along with some other measures such as residential heat pump water heaters (HPWHs)
  - Declines in potential in later years also driven by exhaustion of discretionary measures like tune-ups which could potentially be spread over more years, or benefit from repeat participation
- New opportunities are available, but will require program adjustments and sustained support to build market capacity and tap into available savings
- Areas for growth include HVAC, Envelope, and Hot Water end uses

# Demand Savings DR – TEP (BAU -)



- Evaluate battery storage, managed EV charging, and additional flexible load opportunities that support TEP's evolving Virtual Power Plant strategy.
- Explore opportunities for small-to-medium business participation in flexible load programs.
- Continue expanding TEP's Load Management Pilots (smart thermostat and battery storage) and optimized event strategies.

# Drivers of Demand Savings - TEP



# Top DR Measures – TEP

- **Demand response potential is diverse**
- Residential sector opportunities are present across a range of device types, including **controllable HVAC equipment, batteries, water heaters, and EVs**
- Commercial opportunities include batteries and controllable HVAC, as well as **specific program types targeting larger loads**, which are well-established practices in the commercial DR space.

Residential DR	Commercial DR
Wi-Fi Thermostat, AC System, BYOD	Automatic Curtailment
Battery Energy Storage with Solar, BYOD	Manual Curtailment
Smart Switch, Resistance Storage Water Heater, Control, Direct Install	Interruptible Load
EV Managed Charging, BYOD	Wi-Fi Thermostat, BYOD
Pool Pump Control, Direct Install	Thermal Storage, BYOD
Smart Switch, Heat Pump Water Heater, Control, Direct Install	Smart Switch, Resistance Storage Water Heater, Control, Direct Install
Battery Energy Storage Standalone, BYOD	Battery Energy Storage with Solar, BYOD
-	Battery Energy Storage Standalone, BYOD

**Note:** Top 8 measures sorted and arranged by savings under BAU+ scenario.

# Demand Response Key Takeaways

- Though historically limited, demand response opportunities are available for both TEP and UNSE. Consistent offerings and sustained support will be required to unlock this value.
- With long-term support, demand response programs shift or curtail load during high demand periods.
- Linking DR programs with robust energy efficiency programs supports continued participation and program growth.



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Questions?



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Break – 10 minutes



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# 2026 IRP Preliminary Base Case Results

# Key Terms

## Springerville Generating Station Repowering

- The modification of Springerville 1 and 2 units to run on natural gas

## Planning Reserve Margin (PRM)

- The amount of resource capacity needed above peak load to ensure reliability

## Long-term Capacity Expansion model (LTCE)

- Software that will calculate the lowest-cost resource mix to meet given criteria and constraints

## Production Cost model (PCM)

- Software that will dispatch the modeled resources to meet load and calculate system costs

## Effective Load Carrying Capability (ELCC)

- The amount of capacity each resource can be expected to provide to meet peak load

## Sensitivity

- Modeling results from running the PCM on a different set of parameters (change in market or fuel pricing, etc)

## Natural Gas Combined Cycle (NGCC)

- A type of gas power plant that utilizes both gas and steam turbines to increase efficiency



# Changes since the 2023 IRP

- Solar and storage resource additions
  - Roadrunner Reserve I and II Storage (400 MW/1600 MWh total)
  - Babacomari Solar (160 MW)
  - Wilmot II Solar plus Storage (100 MW, 100 MW/400 MWh)
  - Winchester Solar plus Storage (80 MW, 80 MW/320 MWh) planned for 2027
- New load
  - Industrial load is main driver – existing and new customer requests
- Rising inflation
  - Increases both capital and O&M costs
- Reduction in tax credits
  - Increases in capital costs for certain resource types
- Environmental regulations
  - Requires additional sensitivities

# Modeling improvements since 2023

- Modeling Optimization
  - TEP retained Siemens PTI to assist with the setup of LTCE in Aurora
- Resource Adequacy (RA) Parameters Update
  - TEP retained E3 to update and expand on their 2022 RA study
  - The PRM was updated from 16.5% to 18%
  - E3 performed new ELCC analysis, accounting for updated load and resources forecasts and determining new capacity accreditation values
- Inclusion of Demand Response as a resource
  - Aurora will now select when to dispatch Demand Response

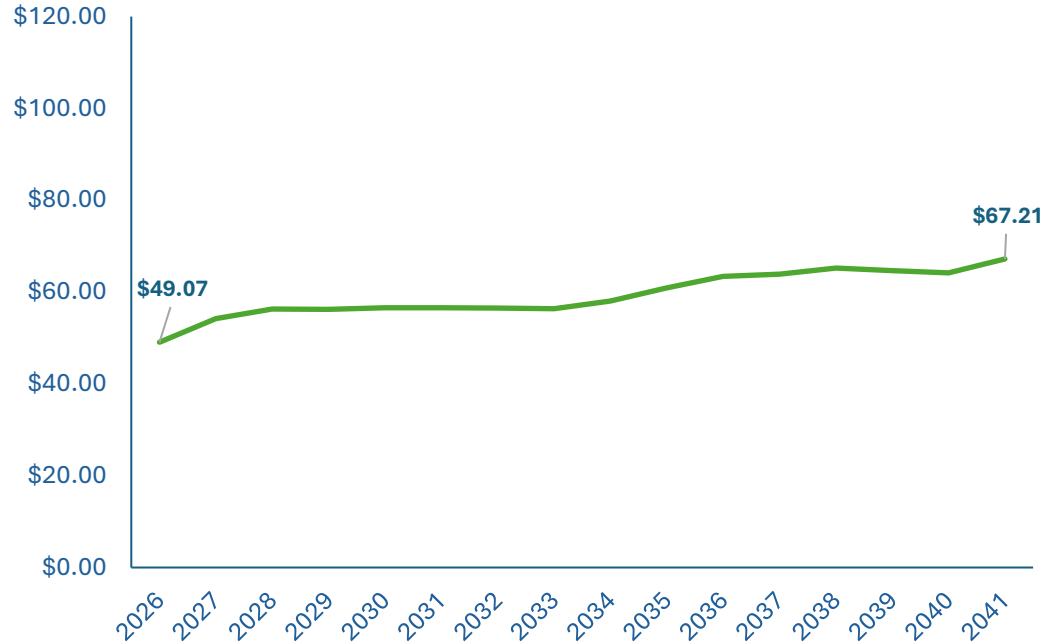
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# 2026 IRP Portfolios

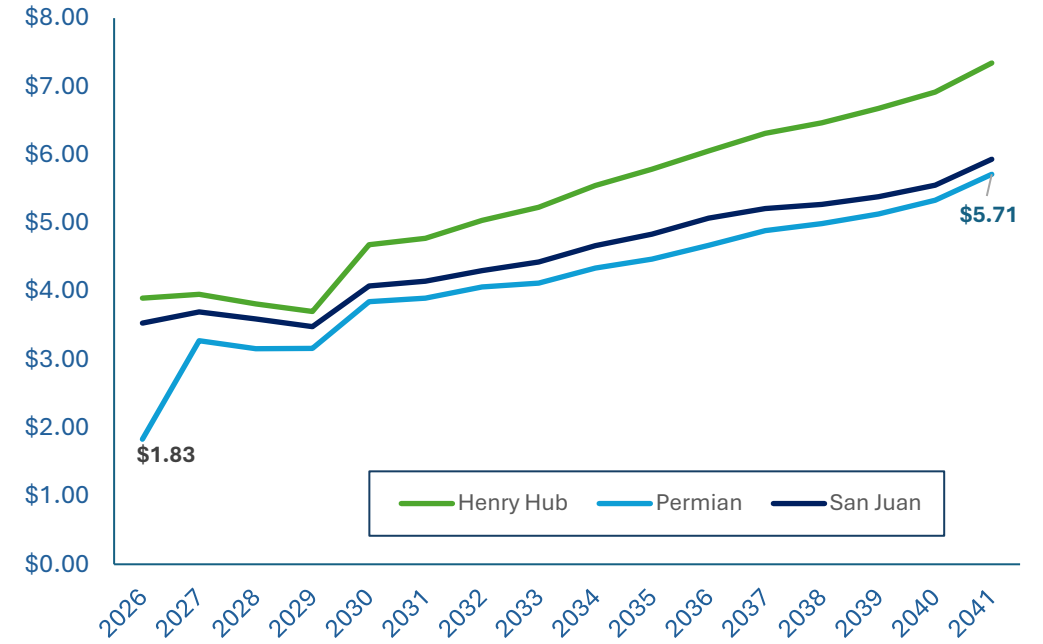
#	Name	Description
P01	Technology Neutral Base Case	<ul style="list-style-type: none"> <li>A least-cost, technology neutral portfolio required by the ACC.</li> </ul>
P02	Clean Energy Buildout	<ul style="list-style-type: none"> <li>A portfolio that only allows the LTCE to chose carbon-free resources (solar, wind, storage, pumped hydro, nuclear), including the resources needed upon Springerville's retirement.</li> </ul>
P03	High Load Factor Customer Growth	<ul style="list-style-type: none"> <li>A least-cost, technology agnostic portfolio that adds 550 MW of high load factor customers to the base forecast beginning in 2030.</li> </ul>
P04	High Load Factor Customer Growth - Clean Energy Buildout	<ul style="list-style-type: none"> <li>A portfolio that adds 550 MW of high load factor customers to the base forecast beginning in 2030 and only allows the LTCE to select carbon-free resources.</li> </ul>
P05	Pumped Hydro	<ul style="list-style-type: none"> <li>A portfolio that adds 100 MW of pumped hydro storage in 2033.</li> </ul>
P06	Geothermal	<ul style="list-style-type: none"> <li>A portfolio that adds 100 MW of geothermal generation in 2034. Included due to interest by the RPAC.</li> </ul>
P07	Nuclear	<ul style="list-style-type: none"> <li>A portfolio that adds 100 MW of nuclear generation in 2038.</li> </ul>

# Forward Wholesale Power & Natural Gas Market Prices

**Palo Verde Power Prices (7x24), Nominal\$/MWh**



**Natural Gas Prices, Nominal\$/MMBtu**



**IRP Assumptions:**

- Near-term prices are derived from monthly Platts Forward curves.
- Long-term prices reflect a blended forward and fundamental outlook based on Wood Mackenzie 2025 North America Power Market Outlook (moderated case).

# Tax credits – One Big Beautiful Bill Act (OBBBA)

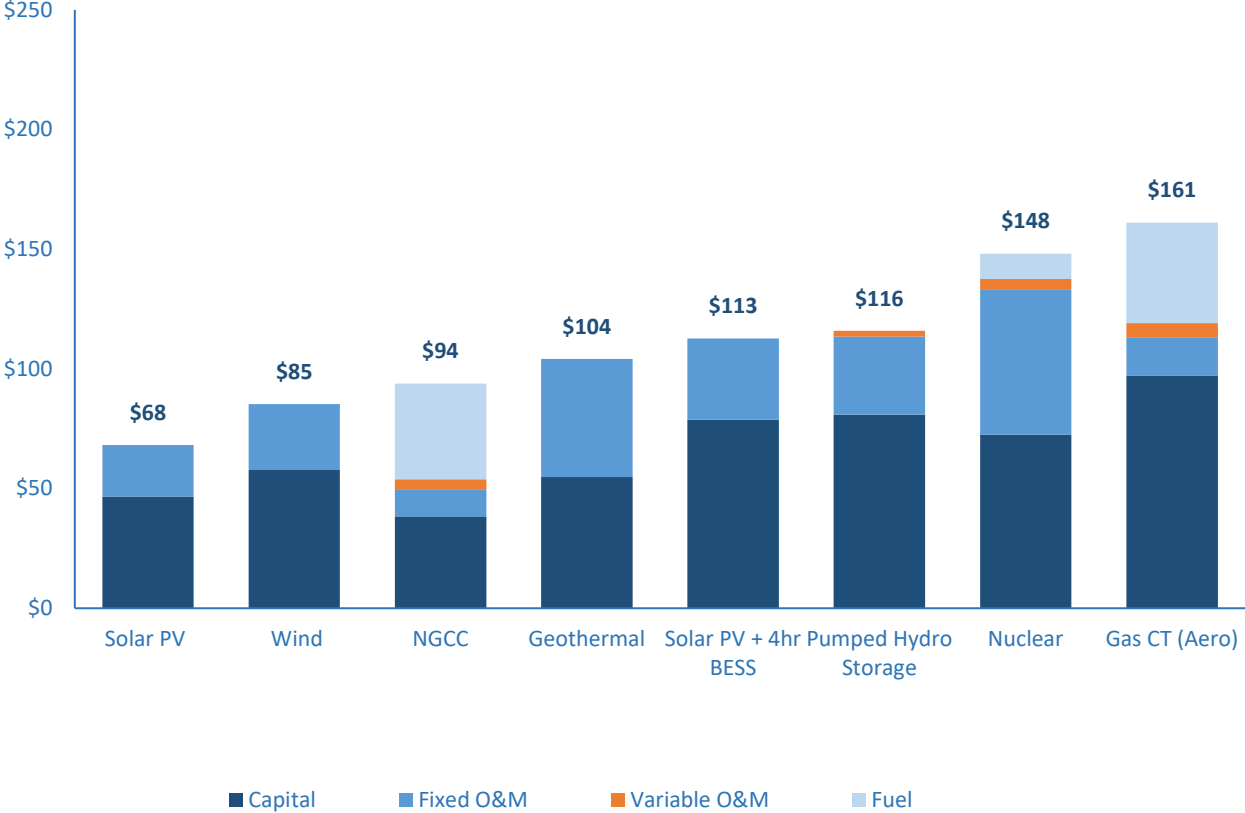
Provision	Inflation Reduction Act (IRA)	OBBBA enacted by President Trump (4 July 2025)
Sections 48E and 45Y tax credit (TC) schedule	<ul style="list-style-type: none"> <li>• 100% through 2033, 75% in 2034, 50% in 2035, 0% in 2036 and onwards.</li> </ul>	<ul style="list-style-type: none"> <li>• 100% by 2026, 0% by 2027 for solar and wind.</li> <li>• 100% by 2033, 75% by 2034, 50% by 2035 and 0% by 2036 for other technologies including storage.</li> </ul>
Requirements to obtain full TC value	<ul style="list-style-type: none"> <li>• Tax credit value depends on start-of-construction date.</li> <li>• Investment Tax Credit (ITC): a project has four years to be placed in service.</li> </ul>	<ul style="list-style-type: none"> <li>• Beginning-of-construction* (BOC) 2025: Placed-in-service (PIS) by 2029, no FEOC requirement.</li> <li>• BOC H1 2026: PIS by 2030, a 4-year safe harbor, subject to FEOC requirements.</li> <li>• BOC H2 2026: PIS by 2027, no safe harbor, subject to FEOC requirements.</li> </ul>
Transferability	<ul style="list-style-type: none"> <li>• In place throughout the ITC schedule.</li> </ul>	<ul style="list-style-type: none"> <li>• Maintained for sections 48E and 45Y credits.</li> <li>• Preserved for section 45X manufacturing credits.</li> </ul>

\* To establish beginning-of-construction, one of two tests must be satisfied: 1) Physical work test: the taxpayer must perform substantial physical work on equipment that is an integral part of the facility. Applies to all projects >1.5 MW<sub>ac</sub>. 2) The 5% safe harbor test: the taxpayer must pay or incur at least 5% of the total cost of the facility and, for accrual-based taxpayers, take delivery of such components or expect to take delivery within 3.5 months of executing the binding written contract. This option is only applicable to smaller project <1.5 MW<sub>ac</sub>.

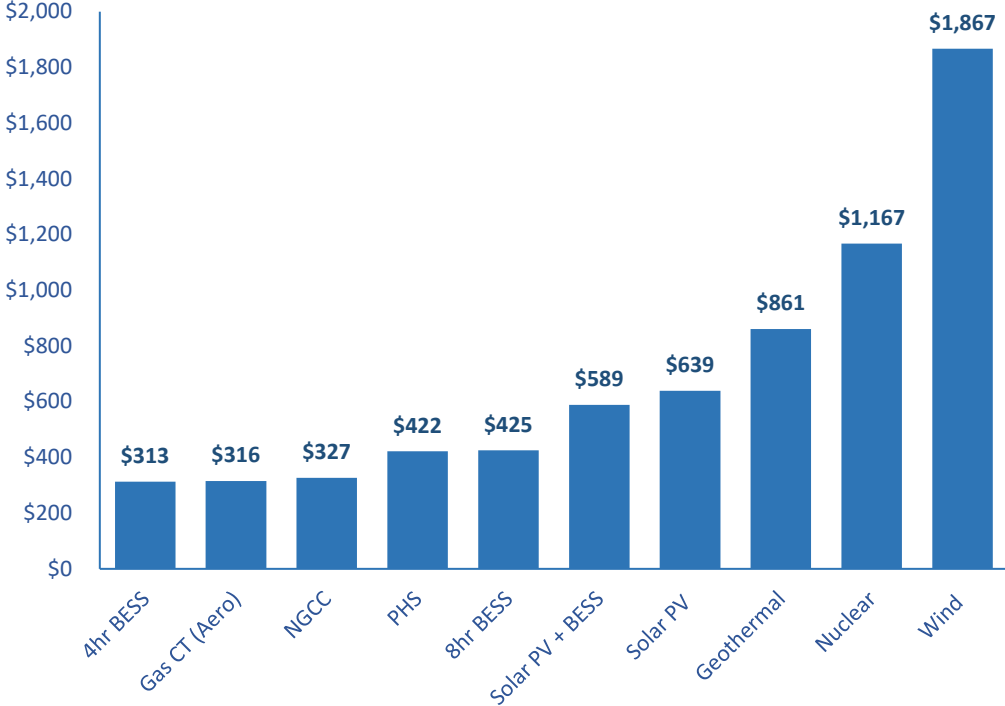
Source: Wood Mackenzie, Power Market Outlook

# Levelized Cost of New Resources

Levelized Cost of Energy, 2030\$/MWh



Levelized Cost of Capacity, 2030\$/kW-yr (ELCC Applied)



# LTCE Constraints

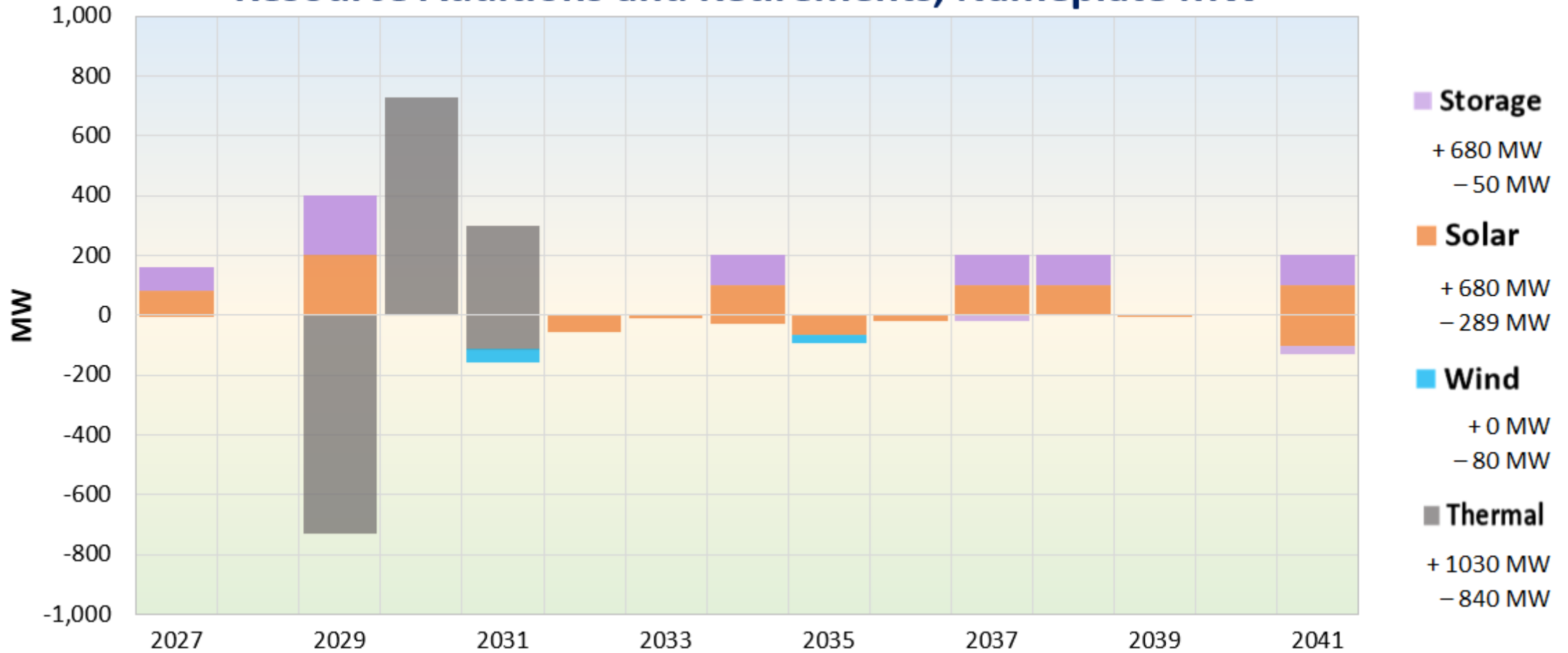
	Planning Reserve Margin
<b>Model Constraints</b>	<b>18.0%</b>

	Nameplate Capacity (MW)	Annual Max (MW)	Overall Max (MW)
<b>Resource Constraints</b>			
NGCC	100	800	1000
Combustion Turbine	100	800	1000
Solar	100	300	2000
Hybrid Solar	100	300	2000
Hybrid Storage (4hr)	100	300	2000
Storage (4hr)	100	300	2000
Storage (8hr)	50	100	500
Storage (10hr)	50	100	500
Wind	100	300	2000
Pumped Hydro Storage (10hr)	50	100	200
Geothermal	50	100	200
Nuclear SMR	50	100	200
Nuclear PWR	50	100	200

NGCC: Natural Gas Combined Cycle  
 SMR: Small Modular Reactors  
 PWR: Pressurized Water Reactor

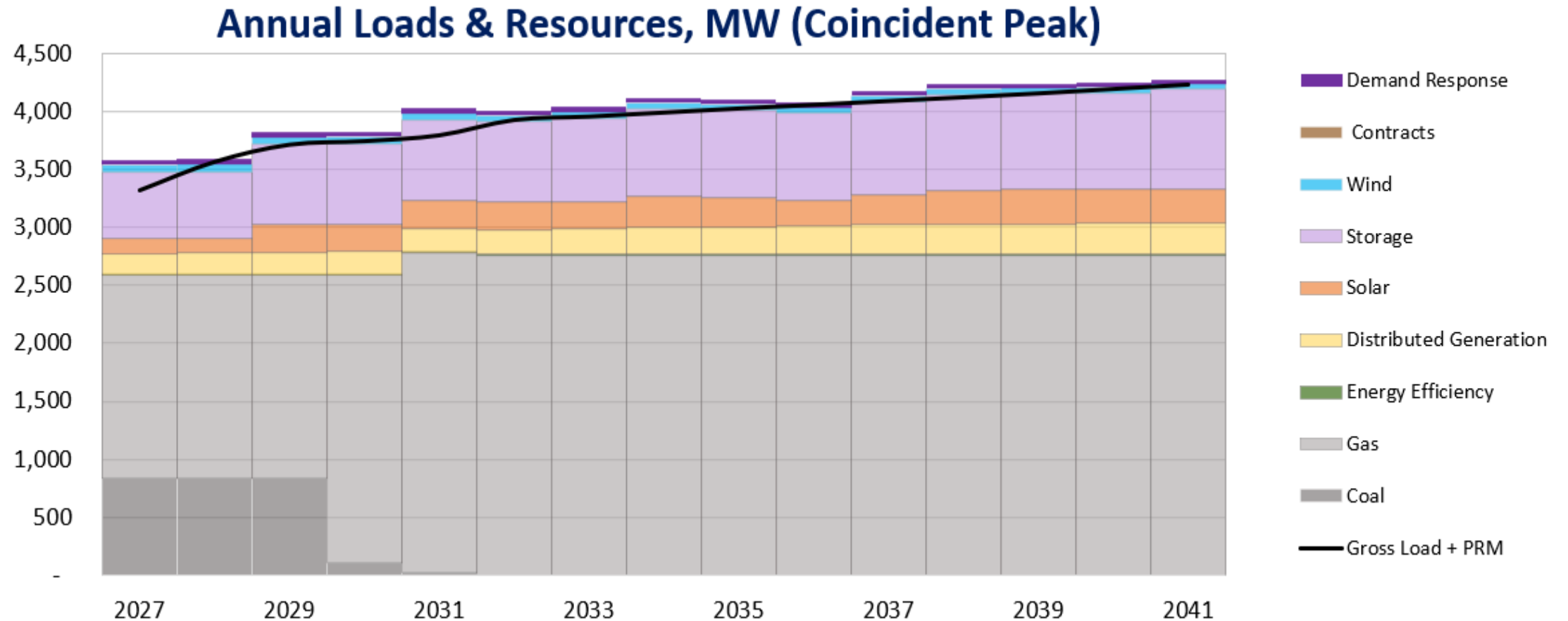
# P01 – Technology Neutral

## Resource Additions and Retirements, Nameplate MW

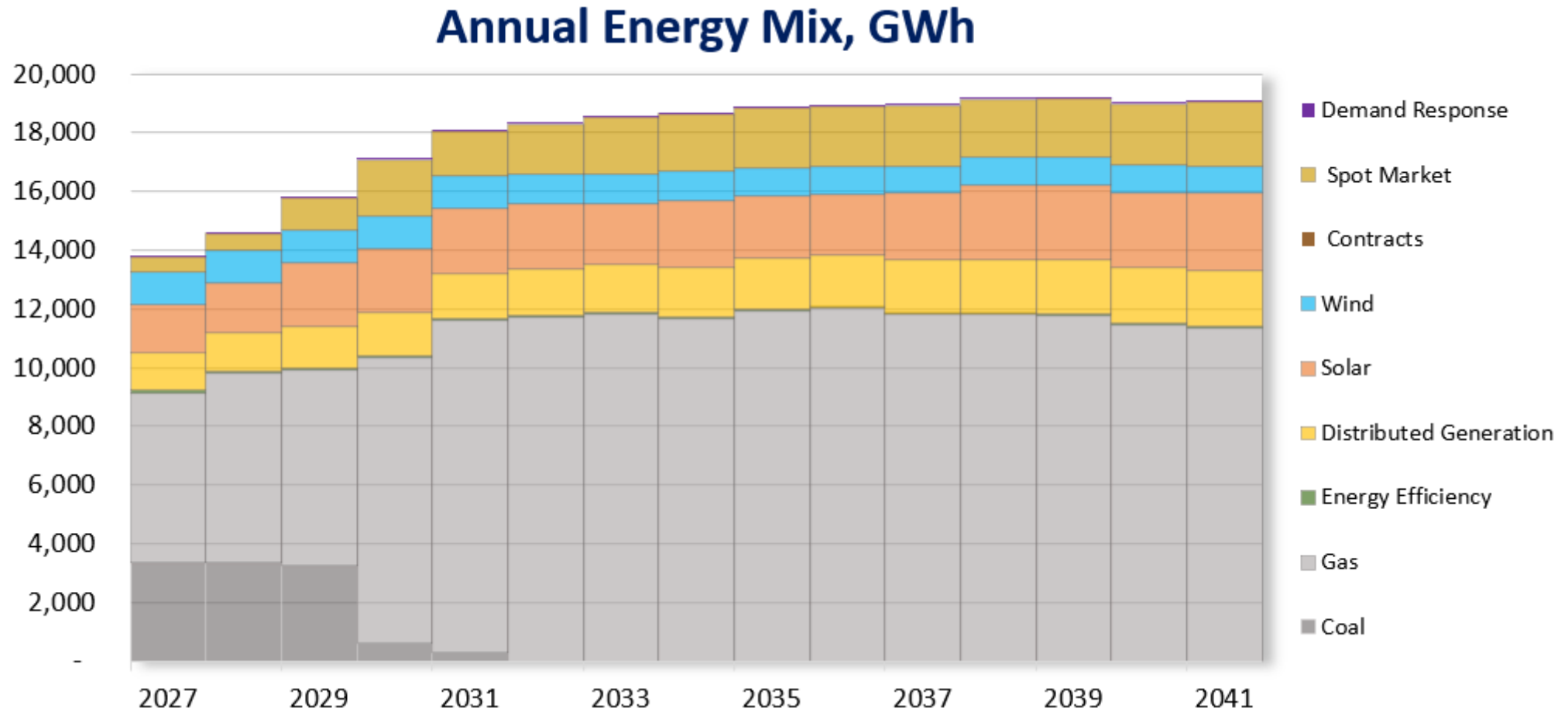


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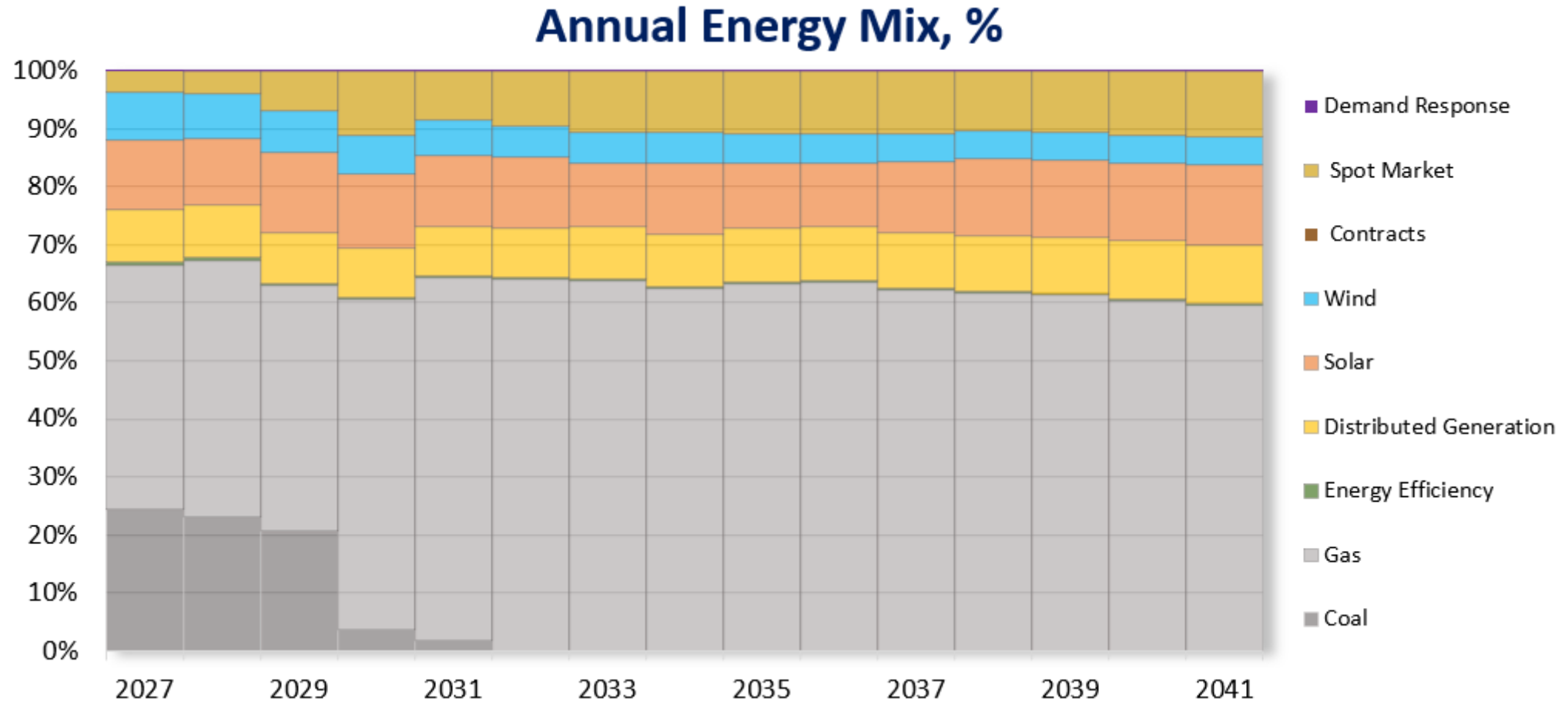
# P01 – Technology Neutral



# P01 – Technology Neutral



# P01 – Technology Neutral



Thank you!

