



EXECUTIVE SUMMARY 2025

PREPARED IN
COLLABORATION
WITH:



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FORWARD BY STEVE STODDEN, MPUA President & CEO



Missouri Public Utility Alliance (MPUA) is pleased to provide the 2025 Integrated Resource Plan (IRP) for MPUA’s three full requirements power pools. As we present this Integrated Resource Plan, our focus is on ensuring reliable, affordable, and sustainable power for the communities we serve. The IRP represents the collective efforts of The Energy Authority (TEA), our MPUA staff, and our member utilities to chart a thoughtful path forward in a time of significant change in the electric sector. From shifting federal and state regulations to evolving customer expectations and the growth of new technologies, we face both challenges and opportunities. This plan reflects our commitment to balancing reliability and affordability while embracing innovation and sustainability where it best serves our members.

Our three full requirements power pools—formed to give municipal utilities the advantages of scale and coordinated resource planning—are the cornerstone of this effort. By working together, we are able to diversify our power supply, manage risks, and pursue new resource options in a way that no single member could do alone. This IRP is not just a roadmap for the future, but a demonstration of how collaboration strengthens our ability to adapt and thrive. I am confident that through this shared vision, MPUA and its members will continue to deliver the value, stability, and service our communities rely on every day.

Steve Stodden
President and Chief Executive Officer, Missouri Public Utility Alliance

Importance of an Integrated Resource Plan (IRP)

The Missouri Public Utility Alliance (MPUA) serves 52 full requirements power pool member cities across Missouri. As a nonprofit alliance, MPUA supports these community-owned utilities in developing a resource portfolio that promotes long-term affordability and resilience across a range of potential future scenarios. In June 2024, MPUA initiated this Integrated Resource Plan (IRP), with support from The Energy Authority (TEA), to create a forward-looking roadmap that addresses future demand growth and market variability while maintaining cost-effective service for its members. TEA's market and planning expertise was instrumental in applying robust economic and technical modeling to identify energy portfolios that support MPUA's reliability and affordability goals.

Regularly scheduled IRPs are essential for MPUA to maintain a well-balanced mix of resources, informed by careful evaluation of dispatchable thermal resources, renewable energy, market purchases, and energy storage. This planning framework enables MPUA to meet its members' evolving needs while responding to a rapidly changing energy landscape. As the region faces increasing uncertainty from extreme weather, shifting regulations, and evolving customer expectations, the IRP process becomes even more critical. Through long-term resource planning, MPUA is better positioned to manage market risks, navigate price volatility, and integrate emerging technologies—ensuring reliable, affordable, and sustainable energy for the communities served by MPUA members.

Missouri Public Utility Alliance Overview

The Missouri Public Utility Alliance (MPUA) is a vital nonprofit organization that serves and advocates for community-owned utilities across Missouri and neighboring states. These utilities provide electric, water, wastewater, natural gas, and broadband services under local governance. Established in 1998 through the strategic consolidation of three utility organizations, MPUA fosters collaboration, strengthens advocacy, and enhances the delivery of utility services. Its mission is to ensure utility services remain safe, reliable, and affordable—an objective supported through advocacy, technical expertise, and comprehensive long-term resource planning.

A key component of MPUA is the Missouri Joint Municipal Electric Utility Commission (MJMEUC), operating as the Missouri Electric Commission (MEC). MEC plays a critical role in the electric power landscape by managing power procurement, securing transmission access, and guiding resource planning for municipal systems. Empowered to own and operate generation and transmission assets on behalf of its members, MEC enables members to retain local control while pursuing flexible supply arrangements and tailored resource strategies. MEC holds joint ownership in major generation projects including Plum Point, Iatan Unit 2, Prairie State, and Dogwood Energy. In a forward-thinking move, MEC has also expanded into ownership of transmission assets and solar facilities to meet growing member demand.

MEC manages three full requirements power pools serving a total of 52 members: Missouri Public Energy Pool (MoPEP) Mid-Missouri Municipal Power Energy Pool (MMMPEP) and the Southwest Missouri Public Energy Pool (SWMPEP)—as well as customized supply arrangements designed to fit unique member needs. MEC coordinates crucial transmission access and market transactions, primarily through the Southwest Power Pool (SPP), a regional transmission organization (RTO) responsible for grid reliability, managing wholesale markets, and overseeing regional planning throughout much of the central U.S. MEC also collaborates with the Midcontinent Independent System Operator (MISO), another RTO responsible

for managing the bulk power transmission system and energy markets across 15 mid-western and southern states and Manitoba, Canada.

To cultivate a robust, data-driven framework for resource planning, MPUA has partnered with TEA. In close collaboration with MPUA member utility staff, TEA has forecasted electric loads, evaluated existing resources, modeled market conditions, and developed forward-looking strategies for all three power pools—MoPEP, MMMPEP, and SWMPEP. The findings from this comprehensive study provide the foundation for an efficient, reliable, and sustainable resource plan that enables MPUA members to meet future energy demands while upholding their commitment to local governance and community service.

The Energy Authority Overview

TEA was established in 1997 by three public power owners to address changes in the electric utility industry. Its unique mission is to enhance the utilization of its members' electric generating assets in the wholesale energy market and to optimize power sales and purchases on their behalf. TEA distinguishes itself through its focus on creating economies of scale, reducing operating costs related to energy trading and marketing, and providing public power clients with effective risk management and settlement services. It accomplishes this through aggregated trading functions, analytical expertise, a skilled workforce, and advanced scheduling and deal capture technologies—systems that would be cost-prohibitive for most individual utilities.


TEA's unwavering commitment to public power and the communities it serves has been the cornerstone of its growth. Since its inception, TEA has expanded to include six members and serves over 80 public power organizations across the nation. These clients represent more than 30,000 megawatts of peak demand and 22,000 megawatts of installed generation capacity. Today, TEA collaborates with these utilities to provide reliable, affordable, and sustainable energy solutions to over 1,300 communities, underscoring the scale of its operations and the trust it has earned from its stakeholders.

Strategic resource planning is a core component of TEA's services. By employing models that account for population growth, economic trends, environmental impacts, and technological advancements, TEA helps utilities identify resource portfolios that support long-term affordability and sustainability. The following exhibit highlights TEA's extensive experience and capabilities in strategic power supply planning for utilities nationwide, demonstrating its commitment to effective, forward-looking resource strategies.

FUELING CLIENT GROWTH IN

10 OUT OF **11**

NERC
REGIONS



50-80%
REDUCTIONS IN CARBON EMISSIONS
across all Integrated Resource Plans


27,000+ MWS
IN POWER PLANNING ASSESSMENTS

TEA

POWER SUPPLY
PLANNING

RANGE OF RESOURCES.
FULLY REVIEWED.

- CARBON-BASED TECHNOLOGIES
- NUCLEAR ENERGY
- RENEWABLE RESOURCES
- DEMAND-SIDE MANAGEMENT
- EMERGING TECHNOLOGIES
- PURCHASED POWER



**TEA'S
EXPERT
TEAM**

OVER A DECADE OF
INTEGRATED
RESOURCE PLANNING
TAILORED TO EACH
CLIENT'S UNIQUE
PORTFOLIO GOALS
AND NEEDS.

1 PhD

2 MASTER
OF
SCIENCE

50+
YEARS OF
STAFF
EXPERIENCE

5 Bachelors

TEA's experienced team consists of specialists in energy management, environmental science, and systems engineering. TEA uses advanced modeling software to assess long-term resource needs and optimize energy portfolios. Their comprehensive expertise allows us to develop strategic plans that meet regulatory requirements while promoting sustainable growth for clients in various regions.

TEA'S PUBLIC POWER OWNERS



American Municipal Power, Inc. ("AMP"), a nonprofit corporation organized under the laws of the State of Ohio whose membership is composed of political subdivisions of various states that own and operate electric utility systems, headquartered at 1111 Schrock Road, Suite 100, Columbus, OH 43229;



Grand River Dam Authority ("GRDA"), an agency of the State of Oklahoma, is headquartered at 8624 Hwy 412B Chouteau, OK 74337;



City Utilities of Springfield, Missouri (“CU”), a component unit of CU of Springfield, Missouri, is headquartered at 301 East Central, Springfield, MO 65801;



Nebraska Public Power District (“NPPD”), a public corporation and political subdivision of the State of Nebraska is headquartered at 1414 15th Street, Columbus, NE 68601;



JEA, a body corporate and politic created by the laws of the State of Florida, headquartered at 21 W. Church Street, Jacksonville, FL 32202;



South Carolina Public Service Authority (“Santee Cooper”), a body corporate and politic created by the laws of the State of South Carolina, headquartered at One Riverwood Drive, Moncks Corner, SC 29461.

IRP Methodology



MPUA’s IRP focuses on maintaining affordability for its members while ensuring flexibility in responding to changes in uncertain future energy markets.

To support this objective, TEA developed a comprehensive set of modeling inputs, including forecasts of electric demand across MPUA’s broad service footprint, natural gas, coal, and diesel prices, Southwest

Power Pool (SPP) market prices, capital costs for generating resources, and projected pricing for renewable resources and bilateral power purchase agreements (PPAs).

TEA and MPUA staff collaborated to define the scenarios used in the analysis. TEA then applied the PLEXOS resource planning model—an industry-recognized simulation tool—to evaluate resource portfolios that meet MPUA’s energy needs from 2025 through 2044. PLEXOS simulates future market conditions and optimizes resource selection based on long-term cost and system performance.

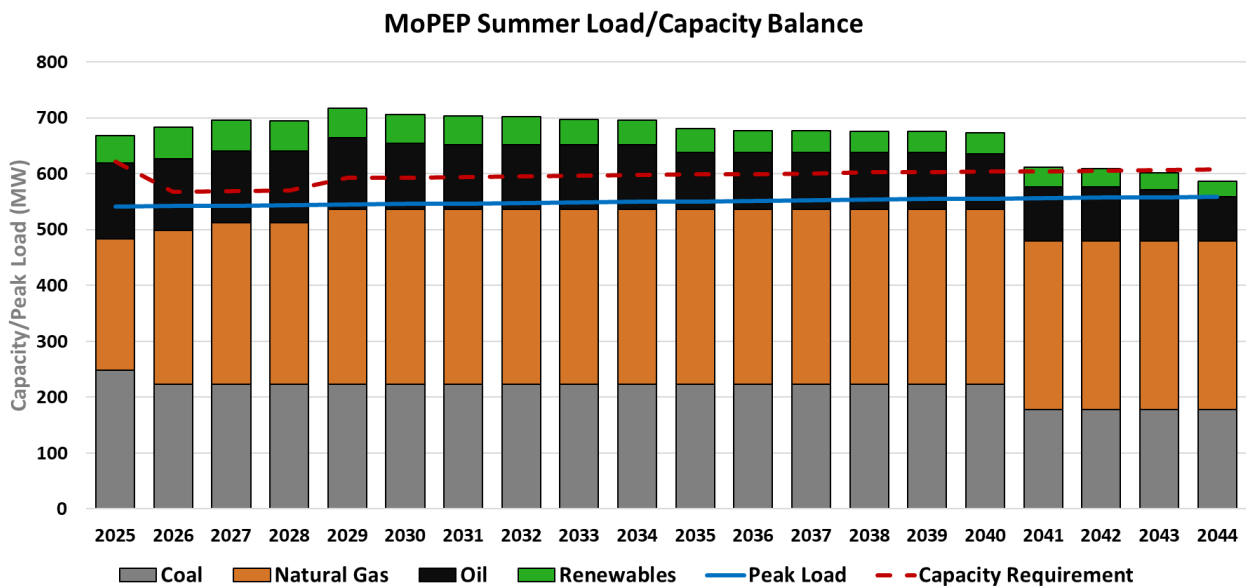
TEA compared the results of multiple scenarios to identify patterns and common solutions. This scenario-based analysis informed MPUA’s recommended resource strategy, which is designed to meet future energy needs while preserving adaptability and cost-effectiveness as market dynamics evolve.

Future Electricity Needs

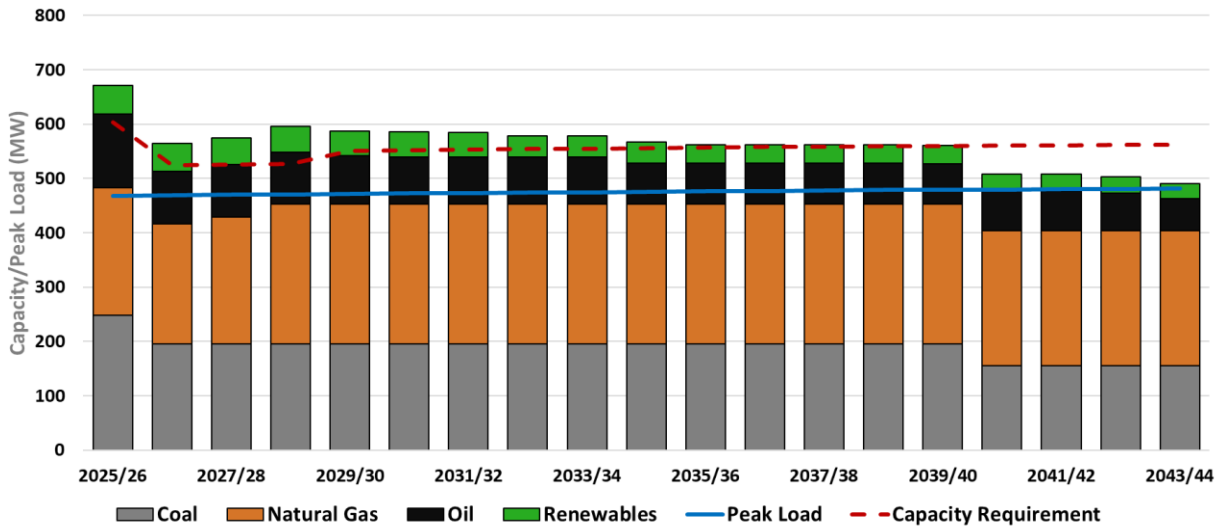
MPUA’s current power supply portfolio is diversified across a mix of thermal generation resources—including coal, natural gas, and diesel—as well as renewable resources such as solar, wind, hydro, and landfill gas. The portfolio is further supplemented by bilateral capacity purchase agreements. However, capacity requirements and resource distributions vary among the three power pools managed by MPUA. The plan seeks to optimize resources across pools when doing so helps lower costs for all parties.

The following figures illustrate projected summer and winter electricity needs for each of MPUA’s three power pools by comparing existing firm capacity to peak load forecasts through 2044.

In MoPEP, winter demand growth is expected to lead to a capacity shortfall beginning in the 2032/33 winter season. Summer capacity remains sufficient until 2041, when the expiration of the Plum Point PPA results in a gap in available resources.



MoPEP Winter Load/Capacity Balance

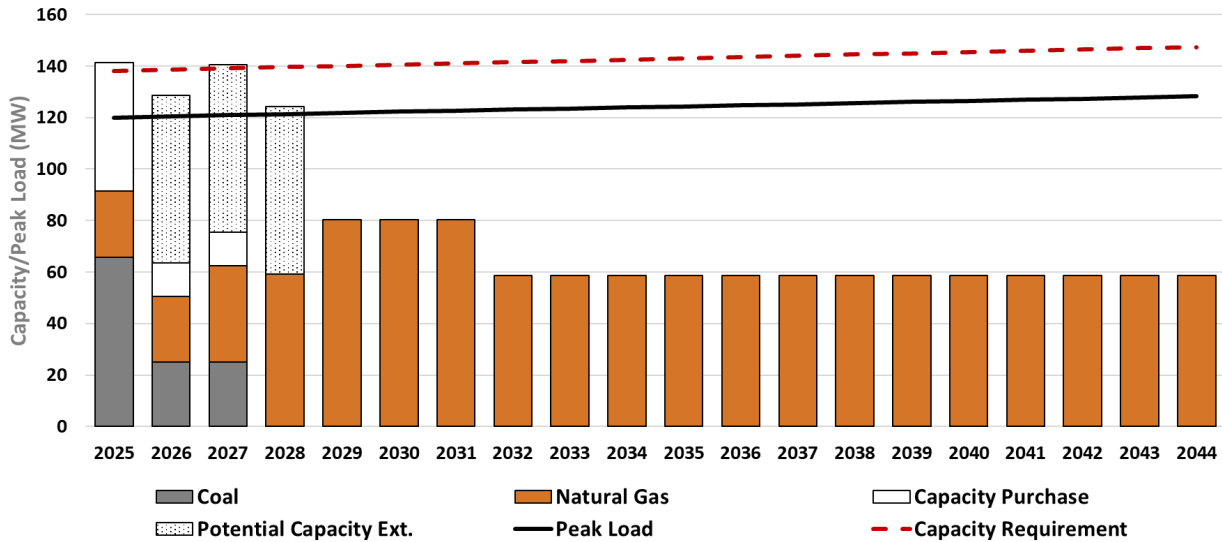


MMMPEP’s existing capacity includes shares of multiple new gas-fired resources: City Utilities’ (CU) CTs scheduled to be online by the winter of 2027/28, and the Marshall Energy Center, with Phase 1 online by winter 2026-27 and Phase 2 following in 2029. The Base Case and related scenarios also assume extensions of the Sikeston (40 MW) and Associated Electric Cooperative, Inc. (AECI) (25 MW) PPAs through 2028. These assumed extensions are shown in the following graphs as potential capacity extensions and help address needs in summer 2027 and the winters of 2027/28 and 2028/29.

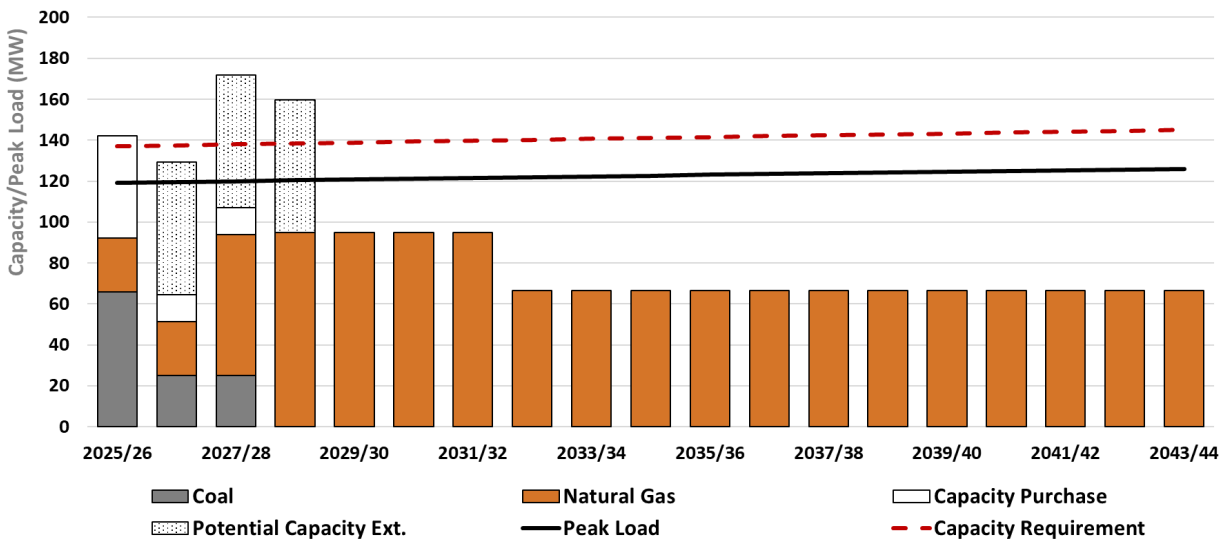
Even with the assumed capacity extensions, MMMPEP faces shortfalls in summer 2026 and 2028, as well as winter 2026/27. In addition, updated information received after the IRP analysis indicates that the

AECI extension may only provide 10 MW from September 2026 through May 2029—15 MW less than modeled. To address resulting gaps, MMMPEP will leverage excess MoPEP capacity when available.

MMMPEP Summer Load / Capacity Balance



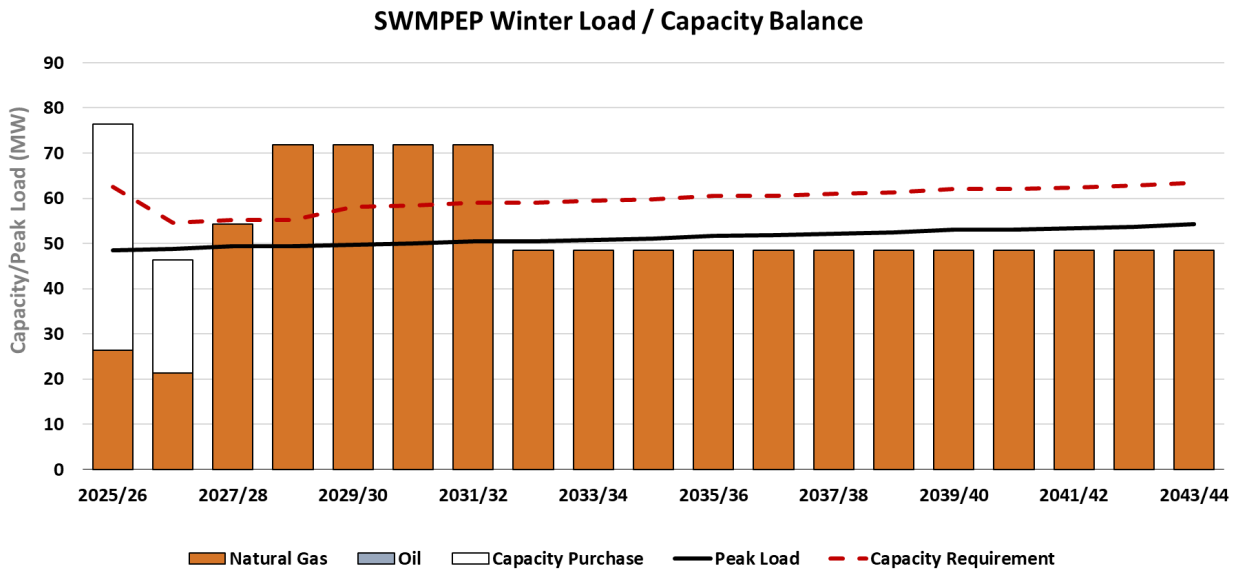
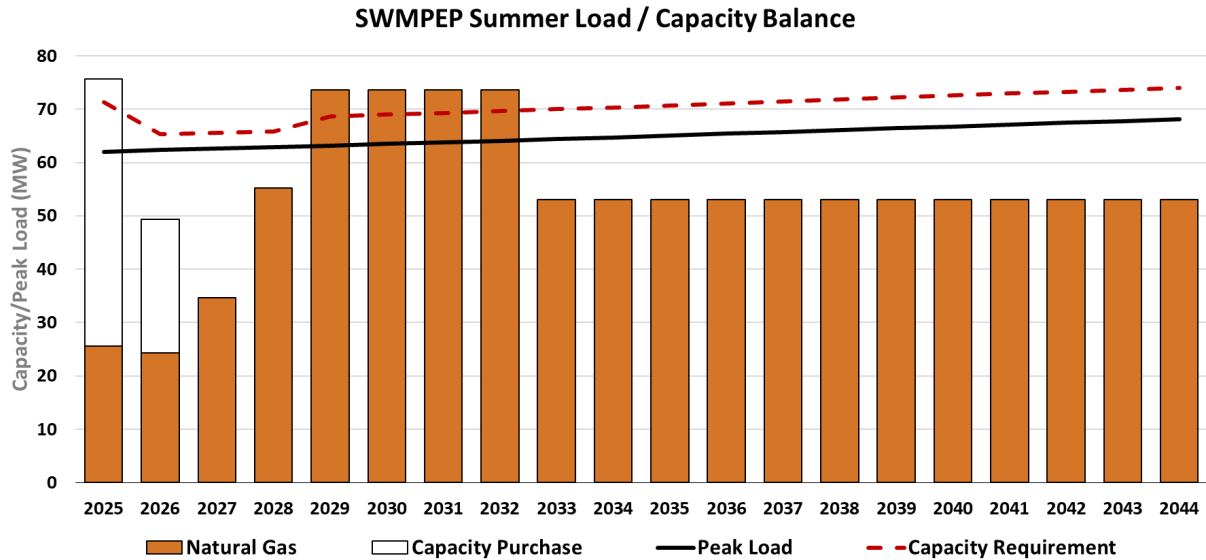
MMMPEP Winter Load / Capacity Balance



Like MMMPEP, SWMPEP receives capacity from natural gas-fired generation at Dogwood and will begin receiving additional capacity from Marshall as its two natural gas-fired combined cycle construction phases are completed. In addition, SWMPEP currently secures capacity through two short-term 25 MW bilateral agreements—one with MoPEP and the other with Liberty Utilities. Existing capacity also reflects the planned addition of a share of CU’s new gas turbine capacity beginning in the winter of 2027/28.

Despite these resources, SWMPEP is projected to fall short of its reserve margin requirements during portions of the 2026–2028 planning period. The combined natural gas-fired capacity from Dogwood,

Marshall, and CU is expected to meet both summer and winter capacity requirements beginning in the winter of 2028-29 and continuing through the summer of 2037. Near-term capacity shortfalls will require additional solutions to ensure reliability.



New Resource Options

MPUA requires new resources to meet future capacity obligations and maintain system reliability under various uncertain conditions. This IRP focuses on identifying resource additions that enable each pool to meet planning reserve requirements, manage risk, and support long-term cost stability.

To support these objectives, TEA evaluated a broad set of resource options—including dispatchable natural gas-fired generation, solar, wind, battery storage, and bilateral capacity purchases. Each option was assessed for its ability to contribute to a reliable, flexible, and cost-effective resource portfolio.

The resource types included in the analysis are:

- **Thermal Generation:** Natural gas-fired units were evaluated for their ability to provide firm, dispatchable capacity. Options include combined cycle and simple cycle combustion turbines, reciprocating internal combustion engines (RICE), and small modular reactor (SMR) nuclear generation.
- **Renewable Resources:** Solar and wind resources were considered, with cost trajectories influenced by continued technological advancements and incentives from the federal Inflation Reduction Act (IRA). Solar was modeled as both a PPA and as a self-build resource; wind was modeled as a PPA.
- **Battery Storage:** Lithium-ion battery storage was analyzed as both a PPA and a self-build option with 4-, 6-, and 8-hour durations modeled to help align renewable output with system needs.
- **Bilateral Capacity:** Short-term capacity purchases were included to reflect ongoing use in MPUA's current portfolio and as a future option to enhance flexibility.

Scenario Results and Key Insights

To evaluate how different future conditions could affect reliability, affordability, and risk, MPUA's IRP examined a range of planning scenarios. These scenarios tested the impacts of high and low load growth, changing fuel prices, policy constraints, and limited access to bilateral capacity. Each scenario generated an optimized portfolio designed to meet reliability targets while minimizing long-term system costs. The results offer valuable insights into how different resource mixes perform under varying conditions and which combinations offer the most favorable balance of cost, reliability, and operational flexibility.

Key findings include:

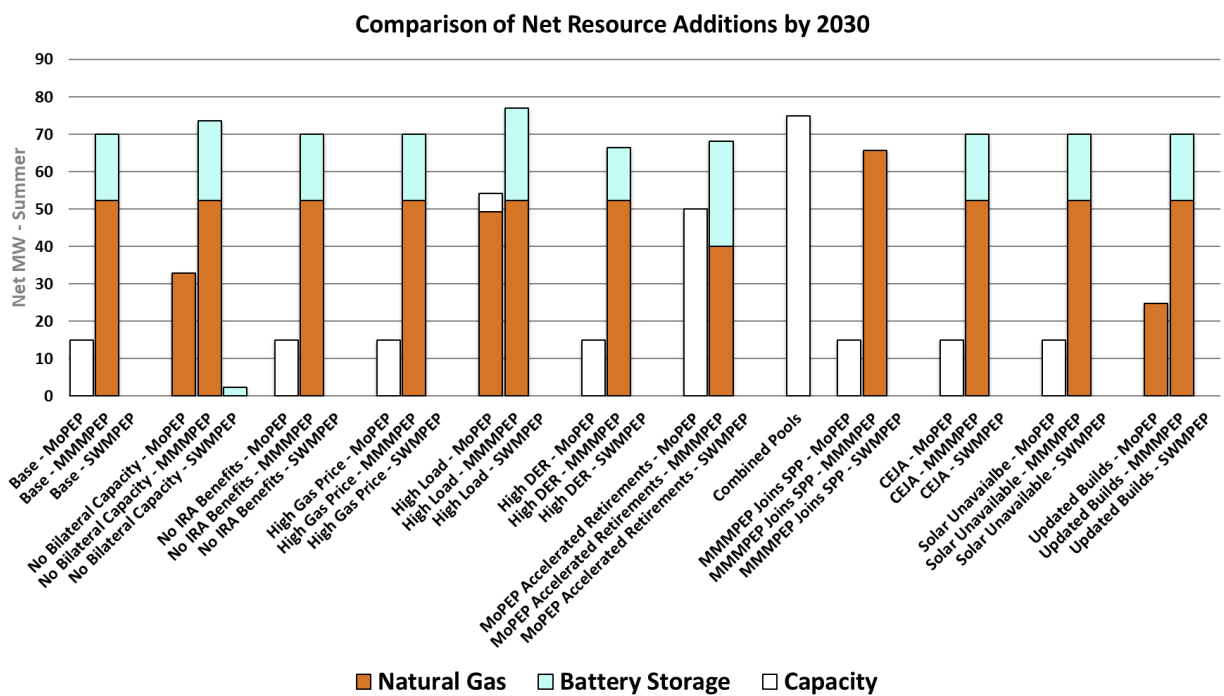
- **Base Case:** The optimized portfolio features a balanced mix of natural gas-fired generation, bilateral capacity purchases, and battery storage to cost-effectively meet system capacity needs. While the scenario included favorable assumptions for renewable energy costs and incentives, utility-scale renewables were not selected in significant quantities. This outcome highlights the relative economic and operational advantages of dispatchable and flexible resources for MPUA's member pools under current planning conditions.
- **Updated Builds:** This scenario incorporates resource commitments made after the Base Case was completed. These updates improve near-term resource adequacy and reduce the need for bilateral and solar capacity compared to the Base Case.
- **High Load:** Higher-than-expected demand accelerates the need for new resource additions across all pools. This scenario produces the highest overall portfolio cost, with MoPEP experiencing the largest increase in NPV. Additional CTs and bilateral purchases are required earlier in the planning period to maintain reliability.

- **High Gas Price:** This scenario is the most financially disruptive. A 60% increase in delivered natural gas prices significantly raises costs for SWMPEP and MMMPEP, which rely more heavily on natural gas generation than MoPEP. The results emphasize the importance of fuel price hedging and generation diversity to reduce exposure to fuel cost volatility.
- **No Bilateral Capacity:** This scenario tests the impact of limited access to bilateral capacity—either due to market constraints or internal policy decisions. MoPEP must add multiple CTs earlier than in the Base Case, resulting in a \$36.3 million increase in NPV and a 2.2 percent rise in LCOE. The scenario illustrates the risks and cost pressures associated with constrained market flexibility.
- **No IRA Benefits:** Removing federal tax credits for battery storage and renewables has only a modest impact on portfolio selection. Battery storage continues to be selected, underscoring its strategic value in meeting capacity requirements and mitigating operational risk, even in the absence of direct incentives.¹
- **Combined Pools:** This scenario models coordinated planning and shared operations across all three pools. It achieves the lowest overall system NPV (\$2,272.7 million) and LCOE (\$44.56/MWh), with cost savings of \$39.8 million relative to the sum of the individual pool outcomes. These benefits are driven by optimized resource additions, shared unit commitment, and improved capacity utilization—especially for MMMPEP.
- **Other scenarios provided targeted insights without significantly altering the preferred resource strategy.** The High DER Adoption scenario showed that increased distributed resources may modestly reduce peak demand but do not eliminate the need for new utility-scale capacity. The Accelerated Retirements scenario reinforced the importance of securing replacement resources ahead of planned unit exits, particularly to maintain winter reliability. In the MMMPEP Joins SPP scenario, joining the regional market provided minor operational benefits but did not shift the overall portfolio composition. The CEJA Impacts scenario highlighted localized cost increases for MoPEP due to environmental restrictions at Prairie State, underscoring the need to monitor policy risks. Lastly, the Solar Unavailable scenario confirmed that utility-scale solar is generally deferred in MPUA’s region and currently lacks the cost competitiveness needed for near-term deployment.

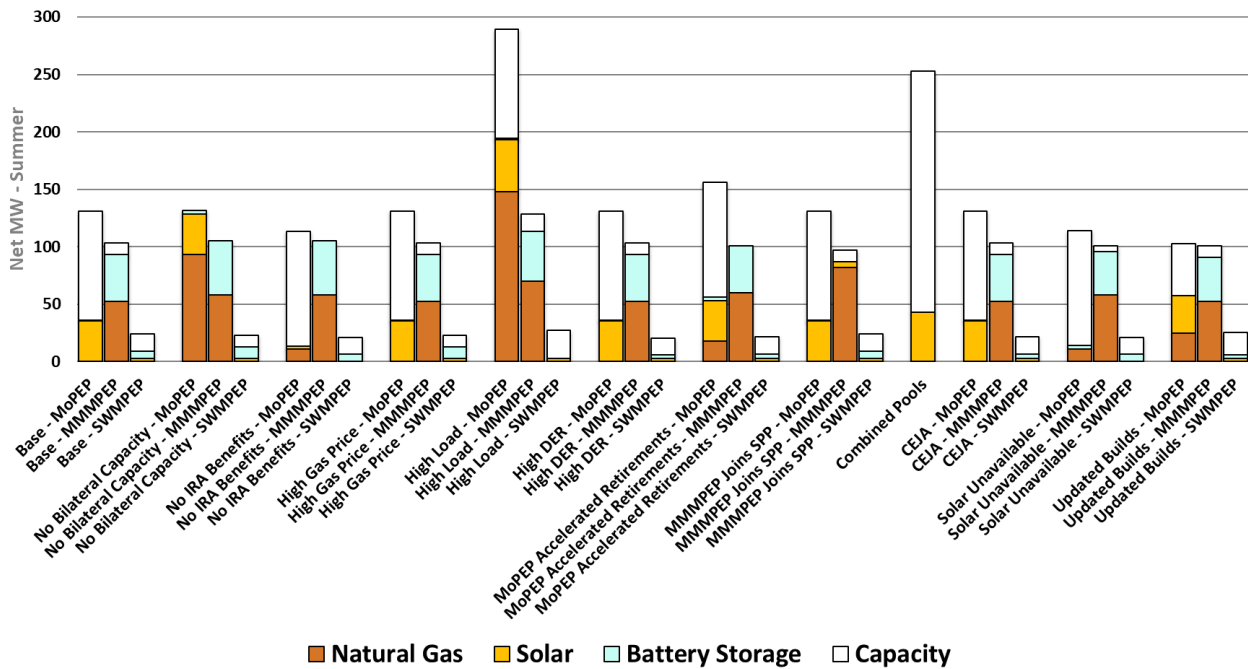
¹ Note that while LCOE captures modeled generation costs and is not inclusive of all costs required to serve load, it serves as a consistent benchmark across scenarios for comparison and analysis.

Across all scenarios, the modeling results indicate that portfolios combining natural gas-fired generation, battery storage, and bilateral capacity consistently yield the best performance. These resources form the foundation of most least-cost portfolios due to their flexibility, reliability, and cost-effectiveness. However, the near-term availability of each resource type remains uncertain, reinforcing the need for proactive planning, diversified procurement strategies, and continued coordination among MPUA’s three power pools.

The following figures present net capacity additions by resource type for each pool in both the near-term (through 2030) and the long-term (through 2044) across all scenarios. In the Updated Builds scenario, after including MoPEP’s natural gas-fired commitments in 2028 and 2029 and reducing MMMPEP’s and SWMPEP’s access to CU’s CT additions reduced from 10 years to 5 years, a natural gas-fired resource is added in MMMPEP in winter 2028/29.



Comparison of Net Resource Additions by 2044



Conclusions

The IRP analysis highlights the importance of maintaining a flexible, cost-effective, and resilient approach to resource planning. While each scenario tested different assumptions about fuel prices, load growth, policy, and market conditions, several consistent themes emerged:

- Resource diversification supports cost stability and risk mitigation.** In nearly all scenarios, portfolios that combine thermal generation, battery storage, and bilateral capacity are preferred—even in the absence of federal storage incentives—underscoring their long-term value.
- Near-term needs in MMMPEP and SWMPEP require action.** Forecasts indicate capacity shortfalls for both pools before 2030 in the summer and winter seasons. The Updated Builds scenario reflects recent MoPEP resource commitments that may help address these gaps; however, additional resources will still be needed.
- Natural gas-fired generation is a consistent anchor in preferred portfolios,** selected in nearly all scenarios to meet capacity needs due to its dispatchability, scalability, and proven cost-effectiveness. Battery storage and bilateral capacity also play essential supporting roles, offering flexibility, risk mitigation, and bridging solutions. Together, these three resource types form the core of most preferred portfolios. However, the availability of all these resources in the near term is uncertain.

- **High gas prices and accelerated load growth are major cost drivers.** Scenario results show swings of up to \$446 million in total system NPV depending on these assumptions, emphasizing the need for updated market intelligence and proactive planning.
- **Coordinated planning yields modest benefits.** The Combined Pools scenario demonstrates that shared commitment and dispatch, along with portfolio coordination, reduce system NPV by \$39.8 million and LCOE by 2.2%, suggesting the potential for future opportunities for expanded collaboration.

Action Plan

MPUA's action plan focuses on identifying options that can be deployed promptly, with a particular emphasis on solutions that are available within the next few years. Natural gas-fired generation and battery storage are expected to be the primary near-term options, and MPUA will continue to evaluate opportunities for capacity PPAs as they become available. While renewable resources may also be considered, their selection for immediate needs is less likely without federal support. Additional actions include maintaining a diversified resource mix, monitoring regulatory and market developments, exploring opportunities for inter-pool coordination, and regularly updating the IRP to adapt to changing conditions.

Following this action plan, MPUA will enable MPUA to address near-term capacity gaps while positioning its member pools to respond to future uncertainties. By emphasizing timely resource additions, flexible procurement strategies, and scenario-driven planning, MPUA can effectively manage risk and maintain system performance as market, policy, and technology conditions evolve.