2023 *Integrated Resource Plan*

Ameren MISSOURI

1. Executive Summary

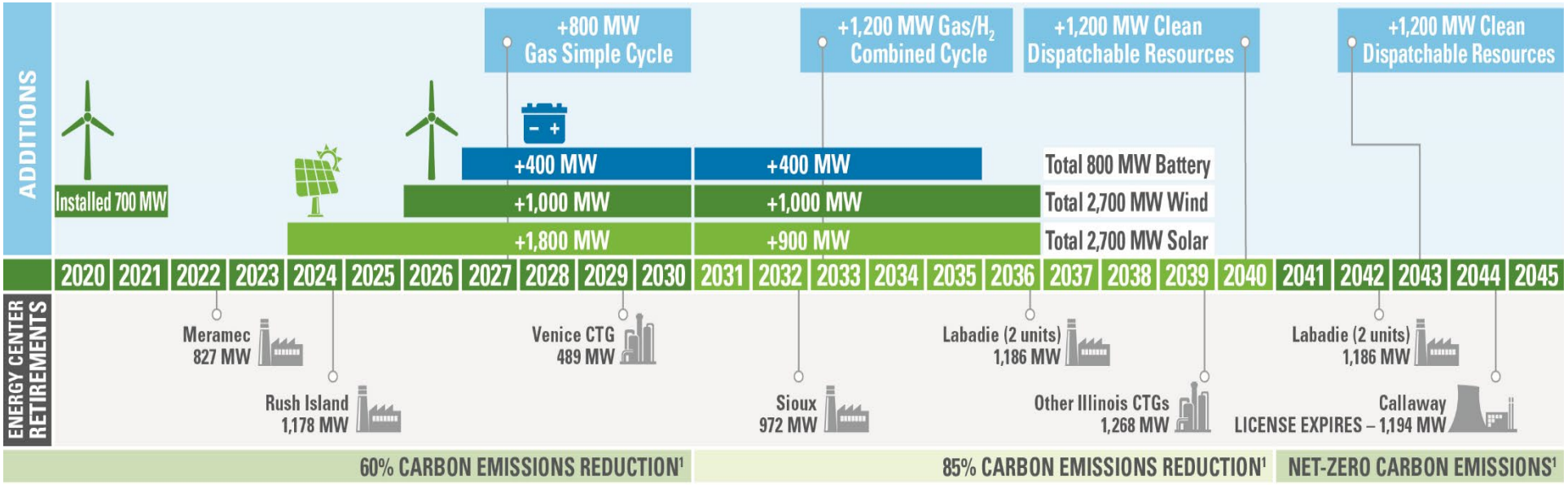
Ensuring a Reliable and Affordable Transformation

Last year, Ameren Missouri announced our plan to accelerate the transformation of our generation portfolio to one with cleaner and more diverse energy resources. The 2022 Preferred Resource Plan included the addition of renewable resources to eventually reach 5,400 megawatts (MW) total, consisting of 2,700MW each of new wind and solar generation, along with 800 MW of new battery storage, the accelerated retirement of coal and gas-fired generation, and the addition of 1,200 MW of new and efficient natural gas-fired generation. As the Company has continued to execute on that plan, we have also continued to update our planning to include changes in the planning environment. These include changes in policy, such as the Inflation Reduction Act (IRA) passed by Congress in 2022, which provides increased incentives for the deployment of clean energy sources. They also include changes in the utility industry and power markets. Over the last year, we have seen increasing concerns regarding reliability and the sufficiency of resources to meet customer needs, especially during extreme weather events. We have also seen changes in the costs of different resource options, which are a key consideration that can affect the nature and cost of our portfolio transition.

In light of these changes, Ameren Missouri has further refined its plan to transition its portfolio in a responsible fashion and ensure reliability and affordability during that transition. Our new plan includes additional on-demand resources to ensure that we can meet our customers' energy needs in all hours, even during extreme weather events. At the same time, we have accelerated planned investments in renewable resources and energy storage resources to take advantage of tax incentives in the IRA that reduce costs to customers while also providing greater energy diversity and availability. Our plan ensures a reliable and affordable transition that results in reductions in CO_2 emissions of 60% by 2030 and 85% by 2040, both based on 2005 levels, and net zero emissions by 2045, based on expected development of viable clean dispatchable generation technologies (e.g., hydrogen, carbon capture and sequestration, advanced nuclear, and long-duration energy storage) and does so at the lowest cost to customers. In doing so, we will also support the decarbonization of our region's economy through efficient electrification of transportation and other sectors that currently require fossil fuels. The timeline on page 2 highlights the key elements of our plan.[1]

[1] In-service dates are approximate and could change based on a number of factors. Assumes the addition of 1,200 MW of unspecified carbon-free generation in each of 2040 and 2043 and extension of Callaway operating license.

Ameren Missouri's Generation Transformation Timeline



NOTE: Final timing of Rush Island retirement is dependent on a revised order from the U.S. District Court. The company continues to evaluate the potential for additional energy efficiency and demand response programs. Reductions are presented as of the end of the period indicated and based off 2005 levels. Wind and solar additions, energy center retirements by end of indicated year.

1. Ameren's goals encompass both Scope 1 and 2 emissions including other greenhouse gas emissions of methane, nitrous oxide and sulfur hexafluoride. This goal is dependent on a variety of factors including cost-effective advancements in innovative clean energy technologies as well as constructive federal and state energy and economic policies.

Our plan reflects a carefully considered balance of customer affordability, reliability, and environmental stewardship. It relies on the significant investments we are making to modernize our electric grid through our Smart Energy Plan to enhance reliability and unlock opportunities for customer energy efficiency, as well as greater levels of renewable energy and other distributed energy resources. Our goal of achieving net-zero CO_2 emissions by 2045 also means that we will continue to actively support public and private investment in research and development of new energy technologies, such as hydrogen fuel, carbon capture, and improved battery technologies, as well as constructive energy policies that support investment and allow us to continue to appropriately balance affordability, reliability, and environmental stewardship. Our plan will allow us to meet our customers' long-term energy needs in a way that is consistent with the objectives of the Paris Agreement to limit global temperature rise to 1.5 degrees Celsius, and do so at the least cost to customers. Aside from achieving environmental stewardship, another benefit of the plan is the critical risk mitigation it provides against ever-more-stringent environmental regulation. Providing that mitigation is extremely important given the significant reliability risk to our customers such regulation poses absent a significant shift away from our current heavy reliance on coal-fired generation to meet customers' energy needs.

Continuing this transformation now is particularly important. Not only does it further advance our ability to provide customers with replacement energy from cleaner generation sources as our existing aging fossil generation reaches end of life, as noted, it also mitigates risks associated with the kinds of clean energy policies that continue to be a focal point at the national level. At the same time, our plan allows us to maximize the value of our existing generating assets and ensure reliable service and resiliency of energy supply to our customers. Our current fleet of low-cost coal, gas, hydroelectric, and nuclear generators continues to be foundational to our ability to provide reliable and affordable energy as we add greater levels of renewable generation resources to our portfolio, with coal serving as a bridge to cleaner energy sources. The addition of new gas-fired resources further ensures a reliable transition by partnering with new renewables and existing resources in our fleet to ensure customers have the energy they need in all hours throughout the year. Through our investments in grid modernization, clean renewable energy, and the focused management of our existing generation portfolio, our plan delivers cleaner energy to our customers while ensuring continued reliability, and it does so at the least cost to our customers.

The transformation of our generation portfolio will be achieved not only through actions Ameren Missouri takes, but through actions our customers take as well. Customers and communities have increasingly expressed interest in energy service options that allow them to manage their energy use, save money, and achieve their own clean energy goals. The approval of our Renewable Solutions Program earlier this year allows customers and

communities to do just that. We will also continue to offer and expand on the popular energy efficiency programs that our customers have been using for years to save money and better manage their energy needs while enjoying the comfort and convenience they desire.

Integrated Resource Plan Highlights

- Ameren Missouri is continuing to transform its generation fleet to a cleaner and more diverse portfolio in a responsible fashion, with a plan that best balances affordability, reliability, and environmental stewardship while addressing future risks.
- By 2030, Ameren Missouri plans to add 2,800 MW of new wind and solar generation, representing an investment of approximately $5-6 billion.[2] Wind and solar generation additions called for by the plan adopted in this IRP after 2030 would bring that total to 5,400 MW of operating solar and wind energy centers. These renewable resources will replace production from fossil-fueled generation even as our own efficient and low-cost fleet of existing and planned dispatchable generation is partnered with these renewable resources to continue to provide reliable and affordable energy.
- The 2023 IRP includes the planned retirement of all of Ameren Missouri's coal-fired generating capacity by 2042. This includes retirement of the Rush Island Energy Center by the end of 2024, the Sioux Energy Center by the end of 2032, two units at the Labadie Energy Center by the end of 2036, and the remaining two units at the Labadie Energy Center by the end of 2042. The collective result of these retirements is a methodical drawdown of fossil fueled generation that, along with the addition of new dispatchble resources, ensures a stable transition to a cleaner energy future.
- New dispatchable generation resources will be added over the next 20 years to partner with our expanding portfolio of renewable resources and continued operation of existing resources to ensure reliability in all hours and under all weather conditions, including the kinds of extreme heat in summer and extreme cold in winter that we have seen in recent years. New dispatchable resources include 800 MW of simple cycle gas-fired combustion turbine generators by 2027, 1,200 MW of efficient gas-fired combined cycle generation by 2032, and 1,200 MW of as-yet-unspecified clean dispatchable generation in each of 2040 and 2043.
- The plan reflects our assumption that the operating license for our Callaway nuclear facility is extended, ensuring its ability to continue providing carbon-free electric energy around the clock.

[2] 2,450 MW in addition to the solar capacity approved by the Commission earlier this year.

- Based on detailed modeling of our plan, Ameren Missouri is expecting reductions in CO_2 emissions of at least 60 percent by 2030 and 85 percent by 2040 (based on 2005 levels), with a goal of achieving net-zero CO_2 emission by 2045. Even as we achieve these significant reductions in carbon emissions across our own fleet, our planned renewable resource additions will result in significant additional carbon emission reductions across the region.
- Ameren Missouri believes the cleanest and cheapest form of energy is the energy you do not have to produce in the first place.This is why the plan continues to include robust and cost-effective customer energy efficiency and demand response programs to help customers better control consumption and reduce their electric bills. By 2043, these programs are expected to result in nearly 1,700 MW of peak demand savings in addition to peak demand savings achieved by programs implemented to date.
- Ameren Missouri has also included in its plan electrification of transportation and other sectors. This is expected to result in significant reductions in CO_2 emissions in transportation and other sectors of our region's economy in addition to the emission reductions we will achieve with the transformation of our generation fleet.
- The plan provides for the continued replacement of aging distribution infrastructure and the development and deployment of smart grid, communications, and other advanced technologies on our distribution system, along with investments in transmission infrastructure, to enhance grid reliability and resiliency, enable new products and services, and achieve greater operational efficiencies and greater access to cleaner sources of energy.
- The plan drives the creation of thousands of clean energy jobs in our region.

Key changes to our preferred resource plan since the one we announced in June 2022 are highlighted in the table below. Ameren Missouri will continue to ensure that customers' long-term electric energy needs are met in a safe, reliable, affordable, and environmentally responsible manner. The company's IRP, filed every three years with the Missouri Public Service Commission, provides an assessment of the future electric energy needs of customers for the coming 20 years and the preferred plan for meeting those needs. Ameren Missouri's 2023 IRP represents a further refinement of our 2022 preferred resource plan, focusing on ensuring reliable energy for customers, in all hours and under all conditions, as we execute the transformation of our generation fleet to a cleaner and more fuel diverse portfolio in a responsible fashion, supporting customers' wants and needs.

	2023 Preferred Plan	2022 Preferred Plan
Coal Retirements	**2,000 MW by 2030** 3,000 MW by 2035 5,400 MW by 2042	3,000 MW by 2030 3,000 MW by 2035 5,400 MW by 2042
Natural Gas Retirements	500 MW by 2030 1,800 MW by 2040	500 MW by 2030 1,800 MW by 2040
Natural Gas Additions	**1,200 MW (2033)**	1,200 MW (2031)
Dispatchable Peaking (Gas/Oil) Generation Addition	**800 MW (2027)**	None
Renewable Additions	2,800 MW by 2030 **4,700 MW by 2036**	2,800 MW by 2030 4,300 MW by 2035 4,700 MW by 2040
Battery Storage Additions	**400 MW by 2030** **800 MW by 2035**	400 MW by 2035 800 MW by 2040
Other Clean Dispatchable Additions	**1,200 MW (2040)** 1,200 MW (2043)	1,200 MW (2043)
Carbon Emission Reduction (CO_2e)	60% by 2030 85% by 2040 Net Zero by 2045	60% by 2030 85% by 2040 Net Zero by 2045

Transformation Benefits

We have created this transformation plan through careful consideration of several key objectives we want to achieve on behalf of our customers, communities, investors, and the environment. These objectives guide our selection of resources to ensure reliable energy service for customers in all hours and under all conditions, including extreme weather. Specifically, we evaluate each of a number of alternative resource plans based on:

- **Minimizing Long-term Customer Costs** – We measure the long-term costs to customers based on the present value of revenue requirements (PVRR), or the costs to be included in determining customer rates in the future expressed in today's dollars. Focusing on long-term costs helps us to ensure long-term affordability for customers.
- **Ensuring Customer Satisfaction** – This includes a number of factors such as rates, reliability, availability of energy efficiency programs, and access to cleaner energy sources.
- **Spurring Economic Development** – We assess economic development benefits based on the direct impact of our resource decisions on jobs in our region. To be sure, these are not the only benefits of our plan to economic development –

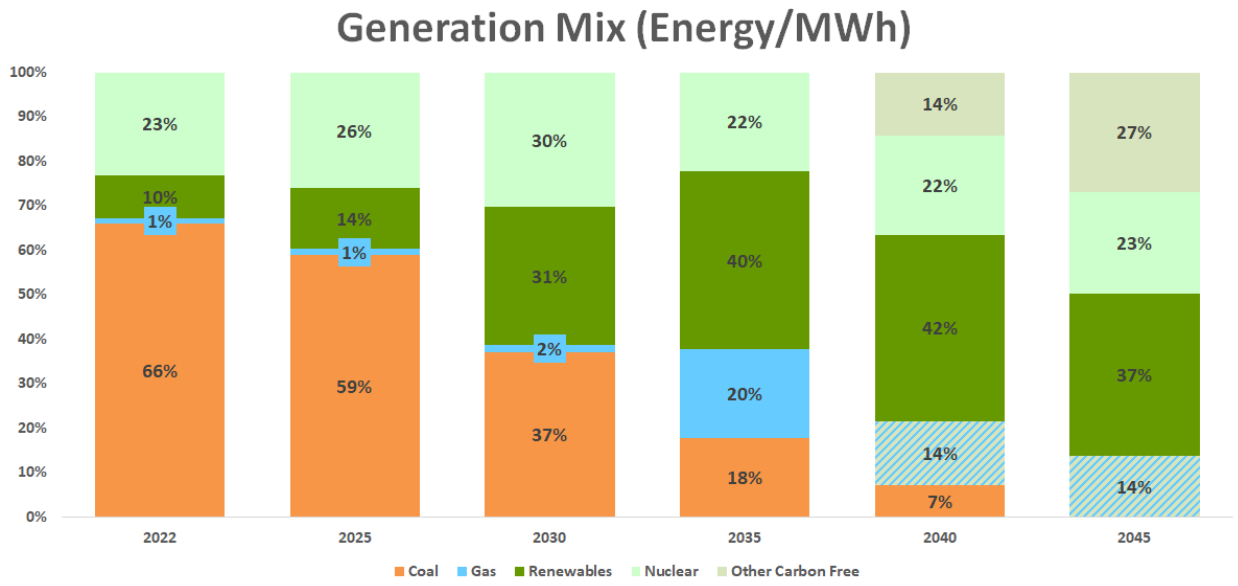
thousands of indirect jobs are expected to be created as well – but they provide a strong indication of the relative benefits of our various alternatives.

- **Addressing Financial and Regulatory Risks** – Our ability to deliver benefits to customers is dependent in large measure on our access to low-cost sources of capital for investment. Therefore, we assess potential risks to our ability to access low-cost sources of capital.
- **Driving Portfolio Transition** – Assessing the relative benefits to our environment as we transition our generation portfolio includes consideration of air emissions, deployment of clean energy sources such as wind and solar, and other environmental factors.

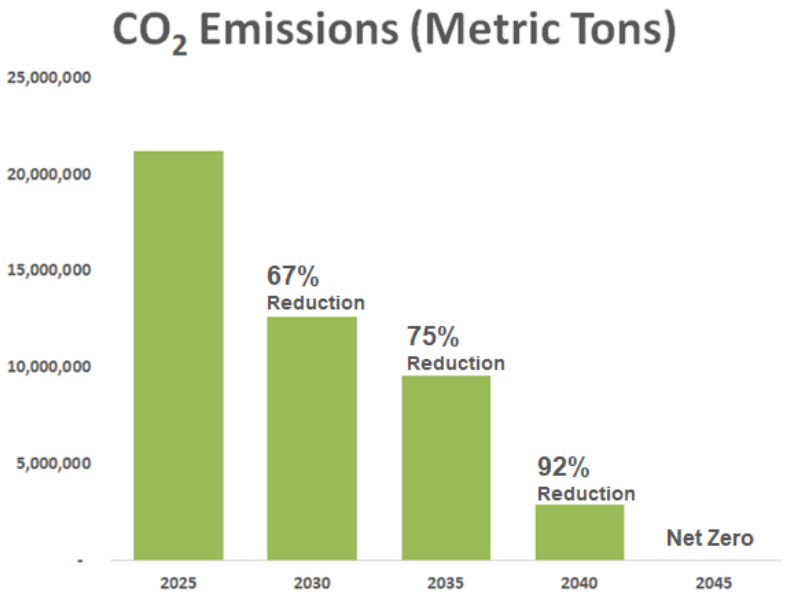
As one might imagine, achieving such objectives requires careful balancing. Ameren Missouri uses a scorecard approach in selecting its preferred resource plan, evaluating each option based on its expected performance in achieving these objectives. Our transformation plan ensures reliable and affordable energy for our customers today, tomorrow and for decades to come.

The deployment of new wind and solar resources allows us to take advantage of the efficiencies of these zero emission technologies. We are also able to take advantage of the availability of significant federal tax credits, which were extended and expanded by the IRA. At the same time, our existing fleet of generation resources continues to provide affordable energy to customers and, along with the addition of new dispatchable resources, ensure reliable energy is available around the clock as we add the renewable resources that will satisfy more and more of our customers' energy needs. Events in California, Texas, North Carolina, and the Tennessee Valley, where extreme weather conditions and a shortage of reliable on-demand generation resulted in disruptions of service to customers, serve to highlight the need to be thoughtful about how we ensure the reliability of our generation fleet for our customers as we execute on our transformation plan. This is especially important during extreme weather events, such as the extreme cold we experienced in February 2021 and December 2022 and the extreme heat we experienced during the summer of 2023. While an integrated resource plan typically focuses on the next twenty years, we are looking beyond that to ensure the plans we pursue will support our goal of achieving net-zero emissions by 2045. The figure below illustrates the transition through 2045, with over half the energy we generate coming from zero carbon sources (renewables and nuclear) by 2030.

As the figure below illustrates, we are executing on a transformation that will steadily replace fossil fuels with cleaner sources of energy. Beyond the obvious benefits to our environment, this also allows us to manage the costs and risks associated with expected future climate policy.



Climate policy may take any number of forms, whether it be through any or some combination of: more stringent EPA regulations, federal clean energy standards, caps on CO_2 emissions, or a price on CO_2 emissions (e.g., a "carbon tax). We expect that some forms of climate policy will continue to be considered during the coming years. While we cannot know the exact timing or form of such a policy today, our transformation plan positions us to address potential costs and risks associated with potential policies that may be enacted. The figure below shows the reductions in CO_2 emissions achieved by our plan compared to actual emissions in 2022.



Note: CO2 Emission reductions based on 2005 levels.

It is important to recognize that even as we manage the drawdown of coal-fired generators in our portfolio, these very assets, along with planned gas generation and battery storage additions and existing gas, hydroelectric and nuclear generation, provide the foundation of reliable energy supply that allows us to expand our portfolio of renewable wind and solar generation. In that respect, our coal-fired generators and new gas-fired generation serve as a bridge to the other technologies we will depend on in the future to ensure reliable and affordable energy supply.

Near-term Implementation

As mentioned previously, the transformation of our portfolio will involve actions taken by Ameren Missouri and its customers. For example, Ameren Missouri has already secured certificates of convencience and necessity (CCN) for two solar projects and applied for CCNs for another four solar projects. Together, these six projects total 900 MW of the 1,800 MW we plan to add to our portfolio by 2030. We continue to pursue additional solar projects to meet our customers energy needs. We also expect to issue another RFP for wind resources in the near term to identify projects that will fulfill our planned addition of 1,000 MW of wind resources by 2030.

In addition, Ameren Missouri has received approval to extend its current energy efficiency and demand response programs through 2024. That extension continues many existing programs for residential and business customers, while also offering business demand response customers the option to opt-out. Programs will retain continuity through 2024 while allowing for the DSM planning team to account for various factors, such as the Inflation Reduction Act, as the next MEEIA cycle is under discussion.

As Ameren Missouri's coal-fired energy centers approach the end of their useful lives, a key step in retiring the units is the assessment of resultant transmission infrastructure needs and the construction of that infrastructure. Our Rush Island Energy Center will be retired by the end of 2024, and the process of putting new transmission system infrastructure in place to support grid reliability needs is underway. With the retirement of our Sioux Energy Center by the end of 2032, we have initiated a similar process to support its retirement. Continued expansion of transmission infrastructure will also be key to integrating renewable wind and solar generation as we transform our portfolio over the next twenty years.

We have also started to take steps for the implementation of the gas-fired simple cycle (800 MW by 2027) and combined cycle (1,200 MW by 2032) generation we are adding to our portfolio to partner with renewable resources and our existing fleet to ensure reliable energy service. Implementation steps over the next three years include design, engineering, procurement, permitting, and securing interconnection rights in MISO as well

as efforts to ensure staffing continuity as coal units are retired and gas generators are added.

As we implement these key steps in our portfolio transformation, we will also continue to monitor conditions that may affect our longer-term plans. This includes continually assessing the power market conditions that affect the economics of our planned generation portfolio, such as prices for coal, natural gas, nuclear fuel, and electric power. Similarly, it also includes monitoring expected customer demand and the adequacy and reliability of our portfolio resources to meet our customers' needs. It also includes advocating for constructive energy and economic policies, including those that address investment in energy infrastructure, climate change, incentives for clean energy technologies, and environmental regulations. New technologies will be critical to achieving our goal of net-zero CO_2 emission by 2045, so we will be continuing to actively participate in efforts to help advance the development of emerging technologies such as carbon capture and sequestration (CCS), the use of hydrogen fuel for electric production and energy storage, next generation nuclear, and large-scale long-duration battery energy storage.

Key Considerations That Influence Our Planning

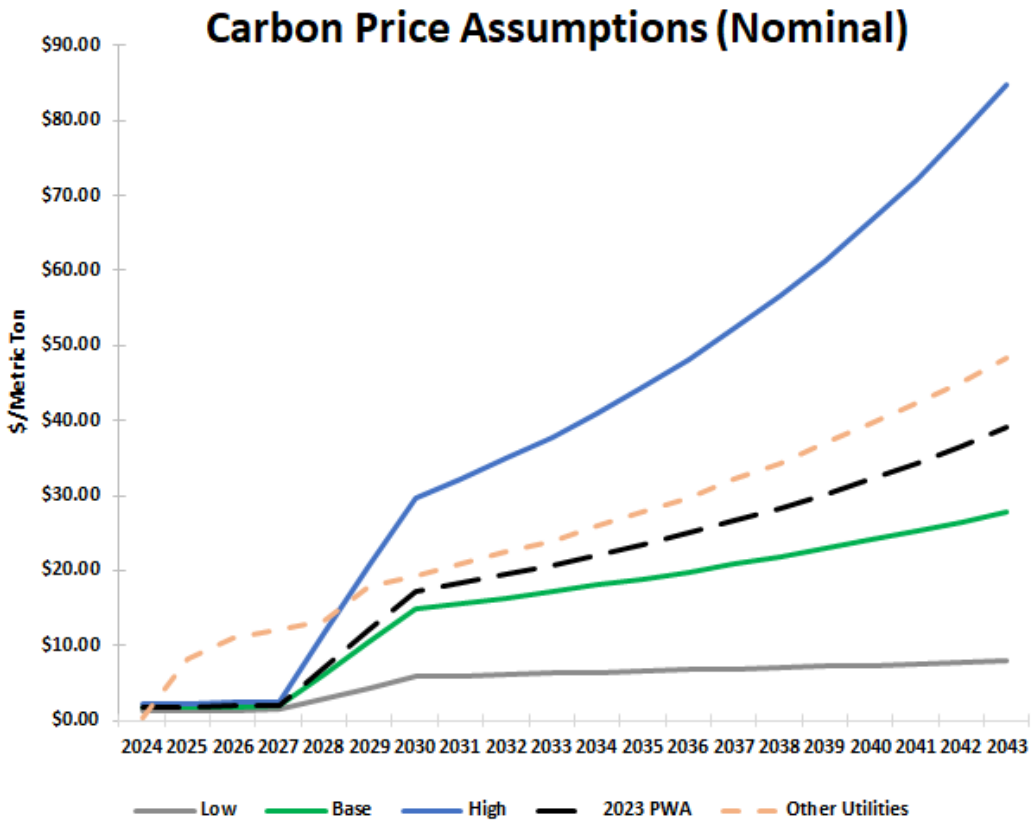
The development and evolution of our transformation plan was influenced by a host of factors and other considerations, with significant input from a broad and diverse group of stakeholders representing our customers, industry, and advocates for environmental justice, among others. Customer and investor interest in cleaner energy sources and reductions in CO_2 emission has continued to increase. Current and potential future customers have expressed interest in cleaner energy options, with some seeking to achieve their own clean energy targets, and Ameren Missouri has responded by offering customers the opportunity to do just that through our Renewable Solutions and Community Solar programs.

An increasing focus on cleaner energy also extends to sectors outside the power sector. Clean electrification continues to transform the transportation sector, with more and more electric vehicle models to choose from and conversions of industrial forklifts and other off-road vehicles to electric options. Uses of fossil fuel in other sectors of the economy will see the potential for electrification as well, including cooking, space heating, and industrial processes. The electric utility industry will play an indispensable role in the decarbonization of a number of sectors of the economy through electrification and electric customers will benefit from a larger base of sales to support current and future investments needed to serve our customers for the next twenty years and beyond.

Cleaner energy technologies will clearly play a pivotal role in supporting these trends in customer and investor needs. The IRA provides significant tax incentives for the deployment of wind, solar and battery storage resources, as well as incentivizing the

development of domestic production for these resources. While battery storage technologies are still relatively costly today, the significant IRA tax benefits make them affordable, and we expect they will increasingly play a role in the integration of intermittent renewable energy resources as wind and solar are added to the grid and older fossil-fired generation is retired.

Trends in customer demand will continue to drive our outlook for the need for generation resources. This includes the electrification trends mentioned earlier along with continuing improvements in energy efficiency. While underlying general economic trends are expected to produce modest increases in demand, we also expect to see further economic development in our service territory, including the potential for adding clean energy manufacturing, in part as a result of the incentives in the IRA.



In addition to the trends in customer and investor attitudes and preferences, we must also consider the potential for changes in energy policy. One of the areas of great potential impact related to energy policy is that of addressing the risks of climate change. For example, the US EPA announced proposed rules in May 2023 that could require billions of dollars in investments in new emission controls. While we do not know what form climate policy will take over the next twenty years, we can represent the expected economic impacts using a price on CO_2 emissions. The CO_2 prices shown in the chart above are those we have utilized in our planning analysis to represent the effects of

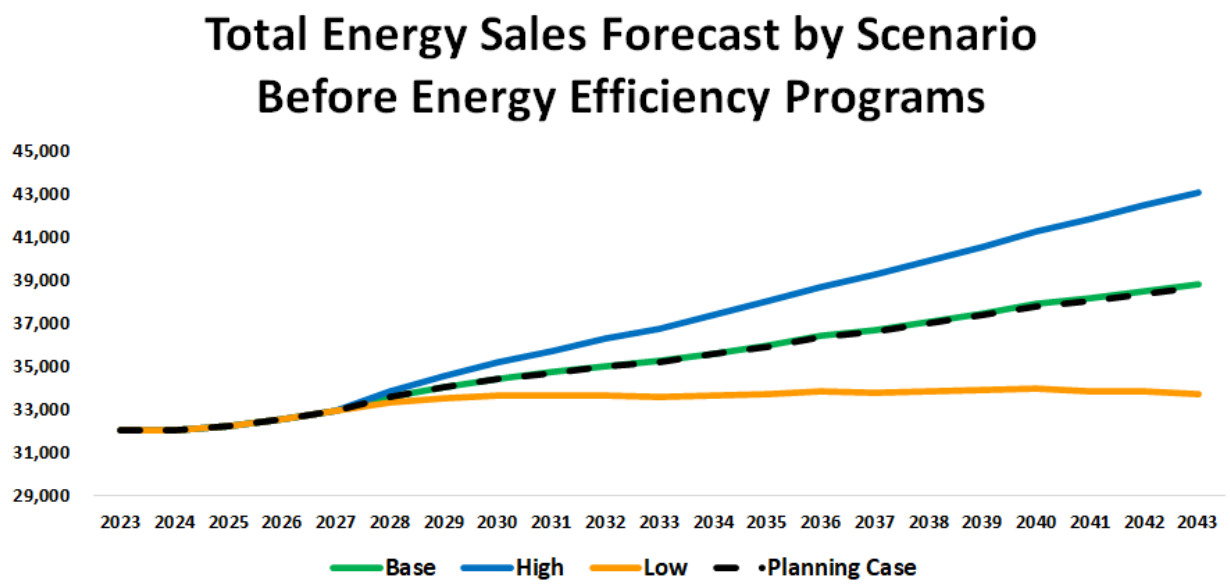
potential future climate policy, including our assumption for the probability of each of three price scenarios and the probability-weighted average (PWA) price represented by the black dashed line. For comparison, we also show a composite price trajectory used by industry peers (the yellow dashed line).

Other policies that could affect our planning include more stringent regulation of hydraulic fracking used to extract natural gas and policies promoting electrification of transportation and other uses of fossil fuels. They also include other potential changes in regulation of power plant emissions, water use and waste handling. We also consider potential changes to Missouri's renewable energy standard (RES), which was passed in 2008 and called for utilties to generate or acquire renewable energy equal to 15% of its customer usage by 2021.

A number of future market conditions also have an influence on our planning, and we have examined ranges of possibilities for such factors to test their potential to impact our planning decisions. These factors include prices for natural gas, electric power, and the cost for debt and equity capital to fund necessary electric infrastructure investments. The cost and reliability of our existing fleet of generation resources is also important as we consider the specific actions necessary to implement our transformation. We will also continue to evaluate the potential need for, and cost of, transmission infrastructure necessary to deliver greater amounts of renewable energy to, and ensure reliability for, our customers.

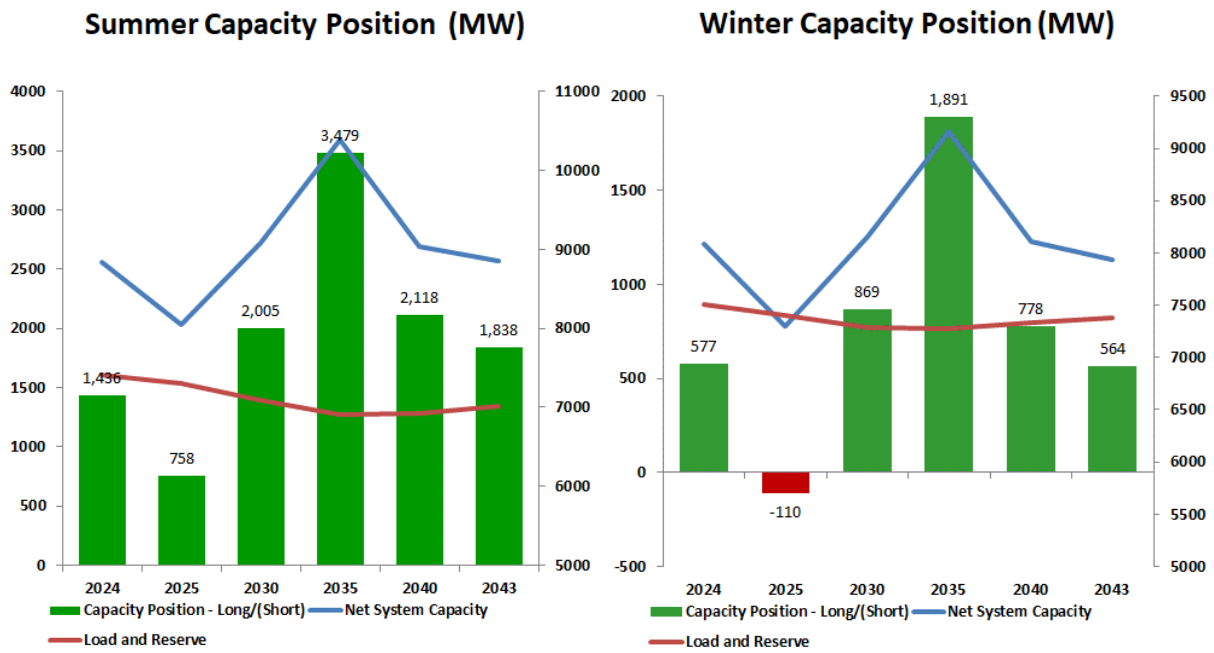
Our Customers' Future Energy Needs

We expect base customer demand to grow over the next twenty years at an annual growth rate of 0.3 percent to 1 percent, before the inclusion of future savings from our energy efficiency programs. This includes consideration of customer-owned distributed energy resources (DER) like rooftop solar, growth in electric vehicles, and other efficient electrification. We have examined future demand under three different scenarios representing different assumptions for economic conditions, electrification, and customer adoption of DER. The chart below shows the range of customer demand we have analyzed in assessing future resource needs and costs.



To ensure reliability, we must have sufficient resource capacity to meet our customers' highest possible peak demand, generally on the hottest day of the year for summer and the coldest day of the year for winter, plus a reserve margin to account for uncertainty. Ameren Missouri's planning standard is to ensure that we have the resources to provide energy for our customers in all hours and under all conditions, including during extreme weather events. The figures below show our planned generation capacity, peak demand, and reserve margin requirement for the summer and winter seasons, in which we see the greatest demand, under normally expected load conditions.[3] It includes peak demand savings from energy efficiency and demand response programs. Our capacity buffer provides us with significant and important flexibility to ensure reliability during extreme weather conditions and respond to emerging trends, changes in market conditions and changes in energy policy. This flexibility allows us to carefully consider all options and execute on those that are most beneficial to our customers. Without that flexibility, our options at any given time will be more limited. Note that in the near term, we expect to see a slight shortfall in capacity in the winter, resulting in greater temporary exposure to the market until new renewable and dispatchable resources are added.

[3] For each chart, the right vertical scale corresponds to the total load+reserve and total generation, and the left vertical scale corresponds to the capacity position (i.e., total generation less total load+reserve). See Chapter 10 for a full discussion of capacity needs under both normal and extreme weather conditions.

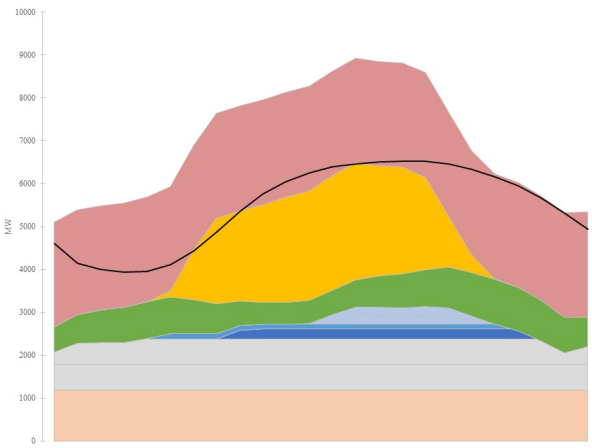


By 2040, our transformed fleet will consist of a balanced mix of renewable wind and solar, hydro, nuclear, and natural gas resources, along with our last remaining coal units at the Labadie Energy Center. This mix of resources will allow us to meet customer energy needs during the hottest days of summer and coldest days of winter. The charts below show how hourly customer energy needs can be met with the balanced mix of complementary resources in our plan, with low-cost emission free generation partnered with efficient, low emitting and dispatchable gas-fired generation.[4]

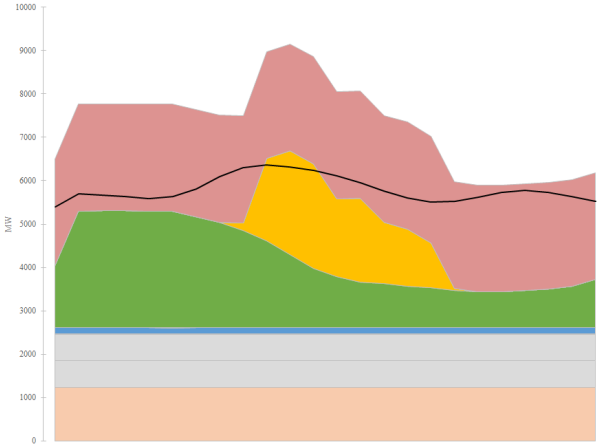
As illustrated by the charts below, solar provides a significant boost in energy generation during the middle of the hottest days in the summer, and wind provides a significant boost in energy on cold winter days, particularly in the early morning hours. Clean dispatchable generation provides energy when wind and solar generation are reduced and provides additional energy to the grid at times when total generation exceeds our customers' energy needs, providing market revenues that help to reduce costs to our customers.

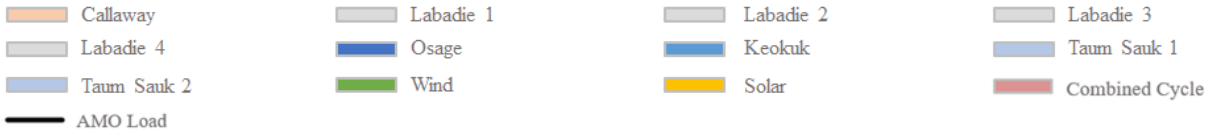
[4] Note that this reflects natural gas combined cycle with carbon capture as the 1,200 MW clean dispatchable resource added in 2040 in our plan. The actual resource type has not yet been determined and will depend on the development of commercially viable clean dispatchable technologies in the coming years.

Summer Peak Day (2040)



Winter Peak Day (2040)

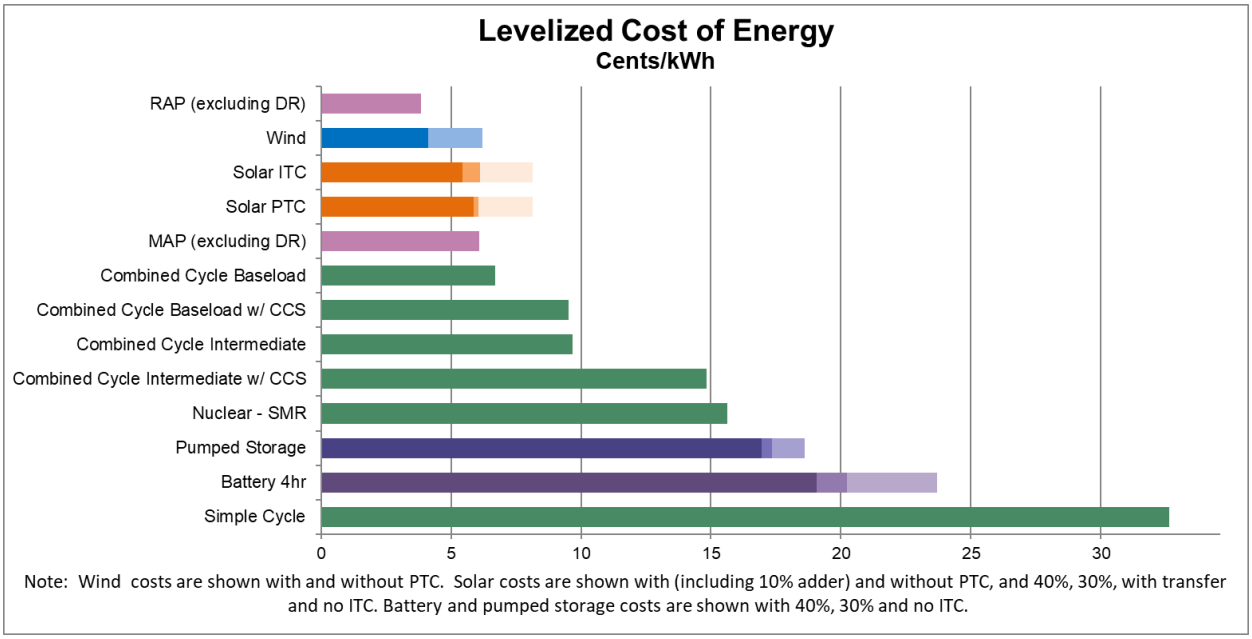




Options for Meeting Our Customers' Needs

We examine a number of options for meeting customer's future needs as existing resources are retired. These include renewable wind and solar, energy storage, gas-fired, and nuclear resources. One useful measure of the long-term cost of various generation resources is the levelized cost of energy (LCOE). The LCOE for the key resource options we have considered is shown in the chart below as compared to the cost of our existing coal and nuclear generation resources.

The LCOE includes all the costs of ownership and operation of a particular resource over its expected operating life per unit of energy produced. While LCOE does not capture all of the relative strengths of each generating technology, it provides a useful indication of the relative cost of energy. We test each of these options through more rigorous analysis that captures all of the costs and benefits of each resource type. We do this by evaluating various alternative resource plans that rely on different combinations of these resources. Using those results and our plan selection scorecard, we are able to consider each of the plans based on its performance against the objectives in our scorecard.



Conclusion

Our plan meets our customers' needs reliably, in all hours and under all conditions, in a least cost manner and maximizes the value of our existing resources as we incorporate cleaner renewable energy and dispatchable generation to transform our portfolio in a forward-thinking manner. Our plan to transform our portfolio over the next twenty years will drive significant investment in renewable energy, significantly reducing carbon emissions until ultimately reaching net-zero CO_2 emission by 2045, and create thousands of good-paying jobs while continuing to ensure that the energy we deliver is reliable and affordable for our customers. It is a balanced and thoughtful plan that looks to deploy proven clean energy technologies as well as new zero emitting techonlogies in the future. In addition, the plan provides much needed flexibility to address changes in the energy marketplace. Further, our plan also positions us to help drive the decarbonization of the broader economy in our region, adding clean renewable resources that can replace the fossil fuels currently used for transportation, and other applications. The utility industry will play a vital role in transforming how energy is used, and Ameren Missouri is taking action to make that a reality for our customers, our shareholders, the communities we serve, and the environment.