ENERGY FORWARD

Generation Study 2022
Addendum to 2021 Climate Assessment Report

Published on December 1, 2022

Introduction

This report builds on PPL's 2021 Climate Assessment Report by expanding analysis of the Fast Transition Future Policy Scenario included in the company's generation scenario analysis. The Fast Transition scenario was one of three scenarios analyzed in the 2021 report. This scenario assumed a future federal policy that requires 100% clean electricity by 2035, which is the expected contribution pathway from the power sector under the U.S. Nationally Determined Contributions (NDC) to the Paris Agreement. In addition, this scenario assumed an interim requirement of 80% clean electricity by 2030.

In subsequent discussions following our 2021 report, several shareowners asked PPL to assess the strategic feasibility and financial implications of achieving an 80% clean generation portfolio by 2030 (meaning that 80% of customer demand is met by renewables and non-emitting resources). This addendum to the 2021 report captures our additional assessment as a result of this shareowner engagement.

In our prior assessment, we determined that change on the scale and at the pace required to meet the Fast Transition targets would necessitate modifying the company's current generation resource mix beyond what we assume would be driven by economics and technology. Our analysis suggests that federal policy intervention would be needed to drive such rapid change. As described in more detail below, the company concludes that the quantity and pace of renewable and storage deployment necessary to meet this target while reliably serving customer load is cost prohibitive, requiring more than $22 billion in new investment in less than a decade, and inconsistent with the regulatory requirements in Kentucky.

PPL's Commitment to the Clean Energy Transition

PPL has committed to achieve net-zero carbon emissions by 2050 with interim targets of 70% by 2035 and 80% by 2040 from a 2010 baseline.

In addition, the company has adopted a broad-based clean energy transition strategy to achieve our emissions reduction targets and deliver an affordable, reliable and resilient clean energy future for our customers and communities. We continue to evaluate our capital investment plans with this clean energy strategy in mind to ensure a successful transition.

Our clean energy strategy supports four primary outcomes:

- Decarbonizing our generation.
- Decarbonizing our non-generation operations.
- Driving digital innovation and research and development to enable new technologies.
- Positioning the grid as an enabler for clean energy resources and driving energy efficiency and demand-side management.

Consistent with our strong focus on decarbonizing our generation, PPL's Kentucky companies, Louisville Gas and Electric and Kentucky Utilities (LG&E and KU), are currently planning for the replacement of capacity and energy resulting from the expected retirements of three coal-fired plants by 2028 — Mill Creek Units 1 and 2 and E.W. Brown Unit 3. These units represent a combined 1,000 megawatts of coal-fired capacity, 21% of the company's current coal capacity. The company is also assessing the implications of proposed federal air quality regulations that could result in the retirement of nearly 500 megawatts of additional coal-fired capacity by 2028. This additional coal plant is currently estimated to retire in the mid-2030s. LG&E and KU expect to make a filing with the Kentucky Public Service Commission by the end of December 2022 for approval of replacement generation related to these requirements.

Achieving an 80% Clean Energy Portfolio by 2030

Assumptions and Inputs

Kentucky is a vertically integrated state with regulated generation. PPL undertook this analysis within Kentucky's current regulatory requirement for generation planning, which requires utilities to provide reliable electric service at the lowest reasonable cost. For the purposes of this analysis, we assume that supply needs are met with in-state resources, as it is reasonable to assume that such a rapid transformation would be driven by federal energy policy. This would increase the demand for clean energy resources and limit our availability to procure supply outside of Kentucky.

Available Supply Resources and Costs

For the purposes of this analysis, only renewables (primarily solar and wind) and storage (lithium-ion batteries) are considered clean energy resources. These resources are the only zero-carbon emitting energy sources that are currently commercially viable and able to be permitted, sited and constructed by 2030. There can be no assurances that the materials and equipment would be available at the scale required to achieve an 80% clean energy portfolio by 2030. PPL continues to invest in research and development of zero- and low-carbon resources and expects that a suite of resources will be available to us as we progress further along on our net-zero-by-2050 pathway.

As our aging coal-fired plants retire, new baseload generation will be needed for load support. There are currently two options that are regionally available — natural gas and nuclear. Due to the lengthy process for planning, regulatory approvals and construction, a nuclear plant is not feasible by 2030.[1] Natural gas is therefore the only option available for replacement of baseload generation by 2030 and has the added benefit of being able to ramp up and down quickly. This flexibility is necessary as intermittent resources make up a greater portion of the generation portfolio.

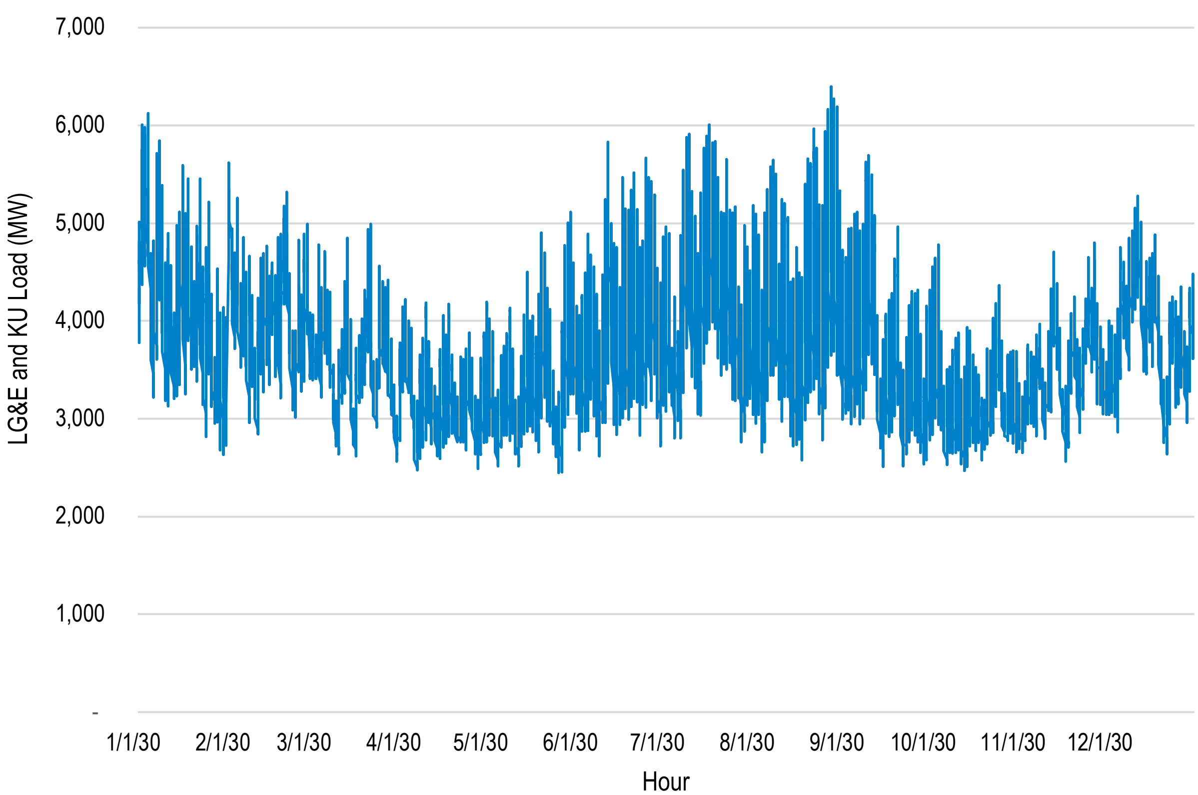
Renewable generation and battery technology costs are from the National Renewable Energy Laboratory (NREL) 2022 Annual Technology Baseline (ATB). Prices are assumed to stay at these levels throughout the planning timeframe (Appendix, Figure A1). Capacity factors are assumed to be 27% for solar and 30% for wind.

Natural gas prices reflect forecast Henry Hub market prices, and coal prices reflect Illinois Basin coal prices as included in LG&E and KU business planning.[2]

Load and Energy Requirements

LG&E and KU's daytime and nighttime energy requirements are comparable and have both summer and winter peaks. This load profile requires a generation portfolio that is available to meet energy needs 24 hours a day, seven days a week. The load forecast used in this analysis (Figure 1) represents LG&E and KU's view of the most likely development in prices, end-use saturations and efficiencies, electric vehicle adoption, distributed energy resources, energy efficiency, demand-side management, demographics and economic conditions in the service territory. The load forecast used for this analysis is reflected in LG&E and KU's business planning[3].

Figure 1: LG&E and KU 2030 Hourly Load



Projected 2030 peak demand across LG&E and KU's systems is 6,400 MW in 2030, with peak demand in both summer and winter topping 6,000 MW. Projected minimum demand is at least 2,450 MW in each hour of the year, including overnight hours when solar is not generating power. In winter, more than 55% of energy use by LG&E and KU customers occurs at night.

[1] PPL continues to evaluate small modular reactor (SMR) technology, which is purported to be cheaper, safer and quicker to construct than conventional technology. To date, SMRs have not been commercially deployed. We estimate that SMR's, if commercially viable, could be an available resource around 2040.

*[2] The Henry Hub is the pricing point for natural gas futures on the New York Mercantile Exchange.
The Illinois Basin covers parts of Illinois, southwestern Indiana and western Kentucky and is one of five coal commodity regions in the U.S.*

[3] This analysis indicates that rates would need to be significantly higher than in our current business plans. The negative impact of higher rates on customers' future energy demand is not reflected in this analysis.

Transmission

Transmission assets must be upgraded to integrate renewables and energy storage, which are forms of inverter-based generation. This requirement is discussed in more detail in the results section below. Material investments would be required to support the level of clean energy assumed in this analysis. Initial analysis has identified that approximately 500 miles of new or upgraded transmission lines will be required in addition to new transformers, voltage support equipment and other assets. The process of siting, obtaining right-of-way for, securing regulatory approval of, and constructing potentially hundreds of miles of new transmission lines would pose a significant challenge in such a short span of time.

Risks

In generation planning, there are risks associated with weather, load and technology. A margin to address these risks, such as optimizing the portfolio to address all weather variations, has not been built into this assessment and would increase the resources required and related costs shown in this analysis.

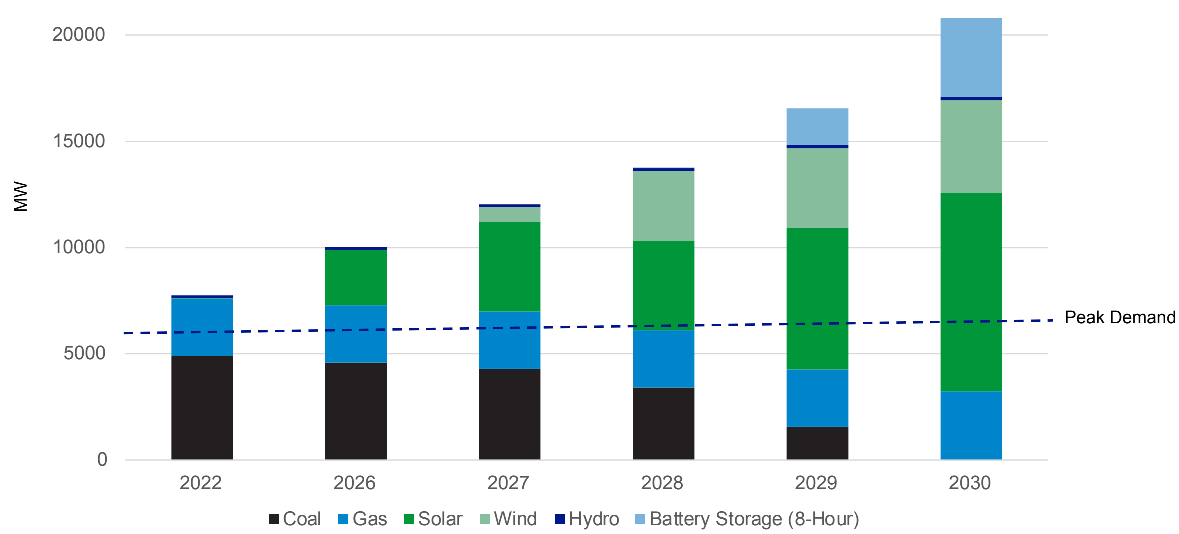
Generation Portfolio Transformation

The shift in generation capacity required to meet an 80% clean portfolio by 2030 would require unprecedented levels of renewable deployment and the premature retirement of coal-fired plants to achieve the percentage of clean generation while still fulfilling the utilities' obligation to provide reliable service.

As shown in Figure 2, by 2030 all coal would be forced to retire, and more than 500 MW of baseload natural gas would be added in 2030 to provide flexible baseload capacity and fill in gaps where renewables and batteries are insufficient to meet customer demand. Solar and wind capacity is added in amounts far exceeding peak demand needs due to the intermittent nature of these resources, their relatively low capacity factors and the need to reliably serve customers at all times. This includes serving the energy storage resources reflected in this analysis. In particular, the scale of generation resources needed is driven by nighttime and winter customer energy needs when wind and solar resources are not generating electricity (Figure 3 and Appendix, Figures A2 and A3).

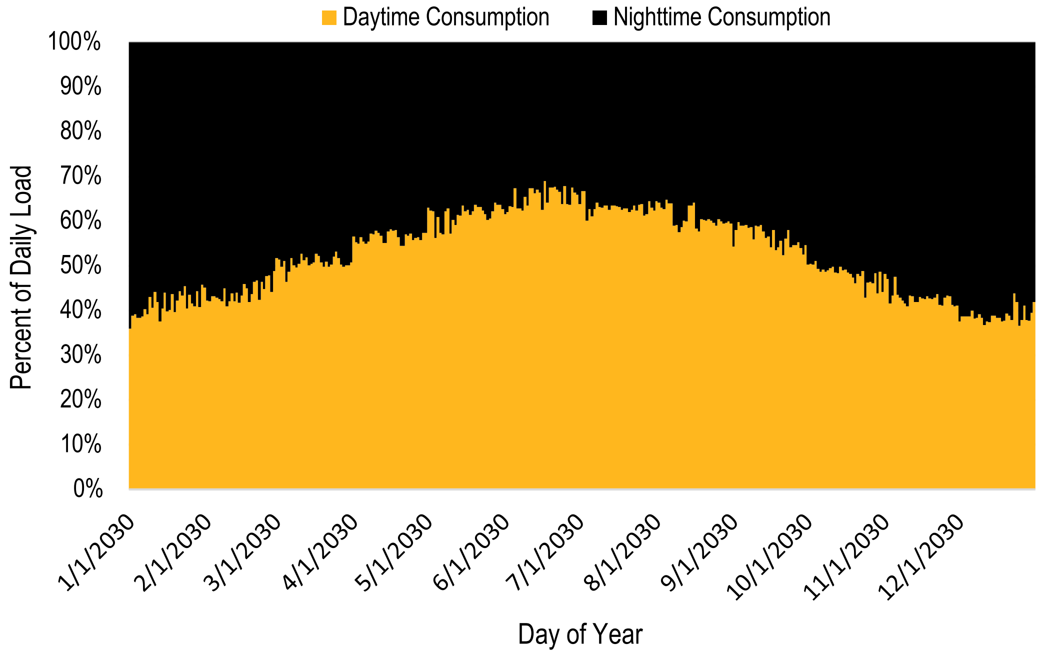
Battery storage is added to the portfolio to store excess energy from renewables in the daytime and serve load primarily at night. By 2030, renewables would directly serve 45% of load and indirectly serve 35% via battery storage. Moving from a 50% to 80% clean portfolio requires using renewables to charge batteries to balance the renewable-dominant portfolio by providing energy when needed and in combination with baseload natural gas (Figure 4 and Appendix, Figure A5).

Figure 2: LG&E and KU Generation Portfolio Transition Required to Achieve 80% Clean Energy by 2030



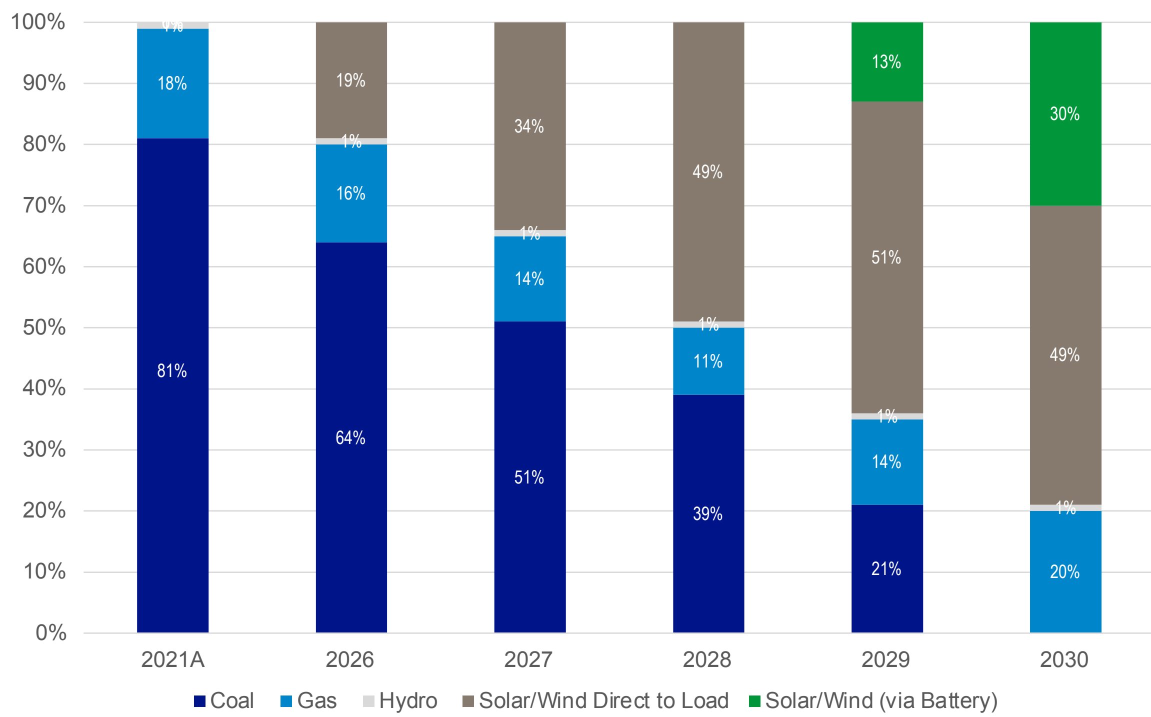
In Kentucky, solar is the least expensive renewable energy source on a dollar/MWh basis. As the figure illustrates for an 80%-clean-by-2030 scenario, it is the only resource initially added within LG&E and KU's systems. When solar capacity tops 4,000 MW (2027), solar becomes oversaturated, leading to curtailments. This allows wind to become competitive with solar. Wind is then deployed up to around 3,000 MW (2028) before it, too, becomes oversaturated. Batteries are then added to store unused energy from solar and wind to meet customer demand. Solar is added in greater quantities than wind to provide energy to charge the batteries. Lastly, natural gas is added in 2030 to ensure 24/7 reliability as remaining coal is forced to retire. Unused solar/wind represents curtailed energy as overbuild is required to meet 24/7 energy demands. For more detail on the resource mix illustrated above, see Appendix, Figure A4.

Figure 3: Proportion of Energy Consumed During Daylight and Nighttime Hours



LG&E and KU's 2030 load forecast projects that approximately 35% of electricity will be used during nighttime hours in the summer, but over 55% of electricity use will take place at night in the winter. The load forecast assumes that approximately 55% of customers will continue to use natural gas for heating.

Figure 4: Percentage of Load Served by Resource



For more detail on the resource mix illustrated above, see the Appendix, Figure A4.

Results – Financial Implications and Strategic Feasibility

PPL believes that the clean energy transition presents more opportunities than risks for the company as we invest in a more flexible, smart and efficient grid and transition our generation to support a low-carbon economy. However, the pace of this transition and technology availability will directly impact the overall cost and sustainability of the clean energy transition. Based upon our analysis, we believe that the scale and pace necessary to achieve an 80% clean energy portfolio by 2030 is prohibitively expensive and operationally infeasible given the resources needed to site, build, secure regulatory approval for, and deploy such a portfolio, the additional financial burden it would create for customers, and our obligation to reliably serve load.

Emissions

On a national level, the 80%-by-2030 interim target is assumed to represent approximately an 85% reduction[4] in power sector emissions from a 2005 baseline. However, the transformation of LG&E and KU's generation portfolio to 80% clean would result in a 95% reduction in carbon emissions from PPL's 2010 emissions baseline given the carbon intensity of the current generation portfolio, which underscores the magnitude of the shift in generation resources required (Appendix, Figure A6)[5]. While an accelerated decline in carbon emissions is desirable, we believe that a more measured pace and approach to the clean energy transition rooted in economics, technology availability and innovation will enable us to achieve steep reductions in a more sustainable, reliable and affordable manner.

Cost and Rate Impacts

Achieving 80% clean energy by 2030 would require a dramatic and unprecedented transformation of LG&E and KU's electric generation and transmission system in roughly seven years' time, significantly impacting customers, the economy, employees and shareowners.

The total cost of this transformation is estimated to be at least $22 billion. Capital investment in new generation and storage assets of $21 billion would negatively impact electricity rates and the economy (Appendix, Figure A8). This represents a 66% increase over today's generation costs by 2030 and reflects the production tax credits available under the Inflation Reduction Act of 2022 (increase without the Inflation Reduction Act tax credits would be 112%). As discussed below, LG&E and KU also estimate that an additional $1 billion in transmission upgrades will be needed to accommodate new generation. The actual costs would be expected to be higher as the companies account for load, weather and technology risks, as well as costs to acquire land for siting of new generation. Fuel savings and ongoing coal plant operational savings would be offset by the large investment in renewables and batteries.

Kentucky residents and industry currently benefit from lower than national average electricity prices. The investment of over $21 billion dollars in new generation in less than a decade would lead to higher annual generation revenue requirements (Appendix, Figure A8). Combined with estimated transmission investments, the resulting impact to electricity rates would create additional hardships for many residential and business customers and impact economic development. It would be extremely disruptive to the economy in Kentucky, where manufacturing accounts for nearly 18% of GDP, a significantly higher share than the U.S. average of nearly 12%.[6] Significantly higher costs would also create additional hardships for many residential customers and businesses already struggling with higher costs for goods and services:

- Electricity bills would increase by an average of 60% from 2022 to 2030.
- Combined $1.2 billion increase in electricity costs annually by 2030 for industrial, large commercial and small business customers would likely result in a negative impact on load and jobs, particularly with energy-intensive manufacturing customers.
- $600 million in additional costs annually by 2030 for residential customers would likely increase the percentage of customers struggling to pay electricity bills.

Regulatory Risk

Under Kentucky statute (KRS 278), the Kentucky Public Service Commission (KPSC) is responsible for ensuring that utility rates are "fair, just and reasonable." Historically, the KPSC has applied a "lowest reasonable cost" analysis to meet this requirement, and to recover their costs, LG&E and KU are required to demonstrate that their investments are prudent and meet this regulatory review standard.

The pace of change contemplated in this analysis injects significant regulatory risk into the recoverability of these investments, even if required to comply with law or regulations. Swift and steep rate increases can result in negative customer sentiment and punitive political and regulatory actions. Further, the premature retirement of LG&E and KU's coal-fired generation would result in $2.7 billion in stranded costs, recovery of which would be a further burden on customers or represent a material financial risk for shareholders.

[4] *https://www.nrdc.org/experts/starla-yeh/2030-us-ndc-policy-progress-all-corners-economy-0*
[5] *PPL's 2005 carbon emissions from generation are not measurably different than the company's 2010 emissions.*
[6] *Source: Kentucky Cabinet for Economic Development New and Expanding Industries Report.*

Siting and Land Use

The scale of renewable capacity would require developing large areas of land and new transmission development at a scale that Kentucky has not seen to date. The demand would likely disrupt communities and create local landowner challenges, including siting and permitting delays. The company estimates that more than 250,000 acres, roughly the size of Louisville by land area, would be required for new renewable generation under this scenario. The company currently has six generation sites, and that could increase to 100 separate sites to accommodate this generation buildout. Land acquisition costs are not estimated in this analysis. It is important to note that this study addresses the impacts of transforming our portfolio by 2030. While LG&E and KU intend for renewable energy, primarily solar, to be a growing part of the companies' generation portfolio, we expect advances in storage and other non-emitting sources over the next decade to mitigate the need to overbuild existing renewable energy technologies to meet reliability needs.

We understand that land use considerations will be a necessary part of our clean energy transition. We are already assessing the use of company-owned property for future development and are engaging with the state on locations best suited for solar development in Kentucky. It is important to note that LG&E and KU have already signed 225 MW of solar power purchase agreements with third-party developers over the past few years, and none of those projects have begun construction due to delays in siting and permitting within the state. A buildout of solar and wind resources as contemplated in this analysis would be unprecedented and injects significant doubt as to whether developers and the company would be able to physically get these resources built and operational by 2030.

Additionally, permitting, siting and construction of new transmission can take several years depending upon project details. While the costs of transmission upgrades are significant, the practicality of successfully executing necessary transmission upgrades, as described below, is expected to be a major challenge to supporting an aggressive clean energy portfolio in this timeframe.

Transmission

Transmission requirements to transition from conventional generation to inverter-based generation (i.e., solar, wind and batteries) would need to be managed through the Federal-Energy-Regulatory-Commission-approved transmission planning process as detailed in the LG&E and KU Open Access Transmission Tariff and LG&E and KU's Transmission Planning Guidelines. Transmission system planning, design and construction and associated costs required for reliable operations are highly dependent upon the location of new inverter-based generation and retirement of existing generation, not only on the LG&E and KU transmission system but on adjacent transmission systems as well. Due to these interdependencies, it is difficult to accurately predict the cost of making such a significant transition. Costs included reflect preliminary estimates.

New interconnection facilities will be required to interconnect nearly 10,000 megawatts of solar and 4,000 megawatts of wind generation to the transmission system. While network upgrades and costs could be best managed if new generation is located at or near existing generation facilities or major substations, integrating 3,000 megawatts of storage on the system will likely require major network upgrades, even if dispersed geographically. Dispersing this generation and storage geographically is beneficial for supporting transmission system voltage, a major issue that must be addressed in such a transition. Additional high-voltage interconnections with neighboring transmission systems, as well as additional primary equipment, would need to be considered to provide voltage support and prevent blackouts from prolonged voltage disturbances.

Taking all of this into consideration, initial analysis indicates the need for new or upgraded transmission lines and adding new transformers and voltage, frequency, and short circuit strength support equipment. Network costs are estimated to be approximately $1 billion, excluding interconnection costs required to connect new generation to the transmission system (Figure 5).

Figure 5: Estimated Transmission Capital Expenses ($M)

Description of Upgrades	Costs
New or upgrades to transmission lines ~500 miles	$679
Transformers and Substation Equipment	$19
Voltage Support Equipment (STATCOMS, Synchronous Condensers)	$271
Total Transmission Upgrades	$969

Workforce

LG&E and KU currently employ 645 people at their existing coal-fired plants along with several hundred supplemental contracted employees engaged in daily operations and maintenance. The companies have successfully retired plants in the past with minimal to no disruption to the workforce or our local communities. PPL's clean energy transition plan for plant retirements through 2030 includes consideration of employee impacts through multi-year workforce planning, with job impacts expected to be minimized through attrition, internal transfers and retraining. Retiring all coal plants by 2030 would remove flexibility to address workforce needs in a systemic and planful manner, causing unnecessary disruption to our workforce and communities.

Conclusion

At PPL, we are committed to delivering a net-zero carbon future while keeping energy reliable and affordable for our customers and communities. Achieving economy-wide decarbonization will not be easy. The path we take will be critical to achieving a successful transition. We must drive investments in clean energy technologies and transition at a pace that enables us to integrate a diverse portfolio of resources to enhance reliability, resilience and affordability.[7]

PPL's analysis of the strategic feasibility and financial implications of achieving an 80% clean generation portfolio by 2030 finds that such a target would be prohibitively expensive for PPL's customers and operationally infeasible.

Our evaluation finds that an 80%-clean-by-2030 target would:

- Necessitate an aggressive and unprecedented renewables buildout far beyond peak demand to support around-the-clock reliability.
- Require significant storage capabilities to be added in the latter part of the decade to minimize wasted generation and serve load, primarily at night.
- Require development of approximately 250,000 acres of land for renewable generation while navigating potential landowner challenges and permitting delays.
- Require extensive transmission system upgrades, including approximately 500 miles of new or upgraded transmission lines to connect new renewables. This requirement would present unprecedented siting and construction challenges within this timeframe.

PPL estimates this transformation would require more than $22 billion in new investment in less than a decade, disrupting the state's economy, creating a significant financial burden for customers already struggling with high inflation and rising commodity costs, and potentially creating backlash that could jeopardize the end objective of achieving a clean energy transition that results in net-zero carbon emissions and economy-wide decarbonization.

PPL remains committed to research and development to accelerate the clean energy transition while ensuring energy affordability for our customers and continued economic competitiveness for the communities we serve – both in the years ahead and longer term.

We look forward to continued engagement with a wide variety of stakeholders in moving forward and will continue to challenge our emissions goals as clean energy technology and economics evolve.

[7] *See Technology, Interdependencies and Pace of Change, page 22 of PPL's Climate Assessment Report for further discussion*

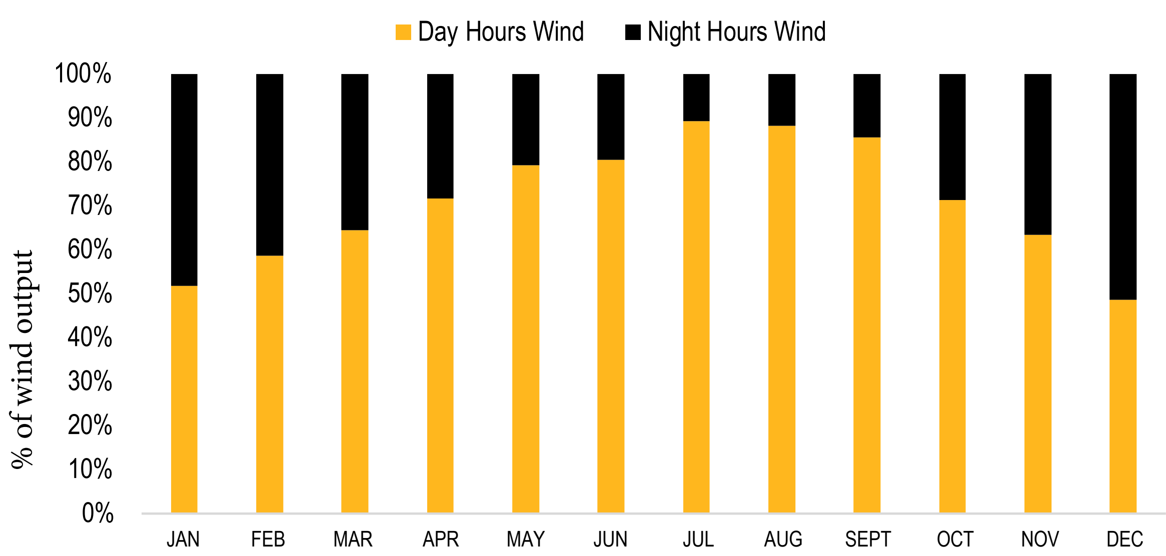
Appendix

Figure A1: Major Assumptions

	Utility-Scale Solar	Utility-Scale Wind	4-Hour Battery	8-Hour Battery
Capital ($/kW; Nominal Dollars)	$1,235	$1,536	$1,147	$1,956
Fixed O&M ($/kW-Yr; Nominal Dollars)	$18.28	$47.54	$28.67	$48.89
Land Requirements				
acres/MW	6.1	44.7		
acres/MWh			0.023	0.023

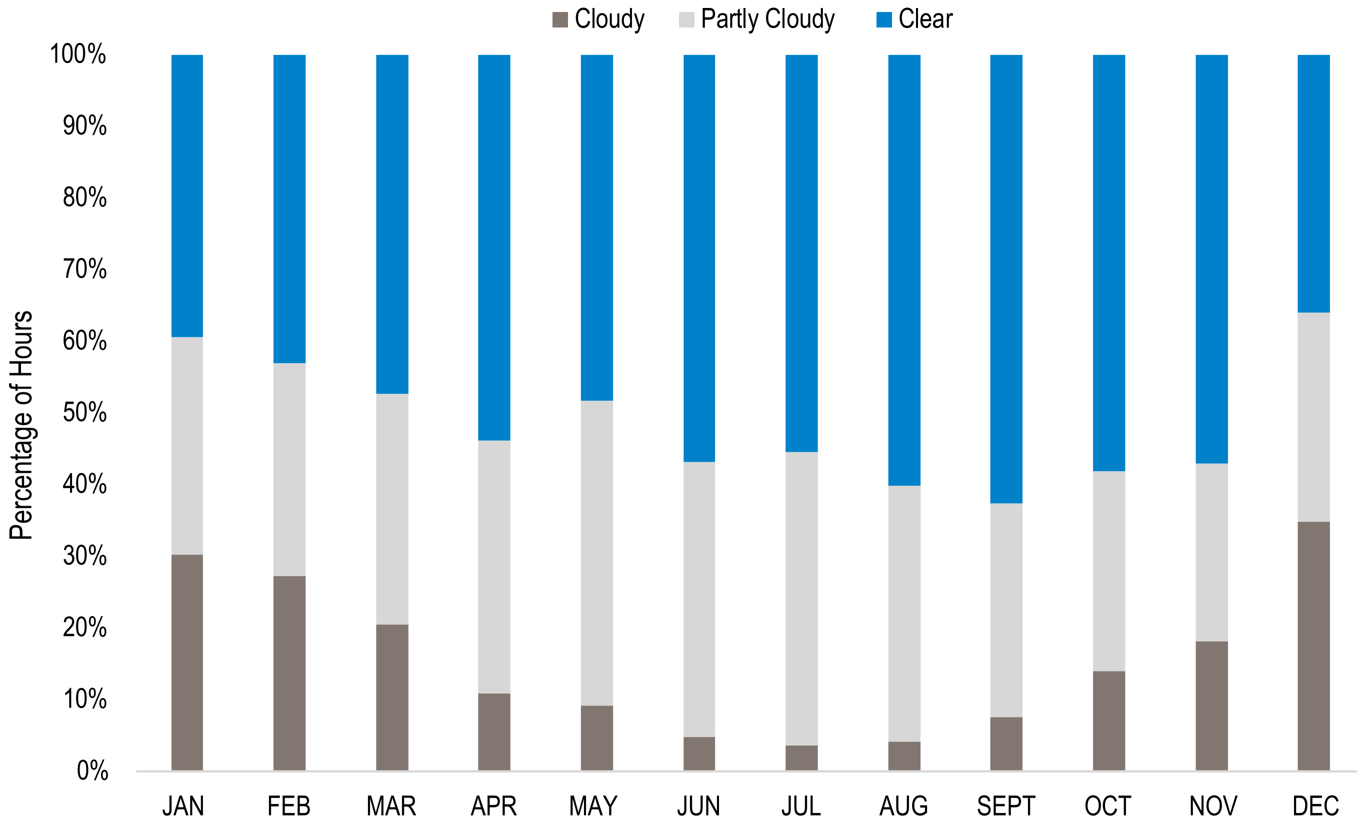
Source: Cost data from National Renewable Energy Laboratory (NREL) 2022 Annual Technology Baseline (ATB). Prices are assumed to remain at these levels throughout the planning timeframe. Solar and Wind land requirements from NREL Land Use study: https://www.nrel.gov/analysis/tech-size.html. Battery land requirements from Convergent Energy and Power website: https://www.convergentep.com/landowners/.

Figure A2: Wind Generation Day vs. Night



While solar generation only occurs during daylight hours, wind turbines are capable of generating power both day and night. For this reason, solar and wind generation can serve as complementary resources, although they remain intermittent even when combined.

Figure A3: Typical Sky Conditions by Month in Kentucky



Cloudy skies pose challenges to solar power. As illustrated above, cloudy to partly cloudy conditions occur more frequently in Kentucky during the winter months and must be accounted as part of generation planning.

Figure A4: LG&E and KU Generation Portfolio Transition Required to Achieve 80% Clean Energy by 2030

Year	2022A	2026		2027		2028		2029		2030	
Clean Energy Target	N/A	20%		35%		50%		65%		80%	
Capacity/Energy	MW	MW	TWh	MW	TWh	MW	TWh	MW	TWh	MW	TWh
Summer Peak Demand	6,187	6,282	32.9	6,376	33.7	6,382	33.7	6,385	33.6	6,397	33.4
Coal	4,889	4,589	21.1	4,292	17.2	3,416	13.2	1,571	6.9	0	0.0
Gas	2,716	2,698	5.3	2,698	4.7	2,698	3.7	2,698	4.8	3,211	6.7
Solar	12	2,602	6.2	4,207	10.0	4,207	10.0	6,636	15.8	9,343	22.3
Wind	0	0	0.0	706	1.8	3,286	8.7	3,771	9.8	4,372	11.4
Hydro	134	134	0.4	134	0.4	134	0.4	134	0.4	134	0.4
Battery Storage (8-hour)	0	0	0.0	0	0.0	29	0.1	1,749	5.0	3,735	11.8
Unused Solar/Wind			0.0		-0.5		-2.2		-3.5		-5.7
Battery/Inverter Losses			0.0		0.0		0.0		-0.7		-1.7

Figure A4 illustrates the aggressive and unprecedented growth in renewable energy that would need to be sited and built this decade to achieve an 80% clean energy target by 2030. In this scenario, all coal units would be forced to retire by 2030. Unused solar/wind represents curtailed energy as overbuild is required to meet 24/7 energy demands. Battery/inverter losses represents loss of energy in the charging and discharging process.
PPL used a generation portfolio optimization model to estimate the least-cost generation portfolio for meeting an 80% clean energy standard by 2030.

Figure A5: Generation Breakdown to Serve 2030 Load in 80% Clean Energy Scenario

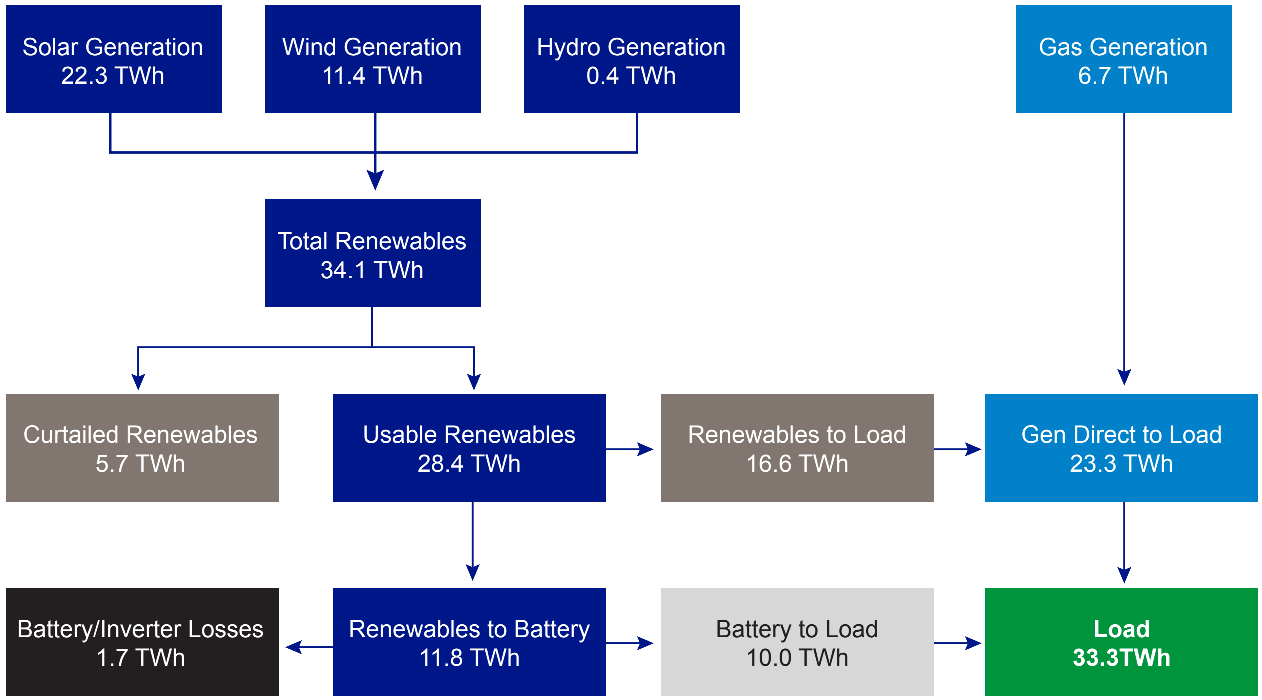


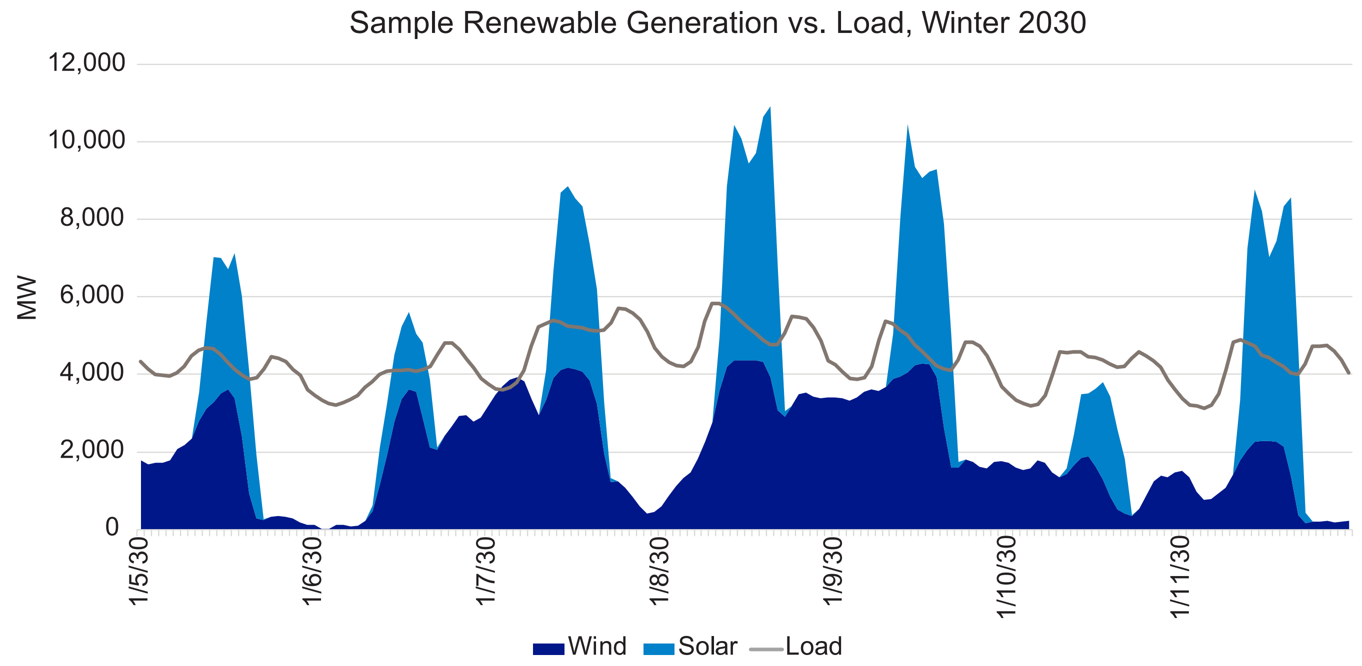
Figure A5 breaks down the estimated generation requirements from various sources to reliably serve projected customer load in 2030 and a chieve an 80% clean energy target.

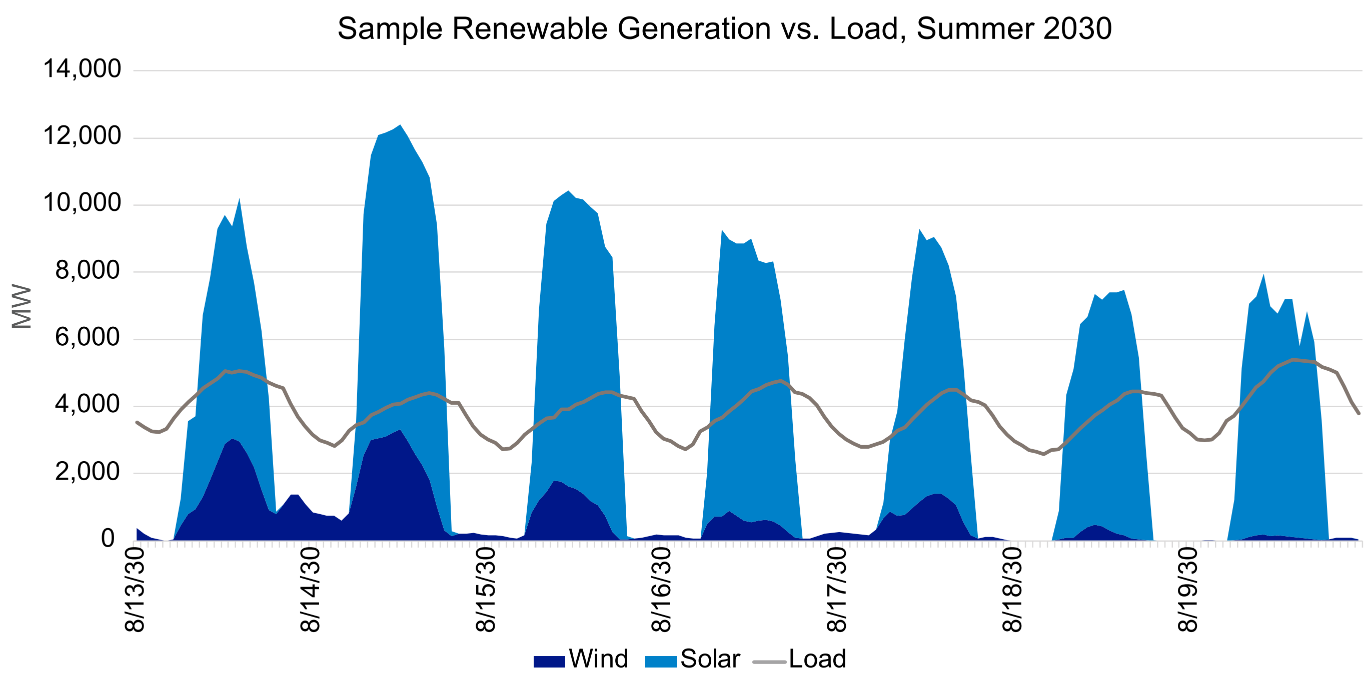
Figure A6: Carbon Emissions and Reductions Associated with Generation Portfolio Transition to Achieve 80% Clean Energy by 2030

Year	2026	2027	2028	2029	2030
Clean Energy Target	20%	35%	50%	65%	80%
LKE CO_2e Emissions (MMT)	21.0	17.1	13.1	7.8	2.9
LKE CO_2e Intensity (lb/MWh)	1,403	1,119	858	512	192
LKE CO_2e Intensity (MT/MWh)	0.64	0.51	0.39	0.23	0.09
PPL Reduction from 2010	-67%	-73%	-79%	-88%	-95%

As noted in the Figure A6 above, the transformation of LG&E and KU's generation portfolio to 80% clean would result in a 95% reduction in carbon emissions from PPL's 2010 emissions baseline given the carbon intensity of the current generation portfolio.

Figure A7: Sample Weeks in Winter and Summer 2030 Showing Renewable Generation and Electric Demand





The figures above show estimated solar production overlaid with electrical demand for sample weeks in winter and summer 2030. These figures show the variability in renewable production day to day and season to season. They illustrate the need for large renewable and energy storage systems to reliably serve load, including enough renewables to both serve load and charge batteries when sun and wind are available.

Figure A8: Estimated Capital Expenses and Other Requirements Associated with Generation Portfolio Changes

	Capital Expenses ($B)							
Year	Solar	Wind	Battery	NGCC	Total	Renewables Land Area (000 acres)	Fuel Expense ($B)	Generation Revenue Requirements ($/MWh)
2026	2.4	0.0	0.0	0.0	2.4	14.4	0.9	66
2027	1.6	0.9	0.0	0.0	2.5	41.4	0.8	66
2028	0.0	3.1	0.1	0.0	3.1	115.3	0.7	69
2029	2.3	0.6	3.3	0.0	6.1	36.9	0.6	84
2030	2.4	0.7	3.7	0.5	7.3	43.7	0.4	103
Total	**8.7**	**5.1**	**7.0**	**0.5**	**21.4**	**251.6**		

"Generation Revenue Requirements" includes capital, operating and maintenance costs for new and existing generating resources, recovery of costs for existing generating assets, and fuel expenses.