Welcome to your CDP Climate Change Questionnaire 2020

C0. Introduction

C0.1

(C0.1) Give a general description and introduction to your organization.

Headquartered in Allentown, Pa., PPL Corporation (NYSE: PPL) is a public utility holding company with more than $7.8 billion in annual revenue and total assets of $46 billion. The company's seven operating utilities in the U.S. and U.K. employ more than 12,000 people, maintain approximately 219,000 miles of electric lines, and annually deliver more than 140 billion kilowatt-hours of electricity and 45.2 Mcf of natural gas.

PPL's U.K. segment consists of the regulated electricity distribution operations of Western Power Distribution plc ("WPD"), which serves 7.9 million customers in central and southwest England and south Wales.

PPL's Kentucky segment consists primarily of regulated electricity and natural gas operations of Louisville Gas and Electric Company ("LGE") and Kentucky Utilities Company ("KU"), which serve over 1.3 million customers in Kentucky and Virginia and operate 7,500 megawatts of regulated generating capacity.

PPL's Pennsylvania segment consists of the regulated electricity transmission and distribution operations of PPL Electric Utilities Corporation ("PPL EU"), which serves approximately 1.4 million customers in eastern and central Pennsylvania.

In addition to these operating utilities, in 2018 PPL acquired Safari Energy ("Safari"), a leading provider of solar energy solutions for commercial customers in the United States. Safari is headquartered in New York.

C0.2

(C0.2) State the start and end date of the year for which you are reporting data.

	Start date	End date	Indicate if you are providing emissions data for past reporting years	Select the number of past reporting years you will be providing emissions data for
Reporting year	January 1, 2019	December 31, 2019	Yes	3 years

C0.3

(C0.3) Select the countries/areas for which you will be supplying data.

United Kingdom of Great Britain and Northern Ireland
United States of America

C0.4

(C0.4) Select the currency used for all financial information disclosed throughout your response.

USD

C0.5

(C0.5) Select the option that describes the reporting boundary for which climate-related impacts on your business are being reported. Note that this option should align with your chosen approach for consolidating your GHG inventory.

Equity share

C-EU0.7

(C-EU0.7) Which part of the electric utilities value chain does your organization operate in? Select all that apply.

Row 1

Electric utilities value chain

Electricity generation
Transmission
Distribution

Other divisions

Gas storage, transmission and distribution
Smart grids / demand response
Battery storage

C1. Governance

C1.1

(C1.1) Is there board-level oversight of climate-related issues within your organization?

Yes

C1.1a

(C1.1a) Identify the position(s) (do not include any names) of the individual(s) on the board with responsibility for climate-related issues.

Position of individual(s)	Please explain
Board-level committee	The Board's Governance and Nominating Committee ("GNC") [effective October 1, 2019, the Board's Compensation, Governance and Nominating Committee split into two Committees: the Compensation Committee and the Governance and Nominating Committee] has regularly scheduled meetings at which sustainability strategy is discussed and climate-related issues are regularly incorporated into those discussions. The full Board is also updated as important matters arise.
Board-level committee	The Board's Audit Committee assists the Board in its oversight of the identification and management of certain broad-based enterprise risks. The Audit Committee periodically reviews the company's enterprise risk management program, including its processes for identifying, assessing and managing business risks and exposures (including sustainability and climate-related issues), as well as formulating related guidelines and policies.
Board-level committee	The Board's Finance Committee annually reviews and approves the Company's three-year business plan and five-year capital expenditure plan. The Committee has both regularly scheduled and ad hoc meetings during which it reviews and approves major capital expenditures not included in the previously approved five-year plan, as well as major acquisitions and divestitures.

C1.1b

(C1.1b) Provide further details on the board's oversight of climate-related issues.

Frequency with which climate-related issues are a scheduled agenda item	Governance mechanisms into which climate-related issues are integrated	Please explain
Scheduled – some meetings	Reviewing and guiding strategy Reviewing and guiding risk management policies Monitoring and overseeing progress against goals and targets for addressing climate-related issues	The Board's Governance and Nominating Committee (GNC) oversees the Company's practices and positions to further its corporate citizenship, including sustainability, environmental and corporate social responsibility initiatives. The GNC has regularly scheduled meetings during which sustainability strategy is discussed and climate-related issues are regularly incorporated into those discussions. The full Board receives reports from the GNC. Management also provides the full Board with periodic updates on climate and other ESG matters, including in conjunction with the publication of the Corporate Sustainability Report. The Board periodically reviews climate and ESG-related issues as part of strategy discussions.

Scheduled – some meetings	Reviewing and guiding strategy Reviewing and guiding risk management policies	The Board's Audit Committee receives quarterly reports on enterprise risk management. The Audit Committee regularly reviews risk management activities related to the company's financial statements and disclosures, certain legal and compliance matters, transition of the utility sector, and other key areas including but not limited to sustainability and climate-related issues. The full Board is also updated as important matters arise and receives reports from the Audit Committee.
Scheduled – some meetings	Reviewing and guiding business plans Overseeing major capital expenditures, acquisitions and divestitures	The Board's Finance Committee annually reviews and approves the three-year business plan and the five-year capital expenditure plan. The Finance Committee also approves major capital expenditures, acquisitions and divestitures. Climate-related issues are addressed in the business and capital plans. The full Board is also updated as important matters arise and receives reports from the Finance Committee.

C1.2

(C1.2) Provide the highest management-level position(s) or committee(s) with responsibility for climate-related issues.

Name of the position(s) and/or committee(s)	Responsibility	Frequency of reporting to the board on climate-related issues
Chief Executive Officer (CEO)	Both assessing and managing climate-related risks and opportunities	More frequently than quarterly
Chief Financial Officer (CFO)	Both assessing and managing climate-related risks and opportunities	More frequently than quarterly
Other C-Suite Officer, please specify Chief Legal Officer (CLO)	Both assessing and managing climate-related risks and opportunities	More frequently than quarterly
Other, please specify Operating Company Leadership	Both assessing and managing climate-related risks and opportunities	As important matters arise
Other, please specify Risk Management Committee	Assessing climate-related risks and opportunities	Quarterly

C1.2a

(C1.2a) Describe where in the organizational structure this/these position(s) and/or committees lie, what their associated responsibilities are, and how climate-related issues are monitored (do not include the names of individuals).

As of June 2020, PPL's Corporate Leadership Council (CLC) is made up of PPL's CEO, CFO and CLO. The CEO and these other key leadership positions have overall responsibility for setting corporate business strategy, including the company's low-carbon transition strategy. The business strategy incorporates the allocation and deployment of capital, adoption of long-term and short-term goals (including carbon reduction goals), and identification and management of climate-related risks and opportunities. CLC is informed by senior leaders across the company, including operating company presidents and leadership positions in human resources, compliance, risk, audit, investor relations, and public affairs and sustainability.

Climate-related issues are incorporated into PPL's overall enterprise risk management (ERM) and business strategy processes. Operating company leadership has primary accountability for identifying, assessing and managing climate-related risks and opportunities. Each operating company has a representative involved in the enterprise risk management process which provides a business portfolio view of material risks that may impact achievement of PPL's business strategy. PPL's Risk Management group manages this process and reports to the Board's Audit Committee quarterly and as needed. The ERM process is overseen by the Chief Financial Officer.

Climate-related issues are also incorporated in PPL's sustainability strategy. The company has adopted seven sustainability commitments to guide this strategy, including a commitment to "Advance a Cleaner Energy Future and Build Tomorrow's Energy Infrastructure." PPL's sustainability strategy begins with a Corporate Sustainability Core Team, a cross-functional and enterprise-wide team of subject matter experts who conduct analysis of sustainability priority issues and environmental, social and governance trends. The Sustainability Core Team is also responsible for developing environmental, social and governance disclosures. A Corporate Sustainability Committee is responsible for reviewing and guiding the development of PPL's sustainability strategy, providing oversight and establishing the priorities and performance metrics. This committee consists of senior leaders throughout the corporation, including operating companies, human resources, compliance, risk, investor relations and audit. Company leadership, including CLC and operating company presidents, reviews, provides strategic input and approves the company's sustainability strategy, commitments and priorities. The Board's GNC has specific oversight over ESG and sustainability strategy.

C1.3

(C1.3) Do you provide incentives for the management of climate-related issues, including the attainment of targets?

	Provide incentives for the management of climate-related issues	Comment
Row 1	Yes	

C1.3a

(C1.3a) Provide further details on the incentives provided for the management of climate-related issues (do not include the names of individuals).

Entitled to incentive	Type of incentive	Activity inventivized	Comment
Other, please specify Designated employees	Monetary reward	Other (please specify) Management of programs and initiatives	Incentive compensation for certain employees includes management of certain programs and initiatives highlighted in this CDP response, including customer facing programs for energy efficiency and solar generation, integration and development of distributed energy resources, and alternative energy portfolio compliance.
Other, please specify All LGE and KU employees	Monetary reward	Behavior change related indicator	Reimbursement for employees who take mass transit to work.

C2. Risks and opportunities

C2.1

(C2.1) Does your organization have a process for identifying, assessing, and responding to climate-related risks and opportunities?

Yes

C2.1a

(C2.1a) How does your organization define short-, medium- and long-term time horizons?

	From (years)	To (years)	Comment
Short-term	0	2	
Medium-term	3	5	
Long-term	6	30	IRP and T&D planning horizon is typically a 15-year timeframe; climate assessment and CO2 goal are 30 years

C2.1b

(C2.1b) How does your organization define substantive financial or strategic impact on your business?

We define substantive impact as risks or opportunities driven by factors such as shareholder and consumer preferences, market and regulatory changes that alone or in combination can drive a substantial change in the Company's business model, including its services**,** and portfolio of assets.

C2.2

(C2.2) Describe your process(es) for identifying, assessing and responding to climate-related risks and opportunities.

Value chain stage(s) covered

Direct operations

Risk management process

Integrated into multi-disciplinary company-wide risk management process

Frequency of assessment

More than once a year

Time horizon(s) covered

Medium-term

Description of process

Each operating company within PPL maintains robust enterprise risk management (ERM) processes. These provide the input for a corporate enterprise risk process and business portfolio view of material risks that may impact achievement of PPL's business strategy. Climate-related risk and broader ESG risks are included in this risk assessment. The time horizon for this assessment is medium-term (maximum of 5 years).

Each operating company has a representative involved in the ERM process. The ERM process is overseen by the Chief Financial Officer, with PPL Corporation's Board of Directors receiving quarterly updates. PPL's full board reviews overall strategy and risks, with the Audit Committee receiving ERM reports and the Governance and Nominating Committee receiving regular ESG reports with a discussion of key risks and opportunities.

Value chain stage(s) covered

Direct operations

Risk management process

A specific climate-related risk management process

Frequency of assessment

Every three years or more

Time horizon(s) covered

Long-term

Description of process

We have also assessed climate risk using a long-term view (2050 endpoint). We have conducted a comprehensive climate assessment, including a scenario analysis consistent with keeping global warming to no more than 2°C, and our effort carefully considered the recommendations of the Task Force on Climate-Related Financial Disclosures. We expect to update this climate assessment in 2021 in conjunction with our next Integrated Resource Plan in Kentucky.

As a result of our actions over the past decade, PPL has reduced its risk associated with climate change. The company's portfolio is now heavily focused on electricity delivery, with more than 80% of our rate-regulated asset base consisting of transmission, distribution and non-coal-fired generation. We believe there will be significant future investment opportunities in our delivery infrastructure and cleaner energy resources, which are expected to further decrease the percentage of our rate-regulated asset base from coal-fired generation assets.

As PPL looks to the future, we will continue to take steps to identify, understand and manage risks and opportunities associated with climate change and the transition to a cleaner energy future. This includes evaluating different options to inform business strategy, using modeling and input from our internal experts and third parties, as needed, and reviewing assessments with senior management and our Board on an ongoing basis.

Value chain stage(s) covered

Direct operations

Risk management process

Integrated into multi-disciplinary company-wide risk management process

Frequency of assessment

Every three years or more

Time horizon(s) covered

Long-term

Description of process

LGE and KU prepares an Integrated Resource Plan roughly every three years and submits the plan to the KY Public Service Commission. The planning horizon is 15 years. The primary focus of resource planning is risk management. Key categories of risk stem from uncertainties related to the way customers use electricity, the performance of generation units, the price of fuel and other commodities, and the future impact of new state and federal regulations.

Through the integrated resource planning process, LGE and KU models the most

reliable and affordable way to meet current and future demand, including considering demand management, renewable resources and carbon pricing.

C2.2a

(C2.2a) Which risk types are considered in your organization's climate-related risk assessments?

	Relevance & inclusion	Please explain
Current regulation	Relevant, always included	As investor-owned utilities are heavily regulated, PPL's enterprise risk management process, as well as compliance risk management processes, consider the risks and impacts of a wide variety of state and national regulations, many of which are climate-related and can have material impact (both as risks as well as opportunities) to the company.
Emerging regulation	Relevant, always included	PPL operates in a dynamic regulatory environment in all of its geographic locations and pays close attention to evolving and emerging regulations, including proposed carbon cap-and-trade, as well as additional renewable and energy efficiency requirements in Pennsylvania, EPA regulation of GHGs, and decarbonization efforts in U.K.
Technology	Relevant, always included	PPL's enterprise risk management process includes careful analysis of emerging technologies that can transform the industry, presenting significant risks as well as opportunities. These include energy storage, electric vehicles, renewable energy and smart grids.
Legal	Relevant, always included	Legal challenges, particularly to new regulations in the United States, can result in significant changes in risk and must always be taken into account in the company's multi-disciplinary risk assessments.
Market	Relevant, always included	Demand for power is influenced by economic conditions, consumer preferences and weather.
Reputation	Relevant, always included	PPL's customers, investors and other stakeholders are increasingly interested in PPL's carbon footprint. PPL's risk assessments are factoring this into long-term investment decisions.
Acute physical	Relevant, always included	Increasingly frequent severe weather is presenting physical risks to PPL's system, presenting risks to reliability that must be regularly taken into account as we prioritize capital investments in our infrastructure.
Chronic physical	Relevant, always included	Long-term temperature changes can affect PPL's facilities and operations as well as demand for electricity. PPL considers this in its operational and strategic planning.

C2.3

(C2.3) Have you identified any inherent climate-related risks with the potential to have a substantive financial or strategic impact on your business?

Yes

C2.3a

(C2.3a) Provide details of risks identified with the potential to have a substantive financial or strategic impact on your business.

Identifier

Risk 1

Where in the value chain does the risk driver occur?

Direct operations

Risk type & Primary climate-related risk driver

Emerging regulation

Carbon pricing mechanisms

Primary potential financial impact

Increased indirect (operating) costs

Company-specific description

Regulations that impose a cost of carbon either through a cap-and-trade program, clean energy standard or a tax would result in additional operational costs to our operations in Pennsylvania, Kentucky and/or the U.K., with the greatest potential impact to our Kentucky operations.

Time horizon

Long-term

Likelihood

Likely

Magnitude of impact

Low

Are you able to provide a potential financial impact figure?

Yes, an estimated range

Potential financial impact figure (currency)

Potential financial impact figure – minimum (currency)

456,477,897

Potential financial impact figure – maximum (currency)

698,142,666

Explanation of financial impact figure

Financial impact calculated using PPL's 2019 domestic Scope 1 emissions and the carbon price included in LGE and KU's Integrated Resource Plan of $17 - $26 per ton. This is very conservative as the bulk of the emissions are in Kentucky and our plan does not project a carbon price in Kentucky prior to 2026.

Cost of response to risk

730,000

Description of response and explanation of cost calculation

Cost of response is total 2019 federal lobbying expenditures. PPL manages the risk of emerging regulation and legislation through direct engagement with public officials and in partnership with our industry associations. PPL actively encourages public policy that furthers our ability to provide reliable and affordable electricity to our customers and our ability to function. PPL is also actively finding ways to provide clean energy options to its customers.

Comment

The time horizon for this risk is based on Kentucky's regulatory environment as the greatest financial impact would be in Kentucky.

Financial impact to the company is low as all prudent costs, including those to comply with regulations, are included in utility rates.

Identifier

Risk 2

Where in the value chain does the risk driver occur?

Downstream

Risk type & Primary climate-related risk driver

Market

Changing customer behavior

Primary potential financial impact

Decreased revenues due to reduced demand for products and services

Company-specific description

This risk includes shifts in demand due to changing consumer preferences as well as evolving technologies allowing new entrants into the market.

Time horizon

Long-term

Likelihood

More likely than not

Magnitude of impact

Low

Are you able to provide a potential financial impact figure?

Yes, an estimated range

Potential financial impact figure (currency)

Potential financial impact figure – minimum (currency)

1,800,000

Potential financial impact figure – maximum (currency)

3,600,000

Explanation of financial impact figure

Financial impact is total revenue impact to our Kentucky operations based upon current and future forecasts of reduced sales from distributed energy resources. Impact is currently mitigated by real-time recovery of lost revenues in rates.

Financial impact is based upon current regulation and tax benefits.

Cost of response to risk

100,000,000

Description of response and explanation of cost calculation

PPL is enabling the deployment of renewables and distributed energy resources through direct investments and is also actively finding ways to provide clean energy options to its customers. Cost of management is the annual capital investments of PPL Renewables and Safari, which are directly engaged in providing competitive renewable and storage products.

Comment

In addition to PPL Renewables and Safari, our Kentucky operations are taking a variety of measures to provide clean energy options to customers. LGE and KU retain their monopoly status for all operations including generation, and all LGE and KU's management costs are fully recoverable in rates.

Identifier

Risk 3

Where in the value chain does the risk driver occur?

Direct operations

Risk type & Primary climate-related risk driver

Acute physical

Increased severity and frequency of extreme weather events such as cyclones and floods

Primary potential financial impact

Increased indirect (operating) costs

Company-specific description

The increasing frequency of severe storms and storm systems can disrupt PPL's operations, increase costs and hurt the reliability of PPL's service in a variety of ways, including increased flooding and severe storms that could damage equipment or disrupt fuel supply, and outages due to fallen trees and debris which can bring down power lines and block access for restoration efforts.

Time horizon

Short-term

Likelihood

Virtually certain

Magnitude of impact

Low

Are you able to provide a potential financial impact figure?

Yes, a single figure estimate

Potential financial impact figure (currency)

7,000,000

Potential financial impact figure – minimum (currency)

Potential financial impact figure – maximum (currency)

Explanation of financial impact figure

Financial impact is PPL EU's unrecoverable storm expense of Superstorm Sandy, the most expensive single storm event experienced across the enterprise in the last decade. Total storm expense (O&M) was $51.4 million dollars before insurance coverage.

Cost of response to risk

2,800,000,000

Description of response and explanation of cost calculation

All of PPL's operating companies monitor their reliability performance and conduct planning analyses of their systems, looking at trends in weather, vegetation management and other impacts to system reliability. Based on these analyses, PPL is planning to invest approximately $14 billion from 2020 through 2024 in infrastructure improvements, the bulk of which is for investments to modernize and strengthen its grid to be more resilient to storm impacts and other stresses on the system. The calculated cost for 2019 is 1/5 of this amount and not the actual amount expended.

Comment

Magnitude of impact is low due to ability of company to recover costs of storms.

Identifier

Risk 4

Where in the value chain does the risk driver occur?

Direct operations

Risk type & Primary climate-related risk driver

Emerging regulation

Mandates on and regulation of existing products and services

Primary potential financial impact

Other, please specify

Decreased capital expenditures due to changing regulation

Company-specific description

Changes in technology and new regulatory requirements regarding electric delivery have the potential to cause erosion of regulated rate base, as solutions may be operating expense rather than CAPEX driven.

Time horizon

Short-term

Likelihood

Likely

Magnitude of impact

Medium

Are you able to provide a potential financial impact figure?

Yes, a single figure estimate

Potential financial impact figure (currency)

35,112,000

Potential financial impact figure – minimum (currency)

Potential financial impact figure – maximum (currency)

Explanation of financial impact figure

In 2019 WPD contracted 123 MW of demand side response (flexibility) that over the period delivered 543 MWh of flexibility, which at an operating expense of £547k deferred and/or avoided reinforcement spend to the value of £26.4m.

Cost of response to risk

Description of response and explanation of cost calculation

Response to risk cannot be currently quantified. Management includes understanding and advocating for appropriate rate treatment.

Work is being undertaken to understand how demand side response would be

appropriately delivered while maintaining a rate of return for WPD and benefit for connected and connecting customers.

Comment

A current example of this is in the U.K. where increasing requirements for demand side response (flexibility service) are being considered as a suitable alternative to defer or mitigate the need for traditional distribution network asset reinforcement schemes.

C2.4

(C2.4) Have you identified any climate-related opportunities with the potential to have a substantive financial or strategic impact on your business?

Yes

C2.4a

(C2.4a) Provide details of opportunities identified with the potential to have a substantive financial or strategic impact on your business.

Identifier

Opp1

Where in the value chain does the opportunity occur?

Direct operations

Opportunity type

Products and services

Primary climate-related opportunity driver

Development of climate adaptation, resilience and insurance risk solutions

Primary potential financial impact

Increased value of fixed assets

Company-specific description

Additional enhancements to the grid are necessary to make it stronger, more resilient and flexible to withstand increasingly frequent severe storm events, as well as to enable the connection of distributed renewable and low-carbon generation sources. Such projects support long-term earnings growth and have typically offered favorable returns on investment.

Time horizon

Short-term

Likelihood

Virtually certain

Magnitude of impact

High

Are you able to provide a potential financial impact figure?

Yes, a single figure estimate

Potential financial impact figure (currency)

270,200,000

Potential financial impact figure – minimum (currency)

Potential financial impact figure – maximum (currency)

Explanation of financial impact figure

The magnitude of financial impact reflects the return expected on investments needed to enhance and modernize the grid, including transmission and distribution enhancements. The 2019 average authorized ROE for electric utilities of 9.65% was used as a proxy.

Cost to realize opportunity

2,800,000,000

Strategy to realize opportunity and explanation of cost calculation

All of PPL's operating companies monitor their reliability performance and conduct planning analyses of their systems, looking at trends in weather, vegetation management and other impacts to system reliability. Based on these analyses, PPL is planning to invest approximately $14 billion from 2020 through 2024 in infrastructure improvements, including replacing wood poles with steel. The stated cost for 2019 is 1/5 of this amount not the actual amount expended.

Comment

Opportunity to earn a return on investments in modernizing and strengthening the grid in all of PPL's operating areas. Investments are recovered through customer rates.

Identifier

Opp2

Where in the value chain does the opportunity occur?

Downstream

Opportunity type

Energy source

Primary climate-related opportunity driver

Use of new technologies

Primary potential financial impact

Returns on investment in low-emission technology

Company-specific description

Asset reinforcement to support electrification. Transitioning of heating from gas to electricity (principally heat pumps) is an important step for the U.K. to transition to a low-carbon economy and meet the government's commitments of a net-zero economy by 2050.

Time horizon

Medium-term

Likelihood

Very likely

Magnitude of impact

Medium-low

Are you able to provide a potential financial impact figure?

No, we do not have this figure

Potential financial impact figure (currency)

Potential financial impact figure – minimum (currency)

Potential financial impact figure – maximum (currency)

Explanation of financial impact figure

Impact is increased utilization of WPD's network; financial figure not available.

Cost to realize opportunity

228,760,000

Strategy to realize opportunity and explanation of cost calculation

Utilizing strategic network investment modelling to determine the distribution network reinforcement required to support the U.K. Government's net-zero commitment to determine the proposed reinforcement costs associated with facilitating the connection of low-carbon technologies and more specifically heat pumps. This investment will be targeted at low-carbon technology hotspots, ensuring timely investment in network reinforcement. In the period 2015-2023, WPD is investing £172 million (as part of the £7.1 billion to manage and develop the network) to specifically target network reinforcement to support the connection of low-carbon technologies.

Comment

All of PPL's businesses are working to make system enhancements necessary to meet electricity demand over the long term to support electrification efforts, including the adoption of electricity-fueled transportation. The U.K. is more advanced than the U.S. in this area, and WPD's investments serve as a proxy for assessing future domestic opportunities.

Identifier

Opp3

Where in the value chain does the opportunity occur?

Direct operations

Opportunity type

Products and services

Primary climate-related opportunity driver

Ability to diversify business activities

Primary potential financial impact

Increased revenues resulting from increased demand for products and services

Company-specific description

Increased demand for renewable energy and declining cost of renewables provide new investment opportunities in the unregulated and regulated renewable and distributed energy space, including solar generation and energy storage solutions driven by customer demand, favorable policies, and retirement of existing coal plants.

Time horizon

Short-term

Likelihood

Virtually certain

Magnitude of impact

Low

Are you able to provide a potential financial impact figure?

No, we do not have this figure

Potential financial impact figure (currency)

Potential financial impact figure – minimum (currency)

Potential financial impact figure – maximum (currency)

Explanation of financial impact figure

Annual revenue figure for Safari is not publicly disclosed.

Cost to realize opportunity

100,000,000

Strategy to realize opportunity and explanation of cost calculation

Safari Energy, a leading provider of solar energy solutions in the United States, is investing approximately $100 million annually to develop solar and storage projects.

Comment

All of PPL's businesses are involved in creating new products and services to enable or generate distributed energy resources. Safari is directly engaged in this business.

C3. Business Strategy

C3.1

(C3.1) Have climate-related risks and opportunities influenced your organization's strategy and/or financial planning?

Yes

C3.1a

(C3.1a) Does your organization use climate-related scenario analysis to inform its strategy?

Yes, qualitative and quantitative

C3.1b

(C3.1b) Provide details of your organization's use of climate-related scenario analysis.

Climate-related scenarios and models applied	Details
IEA 450 Other, please specify Each operating company uses its own in-house scenario analysis.	Climate-related scenario analyses and predictive analytics are used at the enterprise level as well as at the operating company level. At the enterprise level, these analyses guide overall business investment and strategy. At the operating company level, these analyses guide operational strategies and decisions. In 2017, PPL conducted a detailed assessment of how future requirements and technological advances aimed at limiting global warming to 2 degrees Celsius above pre-industrial levels could impact PPL. In conducting the assessment, PPL considered the recommendations of the Task Force on Climate-Related Financial Disclosures. The assessment examined several policy and technology scenarios, including a scenario consistent with limiting global temperatures to an increase of 2 degrees Celsius over pre-industrial levels as set forth in IEA 450. A report of the assessment is publicly available on PPL's website. PPL recognizes that IEA's Sustainable Development Scenarios continue to evolve as global goalposts shift. This will be reflected in PPL's updated assessment expected in 2021. The 2017 assessment formed the basis for PPL's first carbon reduction goal, and PPL will continue to use these assessments to guide PPL's long-term business strategy. At the operating company level, all companies monitor their reliability

	performance and conduct planning analyses of their systems, looking at trends in weather, vegetation management and other impacts to system reliability under various scenarios. For example, as part of these analyses in Pennsylvania, PPL EU is replacing many of its wooden poles with steel structures and is adding more redundancies to the system. In the U.K, WPD has created a climate adaptation plan and has a rigorous flood control program for its substations.

C3.1d

(C3.1d) Describe where and how climate-related risks and opportunities have influenced your strategy.

	Have climate-related risks and opportunities influenced your strategy in this area?	Description of influence
Products and services	Yes	The reliability of PPL's electric service is at risk of being impacted by increasingly frequent severe storm events as well as the increase in distributed energy resources and private renewable energy. This poses a risk of adversely affecting PPL's reputation and future rate recovery but also presents the opportunity to invest in modernizing the grid with more storm-resistant materials, increased redundancies, automated systems and more data-driven management of the grid. PPL is also making enhancements necessary to meet electricity demand over the longer-term to support the adoption of electricity-fueled transportation. In addition to grid enhancements, PPL is offering new types of products and services in response to increasing public desire for renewable energy. LGE and KU have recently built the largest universal solar facility in Kentucky and have begun construction of a community solar site. WPD is transitioning from a Distribution Network Operator to a Distribution System Operator which will allow WPD to more proactively support customer adoption of low-carbon technologies. In 2018, PPL acquired Safari Energy, a leading provider of solar energy solutions for commercial customers in the United States.
Supply chain and/or value chain	Yes	Through PPL's Supplier Code of Conduct, suppliers have an obligation to carry out all of their activities on our behalf in ways that preserve and promote a clean, safe and healthy environment, which includes understanding and abiding by our environmental policies and the environmental laws and regulations applicable to the locations in which we

		operate. PPL EU requires electricity suppliers to provide sufficient renewable energy credits to allow PPL EU to meet Pennsylvania's Alternative Energy Portfolio Standards requirements. Additionally, PPL EU is purchasing remanufactured furniture from its furniture manufacturer and supplier and intends to purchase remanufactured office panels going forward. In 2019, LGE and KU issued a request for proposal to energy suppliers for solar energy to meet increasing demand for renewable energy from certain customers. The WPD purchasing team follows the company's sustainable purchasing practices and sustainability policy to ensure all suppliers understand the concept of sustainability and recognize how business operations can influence sustainability outcomes both for WPD, themselves and other third parties. Throughout the duration of a contract, the WPD purchasing team have the role of discussing sustainability with a view to achieving the following actions: • Understanding how suppliers manage sustainability aspects within their own organizations by asking specific questions included in Sustainability Questions for Contract Review Meetings (CRM) • Recognizing and highlighting any opportunities for improvement i.e. potential alterations to specifications, use of alternative products or services etc.
Investment in R&D	Yes	PPL is a long-time member of the Electric Power Research Institute (EPRI) which conducts research and development on a variety of electric sector topics including climate change, carbon capture and electrification. PPL is a participant in research projects to advance low-carbon technologies including the recently announced Low-Carbon Resources Initiative to accelerate the development and demonstration of low-carbon energy technology. PPL EU is participating in the Keystone Solar Future Project which leverages several different grid technologies to develop a distributed system platform that bridges the gap between existing and future technologies by monitoring, controlling, and optimizing high penetration of solar generation. Additionally, PPL EU is working to carry out a

		500-customer pilot on at least 10 distribution circuits. LGE and KU have created an Energy Storage Research and Demonstration Site to continue developing large-scale battery storage technologies. WPD participates in the U.K. Network Innovation Allowance and Competitions, which has launched projects that test innovative methods to enable the widespread adoption by customers of low-carbon technologies. This includes technology such as solar panels, heat pumps and electric vehicles. Projects underway include Electric Nation, which has piloted electric vehicle usage on a large scale to determine impacts on the grid and required investments to support electric vehicle deployment.
Operations	Yes	Operational impacts are primarily related to enhancing and managing the grid in all of PPL's service areas to meet the growing demand for renewable energy, and to address physical risks from increasingly frequent severe storms. WPD's operations will be significantly altered when it completes its transition from Distribution Network Operator to Distribution System Operator.

C3.1e

(C3.1e) Describe where and how climate-related risks and opportunities have influenced your financial planning.

	Financial planning elements that have been influenced	Description of influence
Row 1	Capital expenditures Capital allocation Acquisitions and divestments	PPL's low-carbon transition strategy is to continue to grow our non-carbon based transmission and distribution portfolio, economically reduce the carbon intensity of our generation portfolio, increase our investment in renewables and distributed energy resources, and invest in new technologies to make the grid more reliable, dynamic and resilient. Climate-related issues are assessed and integrated in business objectives and strategy at various levels throughout the company. Strategy groups across our company evaluate different options to inform business strategy, using modeling and input from our internal experts and third parties as needed. Ultimately, these assessments inform our business strategy at the enterprise level and the operating company level. The company reduced its carbon emissions by 56% from 2010 to 2019, putting us on a path to reach our current goal of an 80% reduction by 2050 and 70% by 2040. In 2019, generation accounted for less than

		25% of the company's revenues and about 15% of our rate base, with the vast majority of revenues and rate base tied to the distribution and transmission of electricity and natural gas. Capital allocation and expenditures We have invested more than $27 billion over the past decade to strengthen grid resilience in the face of future storms, reduce power plant emissions and prepare networks to better integrate more distributed energy resources, including renewables and energy storage. We expect to invest an additional $14 billion through 2024 to further advance these efforts. Examples of specific actions to increase our use of clean energy and lower carbon emitting technology have included: • In early 2019, LGE and KU began construction of the first 500-kilowatt section of their Solar Share Program thanks to founding partner Ford Motor Company and other participating business and residential customers. The nearly 1,400-panel array became fully operational and began serving up solar energy in July 2019. • From June 2018 to May 2019, alternative power sources comprised 15.2% of the power PPL Electric bought for customers who had not chosen a competitive supplier. This included 7% from solar, wind and hydropower energy sources. The renewable energy obligation for June 2019 through May 2020 is 15.7%. • In Pennsylvania, PPL Electric developed and implemented an advanced Distributed Energy Resource Management System designed to manage solar, wind and other renewable power coming onto the grid. Moving forward, it will help PPL Electric better integrate more distributed energy resources like private solar, while preserving network reliability and power quality. • In the U.K., WPD continued to support the U.K.'s Net-Zero goal by participating in the U.K. Network Innovation Allowance and Competitions, which has launched projects that test innovative methods to enable the widespread adoption by customers of low-carbon technologies. This includes technology such as solar panels, heat pumps and electric vehicles. • In 2018/2019, WPD achieved a 17% reduction in its business carbon footprint from 2012/2013 levels and connected 6.2 gigawatts of renewable energy to its network. Acquisitions and divestments In 2018, PPL acquired Safari Energy, LLC in 2018, which has developed hundreds of commercial-scale solar projects since 2008. These projects have generated approximately 300 million kilowatt-hours of electricity, or the equivalent of avoiding more than 200,000 metric tons of CO2 emissions. The company has deployed up to $100 million a year in

		capital for this business. In 2019, Safari acquired solar generation with a nameplate capacity of 17.529 MW (AC), which produced 3,798 MWh. Through 2019, PPL also retired approximately 1,200 megawatts of coal-fired generation in Kentucky. This is in addition to the 4000 megawatts of competitive generation divested in 2015.

C3.1f

(C3.1f) Provide any additional information on how climate-related risks and opportunities have influenced your strategy and financial planning (optional).

At the enterprise level, input from our strategy groups (including input on climate-related issues) resulted in PPL's decision to strategically restructure the corporation in 2015, significantly reducing the power generation component of its portfolio. In 2018, PPL acquired Safari Energy, a leading provider of solar energy solutions for commercial customers in the United States. PPL was the first U.S.-based utility to release a scenario-based climate assessment of its generation portfolio. That assessment informed the company's first carbon reduction goal, announced in early 2018. PPL recently announced a more ambitious enterprise-wide goal of 80% carbon reduction by 2050 and advanced the prior 70% goal by 10 years (by 2040) based upon updated resource planning and market dynamics. Through 2019, PPL's Kentucky operations have economically retired 1,200 MW of coal-fired generation and are expanding renewable options for customers through construction of solar facilities and purchase power agreements for new, in-state solar energy (currently under regulatory review).

At the operating company level, multi-disciplinary teams research, evaluate and model changing business conditions, including physical and transition risks related to climate change. These assessments drive the operating company's business plans. For example, we are making significant investments in grid reliability and resilience, recognizing that increased renewables on the grid as well as increasingly frequent severe storms require a more modern and flexible grid. In 2019, our operating companies invested about $3 billion, the bulk of which was invested in transmission and distribution infrastructure improvements. Under our business plans, we are on track to invest approximately $14 billion from 2020 through 2024 in projects that strengthen reliability, make the grid smarter and more resilient, and enable reliable integration of increased renewable energy on our networks. Our U.K. utilities alone have connected more than 6.2 GW of renewable energy to the grid. In Pennsylvania, PPL Electric Utilities developed and implemented an advanced Distributed Energy Resource Management System designed to manage solar, wind and other renewable power coming onto the grid.

C4. Targets and performance

C4.1

(C4.1) Did you have an emissions target that was active in the reporting year?

Absolute target

C4.1a

(C4.1a) Provide details of your absolute emissions target(s) and progress made against those targets.

Target reference number
Abs 1

Year target was set
2017

Target coverage
Company-wide

Scope(s) (or Scope 3 category)
Other, please specify
Scope 1 + 2 (location and market-based)

Base year
2010

Covered emissions in base year (metric tons CO2e)
62,577,296

Covered emissions in base year as % of total base year emissions in selected Scope(s) (or Scope 3 category)
99.9

Target year
2050

Targeted reduction from base year (%)
70

Covered emissions in target year (metric tons CO2e) [auto-calculated]
18,773,188.8

Covered emissions in reporting year (metric tons CO2e)
27,405,245

% of target achieved [auto-calculated]
80.2939570014

Target status in reporting year
Underway

Is this a science-based target?
No, and we do not anticipate setting one in the next 2 years

Please explain (including target coverage)

Note that PPL's absolute reduction from 2010 baseline is 56.2%. PPL's 2050 goal was publicly announced in January 2018 and covers Scope 1 and Scope 2 CO2e emissions. In February 2020, PPL increased its carbon reduction goal and adopted a more aggressive timeline for achievement of the original goal – 80% reduction by 2050 and a 70% reduction by 2040. Regarding calculation of Scope 2 emissions, LGE and KU's emissions are calculated using a hybrid of location based and market-based factors. LGE and KU have access to location-based factors for power procured from specific contracted units. LGE and KU also purchase a small amount of power in the wholesale market. Emissions associated with all electric and gas use in buildings across all operations (LGE, KU, PPL EU and WPD) are calculated based on market-based factors.

C4.2

(C4.2) Did you have any other climate-related targets that were active in the reporting year?

Target(s) to increase low-carbon energy consumption or production
Other climate-related target(s)

C4.2a

(C4.2a) Provide details of your target(s) to increase low-carbon energy consumption or production.

Target reference number
Low 1

Year target was set
2007

Target coverage
Business division

Target type: absolute or intensity
Absolute

Target type: energy carrier
Electricity

Target type: activity
Consumption

Target type: energy source
Renewable energy source(s) only

Metric (target numerator if reporting an intensity target)
Percentage

Target denominator (intensity targets only)

Base year
2007

Figure or percentage in base year
5.7

Target year
2021

Figure or percentage in target year
18

Figure or percentage in reporting year
15.2

% of target achieved [auto-calculated]
77.2357723577

Target status in reporting year
Underway

Is this target part of an emissions target?
No

Is this target part of an overarching initiative?
Other, please specify
Pennsylvania Act 129

Please explain (including target coverage)
PPL EU's PA Alternative Energy Portfolio Standard for CY2019 is 15.2%, which we achieved. The final target is 18% by CY2021.

C4.2b

(C4.2b) Provide details of any other climate-related targets, including methane reduction targets.

Target reference number
Oth 1

Year target was set
2016

Target coverage
Business division

Target type: absolute or intensity
Absolute

Target type: category & Metric (target numerator if reporting an intensity target)

Energy consumption or efficiency

MWh

Target denominator (intensity targets only)

Base year

2016

Figure or percentage in base year

Target year

2021

Figure or percentage in target year

1,443,035

Figure or percentage in reporting year

1,443,035

% of target achieved [auto-calculated]

Target status in reporting year

Achieved

Is this target part of an emissions target?

No

Is this target part of an overarching initiative?

Other, please specify

Pennsylvania Act 129

Please explain (including target coverage)

PPL EU has achieved Act 129 Phase 3 targets. Phase IV (new targets) is currently projected to go into effect in 2021 – pending PA PUC action and order.

Target reference number

Oth 2

Year target was set

2015

Target coverage

Business division

Target type: absolute or intensity

Absolute

Target type: category & Metric (target numerator if reporting an intensity target)

Waste management

Percentage of total waste generated that is recycled

Target denominator (intensity targets only)

Base year

2012

Figure or percentage in base year

47.8

Target year

2023

Figure or percentage in target year

70

Figure or percentage in reporting year

90

% of target achieved [auto-calculated]

190.0900900901

Target status in reporting year

Achieved

Is this target part of an emissions target?

No

Is this target part of an overarching initiative?

No, it's not part of an overarching initiative

Please explain (including target coverage)

WPD Waste management ED1 Business Plan Output. Reduce the percentage of waste being sent to landfill and increase percentage recycled or recovered.

Target reference number

Oth 3

Year target was set

2015

Target coverage

Business division

Target type: absolute or intensity

Absolute

Target type: category & Metric (target numerator if reporting an intensity target)

Other, please specify

Other, please specify

Reduction CO2 Footprint - Metrics tonnes of CO2

Target denominator (intensity targets only)

Base year

2012

Figure or percentage in base year

89,376

Target year

2023

Figure or percentage in target year

84,908

Figure or percentage in reporting year

79,764

% of target achieved [auto-calculated]

215.1298119964

Target status in reporting year

Achieved

Is this target part of an emissions target?

No

Is this target part of an overarching initiative?

No, it's not part of an overarching initiative

Please explain (including target coverage)

WPD Business carbon footprint (not including losses) ED1 Business Plan Output – 5% reduction over ED1 period.

Target reference number

Oth 4

Year target was set

2015

Target coverage

Business division

Target type: absolute or intensity

Absolute

Target type: category & Metric (target numerator if reporting an intensity target)

Other, please specify

Other, please specify

SF6 Reduction - Percentage reduction

Target denominator (intensity targets only)

Base year

2013

Figure or percentage in base year

0.46

Target year

2023

Figure or percentage in target year

0.31

Figure or percentage in reporting year

0.44

% of target achieved [auto-calculated]

13.3333333333

Target status in reporting year

Underway

Is this target part of an emissions target?

Yes

Is this target part of an overarching initiative?

No, it's not part of an overarching initiative

Please explain (including target coverage)

WPD ED1 business output reduce SF6 leak rate over the ED1 reporting period (2015-2023) as part of ED1 reduction in business carbon emissions.

C4.3

(C4.3) Did you have emissions reduction initiatives that were active within the reporting year? Note that this can include those in the planning and/or implementation phases.

Yes

C4.3a

(C4.3a) Identify the total number of initiatives at each stage of development, and for those in the implementation stages, the estimated CO2e savings.

	Number of initiatives	Total estimated annual CO2e savings in metric tonnes CO2e (only for rows marked *)
Under investigation	3	
To be implemented*	2	
Implementation commenced*	4	5,199
Implemented*	13	946,607
Not to be implemented		

C4.3b

(C4.3b) Provide details on the initiatives implemented in the reporting year in the table below.

Initiative category & Initiative type

Energy efficiency in buildings

Other, please specify

Energy efficiency and demand side management programs

Estimated annual CO2e savings (metric tonnes CO2e)

505,923

Scope(s)

Scope 3

Voluntary/Mandatory

Mandatory

Annual monetary savings (unit currency – as specified in C0.4)

23,795,380

Investment required (unit currency – as specified in C0.4)

57,182,010

Payback period

No payback

Estimated lifetime of the initiative

11-15 years

Comment

PPL EU: Pennsylvania's Act 129 legislation, which became effective in November 2008, requires EDC's to cost-effectively reduce electricity consumption and peak demand on their systems.

New energy efficiency plans need to be submitted to regulator.

Payback period is applicable only to customers and varies based on each project.

Initiative category & Initiative type

Low-carbon energy consumption
Low-carbon electricity mix

Estimated annual CO2e savings (metric tonnes CO2e)

265,077

Scope(s)

Scope 3

Voluntary/Mandatory

Mandatory

Annual monetary savings (unit currency – as specified in C0.4)

Investment required (unit currency – as specified in C0.4)

Payback period

No payback

Estimated lifetime of the initiative

Ongoing

Comment

PPL EU: Alternative Energy Portfolio Standards Act requires Pennsylvania’s Electric Distribution Companies (EDC's) to purchase a set amount of power from alternative sources like solar, wind and biofuels. By 2021, companies will need to purchase eight percent of their overall power from “tier 1” renewable energy sources.

Initiative category & Initiative type

Transportation
Company fleet vehicle efficiency

Estimated annual CO2e savings (metric tonnes CO2e)

954

Scope(s)

Scope 1

Voluntary/Mandatory

Voluntary

Annual monetary savings (unit currency – as specified in C0.4)

2,308,333

Investment required (unit currency – as specified in C0.4)

13,850,000

Payback period

4-10 years

Estimated lifetime of the initiative

Ongoing

Comment

PPL EU: PPL EU established a goal to spend 10% of transportation capital on EV technology from 2019 – 2025, which will result in replacing more than 80% of bucket trucks with electric lift technology bucket trucks by 2025.

Initiative category & Initiative type

Fugitive emissions reductions

Other, please specify

Reduction of SF6 Emissions

Estimated annual CO2e savings (metric tonnes CO2e)

3,252

Scope(s)

Scope 1

Voluntary/Mandatory

Voluntary

Annual monetary savings (unit currency – as specified in C0.4)

Investment required (unit currency – as specified in C0.4)

22,068,000

Payback period

No payback

Estimated lifetime of the initiative

Ongoing

Comment

PPL EU: Reductions are the 9-year average reduction in 2019 emissions compared to 2010 emissions. Since 2014, PPL EU has improved its leak rate faster than industry peers while increasing the total SF6 gas on the system by 209% and decreasing losses by 80% for an overall leak rate reduction of 83%. Based on the latest EPA benchmark data, this is 6th best in the country and top decile performance.

Payback period not yet calculated.

Initiative category & Initiative type

Company policy or behavioral change

Other, please specify

Carbon sequestration

Estimated annual CO2e savings (metric tonnes CO2e)

180

Scope(s)

Scope 3

Voluntary/Mandatory

Voluntary

Annual monetary savings (unit currency – as specified in C0.4)

Investment required (unit currency – as specified in C0.4)

125,000

Payback period

No payback

Estimated lifetime of the initiative

Ongoing

Comment

PPL EU: Beginning in 2017, PPL EU developed a new program within its service territory that focused on community environmental awareness and engagement through tree donations and school outreach.

The carbon sequestration benefits resulted were calculated using a 1998 publication by the U.S. Department of Energy for the “Calculation process for determining CO2e sequestration from planting various trees.” Through 2019, PPL EU has realized 360,000 lbs. of CO2 sequestration through this tree program. The program is funded in the current budget and by 2024 it is estimated a total CO2 sequestration of 2.2M lbs. will have been realized.

Initiative category & Initiative type

Company policy or behavioral change
Supplier engagement

Estimated annual CO2e savings (metric tonnes CO2e)
40.93

Scope(s)
Scope 3

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)

Investment required (unit currency – as specified in C0.4)

Payback period
No payback

Estimated lifetime of the initiative
Ongoing

Comment
PPL EU: The use of remanufactured furniture for PPL EU is ongoing and it is our intent to buy all furniture panels going forward as remanufactured. Our furniture manufacturer has significantly reduced the amount of waste and CO2 in their production product. Using them as our furniture supplier demonstrates our commitment to a cleaner environment.

Initiative category & Initiative type
Low-carbon energy consumption
Solar PV

Estimated annual CO2e savings (metric tonnes CO2e)
16.9

Scope(s)
Scope 2 (market-based)

Voluntary/Mandatory
Voluntary

Annual monetary savings (unit currency – as specified in C0.4)

Investment required (unit currency – as specified in C0.4)

Payback period

11-15 years

Estimated lifetime of the initiative

Ongoing

Comment

PPL EU: The first major solar project was completed at our Quarryville Service Center. This system produced 38 MWh of power in 2019 and 17.6 MWh in 2020 YTD. The CO2 equivalency for this first project already is 24.7 tons CO2 (US) and counting. PPL is working to develop and install a second system at another service center in the near future.

Initiative category & Initiative type

Energy efficiency in buildings
Maintenance program

Estimated annual CO2e savings (metric tonnes CO2e)

10,449

Scope(s)

Scope 2 (location-based)

Voluntary/Mandatory

Voluntary

Annual monetary savings (unit currency – as specified in C0.4)

Investment required (unit currency – as specified in C0.4)

Payback period

4-10 years

Estimated lifetime of the initiative

Ongoing

Comment

PPL EU: For 2019, all of PPL EU's buildings emitted a total of 22,650 tons of CO2 equivalent emissions based on power usage. When compared to PPL EU's 2014 equivalent emissions of 33,099 tons of CO2, this represents a reduction of 10,449 tons of CO2 emission reductions. This was achieved through building upgrades and modernization efforts which reduces power usage that directly benefits the environment.

Initiative category & Initiative type

Fugitive emissions reductions

Other, please specify

Reduction of SF6 Emissions

Estimated annual CO2e savings (metric tonnes CO2e)

Scope(s)

Scope 1

Voluntary/Mandatory

Voluntary

Annual monetary savings (unit currency – as specified in C0.4)

Investment required (unit currency – as specified in C0.4)

32,956,876

Payback period

No payback

Estimated lifetime of the initiative

Ongoing

Comment

PPL EU: In an effort to increase efficiency in system performance and maintenance as well as meet evolving environmental standards, PPL EU initiated a pilot program to test an innovative circuit breaker technology on its system. Vacuum circuit breakers are an environmentally friendly alternative to SF6 for insulating medium and high-voltage electrical equipment. Vacuum technology uses dry air as insulation material and has been demonstrated as highly reliable through 10,000 open/close mechanical operations tests. In addition to resolving the environmental and safety concerns associated with the use of chemical insulation, vacuum technology has an extended maintenance cycle and reduced arcing time, which allows for substantially more switching operations prior to required maintenance.

Initiative category & Initiative type

Low-carbon energy generation

Solar PV

Estimated annual CO2e savings (metric tonnes CO2e)

259

Scope(s)

Scope 1

Voluntary/Mandatory

Voluntary

Annual monetary savings (unit currency – as specified in C0.4)

6,700,000

Investment required (unit currency – as specified in C0.4)

Payback period

No payback

Estimated lifetime of the initiative

Ongoing

Comment

LGE and KU: Business Solar Program: Partnership with Archdiocese of Louisville and Solar Share Program.

LGE and KU generates and delivers electricity, as such these initiatives directly reduce Scope 1 emissions.

Investment and payback calculated on a project-specific basis.

Initiative category & Initiative type

Energy efficiency in buildings

Other, please specify

Demand Side Management Programs

Estimated annual CO2e savings (metric tonnes CO2e)

143,665

Scope(s)

Scope 1

Voluntary/Mandatory

Voluntary

Annual monetary savings (unit currency – as specified in C0.4)

Investment required (unit currency – as specified in C0.4)

44,000,000

Payback period

No payback

Estimated lifetime of the initiative

6-10 years

Comment

LGE and KU: In 2017 LGE and KU invested $44M in Demand Side Management Programs, which includes:
• Residential energy audits,
• Residential winterization,
• Residential appliance rebates,
• Residential behavior programs,
• Residential demand response,
• Residential education programs, and Commercial programs

LGE and KU generates and delivers electricity, as such these initiatives directly reduced Scope 1 emissions.

Payback period is applicable only to customers and varies based on each project.

Initiative category & Initiative type

Fugitive emissions reductions
Other, please specify
Reduction of SF6 Emissions

Estimated annual CO2e savings (metric tonnes CO2e)

5,384

Scope(s)

Scope 1

Voluntary/Mandatory

Voluntary

Annual monetary savings (unit currency – as specified in C0.4)

Investment required (unit currency – as specified in C0.4)

Payback period

No payback

Estimated lifetime of the initiative

Ongoing

Comment

LGE and KU: Reductions are the 8-year average reduction in 2019 emissions compared to 2010 emissions. LGE and KU are replacing equipment to reduce SF6 emissions (O&M expense).

Initiative category & Initiative type

Fugitive emissions reductions

Oil/natural gas methane leak capture/prevention

Estimated annual CO2e savings (metric tonnes CO2e)

0.4

Scope(s)

Scope 1

Voluntary/Mandatory

Voluntary

Annual monetary savings (unit currency – as specified in C0.4)

Investment required (unit currency – as specified in C0.4)

101,000,000

Payback period

No payback

Estimated lifetime of the initiative

11-15 years

Comment

LGE and KU: LGE and KU are using advanced in-line inspection tools to identify gas leaks more quickly and effectively.

Initiative category & Initiative type

Energy efficiency in buildings

Other, please specify

Combination of measures to achieve improved energy efficiency

Estimated annual CO2e savings (metric tonnes CO2e)

4,435.9

Scope(s)

Scope 2 (location-based)

Voluntary/Mandatory

Voluntary

Annual monetary savings (unit currency – as specified in C0.4)

105,210

Investment required (unit currency – as specified in C0.4)

Payback period

4-10 years

Estimated lifetime of the initiative

3-5 years

Comment

WPD: Committed to achieving an “excellent” energy rating under Building Research Establishment Environmental Assessment Method (BREEAM) for all its new buildings and a “very good” rating under BREEAM for all buildings it is refurbishing. BREEAM is the world’s longest established method of assessing, rating and certifying the sustainability of buildings. These are the highest ratings that can be achieved for each category. This has resulted in energy use reduction for WPD’s buildings of 36.9% since 2012-13.

Initiative category & Initiative type

Energy efficiency in production processes

Product or service design

Estimated annual CO2e savings (metric tonnes CO2e)

Scope(s)

Scope 2 (market-based)

Voluntary/Mandatory

Voluntary

Annual monetary savings (unit currency – as specified in C0.4)

35,112,000

Investment required (unit currency – as specified in C0.4)

Payback period

<1 year

Estimated lifetime of the initiative

Ongoing

Comment

WPD: Developed and used its Flexible Power initiative to contract through third parties to deliver energy solutions to the network throughout 2019, through three market offerings: secure, dynamic and restore. Flexible Power Initiative is part of the U.K net-zero initiative.

C4.3c

(C4.3c) What methods do you use to drive investment in emissions reduction activities?

Method	Comment

Compliance with regulatory requirements/standards	PPL determines and implements across its Pennsylvania, Kentucky and U.K. operations the least life cycle cost for compliance with federal, state, and local requirements.
Dedicated budget for energy efficiency	Under Pennsylvania's Act 129, PPL EU has a $312.5 million budget over 5 years for a program to incentivize its customers to install more energy-efficient lighting, HVAC equipment, motors, etc.
Financial optimization calculations	PPL conducts strategic reviews of its operations to select financially optimal solutions.
Partnering with governments on technology development	PPL EU's Keystone Solar Future Project is a three-year project funded in part by a grant from the U.S. Department of Energy. The project includes a number of private and public-sector partners to evaluate management of high levels of DR and the value of an integrated grid. In the U.K., Distribution Network Operators (DNOs) have a budget through Network Innovation Allowance and Competition. This regulatory funding mechanism allows DNOs to compete for funding to test new technology, operating and commercial arrangements. The aim of the projects is to help all DNOs understand how they can provide cost-effective security of supply as the U.K. moves to a low-carbon economy. WPD has delivered 52 projects under the Network Innovation Allowance and 3 from the Competition.
Dedicated budget for low-carbon product R&D	LGE and KU has a dedicated budget for research and development related to battery storage operations and maintenance.
Dedicated budget for other emissions reduction activities	Within the U.K., DNOs have a budget through the Low-Carbon Networks Fund, Network Innovation Allowance and Competition. This allows DNOs to test out new technology, operating and commercial arrangements. The aim of the projects is to help all DNOs understand how they can provide security of supply at value for money as Britain moves to a low-carbon economy. Within this fund mechanism WPD have delivered 52 projects under the Network Innovation Allowance and 3 from the Competition.

C4.5

(C4.5) Do you classify any of your existing goods and/or services as low-carbon products or do they enable a third party to avoid GHG emissions?

Yes

C4.5a

(C4.5a) Provide details of your products and/or services that you classify as low-carbon products or that enable a third party to avoid GHG emissions.

Level of aggregation

Product

Description of product/Group of products

Customer Energy Efficiency and Demand Side Management Services

Are these low-carbon product(s) or do they enable avoided emissions?

Avoided emissions

Taxonomy, project or methodology used to classify product(s) as low-carbon or to calculate avoided emissions

Other, please specify

Avoided emissions based on reduced consumption of electricity

% revenue from low carbon product(s) in the reporting year

0

Comment

Across the enterprise, these services include energy audits, winterization, appliance rebates, demand response and education to modify energy consumption behaviors. These services reduce revenue due to reduced use of our product (electricity).

Level of aggregation

Product

Description of product/Group of products

Alternative Energy Portfolio

Are these low-carbon product(s) or do they enable avoided emissions?

Low-carbon product and avoided emissions

Taxonomy, project or methodology used to classify product(s) as low-carbon or to calculate avoided emissions

Other, please specify

Power from low-carbon sources

% revenue from low carbon product(s) in the reporting year

0

Comment

For PPL EU, the Alternative Energy Portfolio Standards Act requires Pennsylvania Electric Distribution Companies to purchase a set amount of power from alternative sources like solar, wind and biofuels. By 2021 this must be 18% from renewable and low-carbon sources. These services have no impact on revenue.

Level of aggregation

Product

Description of product/Group of products

Low-carbon energy

Are these low-carbon product(s) or do they enable avoided emissions?

Low-carbon product and avoided emissions

Taxonomy, project or methodology used to classify product(s) as low-carbon or to calculate avoided emissions

Other, please specify

Solar PV

% revenue from low carbon product(s) in the reporting year

0

Comment

LGE and KU's Business Solar Program

Level of aggregation

Product

Description of product/Group of products

Low-carbon energy

Are these low-carbon product(s) or do they enable avoided emissions?

Low-carbon product and avoided emissions

Taxonomy, project or methodology used to classify product(s) as low-carbon or to calculate avoided emissions

Other, please specify

Community solar

% revenue from low carbon product(s) in the reporting year

0

Comment

LGE and KU are providing customers the opportunity to purchase low-carbon energy through participating in LGE and KU's community solar program.

Level of aggregation

Product

Description of product/Group of products

Low-carbon network

Are these low-carbon product(s) or do they enable avoided emissions?

Avoided emissions

Taxonomy, project or methodology used to classify product(s) as low-carbon or to calculate avoided emissions

Other, please specify

Plug-in vehicles

% revenue from low carbon product(s) in the reporting year

0

Comment

WPD MADE project, investigating the use of multiple low carbon technologies within a domestic property minimize carbon emissions associated with domestic energy use. The project started in September 2018.

Level of aggregation

Product

Description of product/Group of products

Low-carbon energy purchase

Are these low-carbon product(s) or do they enable avoided emissions?

Low-carbon product and avoided emissions

Taxonomy, project or methodology used to classify product(s) as low-carbon or to calculate avoided emissions

Other, please specify

Enabling commercial use of renewables

% revenue from low carbon product(s) in the reporting year

0

Comment

New systems and contracts with commercial customers to allow WPD to sell aggregated renewable capacity into other DSR schemes.

C-EU4.6

(C-EU4.6) Describe your organization's efforts to reduce methane emissions from your activities.

LGE is reducing methane emissions through its regular leak surveys and gas riser inspection and replacement program. In 2018, the utility also announced its plans to expand infrastructure upgrades within its natural gas system which include:

- Replacing aging steel service lines, with new plastic pipe;
  - LGE is implementing a KY Public Service Commission-approved program to replace approximately 45,000 steel customer service lines and removal of approximately 4,400 steel curbed services. The steel customer service lines are largely 30 to 35 years old or greater and susceptible to corrosion leaks. Through 2019, LGE has replaced about 5,925 customer services lines and 1,800 steel curbed services.

- Replacing aging natural gas transmission lines;
  - LGE is implementing a KY Public Service Commission-approved Transmission Modernization program to replace approximately 15.5 miles of transmission pipeline in Jefferson County. The transmission line is 45 – 60 years old. This is the first phase of the Transmission Modernization Program and construction is just starting on this work. It is anticipated the project will be largely complete by the end of 2020.
- Upgrades to city gate stations and gas regulation facilities with new valves, piping, and modern regulation and measurement equipment.

A gas main replacement program completed an initiative the utility began implementing in its system beginning in 1996 as it established a program committing to replacing 540 miles of cast iron, wrought iron and bare steel natural gas pipelines, which are more vulnerable to degradation over time. These lines will be replaced primarily with more durable plastic natural gas pipelines. The facility portion of this project was completed in 2017 with some restoration completed in 2018.

Gas Distribution Operations complies with all Pipeline and Hazardous Materials Safety Administration (PHMSA) and state regulatory requirements to prevent gas release.

C5. Emissions methodology

C5.1

(C5.1) Provide your base year and base year emissions (Scopes 1 and 2).

Scope 1

Base year start

January 1, 2010

Base year end

December 31, 2010

Base year emissions (metric tons CO2e)

60,906,564

Comment

Scope 1 (Gross): 60,736,086 + Scope 1 (Fleet Vehicles): 48,343 + Scope 1 (Small Plant Stationary): 2,515 + Scope 1 (Plant Mobile Equipment): 4,893 + Scope 1 (SF6): 114,727

Scope 2 (location-based)

Base year start

January 1, 2010

Base year end

December 31, 2010

Base year emissions (metric tons CO2e)

1,252,638

Comment

Estimated location-based CO2 emissions.

Scope 2 (market-based)

Base year start

January 1, 2010

Base year end

December 31, 2010

Base year emissions (metric tons CO2e)

344,519

Comment

Estimated market-based CO2 emissions.

C5.2

(C5.2) Select the name of the standard, protocol, or methodology you have used to collect activity data and calculate emissions.

Defra Voluntary 2017 Reporting Guidelines
US EPA Mandatory Greenhouse Gas Reporting Rule

C6. Emissions data

C6.1

(C6.1) What were your organization's gross global Scope 1 emissions in metric tons CO2e?

Reporting year

Gross global Scope 1 emissions (metric tons CO2e)

26,851,641

Start date

January 1, 2019

End date

December 31, 2019

Comment

Scope 1 (Gross): 26,740,576 + Scope 1 (Fleet Vehicles): 46,646 + Scope 1 (Small Plant Stationary): 4,056 + Scope 1 (Plant Mobile Equipment): 5,898 + Scope 1 (Gas Operations): 27,909 + Scope 1 (SF6) 26,556

Past year 1

Gross global Scope 1 emissions (metric tons CO2e)

29,609,494

Start date

January 1, 2018

End date

December 31, 2018

Comment

Scope 1 (Gross): 29,480,129 + Scope 1 (Fleet Vehicles): 43,256 + Scope 1 (Small Plant Stationary): 1,097 + Scope 1 (Plant Mobile Equipment): 6,459 + Scope 1 (Gas Operations): 29,040 + Scope 1 (SF6): 49,513

Past year 2

Gross global Scope 1 emissions (metric tons CO2e)

28,587,423

Start date

January 1, 2017

End date

December 31, 2017

Comment

Scope 1 (Gross): 28,407,677 + Scope 1 (Fleet Vehicles): 47,630 + Scope 1 (Small Plant Stationary): 8,984 + Scope 1 (Plant Mobile Equipment): 4,893 + Scope 1 (Gas Operations): 28,132 + Scope 1 (SF6): 90,107

Past year 3

Gross global Scope 1 emissions (metric tons CO2e)

28,941,770

Start date

January 1, 2016

End date

December 31, 2016

Comment

Scope 1 (Gross): 28,737,028 + Scope 1 (Fleet Vehicles): 46,633 + Scope 1 (Small Plant Stationary): 32,645 + Scope 1 (Plant Mobile Equipment): 4,893 + Scope 1 (Gas Operations): 35,376 + Scope 1 (SF6): 85,195

C6.2

(C6.2) Describe your organization's approach to reporting Scope 2 emissions.

Row 1

Scope 2, location-based

We are reporting a Scope 2, location-based figure

Scope 2, market-based

We are reporting a Scope 2, market-based figure

Comment

LGE and KU Scope 2 emissions are calculated using a hybrid of location based and market-based factors. LGE and KU have access to location-based factors for power procured from specific contracted units. LGE and KU also purchase a small amount of power in the wholesale market. Emissions associated with all electric and gas use in buildings across all operations (PPL EU, LGE, KU, and WPD) are calculated based on market-based factors.

C6.3

(C6.3) What were your organization's gross global Scope 2 emissions in metric tons CO2e?

Reporting year

Scope 2, location-based

532,952

Scope 2, market-based (if applicable)

48,560

Start date

January 1, 2019

End date

December 31, 2019

Comment

LGE and KU's market-based emissions for building electricity use and gas use have been corrected for all years.

Past year 1

Scope 2, location-based

241,199

Scope 2, market-based (if applicable)

51,755

Start date

January 1, 2018

End date

December 31, 2018

Comment

Past year 2

Scope 2, location-based
470,110

Scope 2, market-based (if applicable)
53,684

Start date
January 1, 2017

End date
December 31, 2017

Comment

Past year 3

Scope 2, location-based
558,092

Scope 2, market-based (if applicable)
50,926

Start date
January 1, 2016

End date
December 31, 2016

Comment

C6.4

(C6.4) Are there any sources (e.g. facilities, specific GHGs, activities, geographies, etc.) of Scope 1 and Scope 2 emissions that are within your selected reporting boundary which are not included in your disclosure?

No

C6.5

(C6.5) Account for your organization's gross global Scope 3 emissions, disclosing and explaining any exclusions.

Purchased goods and services

Evaluation status

Relevant, calculated

Metric tonnes CO2e

6,614,720

Emissions calculation methodology

EPA emission factors

Percentage of emissions calculated using data obtained from suppliers or value chain partners

0

Please explain

CO2e for total purchased electricity for end use electric customers in PA and end use gas customers in KY. Purchased electricity in KY is included in Scope 1.

Capital goods

Evaluation status

Relevant, not yet calculated

Please explain

Fuel-and-energy-related activities (not included in Scope 1 or 2)

Evaluation status

Relevant, calculated

Metric tonnes CO2e

6,281.9

Emissions calculation methodology

Defra conversion factors

Percentage of emissions calculated using data obtained from suppliers or value chain partners

100

Please explain

WPD Contractor / ESP fuel combustion activities

Upstream transportation and distribution

Evaluation status

Relevant, calculated

Metric tonnes CO2e

9,660.8

Emissions calculation methodology

Defra conversion factor for standard road transport fuel kg CO2 / unit diesel – 2.68779 / biodiesel = 2.62694 / petrol = 2.20307

Percentage of emissions calculated using data obtained from suppliers or value chain partners

100

Please explain

WPD Contractor / ESP operational and business transport

Waste generated in operations

Evaluation status

Relevant, not yet calculated

Please explain

Primary waste would be disposal or recycling of wood poles. Not calculated because of insignificant total.

Business travel

Evaluation status

Relevant, calculated

Metric tonnes CO2e

3,436.5

Emissions calculation methodology

Road: Total mileage data. Defra Conversion Factors (Diesel = 0.177530 and Petrol = 0.18368). Rail: collated and miles / tCO2e calculated. Defra conversion factor (kg Co2/km 0.04424 applied). Air: Flight miles are calculated based on Defra conversion factors. Sea: Defra conversion factor (kg CO2 / km 0.11287).

Percentage of emissions calculated using data obtained from suppliers or value chain partners

3

Please explain

As required by the U.K. Energy Regulator, Office of Gas and Electricity Markets (Ofgem), the methodology for the WPD business travel carbon footprint follows U.K. Carbon Reporting guidance as provided by Defra and which is compliant with the principles of the ”Greenhouse Gas Protocol” and the annual guidelines published Defra - GHG Conversion Factors for Company Reporting.

Employee commuting

Evaluation status

Relevant, not yet calculated

Please explain

Upstream leased assets

Evaluation status

Not relevant, explanation provided

Please explain

Insignificant as PPL does not generally lease assets from others.

Downstream transportation and distribution

Evaluation status

Not relevant, explanation provided

Please explain

The electricity and gas that we deliver to end users is not further transported or distributed.

Processing of sold products

Evaluation status

Not relevant, explanation provided

Please explain

The electricity and gas that we deliver to end users is not further processed.

Use of sold products

Evaluation status

Relevant, calculated

Metric tonnes CO2e

2,230,727

Emissions calculation methodology

Electric Greenhouse Gas Reporting Tool Subpart NN

Percentage of emissions calculated using data obtained from suppliers or value chain partners

0

Please explain

Value is calculated with LGE and KU internal data for the quantity of natural gas sold.

End of life treatment of sold products

Evaluation status

Relevant, not yet calculated

Please explain

Treatment of beneficially reused coal combustion products.

Downstream leased assets

Evaluation status

Not relevant, explanation provided

Please explain

PPL does not lease its assets to others.

Franchises

Evaluation status

Not relevant, explanation provided

Please explain

We have no upstream or downstream franchises.

Investments

Evaluation status

Not relevant, explanation provided

Please explain

There are no upstream or downstream investments resulting in any additional CO2e emissions.

Other (upstream)

Evaluation status

Not relevant, explanation provided

Please explain

We have no Other (upstream) CO2e emissions.

Other (downstream)

Evaluation status

Not relevant, explanation provided

Please explain

We have no Other (downstream) CO2e emissions.

C6.7

(C6.7) Are carbon dioxide emissions from biogenic carbon relevant to your organization?

Yes

C6.7a

(C6.7a) Provide the emissions from biogenic carbon relevant to your organization in metric tons CO2.

	CO2 emissions from biogenic carbon (metric tons CO2)	Comment
Row 1		Relevant to vegetation management and siting of facilities. Not yet calculated.

C6.10

(C6.10) Describe your gross global combined Scope 1 and 2 emissions for the reporting year in metric tons CO2e per unit currency total revenue and provide any additional intensity metrics that are appropriate to your business operations.

Intensity figure
0.00353

Metric numerator (Gross global combined Scope 1 and 2 emissions, metric tons CO2e)
27,433,154

Metric denominator
unit total revenue

Metric denominator: Unit total
7,769,000,000

Scope 2 figure used
Location-based

% change from previous year
8.07

Direction of change
Decreased

Reason for change
Increase in revenue and decrease in emissions, resulting in a lower intensity.

Intensity figure
0.83

Metric numerator (Gross global combined Scope 1 and 2 emissions, metric tons CO2e)
26,740,576

Metric denominator
megawatt hour generated (MWh)

Metric denominator: Unit total

32,282,872

Scope 2 figure used

Location-based

% change from previous year

2.35

Direction of change

Decreased

Reason for change

Decrease in emissions greater than decrease in generation due to more efficient generation, resulting in lower intensity.

C7. Emissions breakdowns

C7.1

(C7.1) Does your organization break down its Scope 1 emissions by greenhouse gas type?

Yes

C7.1a

(C7.1a) Break down your total gross global Scope 1 emissions by greenhouse gas type and provide the source of each used greenhouse warming potential (GWP).

Greenhouse gas	Scope 1 emissions (metric tons of CO2e)	GWP Reference
CO2	26,413,349	IPCC Fourth Assessment Report (AR4 - 100 year)
CH4	71,737	IPCC Fourth Assessment Report (AR4 - 100 year)
N2O	123,683	IPCC Fourth Assessment Report (AR4 - 100 year)

C-EU7.1b

(C-EU7.1b) Break down your total gross global Scope 1 emissions from electric utilities value chain activities by greenhouse gas type.

	Gross Scope 1 CO2 emissions	Gross Scope 1 methane emissions	Gross Scope 1 SF6 emissions	Total gross Scope 1 emissions	Comment

	(metric tons CO2)	(metric tons CH4)	(metric tons SF6)	(metric tons CO2e)	
Fugitives	27.1	1,115	1.19	66,179	Scope 1 Gas Operations and Scope 1 SF6 from Distribution Operations
Combustion (Electric utilities)	26,413,349	2,869	0	26,485,086	Scope 1 Gross MWh and Small Plant Stationary
Combustion (Gas utilities)	0	0	0	0	
Combustion (Other)	0	0	0	0	
Emissions not elsewhere classified	0	0	0	52,544	Plant Mobile Equipment and Fleet Vehicles

C7.2

(C7.2) Break down your total gross global Scope 1 emissions by country/region.

Country/Region	Scope 1 emissions (metric tons CO2e)
United States of America	26,819,800
United Kingdom of Great Britain and Northern Ireland	31,841

C7.3

(C7.3) Indicate which gross global Scope 1 emissions breakdowns you are able to provide.

By business division

C7.3a

(C7.3a) Break down your total gross global Scope 1 emissions by business division.

Business division	Scope 1 emissions (metric ton CO2e)
PPL EU	17,393
LGE and KU	26,802,407
WPD	31,841

C-CE7.4/C-CH7.4/C-CO7.4/C-EU7.4/C-MM7.4/C-OG7.4/C-ST7.4/C-TO7.4/C-TS7.4

(C-CE7.4/C-CH7.4/C-CO7.4/C-EU7.4/C-MM7.4/C-OG7.4/C-ST7.4/C-TO7.4/C-TS7.4) Break down your organization's total gross global Scope 1 emissions by sector production activity in metric tons CO2e.

	Gross Scope 1 emissions, metric tons CO2e	Comment
Electric utility activities	26,765,184	Gross Scope 1: emissions associated with gross MWh's (includes C02, N20 and CH4), emissions from small plant stationary fuel combustion sources not included in stack emissions, and emissions from plant mobile equipment and LGE and KU fleet vehicles.

C7.9

(C7.9) How do your gross global emissions (Scope 1 and 2 combined) for the reporting year compare to those of the previous reporting year?

Decreased

C7.9a

(C7.9a) Identify the reasons for any change in your gross global emissions (Scope 1 and 2 combined), and for each of them specify how your emissions compare to the previous year.

	Change in emissions (metric tons CO2e)	Direction of change	Emissions value (percentage)	Please explain calculation
Change in renewable energy consumption				
Other emissions reduction activities	22,957	Decreased	0.08	SF6 reduction initiatives
Divestment				
Acquisitions				
Mergers				
Change in output	2,739,553	Decreased	9.17	Emissions reduction from output include EW Brown coal plant retirements.

Change in methodology				
Change in boundary				
Change in physical operating conditions				
Unidentified				
Other				

C7.9b

(C7.9b) Are your emissions performance calculations in C7.9 and C7.9a based on a location-based Scope 2 emissions figure or a market-based Scope 2 emissions figure?

Market-based

C8. Energy

C8.1

(C8.1) What percentage of your total operational spend in the reporting year was on energy?

More than 0% but less than or equal to 5%

C8.2

(C8.2) Select which energy-related activities your organization has undertaken.

	Indicate whether your organization undertook this energy-related activity in the reporting year
Consumption of fuel (excluding feedstocks)	Yes
Consumption of purchased or acquired electricity	Yes
Consumption of purchased or acquired heat	No
Consumption of purchased or acquired steam	No
Consumption of purchased or acquired cooling	No
Generation of electricity, heat, steam, or cooling	Yes

C8.2a

(C8.2a) Report your organization's energy consumption totals (excluding feedstocks) in MWh.

	Heating value	MWh from renewable sources	MWh from non-renewable sources	Total (renewable and non-renewable) MWh
Consumption of fuel (excluding feedstock)	HHV (higher heating value)	0	336,785	336,785
Consumption of purchased or acquired electricity		35,598	72,518	108,116
Consumption of self-generated non-fuel renewable energy		3,197		3,197
Total energy consumption		38,795	409,303	448,098

C8.2b

(C8.2b) Select the applications of your organization's consumption of fuel.

	Indicate whether your organization undertakes this fuel application
Consumption of fuel for the generation of electricity	Yes
Consumption of fuel for the generation of heat	Yes
Consumption of fuel for the generation of steam	No
Consumption of fuel for the generation of cooling	No
Consumption of fuel for co-generation or tri-generation	No

C8.2c

(C8.2c) State how much fuel in MWh your organization has consumed (excluding feedstocks) by fuel type.

Fuels (excluding feedstocks)

Natural Gas

Heating value

HHV (higher heating value)

Total fuel MWh consumed by the organization

98,697

MWh fuel consumed for self-generation of electricity

0

MWh fuel consumed for self-generation of heat

0

Emission factor

0.18112

Unit

kg CO2e per gallon

Emissions factor source

EPA Emission Factors

Comment

Calculated for combined cycle plant and gas use in buildings.

Fuels (excluding feedstocks)

Diesel

Heating value

LHV (lower heating value)

Total fuel MWh consumed by the organization

180,765

MWh fuel consumed for self-generation of electricity

0

MWh fuel consumed for self-generation of heat

0

Emission factor

10.21

Unit

kg CO2e per gallon

Emissions factor source

EPA Emission Factors

Comment

EPA emission factors for diesel stated. Biodiesel conversion factor is similar

(DEFRA conversion factors are similar)

Fuels (excluding feedstocks)

Petrol

Heating value

LHV (lower heating value)

Total fuel MWh consumed by the organization

51,099.4

MWh fuel consumed for self-generation of electricity

0

MWh fuel consumed for self-generation of heat

0

Emission factor

7.98

Unit

kg CO2e per gallon

Emissions factor source

EPA Emission Factors

Comment

EPA emission factors used. Discounted by 10% to include ethanol content.

Fuels (excluding feedstocks)

Jet Gasoline

Heating value

HHV (higher heating value)

Total fuel MWh consumed by the organization

6,223.22

MWh fuel consumed for self-generation of electricity

0

MWh fuel consumed for self-generation of heat

0

Emission factor

0.6718

Unit

kg CO2e per gallon

Emissions factor source

2019 U.K. DEFRA Emission Factors

Comment

WPD's helicopter fleet

C-EU8.2d

(C-EU8.2d) For your electric utility activities, provide a breakdown of your total power plant capacity, generation, and related emissions during the reporting year by source.

Coal – hard

Nameplate capacity (MW)

4,715

Gross electricity generation (GWh)

27,907

Net electricity generation (GWh)

25,348

Absolute scope 1 emissions (metric tons CO2e)

23,970,295

Scope 1 emissions intensity (metric tons CO2e per GWh)

945.65

Comment

Total CO2e associated with gross generation divided by net generation. Net generation data excludes purchased power.

Net summer rating used for generation capacity consistent with SEC reporting (10-K).

Lignite

Nameplate capacity (MW)

0

Gross electricity generation (GWh)

0

Net electricity generation (GWh)

0

Absolute scope 1 emissions (metric tons CO2e)

0

Scope 1 emissions intensity (metric tons CO2e per GWh)

0

Comment

Oil

Nameplate capacity (MW)

0

Gross electricity generation (GWh)

0

Net electricity generation (GWh)

0

Absolute scope 1 emissions (metric tons CO2e)

0

Scope 1 emissions intensity (metric tons CO2e per GWh)

0

Comment

Gas

Nameplate capacity (MW)

2,742

Gross electricity generation (GWh)

6,713

Net electricity generation (GWh)

6,558

Absolute scope 1 emissions (metric tons CO2e)

2,766,363

Scope 1 emissions intensity (metric tons CO2e per GWh)

421.83

Comment

Net summer rating used for generation capacity consistent with SEC reporting (10-K).

Biomass

Nameplate capacity (MW)

0

Gross electricity generation (GWh)

0

Net electricity generation (GWh)

0

Absolute scope 1 emissions (metric tons CO2e)

0

Scope 1 emissions intensity (metric tons CO2e per GWh)

0

Comment

Waste (non-biomass)

Nameplate capacity (MW)

0

Gross electricity generation (GWh)

0

Net electricity generation (GWh)

0

Absolute scope 1 emissions (metric tons CO2e)

0

Scope 1 emissions intensity (metric tons CO2e per GWh)

0

Comment

Nuclear

Nameplate capacity (MW)

0

Gross electricity generation (GWh)

0

Net electricity generation (GWh)

0

Absolute scope 1 emissions (metric tons CO2e)

0

Scope 1 emissions intensity (metric tons CO2e per GWh)

0

Comment

Fossil-fuel plants fitted with CCS

Nameplate capacity (MW)

0

Gross electricity generation (GWh)

0

Net electricity generation (GWh)

0

Absolute scope 1 emissions (metric tons CO2e)

0

Scope 1 emissions intensity (metric tons CO2e per GWh)

0

Comment

Geothermal

Nameplate capacity (MW)

0

Gross electricity generation (GWh)

0

Net electricity generation (GWh)

0

Absolute scope 1 emissions (metric tons CO2e)

0

Scope 1 emissions intensity (metric tons CO2e per GWh)

0

Comment

Hydropower

Nameplate capacity (MW)

96

Gross electricity generation (GWh)

360

Net electricity generation (GWh)

357

Absolute scope 1 emissions (metric tons CO2e)

0

Scope 1 emissions intensity (metric tons CO2e per GWh)

0

Comment

Net summer rating used for generation capacity consistent with SEC reporting (10-K).

Wind

Nameplate capacity (MW)

0

Gross electricity generation (GWh)

0

Net electricity generation (GWh)

0

Absolute scope 1 emissions (metric tons CO2e)

0

Scope 1 emissions intensity (metric tons CO2e per GWh)

0

Comment

Solar

Nameplate capacity (MW)

8

Gross electricity generation (GWh)

18

Net electricity generation (GWh)

18

Absolute scope 1 emissions (metric tons CO2e)

0

Scope 1 emissions intensity (metric tons CO2e per GWh)

0

Comment

In addition to installed capacity, in 2019, Safari Energy, LLC acquired solar generation with a nameplate capacity of 17.529 MW (AC), which produced 3,798 MWh.

Marine

Nameplate capacity (MW)

0

Gross electricity generation (GWh)

0

Net electricity generation (GWh)

0

Absolute scope 1 emissions (metric tons CO2e)

0

Scope 1 emissions intensity (metric tons CO2e per GWh)

0

Comment

Other renewable

Nameplate capacity (MW)

0

Gross electricity generation (GWh)

0

Net electricity generation (GWh)

0

Absolute scope 1 emissions (metric tons CO2e)

0

Scope 1 emissions intensity (metric tons CO2e per GWh)

0

Comment

Other non-renewable

Nameplate capacity (MW)

0

Gross electricity generation (GWh)

2

Net electricity generation (GWh)

1

Absolute scope 1 emissions (metric tons CO2e)

0

Scope 1 emissions intensity (metric tons CO2e per GWh)

0

Comment

Petroleum – Scope 1 CO2e is captured in the coal number above.

Total

Nameplate capacity (MW)

7,561

Gross electricity generation (GWh)

35,000

Net electricity generation (GWh)

32,282

Absolute scope 1 emissions (metric tons CO2e)

27,736,658

Scope 1 emissions intensity (metric tons CO2e per GWh)

1,367.48

Comment

C-EU8.4

(C-EU8.4) Does your electric utility organization have a transmission and distribution business?

Yes

C-EU8.4a

(C-EU8.4a) Disclose the following information about your transmission and distribution business.

Country/Region

United States of America

Voltage level

Transmission (high voltage)

Annual load (GWh)

68,392

Annual energy losses (% of annual load)

5

Scope where emissions from energy losses are accounted for

Scope 2 (market-based)

Emissions from energy losses (metric tons CO2e)

0

Length of network (km)

17,475

Number of connections

129

Area covered (km2)

50,246

Comment

Defined as voltage not exceeding 69 kV.

This includes LGE and KU's location-based transmission as well as market-based transmission and distribution for PPL EU and LGE and KU.

Country/Region

United States of America

Voltage level

Distribution (low voltage)

Annual load (GWh)

68,392

Annual energy losses (% of annual load)

5

Scope where emissions from energy losses are accounted for

Scope 2 (market-based)

Emissions from energy losses (metric tons CO2e)

0

Length of network (km)

109,704

Number of connections

2,428,690

Area covered (km2)

50,246

Comment

Defined as voltage not exceeding 69 kV.

This includes LGE and KU's location-based transmission as well as market-based transmission and distribution for PPL EU and LGE and KU.

Country/Region
United Kingdom of Great Britain and Northern Ireland

Voltage level
Distribution (low voltage)

Annual load (GWh)
72,061

Annual energy losses (% of annual load)
5.3

Scope where emissions from energy losses are accounted for
Scope 2 (market-based)

Emissions from energy losses (metric tons CO2e)
0

Length of network (km)
226,441

Number of connections
7,935,613

Area covered (km2)
55,955

Comment
Defined as voltage not exceeding 132kV.

Number of connections are the total of end use customers. Distribution is Scope 3 for WPD.

C9. Additional metrics

C9.1

(C9.1) Provide any additional climate-related metrics relevant to your business.

C-EU9.5a

(C-EU9.5a) Break down, by source, your total planned CAPEX in your current CAPEX plan for power generation.

Primary power	CAPEX planned for power	Percentage of total CAPEX planned for	End year of	Comment

generation source	generation from this source	power generation	CAPEX plan	
Solar	100,000,000	100	2020	Percentage is for Safari Energy alone. Safari Energy is planning to design, engineer, install, own, and operate solar facilities at customer facilities across the United States.
Coal – hard	901,277,561	81.76	2024	Percentage is for LGE and KU alone and covers LGE and KU 2020 - 2024 CAPEX.
Gas	179,099,791	16.25	2024	Percentage is for LGE and KU alone and covers LGE and KU 2020 - 2024 CAPEX.
Hydropower	18,129,589	1.65	2024	Percentage is for LGE and KU alone and covers LGE and KU 2020 - 2024 CAPEX.
Solar	3,800,000	0.34	2024	Percentage is for LGE and KU alone and covers LGE and KU 2020 - 2024 CAPEX: Design, Engineering, Construction of solar facilities for the Companies' subscription-based Solar Share program (Solar facilities expected to be built based on customer demand, for utilities' residential and business customers interested in receiving solar energy credits generated from the facility).

C-EU9.5b

(C-EU9.5b) Break down your total planned CAPEX in your current CAPEX plan for products and services (e.g. smart grids, digitalization, etc.).

Products and services	Description of product/service	CAPEX planned for product/service	Percentage of total CAPEX planned products and services	End of year CAPEX plan
Distributed generation	PPL EU: Working with multiple research partners on the Keystone Solar Future Project to integrate and manage distributed energy resources (DER) like solar	5,219,425	0.8	2024

	systems onto the electrical system. The project created a fully automated renewable interconnection portal for customers to apply for DERs, provides state of the art inverter(s) to use and establishes communication to DERs through its innovative Distributed Energy Resource Management System (DERMS)			
Smart grid	PPL EU: The work associated with the development and installation of Smart Grid work will provide both reliability/operations benefits and CO2 reductions by eliminating a significant number of truck miles/traffic each day. This is done through system automation (i.e. remote switching and sectionalizing) and by using remote sensing (e.g. battery and transformer monitoring) to eliminate routine field inspections that were previously performed by field workers driving to each location. This remote sensing will also allow for better predictive maintenance through analytics that will also further extend the useful life of these assets and avoid indirect CO2 emissions from purchase of new assets.	34,164,477	5.21	2024
Other, please specify Battery	PPL EU: The work associated with the development and installation of Smart Grid work will provide both reliability/operations benefits and CO2 reductions by eliminating a significant number of truck roles/traffic each day. This is done through system automation (i.e. remote switching and sectionalizing) and by using remote sensing (e.g. batteries for substation power backup and transformer monitoring) to	3,466,100	0.53	2024

	eliminate routine field inspections that were previously performed by field workers driving to each location. This remote sensing will also allow for better predictive maintenance through analytics that will also further extend the useful life of these assets too.			
Smart grid	PPL EU: Smart Meters have net metering capabilities built for future distribution generation at the customer location and allow for Home Area Network (HAN) devices that can be paired with a customer facing HAN device. This device gives the consumer real time energy usage data that is intended to give the customer tools to make smarter energy choices. By allowing the consumer to make better energy decisions, it will reduce the over-all energy demand/generation. Less generation = less carbon emission into the atmosphere. PPL EU is currently working on a meter replacement project, which enables better management of power usage, more accurate outage reporting and new functionality that improves customer service is finishing a multi-year program that consists of a meter replacement project. This enables better management of power usage, more accurate outage reporting and new functionality that improves customer service.	22,032,169	3.36	2024
Other, please specify Motor operated load break air break	PPL EU: Investment in remote section devices (motor operated load break air breaks) to reduce truck miles traveled.	20,250,000	3.09	2024

Smart grid	LGE and KU: Meters and related system elements that communicate energy usage information to a utility and its customers in ways that allow customers to manage their energy usage and provide the utility with more dynamic information to use in managing the electric system; and Grid-management technologies such as communication networks and intelligent controls that enable utilities to operate more reliably and efficiently the electric system while providing more visibility and security for system operators.	172,256,000	26.25	2024
Smart grid	WPD: Innovation Projects to explore low-carbon technologies and assist networks to enable the increased adoption of renewables, electric vehicles, heat pumps, energy storage and demand side management.	77,486,588.69	11.81	2024
Other, please specify Heat pumps	WPD: Reinforcement of network for heat pumps.	7,151,850.23	1.09	2024
Charging networks	WPD: Reinforcement of network for electric charging points.	91,817,526.22	13.99	2024
Other, please specify Solar/Photovoltaic	WPD: Reinforcement of network for photovoltaic.	34,983,444.86	5.33	2024
Distributed generation	WPD: Reinforcement of network for distributed generation and DG Connections.	87,629,475.92	13.35	2024
Smart grid	WPD: Moving from Distribution Network Operator to Distribution System Operator to facilitate the move to smarter and flexible network management.	99,750,000	15.2	2024

C-CE9.6/C-CG9.6/C-CH9.6/C-CN9.6/C-CO9.6/C-EU9.6/C-MM9.6/C-OG9.6/C-RE9.6/C-ST9.6/C-TO9.6/C-TS9.6

(C-CE9.6/C-CG9.6/C-CH9.6/C-CN9.6/C-CO9.6/C-EU9.6/C-MM9.6/C-OG9.6/C-RE9.6/C-ST9.6/C-TO9.6/C-TS9.6) Does your organization invest in research and development (R&D) of low-carbon products or services related to your sector activities?

	Investment in low-carbon R&D	Comment
Row 1	Yes	Research and development into providing reliable and sustainable electricity is an important part of today's energy landscape. PPL's operating utilities participate in a variety of research and development activities throughout the year, including company research, industry-wide studies and partnerships with educational institutions and research organizations. In 2019, activities included: • PPL Electric partnered with Electric Power Research Institute on research related to energy storage, distribution systems, integration of distributed energy resources and crisis communications. • PPL Electric continued the Keystone Solar Project in partnership with Drexel University to model the effects of distributed energy on the grid. • PPL Electric and LGE and KU participate in industry research projects aimed at advancing understanding, technical research and multi-industry efforts to more effectively consider pollinators in day-to-day business operations. • LGE and KU continued its project with Electric Power Research Institute on an energy storage demonstration facility co-located with the E.W. Brown Solar Plant. Research conducted includes studies designed to understand integration benefits and challenges for battery energy storage. • LGE and KU have conducted several studies to understand emissions and cost benefits for converting customer end use technologies to electric from other fuel sources (i.e., natural gas, propane, diesel, gasoline). • LGE and KU partnered with the University of Kentucky to develop technologies that can capture carbon dioxide from coal generation. • As part of its Innovation Strategy, WPD conducts research and development activities across five broad areas: network performance and efficiency, low-carbon networks, smart grid and meters, the environment and customer service. Progress is tracked and published on an annual basis through WPD's Future Networks Program.

C-CO9.6a/C-EU9.6a/C-OG9.6a

(C-CO9.6a/C-EU9.6a/C-OG9.6a) Provide details of your organization's investments in low-carbon R&D for your sector activities over the last three years.

Technology area	Stage of development in the reporting year	Average % of total R&D investment over the last 3 years	R&D investment figure in the reporting year (optional)	Comment
Energy storage	Pilot demonstration	≤20%	3,466,100	PPL EU Battery Storage Demonstration: For Direct Cost to develop specifications, standards, design and construction.
Distributed energy resources	Full/commercial-scale demonstration	≤20%	5,219,525	PPL EU Keystone Solar Project: A U.S. D.O.E. grant project focused on improving distributed energy resource (DER) integration into PPL EU's distribution grid. Broken down into four phases: 1) development of a Renewable Interconnection Portal for customers, 2) development of a Distributed Energy Resource Management System (DERMS), 3) technology demonstration, and 4) high penetration simulation studies.
Energy storage	Pilot demonstration	≤20%	2,500,000	LGE and KU Battery Storage Demonstration: LGE and KU operates Kentucky's first and largest utility scale battery—a 1 MW, 2 MWh lithium-ion battery located at the E.W. Brown Generating Station. The battery energy storage system includes over 300 modules distributed across two shipping containers, a 1 MVA bidirectional inverter for charge/discharge operations, and a 3-phase transformer for grid connectivity. The 10 MW solar

				photovoltaic (PV) plant co-located with the battery allows LGE and KU to explore how the systems can operate together. To do this, the Technology Research and Analysis department varies the operating mode of the battery between smoothing the intermittent output power from the solar plant, charging during periods of high solar generation, and discharging at times of peak load to reduce the demand on conventional generators. Beyond solar plant support, the battery system can also provide voltage support, reactive power support, and frequency regulation. This facility also includes a programmable 1 MVA load bank for simulating various grid conditions and to analyze how the battery system will respond to a variety of operational scenarios. The battery is a critical tool for understanding how intermittent renewable generation best fits into the company's generation portfolio and how batteries can improve site performance and reliability.
Infrastructure	Pilot demonstration	≤20%	63,688.06	WPD ARC Aid (UKPN led): A project looking to trial a new type of fault indicator (Metrysense 5000) which will help locate faults in a shorter time compared to a full line patrol, which will minimize disruption to customers and allow for intermittent renewable generation and low-carbon technology to remain connected to the network.

Infrastructure	Basic academic/theoretical research	≤20%	113,696.82	WPD Automatic Location of Arc-faults through Remote Monitoring (ALARM): This project is for the purpose of developing and implementing new low voltage fault monitoring in order to enable the optimization of the network configuration which will maximize utilization in respect of connecting low-carbon technologies and generation to the low voltage network. The project is to be implemented in two phases. Phase One - monitors with the supplier's existing fault location capability will be installed, and data will be analyzed by the supplier. This Phase One data will primarily be used to confirm operating parameters for improved data capture hardware that the supplier has also already designed. This improved fault location hardware and capability will then be deployed and tested in Phase Two of the project. Phase Two will then seek to demonstrate optimized fault location data for monitored feeders to the distribution business.
Distributed energy resources	Applied research and development	≤20%	8,327.68	WPD CADET (Curtailment and Dispatch Estimation Toolkit): The development of customer behavior models for all types of demand, generation and storage that can be used as an input to the energy curtailment (and/or dispatch) estimation techniques that WPD is developing.

Demand side response programs	Applied research and development	≤20%	557,300.44	WPD Car Connect (Electric Nation): To enable Distribution Network Operators (DNOs) to identify which parts of their network are likely to be affected by uptake of Plug in Vehicles (PIV) and whether demand control (optimizing the timing of charging PIV) is a cost-effective solution to avoiding or deferring reinforcement on vulnerable parts of their network.
Infrastructure	Pilot demonstration	≤20%	1,208,906.67	WPD EDGE-FCLi (Embedded Distributed Generation Electronic Fault Current Limiting interrupter): A project to further distributed generation. Currently investigating the integration of FCLi technology into the WPD network at the point of common coupling of a synchronous distributed generation plant and assessing the extent to which the fault infeed from the generator can indeed be limited and then interrupted.
Infrastructure	Pilot demonstration	≤20%	720,444.45	WPD Electric Nation - PoweredUp: This project is looking to help the transition to electric vehicles by installing vehicle to grid charging and control equipment in domestic properties across WPD's four license areas. The chargers will be split into various groups of similar size and assigned to the on-board energy suppliers (up to 5). Each supplier will then use their group of chargers to test their various energy services utilizing CrowdCharge's demand management charger platform which provides

				optimized charging sessions, whilst keeping within the DNO network limits. The effect of these services on the LV network will be modelled and reported on, including the use of this real-world vehicle to grid data in a network assessment tool. The project will then create a set of operating parameters for vehicle to grid units in constrained areas.
Smart grids	Applied research and development	≤20%	933,411.16	WPD Electricity Flexibility and Forecasting System (EFFS): A project to maximize network utilization at lowest cost which would encourage low-carbon technologies to connect to the grid. The project is looking at delivering a practical robust and accurate system capability that will enable a DNO to actively manage the provision of flexibility services necessary for transition to becoming a DSO. Technical options for delivering the required functionality will be considered. The selected technical option will be built to support a short trial, to demonstrate that the software can support the functionality specified.
Demand side response programs	Small scale commercial deployment	≤20%	309,667.46	WPD Entire: A project looking to identify and address the key commercial challenges that a Distribution Network Operator will be presented with when developing mechanisms for demand side response. Considering the development of new systems to provide visibility of capacity and

				establishing contracts with commercial customers.
Demand side response programs	Pilot demonstration	≤20%	108,433.5	WPD FutureFlex: A project aiming to develop second generation DSO flexibility service with a focus on the domestic scale. This looks to widen the pool of potential providers and enable the coordination of larger home loads including electric vehicles, smart and hybrid heating and battery storage to benefit the distribution network.
Infrastructure	Pilot demonstration	≤20%	86,248.64	WPD Harmonic Mitigation: A project looking to develop an algorithm that can improve the network's harmonic levels by controlling existing distributed generation inverters which will support the increase in low-carbon technologies to connect to the network, such as electric vehicles and heat pumps. A number of power system studies will be performed in order to develop and implement the algorithm and test its operation. The algorithm will also be tested in a simulated environment at a university laboratory. This project will provide recommendations as to whether to conduct a further project for the trial of the algorithm in the network.
Demand side response programs	Pilot demonstration	≤20%	127,765.61	WPD IntraFlex: A project looking to test a short-term market for Distribution Network Operator (DNO) flexibility which actively accounts for the imbalance that the short-term market creates in the electricity

				market. The project maximizes the use of the existing network to support low-carbon technologies whilst reducing the need for traditional network reinforcement. By creating day ahead information services as well as an auto-rebalancing function to the intraday markets, the project will look to lower supplier exposure to imbalance costs and decrease the costs of providing flexibility in the long run.
Infrastructure	Applied research and development	≤20%	41,403.46	WPD Losses Investigation: Understanding technical losses on the low voltage and high voltage distribution network and determining the minimum information required to accurately predict network losses.
Smart grids	Pilot demonstration	≤20%	298,590.73	WPD LTE: Connecting Futures: The U.K.'s first multi-site, multi-vendor private LTE trial designed to mimic on a small scale, and develop proposals for, the roll-out of a telecommunications network to support active management functionality. Advanced telecoms requirements are needed to operate a network that supports the net-zero 2050 requirements and utilizes the network for low-carbon connections.
Distributed energy resources	Pilot demonstration	≤20%	1,573,482.09	WPD Multi Asset Demand Execution (MADE): A project looking to better understand the feasibility of managing and aggregating multiple Low-Carbon Technology (LCT)

				assets affordably through the use of advanced algorithms to unlock value from energy markets.
Renewable energy	Applied research and development	≤20%	60,515	WPD Net Zero South Wales - Cross Vector Scenarios: A project aiming to develop a process and methodology by which both gas and electricity network operators can conduct local level joint scenario planning in a region or license are, and understand the impacts of a set of net zero carbon pathways on the distribution network, within a single license area.
Smart grids	Applied research and development	≤20%	192,890.18	WPD Network Islanding Investigation: A project looking to understand the technical, commercial, regulatory, and legal options and challenges, and potential benefits of operating parts of the distribution network in islanding mode under different conditions.
Smart grids	Applied research and development	≤20%	118,942.7	WPD Next Generation Wireless Telecoms Analysis: A project seeking to establish a radio network design for the WPD license areas of West Midlands and South West, aligned to the existing infrastructure both active and passive, and in so doing minimize the likely investment. Providing an enhanced operational communications capability to serve future initiatives such as active network management whilst also enabling the anticipated increase in embedded low-carbon generation on the network.

Smart grids	Pilot demonstration	≤20%	952,451.7	WPD OHL (Overhead Line) Power Pointer: Trialing a device that is capable of self-powering operation to provide real-time voltage, current and power flow information. Using this information to assess network operation more accurately, such as latent low-carbon generation output and directional fault detection to more quickly identify the location of faults. This is part of the low-carbon/net zero DER/flexibility effort.
Digital technology	Full/commercial-scale demonstration	≤20%	1,267,670.07	WPD Open LV (Low Voltage): A project trialing and demonstrating an open, flexible platform that could ultimately be deployed to every low voltage substation in Great Britain. Through three key methods, demonstrating the platform's ability to provide benefits to the network, customers, commercial entities and research organizations. This is part of the low-carbon/net zero DER/flexibility effort.
Smart grids	Pilot demonstration	≤20%	609,693.09	WPD Primary Networks Power Quality Analysis: A project building on existing best practice and evaluating how harmonics and power quality can be monitored and analyzed in a cost-effective way across wide areas of the network. Understanding of network power quality will enable understanding of the needs of the network related to increased power electronic-based low-carbon technologies.

Smart meters	Full/commercial-scale demonstration	≤20%	1,441,887.01	WPD Virtual Monitoring Data (VM-Data): A project looking to establish a data platform and carry out an analysis program based on data provided by us (WPD) and Electrical which will provide data to maximize the use of and connection of low-carbon technologies to the existing network. The project will be carried out in three phases: Discovery: A business analysis phase incorporating design thinking activities and setting out the work plan for subsequent phases. Execution: Five one month long “sprints” of data analytics activity covering two work streams – Advanced Low-Carbon Technology Detection and Profile Modelling. Consolidation: Bringing the two work streams together to produce a final report and model which will enable us to predict load patterns on the low voltage network.
Smart grids	Applied research and development	≤20%	245,469.91	WPD Virtual Statcom: Power system studies will be performed to determine whether it is possible to improve the network voltages and release network capacity by controlling the power factor of generators already connected to the 11kV and 33kV network. Facilitating voltage control to create additional network connection capacity, including for low-carbon technologies.

C10. Verification

C10.1

(C10.1) Indicate the verification/assurance status that applies to your reported emissions.

	Verification/assurance status
Scope 1	No third-party verification or assurance
Scope 2 (location-based or market-based)	No third-party verification or assurance
Scope 3	No third-party verification or assurance

C10.2

(C10.2) Do you verify any climate-related information reported in your CDP disclosure other than the emissions figures reported in C6.1, C6.3, and C6.5?

No, but we are actively considering verifying within the next two years

C11. Carbon pricing

C11.1

(C11.1) Are any of your operations or activities regulated by a carbon pricing system (i.e. ETS, Cap & Trade or Carbon Tax)?

Yes

C11.1a

(C11.1a) Select the carbon pricing regulation(s) which impacts your operations.

UK carbon price floor

C11.1c

(C11.1c) Complete the following table for each of the tax systems you are regulated by.

UK carbon price floor

Period start date

April 1, 2015

Period end date

March 21, 2019

% of total Scope 1 emissions covered by tax

100

Total cost of tax paid

121,599.24

Comment

The U.K. Carbon Price Floor (CRC Energy Efficiency Scheme) applied to WPD's Scope 2 emissions (building energy use), not Scope 1 emissions. Under these requirements, WPD purchased carbon allowances to offset emissions associated with its building energy use. The relevant compliance period under this scheme ran from 04/0/2015 to 03/31/2019.

C11.1d

(C11.1d) What is your strategy for complying with the systems you are regulated by or anticipate being regulated by?

WPD's strategy for compliance with the U.K. Carbon Price Floor (CRC Energy Efficiency Scheme) was to purchase carbon allowances to offset emissions associated with its building energy use. The relevant compliance period under this scheme ran from 04/01/2015 to 03/31/2019. WPD was required to report on emissions associated with its building energy use and to purchase allowances to offset those emissions for each regulatory compliance year which ran from April 1 to March 31. The CRC Energy Efficiency Scheme has now closed and has been replaced with the U.K. Streamlined Energy and Carbon Reporting (SECR) requirements. Under SECR, WPD must provide business carbon emissions, intensity metrics and explanatory commentary within annual Director Reports. There is no carbon cost or tax associated with SECR obligations.

C11.2

(C11.2) Has your organization originated or purchased any project-based carbon credits within the reporting period?

No

C11.3

(C11.3) Does your organization use an internal price on carbon?

Yes

C11.3a

(C11.3a) Provide details of how your organization uses an internal price on carbon.

Objective for implementing an internal carbon price

Other, please specify

Used in LGE and KU's integrated resource planning (IRP) process

GHG Scope

Scope 1

Application

Applicable to LGE and KU operating companies

Actual price(s) used (Currency /metric ton)

17

Variance of price(s) used

LGE and KU's IRP reflects a carbon price of $17 - $26 per ton beginning in 2026.

Type of internal carbon price

Shadow price

Impact & implication

LGE and KU evaluate long-term resource planning through the company's IRP. Internal carbon price in an input to the resource planning guiding investment decisions.

C12. Engagement

C12.1

(C12.1) Do you engage with your value chain on climate-related issues?

Yes, our suppliers

Yes, our customers

C12.1a

(C12.1a) Provide details of your climate-related supplier engagement strategy.

Type of engagement

Compliance & onboarding

Details of engagement

Other, please specify

Suppliers must meet 15.2% renewables

% of suppliers by number

12.5

% total procurement spend (direct and indirect)

34

% of supplier-related Scope 3 emissions as reported in C6.5

Rationale for the coverage of your engagement

Every energy supplier to PPL EU is required to fulfill their portion of the Alternative Energy Portfolio Standards obligation.

Impact of engagement, including measures of success

Success is measured by confirming that the total number of credits transferred through the PJM electronic transfer system is commensurate with PPL EU's Alternative Energy Portfolio (AEPS) Standards obligation.

Comment

From June 2018 to May 2019, alternative power sources comprised at least 15.2% of the power PPL EU bought for customers who had not chosen a competitive supplier. The projected renewable energy obligation for June 2019 through May 2020 is 15.7%.

PPL EU required all energy suppliers to meet these AEPS requirements. Procurement spend on energy contracts for PPL EU is $531 million.

C12.1b

(C12.1b) Give details of your climate-related engagement strategy with your customers.

Type of engagement

Education/information sharing

Details of engagement

Share information about your products and relevant certification schemes (i.e. Energy STAR)

% of customers by number

100

% of customer - related Scope 3 emissions as reported in C6.5

0

Please explain the rationale for selecting this group of customers and scope of engagement

PPL's operating companies engage customers through a variety of rebate programs, energy efficiency workshops, video and social media profiles highlighting customers' energy savings and in-school curricula that teach students the importance of energy, natural resources and environmental issues. In addition to direct customer engagement programs, the companies also conduct community outreach programs such as tree planting programs, sponsorships of environmental programs with community partners and collaboration with industry and academic partners. Engagement across all levels of customer class – from residential to industrial – ensures all customers have the information they need regarding energy efficiency, PPL's carbon goals and how we can help customers achieve their own sustainability goals.

Impact of engagement, including measures of success

The programs are all facilitated by individual operating companies and success is measured in various ways for each program including but not limited to tracking of

rebates for appliance installations and tracking participation in auditing and behavioral programs.

For customers engaged in formal energy saving programs such as demand response programs, concrete energy savings are a clear measure of success. Energy efficiency programs across PPL's utilities helped customers save more than 538,000 megawatt-hours of electricity and reduced peak demand by more than 179 megawatts across our business.

In addition to helping customers reduce their own energy consumption, engagement helps increase awareness among all stakeholders regarding PPL's sustainability efforts, carbon goals and energy efficiency programs.

Type of engagement

Education/information sharing

Details of engagement

Share information about your products and relevant certification schemes (i.e. Energy STAR)

% of customers by number

100

% of customer - related Scope 3 emissions as reported in C6.5

0

Please explain the rationale for selecting this group of customers and scope of engagement

PPL EU developed and implemented an advanced Distributed Energy Resource Management System designed to manage solar, wind and other renewable power coming onto the grid. The system will help the company ensure good power quality and reliability and keep the grid running smoothly. Moving forward, it will also help PPL EU better integrate more distributed energy resources like private solar, while preserving network reliability and power quality.

Impact of engagement, including measures of success

To date, PPL EU customers have connected more than 200 megawatts of renewable energy to the grid through the program.

Type of engagement

Education/information sharing

Details of engagement

Share information about your products and relevant certification schemes (i.e. Energy STAR)

% of customers by number

100

% of customer - related Scope 3 emissions as reported in C6.5

0

Please explain the rationale for selecting this group of customers and scope of engagement

LGE and KU have created and continue to expand their portfolio of renewable energy programs. In February 2019, LGE and KU issued a request for proposals for up to 200 megawatts of renewable energy that could potentially grow the utilities' renewable energy portfolio and help attract businesses with sustainability goals.

LGE and KU offer demand conservation programs for residential and business customers. The programs allow customers to save energy and earn bill credits for allowing the utility to install a demand conservation device on their property. These devices allow LGE and KU to safely cycle connected equipment off and on for brief periods during peak usage summer days.

The utilities offer a green tariff to support the growth of renewable energy and economic development in Kentucky. New or existing businesses can choose from several options to meet their renewable energy goals, including purchasing renewable energy certificates through the Green Energy Program, building a solar array or purchasing solar, hydro or wind power through the utility's renewable power agreement. LGE and KU also offer a Solar Share program, which gives residential, business and industrial customers the opportunity to share in local solar energy and receive credits on their monthly bills.

Impact of engagement, including measures of success

LGE and KU have created and continue to expand their portfolio of renewable energy programs. In February 2019, LGE and KU issued a request for proposals for up to 200 megawatts of renewable energy that could potentially grow the utilities' renewable energy portfolio and help attract businesses with sustainability goals. Toyota and Dow have signed power purchase agreements for the solar facility to be built under this proposal, which was approved, with conditions, by the Kentucky Public Service Commission in May 2020.

The subscription-based Solar Share Program is a cost-effective option available to residential, business and industrial customers who want to support solar energy. When energy is produced by the facility, customers earn credits on their monthly bills based on their subscription level, enabling them to reap the benefits from solar energy without the up-front cost and long-term maintenance that come when installing a private solar system. The program's first 1,400-panel array reached full subscription thanks to participation from founding partner Ford Motor Company and about 300 other participating business and residential customers.

Type of engagement

Collaboration & innovation

Details of engagement

Run a campaign to encourage innovation to reduce climate change impacts

% of customers by number

5

% of customer - related Scope 3 emissions as reported in C6.5

0

Please explain the rationale for selecting this group of customers and scope of engagement

WPD launched a new energy saving program that will give up to 100 primary schools the chance to earn financial rewards for reducing their energy consumption. WPD also rolled out a demand response program for business customers. The program allows them to curtail usage or shift demand to off-peak hours to help save energy.

In 2019, WPD also worked with local partners on an innovative community project in Cannock, Staffordshire, that helped public housing tenants in the U.K. use solar panels to generate clean, renewable energy and store and sell power back to the grid to help offset their energy costs. The project partners installed batteries that can be automatically controlled to discharge at times of peak network demand, helping to manage the demand and generation for local residents without causing them any disruptions.

Impact of engagement, including measures of success

This project delivered real benefits directly to customers, in the form of energy bill savings, with no disruption and no need for them to have an in-depth understanding of industry rules and codes. Additionally, the project is being used as a model for local councils, housing associations and community energy groups to deliver renewable energy to communities, while guaranteeing cost savings to deprived or fuel poor residents.

C12.3

(C12.3) Do you engage in activities that could either directly or indirectly influence public policy on climate-related issues through any of the following?

Direct engagement with policy makers
Trade associations
Funding research organizations
Other

C12.3a

(C12.3a) On what issues have you been engaging directly with policy makers?

Focus of legislation	Corporate position	Details of engagement	Proposed legislative solution
Adaptation or resilience	Support	Monitoring policy discussions regarding grid resilience and fuel diversity and advocating for recognition that resilience of the bulk power system is a growing issue of policy focus due to the critical importance of the energy sector for national and economic security.	There is no single legislative solution addressing this issue. It is woven into a variety of legislative and regulatory proposals. Any legislation should include a definition of resilience that values robust transmission and reliable energy supply, including 24/7 generation resources. Support policies that preserve flexibility of local solutions to optimize utilities' own resource portfolios.
Adaptation or resilience	Support	Advocating for legislative and policy approaches that streamline and reduce the complexity, cost and time involved in licensing, permitting and review processes for infrastructure projects.	No specific legislation yet proposed. Any legislative solution should create a more efficient and predictable permitting process for large infrastructure projects and a more transparent and accountable regulatory system that promotes economic development while maintaining necessary safety, environmental and public health protection. Improved cooperation among jurisdictions is needed in order to facilitate siting and construction of transmission infrastructure.
Clean energy generation	Support with major exceptions	Supporting deployment of electric vehicles, charging infrastructure and national electric vehicle corridors and enabling solar distributed energy resources in the U.S. and U.K. Legislative efforts are focused in Pennsylvania to allow for expanded utility engagement in both areas. Opposing community solar proposals in Pennsylvania that impose significant administrative burdens on utilities.	Pennsylvania legislation should provide for utility ownership of electric vehicle infrastructure and utility management of community solar programs for low-income customers.
Clean energy generation	Support	Net metering - Advocating for compensation structures for private distributed energy resources that are fair to all customers.	Allow state regulatory commissions to determine the value of excess energy generated by future net-metering customers. Support efforts

			to reform net-metering laws to compensate excess generation fairly, minimize shifting private generation costs to other consumers and ensure that all customers are contributing fairly to the fixed cost of the energy grid.
Clean energy generation	Oppose	Nuclear subsidies - Advocated against proposals in Pennsylvania that would subsidize competitive nuclear facilities through regulated utility customer bills by mandating that electric utilities purchase up to 50% of customer load from nuclear facilities.	Legislation should take a market-based approach. If subsidies are to be provided, they must be based on demonstrated need.
Clean energy generation	Support	Investment tax credit for energy storage – Advocating for the same tax credits for energy storage as are currently available for solar and other technologies.	Existing legislation providing investment tax credits for solar and other technologies should be modified to include energy storage technologies.
Cap and trade	Undecided	Monitoring climate legislation and policy discussions at federal and state level. There are various federal legislative proposals in different stages of development. In Pennsylvania, legislative discussions are centered around joining a regional cap-and-trade scheme (RGGI). PPL supports the U.K. government's efforts to achieve net-zero carbon emissions by 2050. The company will not take a position on any U.S. federal or state legislation until more details are available.	To be the most effective in producing lasting carbon reductions, PPL believes that legislation should be economy-wide, market-based, and provide for regional flexibility. PPL supports a federal carbon rule that is based on "inside the fence" or unit-specific reductions that are demonstrated to be achievable.

C12.3b

(C12.3b) Are you on the board of any trade associations or do you provide funding beyond membership?

Yes

C12.3c

(C12.3c) Enter the details of those trade associations that are likely to take a position on climate change legislation.

Trade association

Edison Electric Institute (EEI)

Is your position on climate change consistent with theirs?

Consistent

Please explain the trade association's position

EEI member companies are committed to addressing the challenge of climate change and have undertaken a wide range of initiatives over the last 30 years to reduce, avoid or sequester GHG emissions. Policies to address climate change should seek to minimize impacts on consumers and avoid harm to U.S. industry and the economy. EEI has led the development of the first industry/investor-focused ESG reporting framework.

https://www.eei.org/issuesandpolicy/environment/climate/Pages/default.aspx

How have you influenced, or are you attempting to influence their position?

PPL's President and CEO is on the Board of EEI and is actively engaged in the development and refinement of EEI's position on climate change. PPL's VP-Public Affairs and Sustainability co-chairs EEI's sustainability workgroup.

Trade association

American Gas Association

Is your position on climate change consistent with theirs?

Consistent

Please explain the trade association's position

The American Gas Associated is committed to reducing greenhouse gas emissions through smart innovation, new and modernized infrastructure, and advanced technologies that maintain reliable, resilient, and affordable energy service choices for consumers. AGA has joined EEI's sustainability efforts by expanding the electric ESG reporting framework to the gas industry.

https://www.aga.org/globalassets/aga_climate-change-document_final.pdf

How have you influenced, or are you attempting to influence their position?

The Chief Operating Officer of the PPL subsidiary with gas operations is an advisory director for AGA and regularly provides input on AGA's policy positions.

Trade association

Energy Networks Association (ENA)

Is your position on climate change consistent with theirs?

Consistent

Please explain the trade association's position

ENA supports the U.K. government target to deliver net-zero emissions by 2050. ENA actively promotes the role that energy networks will play in U.K. decarbonization, engaging with government and wider stakeholders to ensure that the policy and regulatory framework required to deliver the low-carbon transition are closely aligned. ENA is promoting technology innovation, a fair transition for all, and an inclusive cooperative approach by the government and private sectors.

https://www.energynetworks.org/assets/files/Final%20ENA%20general%20election%20manifesto%202019.pdf

How have you influenced, or are you attempting to influence their position?

WPD's CEO serves as a Director on the ENA board, which includes the responsibility for the development and endorsement of ENA's position on climate change.

C12.3d

(C12.3d) Do you publicly disclose a list of all research organizations that you fund?

Yes

C12.3e

(C12.3e) Provide details of the other engagement activities that you undertake.

Participant in trial programs to support low-carbon research and demonstration

C12.3f

(C12.3f) What processes do you have in place to ensure that all of your direct and indirect activities that influence policy are consistent with your overall climate change strategy?

All direct and indirect activities that influence policy are directed by, or communicated to, PPL's Vice President-Public Affairs and Sustainability and coordinated with external affairs/government relations across the enterprise to ensure proper alignment of significant policy-related activities. The Corporate Sustainability Committee is engaged, as necessary, and information is reviewed with the expanded corporate leadership council as appropriate. PPL's Board of Directors is apprised of significant legislative and policy issues and company positions annually, and additionally, as needed. In addition, corporate leadership and the board receive a report of corporate political contributions and trade association memberships, which are discussed with GNC and also made available on PPL's corporate website.

C12.4

(C12.4) Have you published information about your organization's response to climate change and GHG emissions performance for this reporting year in places other than in your CDP response? If so, please attach the publication(s).

Publication

In voluntary communications

Status

Complete

Attach the document

PPL 2019 Corporate Sustainability Report.pdf

Page/Section reference

Pages: 7-8, 12, 15-20, 22-38, 65-69

Content elements

Governance
Strategy
Risks & opportunities
Emissions figures
Emission targets
Other metrics
Other, please specify
Operational, Community, Employee, Environmental

Comment

PPL's response to climate change and GHG emissions performance are included throughout PPL's 2019 Sustainability Report but are primarily addressed in the following sections: Key Metrics (p. 7): Public Policy Engagement (p. 18); Advance a Clean Energy Future (26-34); Build Tomorrow's Infrastructure (35-39); PPL's Contribution to U.N. Sustainable Development Goals; and Appendix which contains data aligned with GRI indicators.

Publication

Other, please specify
EEI-AGA ESG Report

Status

Underway – previous year attached

Attach the document

PPL 2018 EEI-AGA ESG Report.pdf

Page/Section reference

Pages: 2-5

Content elements

Governance
Strategy
Risks & opportunities
Emissions figures
Emission targets
Other metrics
Other, please specify
Operational, Employee, Environmental

Comment

The EEI-AGA ESG report enables consistent reporting of key metrics for investor-owned utilities. Metrics include climate-related emissions reporting and methane management, as well as a qualitative section that provides an overview of key sustainability-related initiatives and a climate response following the TCFD categories of reporting.

C15. Signoff

C-FI

(C-FI) Use this field to provide any additional information or context that you feel is relevant to your organization's response. Please note that this field is optional and is not scored.

This CDP Climate Change Response (“Response”) contains forward-looking statements regarding, among other things, future energy demand, the availability and cost of natural gas, the market for electric vehicles, the growth of solar and other renewable forms of electricity generation and storage, potential rates of reduction in coal-fired electricity generation in Kentucky, low-carbon technologies, enhancement of the grid, the expected operating life of existing coal-fired electricity generation plants and PPL Corporation’s corporate strategy. These statements, and all others that reflect beliefs, plans, estimates or any other forward-looking information, are “forward-looking statements” within the meaning of the federal securities laws. PPL Corporation believes that the forward-looking statements in this Response reflect reasonable expectations and assumptions. However, it is important to understand that forward-looking statements, and their underlying assumptions, are subject to a wide range of risks and uncertainties, both known and unknown. Any number of factors could cause actual results to be materially different from those discussed in the statements, including: market demand for energy in our service territories; weather or other conditions affecting customer energy usage and operating costs; the effect of any business or industry restructuring; the profitability and liquidity of PPL Corporation and its subsidiaries; operating performance of its facilities; environmental, legal and regulatory requirements and the related costs of compliance;

development of new projects, markets and technologies for the generation and delivery of electricity; performance of new ventures; asset or business acquisitions and dispositions; receipt of necessary government permits, approvals, rate relief and regulatory cost recovery; capital market conditions and decisions regarding capital structure; the outcome of litigation against PPL Corporation and its subsidiaries; the securities and credit ratings of PPL Corporation and its subsidiaries; political, regulatory or economic conditions in states, regions or countries where PPL Corporation or its subsidiaries conduct business; new state, federal or foreign legislation; commitments and liabilities of PPL Corporation and its subsidiaries; and catastrophic events such as fires, earthquakes, explosions, floods, hurricanes and other storms, droughts or other similar occurrences as well as cyber intrusion or other terrorist incidents and their direct or indirect effect on PPL Corporation's businesses and the U.S. or U.K. electricity grids. All forward-looking statements in this Response should be considered in light of these important factors. Further information on these and other risks and uncertainties is available in PPL Corporation's Form 10-K and other reports on file with the Securities and Exchange Commission.

C15.1

(C15.1) Provide details for the person that has signed off (approved) your CDP climate change response.

	Job title	Corresponding job category
Row 1	Vice President-Public Affairs and Sustainability	Chief Sustainability Officer (CSO)

SC. Supply chain module

SC0.0

(SC0.0) If you would like to do so, please provide a separate introduction to this module.

SC0.1

(SC0.1) What is your company's annual revenue for the stated reporting period?

	Annual Revenue
Row 1	

SC0.2

(SC0.2) Do you have an ISIN for your company that you would be willing to share with CDP?

SC1.1

(SC1.1) Allocate your emissions to your customers listed below according to the goods or services you have sold them in this reporting period.

SC1.2

(SC1.2) Where published information has been used in completing SC1.1, please provide a reference(s).

SC1.3

(SC1.3) What are the challenges in allocating emissions to different customers, and what would help you to overcome these challenges?

Allocation challenges	Please explain what would help you overcome these challenges

SC1.4

(SC1.4) Do you plan to develop your capabilities to allocate emissions to your customers in the future?

SC2.1

(SC2.1) Please propose any mutually beneficial climate-related projects you could collaborate on with specific CDP Supply Chain members.

SC2.2

(SC2.2) Have requests or initiatives by CDP Supply Chain members prompted your organization to take organizational-level emissions reduction initiatives?

SC3.1

(SC3.1) Do you want to enroll in the 2020-2021 CDP Action Exchange initiative?

SC3.2

(SC3.2) Is your company a participating supplier in CDP's 2019-2020 Action Exchange initiative?

SC4.1

(SC4.1) Are you providing product level data for your organization's goods or services?

Submit your response

In which language are you submitting your response?

English

Please confirm how your response should be handled by CDP

	I am submitting to	Public or Non-Public Submission
I am submitting my response	Investors	Public

Please state the main reason why you are declining to respond to your Customers

Prefer to work directly with customer, not through a third party

Please confirm below

I have read and accept the applicable Terms