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CORPORATION COMMISSION
OF OKLAHOMA

BEFORE THE CORPORATION COMMISSION

OF THE STATE OF OKLAHOMA

IN THE MATTER OF THE APPLICATION OF	)	
OKLAHOMA GAS AND ELECTRIC COMPANY	)	
FOR AN ORDER OF THE COMMISSION	)	Cause No. PUD 202_000021
APPROVING A RECOVERY MECHANISM FOR	)	
EXPENDITURES RELATED TO THE	)	
OKLAHOMA GRID ENHANCEMENT PLAN	)	

Direct Testimony

Of

Kandace Smith

on behalf of

Oklahoma Gas and Electric Company

February 24, 2020

Introduction

Q. Please state your name, position, by whom you are employed, and your business address.

A. My name is Kandace Smith. I am the Manager of Grid Modernization for Oklahoma Gas and Electric Company ("OG&E"). My business address is 321 N. Harvey, Oklahoma City, Oklahoma, 73102.

Q. Please state your educational qualifications and employment history.

A. I received a Bachelor of Science in Electrical Engineering from Oklahoma Christian University and a Master of Business Administration from Oklahoma Christian University. I have been employed by OG&E since 2003 and have held various positions within the organization including most recently Grid Innovation Manager and my current position, Manager Grid Modernization. Prior to the Grid Innovation Manager role, I served as a Product Innovation Manager, Manager of Business Relationship Management and Requirements, Manager of Energy Operations, Eastern Region Engineer, Senior Distribution Network Engineer, Distribution Planning Engineer, and Distribution Engineer.

Q. Please describe your current role and responsibilities.

A. My primary duties as Manager of Grid Modernization include leading a cross-functional modeling and planning team to develop the Grid Modernization Plan in Arkansas and the Oklahoma Grid Enhancement Plan ("OGE Plan") in Oklahoma. This includes developing and maintaining the multi-year plan and forecast as well as developing each year's Annual Investment Plan. My responsibilities also include creating and maintaining the cost-benefit optimization model and ensuring planned project cost and benefits are accurate. While I am responsible for the modeling and planning of our grid enhancement plan, I also sit on the OGE Plan steering team and coordinate with the execution team to provide support and direction on scope, benefits, and costs as the plan moves into the design and execution phases.

Q. Have you previously testified before the Oklahoma Corporation Commission or any other Regulatory Commissions?

A. No, I ask that my credentials be accepted.

Q. Will you please discuss the purpose of your testimony?

A. The purpose of my testimony is to discuss the steps OG&E took to develop the Oklahoma Grid Enhancement Plan ("OGE Plan") and explain how it will be implemented over the course of the five-year deployment. To do so, I:

- Describe how the plan was developed through an extensive process following the determination of the plan objectives;
- Explain how the five-year plan will be converted into Annual Investment Plans by prioritizing annual investments based on the latest information including, but not limited to, system characteristics and asset conditions and technology trends;
- Explain how each Annual Investment Plan will be developed through a four step process;
- Describe the timeline associated with the overall OGE Plan and the Annual Investment Plans; and
- Demonstrate how the 2020 Plan was developed through the four step Annual Investment Plan Process.

Development of the Five-Year OGE Plan

Q. How were the OGE Plan objectives determined?

A. The OGE Plan objectives were developed by leveraging our previous experiences with smart grid, system hardening, the technology growth period, and our recent experience with grid modernization work in Arkansas. Additionally, we researched industry trends and activities happening across the nation related to grid modernization efforts. In doing so, we reviewed a variety of grid modernization papers and articles to help us understand how other entities view the work being done and the associated benefits. We also reviewed other utilities' grid modernization plans to understand what activities are being pursued across the country, and how the investments included in those plans are benefitting customers. In reviewing these learnings, OG&E's grid performance, and system characteristics, six objectives for the OGE Plan were determined. The objectives are (1) improved reliability, (2) greater resiliency, (3) enhanced flexibility, (4) increased efficiency, (5) additional affordability, and (6) expanded customer benefits. As outlined in Witness Gladhill's testimony, the objectives were established to serve as our guideposts over the course of our multi-year plan.

Q. **What was the first step in developing the overall OGE Plan?**

A. The first step in creating the overall OGE plan was to create a list of potential investments needed to modernize the grid. Following the deployment of OG&E's smart grid and system hardening programs, teams within the organization have been evaluating system performance and identifying work activities needed to continue improving the grid. The team started by combining each of the identified work activities and created one list of potential investments. Once the list was assembled, each distinct work activity was reviewed and any work activities that did not meet the grid modernization objectives as outlined above, were filtered out. Next, a group of planning, design, and operations teams met to review the list and identify any missing activities and any activities that should be removed. The result was 47 distinct work activities identified within the list of potential investments, as shown in Direct Exhibit KS-2. This list will serve as a starting point for each Annual Investment Plan.

Q. **What followed the identification of potential investments?**

A. The second step in creating the overall OGE Plan was to identify the scope of work for each distinct work activity which includes categorizing the investment, determining the volume of work, and identifying the expected cost. First, each work activity was reviewed, the description was updated, and an investment category (e.g. – grid resiliency, grid automation, etc.) was identified.

Next, the volume of work assumptions were updated. For example, for each of the grid automation activities on the distribution line, the volume of work is based on the average number of devices per circuit and number of circuits expected to deploy within the grid modernization plan. So, for these activities, we updated the average number of devices and the expected number of circuits to be deployed.

The next step was to update the cost assumptions associated with each distinct work activity. Where possible, average actual costs from similar work activities that had been completed recently was used. If actual cost information was not available, we used a few methods for developing order of magnitude costs:

- Utilization of our cost estimating tool (used for design estimates) to create a high-level estimate for the specific work activity;
- Utilization of current market costs for future material items and assumed labor cost associated with the work activity; and
- Comparison of the work activity and costs to other similar work activities and assume a similar cost.

Last, we reviewed this scope of work with the same planning, design, and operations teams to determine if we believed we could accomplish the work. After review, it was determined to move forward with the identified scope of work.

Q. **What followed the determination of the scope of work?**

A. The third step in creating the OGE Plan was to evaluate the overall benefits. As discussed by Witness Gladhill, there are both quantitative and qualitative benefits associated with the Plan. The quantitative benefits identified are associated with avoided future cost to customers and are defined as avoided cost of service and avoided economic harm. These benefits were derived by first using a benchmark, which was derived from the Arkansas Grid Modernization Plan. The benchmark was an average of 60% reliability improvement on modernized circuits. Next we reviewed the investments planned for Oklahoma and identified the expected reliability improvement (based on the 60% assumption) associated with those investments. This resulted in a projected SAIDI improvement of 60 minutes in Oklahoma. This reliability benefit was then used to calculate the projected avoided cost of service and avoided economic harm benefits over a 30-year period as outlined in the table below.

Category	Amount
Avoided Cost of Service	$500,000,000
Avoided Economic Harm	$1,400,000,000
Total Avoided Future Costs to Customers	**$1,900,000,000**

Q. **What followed the evaluation of plan benefits?**

A. The fourth and final step in creating the OGE Plan was to create the five-year investment forecast. When considering customer impact, the investments needed to be spread across multiple years. There also needed to be a ramp up on the front end of the investment forecast to prepare for the increased grid resiliency and grid automation investments and allow for adjustments to processes, material forecasts, resource forecasts, scheduling, and other activities. The resulting five-year investment forecast is outlined below in Table 2.

Table 2: Estimated Investment for Five-Year Plan (in millions of dollars)

Category	2020	2021	2022	2023	2024	Total
Grid Resiliency	$ 50.1	$ 71.8	$ 86.8	$ 86.8	$ 86.8	*$ 382.4*
Grid Automation	$ 36.5	$ 52.0	$ 61.5	$ 61.5	$ 61.5	*$ 272.8*
Communication Systems	$ -	$ 30.0	$ 16.7	$ 16.7	$ 16.7	*$ 80.1*
Technology Platforms and Applications	$ 2.4	$ 18.4	$ 18.0	$ 18.0	$ 18.0	*$ 74.9*
Total	*$ 89.0*	*$ 172.2*	*$ 183.0*	*$ 183.0*	*$ 183.0*	*$ 810.2*

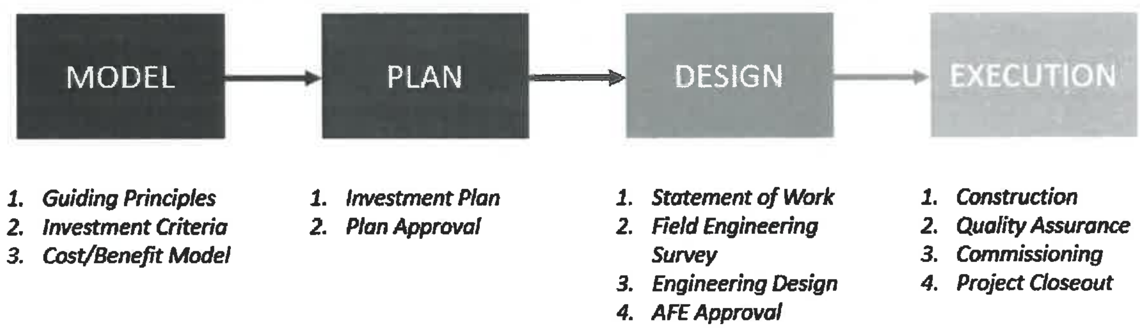
Q. **How will the overall five-year plan be converted into Annual Investment Plans?**

A. Each year, the Company will develop and submit, in July of the previous year, an Annual Investment Plan which will include investments that have been prioritized with the latest information including: (1) updated assumptions for expected cost and benefits, (2) updated system characteristics and asset conditions, (3) updated technology trends including maturity analysis, (4) updated customer trends including distributed energy resource participation levels and electric vehicle adoption trends, and (5) inclusion of future emerging system requirements. Creating the Annual Investment Plan in this way allows the Company to continually improve the cost benefit model and minimize the risk and uncertainty of what is to come in future years.

Q. What is your process for developing and implementing each Annual Investment Plan?

A. Each Annual Investment Plan will move through the following four stages: Model, Plan, Design, and Execution. This process is outlined in Figure 1 below and a more detailed description can also be found in Direct Exhibit KS-1, Appendix 1 of my testimony.

Figure 1: Annual Investment Plan Process



Q. Please describe the Model Stage.

A. There are 3 main steps associated with the Model Stage: (1) develop guiding principles, (2) develop investment criteria, and (3) run the cost/benefit model with the inputs from the previous steps. The Model Stage will use average volumes of work, cost, and benefits to determine the optimal set of projects for that specific year's objectives given the current system characteristics. The output of the model stage is a list of optimal projects and estimated total spend for the year.

Q. Please describe the Plan Stage.

A. There are 2 main steps associated with the Plan Stage: (1) create the investment plan and (2) gain approval for the investment plan. During the Plan Stage, the optimal set of projects are reviewed one by one. During this review the Company identifies the volume of work, cost, and benefits specific to each project and its unique characteristics. Once the scope of work and estimated cost (including major material estimates and estimated labor for each project) are updated the cost benefit model is re-run and the work for each year is then prioritized. There are two outputs of the Plan Stage: (1) the Annual Investment Plan which includes a forecasted spend for the year and a prioritized list of projects and (2) a Scope of

Work which includes estimated labor, major material volumes, unique circuit and substation characteristics, and a detailed work activity scope for each project. The Annual Investment Plan will serve as the budgetary and high level scope document which the Company will file in July of the previous year. The Scope of Work document will serve as the detailed plan to define the scope for the design team.

Q. **Please describe the Design Stage.**

A. There are 4 main steps associated with the Design Stage: (1) create statement of work, (2) field engineering survey, (3) engineering design, and (4) authorization for expenditure ("AFE") approval. In the Design Stage, each project is evaluated with a field survey of the existing equipment and associated conditions, then a detailed design estimate is completed. The output of the Design Stage is an engineering design including a cost estimate, engineering drawing, and construction packet as well as an AFE approval for each project.

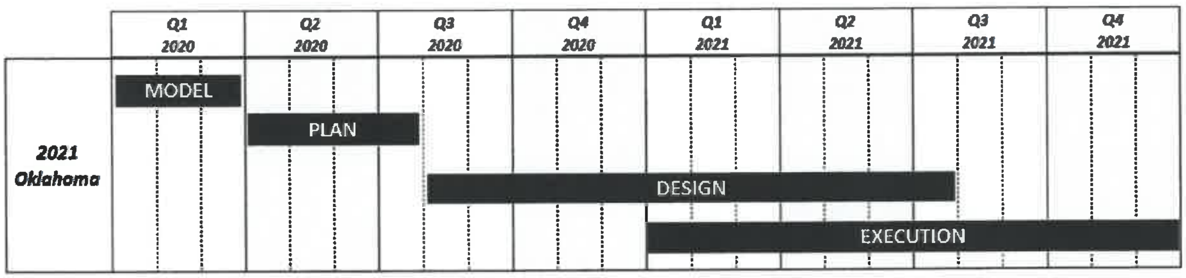
Q. **Please describe the Execution Stage.**

A. There are 4 main steps associated with the Execution Stage: (1) construction, (2) quality assurance, (3) commissioning, and (4) project closeout. In the Execution Stage, construction of each project is completed, with progress reports provided until the work is complete. Progress reports include percent complete and forecasted spend. The output of this stage is actual spend by project and project close.

Q. **What is the Annual Investment Plan timeline for completing each stage?**

A. The Model Stage should be completed by end of the first quarter in the previous year. The Plan Stage should be completed by end of July in the previous year. The Design and Execution Stage will be completed project by project, with the expectation that all projects are completed by year end. See Figure 2 below for example of timing of the 2021 Annual Investment Plan.

Figure 2: Example Timing for 2021 Investment Plan



Q. **How do you expect the type of investments to evolve over the five-year period?**

A. In the early years OG&E will be making foundational investments that are broad-scale and touch entire circuits. As the Plan progresses through the five years, and as technology emerges that allows for cost effective solutions to specific areas and locations, the Company will transition to a more granular approach with targeted investments to areas, instead of circuits, and potentially to specific locations.

Q. **Can you please describe how the 2020 Investment Plan was developed during the Model Stage?**

A. Yes. First, the Company reviewed trends and determined no changes to our approach for planning, design, or operations of the grid. The Company then decided the optimization criteria would be to prioritize projects by the net present value ("NPV") of the costs and the avoided cost of service benefits. The guiding principles for 2020 investments are to invest in projects that have (1) positive NPV, without the avoided economic harm benefits, (2) proven reliability or resiliency benefits, and (3) guaranteed flexibility or efficiency benefits.

Next, the investment criteria was developed by reviewing each distinct work activity in the list of potential investments. It was determined that 18 activities fit within the guiding principles for the year and the associated technology was mature enough to gain the desired value for each activity. Distinct work activities associated with distribution line and substations for 2020 were limited to only include work on the top 250, when ranked by criticality and condition, circuits and their associated substations. Criticality was determined using a mix of total circuit load and customers per mile. Condition analysis included asset age, interruption counts (momentary and sustained), and SAIDI (system average interruption duration index), and CAIDI (customer average interruption duration index) reliability indices. The investment criteria for each of the distinct work activities was developed and applied to each of the identified circuits and substations. The resulting work activities for each circuit/substation were added as inputs to the cost benefit model.

Last, when the cost benefit model was run we first reviewed all of the assumptions for both costs and benefits. Then, we updated the average volumes of work for each distinct work activity along with the associated cost. We also reviewed the results of Arkansas Series I Grid Modernization. With the initial results showing significantly better reliability improvements than expected, as shown in Witness Gladhill's testimony, it was determined to update the expected circuit reliability improvement assumptions from 40% to 60%. We also reviewed the results of recent storms affecting the areas improved in Arkansas Series I and determined the storm benefit is significant and should be included as part of the cost benefit analysis. Improved resiliency during storms was added to the benefit assumptions including adding the resiliency improvement to the avoided economic harm benefit (calculated based on the Department of Energy's Interruption Cost Estimate (ICE) calculation). After the model and assumptions were updated, the inputs from the previous step were added to the cost benefit model. Next, we ran the cost benefit model to determine the costs and benefits associated with each project. The avoided cost of service and avoided economic harm benefits were calculated based on the circuits' avoided outages using each circuit's three-year average sustained and momentary outages including storm related outages. The total benefit for each project was calculated by quantifying the estimated reduction in SAIDI, customer minutes of interruption, isolation time, avoided work hours, as well as the O&M and capital avoided cost realized by the installation of each project. Each of the 250 circuits was then ranked based on the NPV of estimated costs from both the circuit and its associated substation to improve reliability and avoid costs from outages. After the optimization of the model, the top 55 circuits and 40 associated substations as well as a mobile substation, 4kV conversions, and 3 technology applications were selected to move from the Model Stage to the Plan Stage. The results are shown in Direct Exhibit KS-3.

Q. **What did the Company do during the Plan Stage?**

During the Plan Stage, the Company first reviewed the cost benefit model results for each project along with each circuit/substation's specific characteristics. As we reviewed each circuit/substation, it was noted that ROSS LAKE substation was being replaced due to the recent flooding events. So, for this reason, ROSS LAKE substation and the associated circuit were removed from the 2020 investment plan. It was also noted that we are currently reviewing our 69kV system to identify any substations and transmission lines that may need to be converted to a higher voltage. As a result, we reviewed each substation with a high side voltage of 69kV and discussed the project with the 69kV modernization team to identify if the substation is on the list for potential conversion. If it was on the list for potential conversion, we limited the work to only items that would not be affected by the conversion or would be easily reused after conversion. Any remaining work that was identified was then deferred until the 69kV plan is known.

Second, the Company reviewed each circuit/substation, looking at the individual characteristics and the identified work activities for each circuit/substation to determine specifically for each location the volume of work for each activity. For example, we assumed an average of 2.5 automated switches per circuit when we ran the cost benefit model for the automated circuit tie lines work activity. However, when we examined the circuit characteristics for Western Ave 24 and applied the investment criteria for automated circuit tie lines, we determined we needed 4 automated switches for this specific circuit.

Last, the specific locations of the devices identified to be added or replaced were documented and any specific characteristics that might be needed to understand the scope of work were provided. Then, the cost estimate for each distinct work activity and project as well as the labor and major material estimates was updated. The scope of work packet was then created for each project. Each project was then re-run through our cost benefit analysis to update the associated benefits. After review of the benefits with the updated cost estimates, 6 projects were removed from the 2020 scope of work after it was determined that they did not fit with our guiding principles for the year.

This resulted in the 2020 Investment Plan, attached as Direct Exhibit KS-4, with a scope of 33 substations, 47 circuits, as well as a mobile substation, 4kV conversions, and 3 technology applications, estimated to cost approximately $89 million. The plan stage also produced, the confidential 2020 Scope of Work, attached as Direct Exhibit KS-5_Confidential, which defines, for the design team, the detailed scope for each project identified.

Q. **Will the remaining Annual Investment Plans be developed the same way?**

A. Yes. The same steps within the Model and Plan Stages will be followed to develop each year's Annual Investment Plan. It is the decisions within each step that may change over time. As the market trends evolve, technology emerges, and system characteristics change, the optimization criteria, guiding principles, and investment criteria will shift. The Company will also continue to make improvements in the cost benefit model as it learns more about the results of previous year's activities.

Q. **Does this conclude your testimony?**

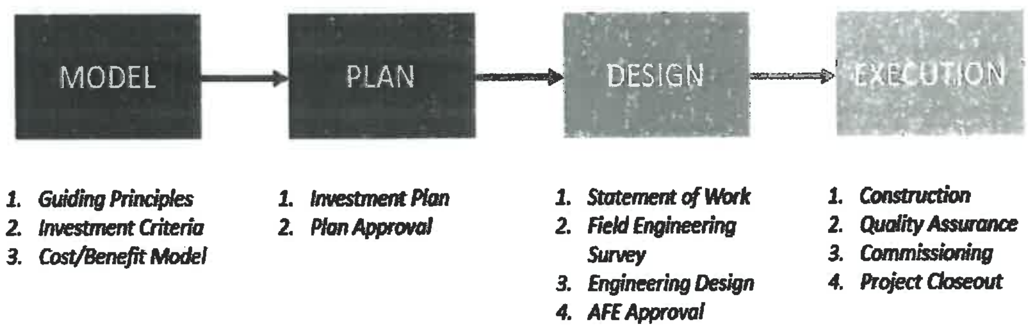
A. Yes.

APPENDIX 1

Annual Investment Plan Process

Each Annual Investment Plan will move through the following four stages: model, plan, design, and execution. This process is outlined in Figure 1 below.

Figure 1: Annual Investment Plan Process



The Model Stage

There are 3 main steps associated with the model stage: (1) develop guiding principles, (2) develop investment criteria, and (3) run the cost/benefit model with the inputs from the previous steps.

The first step in the model stage is to develop a set of ***guiding principles*** for the year. The guiding principles are the set of objectives specific to that year and are developed based on the current system characteristics and trends. To develop these guiding principles, we will first review any change in technology, customer, and system trends that might impact the planning, design, or operations of the grid. Next, we will determine what the optimization criteria will be for the upcoming year. This means we will identify which grid modernization objectives we plan to address in the coming year. We will then determine the desired level of improvement or change for the identified grid modernization objectives. For example, if we chose to optimize the investments based on the improved reliability objective, we might determine we would like to see a three-year average overall SAIDI improvement of 10 points. Then we would determine what guiding principles we need to apply to the upcoming year's investment decisions to ensure we meet the defined optimization criteria. This set of principles should guide the decisions made as we plan, design, and execute the coming year's investments.

The second step in the model stage is to develop the ***investment criteria*** for each distinct work activity. In this step, we will review each distinct work activity in the list of potential investments and determine if this work activity fits within the guiding principles for the year and if the associated technology is mature enough for us to gain the desired value. If it is determined that the distinct work activity fits both scenarios listed above, then we develop investment criteria for that distinct work activity that will allow us to meet our guiding principles for the year. For example, the investment criteria for lightning outage reduction might be based on the customer minutes of interruption associated with lightning strikes. We would then determine that only the circuits with the highest customer minutes of interruption associated with lightning strikes would get lightning outage reduction investment in this year. These circuits would then be added to the cost benefit model inputs for that distinct work activity.

The third step in the model stage is to run the ***cost benefit model*** using the inputs from the previous step. First, we will review all the of the assumptions for both costs and benefits. This means we will review industry trends and previous years benefit results, planned and actual costs, and volumes of work. After review, all assumptions will be updated appropriately. Once we have updated the assumptions, we will review the model calculations and determine if there are any opportunities to improve the methodology. If so, we will develop a plan to improve the methodology and implement any changes that will provide a more effective cost benefit analysis. Once the cost benefit model has been updated, we will add the inputs from the investment criteria to the model. Next, we will run the cost benefit model to determine the costs and benefits associated with each project. Finally, we will optimize the model based on the investment plan's guiding principles and optimization criteria for that year. It is here that the projects are selected and move from the MODEL stage to the PLAN stage.

The output of the Model stage is a list of optimal projects and estimated total spend for the year.

The Plan Stage

There are 2 main steps associated with the plan stage: (1) create the investment plan and (2) gain approval for the investment plan.

The first step in the plan stage is to create the ***investment plan***. In this step, we will take the cost benefit model result for each project and review the system characteristics specific to the project to update the costs and benefits associated with each specific project. For example, if the projects are by circuit, we would review each circuit and each identified work activity to determine the specifics for the circuit. So, for circuit A, transformer load management has been identified as a work activity and, in the model, we may average 10 overloaded transformers per circuit. We will review the loading on each transformer within circuit A and may determine that we have 8 transformers that are overloaded on this circuit. We would then document which transformers are overloaded and their specific characteristics, so that when the project is moved to the DESIGN stage, the designer can perform field surveys and design the job based on the specifications in the investment plan. Once the associated work activities have been reviewed for each project, we will create a scope of work packet. Once all of the scope of work packets are created, we will re-run the projects through the cost benefit model and update the associated benefits. The projects are then prioritized, and an overall summary is created to complete the investment plan for the upcoming year.

The second step in the plan stage is to gain ***approval*** for the investment plan. In this step we first review the investment plan for the upcoming year with the grid modernization planning team (leaders from our planning, design, and operations teams). If this team approves the investment plan, then the plan is reviewed by OG&E's grid modernization leadership team (executive leaders from across the company) and is approved to move from the PLAN stage to the DESIGN stage.

There are two outputs of the Plan stage: (1) the Annual Investment Plan which includes a forecasted spend for the year and a prioritized list of projects and (2) a Scope of Work which includes estimated labor, major material volumes, unique circuit and substation characteristics, and a detailed work activity scope for each project. The Annual Investment Plan will serve as the budgetary and high-level scope document which the Company will file in July of the previous year. The Scope of Work document will serve as the detailed plan to define the scope for the design team.

The Design Stage

There are 4 main steps associated with the design stage: (1) create statement of work, (2) field engineering survey, (3) engineering design, and (4) AFE approval.

Each project will progress through the design stage individually. The first step in the design stage is to create a ***statement of work*** for the project. The statement of work pulls in the information from the scope of work document created in the PLAN stage and adds a detailed explanation of the work to be performed during the DESIGN stage for each distinct work activity. It also includes approved guidelines for determining asset deficiencies.

The second step in the design stage is to complete a ***field engineering survey***. Each piece of equipment associated with the project is surveyed in the field, pictures are taken, and notes of any deficiencies are described in an application that is used throughout the DESIGN and EXECUTION stage. Next, a designated OG&E Asset Management team member reviews each location, approves it for design, and then flags it in the application.

The third step in the design stage is to complete ***engineering design***. During engineering design, construction drawings are created with associated cost and labor estimates as well as material quantities. The engineering design is then reviewed and approved by a designated OG&E Distribution Design team member.

The fourth step in the design stage is to gain ***AFE approval***. During this step the assigned project manager uses the grid modernization AFE template and the output from engineering design to create the AFE for the project. After the AFE is created, the project manager reviews the AFE documents with the participating work groups (engineering, execution, field coordination, vegetation management, scheduling, etc.), and then it is routed based on OG&E's AFE policy. Once the AFE is approved, the project moves to the EXECUTION stage.

The output of the Design stage is an engineering design including a cost estimate, engineering drawing, and construction packet as well as an AFE approval for each project.

The Execution Stage

There are 4 main steps associated with the execution stage: (1) construction, (2) quality assurance, (3) commissioning, and (4) project closeout.

Each project will progress through the execution stage individually. The first step in the execution stage is to complete ***construction*** of the project according to the project's engineering design. During this step, a construction coordinator reviews the design and visits the job site to ensure the site is prepped and ready construction, material is available, and that the construction crew can go straight to work. Next, the construction crew completes the work as outlined in the engineering design.

The second step in the execution stage is to perform a ***quality assurance*** inspection. In this step, the quality assurance inspector reviews the work performed to ensure that OG&E's construction standards have been met and that the work identified in the engineering design is complete. If there are areas where additional work needs to be performed, the crew is sent back to the location to complete the task.

The third step in the execution stage is project ***commissioning***. In this step, testing is performed to ensure all components of the project meet the operational requirements of the system so that it can be integrated into OG&E's outage management, distribution management, and energy management systems.

The fourth and final step in the execution stage is ***project closeout***. During this step, all open items from any of the previous steps should be resolved. Project costs are reviewed to ensure all costs have come in and are accounted for in the project. Then, the project is closed.

The output of the Execution stage is actual spend by project and project close.

Category	Distinct Work Activity
Grid Resiliency	• Animal Protection • Downtown Underground Network Upgrades • Distribution Line Reliability • Distribution Storage • Lightning Outage Reduction • Mobile Generator • Mobile Substation • OH Conductor Replacement • Oil Filled Stepdown Replacement • River Crossing Reinforcement • Substation Breaker Replacement • Substation Transformer Replacement • Transformer Load Management • Transmission Attachment Upgrades • UG Cable Replacement • Wood Pole Substation Replacement • 4kV Conversions
Grid Automation	• Add Communication to Capacitors • Add Communications to Regulators • Automated Circuit Tie Lines • Fault Location SCADA Inputs • Relay Replacement • Replace S4/AD Meters • Remaining substations without SCADA • SCADA (new/upgrade) • SCADA for ATOs • Smart Fault Indicators

	• Smart Lateral Fuses • Smart Sensors • Substation Equipment Monitoring
Communication Systems	• Freewave Network Upgrade • Mesh Network Upgrade • Microwave and Wimax Upgrade
Technology Platforms & Applications	• Add Smart Devices to CADS • Advanced DMS Apps • Advanced EMS Apps • Advanced Planning Tools • DER Interconnection Management • DERMS (distributed energy resources management system) • Digital Field Servies Management • Digital Workforce Optimization • Expand GIS Network Model • LiDAR – Change Management • SP&C/Substastion Design Tool • Substation Operations Workforce Optimization • Syncrophaser Data in TCC • Weather Forecast Integration

Direct Exhibit KS-3

Priority	Substation	Circuits
1	HEALDTON	21
2	JAMESVILLE	21, 41
3	BOWDEN	23, 29
4	TENNYSON	22, 23, 24
5	CHECOTAH	21, 22
6	ILLINOIS RIVER	21
7	LONE STAR	22
8	MERIDIAN	22, 23, 29
9	WESTERN AVE	23, 24, 25
10	DEWEY	41
11	ROSS LAKE	31
12	HANCOCK	22, 24
13	BEGGS	24, 29
14	ROMAN NOSE	47
15	JENSEN RD	69
16	MAY AVE	21, 22, 24
17	HONOR HEIGHTS	21
18	TIBBENS ROAD	24
19	FIXICO	22, 24
20	WELLS	49
21	MIDWAY	63
22	KELLYVILLE	24
23	BELLE ISLE ISA	26, 28
24	LITTLE RIVER	21
25	EIGHTY FOURTH ST	31
26	RIVERSIDE	24
27	INGLEWOOD	22
28	WESTOAKS	22
29	BRISTOW	21

30	NEWMAN AVE	41
31	SW 5TH ST	64
32	BIXBY	29
33	STONEWALL	24
34	WOODWARD DIST	46
35	BEELINE	33
36	GREEN PASTURES	21
37	ARDMORE	26
38	HOWE	22
39	CYPRESS	22
40	PENNSYLVANIA	36
41	4kV Conversions	
42	Mobile Substation	
43	Planning Tools	
44	DER Interconnection Management	
45	Advanced EMS Apps	

Oklahoma 2020 Investment Plan

Forecasted Spend		
Grid Resiliency	$	50,100,000
Grid Automation	$	36,500,000
Communication Systems	$	-
Technology Platforms & Apps	$	2,400,000
	$	*89,000,000*

Forecasted Substation & Circuit Projects

Project ID	Substation	Circuit(s)
1	Healdton	21
2	Jamesville	21, 41
3	Bowden	23, 29
4	Tennyson	22, 23, 24
5	Checotah	21, 22
6	Illinois River	21
7	Lone Star	22
8	Meridian	22, 23, 29
9	Western Ave	23, 24, 25
10	Dewey	41
11	Hancock	22, 24
12	Beggs	24, 29
13	Roman Nose	47
14	Jensen Rd	69
15	May Ave	21, 22, 24
16	Honor Heights	21
17	Tibbens Road	24
18	Fixico	22, 24
19	Midway	63
20	Kellyville	24
21	Little River	21
22	Eighty Fourth St	31
23	Riverside	24
24	Newman Ave	41
25	Stonewall	24
26	Woodward Dist	46
27	Beeline	33
28	Green Pastures	21
29	Ardmore	26
30	Howe	22
31	Inglewood	22
32	Westoaks	22
33	Cypress	22

Additional Forecasted Projects

Project ID	Project Name
34	4kV Conversions
35	Mobile Substaton
36	Planning Tools
37	Advanced EMS Apps
38	DER Interconnection Mgmt

2020 Investment Descriptions

Grid Resiliency Investments

Animal Protection ~ Fence
Add protective fence around substation equipment at substations with the highest risk for outages caused by animals.

Animal Protection ~ Cover Up
Add advanced cover up at substations with the highest risk for outages caused by wildlife.

PCR Replacement
Replace substation PCRs that are obsolete or need to be upgraded to allow for improved grid protection & coordination.

FIS/PCB Replacement
Install new PCBs or FISs to replace line switches or fuses to allow for improved grid protection and coordination.

Capacitor Protection
Upgrade protection for substation capacitors that are obsolete or need to be upgraded to allow for improved grid protection & coordination.

Substation Transformer Replacement
Replace poor performing substation transformers that are nearing end of life.

Distribution Line Reliability
Survey circuits with the highest condition and criticality rank and upgrade facilities to improve reliability.

UG Cable Replacement
Replace unjacketed concentric neutral cable on circuits with the highest reliability impact.

OH Conductor Replacement
Replace obsolete overhead conductor (8S3, 3X3, 7W3) on circuits with the highest customer count associated with obsolete overhead conductor.

Lightning Outage Reduction
Bring circuits up to current lightning protection standards by installing new lighting arrestors on circuits with the highest risk for outages caused by lightning.

Transformer Load Management
Replace distribution transformers that are overloaded according to engineering guide E204 for at least 40 hours per year.

4kV Conversions
Convert remaining 4kV lines to a current standard voltage.

Mobile Substation
Add mobile substation to fleet to address gaps in the current fleet of mobile substation equipment and refurbish an existing mobile substation.

2020 Investment Descriptions (continued)

Grid Automation Investments

Automated Circuit Tie Lines
Install automated switches at normal open locations, behind stepdown transformers, and in areas that will allow commercial and industrial load to be isolated from residential load.

Smart Lateral Fuses
Install tripsavers on all laterals except ones with small load or minimal exposure.

Add Comm. to Capacitors
Add communications to existing capacitors on circuits in urban areas and circuits off the 69 kV transmission system to allow for greater voltage control.

Add Comm. to Regulators
Add communications to existing regulator stations to allow for greater voltage control.

Fault Loc. SCADA Inputs
Install SCADA points to allow for remote fault location analysis in the DMS system.

Substation Relay Replacement
Replace relays with technical bulletins from the manufacturer which have limited parts available or have known mis-operation issues.

SCADA - NEW
Install SCADA at substations where it does not exist today. This will allow for better coordination and visibility of distribution automation.

SCADA - UPGRADE
Upgrade SCADA at substations where it does not meet today's standards and there is room in the substation to add the equipment. This will allow for better coordination and visibility of distribution automation.

Communications
Install or upgrade network communications to the substation.

Technology Platforms & Apps

Planning Tools
Purchase planning tools to enable DER integration, forecasting, and power flow analysis as well as increase our ability to run reliability analysis.

Advanced EMS Apps
Upgrade EMS system to enhance or enable the following functions transient analysis, GEO map, switch order management, operator log, historian, and security profiler.

DER Interconnection Mgmt.
Invest in platform to manage DER interconnection process and integrate into existing systems to make DER interconnections visible.

BEFORE THE CORPORATION COMMISSION
OF THE STATE OF OKLAHOMA

IN THE MATTER OF THE APPLICATION OF	)
OKLAHOMA GAS AND ELECTRIC COMPANY	)
FOR AN ORDER OF THE COMMISSION	)
APPROVING A RECOVERY MECHANISM FOR	)
EXPENDITURES RELATED TO THE	)
OKLAHOMA GRID ENHANCEMENT PLAN	)

<u>Direct Testimony Exhibit KS-5</u>

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