STATE OF INDIANA

INDIANA UTILITY REGULATORY COMMISSION

PETITION OF THE CITY OF CRAWFORDSVILLE, INDIANA, BY AND THROUGH ITS MUNICIPAL ELECTRIC UTILITY, CRAWFORDSVILLE ELECTRIC LIGHT AND POWER, FOR APPROVAL OF A NEW SCHEDULE OF RATES AND CHARGES FOR ELECTRIC SERVICE AND FOR APPROVAL TO MODIFY ITS ENERGY COST ADJUSTMENT PROCEDURES	)	**CAUSE NO. 45420**

PRE-FILED VERIFIED DIRECT TESTIMONY OF

THOMAS A. GHIDOSSI, P.E.

AND ATTACHMENTS TAG-1 THROUGH TAG-2

ON BEHALF OF PETITIONER

CRAWFORDSVILLE ELECTRIC LIGHT AND POWER

PETITIONER'S EXHIBIT NO. 3

AUGUST 19, 2020

Table of Contents

I. INTRODUCTION

Q1. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Thomas A. Ghidossi. My business address is 2950 East Harmony Road, Suite 265, Fort Collins, Colorado 80528.

Q2. ON WHOSE BEHALF YOU ARE TESTIFYING?

A. I am testifying on behalf of the Petitioner, Crawfordsville Electric Light and Power ("CEL&P" or "Utility"), which is the electric utility owned and operated by the City of Crawfordsville, Indiana ("Crawfordsville").

Q3. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?

A. I am the President of Exponential Engineering Company ("Exponential"). I founded Exponential in 1993 as a power systems consulting firm. We employ electrical engineers, CAD designers, construction technicians, and field inspectors that serve clients across the country. I have been a licensed Professional Engineer in the State of Colorado, in good standing, for 36 years and I have over 40 years of experience in the electric power industry. I am also licensed in Alaska, California, Florida, Louisiana, Nebraska, New Mexico, Texas, Utah, Washington and Wyoming.

Q4. PLEASE DESCRIBE YOUR EDUCATIONAL AND PROFESSIONAL BACKGROUND.

A. I hold a Bachelor of Science degree in Electrical Engineering and a Master of Business Administration from the University of Colorado. I have engineered and managed projects including: transmission and distribution line design, municipal distribution planning, condition assessment and evaluation, generation and interconnection negotiations, substation design, protective relaying, and regional transmission system studies for

electrical cooperatives, municipal utilities, investor-owned utilities, government agencies and independent power producers. I have performed transmission interconnection studies for Western Area Power Administration and renewable energy developers using PSS/E Western Electricity Coordinating Council ("WECC") models. My work has included construction observation, commissioning and inspection on site of generation, transmission, distribution and substation projects. I provide a three- and five-day seminar for engineers regarding protective relaying theory, as well as a three-day transmission line design seminar. I have taught courses for senior electrical engineering students at both the University of Colorado and Colorado State University. A copy of my Statement of Qualifications is included as Attachment TAG-1.

Q5. HAVE YOU TESTIFIED BEFORE THE COMMISSION IN THE PAST?

A. No, however, I have provided expert testimony regarding transmission, distribution and substation facilities in various proceedings including courts of law, arbitration proceedings, the Colorado Public Utilities Commission and the California Public Utilities Commission.

Q6. WHAT ATTACHMENTS ARE YOU SPONSORING IN THIS CAUSE?

A. The attachments to my testimony include:

- Attachment TAG-1: Statement of Qualifications
- Attachment TAG-2: Crawfordsville Electric Light & Power Capital Improvement Plan Cost Report

Q7. WHAT WORKPAPERS ARE YOU SPONSORING IN THIS CAUSE?

A. I am submitting workpapers providing cost support for the Capital Improvement Plan.

Q8. WERE THESE EXHIBITS, ATTACHMENTS AND WORKPAPERS PREPARED

BY YOU OR UNDER YOUR SUPERVISION?

A. Yes.

Q9. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. I was retained by CEL&P to review and assist in the development a Capital Improvement Plan ("CIP") for CEL&P's infrastructure projects for the 2021-2026 time period. I have produced a report, included as Attachment TAG-2, which describes the proposed projects, cost estimates (including contingency and escalation), and schedule.

Q10. PLEASE PROVIDE AN OVERVIEW OF YOUR TESTIMONY AND RECOMMENDATONS.

A. My testimony includes CEL&P's proposed 2021-2026 CIP and explains (1) the rationale and necessity for the CIP, (2) the source data and process used to develop the CIP, (3) an explanation of the estimating process and assumptions used to develop the CIP, (4) a discussion of the escalation and contingency considerations included in the CIP, and (5) a discussion of the potential impacts on the CIP of the COVID-19 pandemic. Ultimately, I conclude that the CIP is necessary, reasonable, in the public interest and I recommend that it be approved by the Commission.

II. OVERVIEW OF AND NEED FOR CAPITAL IMPROVEMENT PLAN

Q11. PLEASE PROVIDE AN OVERVIEW OF THE BASIC ELEMENTS OF THE CAPITAL IMPROVEMENT PLAN.

A. Generally speaking, the CIP describes necessary system improvements to address aging facilities, ensures appropriate facilities will be in place to secure reliability and resilience and continues CEL&P's efforts to modernize its system to create efficiencies. As Mr. Goode explains in his testimony, the Capital Improvement Projects fall into one of five (5)

general categories: (1) substations; (2) transmission lines; (3) protection and control systems; (4) Advanced Metering Infrastructure ("AMI") deployment; and (5) general capital projects.

Q12. PLEASE EXPLAIN THE NEED FOR THE PROJECTS.

A. The CIP report explains the need/justification for each specific project. The following is a summary of the need/justification for the projects in each category:

1. Substations – Work will provide CEL&P flexibility to maintain its existing substations and serve its load from alternate substations and avoid customer outages; address inadequate transformer oil containment facilities; and, replace obsolete substation circuit breakers and switches enhancing reliability, safety and system integrity.
2. Transmission Lines – 138kV transmission line work will replace wood poles that have served their useful life with steel poles; increase pole heights to allow for distribution circuit underbuild and required clearances improving system performance, reliability and safety.
3. Protection & Control Systems – Work will replace obsolete relays and aged, obsolete substation SCADA systems to enhance reliability, provide redundancy and fault location capability and upgrade communications interfaces.
4. AMI Deployment – Work will continue installing the remaining 4,000 to 5,000 AMI meters to complete the AMI project, which has installed approximately 6,000 AMI meters to date. Completing this deployment will enable CEL&P to automatically and efficiently collect meter readings and detect outages, reducing operating expenses and improving outage response times.

5. General Capital Projects – Work includes planned Geographic Information System ("GIS") upgrades, rebuilding an aged distribution feeder; replacing an aged, undersized and non-compliant back-up generator; replacing undersized distribution feeder conductor; and replacing aged vehicles and purchasing a necessary fiber optic splicing trailer – all of which are to support system reliability, maintenance, efficiency and safety.

Q13. WHAT WOULD BE THE IMPLICATION ON CEL&P'S DELIVERY OF ELECTRIC SERVICE IF THESE CIP PROJECTS WERE NOT INITIATED?

A. In order to provide reliable service, electric utility systems must be maintained in good condition by addressing load growth and development, performing periodic inspections and equipment tests, tracking equipment age and performance, replacing failed or failing equipment and vegetation management. Due to the financial constraints addressed by Mr. Goode, some of the projects needed to provide reliable service were previously included in CEL&P's CIP but could not be initiated. Each of these projects is reasonable and necessary to ensure that CEL&P continues to provide safe, reliable electric service that is resilient. If a new substation is not constructed, CEL&P will continue to be unable to take existing substation facilities off-line for maintenance and replacement. If the 138kV transmission lines are not upgraded, CEL&P will experience decreased reliability and will not be able to efficiently add needed distribution circuits in existing transmission line rights-of-way. As such, the CIP projects are in the public interest.

III. CAPITAL IMPROVEMENT PLAN REVIEW PROCESS

Q14. PLEASE DESCRIBE THE CAPITAL IMPROVEMENT PLAN REVIEW PROCESS.

A. First, I was provided a copy of the six-year capital plan developed by CEL&P for the years 2021 through 2026. I then requested background information from CEL&P to understand the projects proposed in the plan, including:

- Memorial Drive Substation;
- Continuing AMI Meter Installations and Replacements;
- Upgrades to the 138kV Transmission System;
- Improvements to existing Substations; and
- Distribution System Improvements

I then verified and updated the need/justification and cost estimates for the plan components, and established reasonable contingency and escalation factors. Finally, I provided an updated CIP estimate and schedule for inclusion in the Revenue Requirement calculation and presentation to the Commission.

Q15. WHAT WERE THE SOURCES OF THE DATA USED TO PREPARE THE COST ESTIMATES SHOWN IN ATTACHMENT TAG-2?

A. CEL&P provided detailed material and labor tabulations for the proposed transmission line and protection projects; material and construction costs based on preliminary analysis of the Memorial Drive Substation; and meter replacement estimates based upon 1,000 meter replacements per year. CEL&P provided estimates for each of the other Capital Projects in a single dollar figure per project. Exponential then analyzed this information to separate labor and material costs by historic values and ratios in order to apply relevant

escalation factors, as well as updated substation material and construction estimates based on Exponential's experience and recent vendor and contractor cost data for the region.

Q16. WHAT IS YOUR OPINION OF THE REASONABLENESS OF THE TIMING FOR THE PROJECTS AS OUTLINED IN THE CIP?

A. I worked closely with CEL&P engineering and operations to sequence the projects in the CIP. Four components were evaluated to establish the projects for each year of the CIP: (1) priority as to need for the project to address existing system issues, (2) project sequencing in proper order, (3) allocating long-term work (such as AMI replacement) to each year, and (4) CEL&P's financial capacity and personnel resources to design, manage and construct projects in a given year. This evaluation resulted in a set of projects that are in proper sequence and distribute the capital costs over the six year plan.

Q17. DO YOU THINK CEL&P'S SCOPE AND COST ESTIMATES FOR ITS CONSTRUCTION PROJECTS WERE REASONABLE?

A. Yes, CEL&P management provided me with sufficient supporting documentation to verify their cost estimates, and I was provided with their historical project cost experience. I also obtained current cost figures for certain major equipment procurement and construction from vendors and contractors. I updated the cost estimates and produced what should be considered a Class 3 cost estimate (per AACE guidelines) suitable for budgeting and long range planning. In my independent judgment, after my own review and adjustments to the cost estimate, I believe the scope and cost estimates in the CIP are reasonable.

Q18. WHY IS IT IMPORTANT TO APPLY ESCALATION FACTORS TO THE COST ESTIMATES IN THE CIP?

A. Escalation factors are an important measure used to address the risk of changes in unit

costs over time. Escalation factors are applied in the budgeting process for future years to avoid understating project costs which could result in inadequate financial capacity resources to execute the CIP. Construction and major material costs for utility industry projects generally rise over time, affected by changes in the cost of labor, raw materials, components, and transport. The "base" estimates in my report are in 2020 dollars; therefore, escalation factors were applied to the projects for their planned year to provide a more accurate estimate of actual costs for those projects as they are presently defined. However, it is important to note that escalation factors are primarily based upon recent historical experience and government and industry projections. Escalation factors are not always positive (increasing costs); as shown in the CIP at page 6, sometimes those factors are negative.

Q19. HOW ARE CONTINGENCY FACTORS DIFFERENT FROM ESCALATION FACTORS?

A. Contingency factors address completely different risks than escalation factors. Contingency factors are intended to mitigate unexpected, additional (unbudgeted) costs due to actual changes to the projects, while escalation recognizes likely price increases in known and budgeted costs for defined projects. Unexpected costs that would typically be associated with the projects in the CIP include: changes in design requirements and project definitions due to passage of time and unforeseen events; subsurface issues encountered during construction; import tariffs; changes in regulations; and extended lead times for major equipment. Contingency factors were applied to total escalated project costs to address those project uncertainties that are not due to cost inflation. My report tabulates the contingency factors used and the information that led to their selection. The Association for the Advancement of Cost Engineering ("AACE") recognizes both

techniques as industry best practices.

Q20. WHAT IMPACT COULD THE COVID-19 PANDEMIC HAVE ON CEL&P'S CAPITAL PROJECT COSTS?

A. The pandemic creates considerable uncertainty and a type of risk that we have not seen in modern times. However, since material and labor costs for the electric utility industry have shown stable growth over longer periods of time, I believe it is reasonable and conservative to utilize escalation indices developed prior to March, 2020 to best approximate future annual cost escalation. I did not adjust the typical contingency factors since pandemic effects would generally be limited to project delays in the near term.

Q21. DO YOU THINK THE ESCALATION AND CONTINGENCY FACTORS YOU APPLIED TO THE COST ESTIMATES ARE REASONABLE?

A. Yes, particularly in times of economic uncertainty, it is important that utilities include escalation and contingency factors in their budget estimates. My intent is to reduce the risk that CEL&P plans for these projects but does not have insufficient capital budgeted in the revenue requirement calculations to finance the projects.

IV. SUMMARY AND CONCLUSION

Q22. PLEASE PROVIDE A SUMMARY OF YOUR RECOMMENDATIONS.

A. I conclude that the CIP is necessary, reasonable, in the public interest and I recommend that it be approved by the Commission.

Q23. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes.

VERIFICATION

I affirm under the penalties of perjury that the foregoing Prefiled Verified Direct Testimony is true to the best of my knowledge, information and belief as of the date here filed.

Thomas A. Ghidossi

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Statement of Qualifications

Thomas A. Ghidossi, P.E.

Mr. Ghidossi earned his Bachelor of Science in Electrical Engineering from the University of Colorado, Boulder, Colorado in 1979. He earned his Master of Business Administration from the University of Colorado, Boulder, Colorado in 1981.

Mr. Ghidossi is one of the founders of Exponential Engineering Company (1993) and has been president since 1995. Today Mr. Ghidossi is one of the company's Principal Engineers, leading a team of 11 engineers and 4 technical staff members. In addition he provides one-time and ongoing training in protective relaying, setting, testing and maintenance for outside engineers and technicians. He also is responsible for quality control and quality assurance of transmission line, distribution line, substation, relay upgrade and protection projects. Mr. Ghidossi has testified before the Colorado Public Utilities Commission, the California Public Utilities Commission, and as an expert witness. He maintains Professional Engineering registrations in 11 states: Colorado, Alaska, California, Florida, Louisiana, Nebraska, New Mexico, Utah, Texas, Washington, and Wyoming.

From 1988-1993 Mr. Ghidossi was Vice President at PLM Technologies, Inc. in Evergreen, Colorado. He managed on-site engineering support services for the regional office of Western Area Power Administration in Salt Lake City, furnishing power system analysis and design services for Western's transmission system.

During 1984-1988 Mr. Ghidossi was the Senior Control Engineer at Lee Wan & Associates in Lakewood, Colorado. He designed relay and control system upgrades for more than 20 Western Area Power Administration substations across the western United States.

Mr. Ghidossi was an Electrical Engineer at Electrical Systems Consultants, Inc. in Fort Collins, Colorado from 1981-1984. He designed substations, transmission lines and protective relay systems for clients throughout the Rocky Mountain region.

As a Transmission Design Engineer at Tri-State Generation and Transmission Association, Inc. in Thornton, Colorado Mr. Ghidossi designed substations, transmission lines and protective relay systems for Tri-State substations in Colorado, Wyoming and Nebraska.

Mr. Ghidossi has extensive background in low-, medium-, and high-voltage power transmission and distribution systems including utility industrial and commercial systems (600V to 500kV) and specialized expertise in protective relaying and communications systems. He has designed and managed substation, transmission line, distribution line, protective relaying, communication systems and power system studies projects.

He is a member of the Institute of Electrical and Electronics Engineers (IEEE) and the Tau Beta Pi Engineering Honor Society.

CRAWFORDSVILLE ELECTRIC LIGHT & POWER CAPITAL IMPROVEMENT PLAN COST REPORT

Prepared For:

CEL&P
P.O. Box 428
Crawfordsville, IN 47933-0428

By:

Exponential Engineering Company

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TABLE OF CONTENTS

SCOPE OF REPORT

Crawfordsville Electric Light & Power (CELP) is developing a Capital Investment Plan (CIP) for utility infrastructure projects for the 2021-2026 time period. This report describes the proposed projects, cost estimates including contingency and escalation, and schedule.

PROPOSED PROJECTS

CELP's proposed projects were developed based on system needs due to aging equipment, reliability concerns, and on-going upgrades. Each project is described below with individual justifications and listed by major system category.

Substations

1. New Memorial Drive Substation
   a. Description: A new 138kV to 13.8kV Substation with a 30/40/50MVA Transformer, 138kV Circuit Breakers and 13.8kV Switchgear serving five to six distribution feeders.
   b. Need/Justification: CELP's existing Kentucky Street Substation presently serves 50-60% of CELP's load. This substation cannot be taken off-line for maintenance as the load cannot be served by the other three CELP substations and their associated distribution feeders. The Memorial Drive Substation will serve some of Kentucky Street Substation's industrial and residential loads and will enable CELP to take portions of Kentucky Street Substation off line for maintenance and replacement. This substation was originally planned for a 2020 in-service date but was delayed due to fiscal constraints. CELP has already performed some of the site work for the transmission line interconnections.
2. Transformer Oil Containment at Kentucky Street Substation
   a. Description: Addition of oil containment facilities for the existing transformers at Kentucky Street Substation.
   b. Need/Justification: Existing oil containment is no longer adequate for this substation.
3. Circuit Breaker and Disconnect Switch Replacement at Kentucky Street Substation
   a. Description: Replace two 138kV oil circuit breakers with SF_6 circuit breakers and replace three 138kV air-break disconnect switches.
   b. Need/Justification: The oil circuit breakers are aged and obsolete and present potential issues with oil leaks. The disconnect switches are aged and can no longer be adjusted for proper alignment. This work cannot be performed without the new Memorial Drive Substation to take on some or all of the Kentucky Street Substation load during the replacement.

Transmission Lines

1. Rebuild 138kV Transmission Lines
   a. Description: Install new poles and insulators to support the existing conductor and shield wire. New poles will be direct-buried ductile iron for tangent structures and self-supporting steel poles for angle and deadend structures. Poles will typically be 85' to allow for existing and/or proposed distribution underbuild.
      i. Spann Avenue Substation to Memorial Drive Substation (rebuild and connection to new substation) (2.5 miles)
      ii. Memorial Drive Substation to Kentucky Street Substation (rebuild and connection to new substation) (2.9 miles)
      iii. Big Four Arch Road Substation to Dry Branch Road Substation (2.5 miles)
      iv. Dry Branch Road Substation to Spann Avenue Substation (2.0 miles)
      v. PSI (Duke Energy) Substation to Big Four Arch Road Substation (5.2 miles)

b. Need/Justification: The existing lines were constructed in the 1970's (Kentucky Street to Spann Avenue) and 1980's (Spann Avenue to Dry Branch Road to Big Four Arch Road to PSI). Existing wood poles have served their useful life and are in need of replacement. Additional ground clearance is needed for existing/new distribution underbuild circuits. CELP's 138kV transmission system will be completely rebuilt as a result of these projects, extending the useful life of the loop at least 30 years.

Protection and Control Systems

1. Transmission Line and Substation Transformer Protection
   a. Description: Install replacement relay and control panels including Schweitzer Engineering Laboratories (SEL) microprocessor relays and test switches.
      i. Kentucky Street Substation
      ii. Big Four Arch Road Substation
      iii. Dry Branch Road Substation
      iv. PSI Substation
   b. Need/Justification: The existing relays are obsolete and replacement parts/units can no longer be obtained. The new protection schemes will provide greater reliability, fault location capability, SCADA interface communications and redundancy.
2. Switchgear Feeder Protection
   a. Description: Install replacement relay and control doors in the existing switchgear lineups for feeder and bus protection.
      i. Spann Avenue Substation
      ii. Big Four Arch Road Substation
      iii. Kentucky Street Substation, Switchgear #2
   b. Need/Justification: The existing relays are obsolete and replacement parts/units can no longer be obtained. The new protection schemes will provide greater reliability, fault location capability and SCADA interface communications.
3. SCADA and Controls
   a. Description: Upgrade SCADA systems and capacitor controls.
      i. Kentucky Street Substation
      ii. Spann Avenue Substation
      iii. Big Four Arch Road Substation
   b. Need/Justification: The existing SCADA systems at each substation are aged and obsolete. New SCADA RTU's will be more effective and compatible with the new equipment planned for Memorial Drive Substation.

Advanced Metering Infrastructure (AMI)

1. Description: Continue installation of new AMI meters to replace existing meters. Approximately 1,000 meters will be installed each year, replacing existing electromechanical meters.
2. Need/Justification: The AMI program began five years ago and 5-6,000 meters have been installed to date. The remaining 4-5,000 meters will be installed over the next six years to complete the system and efficiently read all customer meters.

General Capital Projects

1. Geographic Information System (GIS)
   a. Description: Upgrades to existing GIS hardware and software.
   b. Need/Justification: Scheduled upgrades to GIS.
2. Distribution Feeder Rebuild
   a. Description: Rebuild the Holiday Inn 13.8kV feeder circuit over Sugar Creek toward the Power Plant.
   b. Need/Justification: The existing feeder is aged and poles and conductor need to be replaced.

3. Backup Generator Replacement
   a. Description: Replace the 75kW indoor backup generator at the Utility Office with a new 200kVA backup generator with sound attenuation.
   b. Need/Justification: The existing backup generator is aged, under-sized and does not meet noise limits inside the building.
4. Distribution Feeder Conductor Replacement
   a. Description: Replace conductor on the Big Four Arch 302 circuit.
   b. Need/Justification: The existing conductor is undersized for the projected loads on the feeder circuit.
5. Utility Vehicles
   a. Description: Add a 42' Aerial Lift Truck, Fiber Optic Splicing Trailer, and Digger Derrick Truck.
   b. Need/Justification: Existing vehicles are aged and require replacement. The Fiber Optic Splicing Trailer is necessary due to the amount of fiber to be maintained/installed on the CELP system.

COST ESTIMATES AND SCHEDULE

Cost estimates have been prepared based on:

- Labor and Material Costs
- Application of Escalation Factors
- Application of Contingency Factors

Labor and Material Costs

Base Labor and Material Costs are based on 2020 dollars.

CELP provided the following information:

- Detailed material and labor tabulations for proposed transmission line and protection projects based on preliminary designs prepared in 2019.
- Memorial Drive Substation material and construction costs based on preliminary analysis performed in 2019.
- Meter Replacement estimates based on 1,000 meter replacements per year.
- Estimates for each of the other Capital Projects were provided as a single dollar figure per project.

EEC analyzed and updated CELP's information as follows:

- Separated labor and material costs by historic values and ratios in order to apply relevant escalation factors.
- Updated substation material and construction estimates based on recent vendor and contractor data.

Annual Escalation Factors

While there is significant uncertainty about material and labor costs for the next one to two years due to the effects of the pandemic, EEC believes it is reasonable and conservative to utilize indices developed prior to March, 2020 to best approximate future annual cost escalation. Material and labor costs for the electric utility industry show stable growth over longer periods, due to specialized equipment and materials, long-term planning and consistency in construction, and the critical nature of electric utilities.

- Annual labor escalation factors are based on the BLS Employment Cost Index Historical Listing for the December 2018 to December 2019 period (Table 1).
- Annual material escalation factors are based on Producer Price Index data for the February 2019 to February 2020 period (Table 2).

- Composite annual escalation factors for certain specific categories were developed based on EEC's experience over the past ten years (Table 3).

Table 1 Material Cost Escalation Factors

Material Cost Escalation Factors for 2019-2020		
Producer Price Index Table 9. Producer price indexes and percent changes for commodity and service grouping and individual items, not seasonally adjusted.	**Commodity Code**	**Percent Change February 2019-February 2020**
Off-highway trucks, haulers, truck-type tractor chassis, trailers, etc. (excluding parts)	112D-0201	2.0%
Wood Poles, piles, and posts owned and treated by the same establishment	0871-0101	5.7%
Aluminum extruded and drawn pipe and tube	1025-0163	-0.7%
Power wire and cable	1026-0332	-0.8%
Fiber optic cable	1026-0333	-10.9%
Noncurrent-carrying electrical conduit and conduit fittings, including plastic conduit & fittings	1171-0216	0.7%
Electrical integrating instruments and other instruments to measure electricity	1172-0901	1.1%
Integral horsepower motors and generators (excluding land transportation types)	1173-0405	0.4%
Power and distribution transformers, except parts	1174-0999	3.9%
Switchgear, except relays and ducts	1175-2201A	3.9%
Midwest region ready-mix concrete	1333-0101B	2.1%
Burial vaults and boxes, precast concrete	1334-01063	2.7%

Table 2 Labor Cost Escalation Factors

Labor Cost Escalation Factors for 2019			
Employment Cost Index - Historical Listing - Volume III National Compensation Survey January 2020. www.bls.gov/ect (December 2005=100)	**Percent Change December 2018-December 2019**	**Index December 2018**	**Index December 2019**
Construction	3.4%	132.5	137.0
Trade, transportation and utilities	2.8%	137.2	141.1
Utilities	3.8%	145.7	151.2
Average	*3.3%*		

Table 3 Composite Escalation Factors

Composite Factors based on EEC Experience	Escalation Factor
Transmission Line Materials (general)	2.0%
Substation Materials (general)	3.0%
Protective Relays and Controls	2.5%

Contingency Factors

EEC applied contingency factors according to the following table.

Table 4 Contingency Factors

Contingency Assumptions	Factor	Notes
2021 and 2022 Projects		
General (transmission lines, substations, distribution lines)	10%	Projects have been well defined by CELP and are planned within the next two years.
Protection and Control	10%	Projects have been well defined by CELP and are planned within the next two years.
Metering	5%	Metering improvements are based on a well-defined and consistent set of meters per year and are subject to discretionary budget control.
2023-2026 Projects		
General (transmission lines, substations, distribution lines)	20%	Projects have been well defined, but are subject to greater time uncertainty for costs.
Protection and Control	15%	Projects have been well defined, but are subject to greater time uncertainty for costs.
Metering	5%	Metering improvements are based on a well-defined and consistent set of meters per year and are subject to discretionary budget control.
Vehicles	5%	Minimal changes in options or type of vehicle.

Capital Plan Schedule

EEC reviewed the schedule of projects with CELP to verify the sequence and the size and quantity of projects that could be accomplished in each year. The projects are listed by year in Table 5.

CAPITAL IMPROVEMENT PLAN

Table 5 Capital Improvement Plan 2021-2026

Proposed Project	Estimated Cost (2020 dollars)		Escalation Factors		Contingency Factor	CIP Budget	Capital Category
	Labor	Materials	Labor	Materials			
					2021	**$ 1,142,609**	
1) Meter Replacement	$ 23,408	$ 157,592	3.3%	1.1%	5%	$ 192,691	Distribution
26) Transformer Oil Containment at Kentucky Street Substation	$ 81,500	$ 81,500	3.3%	2.1%	10%	$ 184,175	Transmission
50% down payment on Memorial Drive Substation Transformer	$ -	$ 550,000	3.3%	3.9%	10%	$ 628,595	Transmission
20% down payment on Memorial Drive Substation Distribution Switchgear	$ -	$ 120,000	3.3%	3.9%	10%	$ 137,148	Distribution
					2022	**5,218,580**	
29) Rebuild Transmission Line from Spann Ave. to Memorial Drive Substations (50%)	$ 892,085	$ 436,672	6.8%	4.0%	10%	$ 1,547,641	Transmission
30) Rebuild Transmission Line from Memorial Drive to Kentucky Street Substations (50%)	$ 325,454	$ 197,220	6.8%	4.0%	10%	$ 608,004	Transmission
1) Meter Replacement	$ 23,408	$ 157,592	6.8%	2.2%	5%	$ 195,379	Distribution
7) Memorial Drive Substation (138kV Tap, Transformer, Switchgear, Breakers) (70%)	$ 710,000	$ 1,712,500	6.8%	8.0%	10%	$ 2,867,556	60% Transmission 40% Distribution
					2023	**$ 3,641,148**	
1) Meter Replacement	$ 23,408	$ 157,592	10.4%	3.3%	5%	$ 198,115	Distribution
29) Rebuild Transmission Line from Spann Ave. to Memorial Drive Substations (50%)	$ 892,085	$ 436,672	10.4%	6.1%	20%	$ 1,737,397	Transmission
30) Rebuild Transmission Line from Memorial Drive to Kentucky Street Substations (50%)	$ 325,454	$ 197,220	10.4%	6.1%	20%	$ 682,123	Transmission
37) Transmission Line Relay System Replacement at Spann Ave. Substation	$ 63,086	$ 59,436	10.4%	7.7%	15%	$ 153,666	Transmission
38) Transmission Line Relay System Replacement at Kentucky Street Substation	$ 63,086	$ 59,436	10.4%	7.7%	15%	$ 153,666	Transmission
7) Memorial Drive Substation (138kV Tap, Transformer, Switchgear, Breakers) (30%)	$ 590,000	$ -	10.4%	12.2%	10%	$ 716,182	60% Transmission 40% Distribution
					2024	**$ 4,574,655**	
33) Rebuild Transmission Line from Big Four Arch to Dry Branch Road Substations	$ 1,381,946	$ 692,229	14.0%	8.2%	20%	$ 2,790,233	Transmission
32) Rebuild Transmission Line from Dry Branch Road to Spann Ave. Substations	$ 581,701	$ 341,657	14.0%	8.2%	20%	$ 1,239,796	Transmission

CRAWFORDSVILLE ELECTRIC LIGHT & POWER
CAPITAL IMPROVEMENT PLAN COST REPORT

MAY 21, 2020
T. GHIDOSSI, D. COX

Proposed Project	Estimated Cost (2020 dollars)		Escalation Factors		Contingency Factor	CIP Budget	Capital Category
	Labor	Materials	Labor	Materials			
35) Transmission Line Relay System Replacement at Big Four Arch Substation	$ 63,086	$ 59,436	14.0%	10.4%	15%	$ 158,178	Transmission
36) Transmission Line Relay System Replacement at Dry Branch Substation	$ 63,086	$ 59,436	14.0%	10.4%	15%	$ 158,178	Transmission
14) GIS System Upgrades	$ 20,000	$ -	14.0%		20%	$ 27,368	General Plant
1) Meter Replacement	$ 23,408	$ 157,592	14.0%	4.5%	5%	$ 200,901	Distribution
					2025	**$ 5,073,047**	
31) Rebuild Transmission Line from PSI to Big Four Arch Substations	$ 2,295,675	$ 1,225,002	17.8%	10.4%	20%	$ 4,869,308	Transmission
1) Meter Replacement	$ 23,408	$ 157,592	17.8%	5.6%	5%	$ 203,739	Distribution
					2026	**$ 3,656,592**	
15) 13.8 kV Switchgear relay system upgrade at Spann Ave. Substation	$ 77,234	$ 72,766	21.8%	16.0%	15%	$ 205,203	Distribution
18) SCADA upgrades and Capacitor controls at Kentucky Street, Spann Ave., and Big Four Arch Substations	$ 64,361	$ 60,639	21.8%	16.0%	15%	$ 171,003	Transmission
19) Rebuild Holiday Inn feeder circuit over Sugar Creek toward the Power Plant	$ 54,400	$ 54,400	21.8%	12.6%	20%	$ 153,010	Distribution
21) Vehicle Additions (#10 42' Aerial Lift Truck)	$ -	$ 130,550	21.8%	12.6%	5%	$ 154,372	General Plant
25) Vehicle Fleet Additions (Fiber Splicing Trailer)	$ -	$ 27,200	21.8%	12.6%	5%	$ 32,163	General Plant
27) Switchgear relay upgrades at Big Four Arch Road Substation	$ 422,726	$ 398,274	21.8%	16.0%	15%	$ 1,123,147	Distribution
28) Replace 75 kW indoor Generator at Utility Office with a new 200 kVA Gen Set with Sound Attenuation	$ 44,145	$ 103,005	21.8%	2.4%	20%	$ 191,111	General Plant
34) Transmission Line Relay System Replacement at PSI Substation	$ 63,086	$ 59,436	21.8%	16.0%	15%	$ 167,613	Transmission
1) Meter Replacement	$ 23,408	$ 157,592	21.8%	6.8%	5%	$ 206,628	Distribution
2) Replace under sized conductor; BF 302 circuit	$ 75,000	$ 75,000	21.8%	12.6%	20%	$ 210,952	Distribution
3) Replace (2) 138 kV OCB's with 138 kV SF6 breakers @ Kentucky St. substation	$ 91,000	$ 169,000	21.8%	25.8%	20%	$ 388,108	Transmission
4) Replace (3) 138 kV Air Break Switches @ Kentucky St. substation	$ 23,625	$ 43,875	21.8%	25.8%	20%	$ 100,759	Transmission
5) #2 Switchgear relay upgrades @ Kentucky St. substation	$ 56,638	$ 53,362	21.8%	16.0%	15%	$ 150,483	Distribution
39) Digger Derrick	$ -	$ 340,000	21.8%	12.6%	5%	$ 402,040	General Plant
					Capital Improvement Plan Total	**$ 23,306,631**	
					Average 2021-2026	$ 3,884,438	

REVISION HISTORY

REV NO	DESCRIPTION	DATE	PREPARED BY	APPROVED BY
0	DRAFT ISSUE FOR REVIEW	4/29/2020	TAG	TAG
1	FINAL REPORT	5/21/2020	TAG	TAG