Final Report

Mid 2020 – Mid 2024
(July 1, 2020 – June 30, 2024)
Construction Work Plan
KENTUCKY 65

Kenergy Corporation
Henderson, Kentucky

March 2020

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Purpose of Report

This Mid 2020–Mid 2024 Construction Work Plan (CWP) documents the engineering analysis and proposed system improvements required for Kenergy Corporation (Kenergy) to provide satisfactory and reliable service to its customers through the winter peak of 2023–2024. Leidos Engineering, LLC (Leidos) was retained to assist Kenergy in the preparation of the CWP. Included within is engineering support for a loan application to RUS to finance the proposed construction program. The engineering support includes descriptions, estimated costs, and justification of required new facilities and facility improvements.

Service Area and Power Supply

Kenergy provides service to approximately 57,800 customers located in all or parts of Breckinridge, Caldwell, Crittenden, Daviess, Hancock, Henderson, Hopkins, Livingston, Lyon, McLean, Muhlenberg, Ohio, Union, and Webster Counties in northwestern Kentucky. Kenergy purchases power from the Big Rivers Electric Corporation (BREC) at all fifty delivery points. Kenergy distributes power over approximately 7,169 miles of distribution lines. The distribution system consists of 6,195 miles of overhead distribution lines and 974 miles of underground distribution lines.

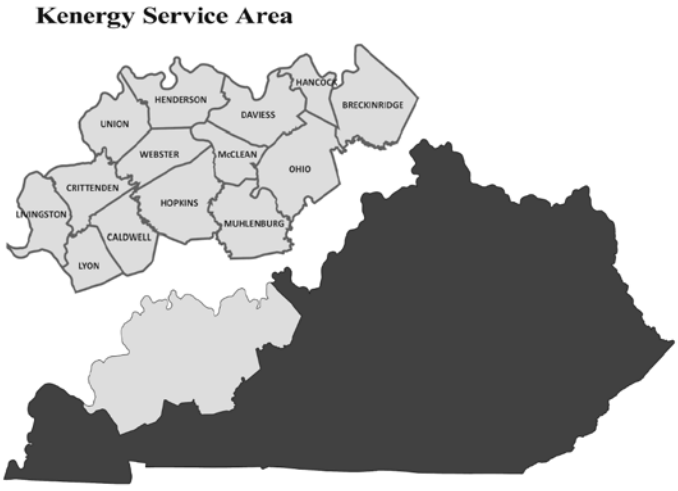

Figure ES-1. Location Map

BREC constructs, owns, and operates the 69 kV transmission system supplying power to the 50 delivery points on the Kenergy system. Kenergy owns the substations serving the distribution system. The distribution system includes 196 circuits operated at 24.9/14.4 kV or 12.5/7.2 kV. The installed overhead conductor sizes range from #6 CWC to 795 MCM ACSR, and the underground cable sizes range from #2 AL to 750 MCM AL. A tabulation of general operating statistics for the calendar years 2017 and 2018 from RUS Form 7 are shown in Table ES-1.

Table ES-1
General System Operating Statistics

	2017	2018
Miles of Distribution Line[1]	7,151	7,169
Year-End consumers per Month Served[1]	57,319	57,630
Consumers per Mile	8.0	8.0
Average Residential Consumption (kWh/mo)[1]	1,194	1,325
Total Rural System MWh Purchased[2]	1,132,856	1,212,570
Total Rural System MWh Sold[2,3]	1,075,098	1,159,333
Percent System Losses	5.1%	4.4%

1. From RUS Form 7.
2. Rural System Sales and Purchases provided by Kenergy, excludes direct served delivery points.
3. Does not include own use.

Results of Proposed Construction

On completion of the proposed construction program, the system will adequately serve the 2023–2024 non-coincident rural system winter peak load of 313.2 MW and the 2023 non-coincident rural system summer peak load of 303.69 MW as estimated by Kenergy and Leidos, based on 1.25% year-over-year growth of the 2018 non-coincident summer and winter peaks with added spot loads provided by Kenergy, and not including the Tyson and Valley Grain customer loads. The CWP was prepared to provide adequate and dependable service to 60,157 residential, commercial, and industrial customers with total annual sales of 1,180,291 MWh through the winter of 2023–2024 as projected in the load forecast (LF) prepared by BREC and GDS Associates, Inc. (GDS) in 2017.

A detailed description of the proposed system improvements is given in Section 2. This CWP includes carryovers from the previous 2016–2020 CWP. The proposed system improvements are summarized in Table ES-2.

Table ES-2
System Improvements and Additions Summary

RUS Code	Item	Estimated Cost
100	New Line	$13,395,811
200	New Tie Lines	$0
300	Conversion and Line Changes	$4,063,552
400	New Substations	$0
500	Substation Changes	$1,698,000
600	Miscellaneous Distribution Equipment	
	601 Transformers & Meters	$7,185,249
	602 Service Changes	$1,457,430
	603 Line Sectionalizing Equipment	$1,558,050
	604 Line Regulators	$672,825
	605 Line Capacitors and/or Reactors	$50,000
	606 Pole Replacements	$8,313,350
	607 Miscellaneous Replacements	$800,000
	608 Conductor Replacements	$9,941,598
700	Other Distribution Items	
	702 Security Lights	$4,171,089
TOTAL CWP Improvements		**$53,306,954**

General Basis of Study

The projected 2023–2024 winter system peak load and number of customers served used in this report were based on the 2017 LF prepared by BREC and GDS with input from Kenergy, the RUS General Field Representative, and Leidos. Kenergy's load projections and recommendations were reviewed and generally found to be adequate for the CWP planning period. The construction proposed herein is consistent with the LF unless otherwise noted and explained.

Kenergy's 2019 operations and maintenance review (Review Rating Summary, RUS Form 300) was used to determine construction required to replace physically deteriorated equipment and material, upgrade portions of the system to conform with code or safety requirements, and/or improve reliability or quality of service.

New distribution and power supply construction requirements were considered simultaneously as a "one system" approach for the orderly and economical development of the total system. The proposed construction and recommendations herein, relative to power supply and delivery, will be discussed with the cooperative's power supplier, BREC.

Details and estimated costs of the line and equipment changes and the additional requirements to serve 2,428 new residential, commercial, and industrial customers during the work plan period are included in Section 2. An estimated cost of necessary service upgrades to existing customers is also included in Section 2.

Leidos performed an analysis on the substations, distribution lines, and major equipment of the existing system, using as a basis RUS guidelines and the design criteria herein of thermal loading, voltages, physical conditions, and reliability. Milsoft Utility Solutions, Inc.'s WindMil™ software was used to analyze the distribution circuits for the projected 2023–2024 summer and winter peak loads. When applicable, Leidos investigated and economically evaluated alternate solutions so that the most cost effective construction could be proposed.

In the preparation of this Report, including the results and findings contained herein, the Consultant relied on certain assumptions and considerations with respect to conditions that may occur in the future. While these considerations and assumptions are reasonable based on information known as of the date of this Report, actual field conditions of the electric system were not verified and may differ from those assumed. Future standards and system changes may alter the results and findings. In addition, field conditions encountered during design will impact some of the projects.

Section 1
BASIS OF STUDY AND PROPOSED CONSTRUCTION

1.1 Design Criteria

Construction proposed herein is required to meet the following minimum standards of adequacy for voltages, thermal loading, safety, and reliability on the system.

- Corrective action is required for voltages less than 118 volts on a primary distribution line, assuming a system base of 120 volts. System improvements based on the voltage's calculated value shall be proven in the field before construction approval. (Extrapolation to peak is allowed). The following criteria will be used to evaluate the voltage on the distribution system:
  - Substation regulation shall be set at 125 volts with a 2-volt bandwidth.
  - Down-line regulators will be coordinated with substation regulators such that they operate within the range stipulated in Kenergy's Tariffs.
  - More than one line voltage regulator in series on the main feeder is intended as a temporary solution for voltage correction.
- All single-phase lines should be reviewed if the peak load exceeds 288 kVA. Multi-phasing or load transfers should be considered if the peak load current exceeds 40 ampere (288 kVA) on the 7.2 kV system or 20 ampere (288 kVA) on the 14.4 kV system.
- Conversions of single-phase to multiphase can be implemented to correct voltage drop, balance, sectionalizing problem or a combination. Distribution lines are subject to multi-phasing if:
  - Voltage levels do not conform to Criteria #1.
  - The limit of Criteria #2 is exceeded and load transfer is not possible or advantageous.
  - The number of consumers exceeds 60 on a single-phase tap.
- The following loading standards are recommended for thermal protection of Kenergy Corp's equipment. Loading of power transformers is calculated from the base MVA(OA) nameplate rating at 55 °C rise and metered power factor. If the actual power factor is not known, 90% will be assumed.
  - Power Transformer 130% winter; 100% summer (ANSI C57)
  - Substation Regulators 120% at 7.5% rise
  - Line Regulators 80%
  - OCR Reclosers 80%
  - Line Fuses 80%
  - Current Limiting Fuses 80%
- System studies flag conductors loaded to 50% of capacity and 100% for feeders. Conductors used for primary lines loaded more than 70% of thermal rating will be evaluated for replacement or an alternative action.

- Any deteriorated conductor is subject to replacement if any or all of the following conditions exist:
  - Records indicate the section of overhead conductor has experienced an outage more than three times in the last year for reasons other than right-of-way or storm.
  - Records indicate the section of underground cable has been repaired or spliced a total of three times.
  - The conductor is copper (CWC or hard drawn), #4 ACSR, or steel wire. (Larger copper conductors will be evaluated on an individual basis.)
- A primary distribution line will be rebuilt or relocated if a condition exists in which the line fails to meet applicable National Electric Safety Coderequirements.
- Annual SAIDI, CAIDI, SAIFI targets, number of outages, and number of customers are used to identify the worst performing feeders. If improvements do not adequately address these sections, additional analysis may be performed.
- New primary conductor shall be sized on a case by case basis using Economic Conductor Analysis. Kenergy Corp's system cost at the time of the study will be used in the program and their standard conductor sizes for primary follows:
  - #2 ACSR
  - #1/0 ACSR
  - #4/0 ACSR
  - 336.4 ACSR
  - 795 MCM ACSR
  - #2 Aluminum 15 KV URD Cable
  - #4/0 Aluminum 15 KV URD Cable
  - 500 MCM Aluminum 15 KV URD Cable
  - 750 MCM Aluminum 15 KV URD Cable
  - #1/0 Aluminum 25 KV URD Cable
  - #4/0 Aluminum 25 KV URD Cable
  - 500 MCM Aluminum 25 KV URD Cable
- New substations or upgrades to existing substations will be coordinated with Big Rivers Electric.
- All construction shall be designed and built according to NESC and RUS construction guidelines or equivalent Kenergy Corp standards.
- With the exception of dedicated circuits, feeders with a peak load exceeding 5,000 kW will be evaluated for:
  - Load transfer to an adjacent feeder
  - New feeder constructed to serve a portion of load
- Sectionalizing studies are completed on a rotating cycle. It is Kenergy's intent to study one-fifth of the substation service areas each year. Substation or feeder upgrades may require interim studies.

- Capacitors are placed on the system based on peak feeder reading from SCADA system. Summer and winter conditions are both studied. A power factor less than 90% is a flag to install a capacitor bank. The capacitor bank will be sized so that leading power factor will not fall below 95% at a load level of 60% of the winter peak loading condition.
- The installation of a 10 MVA (OA base rating) transformer at a new or existing substation shall be fused on the high side for overcurrent protection. If the installed transformer is larger than 10 MVA, the high side overcurrent protection will be a breaker with relay controls.
- Reliability of Kenergy system design shall consider single contingency planning. The system shall have the ability to maintain adequate service with loss of a major system element such as a substation transformer or three-phase feeder during non-extreme conditions. The scope of system improvements will include (when applicable) provision of capacity to meet the single contingency criteria:
  - Critical loads will have first priority.
  - Non-extreme load conditions shall be defined as the average of the minimum and maximum monthly peaks, for each substation transformer during the calendar year.
  - Each substation should have reserve transformer capacity available to support an adjacent substation (OA/FA capacity) equal to projected non-extreme load of both substations if distribution ties are available.
  - Three-phase feeder capacity between two adjoining substations shall be adequate to allow backfeeding during non-extreme load conditions.
  - Planning shall consider minimum tie-line conductor to be 336.4 kcmil ACSR at 12.5/7.2 kV and #4/0 ACSR at 24.9/14.4 kV. Minimum conductor for single-phase taps is 1/0 ACSR, if two-way feed is possible.

1.2 Distribution Line and Equipment Costs

Table 1-1 and Table 1-2 present the distribution line and equipment costs. The costs were estimated based on recent trends in the escalation of the cost of materials and labor and recent construction costs on Kenergy's system. They include material, installation, engineering, and overheads and are inflated 2.5 per year from the first year of construction.

Table 1-1
Distribution Line (Installed Cost)

Distribution Lines - Overhead	2020 Estimated Cost ($/mile)
New Lines	
3ϕ 795 MCM ACSR	$325,000
3ϕ DC 336 ACSR	$285,000
3ϕ 336 ACSR	$180,000
3ϕ #4/0 ACSR	$160,000
3ϕ #1/0 ACSR	$125,000

Distribution Lines - Overhead	2020 Estimated Cost ($/mile)
2ϕ #1/0 ACSR	$105,000
1ϕ #1/0 ACSR	$75,000
1ϕ #2 ACSR	$70,000
Line Reconductor	
3ϕ 795 MCM ACSR	$305,000
3ϕ DC 336 MCM ACSR	$275,000
3ϕ 336 MCM ACSR	$160,000
3ϕ #4/0 ACSR	$150,000
3ϕ #1/0 ACSR	$115,000
2ϕ #1/0 ACSR	$95,000
1ϕ #1/0 ACSR	$65,000
1ϕ #2 ACSR	$60,000
Distribution Lines – Underground	**2020 Estimated Cost ($/mile)**
New Lines	
3ϕ 750 MCM Aluminum 15 kV URD	$300,000
3ϕ 500 MCM Aluminum 15 kV URD	$290,000
3ϕ #4/0 Aluminum 15 kV URD	$225,000
1ϕ #2 Aluminum 15 kV URD	$170,000
3ϕ 500 MCM Aluminum 25 kV URD	$295,000
3ϕ #4/0 Aluminum 25 kV URD	$230,000
1ϕ #1/0 Aluminum 25 kV URD	$180,000
Line Reconductor	
3ϕ 750 MCM Aluminum 15 kV URD	$290,000
3ϕ 500 MCM Aluminum 15 kV URD	$280,000
3ϕ #4/0 Aluminum 15 kV URD	$220,000
1ϕ #2 Aluminum 15 kV URD	$165,000
3ϕ 500 MCM Aluminum 25 kV URD	$285,000
3ϕ #4/0 Aluminum 25 kV URD	$225,000
1ϕ #1/0 Aluminum 25 kV URD	$175,000
25 kV Conversion	**2020 Estimated Cost ($/mile)**
1Ø Re-insulation	$10,000
3Ø Re-insulation	$35,000

Table 1-2
Distribution Equipment (Installed Cost)

Distribution Equipment	2020 Estimated Cost
Line Regulators	
Line Regulator – 50 amp, 1ϕ	$16,000
Line Regulator – 100 amp, 1ϕ	$33,000
Line Regulator – 150 amp, 1ϕ	$46,000
Line Regulator – 100 amp, 3ϕ	$55,000
Line Regulator – 150 amp, 3ϕ	$62,000
Line Regulator – 219 amp, 3ϕ	$69,000
Line Regulator – 328 amp, 3ϕ	$101,000
Relocate Regulator Bank	$7,500
Remove Regulator Bank	$5,000
Line Shunt Capacitors	
Shunt Capacitor – 50 kVAR, 1ϕ	$8,000
Shunt Capacitor – 100 kVAR, 1ϕ	$13,000
Shunt Capacitor – 50 kVAR, 3ϕ	$22,000
Shunt Capacitor – 100 kVAR, 3ϕ	$32,000
Shunt Capacitor – 200 kVAR, 3ϕ	$46,000
Relocate Shunt Capacitor Bank	$7,500
Remove Shunt Capacitor Bank	$5,000
Reclosers	
(1) 1ϕ recloser	$7,000
(3) 1ϕ reclosers	$17,000
(1) 3ϕ recloser	$51,000
Relocate (1) recloser	$8,500
Remove (1) recloser	$5,000

1.3 Status of Previous CWP Items

Leidos reviewed the previous work plan for the 2016–2020 construction period. At the time of this report, 63% of the projects in the previous plan were completed, 24% of the projects are in progress, 5% of the projects were cancelled, and 7% of the projects are being carried over to this work plan. Appendix A summarizes the status of each project based on the following:

- Carry Over — Project will be a carry-over in the Mid 2020–Mid 2024 CWP
- In Progress — Project is currently in the construction phase, but will not be closed out before the end of the previous work plan. Project will be a carry-over in the Mid 2020–Mid 2024 CWP

- Complete Project has been completed
- Cancelled Project was cancelled

1.4 Analysis of Current System Studies

1.4.1 2017 Load Forecast

BREC, in association with GDS, prepared the 2017 Load Forecast (LF), which details the forecasted system coincident peak loads through 2031. The 2017 LF was based on 2016 loading and information. The forecast projects a rural system non-coincident peak of 277 MW in 2031, an average annual customer growth of 0.7%, and an average annual growth of energy sales of 0.2%.

From discussions with Kenergy and the RUS representative, growing Kenergy's non-coincident summer and winter peaks by 1.25% as given by Kenergy in the provided Milsoft model came close to BREC's projections for the Rural System Peak Summer Demand found in Table 3.7 and the Normal Station non-coincident peak for the winter on page A-12. On top of this, Kenergy provided expected additional spot loads for the projected planning period. Kenergy, the RUS representative, and Leidos agreed these projections were realistic for the service territory, and were the basis for project development in the Mid 2020–Mid 2024 CWP.

1.4.2 Long Range Plan

The most recent Long Range Plan (LRP) was prepared in 2010 based on the 2009 system non-coincident summer and winter peaks. The purpose of the LRP is to provide general guidance for system expansion. Periodic reviews of the LRP will be required to examine the applicability of the preferred plan considering actual system developments. Detailed construction work plans should be prepared for necessary construction, and the LRP should be reevaluated as each work plan is prepared. A review of the 2010 LRP was conducted to ensure that the Mid 2020–Mid 2024 CWP and the 2010 LRP were in alignment. The projected 2022–23 load from the LRP was above 400 MW for both the summer and winter. Substations projected in the LRP are not necessary at this time, as the projected load for this CWP is over 100 MW below the projected LRP load for the same time frame.

1.4.3 2019 Operations and Maintenance Survey

Kenergy and the RUS field representative performed the Form 300 operations and maintenance review in July 2019. RUS Form 300 is located in Appendix C. The review indicated a satisfactory rating in all areas except the following, which received an acceptable rating. Additional comments and corrective measures included in the Form 300 for each area receiving an acceptable rating are also given below.

- *Substations (Transmission and Distribution): Physical Conditions: Structure, Major Equipment, Appearance.* Trees growing at one substation fence need to be trimmed.

- *Distribution Lines – Overhead: Compliance with Safety Codes (Foreign Structures, Attachments).* Telephone and cable TV poles left standing next to electric poles should be removed promptly following changes. Telephone and cable TV attachments require constant monitoring and follow-up to ensure contract compliance.
- *Distribution Lines – Overhead: Observed Physical Condition from Field Checking (Right-of-Way).* A more aggressive program is recommended to remove yard trees close to lines.
- *Line Maintenance and Work Order Procedures: Work Backlogs (Retirement of Idle Services).* The co-op has a program in place to reduce idle services and correct the report on the Form 7.

1.4.4 Sectionalizing Studies

Kenergy reviews the coordination of all sectionalizing devices on the system. Kenergy will analyze the protection schemes of all new or significantly changed circuits due to CWP projects. Leidos has made recommendations where appropriate, with the intention of Kenergy confirming and updating coordination in the field. For the remaining system, approximately one-fifth of the substations are studied each year; therefore, this is an on-going project.

Upon completion of the analyses, a list of protection devices loaded to greater than 80% of rated capacity was prepared. This list can be found in Appendix F. Section 2 of this CWP estimates costs for ongoing upgrades to Kenergy's sectionalizing.

1.4.5 Annual Energy, Load, and Consumer Data

Table 1-3 presents a summary of the annual energy, demand, and consumer information. The historical data provided was provided by Kenergy. Projections for the Mid 2020–Mid 2024 CWP design loads were based on the 2017 load forecast. The total projected system load was allocated to individual substations and feeders based on Kenergy's knowledge of the system, historical loading, and known future development. Appendix B includes the load forecast for the Kenergy substations and feeders.

Table 1-3
Historical and Projected Annual Energy, Demand, and Consumer Data[1,2]

Calendar Year	Energy Purchased (MWh)	Energy Sold		Energy Loss		Non-Coincident Peak Demand[3]		Percent Increase	Annual Load Factor	Number of Customers[4]	
		(MWh)	Percent Increase	(MWh)	Percent of Purchases	Season	(MW)			Average[5]	Percent Increase
2014	1,240,267	1,178,466		61,801	4.98%	Winter	328.1		43.15%	55,932	
2015	1,192,608	1,137,157	-3.51%	55,451	4.65%	Winter	305.3	-6.95%	44.59%	56,406	0.85%
2016	1,196,513	1,137,908	0.07%	58,605	4.90%	Summer	273.8	-10.32%	49.89%	56,832	0.76%
2017	1,132,856	1,075,098	-5.52%	57,758	5.10%	Summer	269.8	-1.46%	47.93%	57,319[6]	0.86%
2018	1,212,570	1,159,333	7.84%	53,237	4.39%	Winter	286.0	6.00%	48.40%	57,630[6]	0.54%
2019	1,156,733	1,104,484	-4.73%	52,249	4.52%	Winter	276.8	-3.22%	47.70%	58,098	0.81%
2020	1,221,660	1,162,395	5.24%	59,265	4.85%	Winter	295.0	6.58%	47.27%	58,597	0.86%
2021	1,222,517	1,163,211	0.07%	59,306	4.85%	Winter	302.0	2.37%	46.21%	59,004	0.69%
2022	1,228,365	1,168,774	0.48%	59,591	4.85%	Winter	308.1	2.02%	45.51%	59,389	0.65%
2023	1,233,576	1,173,733	0.42%	59,843	4.85%	Winter	313.21	1.66%	44.96%	59,773	0.65%
2024	1,240,469	1,180,291	0.56%	60,178	4.85%	Winter	317.0[5]	1.20%	44.68%	60,157	0.64%

1. Historical and projected data based on the 2017 LF from BREC and GDS as well as data provided by Kenergy.
2. Values are for Rural System Only, and do not include direct serve customers.
3. Non-coincident peak for the system is the sum of the metered substation coincident peaks.
4. Average number of customers for projected CWP period was based on LF projections.
5. Projected Winter 2024–2025 Peak.
6. RUS Form 7 Information Used for Actual Values.

1.5 Substation Load Data

Kenergy distributes power from 50 69-12.47 kV substations owned, operated, and maintained by Kenergy. Table 1-4 summarizes the existing Kenergy substations, configuration, voltage, and capacity. Historical summer and winter substation demands and power factor are shown in Table 1-5.

The total installed substation transformer calculated capacity for Kenergy's system is approximately 529.3 MVA in the summer and 688.3 MVA in the winter based on the current configuration and location of the transformers. The calculated transformer capacity is 193% greater than the projected summer coincident system peak of 274.3 MW and 228% greater than the projected winter coincident system peak of 302.0 MW.

Table 1-4
Substation Voltages and Capacities

Substation	Voltage (kV)	Cal. Summer Transformer Capacity[1] (MVA)	Cal. Winter Transformer Capacity[1] (MVA)
Adams Lane	69-12.47	10,000	13,000
Beda	69-12.47	10,000	13,000
Beech Grove	69-12.47	10,000	13,000
Bon Harbor	69-12.47	10,000	13,000
Caldwell Springs	69-12.47	10,000	13,000
Centertown	69-12.47	5,000	6,500
Crossroads	69-24.9	10,000	13,000
Dermont	69-12.47	10,000	13,000
Dixon	69-12.47	10,000	13,000
East Owensboro	69-12.47	10,000	13,000
Geneva	69-12.47	10,000	13,000
Guffie	69-12.47	10,000	13,000
Hanson	69-12.47	3,800	4,900
Hawesville	69-12.47	10,000	13,000
Horse Fork #1	69-12.47	12,000	15,600
Horse Fork #2	69-12.47	12,000	15,600
Hudson #1	69-24.9	10,000	13,000
Hudson #2	69-24.9	10,000	13,000
Lewisport #1	69-12.47	10,000	13,000
Lewisport #2	69-12.47	10,000	13,000
Little Dixie	69-12.47	6,250	8,200
Lyon	69-12.47	10,000	13,000

Substation	Voltage (kV)	Cal. Summer Transformer Capacity[1] (MVA)	Cal. Winter Transformer Capacity[1] (MVA)
Maceo	69-12.47	10,000	13,000
Madisonville	69-12.47	10,000	13,000
Marion	69-12.47	10,000	13,000
Masonville	69-12.47	10,000	13,000
Morganfield	69-24.9	10,000	13,000
Niagara	69-12.47	10,000	13,000
Nuckols	69-12.47	10,000	13,000
Onton	69-12.47	10,000	13,000
Philpot #1	69-12.47	10,000	13,000
Philpot #2	69-12.47	10,000	13,000
Pleasant Ridge	69-12.47	10,000	13,000
Providence	69-24.9	10,000	13,000
Race Creek	69-12.47	10,000	13,000
Riverport	69-12.47	10,000	13,000
S. Dermont #1	69-12.47	10,000	13,000
S. Dermont #2	69-12.47	10,000	13,000
S. Hanson #1	69-12.47	10,000	13,000
S. Hanson #2	69-12.47	10,000	13,000
S. Owensboro #1	69-12.47	10,000	13,000
S. Owensboro #2	69-12.47	10,000	13,000
Sacramento	69-12.47	3,750	4,900
Sebree	69-12.47	5,000	6,500
St. Joe	69-12.47	7,500	9,800
Stanley	69-12.47	5,000	6,500
Sullivan	69-12.47	10,000	13,000
Thruston #1	69-12.47	10,000	13,000
Thruston #2	69-12.47	10,000	13,000
Utica	69-12.47	10,000	13,000
W. Owensboro	69-12.47	12,000	15,600
Weaverton	69-12.47	10,000	13,000
Weberstown	69-12.47	7,500	9,800
Whitesville	69-12.47	10,000	13,000
Wolf Hills	69-12.47	10,000	13,000
Yeager	69-12.47	1,500	1,950
Zion	69-12.47	10,000	13,000

1. Ratings provided by Kenergy.

2. Regulator capacity not available for this planning period. It is assumed Kenergy will upgrade substation regulators as necessary.

Table 1-5
Historical Substation Demands

Substation	S. Cap[1] (MVA)	S. Peak[2] (MW)	PF @ Peak[2]	% Loaded[3]	W. Cap[1] (MVA)	W. Peak[2] (MW)	PF @ Peak[2]	% Loaded[3]
Adams Lane	10,000	4.8	91.5%	52.0%	13,000	5.30	99.4%	41.0%
Beda	10,000	7.1	95.8%	73.8%	13,000	7.43	99.7%	57.4%
Beech Grove	10,000	4.1	95.5%	43.2%	13,000	4.55	99.4%	35.2%
Bon Harbor	10,000	7.2	94.7%	76.2%	13,000	5.47	99.4%	42.3%
Caldwell Springs	10,000	2.5	99.5%	24.9%	13,000	2.48	99.7%	19.2%
Centertown	5,000	2.1	94.0%	44.0%	6,500	3.12	99.5%	48.2%
Crossroads	10,000	4.7	97.8%	48.0%	13,000	6.36	99.9%	49.0%
Dermont	10,000	7.7	95.2%	80.6%	13,000	5.54	98.8%	43.1%
Dixon	10,000	4.0	94.7%	41.8%	13,000	4.93	99.8%	38.0%
East Owensboro	10,000	6.3	93.7%	67.6%	13,000	4.44	99.0%	34.5%
Geneva	10,000	5.0	96.0%	52.3%	13,000	6.95	99.8%	53.5%
Guffie	10,000	6.0	96.0%	62.2%	13,000	6.91	99.3%	53.5%
Hanson	3,800	3.0	95.8%	81.8%	4,900	4.16	99.8%	85.0%
Hawesville	10,000	7.1	94.6%	74.7%	13,000	7.15	98.8%	55.7%
Horse Fork #1	12,000	5.5	94.9%	47.9%	15,600	3.54	98.4%	23.0%
Horse Fork #2	12,000	4.9	94.9%	43.0%	15,600	3.76	98.4%	24.5%
Hudson #1	10,000	2.4	92.8%	25.5%	13,000	2.04	95.8%	16.4%
Hudson #2	10,000	2.2	91.8%	23.8%	13,000	2.18	95.8%	17.5%
Lewisport #1	10,000	6.6	93.3%	70.2%	13,000	5.19	98.2%	40.7%
Lewisport #2	10,000	2.7	93.3%	28.5%	13,000	2.46	98.2%	19.2%
Little Dixie	6,250	4.6	96.0%	76.9%	8,200	3.80	99.9%	46.4%
Lyon	10,000	4.9	97.8%	50.0%	13,000	5.63	99.9%	43.4%
Maceo	10,000	3.4	95.3%	35.9%	13,000	3.60	99.6%	27.8%
Madisonville	10,000	4.4	91.8%	48.2%	13,000	5.20	96.1%	41.6%
Marion	10,000	5.6	95.9%	58.4%	13,000	7.17	99.5%	55.5%
Masonville	10,000	6.7	96.4%	69.4%	13,000	4.21	99.9%	32.4%
Morganfield	10,000	9.1	93.0%	97.6%	13,000	9.32	99.7%	71.9%
Niagara	10,000	5.8	97.6%	59.6%	13,000	8.11	99.9%	62.4%
Nuckols	10,000	4.5	98.9%	45.9%	13,000	5.04	100.0%	38.8%
Onton	10,000	4.8	95.9%	50.4%	13,000	7.25	98.2%	56.8%
Philpot #1	10,000	5.1	95.5%	53.7%	13,000	4.17	99.6%	32.2%
Philpot #2	10,000	3.6	95.5%	37.5%	13,000	3.24	99.6%	25.0%
Pleasant Ridge	10,000	4.3	96.8%	44.8%	13,000	5.51	99.9%	42.4%
Providence	10,000	4.1	96.5%	42.8%	13,000	6.40	99.8%	49.3%
Race Creek	10,000	5.0	96.3%	52.2%	13,000	6.03	99.9%	46.4%
Riverport	10,000	3.7	84.6%	44.1%	13,000	4.10	87.6%	36.0%

Substation	S. Cap[1] (MVA)	S. Peak[2] (MW)	PF @ Peak[2]	% Loaded[3]	W. Cap[1] (MVA)	W. Peak[2] (MW)	PF @ Peak[2]	% Loaded[3]
S. Dermont #1	10,000	9.7	95.4%	102.2%	13,000	5.73	99.2%	44.4%
S. Dermont #2	10,000	7.1	95.4%	74.0%	13,000	3.98	99.2%	30.9%
S. Hanson #1	10,000	3.8	95.5%	39.6%	13,000	7.45	99.1%	57.8%
S. Hanson #2	10,000	5.5	95.5%	57.2%	13,000	8.27	99.1%	64.2%
S. Owensboro #1	10,000	4.5	95.9%	47.0%	13,000	3.23	99.8%	24.9%
S. Owensboro #2	10,000	5.0	95.9%	52.6%	13,000	3.87	99.8%	29.8%
Sacramento	3,750	3.4	92.6%	97.0%	4,900	3.49	99.1%	71.9%
Sebree	5,000	3.5	92.3%	75.9%	6,500	4.26	98.3%	66.6%
St. Joe	7,500	5.6	94.0%	79.5%	9,800	4.85	98.4%	50.3%
Stanley	5,000	2.9	97.2%	60.6%	6,500	3.06	99.9%	47.1%
Sullivan	10,000	2.9	95.5%	30.6%	13,000	3.01	99.4%	23.3%
Thruston #1	10,000	5.0	94.1%	52.7%	13,000	4.76	99.1%	37.0%
Thruston #2	10,000	3.7	94.1%	39.4%	13,000	3.41	99.3%	26.4%
Utica	10,000	5.7	94.9%	59.7%	13,000	6.91	99.5%	53.5%
W. Owensboro	12,000	8.0	97.9%	68.1%	15,600	6.18	99.5%	39.8%
Weaverton	10,000	3.8	97.6%	38.5%	13,000	4.75	99.2%	36.8%
Weberstown	7,500	5.4	94.9%	75.9%	9,800	7.25	99.1%	74.7%
Whitesville	10,000	6.9	94.5%	73.5%	13,000	7.61	98.8%	59.3%
Wolf Hills	10,000	2.9	99.1%	29.2%	13,000	2.71	99.5%	21.0%
Yeager	1,500	0.1	69.7%	9.5%	1,950	0.11	79.8%	7.3%
Zion	10,000	6.2	98.3%	63.4%	13,000	8.37	100.0%	64.4%

1. Based on ratings provided by Kenergy.
2. Demand and power factor based on metered non-coincident data provided by Kenergy for the 2018 winter and summer peaks.
3. Loading percentage stated as non-coincident peak and power factor to the calculated rating.
4. Regulator capacity not available for this planning period. It is assumed Kenergy will upgrade substation regulators as necessary.

1.6 Circuit Loads

The distribution system is served through (18) 24.9/14.4 kV feeders at Crossroads, Hudson, Morganfield, and Providence Substations, 12.47 to 24.9 kV feeders with autotransformers at Geneva 6303, Marion 7002, and Marion 7003, and (175) 12.47/7.2 kV feeders at the remaining substations. Kenergy allows up to 5 MW on a feeder, and summer and winter peak feeder loads are compared to this limit in Table 1-6. Based on the projected peak loads, Feeders 5103 and 9104 exceeded the 5 MW capacity load planning criteria in the winter and summer, while Feeder 1804 only exceeded the 5 MW limit in the summer.

Table 1-6
Feeder Capacity at 2023 Summer and 2023-2024 Winter Peak

Substation/ Feeder	Summer Load[1] (MW)	Power Factor @ Peak[2]	Winter Load[1] (MW)	Power Factor @ Peak[2]	Over 5 MVA?
Adams Lane					
10601	1.36	91.9%	1.10	99.9%	
10602	3.08	91.7%	3.78	99.7%	
10603	0.52	91.7%	0.63	92.3%	
Beda					
4101	2.18	94.9%	2.83	98.9%	
4102	1.21	95.2%	1.60	99.3%	
4103	1.35	93.5%	1.53	99.2%	
4104	2.60	97.7%	1.77	-99.4%	
Beech Grove					
3301	0.95	95.1%	0.99	99.2%	
3302	0.68	97.9%	0.93	99.9%	
3303	1.23	95.4%	1.32	99.6%	
3304	1.42	94.4%	1.50	98.6%	
Bon Harbor					
2701	1.75	93.9%	0.78	98.1%	
2702	2.10	94.5%	1.48	99.4%	
2703	0.38	95.1%	0.19	99.8%	
2704	1.74	94.8%	2.15	99.6%	
2705	1.80	95.3%	1.31	99.6%	
Caldwell Springs					
6001	0.49	95.7%	0.41	96.7%	
6002	1.17	-99.1%	1.16	-98.8%	
6003	0.92	95.8%	1.03	96.4%	
Centertown					
4001	0.47	94.7%	0.61	99.8%	
4002	0.60	92.7%	0.72	98.8%	
4003	0.96	94.4%	1.73	99.6%	
4004	0.04	95.7%	0.07	100.0%	
Crossroads					
6101	1.27	99.1%	1.98	100.0%	
6102	0.62	-96.1%	0.78	-94.7%	
6103	2.46	94.2%	3.22	99.0%	
6104	0.42	94.4%	0.66	98.6%	

Substation/ Feeder	Summer Load[1] (MW)	Power Factor @ Peak[2]	Winter Load[1] (MW)	Power Factor @ Peak[2]	Over 5 MVA?
Dermont					
1701	1.18	95.6%	0.73	99.1%	
1702	0.57	95.6%	0.47	99.2%	
1703	1.54	95.0%	0.90	97.5%	
1704	2.63	95.2%	1.57	99.2%	
1705	2.35	94.9%	2.31	98.7%	
Dixon					
6201	1.64	91.8%	1.63	99.6%	
6202	1.20	92.5%	1.71	98.8%	
6203	1.52	98.9%	2.04	-99.9%	
East Owensboro					
1901	0.90	-12.4%	0.90	0.0%	
1902	3.64	92.8%	1.70	98.1%	
1903	0.85	95.7%	0.48	-100.0%	
1904	0.49	88.4%	0.69	90.4%	
1905	1.84	95.4%	1.93	100.0%	
Geneva					
6301	0.47	-96.2%	1.03	-99.7%	
6302	2.52	92.9%	2.92	99.2%	
6303	2.22	96.0%	3.28	99.8%	
Guffie					
3101	2.82	97.3%	3.67	99.6%	
3102	2.22	95.5%	2.58	98.7%	
3103	0.31	95.6%	0.34	99.9%	
3104	0.85	92.3%	0.61	98.4%	
Hanson					
5103	5.83	93.0%	5.90	99.9%	Yes
5104	2.86	96.0%	4.02	99.8%	
Hawesville					
1301	1.27	93.7%	0.82	98.2%	
1302	1.88	93.8%	1.72	98.5%	
1303	1.91	95.1%	2.39	99.2%	
1304	1.43	95.5%	1.87	99.1%	
1305	1.13	94.7%	0.93	98.0%	
Horse Fork #1					
2001	2.04	97.0%	1.36	99.4%	
2002	3.61	93.5%	2.28	97.4%	
2003	0.02	-99.8%	0.04	-99.2%	

Substation/ Feeder	Summer Load[1] (MW)	Power Factor @ Peak[2]	Winter Load[1] (MW)	Power Factor @ Peak[2]	Over 5 MVA?
Horse Fork #2					
2004	2.60	93.3%	1.78	98.2%	
2005	2.49	96.4%	2.13	98.5%	
Hudson #1					
6501	0.00	100.0%	0.00	100.0%	
6502	0.00	100.0%	0.00	100.0%	
6503	0.00	100.0%	0.00	100.0%	
6504	2.71	92.8%	2.37	95.8%	
Hudson #2					
6505	0.00	100.0%	0.00	100.0%	
6506	2.27	91.8%	2.27	95.8%	
6507	0.00	100.0%	0.00	100.0%	
Lewisport #1					
1201	1.77	93.0%	1.21	98.7%	
1202	1.95	94.7%	1.47	99.6%	
1203	1.68	89.5%	1.27	94.7%	
1207	1.65	95.3%	1.67	98.1%	
Lewisport #2					
1204	1.25	97.9%	1.44	-100.0%	
1205	0.93	85.4%	0.71	85.6%	
1206	0.65	92.5%	0.50	97.2%	
Little Dixie					
6601	2.47	95.2%	1.86	99.7%	
6602	1.28	95.5%	1.20	99.9%	
6603	0.85	98.5%	0.74	-99.9%	
Lyon					
6901	1.29	96.4%	1.40	99.6%	
6902	3.02	98.7%	3.62	100.0%	
6903	0.96	96.2%	1.08	99.7%	
Maceo					
2801	0.29	96.4%	0.38	99.6%	
2802	0.83	95.6%	0.65	99.7%	
2803	0.97	94.0%	1.06	99.3%	
2804	1.05	95.5%	1.02	99.7%	
2805	0.41	96.1%	0.63	99.7%	
Madisonville					
4901	1.17	94.8%	1.69	98.0%	
4902	1.82	95.3%	3.00	97.3%	
4903	1.78	85.2%	0.93	85.5%	

Substation/ Feeder	Summer Load[1] (MW)	Power Factor @ Peak[2]	Winter Load[1] (MW)	Power Factor @ Peak[2]	Over 5 MVA?
Marion					
7001	1.55	93.7%	2.21	98.5%	
7002	1.11	95.3%	1.48	99.3%	
7003	2.43	97.9%	2.85	100.0%	
7004	0.72	93.1%	0.93	98.6%	
Masonville					
2301	1.20	94.6%	0.72	98.4%	
2302	2.89	98.1%	1.68	-99.3%	
2303	3.11	95.2%	2.15	99.2%	
2304	0.00	100.0%	0.00	100.0%	
Morganfield					
7101	3.99	91.2%	3.28	99.1%	
7102	2.29	92.3%	2.89	99.5%	
7103	1.74	97.7%	2.17	-99.9%	
7104	1.43	92.2%	1.36	99.7%	
Niagara					
8001	2.67	98.6%	3.83	100.0%	
8002	3.33	94.4%	4.23	99.1%	
8003	1.63	98.5%	1.97	-100.0%	
Nuckols					
4201	0.06	94.3%	0.06	98.1%	
4202	0.00	0.0%	0.00	0.0%	
4203	2.31	99.6%	2.83	-100.0%	
4204	2.51	98.0%	2.56	100.0%	
Onton					
5201	1.88	94.0%	3.09	97.1%	
5202	2.18	93.1%	2.89	96.7%	
5203	0.89	-99.6%	1.56	-99.9%	
Philpot #1					
2501	2.25	98.5%	2.22	-99.7%	
2503	1.56	96.1%	1.16	99.9%	
2504	1.72	89.1%	1.14	90.7%	
Philpot #2					
2505	1.74	95.3%	1.62	99.5%	
2507	2.12	95.6%	1.88	99.7%	

Substation/ Feeder	Summer Load[1] (MW)	Power Factor @ Peak[2]	Winter Load[1] (MW)	Power Factor @ Peak[2]	Over 5 MVA?
Pleasant Ridge					
2601	0.80	96.1%	1.32	99.8%	
2602	2.04	97.3%	2.45	100.0%	
2603	1.08	96.1%	1.21	99.8%	
2604	0.58	96.8%	0.75	99.8%	
Providence					
8101	1.21	94.9%	1.81	99.5%	
8102	1.25	94.1%	2.16	99.2%	
8104	1.88	98.5%	2.72	-100.0%	
Race Creek					
8201	1.23	95.3%	1.77	99.7%	
8202	2.25	95.4%	2.70	99.7%	
8203	1.74	97.8%	1.80	-99.9%	
Riverport					
8301	0.00	100.0%	0.00	100.0%	
8302	3.08	84.6%	3.52	87.5%	
8303	0.65	84.6%	0.58	88.3%	
S. Dermont #1					
1801	3.91	97.5%	3.50	99.8%	
1802	1.98	95.0%	0.81	98.8%	
1804	4.59	93.3%	1.89	97.3%	Yes
S. Dermont #2					
1803	1.64	97.2%	1.06	99.8%	
1805	3.28	97.3%	1.59	99.9%	
1806	2.69	91.0%	1.65	97.2%	
S. Hanson #1					
5301	1.22	95.7%	2.59	98.8%	
5304	0.83	96.1%	1.93	99.4%	
5305	2.02	95.0%	3.54	99.1%	
S. Hanson #2					
5302	1.34	93.7%	2.19	98.6%	
5303	1.97	95.6%	2.39	98.8%	
5306	2.57	96.2%	4.36	99.4%	
S. Owensboro #1					
5803	0.56	98.5%	0.42	95.2%	
5804	0.43	-63.5%	0.43	-53.9%	
5806	2.22	87.5%	1.24	93.6%	
5807	1.47	93.1%	1.27	97.6%	

Substation/ Feeder	Summer Load[1] (MW)	Power Factor @ Peak[2]	Winter Load[1] (MW)	Power Factor @ Peak[2]	Over 5 MVA?
S. Owensboro #2					
5801	1.76	90.1%	1.61	98.6%	
5802	0.60	88.7%	0.80	89.3%	
5805	2.88	99.1%	1.61	-96.8%	
Sacramento					
5001	1.12	93.5%	1.25	98.9%	
5003	0.66	93.5%	0.79	99.5%	
5004	1.58	91.4%	1.45	99.0%	
Sebree					
8401	0.56	91.4%	0.83	96.2%	
8402	0.78	87.7%	1.09	95.8%	
8403	1.77	96.1%	1.85	99.9%	
8404	0.52	88.2%	0.67	96.4%	
St. Joe					
3201	2.88	93.5%	2.47	97.7%	
3202	1.96	94.1%	1.54	99.5%	
3203	0.99	95.1%	1.04	97.8%	
Stanley					
2101	2.07	98.2%	2.20	100.0%	
2102	0.36	94.2%	0.30	99.2%	
2103	0.63	94.9%	0.69	99.2%	
Sullivan					
8501	0.79	95.8%	0.84	98.9%	
8502	1.17	95.3%	1.18	99.1%	
8503	1.07	95.3%	1.10	99.2%	
Thruston #1					
1101	0.62	95.1%	0.90	99.4%	
1102	2.93	94.2%	2.74	98.8%	
1103	1.65	96.7%	1.33	100.0%	
Thruston #2					
1104	0.52	93.8%	0.27	99.8%	
1105	3.37	95.1%	3.28	99.3%	
Utica					
2401	1.74	94.0%	1.76	99.0%	
2402	1.81	94.3%	2.61	99.1%	
2403	1.26	94.8%	1.66	99.7%	
2404	1.01	97.1%	1.09	-100.0%	
2405	0.06	96.4%	0.06	100.0%	

Substation/ Feeder	Summer Load[1] (MW)	Power Factor @ Peak[2]	Winter Load[1] (MW)	Power Factor @ Peak[2]	Over 5 MVA?
W. Owensboro					
2201	0.10	87.2%	0.05	92.8%	
2202	0.82	95.1%	0.52	96.2%	
2203	3.19	98.7%	2.89	100.0%	
2204	0.75	98.1%	0.86	99.2%	
2205	3.77	97.7%	2.37	99.0%	
Weaverton					
6401	0.10	96.5%	0.15	99.0%	
6402	1.81	98.9%	2.86	99.5%	
6403	1.00	95.9%	0.80	98.7%	
6404	0.98	96.2%	1.14	98.5%	
Weberstown					
1401	2.11	95.0%	3.11	98.9%	
1402	1.52	95.5%	2.06	99.3%	
1403	1.98	94.2%	2.37	99.0%	
1404	0.00	100.0%	0.00	100.0%	
Whitesville					
1501	1.08	93.9%	1.16	97.1%	
1502	2.90	94.1%	2.23	98.8%	
1503	1.93	94.5%	2.85	98.9%	
1504	1.31	95.6%	1.68	99.5%	
Wolf Hills					
9101	0.10	91.9%	0.07	92.9%	
9103	1.64	96.5%	1.78	96.3%	
9104	5.28	-99.8%	4.97	-97.2%	Yes
Yeager					
9901	0.10	69.7%	0.11	79.8%	
Zion					
9001	0.93	95.0%	1.70	99.5%	
9002	1.76	98.9%	2.76	100.0%	
9003	2.58	99.6%	3.52	-99.8%	
9004	1.21	94.8%	0.73	99.6%	

1. Historical system coincident peak loads as provided by Kenergy in the WindMil model.
2. Power factor based on historical metered data provided by Kenergy in the WindMil model.

A review of Table 1-7 provides an overview of the existing transformer capacity compared to the projected CWP design load for the 2023 summer and 2023–2024 winter. In projected summer loads, Morganfield, Hanson, and South Dermont #1 Substations are projected to exceed their transformer ratings, while only Hanson is projected to exceed its rating in the winter.

Table 1-7
Existing Substation Capacity with Projected Loading

Substation	S. Cap[1] (MVA)	S. Peak[2] (MW)	PF @ Peak[2]	% Loaded[3]	W. Cap[1] (MVA)	W. Peak[2] (MW)	PF @ Peak[2]	% Loaded[3]
Adams Lane	10,000	4.94	91.5%	54.0%	13,000	5.52	99.4%	42.7%
Beda	10,000	7.35	95.8%	76.7%	13,000	7.73	99.7%	59.7%
Beech Grove	10,000	4.28	95.5%	44.9%	13,000	4.73	99.4%	36.6%
Bon Harbor	10,000	7.78	94.7%	82.1%	13,000	5.92	99.4%	45.8%
Caldwell Springs	10,000	2.57	99.5%	25.9%	13,000	2.58	99.7%	19.9%
Centertown	5,000	2.07	94.0%	44.0%	6,500	3.12	99.5%	48.2%
Crossroads	10,000	4.88	97.8%	49.9%	13,000	6.62	99.9%	51.0%
Dermont	10,000	8.27	95.2%	86.9%	13,000	5.99	98.8%	46.6%
Dixon	10,000	4.36	94.7%	46.0%	13,000	5.38	99.8%	41.5%
East Owensboro	10,000	7.73	93.7%	82.5%	13,000	5.71	99.0%	44.3%
Geneva	10,000	5.21	96.0%	54.3%	13,000	7.22	99.8%	55.7%
Guffie	10,000	6.21	96.0%	64.7%	13,000	7.19	99.3%	55.7%
Hanson	3,800	8.69	95.8%	238.8%[4]	4,900	9.92	99.8%	202.9%[4]
Hawesville	10,000	7.62	94.6%	80.5%	13,000	7.73	98.8%	60.2%
Horse Fork #1	12,000	5.67	94.9%	49.8%	15,600	3.68	98.4%	24.0%
Horse Fork #2	12,000	5.08	94.9%	44.7%	15,600	3.91	98.4%	25.5%
Hudson #1	10,000	2.71	92.8%	29.2%	13,000	2.37	95.8%	19.0%
Hudson #2	10,000	2.27	91.8%	24.7%	13,000	2.27	95.8%	18.2%
Lewisport #1	10,000	7.06	93.3%	75.7%	13,000	5.61	98.2%	44.0%
Lewisport #2	10,000	2.86	93.3%	30.7%	13,000	2.66	98.2%	20.8%
Little Dixie	6,250	4.61	96.0%	76.9%	8,200	3.80	99.9%	46.4%
Lyon	10,000	5.28	97.8%	53.9%	13,000	6.09	99.9%	46.9%
Maceo	10,000	3.55	95.3%	37.3%	13,000	3.74	99.6%	28.9%
Madisonville	10,000	4.77	91.8%	51.9%	13,000	5.62	96.1%	45.0%
Marion	10,000	5.82	95.9%	60.7%	13,000	7.46	99.5%	57.7%
Masonville	10,000	7.21	96.4%	74.8%	13,000	4.55	99.9%	35.0%
Morganfield	10,000	9.43	93.0%	101.4%[4]	13,000	9.70	99.7%	74.8%
Niagara	10,000	7.65	97.6%	78.4%	13,000	10.03	99.9%	77.3%
Nuckols	10,000	4.89	98.9%	49.5%	13,000	5.45	100.0%	41.9%
Onton	10,000	5.02	95.9%	52.4%	13,000	7.54	98.2%	59.1%
Philpot #1	10,000	5.53	95.5%	57.9%	13,000	4.51	99.6%	34.8%
Philpot #2	10,000	3.86	95.5%	40.4%	13,000	3.51	99.6%	27.1%
Pleasant Ridge	10,000	4.50	96.8%	46.5%	13,000	5.73	99.9%	44.1%
Providence	10,000	4.29	96.5%	44.4%	13,000	6.65	99.8%	51.3%
Race Creek	10,000	5.22	96.3%	54.2%	13,000	6.27	99.9%	48.3%
Riverport	10,000	3.73	84.6%	44.1%	13,000	4.10	87.6%	36.0%

Substation	S. Cap[1] (MVA)	S. Peak[2] (MW)	PF @ Peak[2]	% Loaded[3]	W. Cap[1] (MVA)	W. Peak[2] (MW)	PF @ Peak[2]	% Loaded[3]
S. Dermont #1	10,000	10.51	95.4%	110.2%[4]	13,000	6.19	99.2%	48.0%
S. Dermont #2	10,000	7.61	95.4%	79.7%	13,000	4.31	99.2%	33.4%
S. Hanson #1	10,000	4.08	95.5%	42.7%	13,000	8.06	99.1%	62.6%
S. Hanson #2	10,000	5.89	95.5%	61.7%	13,000	8.94	99.1%	69.4%
S. Owensboro #1	10,000	4.68	95.9%	48.8%	13,000	3.36	99.8%	25.9%
S. Owensboro #2	10,000	5.24	95.9%	54.6%	13,000	4.02	99.8%	31.0%
Sacramento	3,750	3.37	92.6%	97.1%	4,900	3.49	99.1%	71.9%
Sebree	5,000	3.64	92.3%	78.8%	6,500	4.43	98.3%	69.3%
St. Joe	7,500	5.82	94.0%	82.6%	9,800	5.04	98.4%	52.3%
Stanley	5,000	3.06	97.2%	63.0%	6,500	3.18	99.9%	49.0%
Sullivan	10,000	3.04	95.5%	31.8%	13,000	3.13	99.4%	24.2%
Thruston #1	10,000	5.15	94.1%	54.7%	13,000	4.95	99.1%	38.5%
Thruston #2	10,000	3.85	94.1%	40.9%	13,000	3.54	99.3%	27.4%
Utica	10,000	5.89	94.9%	62.0%	13,000	7.19	99.5%	55.6%
W. Owensboro	12,000	8.65	97.9%	73.6%	15,600	6.68	99.5%	43.0%
Weaverton	10,000	3.91	97.6%	40.0%	13,000	4.94	99.2%	38.3%
Weberstown	7,500	5.61	94.9%	78.8%	9,800	7.55	99.1%	77.7%
Whitesville	10,000	7.21	94.5%	76.3%	13,000	7.92	98.8%	61.7%
Wolf Hills	10,000	6.98	99.1%	70.4%	13,000	6.83	99.5%	52.8%
Yeager	1,500	0.10	69.7%	9.5%	1,950	0.11	79.8%	7.3%
Zion	10,000	6.47	98.3%	65.9%	13,000	8.71	100.0%	67.0%

1. Based on ratings provided by Kenergy.
2. Projected demand and power factor based on the 2023 summer and 2023–2024 winter peak projections.
3. Loading percentage stated as non-coincident peak and power factor to the calculated rating.
4. Transformer overloading will be fixed using projects in Section 2, including load transfer, upgraded substation transformers, and new substations as necessary.

The Kenergy electric system was modeled on Milsoft Utility Solutions, Inc.'s WindMil™ software. Load data were obtained from the Kenergy member billing information. Load flows were prepared to provide information such as the percent conductor loading to its capacity, calculated line losses, and voltage drop along line sections. The load-flow information from the computer model was compared to the criteria outlined in this report. Recommendations were then based on these results.

Each of the 196 circuits was analyzed with respect to adequate voltage and loading conditions. The computer analysis of the 2018 summer system peak indicated the following deficiencies:

- Voltage levels less than 118 volts on line sections of Adams Lane, Beda, Little Dixie, and Nuckols Substations

- Greater than 288 kVA on single-phase line sections on Adams Lane, Bon Harbor, Horse Fork 1, Masonville, Philpot 2, South Dermont 1, South Dermont 2, South Owensboro 2, and Sullivan Substations
- Line regulators loaded to greater than 80% capacity on Little Dixie, Morganfield, and St. Joe Substations
- Conductor loaded to greater than 70% capacity on Whitesville Substation

The computer analysis of the 2018 winter system peak indicated the following deficiencies:

- Voltage levels less than 118 volts on line sections of Marion, Nuckols, Onton, Utica, and Whitesville Substations
- Greater than 288 kVA on single-phase line sections on Adams Lane, Bon Harbor, Crossroads, Dixon, Geneva, Guffie, Hanson, Lyon, Marion, Morganfield, Philpot 1, Pleasant Ridge, Providence, Race Creek, South Dermont 1, South Hanson 1, South Hanson 2, South Owensboro 2, Weaverton, West Owensboro, Wolf Hills, and Zion Substations
- Line regulators loaded to greater than 80% capacity on Geneva, Guffie, Little Dixie, Nuckols, and Weaverton Substations
- Conductor loaded to greater than 70% capacity on Guffie Substation

Computer analysis of the projected 2023 summer system peak revealed additional deficiencies as follows:

- Voltage levels less than 118 volts on line sections of Dixon, Geneva, Hanson, Marion, Masonville, Morganfield, Niagara, Philpot 1, Sebree, Sullivan, Thruston 1, Utica, Whitesville, and Wolf Hills Substations
- Greater than 288 kVA on single-phase line sections on Crossroads, Niagara, Philpot 1, and Weaverton Substations
- Line regulators loaded to greater than 80% capacity on Guffie, Nuckols, and Wolf Hills Substations
- Conductor loaded to greater than 70% capacity on Guffie, Hanson, Niagara, South Owensboro 2, West Owensboro, and Wolf Hills Substations

Computer analysis of the projected 2023–2024 winter system peak revealed additional deficiencies as follows:

- Voltage levels less than 118 volts on line sections of Adams Lane, Hanson, Lyon, Niagara, Sebree, and Wolf Hills Substations
- Greater than 288 kVA on single-phase line sections on East Owensboro, Lewisport 2, Niagara, Nuckols, St. Joe, and Weberstown Substations
- Line regulators loaded to greater than 80% capacity on Onton, Whitesville, and Wolf Hills Substations
- Conductor loaded to greater than 70% capacity on Hanson, Lyon, Niagara, South Hanson 1, and Wolf Hills Substation

1.7 System Outages

A summary of the outages experienced by Kenergy for the last five years is given in Table 1-8. The five-year average annual outage minutes per customer is 87.990 minutes, excluding outages caused by the power supplier or major events. RUS suggests a system goal for outages of no more than an average of 300 consumer outage minutes, per customer, per year, excluding outages caused by major events or the power supplier, for the last five consecutive years in any specific area. Kenergy's goal is to improve system reliability and keep the average outage hours per customer below the recommended guideline.

Table 1-8
Service Interruption Summary
Average Minutes per Consumer by Cause

Year	Power Supplier	Major Event	Prearranged	Others	Total
2014	1.800	27.460	6.110	90.630	126.000
2015	3.570	12.610	1.120	77.480	94.780
2016	1.420	130.570	1.140	81.040	214.170
2017	6.200	38.530	3.220	62.730	110.680
2018	3.170	131.430	4.980	99.150	238.730
5-Yr. Avg.	3.230	65.600	3.310	84.680	156.820

Note: From RUS Form 7.

Section 2
REQUIRED CONSTRUCTION ITEMS

The required Mid 2020–Mid 2024 CWP items are discussed in this section. The design criteria as given in Section 1 were used as a guide to identify potential CWP items for evaluation. Load flow, voltage drop, and where appropriate, economic analysis was performed to support the recommended CWP items. An example Form 740c for the work plan can be found in Appendix D, and environmental clearance can be found in Appendix E.

2.1 Service to New Members

Historical information was reviewed for a 24-month period from calendar years 2018 and 2019 to project new member service requirements for the CWP period. The historical number of members was not increased for the Mid 2020–Mid 2024 CWP period. However, the historical equipment costs were inflated by 2.5% per year. Additionally, Kenergy's contract for meter purchases will end in 2021. It is expected that meter prices will double in the 2022/2023 Work Plan year. Costs have been updated accordingly to reflect this projected change.

Table 2-1
Construction Required to Serve New Members

	Estimated 48-Month Work Plan Period					
New Members - System Wide	Average 2018-2019	2020/2021	2021/2022	2022/2023	2023/2024	TOTAL
Number of New Services						
Underground	250	250	250	250	250	1,000
Overhead	357	357	357	357	357	1,428
Total New Services	607	607	607	607	607	2,428
Linear Feet of New Underground Line						
Total	69,297	69,297	69,297	69,297	69,297	277,188
Total (Miles)	13.12	13.12	13.12	13.12	13.12	52.50
Average Length in Feet/UG Member	277.2	277.2	277.2	277.2	277.2	277.2
Linear Feet of New Overhead Line						
Total	64,893	64,893	64,893	64,893	64,893	259,572
Total (Miles)	12.29	12.29	12.29	12.29	12.29	49.16
Average Length in Feet/OH Member	181.8	181.8	181.8	181.8	181.8	181.8
Total New Line (Linear Feet)	134,190	134,190	134,190	134,190	134,190	536,760
Total New Line (Miles)	25.41	25.41	25.41	25.41	25.41	101.66

Estimated 48-Month Work Plan Period						
New Members - System Wide	Average 2018-2019	2020/2021	2021/2022	2022/2023	2023/2024	TOTAL
Cost of New Line						
Underground	$1,443,378	$1,516,500	$1,554,500	$1,593,250	$1,633,250	$6,297,500
Average Cost/UG Member	$5,774	$6,066	$6,218	$6,373	$6,533	$6,298
Overhead	$1,579,053	$1,661,121	$1,702,890	$1,745,373	$1,788,927	$6,898,311
Average Cost/OH Member	$4,429	$4,653	$4,770	$4,889	$5,011	$4,831
Total Cost of New Line	$3,022,431	$3,177,621	$3,257,390	$3,338,623	$3,422,177	$13,195,811
Number of New Transformers						
3Ø Underground	5	5	5	5	5	20
1Ø UG and OH	774	774	774	774	774	3,096
Total New Transformers	779	779	779	779	779	3,116
Average Installed Cost/Transformer						
3Ø Underground	$9,012	$9,511	$9,705	$9,948	$10,196	$9,840
1Ø UG and OH	$1,550	$1,589	$1,669	$1,711	$1,754	$1,681
Cost of Transformers						
3Ø Underground	$45,060	$47,555	$48,525	$49,740	$50,980	$196,800
1Ø UG and OH	$1,199,700	$1,229,886	$1,291,806	$1,324,314	$1,357,596	$5,203,602
Total Cost Of New Transformers	$1,244,760	$1,277,441	$1,340,331	$1,374,054	$1,408,576	$5,400,402
New Meters						
Number of New Meters	1,343	1,343	1,343	1,343	1,343	5,372
Average Installed Cost/Meter	$239	$256	$263	$400	$410	$332
Cost of Meters	$320,977	$343,808	$353,209	$537,200	$550,630	$1,784,847
Total Cost Of New Meters	$320,977	$343,808	$353,209	$537,200	$550,630	$1,784,847
TOTAL COST OF NEW SERVICES	$4,588,168	$4,798,870	$4,950,930	$5,249,877	$5,381,383	$20,381,060

Table 2-2
Summary of Costs to Serve a New Member

RUS Code	Category Description	2020/2021	2021/2022	2022/2023	2023/2024	TOTAL
101	UG Lines	$1,716,500	$1,554,500	$1,593,250	$1,633,250	$6,497,500
102	OH Lines	$1,661,121	$1,702,890	$1,745,373	$1,788,927	$6,898,311
100	Total New Lines	$3,377,621	$3,257,390	$3,338,623	$3,422,177	$13,395,811

RUS Code	Category Description	2020/2021	2021/2022	2022/2023	2023/2024	TOTAL
601	3Ø Underground – Transformers	$47,555	$48,525	$49,740	$50,980	$196,800
601	1Ø OH and UG – Transformers	$1,229,886	$1,291,806	$1,324,314	$1,357,596	$5,203,602
601	Meters	$343,808	$353,209	$537,200	$550,630	$1,784,847
601	Total Transformers and Meters	$1,621,249	$1,693,540	$1,911,254	$1,959,206	$7,185,249

Note: $200,000 added to 2020/2021 Underground Lines – New Members to account for anticipated rocky terrain in new commercial development.

2.2 Service Changes to Existing Members

Historical information was reviewed for a 24-month period from calendar years 2018 and 2019 to project service changes to existing members for the CWP period. The historical number of services was not increased for the Mid 2020–Mid 2024 CWP period.

The historical equipment costs for the projected service changes were inflated by 2.5% per year.

Table 2-3
Construction Required for Service Changes to Existing Members

		Estimated 48-Month Work Period				
Service Changes to Existing Members	Average 2017-2018	2020/2021	2021/2022	2022/2023	2023/2024	TOTAL
Service Changes						
Number of Service Changes	101	101	101	101	101	404
Average Cost/Service Change	$2,941	$3,475	$3,562	$3,651	$3,742	$3,608
Cost of Service Changes	$297,041	$350,975	$359,762	$368,751	$377,942	$1,457,430
TOTAL COST OF SERVICE CHANGES	$297,041	$350,975	$359,762	$368,751	$377,942	$1,457,430

Table 2-4
Summary of Costs for Service Changes

RUS Code	Category Description	2020/2021	2021/2022	2022/2023	2023/2024	TOTAL
602	Total Service Changes	$350,975	$359,762	$368,751	$377,942	$1,457,430

2.3 Poles

Based on Kenergy's pole inspection and treatment program results, it is estimated that 2,300 poles will be replaced during the CWP period. In 2019 Kenergy experienced a higher reject rate from pole inspection than the past few years. Kenergy does not feel that this many poles will normally be rejected, and is expecting to replace 575 poles a year.

Table 2-6 shows a summary of pole replacement cost for the Mid 2020–Mid 2024 CWP period. The historical number of poles was not increased, but the costs were inflated by 2.5% per year.

Table 2-5
Poles

Estimated 48-Month Work Period						
	Average 2017-2018	2020/2021	2021/2022	2022/2023	2023/2024	TOTAL
Pole Replacements						
Number of Pole Replacements	620	575	575	575	575	2,300
Average Cost/Pole Replacement	$3,314	$3,482	$3,569	$3,658	$3,749	$3,615
TOTAL COST OF POLES	$2,054,680	$2,002,150	$2,052,175	$2,103,350	$2,155,675	$8,313,350

Table 2-6
Summary of Costs for Pole Replacements

RUS Code	Category Description	2020/2021	2021/2022	2022/2023	2023/2024	TOTAL
606	Total Pole Replacements	$2,002,150	$2,052,175	$2,103,350	$2,155,675	$8,313,350

2.4 Conductor Replacement

Kenergy is rearranging how conductor replacement projects are coded within their system. Based on conversations between Kenergy, the RUS field representative, and Leidos, previous 371 and 372 projects will now be coded as 608 projects. For the CWP period, shown in Table 2-7, it was estimated that a total of 121 miles of conductor will be replaced due to poor physical condition. Pricing for replacement wire from Table 1-1 was utilized to develop replacement costs for this conductor replacement.

Table 2-8 shows a summary of conductor replacement cost for the Mid 2020–Mid 2024 CWP period. Costs were inflated by 2.5% per year.

Table 2-7
Conductor Replacement

Estimated 48-Month Work Period					
	2020/2021	2021/2022	2022/2023	2023/2024	TOTAL
Conductor Replacements					
Miles of 500 MCM UG Replacements		1.0			1.0
Average Cost/Mile	$280,000	$287,000	$294,175	$301,529	
Miles of #2 ACSR UG Replacements	5.0	5.0	5.0	5.0	20.0

Estimated 48-Month Work Period					
	2020/2021	2021/2022	2022/2023	2023/2024	TOTAL
Average Cost/Mile	$165,000	$169,125	$173,353	$177,687	
Cost of UG Replacement	$825,000	$1,132,625	$866,765	$888,435	$3,712,825
Miles of #2 ACSR OH Replacements	25.0	25.0	25.0	25.0	100.0
Average Cost/Mile	$60,000	$61,500	$63,038	$64,613	
Cost of OH Replacement	$1,500,000	$1,537,500	$1,575,938	$1,615,336	$6,228,773
TOTAL COST OF REPLACEMENTS	$2,325,000	$2,670,125	$2,442,703	$2,503,771	$9,941,598

Table 2-8
Summary of Costs for Conductor Replacement

RUS Code	Category Description	2020/2021	2021/2022	2022/2023	2023/2024	TOTAL
608	Total Conductor Replacement	$2,325,000	$2,670,125	$2,442,703	$2,503,771	$9,941,598

2.5 Miscellaneous Construction

Kenergy is rearranging how miscellaneous construction projects are coded within their system. Based on conversations between Kenergy, the RUS field representative, and Leidos, Kenergy will begin using RUS Code 607 for costs associated with the replacement of plant items such as guys, anchors, or crossarms, etc. where pole changeout due to pole condition is not the predominant cost involved.

Table 2-9 shows a summary of miscellaneous construction cost for the Mid 2020–Mid 2024 CWP period.

Table 2-9
Summary of Costs for Miscellaneous Construction

RUS Code	Category Description	2020/2021	2021/2022	2022/2023	2023/2024	TOTAL
607	Miscellaneous Construction	$200,000	$200,000	$200,000	$200,000	$800,000

For the 24-month period from calendar years 2018 and 2019, Kenergy has installed an average of 1,299 security lights per year at an average cost of $736 each. Kenergy estimates that the cost will increase 2.5% a year during the CWP period, shown in Table 2-10. A summary of the miscellaneous construction costs for the CWP period is given in Table 2-11.

Table 2-10
Security Lights

	Estimated 48-Month Work Period					
	Average 2018-2019	2020/2021	2021/2022	2022/2023	2023/2024	TOTAL
Security Lights						
Number of Security Lights	1,299	1,299	1,299	1,299	1,299	5,196
Average Cost/Security Lights	$736	$773	$793	$812	$833	$803
TOTAL COST OF SECURITY LIGHTS	$956,064	$1,004,127	$1,030,107	$1,054,788	$1,082,067	$4,171,089

Table 2-11
Summary of Costs for Security Lights

RUS Code	Category Description	2020/2021	2021/2022	2022/2023	2023/2024	TOTAL
702	Security Lights	$1,004,127	$1,030,107	$1,054,788	$1,082,067	$4,171,089

2.6 Conversion and Line Changes

Conversion and line changes to existing lines were recommended to reduce voltage drop or relieve conductor loading. Switching load to other feeders was also evaluated when appropriate. Line regulators were considered as an alternative to improve voltage drop problems; however, no more than two line regulators were used in series.

Line and equipment costs were inflated by 2.5% per year based on the anticipated year of construction. Costs of carry-over projects were updated based on the existing line and equipment costs. The following conversions and line changes were recommended for the Mid 2020–Mid 2024 CWP. A summary of the jobs for which Kenergy is requesting RUS funds is given in Table 2-12 at the end of this section.

Adams Lane - 10602

Location – S. Barren Church Rd **313-16 – LL1 - $69,000**

Description: Multi-phase and reconductor from single-phase 2 ACSR to three-phase 1/0 ACSR between poles P41082067 and P41083003 for 0.6 miles. The project is recommended to improve low voltage on Adams Lane 10602 in projected peak loading conditions along with projects 604-1-20 and 301-20. Before improvements, voltage at sections of Adams Lane was as low as 115.1 V by the end of the work plan, and the single-phase tap was loaded to greater than 40 A. With the recommended improvements, the voltage will be improved to 121.1 V and no single-phase taps on Adams Lane will be loaded to greater than 40 A. See Figure 2-1 for a geographic representation of the location of the project.

Sectionalizing: Upgrade the existing single-phase recloser to three single-phase 50 A reclosers at P41082067. Sectionalizing costs are not included in this project, but are included in general sectionalizing, RUS Code 603.

Alternatives: Avoids the cost of longer conductor conversion near the substation or single to three phase conversion on Zion 9003.

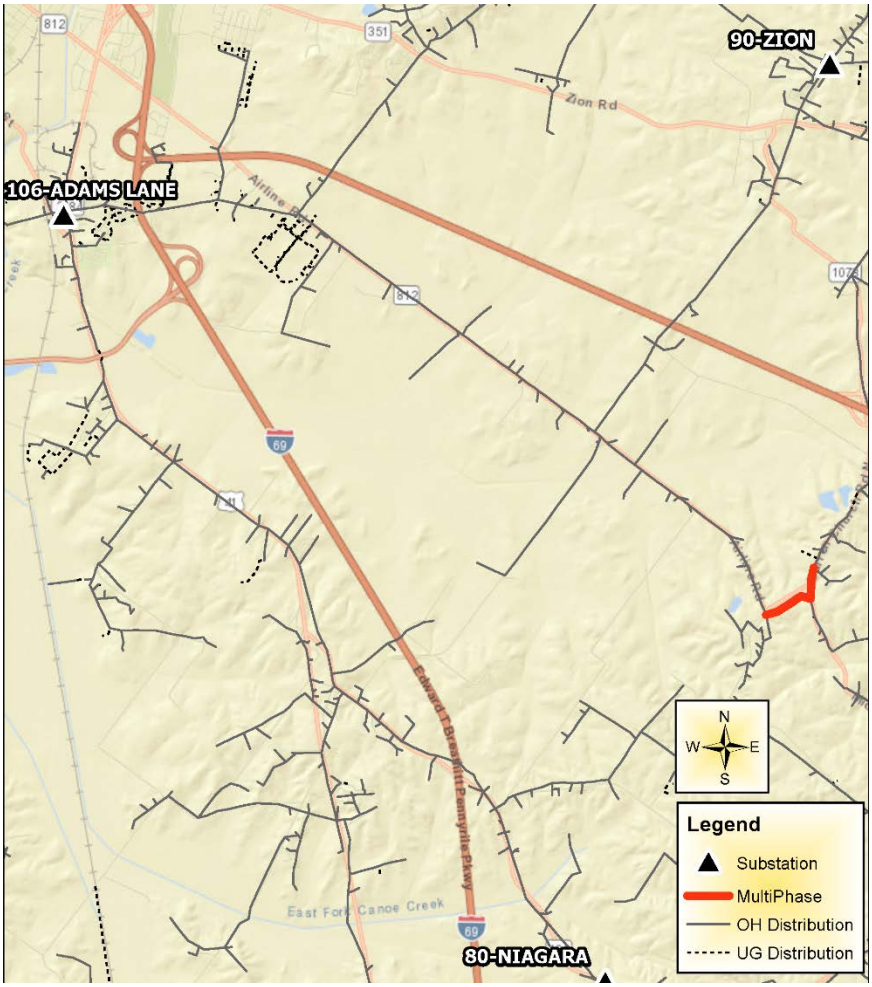

Figure 2-1. RUS Code 313-16 - Adams Lane 10602

Adams Lane - 10602

Location – Adams Ln. **301-20 – LL3 - $42,025**

Description: Reconductor from three-phase 3/0 ACSR to three-phase 336 ACSR between poles P40956283 and P40956050 for 0.25 miles. The project is recommended to relieve backbone conductor loading on Adams Lane 10602 in projected peak loading conditions along with projects 604-1-20 and 313-16. Before improvements, loading on phases of Adams Lane 10602 backbone conductor exceeded 50% maximum capacity by end of the work plan. With the recommended improvements, the loading will be improved to a maximum of 35.5%. See Figure 2-2 for a geographic representation of the location of the project.

Sectionalizing: No sectionalizing improvements are recommended.

Alternatives: Transfers to other feeders result in conductor overloading and voltage problems at peak conditions.

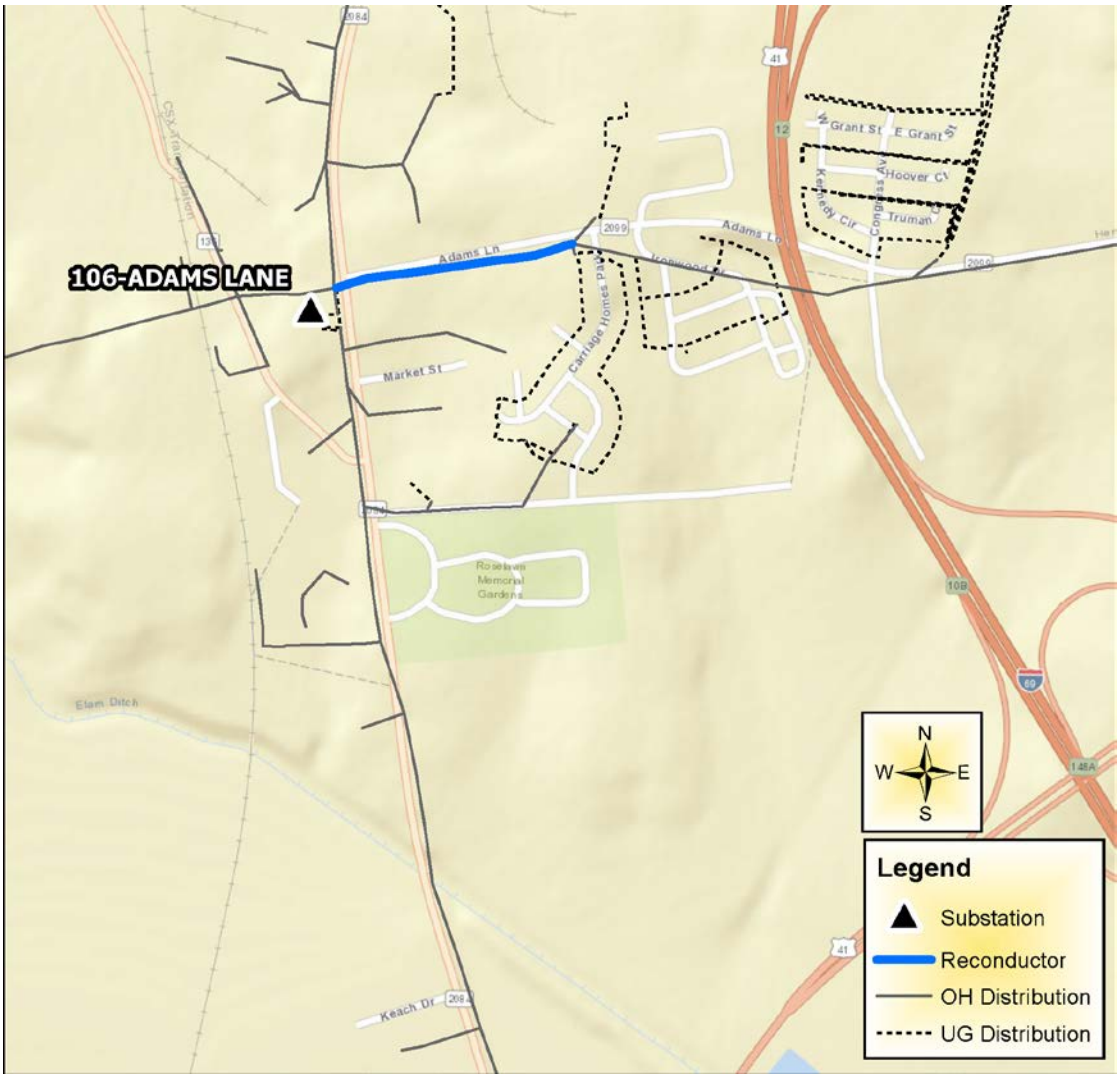

Figure 2-2. RUS Code 301-20 - Adams Lane 10602

South Dermont 1 - 1801

Location – HWY 54 (Leitchfield Rd.) **374-16 – LL2 - $196,800**

Description: Reconductor from three-phase 1/0 STR CU to three-phase 336 ACSR from pole P13222049 to pole P13290139 and from pole P13222049 to pole P13216015 for 1.2 miles. The project is recommended to improve conductor loading greater than 50% of rated capacity at projected peak loading conditions and replaced age-weakened copper conductor on the system. Before improvements, maximum conductor loading of 62.0% was calculated on sections of South Dermont 1 1801. With recommended improvements, the maximum conductor loading was reduced to 38.3%. See Figure 2-3 for a geographic representation of the location of the project.

Sectionalizing: No sectionalizing improvements are recommended.

Alternatives: No transfers are available due to heavily loaded feeders and substation transformers in the area.

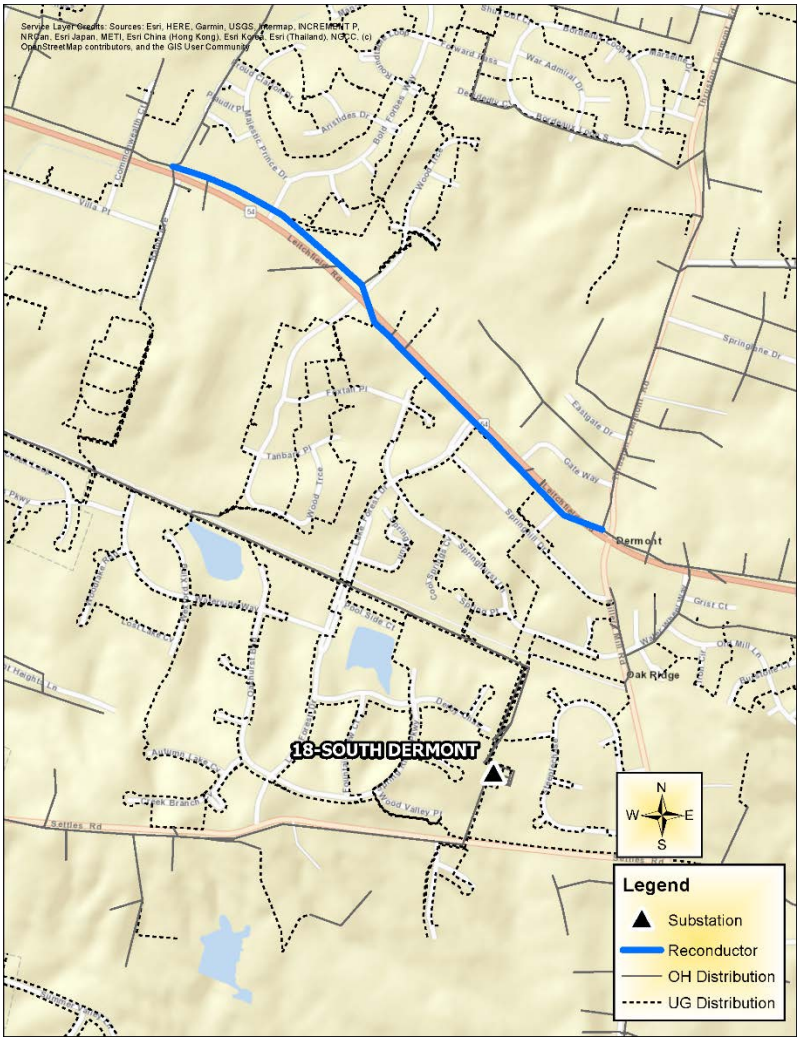

Figure 2-3. RUS Code 374-16 - South Dermont 1 1801

Philpot 1 - 2501

Location – Knottsville MT Zion Rd. **310-16 – LL1 - $46,000**

Description: Multi-phase from single-phase 1/0 ACSR to three-phase 1/0 ACSR between pole P13404038 and pole P11423031 for 0.4 miles. The project is recommended to relieve single-phase loading greater than 40 A on Philpot 1 2501 in projected peak loading conditions. After improvements, the single-phase loading issue was alleviated. See Figure 2-4 for a geographic representation of the location of the project.

Sectionalizing: Upgrade the existing single-phase 50 A recloser on pole P13404153 to three single-phase 35 A reclosers. Sectionalizing should be reviewed to ensure the area meets Kenergy standards.

Alternatives: No load transfers are available due to voltage problems and heavily loaded taps on nearby single-phase taps.

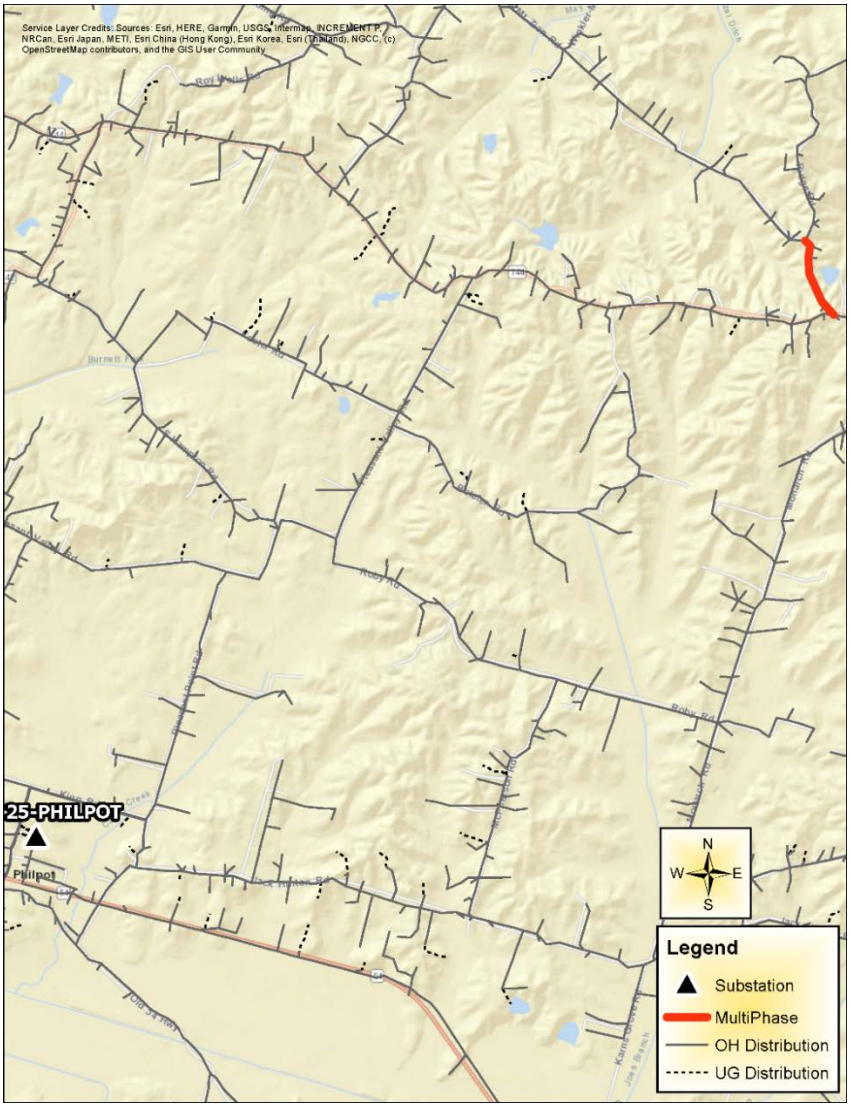

Figure 2-4. RUS Code 310-16 - Philpot 1 2501

Guffie - 3101

Location – KY-815 **302-20 – LL4 - $111,458**

Description: Multi-phase from single-phase 1/0 ACSR to three-phase 1/0 ACSR between pole P18813003 and pole P18803040 for 0.9 miles. The project is recommended to relieve single-phase loading greater than 40 A on Guffie 3101 in projected peak loading conditions. After improvements, the single-phase loading issue was alleviated. See Figure 2-5 for a geographic representation of the location of the project.

Sectionalizing: Add two single-phase 35 A reclosers on pole P18803040 to protect the single-phase taps going east and west. Sectionalizing should be reviewed to ensure the area meets Kenergy standards.

Alternatives: No load transfers are available due to voltage problems and heavily loaded taps on nearby single-phase taps.

Figure 2-5. RUS Code 302-20 - Guffie 3101

St. Joe – 3201 and 3203

Location – KY-258 **201-20, 202-20 - LL4 – No RUS funds ($327,375)**

303-20 – LL4 – $145,380

Description: Construct a new three-phase, 4/0 ACSR tie line between poles P16706006 and P16610011 along KY-258 for 1.0 mile as code 201-20. Multi-phase and reconductor from single-phase 4 ACSR to three-phase 4/0 ACSR along between poles P16610011 and P14624023 along KY-258 for 0.9 miles as code 303-20. Construct a new three-phase, 4/0 ACSR tie line between poles P14624023 and P14618024 along Smock Rd. for 0.9 miles as code 202-20. Open the circuit at poles P14620014 and P14607006 to disconnect area from feeder St. Joe 3201 and backfeed the area through the newly constructed lines to tie in to St. Joe 3203. This project will more evenly balance load among the feeders of St. Joe Substation and mitigate voltage and loading problems present during existing and projected peak loading conditions. Additionally, these projects will significantly improve reliability to the large power load in the area. See Figure 2-6 for a geographic representation of the location of the project.

Sectionalizing: After project construction and load transfer is completed, sectionalizing in the area should be reviewed to ensure Kenergy standards are met and devices on the new lines properly coordinate during normal operation and backfeed conditions.

Alternatives: These jobs save the cost of constructing new substation and transmission lines to serve the large power load in the area. Backfeeds to the west are difficult due to the Green River.

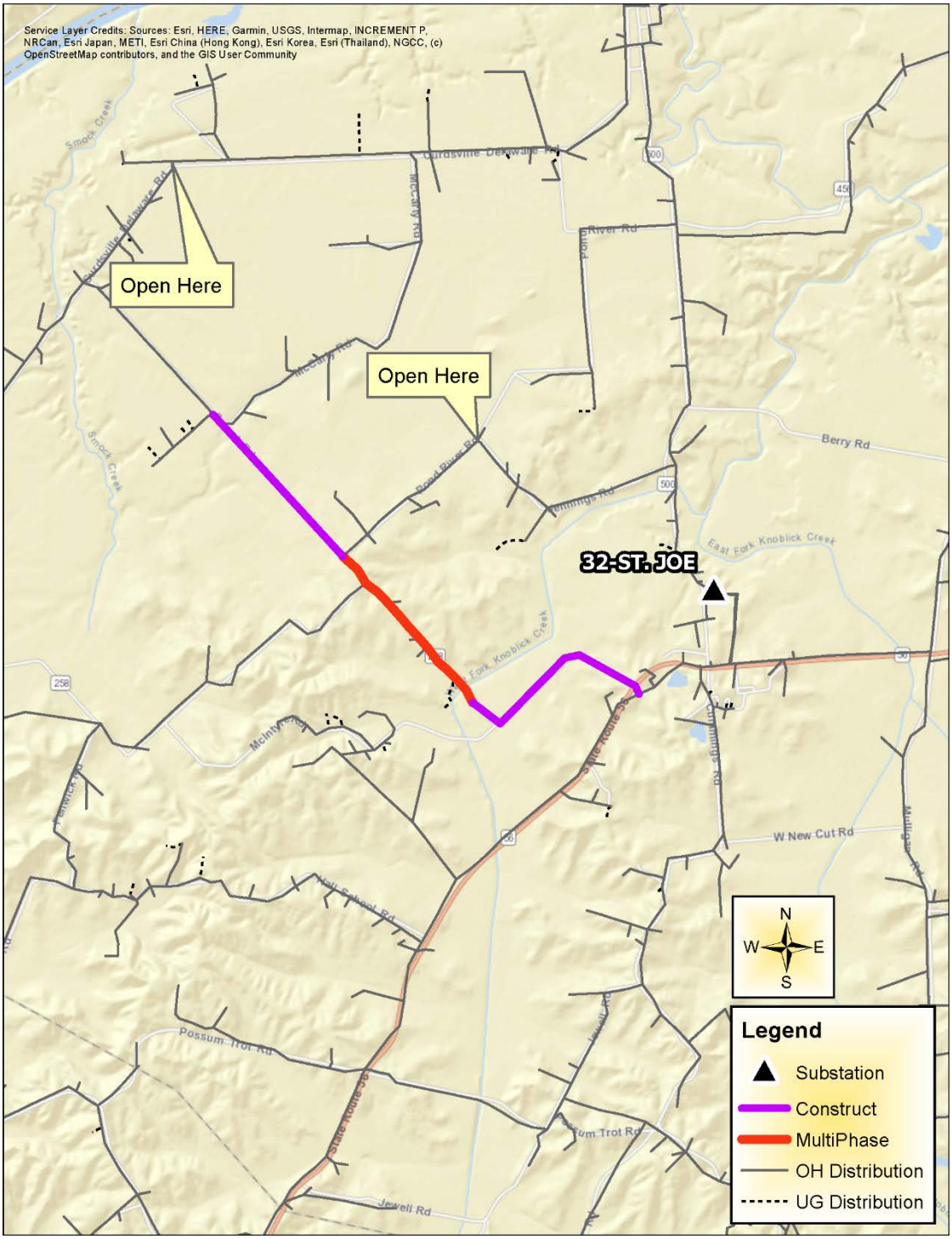

Figure 2-6. RUS Codes 201-20, 303-20, & 202-20 - St. Joe 3201 & 3203

Hanson - 5103

Location – Rickard Hemp Farm **304-20 – LL1 – $1,069,011**

Description: Reconductor the existing 3Ø 336 ACSR to double circuit 3Ø 336 ACSR between Hanson Substation and the new Rickard Hemp Farm for 3.7 miles. Use an existing empty feeder bay to construct a new dedicated feeder to feed the Rickard Hemp Farm. This project is recommended to feed the projected 5.6 MW spot load that is Rickard Hemp Farms on Hanson Feeder 5103. Kenergy limits the loading on individual feeders to 5 MW, except in special cases, necessitating the construction of a new feeder or substation. See Figure 2-7 for a geographic representation of the location of the project.

Sectionalizing: An additional feeder breaker should be added to Hanson Substation for the new feeder to Rickard Hemp Farm. Feeder breaker settings should address the needs of the new load and be similar to other feeder breaker settings at Hanson Substation

Alternatives: This project, in conjunction with project 502-20, saves the cost of constructing Hanson East Substation next to the proposed Rickard Hemp Farm, with an estimated substation greater than $4 million. This alternative will become necessary if the proposed load grows to greater than 7 MW.

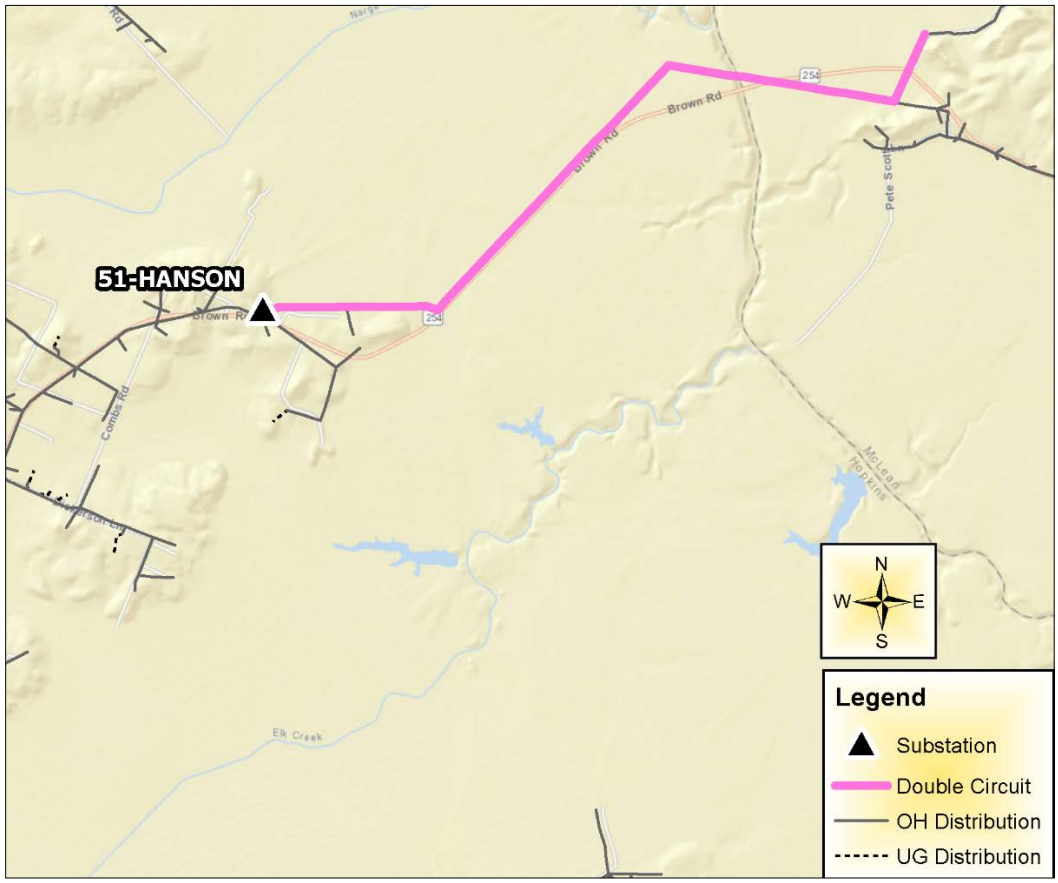

Figure 2-7. RUS Code 304-20 - Hanson 5103

Onton – 5203 and South Hanson - 5306

Location – Vandetta and Dame Rds. **391-16 - LL1 – $432,000**

Description: Reconductor from three-phase 4A CU and 1/0 ACSR to three-phase 336 ACSR between pole P26418005 and pole P28413008 for 2.7 miles. Open the circuit at pole P28422016 and close the circuit at pole P28413006. The project is recommended to improve backfeed capacity to South Hanson Substation. Additionally, this project allows load transfer from South Hanson Substation to Onton Substation so that South Hanson Substation can receive a load transfer from Hanson Substation. See Figure 2-8 for a geographic representation of the location of the project.

Sectionalizing: After the load transfer is finalized, sectionalizing should be reviewed to ensure the area meets Kenergy standards.

Alternatives: This project averts the cost of constructing a new substation in the area for transformer loading and single contingency outage deficiencies.

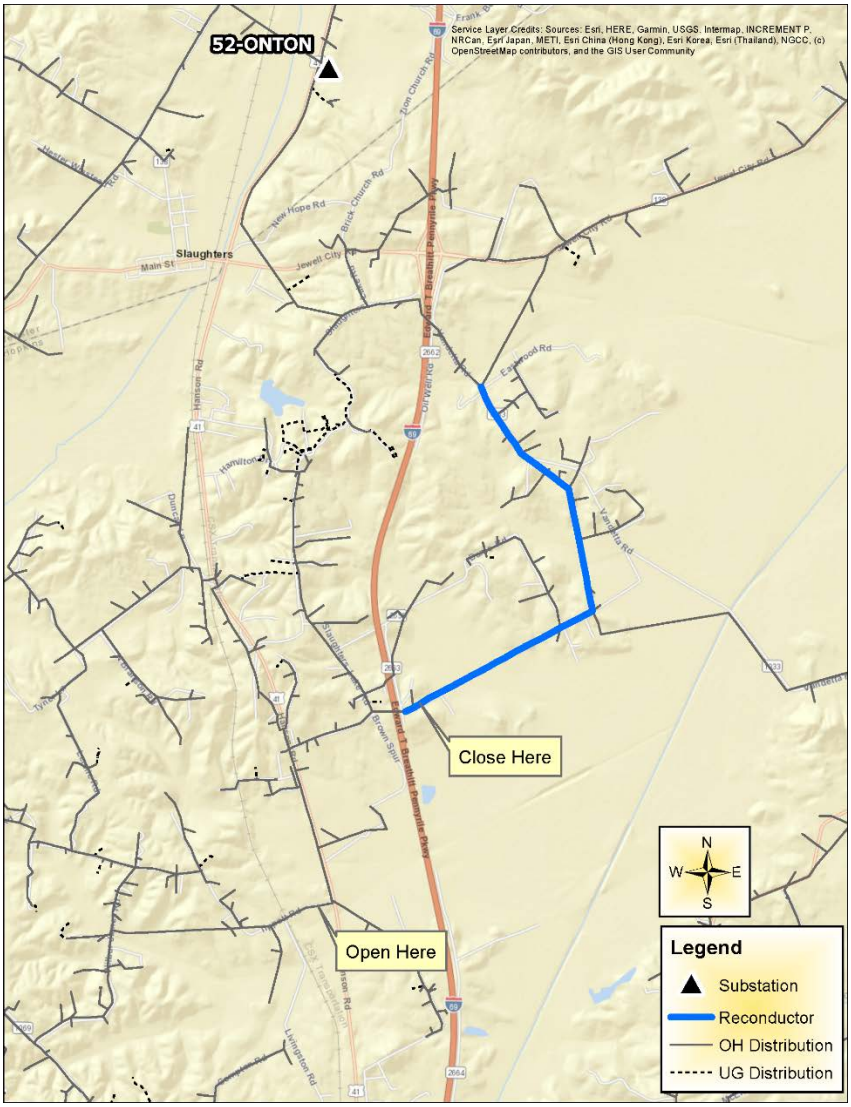

Figure 2-8. RUS Code 391-16 - Onton 5203 & South Hanson 5306

South Hanson - 5303

Location – Carroll Gentry Rd. **203-20 – LL3 – No RUS Funds ($14,709)**

Description: Construct single-phase 2 ACSR between poles P32511017 and P32511013 for 0.2 miles. Open the circuit at pole P32420025 and backfeed the area through pole P32511017. The project is recommended to relieve single-phase loading greater than 40 A on South Hanson 2 5303 in projected peak loading conditions. With the recommended improvements, the single-phase loading issue was alleviated. See Figure 2-9 for a geographic representation of the location of the project.

Sectionalizing: After the load transfer is finalized, sectionalizing should be reviewed to ensure the area meets Kenergy standards.

Alternatives: No alternative transfers are available due to overloading nearby single-phase taps.

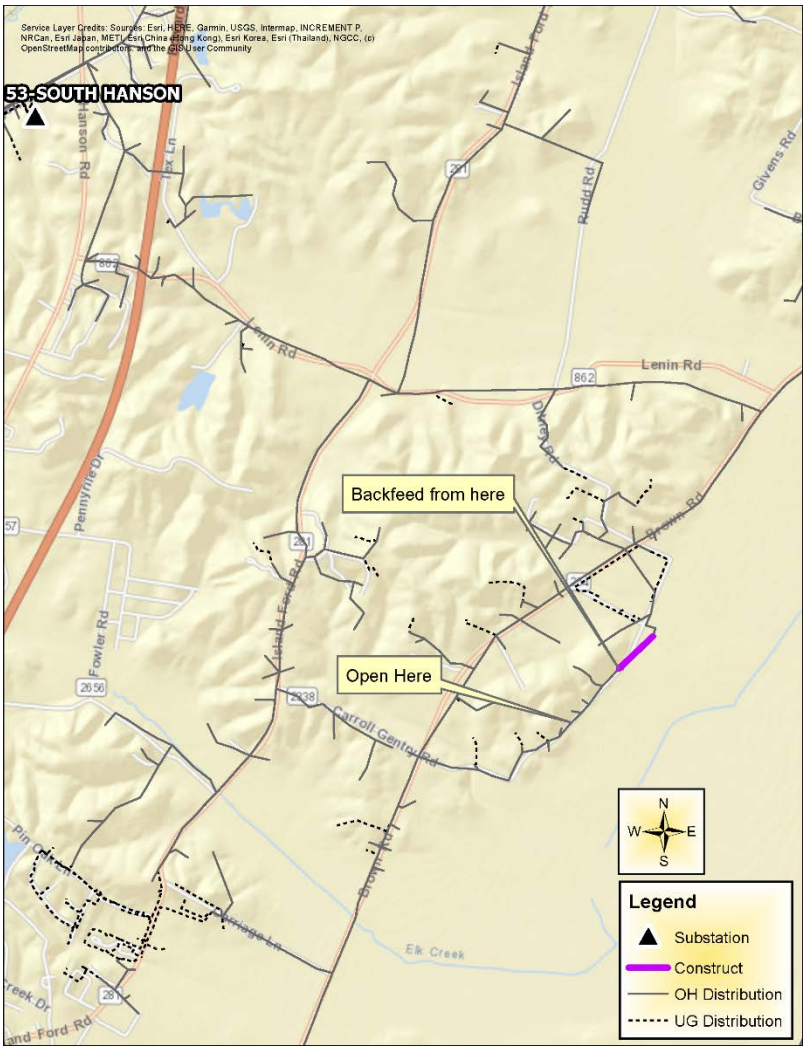

Figure 2-9. RUS Code 203-20 - South Hanson 5303

Geneva - 6303

Location – Waverly-Hitesville Rd. **204-20 – LL3 – No RUS Funds ($12,608)**

Description: Construct a new single-phase 2 ACSR tie line between pole P41422078 and pole P41412026 for 0.2 miles. Open the circuit at pole P41422003 and backfeed along the new tie line. Retire the single-phase line west of pole P41422003 to the three-phase feeder. The project is recommended to improve reliability and line accessibility on Geneva 6303 by bringing the line out of a field and close to the nearest street. See Figure 2-10 for a geographic representation of the location of the project.

Sectionalizing: No sectionalizing improvements are recommended.

Alternatives: This tie line saves the cost of adding three-phase to a long single-phase line to serve the area.

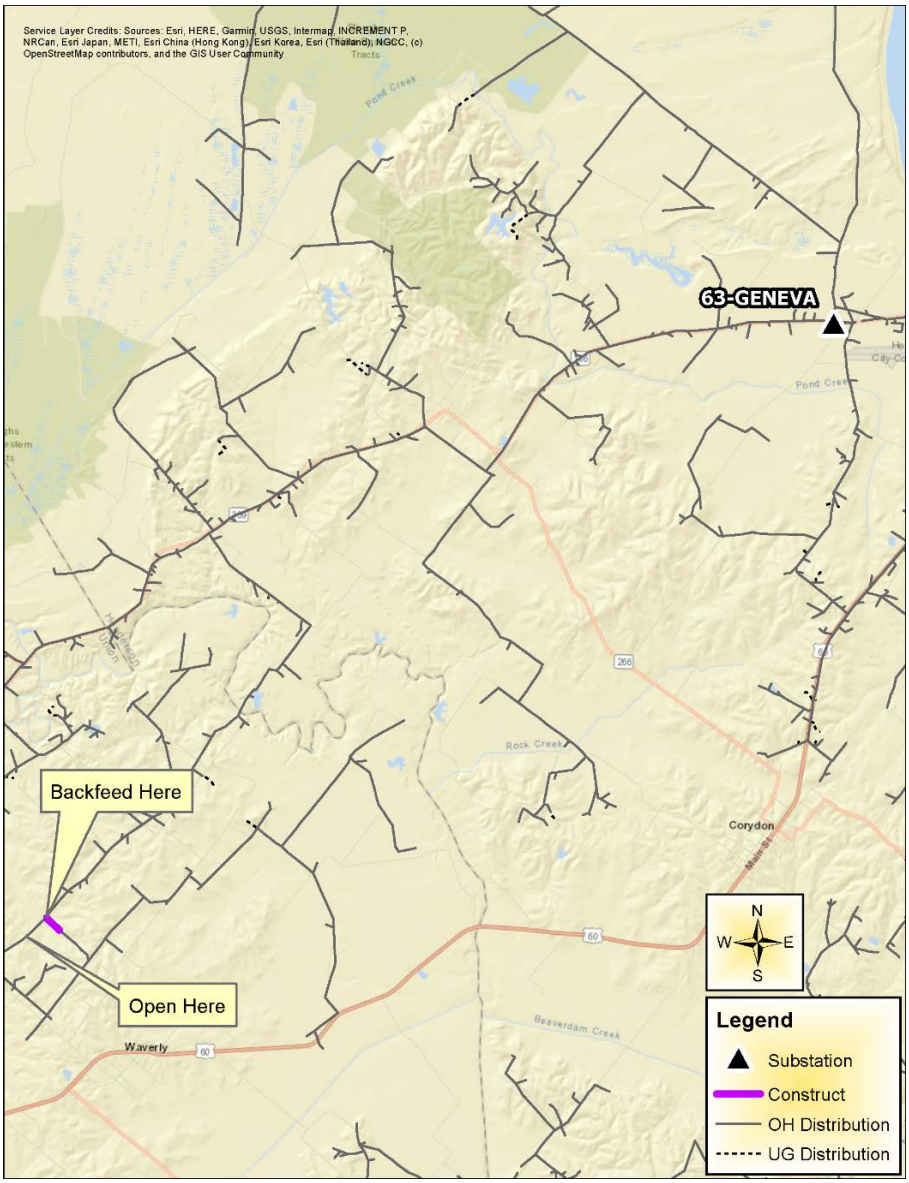

Figure 2-10. RUS Code 204-20 - Geneva 6303

Weaverton - 6402

Location – HWY 41A and Rudy Rd **394-16 - LL1 – $161,000**

Description: Multi-phase and reconductor from single-phase 2 ACSR to three-phase 1/0 ACSR between pole P41502015 and pole P41513018 for 1.4 miles. The project is recommended to relieve single-phase loading greater than 40 A on Weaverton 6402 in projected peak loading conditions. With the recommended improvements, the single-phase loading issue was alleviated. See Figure 2-11 for a geographic representation of the location of the project.

Sectionalizing: Upgrade the existing single-phase 50 A recloser on pole P41502022 to three single-phase 35 A reclosers. Sectionalizing should be reviewed to ensure the area meets Kenergy standards.

Alternatives: No transfers are available due to overloading nearby single-phase taps.

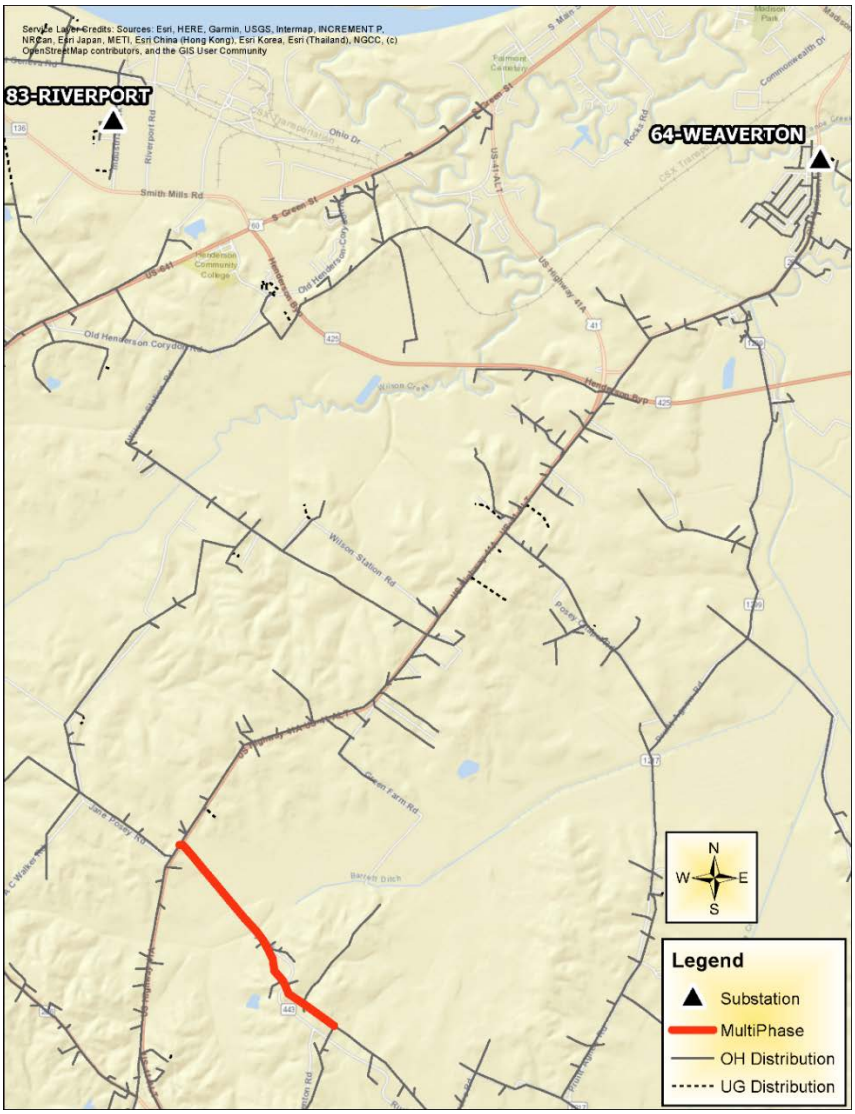

Figure 2-11. RUS Code 394-16 - Weaverton 6402

Weaverton - 6403

Location –Sutton Dr **201-16 - LL1 – No RUS Funds ($6,500)**

Description: Construct a single-phase 1/0 ACSR tie line between pole P40955057 and pole P40955262 for 0.1 miles. Open the circuit at pole P40955246 and backfeed through the new tie line. The project is recommended to relieve single-phase customer count greater than 60 consumers on Weaverton 6403. This project is to be done in conjunction with Project 396-16. With the recommended improvements, the single-phase loading issue was alleviated. See Figure 2-12 for a geographic representation of the location of the project.

Sectionalizing: See sectionalizing changes in Project 396-16.

Alternatives: No transfers are available due to overloading nearby single-phase taps.

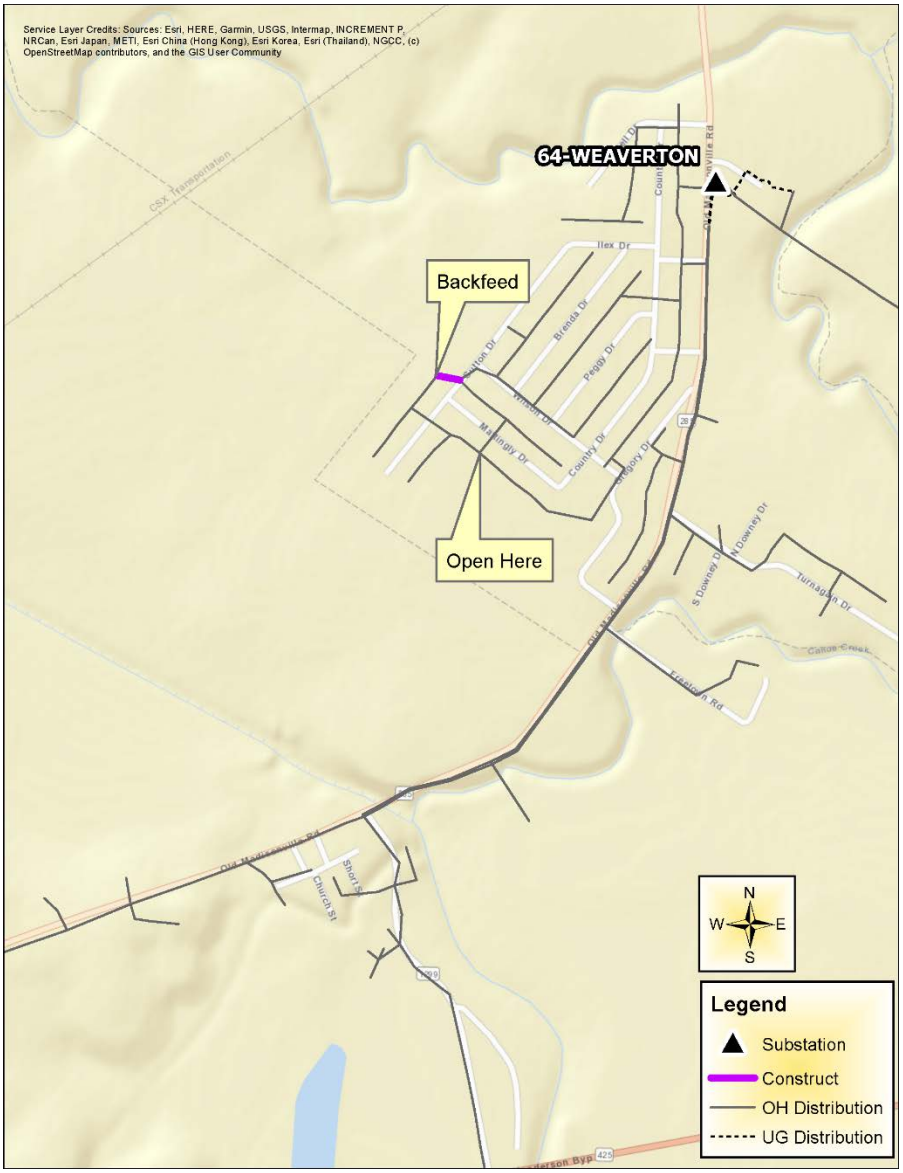

Figure 2-12. RUS Code 201-16 - Weaverton 6403

Little Dixie - 6601

Location – Whitelick Rd. **305-20 – LL4 – $172,303**

Description: Reconductor from three-phase 1/0 ACSR to three-phase 336 ACSR between poles P41467068 and P41458039 for 1.0 mile. The project is recommended to improve voltage drop to the regulator on Little Dixie 6601 in projected peak loading conditions. Before improvements, voltage was as low as 116.1 V at projected peak loading conditions. With the recommended improvements, the voltage improved to 119.6 V. See Figure 2-13 for a geographic representation of the location of the project.

Sectionalizing: No sectionalizing improvements are recommended.

Alternatives: No transfers are available with connecting feeders reaching their peak capacity.

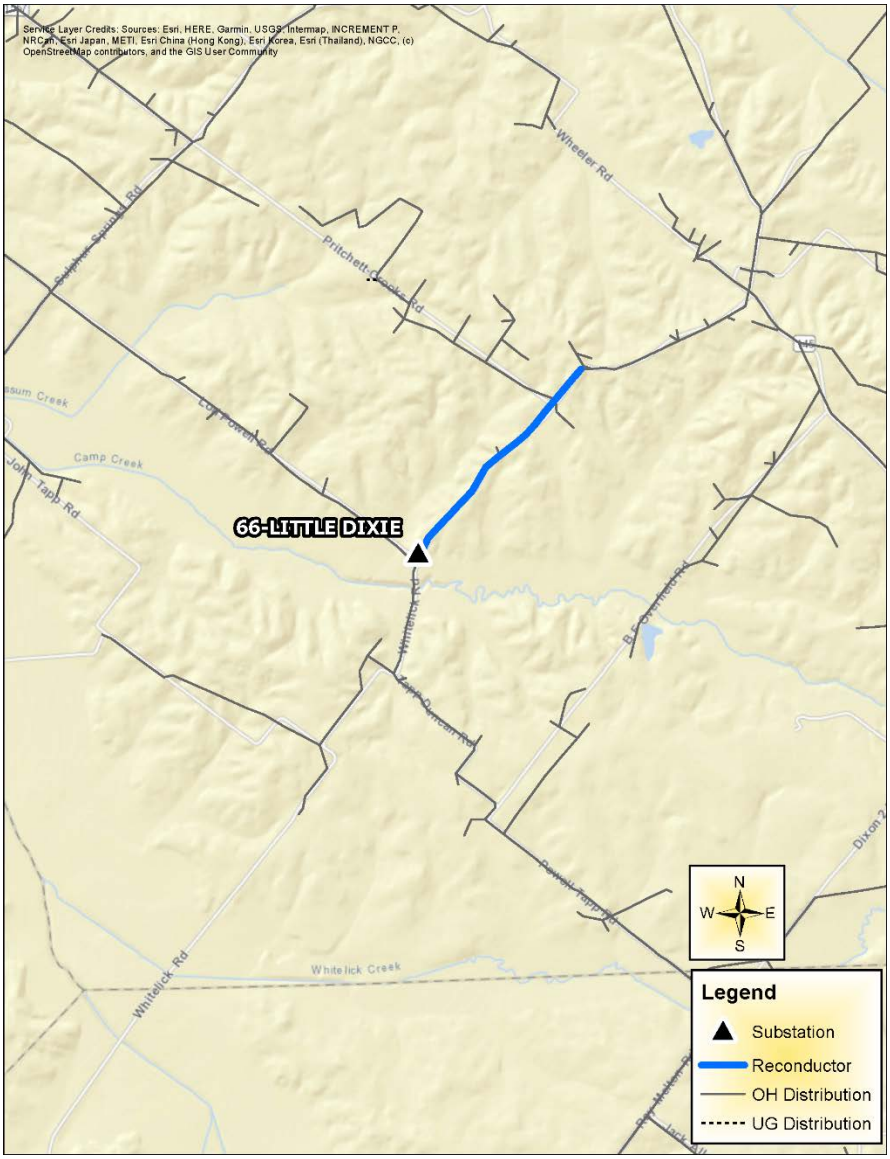

Figure 2-13. RUS Code 305-20 - Little Dixie 6601

Lyon - 6902

Location – KY-810 and Chestnut Oak Rd. **301-16 - LL1 – $57,500**

Description: Multi-phase and reconductor from single-phase 2 ACSR to three-phase 1/0 ACSR between pole P44892036 and pole P44789028 for 0.5 miles. The project is recommended to improve feeder load balancing issues and low voltage conditions on Lyon 6902 in projected peak loading conditions. Before improvements, voltage at sections of Lyons 6902 was as low as 117.8 V by the end of the work plan, and the highest and lowest feeder imbalance at the feeder breaker differed by over 35 A. This project is to be done in conjunction with Project 399-16. With the recommended improvements, the voltage will be improved to 118.9 V, and the highest and lowest feeder imbalance at the feeder breaker improved to less than 20 A. See Figure 2-14 for a geographic representation of the location of the project.

Sectionalizing: Remove the existing single-phase recloser at P44892036. After the project, sectionalizing should be reviewed to ensure the area meets Kenergy standards.

Alternatives: No load transfers or tie feeds are available due to the area's position near the edge of Kenergy's system.

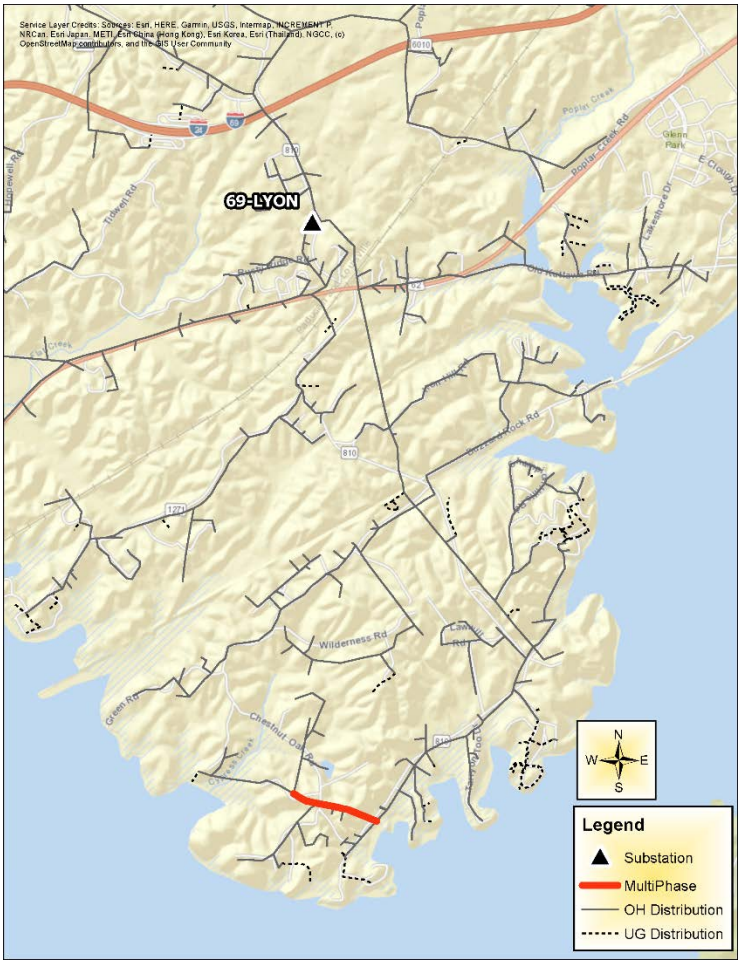

Figure 2-14. RUS Code 301-16 - Lyon 6902

Lyon - 6902

Location – KY-810 and Mt. Zion Rd. **399-16 – LL2 – $47,150**

Description: Multi-phase and reconductor from two-phase 2 ACSR to three-phase 1/0 ACSR between pole P44882008 and pole P44892036 for 0.4 miles. The project is recommended to improve feeder load balancing issues and low voltage conditions on Lyon 6902 in projected peak loading conditions. Before improvements, voltage at sections of Lyons 6902 was as low as 117.8 V by the end of the work plan, and the highest and lowest feeder imbalance at the feeder breaker differed by over 35 A. This project is to be done in conjunction with Project 301-16. With the recommended improvements, the voltage will be improved to 118.9 V, and the highest and lowest feeder imbalance at the feeder breaker improved to less than 20 A. See Figure 2-15 for a geographic representation of the location of the project.

Sectionalizing: See sectionalizing changes in Project 301-16.

Alternatives: No load transfers or tie feeds are available due to the area's position near the edge of Kenergy's system.

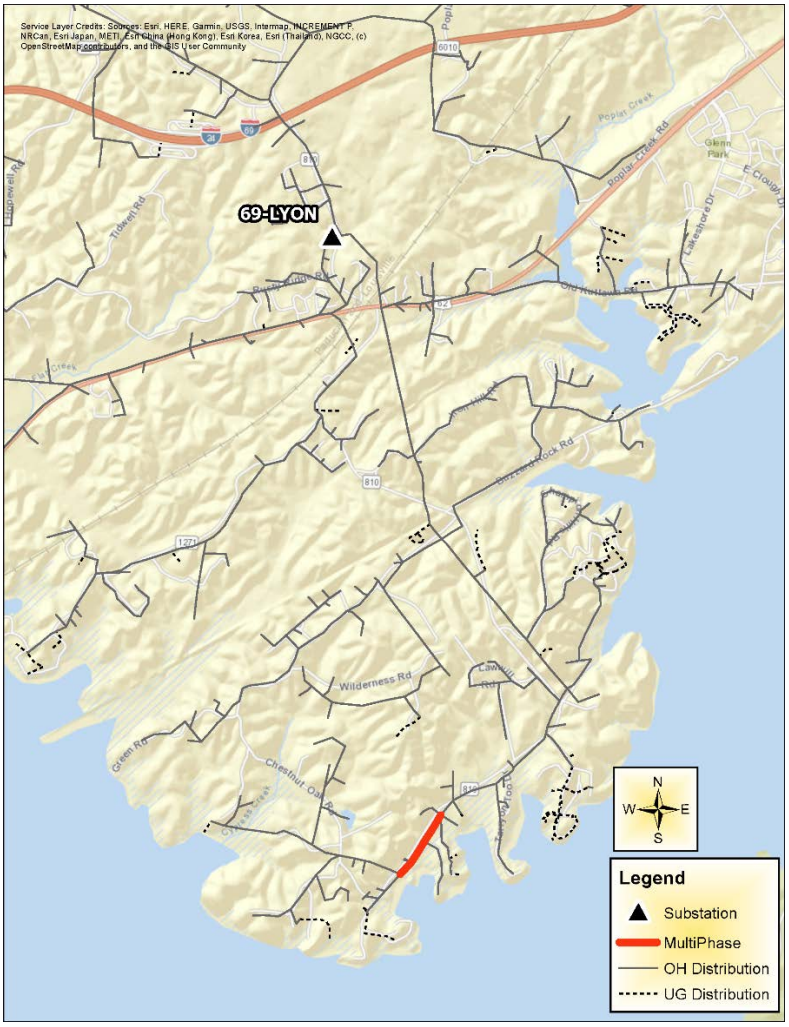

Figure 2-15. RUS Code 399-16 - Lyon 6902

Morganfield - 7101

Location – KY-1594 **307-20 – LL4 – $242,300**

Description: Reconductor from three-phase 1/0 ACSR to three-phase 4/0 ACSR between poles P41343005 and P41324022 for 1.5 miles. The project is recommended to improve low voltage conditions on Morganfield 7101 in projected peak loading conditions. Before improvements, voltage at sections of Morganfield 7101 was as low as 115.9 V by the end of the work plan. This project is to be done in conjunction with Project 604-7-20. With the recommended improvements, the voltage will be improved to 119.6 V. See Figure 2-16 for a geographic representation of the location of the project.

Sectionalizing: No sectionalizing improvements are recommended.

Alternatives: No load transfers are available as connecting feeders experience voltage problems when given significant portions of load. These projects save the cost of constructing a substation and transmission line to a remote part of Kenergy's system costing over $4 million.

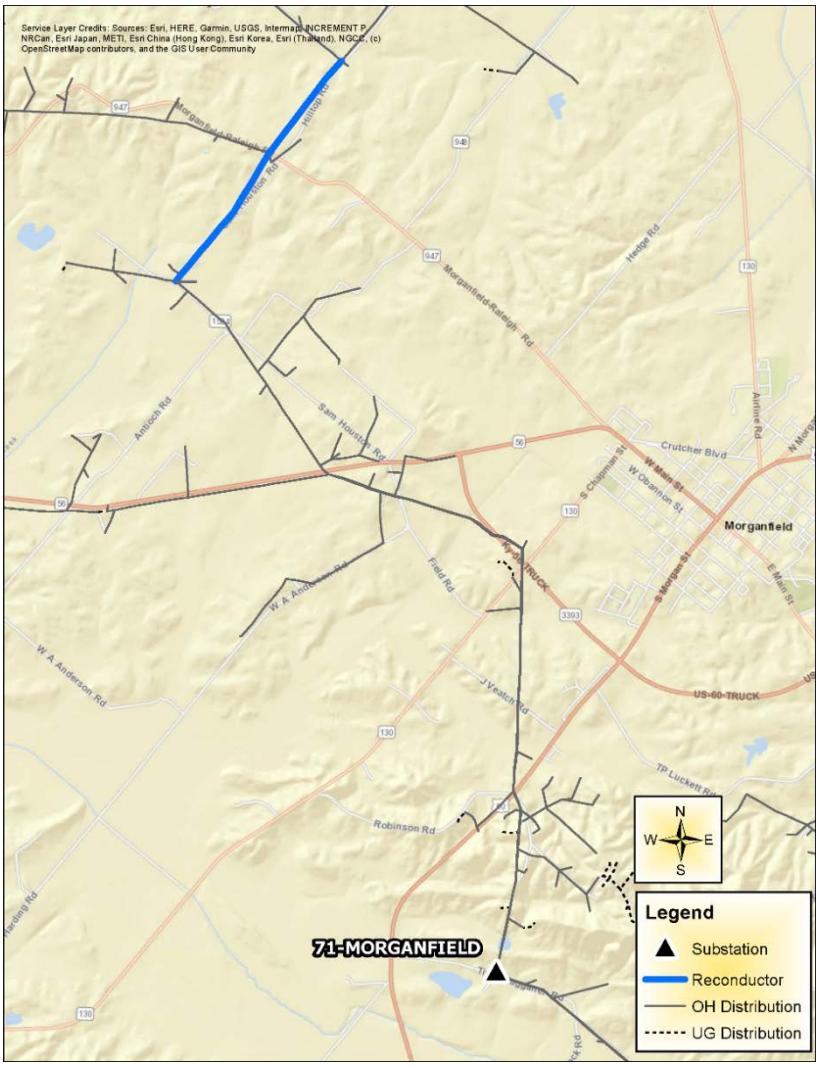

Figure 2-16. RUS Code 307-20 - Morganfield 7101

Morganfield 7102

Location – KY-2153 **308-20 – LL4 - $111,458**

Description: Multi-phase and reconductor from single- and two-phase 2 ACSR to three-phase 1/0 ACSR between poles P41929067 and P41929043 for 0.9 miles. The project is recommended to relieve single-phase loading greater than 40 A on Morganfield 7102 in projected peak loading conditions. With the recommended improvements, the single-phase loading issue was alleviated. See Figure 2-17 for a geographic representation of the location of the project.

Sectionalizing: Remove the two existing single-phase 70 A reclosers on pole P41929069. Install two single-phase 50 A reclosers, one at pole P41929033 and one at pole P41929043. Sectionalizing should be reviewed to ensure the area meets Kenergy standards.

Alternatives: No transfers are available due to overloading nearby single-phase taps.

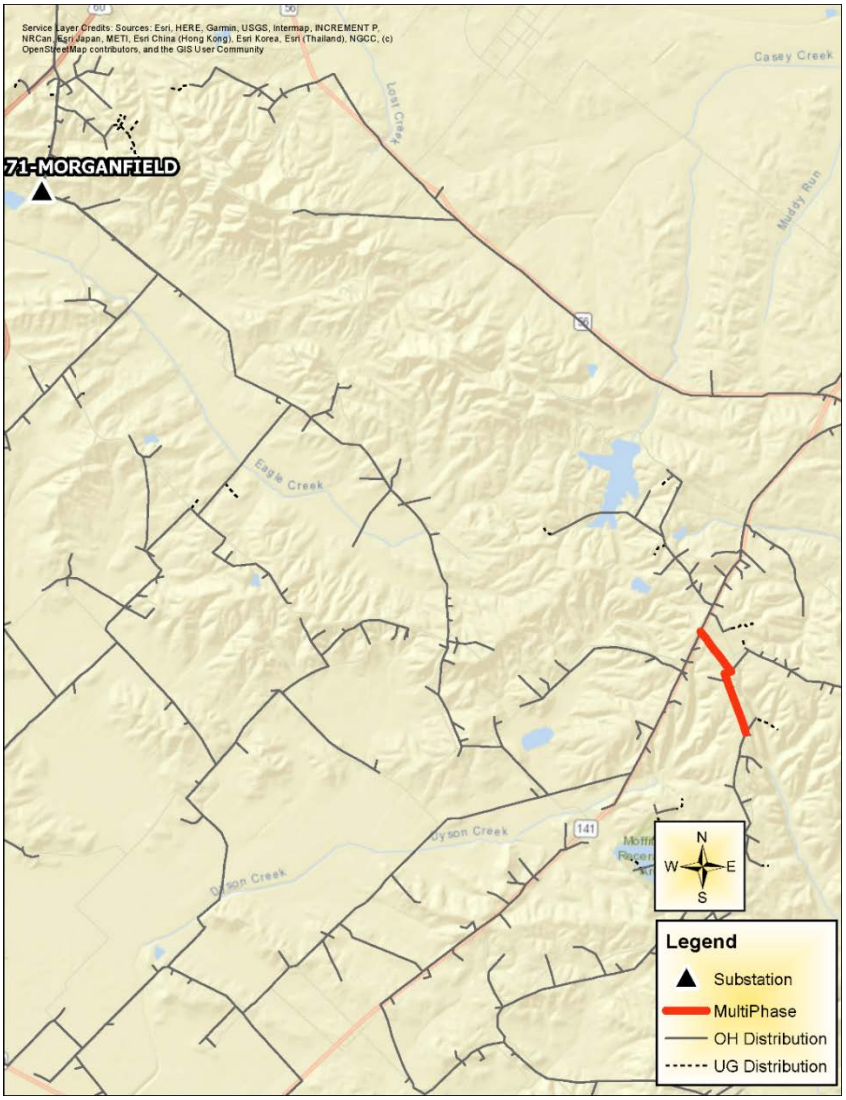

Figure 2-17. RUS Code 308-20 - Morganfield 7102

Niagara - 8002

Location – KY-416 and S. Pleasant Valley Road **386-16 - LL1 - $69,000**

Description: Multi-phase and reconductor from single-phase 2 ACSR to three-phase 1/0 ACSR between pole P41549041 and pole P41549021 for 0.6 miles. Open the feeder at pole P41642105 and close at pole P41549021. Backfeed the area through the new three-phase construction. This project is recommended to improve single-phase conductor balancing and through consumer issues in a heavily loaded area of Niagara 8002. See Figure 2-18 for a geographic representation of the location of the project.

Sectionalizing: After the project, sectionalizing should be reviewed to ensure the area meets Kenergy standards.

Alternatives: This project saves the cost of longer three-phase construction in other areas of the feeder.

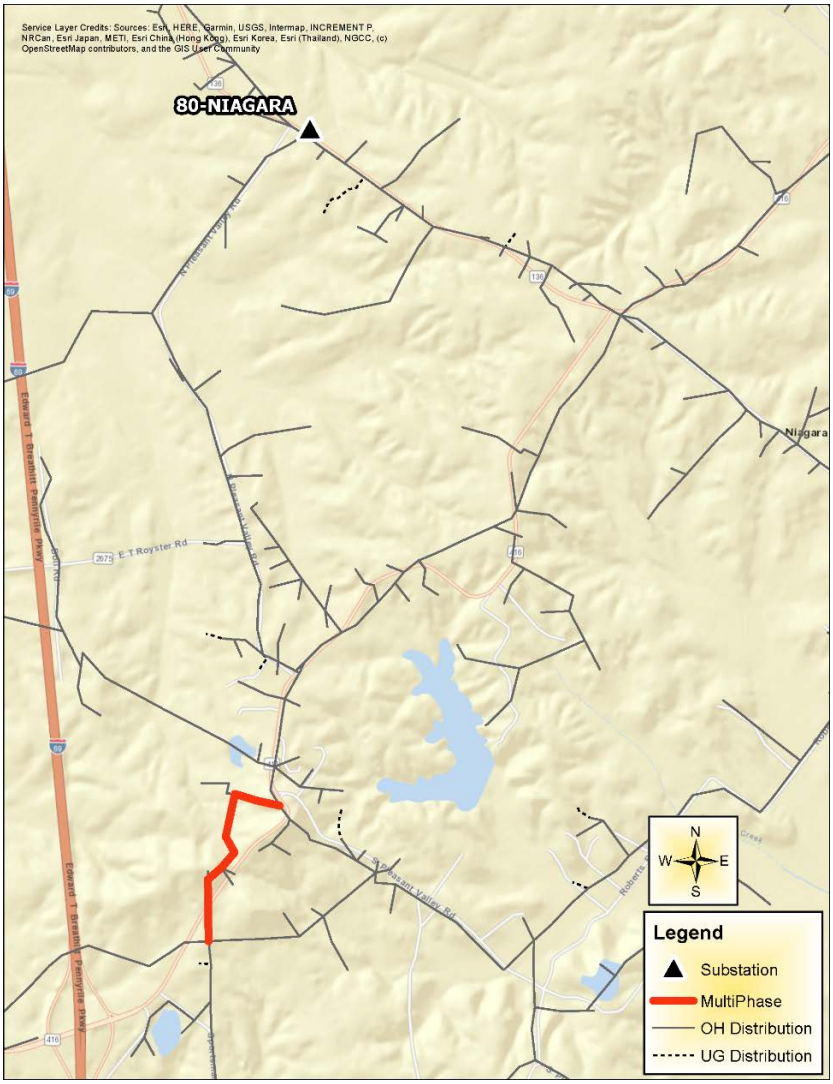

Figure 2-18. RUS Code 386-16 - Niagara 8002

Niagara - 8002

Location – KY-1299 **387-16 - LL1 – $69,000**

Description: Multi-phase and reconductor from single-phase 2 ACSR to three-phase 1/0 ACSR between pole P41535013 and poles P41545053 and P41535038 for 0.6 miles. The project is recommended to improve single-phase conductor balancing issues in a heavily loaded area of Niagara 8002 and support the new Jeff Brady Hemp Farm. See Figure 2-19 for a geographic representation of the location of the project.

Sectionalizing: After the project, sectionalizing should be reviewed to ensure the area meets Kenergy standards.

Alternatives: No alternatives are available. The Jeff Brady Hemp Farm requires three-phase, main line connection, and this is the most direct way to accomplish the required connection.

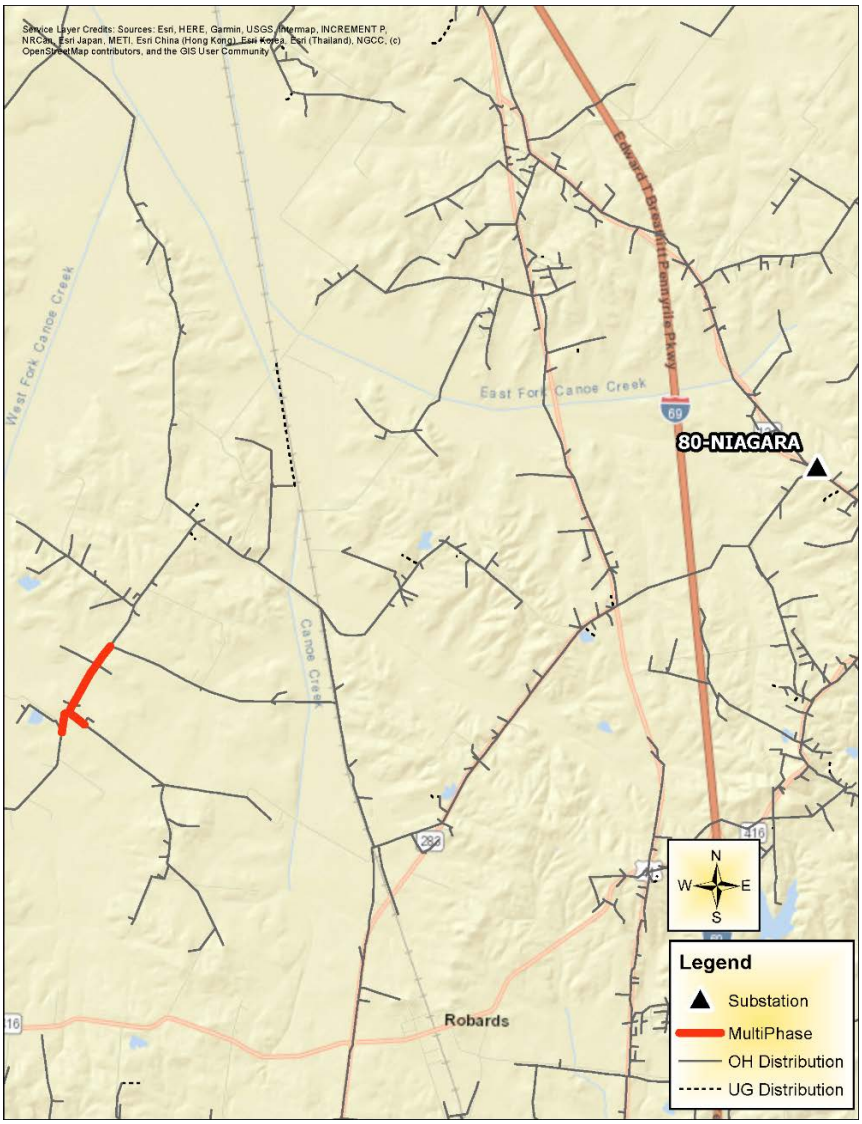

Figure 2-19. RUS Code 387-16 - Niagara 8002

Niagara – 8002

Location – KY-416 **388-16 - LL1 –$62,000**

Description: Multi-phase and reconductor from single-phase to three-phase 1/0 ACSR between pole P41632110 and pole P41539117 for 0.8 miles. The project is recommended to improve backfeed capability between Niagara 8001 and Niagara 8002. See Figure 2-20 for a geographic representation of the location of the project.

Sectionalizing: After the project, sectionalizing should be reviewed to ensure the area meets Kenergy standards.

Alternatives: No alternatives are available.

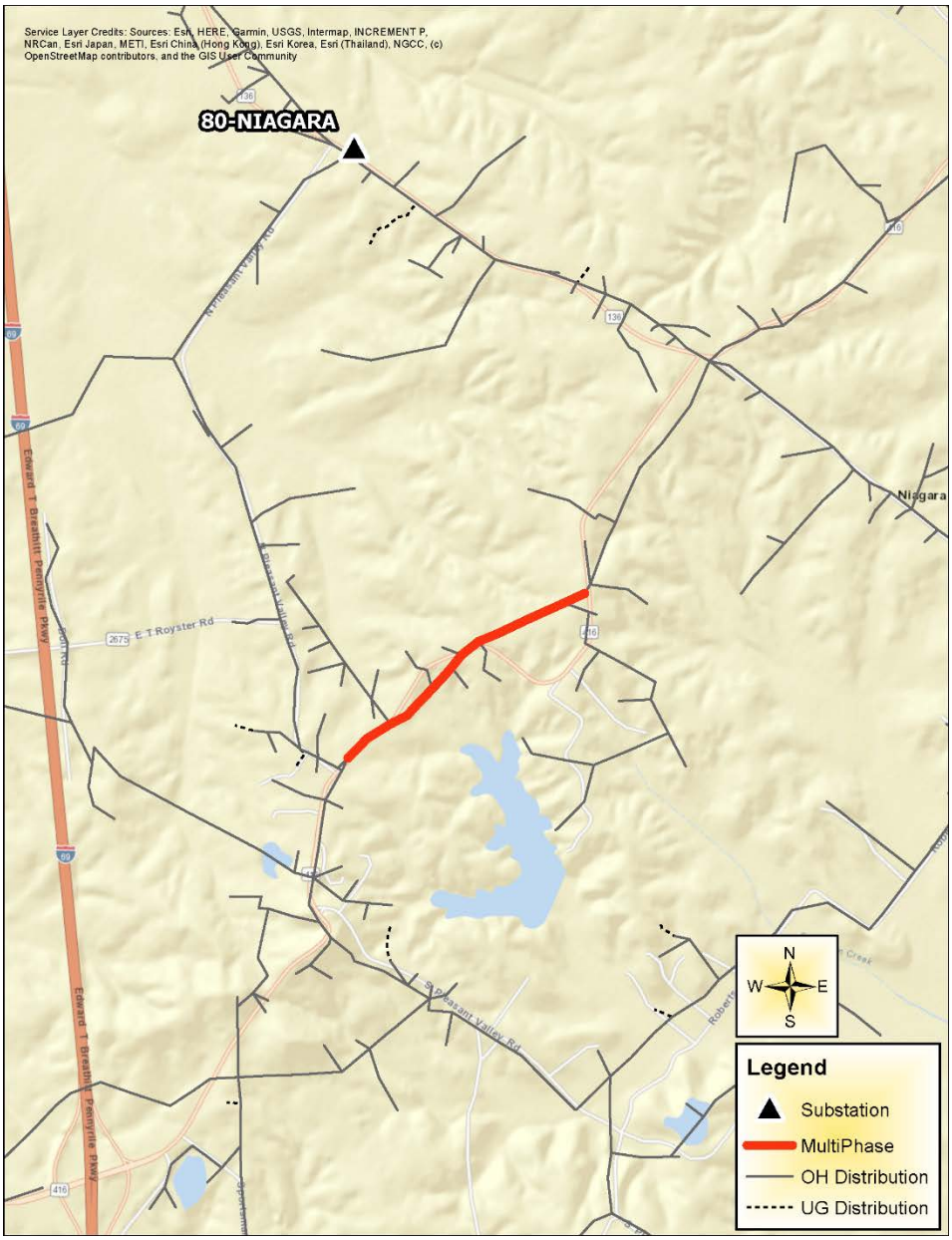

Figure 2-20. RUS Code 388-16 - Niagara 8002

Niagara - 8003

Location – US 41 and Willett Ln. **390-16 – LL2 - $11,788**

Description: Multi-phase and reconductor from single-phase 2 ACSR to three-phase 1/0 ACSR between poles P41508009 and P41508011 for 0.1 miles. The project is recommended to improve single-phase conductor balancing issues in a heavily loaded area of Niagara 8003. See Figure 2-21 for a geographic representation of the location of the project.

Sectionalizing: After the project, sectionalizing should be reviewed to ensure the area meets Kenergy standards.

Alternatives: No transfers are available due to overloading nearby single-phase taps.

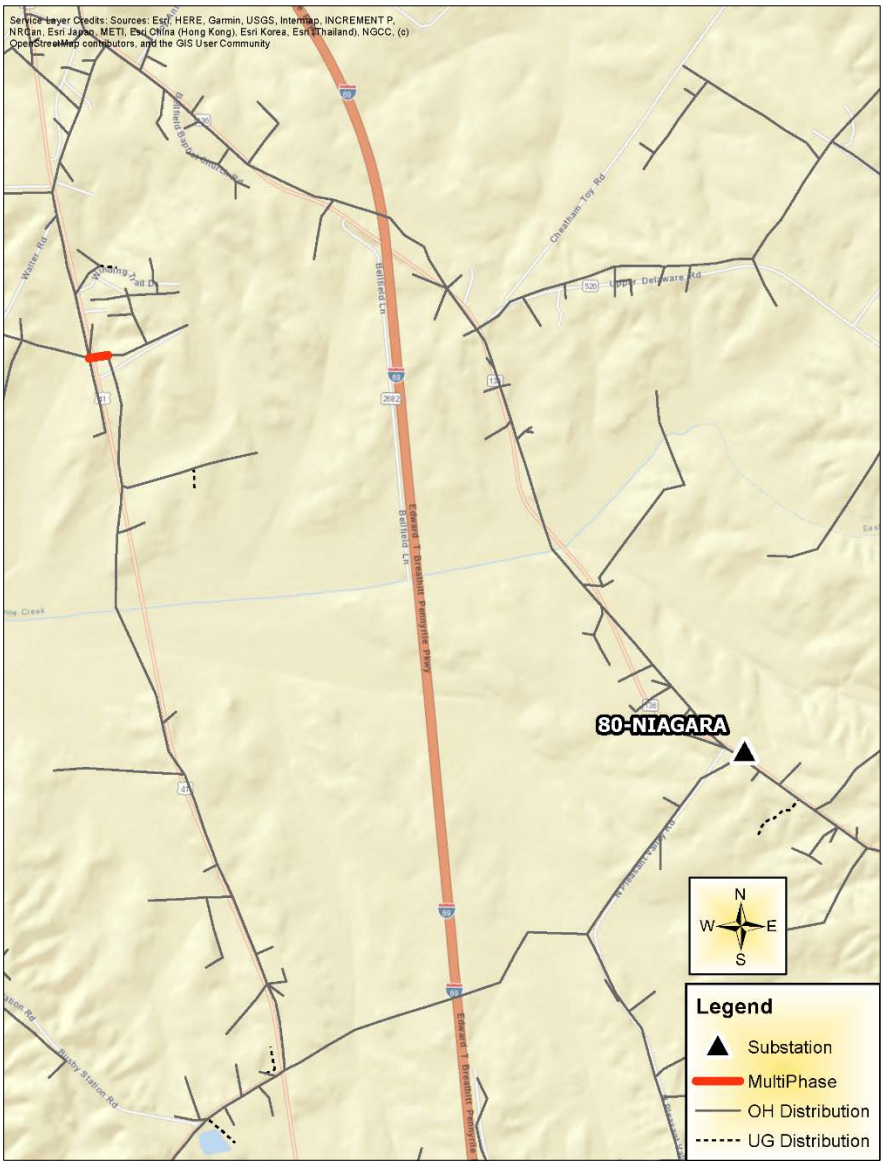

Figure 2-21. RUS Code 390-16 – Niagara 8003

Sullivan - 8503

Location – KY-365 **309-20 – LL4 - $173,379**

Description: Multi-phase and reconductor from single-phase 2 ACSR to three-phase 1/0 ACSR between pole P43059009 and pole P43049005 for 1.4 miles. The project is recommended to relieve single-phase loading greater than 40 A on Sullivan 8503 in projected peak loading conditions. With the recommended improvements, the single-phase loading issue was alleviated. See Figure 2-22 for a geographic representation of the location of the project.

Sectionalizing: Add two more single-phase 50 A reclosers to the existing single-phase 50 A recloser on pole P43059008.

Alternatives: No transfers are available due to overloading nearby single-phase taps.

Figure 2-22. RUS Code 309-20 - Sullivan 8503

Zion - 9001

Location – KY-1078 and Ridgewood Rd **397-16 – LL1 - $23,000**

Description: Multi-phase and reconductor from single-phase 2 ACSR to three-phase 1/0 ACSR between pole P41024002 and pole P41024111 for 0.2 miles. The project is recommended to relieve single-phase loading greater than 40 A on Zion 9001 in projected peak loading conditions. With the recommended improvements, the single-phase loading issue was alleviated. See Figure 2-23 for a geographic representation of the location of the project.

Sectionalizing: Upgrade the existing single-phase 50 A recloser at pole P41024002 to three single-phase 35 A reclosers. Sectionalizing should be reviewed to ensure the area meets Kenergy standards.

Alternatives: No transfers are available due to overloading nearby single-phase taps.

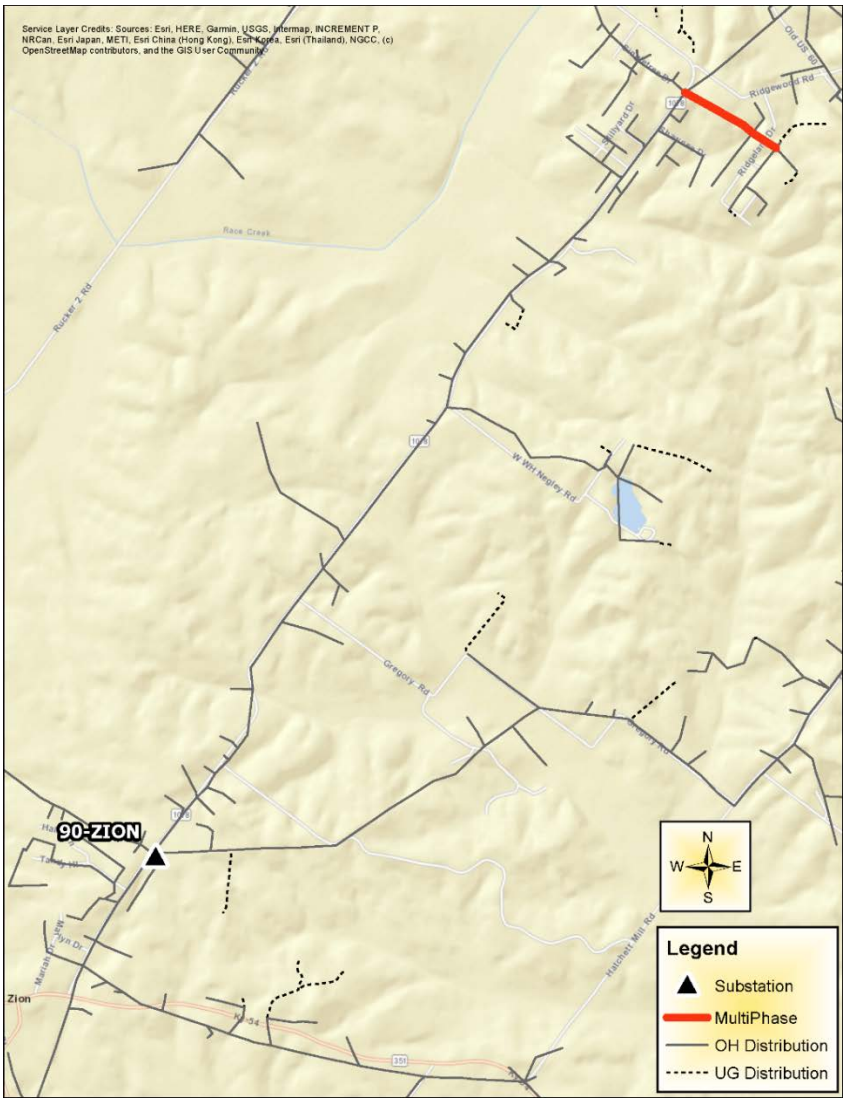

Figure 2-23. RUS Code 397-16 - Zion 9001

Wolf Hills - 9104

Location – Ellis Park **310-20 – LL1 - $752,000**

Description: Reconductor from three-phase 1/0 ACSR to three-phase 336 ACSR between pole P40388145 and pole P40367033 for 4.2 miles. 0.5 miles of this project is replacement of existing wire along a bridge, necessitating double the cost for that section. The project is recommended to serve the new 4 MW load currently being installed at the Ellis Park racing track. The new load will cause significant voltage and conductor overloading issues. This project is to be done in conjunction with project 604-10-20. With the recommended improvements, the load can be adequately served. See Figure 2-24 for a geographic representation of the location of the project.

Sectionalizing: Sectionalizing should be reviewed to ensure the area meets Kenergy standards.

Alternatives: Potential substation construction is not possible due to excessive transmission costs

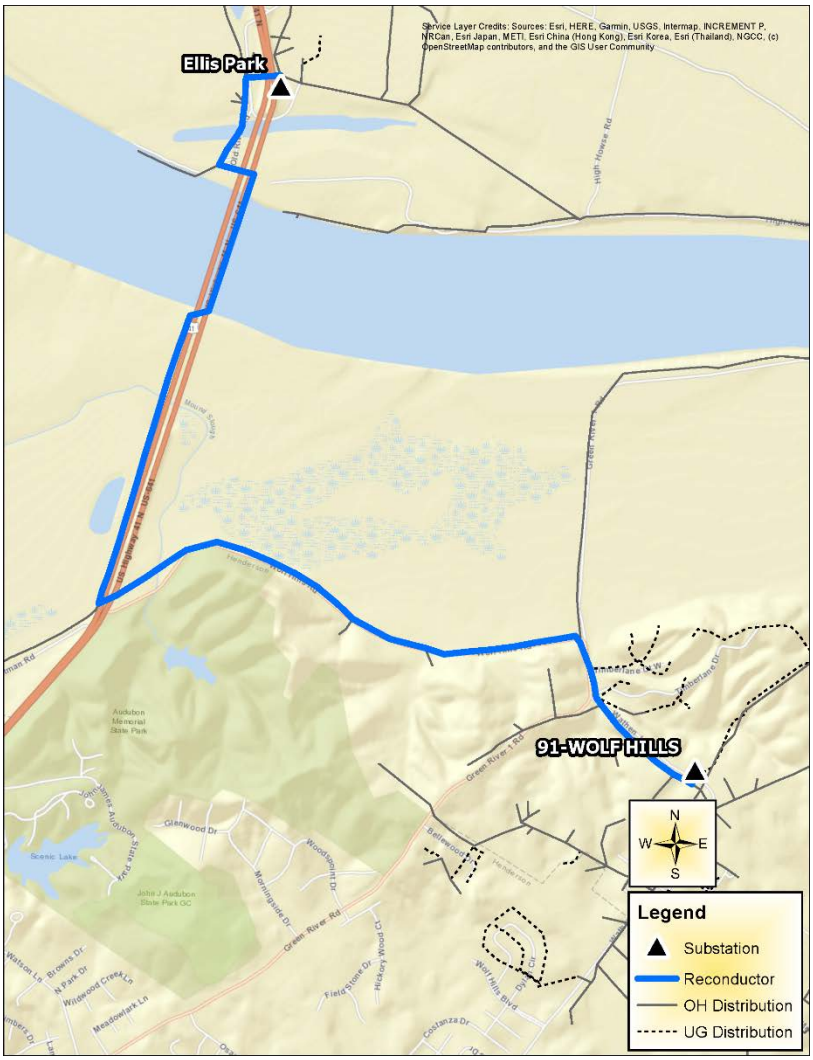

Figure 2-24. RUS Code 397-16 - Zion 9001

Table 2-12
Summary of Code 300 Projects

RUS Code	Carryover	Job Name	Mileage	Budget Cost	RUS Financed
201-16	Y	Weaverton 6403	0.1	$6,500	$0
201-20		St. Joe 3201 & 3203	1.0	$172,303	$0
202-20		St. Joe 3201 & 3203	0.9	$155,072	$0
203-20		South Hanson 5303	0.2	$14,709	$0
204-20		Geneva 6303	0.2	$12,608	$0
301-16	Y	Lyon 6902	0.5	$57,500	$57,500
301-20		Adams Lane 10602	0.25	$42,025	$42,025
302-20		Guffie 3101	0.9	$111,458	$111,458
303-20		St. Joe 3201 & 3203	0.9	$145,380	$145,380
304-20		Hanson 5103	3.7	$1,069,011	$1,069,011
305-20		Little Dixie 6601	1.0	$172,303	$172,303
307-20		Morganfield 7101	1.5	$242,300	$242,300
308-20		Morganfield 7102	0.9	$111,458	$111,458
309-20		Sullivan 8503	1.4	$173,379	$173,379
310-16	Y	Philpot 1 2501	0.4	$46,000	$46,000
310-20		Wolf Hills 9104	4.2	$752,000	$752,000
313-16	Y	Adams Lane 10602	0.6	$69,000	$69,000
374-16	Y	South Dermont 1 1801	1.2	$196,800	$196,800
386-16	Y	Niagara 8002	0.6	$69,000	$69,000
387-16	Y	Niagara 8002	0.6	$69,000	$69,000
388-16	Y	Niagara 8002	0.8	$62,000	$62,000
390-16	Y	Niagara 8001	0.1	$11,788	$11,788
391-16	Y	Onton 5203 & South Hanson 5306	2.7	$432,000	$432,000
394-16	Y	Weaverton 6402	1.4	$161,000	$161,000
397-16	Y	Zion 9001	0.2	$23,000	$23,000
399-16	Y	Lyon 6902	0.4	$47,150	$47,150
Totals		Cooperative Budget	26.7	$4,424,743	
		RUS Financed	24.3		$4,063,552

2.7 Phase Changes and Load Transfers

Phase changes and load transfers recommended to reduce voltage drop or relieve conductor loading. Table 2-13 lists recommended phase changes of single-phase to increase load balance and reduce voltage drop in areas of the system. Table 2-14 lists recommended single-phase load transfers to reduce single-phase loading and increase load balance on feeders. Finally, some phase changes required more explanation, and these are listed as separate projects with illustrations after Tables 2-13 and 2-14. No funds are requested for these jobs, nor are RUS Codes given.

Table 2-13
Summary of Single-Phase Phase Changes

Substation	Feeder	Line Section	Pole	From Ø	To Ø
Adams Lane	10602	OH336386	P41082014	C	B
Beda	4103	OH701121	P27202001	C	B
Beda	4104	OH702402	P29517011	B	A
Beech Grove	3303	OH-1957668446	P18609009	C	B
Beech Grove	3303	OH525398	P16621028	B	A
Dixon	6203	OH309393	P42066015	A	C
Guffie	3101	OH529579	P20923029	C	A
Guffie	3102	OH530962	P22810014	C	B
Little Dixie	6601	OH326430	P41459042	B	A
Little Dixie	6601	OH326471	P41469071	B	C
Little Dixie	6602	OH319327	P42016005	B	C
Lyon	6902	OH1146648603	P44852133	C	B
Lyon	6902	OH307839	P44853022	C	B
Lyon	6902	OH306529	P44779038	C	A
Marion	7001	OH314416	P43088018	C	A
Masonville	2303	OH708457	P17204027	B	C
Morganfield	7101	OH328693	P41322009	B	A
Morganfield	7101	OH337217	P41299002	C	B
Morganfield	7101	OH328200	P41306012	B	A
Nuckols	4203	OH518128	P25021007	A	B
Nuckols	4204	OH533659	P22925050	A	C
Onton	5201	OH310013	P42184019	B	A
Onton	5202	OH529842	P22319040	C	A
Onton	5203	OH519226	P26502010	A	C
Onton	5203	OH-109634099	P28406028	A	B
Pleasant Ridge	2602	OH714307	P23313076	B	C
Sebree	8503	OH318826	P42115029	B	A
South Hanson	5301	OH85716705	P30324028	A	C
South Hanson	5301	OH100909	P30313148	A	C
South Hanson	5303	OH102644	P32506071	A	B
South Hanson	5303	UG103163	P32422011*	A	C
Weberstown	1401	OH722514	P09712036	C	A
Weberstown	1401	OH721982	P09619030	C	B

Substation	Feeder	Line Section	Pole	From Ø	To Ø
Weberstown	1401	OH722514	P09712036	C	A
Weberstown	1401	OH721982	P09619030	C	B
West Owensboro	2205	UG532806	P12918079	A	B
West Owensboro	2205	UG126254	P12919021	A	C
Whitesville	1503	OH711636	P19623002	A	B
Whitesville	1503	OH-2126235846	P19513002	A	C

Notes: * = UG Line Sections with the closest pole listed.

Table 2-14
Summary of Single-Phase Load Transfers

From		To		Open	Close
Substation	Feeder	Substation	Feeder	at Pole	at Pole
South Hanson	5302	South Hanson	5302	P30415070	P30410019
Lewisport 2	1204	Thruston 1	1102	P07425007	P09405032
Weberstown	1403	Whitesville	1502	P15515014	P15519007
West Owensboro	2203	West Owensboro	2203	P16913046	P16913042
Bon Harbor	2702	Bon Harbor	2701	P11016074	P11016079
South Hanson	5304	South Hanson	5305	P32305011	P30325014
South Hanson	5304	South Hanson	5305	P32308025	P30323017
South Hanson	5302	Hanson	5104	P30511004	P30511001
South Owensboro	5801	South Owensboro	5801	P15064036	P15051018
Dixon	6201	Little Dixie	6602	P42037014	P42028085
Geneva	6302	Geneva	6302	P40878075	P40868060
Lyon	6902	Lyon	6902	P44873052	P44872179
Providence	8104	South Hanson	5305	P42745014	P42745010

Beech Grove - 3301 and Onton - 5202

Location – KY-370

Description: It is recommended to open the circuit at pole P22522023 and close the switch at pole P22522018 to backfeed the area to Beech Grove 3301. This project is recommended to balance circuit loading in projected peak loading conditions. Before improvements the regulator on Onton 5202 was loaded to 96.5% capacity by the end of the work plan. With the recommended improvements, the regulators are loaded to a maximum of 74.6% capacity. Please see Figure 2-25 for the proposed changes.

Sectionalizing: After the load transfer is finalized, sectionalizing should be reviewed to ensure the area meets Kenergy standards.

Alternatives: This project averts the cost of replacing the regulators on Onton 5202.

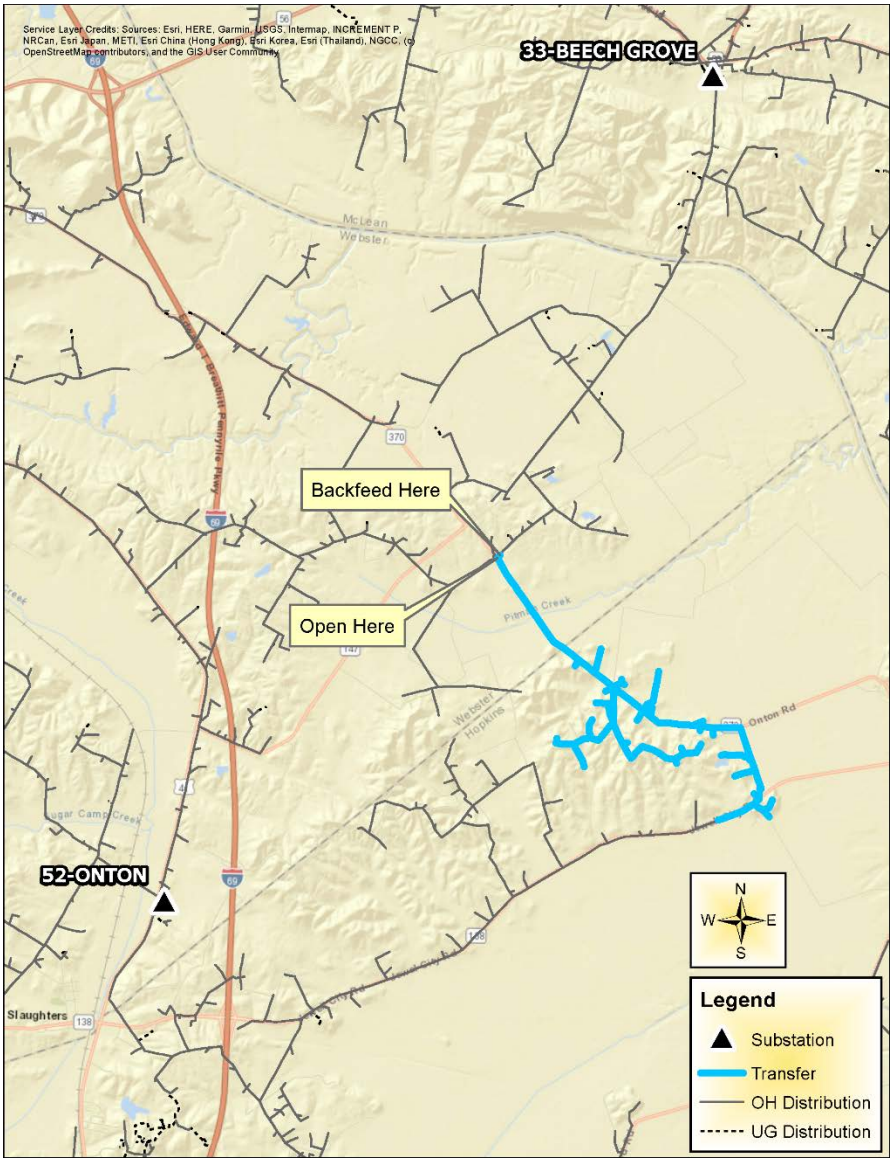

Figure 2-25. Beech Grove - Onton Load Transfer

South Hanson – 5303 and Hanson - 5104

Location – Brown Rd. **LL1 – No RUS Funds**

Description: It is recommended to open the circuit at pole P32502018 and close the circuit at pole P32405021. This project is recommended to allow greater loading on the Hanson Substation Transformer during the addition of the Rickard Hemp Farm load. See Figure 2-26 for a geographic representation of the location of the project.

Sectionalizing: After the load transfer is finalized, sectionalizing should be reviewed to ensure the area meets Kenergy standards.

Alternatives: This project averts the cost of constructing a new substation in the area for transformer loading and single contingency outage deficiencies.

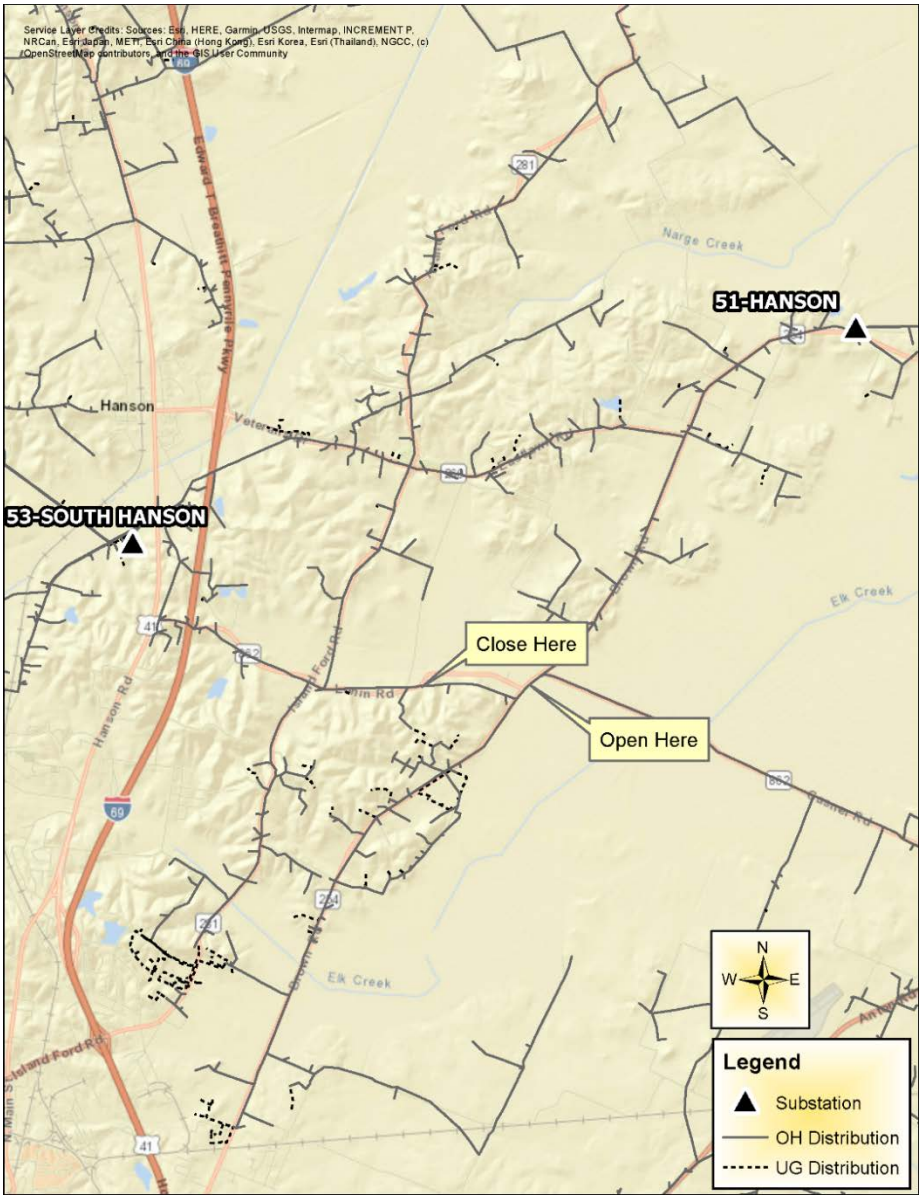

Figure 2-26. South Hanson - Hanson Load Transfer

2.8 Substation Construction and Changes

Substation changes were required to increase capacity at substations and construct substations for new loads. Estimated costs were inflated by 2.5% per year based on the anticipated year of construction. The following changes are recommended.

Hanson **501-20 – LL2 – $321,700**

Description: Upgrade the existing 3ø 5/5.6 MVA transformer to a 3ø 10/12.5/14.4 MVA transformer. Upgrade the substation regulators to three single-phase 333 kVA. The addition of the Rickard Hemp Farm will overload the existing Hanson Substation transformer. It is recommended to use the power transformer being retired from Hudson 1 in Project 502-20

Alternatives: This project, in conjunction with Project 397-20, saves the cost of constructing Hanson East Substation next to the proposed Rickard Hemp Farm, with an estimated substation cost of approximately $4 million. This alternative will become necessary if the proposed load grows to greater than 7 MW.

Hudson 1 **502-20 – LL2 – $256,800**

Description: Replace the existing 3ø 10/12.5 MVA transformer with the 3ø 10/13/16 MVA transformer being retired from Morganfield Substation in Project 503-20. Hudson 2 is an existing 3ø 10/13/16 MVA transformer, and replacing Hudson 1 with the same transformer allows either substation transformer to feed the load on Hudson Substation in emergency contingency situations.

Alternatives: Replacing the existing transformer with a retired transformer from a different substation saves the cost of a new 3ø 10/13/16 transformer that could be purchased at a higher cost or an additional transformer bay being built at Hudson Substation.

Morganfield **503-20 – LL2 – $1,119,500**

Description: Upgrade the existing 3ø 10/13/16 MVA transformer to a 3ø 12/14/16 MVA transformer. Upgrade the substation regulators to three single-phase 416 kVA. The Morganfield Substation transformer is expected to be loaded past 10 MVA in the summer of 2022.

Alternatives: No load transfers are available as connecting feeders experience voltage problems when given significant portions of load. This project, in conjunction with Projects 307-20 and 604-7-20, save the cost of constructing a substation and transmission line to a remote part of Kenergy's system, which would cost over $4 million.

Total Cost, Sub. Construction and Changes $1,698,000

2.9 Sectionalizing Equipment

Kenergy has invested VersaTech sectionalizing devices throughout the system to improve sectionalizing. Kenergy will continue purchasing new devices for placement on the system. Estimated costs were inflated by 2.5% per year based on the anticipated year of construction.

Table 2-15
Sectionalizing Equipment

Estimated 48-Month Work Period

	2020/2021	2021/2022	2022/2023	2023/2024	TOTAL
New VersaTech Devices					
Number/Year	75	75	75	75	300
Cost/Device	$5,003	$5,128	$5,256	$5,387	
Cost of New Devices	$375,225	$384,600	$394,200	$404,025	$1,558,050
TOTAL COST OF SECTIONALIZING EQUIPMENT	$375,225	$384,600	$394,200	$404,025	$1,558,050

Table 2-16
Summary of Costs for Sectionalizing Equipment

RUS Code	Category Description	2020/2021	2021/2022	2022/2023	2023/2024	TOTAL
603	Sectionalizing Equipment	$375,225	$384,600	$394,200	$404,025	$1,558,050

Total RUS Code 603 $1,558,050

2.10 Line Regulators

Specific locations for line regulators were identified to correct voltage drop problems as an alternative solution when switching was not feasible or reconductoring was more expensive and not necessary due to lightly loaded circuits. The total estimated cost was inflated 2.5% per year to the recommended year of the Mid 2020–Mid 2024 CWP.

Adams Lane - 10602

Location – Airline Rd. **604-1-20 – LL2 - $56,375**

Description: Install three single-phase 100 amp regulators on pole P40958019 to improve voltage on downstream line sections. Before improvements, voltage at sections of Adams Lane 10602 was as low as 115.1 V at projected peak loading conditions. With the recommended improvements, the voltage will be improved to 121.1 V. Results include the improvements associated with Projects 313-16 and 301-20.

Onton – 5203 and South Hanson - 5306

Location – Tippett and Dame Rd. **604-2-20 – LL2 – $68,675**

Description: Retire three single-phase 100 amp regulators on pole P28421011 and install three single-phase 150 amp regulators on pole P28404030 to improve voltage on downstream line sections during single contingency backfeed scenarios.

Alternatives: This project averts the cost of constructing a new substation in the area for transformer loading and single contingency outage deficiencies .

Geneva - 6302

Location – US 60 Hwy. **604-3-20 – LL2 – $61,500**

Description: Remove the single-phase 50 amp regulator on pole P40878022. Install three single-phase 100 amp regulators on pole P40869008 to improve voltage on downstream line sections. Before improvements, voltage at sections of Geneva 6302 was as low as 117.3 V at projected peak loading conditions. With the recommended improvements, the voltage will be improved to 124.1 V.

Alternatives: No transfers are available due to overloading nearby single-phase taps and nearby feeders.

Weaverton - 6402

Location – US-41A Hwy. **604-4-20 – LL2 – $68,675**

Description: Retire the three single-phase 100 amp regulators on pole P40983153 and install three single-phase 150 amp regulators on pole P40983008. Before improvements, load capacity percentage at the regulators was as high as 107.1% at projected peak loading conditions. With the recommended improvements, the capacity percentage will be improved to 73.6%.

Alternatives: No transfers are available due to heavily loaded feeders and substation transformers in the area

Little Dixie - 6602

Location – Ray Melton Rd. **604-5-20 – LL2 – $61,500**

Description: In an effort of improve the reliability of voltage to members, it is recommended to replace existing auto boosters on the system as they do not have a bucking voltage function, and they are a hazard to maintenance due to the nature of the device. The three single-phase 50 amp auto boosters at P42028114 on Little Dixie 6602 should be replaced with three single-phase 100 amp regulators.

Alternatives: No alternatives are available, as the auto boosters should be retired even if no planning criteria are violated in the area

Marion - 7004

Location – KY-91 **604-6-20 – LL2 – $61,500**

Description: In an effort of improve the reliability of voltage to members, it is recommended to replace existing auto boosters on the system as they do not have a bucking voltage function, and they are a hazard to maintenance due to the nature of the device. The three single-phase 50 amp auto boosters at P43084032 on Marion 7004 should be replaced with three single-phase 100 amp regulators.

Alternatives: No alternatives are available, as the auto boosters should be retired even if no planning criteria are violated in the area.

Morganfield - 7101

Location – Hilltop Rd. **604-7-20 – LL2 - $68,675**

Description: Upgrade three single-phase 100 amp regulators to three single-phase 150 amp regulators on pole P41314033. Before improvements, the regulators were loaded as high as 109.6% capacity at projected peak loading conditions. This project is to be done in conjunction with Project 307-20. With the recommended improvements, the regulators will be loaded to a maximum of 65.8% capacity.

Alternatives: No load transfers are available as connecting feeders experience voltage problems when given significant portions of load. These projects save the cost of constructing a substation and transmission line to a remote part of Kenergy's system costing over $4 million.

Niagara – 8002

Location – KY-1078 Henderson **604-8-20 – LL2 – $63,550**

Description: Install three single-phase 150 amp regulators on pole P41547064 to improve voltage on downstream line sections and support the Jeff Brady Hemp Farm. Without the regulators, the Jeff Brady Hemp Farm will cause low voltage on most of Niagara – 8002.

Alternatives: No alternatives are available.

Providence - 8102

Location – KY-291 **604-9-20 – LL2 - $56,375**

Description: Install three single-phase 100 amp regulators on pole P43256049 to improve voltage on downstream line sections during feeder Providence 8102 backfeed contingency with feeder Crossroads 6101.

Alternatives: No alternatives are available under single contingency scenarios.

Wolf Hills - 9104

Location – US-41A Hwy. **604-10-20 – LL1 – $106,000**

Description: Retire the three single-phase 100 amp regulators on pole P40367119 and install three single-phase 328 amp regulators on pole P40387031. This project is recommended to be done in conjunction with project 310-20 to support the additional 4 MW of load being installed at Ellis Park.

Alternatives: No transfers are available due to heavily loaded feeders and substation transformers in the area

Total RUS Code 604 $672,825

2.11 Line Shunt Capacitors

Specific locations for line shunt capacitor changes were not identified in this work plan. Kenergy will continue to monitor power factor on the system and make capacitor changes as necessary. An estimated budget of $50,000 is suggested for this work plan.

Total RUS Code 605	$50,000

The data contained in this Section details the assumptions which were used to calculate the cost of losses and evaluate the economic conductor selection.

3.1 Interest Rates

To determine a real interest rate, historical interest rates were reviewed relative to the rate of inflation. Historically, prime lending rates have been one to three percent greater than inflation. Based on information from Kenergy, the discount rate for economic analysis was 2.5 percent.

3.2 Fixed Annual Charge Rates

The annual fixed charge rate applied to the initial plant investment gives the annual revenue requirement for capital. Annual fixed charge rates, provided by Kenergy, were developed based on a three-year average of cost of operation and maintenance, depreciation, insurance, and taxes as a percentage of installed plant cost and the cost of capital as previously developed. The provided depreciation life is 26 years for distribution facilities. The annual fixed charge rates used in the analysis are summarized in Table 3-1.

Table 3-1
Summary of Assumed Fixed Annual Charge Rates

Item	Distribution Plant[1]
Cost of Capital	3.00%
Depreciation	3.85%
Operation and Maintenance(2)	4.00%
Taxes	0.20%
Insurance	0.00%
TOTAL	11.05%

Notes:
1. Rates expressed as a percent of original installed cost.

3.3 Cost of Power

According to the data provided by Kenergy, the cost of power is projected to increase 1.15 percent annually over the CWP period based on a 2020 $0.07829/kWh cost and a projected 2024 $0.08278/kWh cost.

3.4 Cost of Losses

The cost of losses was calculated based on the wholesale power cost of $0.07829/kWh and $13.81/kW. The wholesale power costs were obtained from Kenergy. The calculated cost of losses was based on an average of the 2017, 2018, and 2019 monthly billing demands and an average annual load factor of 50.92 percent. The cost of losses to carry one kW of loss at peak is $330.40. The calculation is presented in Appendix F.

3.5 Economic Conductor Selection

Economic conductor selection includes the consideration of initial construction costs and the associated losses of the selected conductors. For two alternative conductors compared, there is generally a kW load at which the fixed costs associated with the construction, plus the variable costs related to line losses, are equal for the two alternatives. For loads less than the equal cost load, the smaller conductor should be selected; while for loads greater than such load, the larger conductor would be selected. There are many choices of conductor sizes, but as part of system operation, standard conductor sizes for overhead construction of #2 ACSR, #1/0 ACSR, #4/0 ACSR, 336.4 MCM ACSR , and 795 MCM ACSR have been selected by Kenergy.

Since a distribution line is used for many years, economic conductor selection should include the consideration of the initial load, load growth, cost of losses, increases in power cost, the annual fixed cost, and the present worth of the dollars spent.

The load on the distribution line considered was expressed as the current annual peak load and was assumed to grow over the life cycle analyzed. The cost of power was assumed to increase at a rate of 1.15 percent. A 26-year present-worth factor was developed for the cost of losses and for the annual fixed cost.

Two basic conditions arise as alternatives are compared. The first, and most often encountered alternative, is the timing of the conversion of an existing distribution line. The question is simply a comparison of which is more economical for the next year. Thus, based on economics alone, the existing distribution line should remain as long as the annual cost of the losses on the existing line is less than the annual cost of the losses, plus fixed costs to reconductor the line. Generally, voltage drop problems are relieved through conversion prior to economics.

The second alternative arises when a new line is to be constructed or an existing line must be changed for reasons other than economic conductor selection. Such conditions include voltage drop, system changes, and reliability. Economic conductor selection analyses were performed and a summary for new construction and change-out was prepared.

General guidelines were developed based on the following assumptions.

- Compound annual load growth 1.25%
- Annual cost of peak kW losses $330.40
- Compound annual power cost increase 1.15%

- Fixed cost factor 11.05%
- Present worth discount factor 2.50%
- Distribution line cost estimates in Section 1

3.5.1 12.47/7.2 kV Operating Voltage

The following general guidelines were developed based upon the analysis described previously for overhead conductors at an operating voltage of 12.47/7.2 kV.

New single-phase distribution lines should generally be constructed with #1/0 ACSR if the load on the line will potentially grow to require conversion to three-phase. If the load will not grow requiring conversion to three-phase, #2 ACSR is adequate for single-phase construction for loads less than 288 kW.

The single-phase #1/0 ACSR lines should be converted to three-phase #1/0 ACSR based upon operating conditions and voltage-drop.

New three-phase 12.47 kV distribution lines should be constructed with the following conductors at the initial load given as follows:

- For loads less than 1,750 kW: 1/0 ACSR
- For loads greater than 1,750 kW and less than 2,000 kW: 4/0 ACSR
- For loads greater than 2,000 kW and less than 5,750 kW: 336 ACSR
- For loads greater than 5,750 kW: 795 ACSR

Existing three-phase distribution lines should be reconductored based on the following:

- For loads less than 1,500 kW: 1/0 ACSR
- For loads greater than 1,500 kW and less than 5,750 kW: 336 ACSR
- For loads greater than 5,750 kW: 795 ACSR

Economic conductor selection curves for overhead conductors are graphically presented in Figures 3-1 through 3-2. The economic conductor selection curves and guides should be updated periodically based on changes in construction cost, power cost, or fixed operating cost.

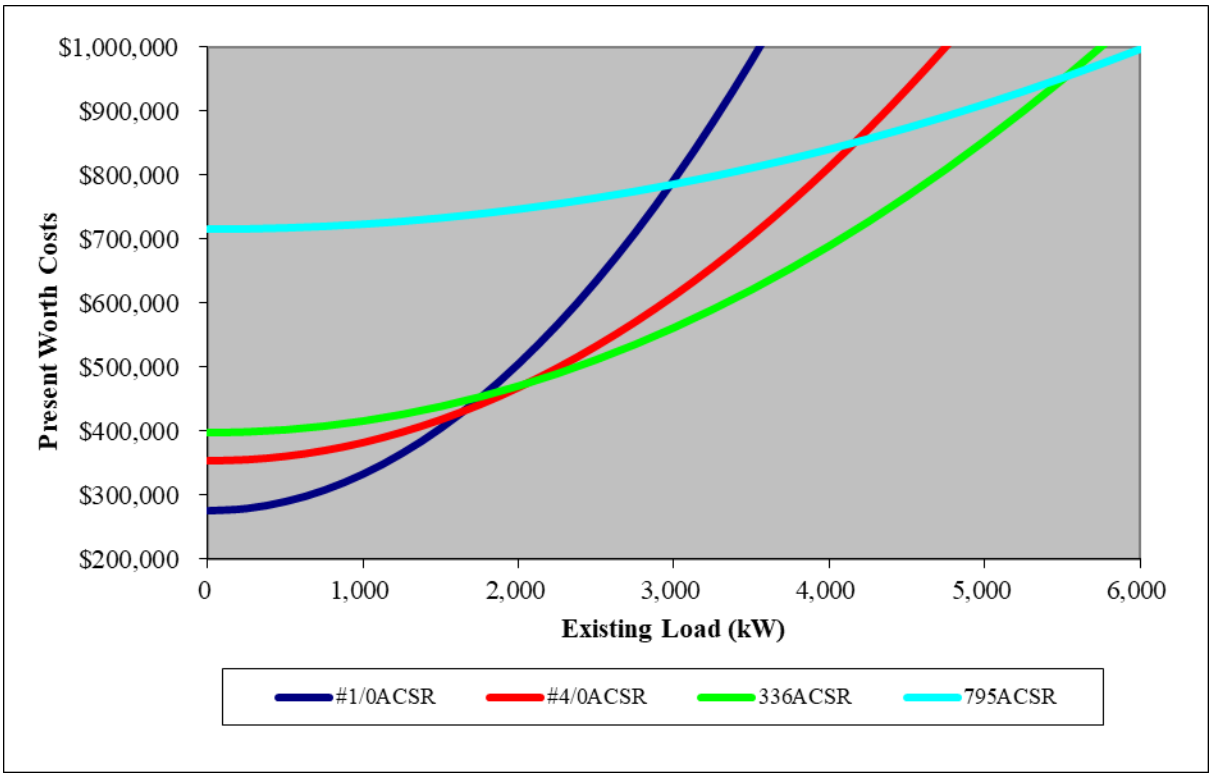

Figure 3-1. New Three-Phase Construction 12.47 kV

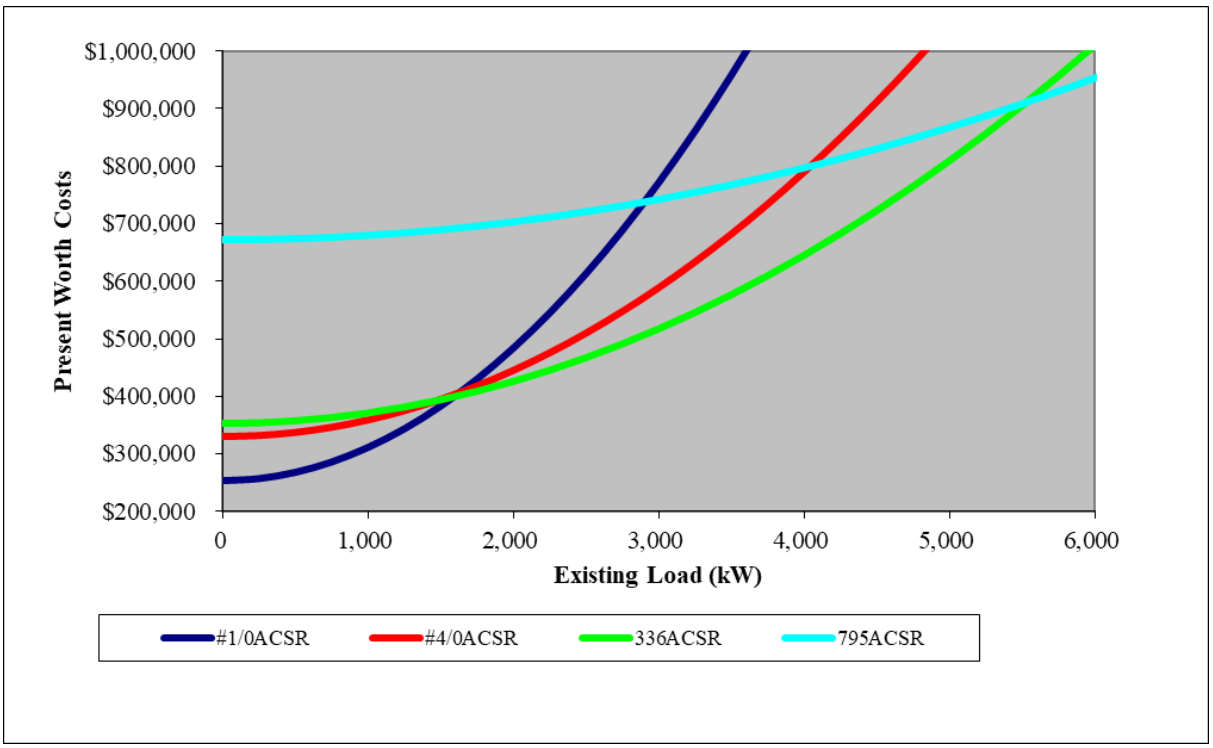

Figure 3-2. Three-Phase Reconductor 12.47 kV

3.5.2 24.9/14.4 kV Operating Voltage

The following general guidelines were developed based upon the analysis described previously for overhead conductors at an operating voltage of 24.9/14.4 kV.

New single-phase distribution lines should generally be constructed with #1/0 ACSR if the load on the line will potentially grow to require conversion to three-phase. If the load will not grow requiring conversion to three-phase, #2 ACSR is adequate for single-phase construction for loads less than 288 kW.

The single-phase #1/0 ACSR lines should be converted to three-phase #1/0 ACSR based upon operating conditions and voltage-drop.

New three-phase 24.9 kV distribution lines should be constructed with the following conductors at the initial load given as follows:

- For loads less than 3,500 kW: 1/0 ACSR
- For loads greater than 3,500 kW and less than 4,250 kW: 4/0 ACSR
- For loads greater than 4,250 kW: 336 ACSR

Existing three-phase distribution lines should be reconductored based on the following:

- For loads less than 3,500 kW: 1/0 ACSR
- For loads greater than 3,500 kW 336 ACSR

Note that 795 MCM is not pictured in the charts below. At 24.9 kV operating voltage, this conductor is not economically viable for loads up to 10,000 kW

Economic conductor selection curves for overhead conductors are graphically presented in Figures 3-3 through 3-4. The economic conductor selection curves and guides should be updated periodically based on changes in construction cost, power cost, or fixed operating cost.

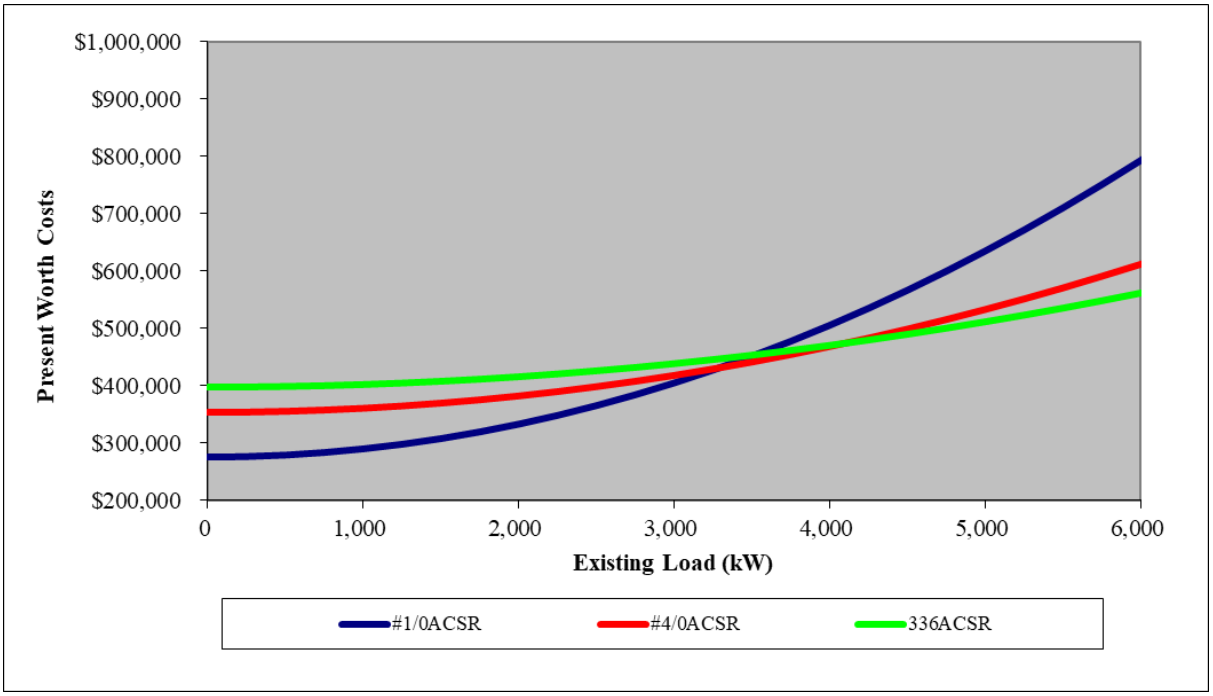

Figure 3-3. New Three-Phase Construction 24.9 kV

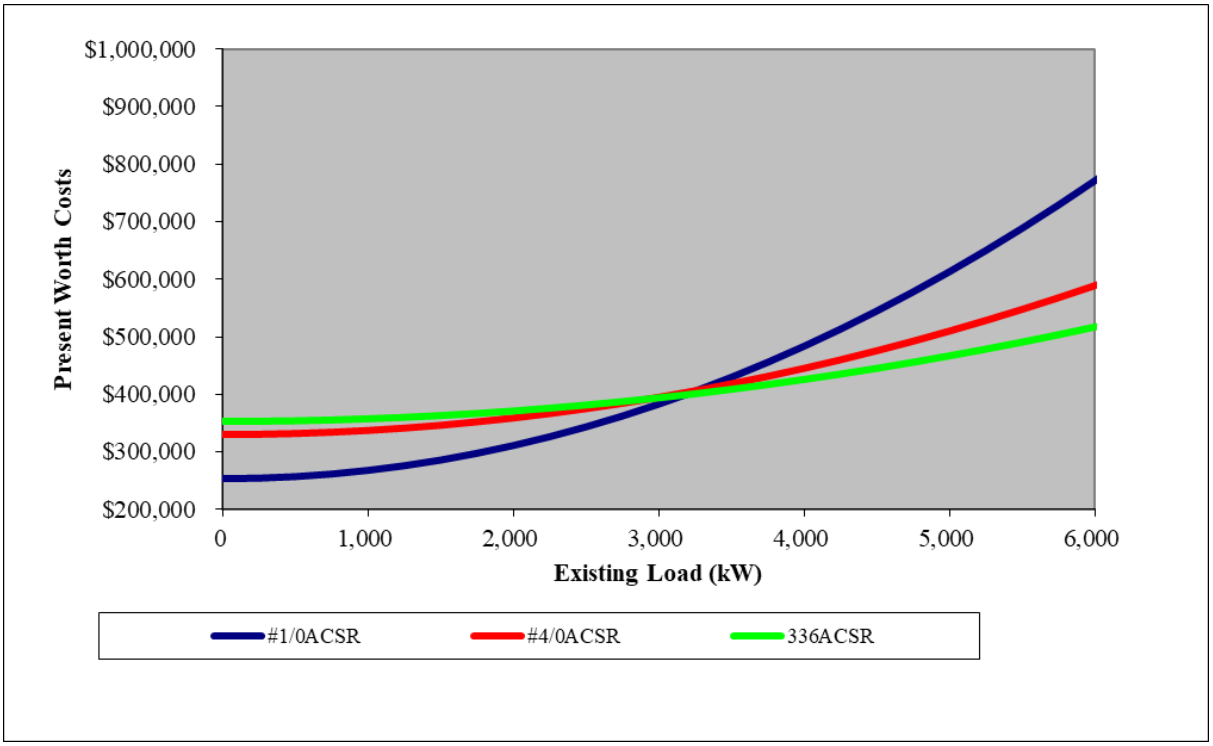

Figure 3-4. Three-Phase Reconductor 24.9 kV

Appendix A
STATUS OF PREVIOUS CWP PROJECTS

Status of Previous CWP Projects

Code	Job Name	CWP Length	CWP Estimate	Status
103	East Owensboro Gateway Commons Tie	0.80	$240,000	Cancelled
201	Weaverton New Construction 1Ø 1/0 ACSR	0.10	$6,700	In Progress
202	Centertown New Construction 3Ø 336	0.10	$13,392	Complete
203NF	Horse Fork 3Ø 750 MCM UG - Feeders 4 & 5 Exit	0.10		Complete
204	Weaverton Exit for New Feeder 4	0.10		Complete
301	Lyon 1Ø to 3Ø 1/0 ACSR	0.50	$41,850	In Progress
302	Lyon 3Ø to 3Ø 336 ACSR	1.10	$130,680	Complete
303	Lyon 3Ø to 3Ø 336 ACSR	1.00	$118,800	Complete
304	Beda 3Ø to 3Ø 336 ACSR	2.30	$273,240	Complete
305	Centertown Upgrade 3Ø URD to 4/0 AL 25kV	0.40	$90,000	Complete
306	East Owensboro 3Ø to D.C. 3Ø 336 ACSR	0.75	$168,750	Complete
307	East Owensboro 3Ø to 3Ø 336 ACSR	0.20	$23,760	Complete
310	Philpot 1Ø to 3Ø 1/0 ACSR	0.40	$33,480	In Progress
312	South Owensboro Underground Upgrade	0.10	$70,000	Cancelled
313	Adams Lane 1Ø to 3Ø 1/0 ACSR	0.50	$41,850	In Progress
314	Geneva AutoTransformer Upgrade	0.00	$45,000	Complete
360	Guffie 3Ø 1/0 CU to 3Ø 336 ACSR	1.43	$169,884	Complete
361	Hanson 3Ø to 3Ø 336 ACSR	2.20	$261,360	Complete
364	Masonville 3Ø to 3Ø 336 ACSR	1.70	$201,960	Complete
370	Providence 1Ø to 3Ø 1/0 ACSR	0.90	$75,330	Complete
374	South Dermont 3Ø to 3Ø 336 ACSR	1.20	$142,560	Carryover
383	Hanson 3Ø to 3Ø 336 ACSR	1.00	$118,800	Complete
384	Morganfield Voltage Conversion to 25 kV	13.50	$398,860	Complete
385	Morganfield 1Ø to 3Ø 1/0 ACSR	1.69	$128,770	Complete
386	Niagara 1Ø to 3Ø 1/0 ACSR	0.50	$41,850	In Progress
387	Niagara 1Ø to 3Ø 1/0 ACSR	0.50	$41,850	In Progress
388	Niagara 1Ø to 3Ø 1/0 ACSR	0.80	$66,960	In Progress
390	Niagara 1Ø to 3Ø 1/0 ACSR	0.10	$8,370	Carryover
391	Onton 3Ø to 3Ø 336 ACSR	2.50	$297,000	In Progress
392	Weaverton 3Ø to D.C. 3Ø 336 ACSR	1.10	$247,500	Complete
393	Weaverton 1Ø to 3Ø 336 ACSR	2.00	$217,620	Complete
394	Weaverton 1Ø to 3Ø 1/0 ACSR	1.40	$117,180	In Progress
395	Weaverton 2Ø to 3Ø 1/0 ACSR	0.30	$25,920	Complete
396	Weaverton 1Ø to 3Ø 1/0 ACSR	0.10	$8,370	Complete
397	Zion 1Ø to 3Ø 1/0 ACSR	0.30	$25,110	In Progress
398	Caldwell Springs 3Ø to 3Ø 336 ACSR	2.10	$283,500	Complete
399	Lyon 2Ø to 3Ø 1/0 ACSR	0.40	$34,560	Carryover
501NF	Horse Fork Bay 1 Rebuild	N/A		Complete
504	Weaverton Station Upgrade for New Circuit	N/A	$200,000	Complete
505	East Owensboro Station Upgrade for New Circuit	N/A	$150,000	Complete
507	Horse Fork Station Upgrade to Dual Transformer Capacity	N/A	$825,000	Complete
	Complete	26	63%	
	Carryover	3	7%	
	Cancelled	2	5%	
	In Progress	10	24%	
	Total	41	100%	

Appendix B
SUBSTATION FORECAST

KENERGY Corporation
Summer Substation and Feeder Load Forecast - Totals

SUBSTATION / FEEDER NAME	TOTAL CAPACITY (MVA)	2018 PEAK (MW)	PROJECTED LOADS (MW) LL1 2020	LL2 2021	LL3 2022	LL4 2023	LL5 2024	LL6 2025	LL7 2026	LL8 2027	LL9 2028	LL10 2029	COMP. ANNUAL GROWTH
PROJECTED SYSTEM COINCIDENT PEAK		**250.15**	**253.3**	**256.4**	**259.6**	**262.9**	**266.2**	**269.5**	**272.9**	**276.3**	**279.7**	**283.2**	1.25%
PROJECTED SYSTEM COINCIDENT PEAK (w/Spot Loads)		**250.15**	**258.2**	**264.4**	**269.7**	**274.3**	**277.5**	**280.9**	**284.2**	**287.6**	**291.1**	**294.6**	1.48%
Adams Lane	**10.0**	4.75	4.80	4.85	4.89	4.94	4.98	5.03	5.08	5.13	5.17	5.22	0.94%
106-1	5.00	1.31	1.32	1.33	1.35	1.36	1.37	1.39	1.40	1.41	1.43	1.44	0.94%
106-2	5.00	2.96	2.99	3.02	3.05	3.08	3.11	3.13	3.16	3.19	3.22	3.25	0.94%
106-3	5.00	0.50	0.50	0.51	0.51	0.52	0.52	0.53	0.53	0.54	0.54	0.55	0.94%
Total Feeder Load		**4.77**	**4.81**	**4.86**	**4.91**	**4.95**	**5.00**	**5.05**	**5.09**	**5.14**	**5.19**	**5.24**	-----
Substation Coincident Factor		99.70%	99.70%	99.70%	99.70%	99.70%	99.70%	99.70%	99.70%	99.70%	99.70%	99.70%	-----
Beda	**10.0**	7.07	7.14	7.21	7.28	7.35	7.42	7.49	7.56	7.63	7.70	7.77	0.94%
41-1	5.00	2.10	2.12	2.14	2.16	2.18	2.20	2.22	2.24	2.26	2.28	2.31	0.94%
41-2	5.00	1.17	1.18	1.19	1.20	1.21	1.22	1.23	1.25	1.26	1.27	1.28	0.94%
41-3	5.00	1.30	1.31	1.32	1.33	1.35	1.36	1.37	1.38	1.40	1.41	1.42	0.94%
41-4	5.00	2.50	2.53	2.55	2.57	2.60	2.62	2.65	2.67	2.70	2.72	2.75	0.94%
Total Feeder Load		**7.06**	**7.13**	**7.20**	**7.27**	**7.34**	**7.41**	**7.48**	**7.55**	**7.62**	**7.69**	**7.76**	-----
Substation Coincident Factor		100.14%	100.14%	100.14%	100.14%	100.14%	100.14%	100.14%	100.14%	100.14%	100.14%	100.14%	-----
Beech Grove	**10.0**	4.12	4.16	4.20	4.24	4.28	4.32	4.36	4.41	4.45	4.49	4.53	0.94%
33-1	5.00	0.92	0.92	0.93	0.94	0.95	0.96	0.97	0.98	0.99	1.00	1.01	0.94%
33-2	5.00	0.66	0.66	0.67	0.68	0.68	0.69	0.70	0.70	0.71	0.72	0.72	0.94%
33-3	5.00	1.18	1.19	1.21	1.22	1.23	1.24	1.25	1.26	1.27	1.29	1.30	0.94%
33-4	5.00	1.36	1.38	1.39	1.40	1.42	1.43	1.44	1.46	1.47	1.48	1.50	0.94%
Total Feeder Load		**4.12**	**4.16**	**4.20**	**4.24**	**4.28**	**4.32**	**4.36**	**4.40**	**4.44**	**4.48**	**4.53**	-----
Substation Coincident Factor		100.08%	100.08%	100.08%	100.08%	100.08%	100.08%	100.08%	100.08%	100.08%	100.08%	100.08%	-----
Bon Harbor	**10.0**	7.21	7.35	7.49	7.63	7.78	7.92	8.07	8.22	8.38	8.53	8.69	1.88%
27-1	5.00	1.62	1.65	1.69	1.72	1.75	1.78	1.82	1.85	1.89	1.92	1.96	1.88%
27-2	5.00	1.95	1.99	2.03	2.06	2.10	2.14	2.18	2.22	2.27	2.31	2.35	1.88%
27-3	5.00	0.35	0.36	0.36	0.37	0.38	0.39	0.39	0.40	0.41	0.42	0.42	1.88%
27-4	5.00	1.61	1.64	1.67	1.70	1.74	1.77	1.80	1.84	1.87	1.91	1.94	1.88%
27-5	5.00	1.67	1.71	1.74	1.77	1.80	1.84	1.87	1.91	1.94	1.98	2.02	1.88%
Total Feeder Load		**7.21**	**7.35**	**7.49**	**7.63**	**7.77**	**7.92**	**8.07**	**8.22**	**8.38**	**8.53**	**8.69**	-----
Substation Coincident Factor		100.02%	100.02%	100.02%	100.02%	100.02%	100.02%	100.02%	100.02%	100.02%	100.02%	100.02%	-----
Caldwell Springs	**10.0**	2.48	2.50	2.52	2.55	2.57	2.60	2.62	2.65	2.67	2.70	2.72	0.94%
60-1	5.00	0.47	0.47	0.48	0.48	0.49	0.49	0.50	0.50	0.51	0.51	0.52	0.94%
60-2	5.00	1.13	1.14	1.15	1.16	1.17	1.18	1.20	1.21	1.22	1.23	1.24	0.94%
60-3	5.00	0.89	0.90	0.91	0.91	0.92	0.93	0.94	0.95	0.96	0.97	0.98	0.94%
Total Feeder Load		**2.49**	**2.51**	**2.54**	**2.56**	**2.58**	**2.61**	**2.63**	**2.66**	**2.68**	**2.71**	**2.73**	-----
Substation Coincident Factor		99.59%	99.59%	99.59%	99.59%	99.59%	99.59%	99.59%	99.59%	99.59%	99.59%	99.59%	-----
Centertown	**3.8**	2.07	2.07	2.07	2.07	2.07	2.07	2.07	2.07	2.07	2.07	2.07	0.01%
40-1	5.00	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.01%
40-2	5.00	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.01%
40-3	5.00	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.01%
40-4	5.00	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.01%
Total Feeder Load		**2.07**	**2.07**	**2.07**	**2.07**	**2.07**	**2.07**	**2.07**	**2.07**	**2.07**	**2.07**	**2.07**	-----
Substation Coincident Factor		100.04%	100.04%	100.04%	100.04%	100.04%	100.04%	100.04%	100.04%	100.04%	100.04%	100.04%	-----

KENERGY Corporation
Summer Substation and Feeder Load Forecast - Totals

SUBSTATION / FEEDER NAME	TOTAL CAPACITY (MVA)	2018 PEAK (MW)	PROJECTED LOADS (MW) LL1 2020	LL2 2021	LL3 2022	LL4 2023	LL5 2024	LL6 2025	LL7 2026	LL8 2027	LL9 2028	LL10 2029	COMP. ANNUAL GROWTH
Crossroads	**10.0**	4.70	4.74	4.79	4.83	4.88	4.93	4.97	5.02	5.07	5.11	5.16	0.94%
61-1	5.00	1.23	1.24	1.25	1.26	1.27	1.28	1.30	1.31	1.32	1.33	1.35	0.94%
61-2	5.00	0.60	0.60	0.61	0.61	0.62	0.63	0.63	0.64	0.64	0.65	0.66	0.94%
61-3	5.00	2.37	2.40	2.42	2.44	2.46	2.49	2.51	2.53	2.56	2.58	2.61	0.94%
61-4	5.00	0.40	0.41	0.41	0.42	0.42	0.42	0.43	0.43	0.44	0.44	0.44	0.94%
Total Feeder Load		**4.60**	**4.64**	**4.69**	**4.73**	**4.78**	**4.82**	**4.87**	**4.91**	**4.96**	**5.01**	**5.05**	-----
Substation Coincident Factor		102.15%	102.15%	102.15%	102.15%	102.15%	102.15%	102.15%	102.15%	102.15%	102.15%	102.15%	-----
Dermont	**10.0**	7.67	7.82	7.97	8.12	8.27	8.43	8.59	8.75	8.91	9.08	9.25	1.88%
17-1	5.00	1.10	1.12	1.14	1.16	1.18	1.20	1.23	1.25	1.27	1.30	1.32	1.88%
17-2	5.00	0.53	0.54	0.55	0.56	0.57	0.58	0.59	0.61	0.62	0.63	0.64	1.88%
17-3	5.00	1.43	1.45	1.48	1.51	1.54	1.57	1.60	1.63	1.66	1.69	1.72	1.88%
17-4	5.00	2.44	2.48	2.53	2.58	2.63	2.68	2.73	2.78	2.83	2.88	2.94	1.88%
17-5	5.00	2.18	2.22	2.27	2.31	2.35	2.40	2.44	2.49	2.53	2.58	2.63	1.88%
Total Feeder Load		**7.67**	**7.82**	**7.97**	**8.12**	**8.27**	**8.43**	**8.59**	**8.75**	**8.91**	**9.08**	**9.25**	-----
Substation Coincident Factor		99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	-----
Dixon	**10.0**	3.96	4.24	4.28	4.32	4.36	4.40	4.44	4.48	4.52	4.56	4.60	0.89%
62-1	5.00	1.58	1.59	1.61	1.62	1.64	1.65	1.67	1.69	1.70	1.72	1.73	0.94%
62-2	5.00	1.16	1.17	1.18	1.19	1.20	1.21	1.22	1.24	1.25	1.26	1.27	0.94%
62-3	5.00	1.23	1.49	1.50	1.51	1.52	1.53	1.55	1.56	1.57	1.58	1.60	0.79%
Total Feeder Load		**3.96**	**4.25**	**4.29**	**4.32**	**4.36**	**4.40**	**4.44**	**4.48**	**4.52**	**4.56**	**4.60**	-----
Substation Coincident Factor		99.92%	99.92%	99.92%	99.92%	99.92%	99.92%	99.92%	99.92%	99.92%	99.92%	99.92%	-----
East Owensboro	**10.0**	6.33	7.35	7.48	7.60	7.73	7.86	7.99	8.12	8.26	8.39	8.53	1.67%
19-1	5.00	0.00	**0.90**	**0.90**	**0.90**	**0.90**	**0.90**	**0.90**	**0.90**	**0.90**	**0.90**	**0.90**	0.00%
19-2	5.00	3.38	3.44	3.51	3.57	3.64	3.71	3.78	3.85	3.92	3.99	4.07	1.88%
19-3	5.00	0.79	0.80	0.82	0.84	0.85	0.87	0.88	0.90	0.92	0.93	0.95	1.88%
19-4	5.00	0.45	0.46	0.47	0.48	0.49	0.50	0.51	0.52	0.53	0.54	0.55	1.88%
19-5	5.00	1.71	1.74	1.77	1.81	1.84	1.88	1.91	1.95	1.98	2.02	2.06	1.88%
Total Feeder Load		**6.33**	**7.35**	**7.47**	**7.60**	**7.72**	**7.85**	**7.98**	**8.12**	**8.25**	**8.39**	**8.53**	-----
Substation Coincident Factor		100.04%	100.04%	100.04%	100.04%	100.04%	100.04%	100.04%	100.04%	100.04%	100.04%	100.04%	-----
Geneva	**10.0**	5.02	5.07	5.11	5.16	5.21	5.26	5.31	5.36	5.41	5.46	5.51	0.94%
63-1	5.00	0.45	0.46	0.46	0.47	0.47	0.48	0.48	0.49	0.49	0.49	0.50	0.94%
63-2	5.00	2.43	2.45	2.48	2.50	2.52	2.55	2.57	2.59	2.62	2.64	2.67	0.94%
63-3	5.00	2.14	2.16	2.18	2.20	2.22	2.24	2.27	2.29	2.31	2.33	2.35	0.94%
Total Feeder Load		**5.03**	**5.07**	**5.12**	**5.17**	**5.22**	**5.27**	**5.32**	**5.37**	**5.42**	**5.47**	**5.52**	-----
Substation Coincident Factor		99.86%	99.86%	99.86%	99.86%	99.86%	99.86%	99.86%	99.86%	99.86%	99.86%	99.86%	-----
Guffie	**10.0**	5.97	6.03	6.09	6.15	6.21	6.26	6.32	6.38	6.44	6.50	6.56	0.94%
31-1	5.00	2.72	2.74	2.77	2.79	2.82	2.85	2.87	2.90	2.93	2.96	2.98	0.94%
31-2	5.00	2.13	2.15	2.17	2.20	2.22	2.24	2.26	2.28	2.30	2.32	2.34	0.94%
31-3	5.00	0.30	0.30	0.31	0.31	0.31	0.32	0.32	0.32	0.32	0.33	0.33	0.94%
31-4	5.00	0.82	0.82	0.83	0.84	0.85	0.86	0.86	0.87	0.88	0.89	0.90	0.94%
Total Feeder Load		**5.97**	**6.02**	**6.08**	**6.14**	**6.20**	**6.25**	**6.31**	**6.37**	**6.43**	**6.49**	**6.55**	-----
Substation Coincident Factor		100.14%	100.14%	100.14%	100.14%	100.14%	100.14%	100.14%	100.14%	100.14%	100.14%	100.14%	-----

KENERGY Corporation
Summer Substation and Feeder Load Forecast - Totals

SUBSTATION / FEEDER NAME	TOTAL CAPACITY (MVA)	2018 PEAK (MW)	PROJECTED LOADS (MW) LL1 2020	LL2 2021	LL3 2022	LL4 2023	LL5 2024	LL6 2025	LL7 2026	LL8 2027	LL9 2028	LL10 2029	COMP. ANNUAL GROWTH
Hanson	**3.8**	2.98	**4.41**	**5.83**	**7.26**	**8.69**	**8.72**	**8.75**	**8.78**	**8.81**	**8.84**	**8.87**	8.09%
51-3	5.00	0.22	1.63	3.03	4.43	**5.83**	**5.83**	**5.84**	**5.84**	**5.84**	**5.84**	**5.85**	15.28%
51-4	5.00	2.75	2.78	2.81	2.83	2.86	2.89	2.91	2.94	2.97	3.00	3.02	0.94%
Total Feeder Load		**2.98**	**4.40**	**5.83**	**7.26**	**8.69**	**8.72**	**8.75**	**8.78**	**8.81**	**8.84**	**8.87**	-----
Substation Coincident Factor		100.02%	100.02%	100.02%	100.02%	100.02%	100.02%	100.02%	100.02%	100.02%	100.02%	100.02%	-----
Hawesville	**10.0**	7.06	7.20	7.34	7.48	7.62	7.76	7.91	8.06	8.21	8.36	8.52	1.88%
13-1	5.00	1.17	1.20	1.22	1.24	1.27	1.29	1.31	1.34	1.36	1.39	1.42	1.88%
13-2	5.00	1.74	1.78	1.81	1.84	1.88	1.91	1.95	1.99	2.02	2.06	2.10	1.88%
13-3	5.00	1.77	1.80	1.84	1.87	1.91	1.94	1.98	2.02	2.06	2.09	2.13	1.88%
13-4	5.00	1.33	1.35	1.38	1.41	1.43	1.46	1.49	1.52	1.54	1.57	1.60	1.88%
13-5	5.00	1.05	1.07	1.09	1.11	1.13	1.15	1.17	1.19	1.22	1.24	1.26	1.88%
Total Feeder Load		**7.06**	**7.20**	**7.34**	**7.48**	**7.62**	**7.76**	**7.91**	**8.05**	**8.21**	**8.36**	**8.51**	-----
Substation Coincident Factor		100.02%	100.02%	100.02%	100.02%	100.02%	100.02%	100.02%	100.02%	100.02%	100.02%	100.02%	-----
Horse Fork 1	**12.0**	5.45	5.51	5.56	5.61	5.67	5.72	5.77	5.83	5.88	5.94	5.99	0.94%
20-1	5.00	1.96	1.98	2.00	2.02	2.04	2.06	2.08	2.10	2.12	2.14	2.16	0.94%
20-2	5.00	3.48	3.51	3.54	3.58	3.61	3.64	3.68	3.71	3.75	3.78	3.82	0.94%
20-3	5.00	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.94%
Total Feeder Load		**5.46**	**5.51**	**5.56**	**5.62**	**5.67**	**5.72**	**5.78**	**5.83**	**5.89**	**5.94**	**6.00**	-----
Substation Coincident Factor		99.92%	99.92%	99.92%	99.92%	99.92%	99.92%	99.92%	99.92%	99.92%	99.92%	99.92%	-----
Horse Fork 2	**12.0**	4.90	4.94	4.99	5.04	5.08	5.13	5.18	5.23	5.28	5.33	5.38	0.94%
20-4	5.00	2.50	2.52	2.55	2.57	2.60	2.62	2.65	2.67	2.70	2.72	2.75	0.94%
20-5	5.00	2.40	2.42	2.44	2.47	2.49	2.51	2.54	2.56	2.58	2.61	2.63	0.94%
Total Feeder Load		**4.90**	**4.94**	**4.99**	**5.04**	**5.08**	**5.13**	**5.18**	**5.23**	**5.28**	**5.33**	**5.38**	-----
Substation Coincident Factor		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	-----
Hudson 1	**10.0**	2.37	2.64	2.66	2.68	2.71	2.73	2.75	2.78	2.80	2.82	2.85	0.85%
65-1	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%
65-2	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%
65-3	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%
65-4	5.00	2.37	2.64	2.66	2.68	2.71	2.73	2.75	2.78	2.80	2.82	2.85	0.85%
Total Feeder Load		**2.37**	**2.64**	**2.66**	**2.68**	**2.71**	**2.73**	**2.75**	**2.78**	**2.80**	**2.82**	**2.85**	-----
Substation Coincident Factor		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	-----
Hudson 2	**10.0**	2.18	2.20	2.22	2.24	2.27	2.29	2.31	2.33	2.35	2.37	2.40	0.94%
65-5	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%
65-6	5.00	2.18	2.20	2.22	2.24	2.27	2.29	2.31	2.33	2.35	2.37	2.40	0.94%
65-7	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%
Total Feeder Load		**2.18**	**2.20**	**2.22**	**2.24**	**2.27**	**2.29**	**2.31**	**2.33**	**2.35**	**2.37**	**2.40**	-----
Substation Coincident Factor		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	-----
Lewisport 1	**10.0**	6.55	6.68	6.80	6.93	7.06	7.20	7.33	7.47	7.61	7.75	7.90	1.88%
12-1	5.00	1.64	1.67	1.70	1.74	1.77	1.80	1.84	1.87	1.91	1.94	1.98	1.88%
12-2	5.00	1.81	1.85	1.88	1.92	1.95	1.99	2.03	2.07	2.11	2.14	2.18	1.88%
12-3	5.00	1.55	1.58	1.61	1.64	1.68	1.71	1.74	1.77	1.81	1.84	1.87	1.88%
12-7	5.00	1.53	1.56	1.59	1.62	1.65	1.68	1.71	1.74	1.78	1.81	1.84	1.88%
Total Feeder Load		**6.54**	**6.66**	**6.79**	**6.92**	**7.05**	**7.18**	**7.32**	**7.46**	**7.60**	**7.74**	**7.88**	-----
Substation Coincident Factor		100.18%	100.18%	100.18%	100.18%	100.18%	100.18%	100.18%	100.18%	100.18%	100.18%	100.18%	-----

KENERGY Corporation
Summer Substation and Feeder Load Forecast - Totals

SUBSTATION / FEEDER NAME	TOTAL CAPACITY (MVA)	2018 PEAK (MW)	PROJECTED LOADS (MW)										COMP. ANNUAL GROWTH
			LL1	LL2	LL3	LL4	LL5	LL6	LL7	LL8	LL9	LL10	
			2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	
Lewisport 2	**10.0**	2.66	2.71	2.76	2.81	2.86	2.92	2.97	3.03	3.09	3.14	3.20	1.88%
12-4	5.00	1.16	1.18	1.21	1.23	1.25	1.28	1.30	1.32	1.35	1.38	1.40	1.88%
12-5	5.00	0.86	0.88	0.89	0.91	0.93	0.94	0.96	0.98	1.00	1.02	1.04	1.88%
12-6	5.00	0.61	0.62	0.63	0.64	0.65	0.67	0.68	0.69	0.70	0.72	0.73	1.88%
Total Feeder Load		**2.63**	**2.68**	**2.73**	**2.78**	**2.83**	**2.89**	**2.94**	**3.00**	**3.05**	**3.11**	**3.17**	**-----**
Substation Coincident Factor		101.11%	101.11%	101.11%	101.11%	101.11%	101.11%	101.11%	101.11%	101.11%	101.11%	101.11%	-----
Little Dixie	**7.5**	4.61	4.61	4.61	4.61	4.61	4.61	4.61	4.61	4.62	4.62	4.62	0.01%
66-1	5.00	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	2.47	0.01%
66-2	5.00	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28	1.28	0.01%
66-3	5.00	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.86	0.86	0.86	0.86	0.01%
Total Feeder Load		**4.61**	**4.61**	**4.61**	**4.61**	**4.61**	**4.61**	**4.61**	**4.61**	**4.61**	**4.61**	**4.61**	**-----**
Substation Coincident Factor		100.13%	100.13%	100.13%	100.13%	100.13%	100.13%	100.13%	100.13%	100.13%	100.13%	100.13%	-----
Lyon	**10.0**	4.89	4.99	5.08	5.18	5.28	5.38	5.48	5.58	5.68	5.79	5.90	1.88%
69-1	5.00	1.19	1.22	1.24	1.26	1.29	1.31	1.34	1.36	1.39	1.41	1.44	1.88%
69-2	5.00	2.80	2.86	2.91	2.97	3.02	3.08	3.14	3.20	3.26	3.32	3.38	1.88%
69-3	5.00	0.89	0.90	0.92	0.94	0.96	0.97	0.99	1.01	1.03	1.05	1.07	1.88%
Total Feeder Load		**4.89**	**4.98**	**5.07**	**5.17**	**5.27**	**5.37**	**5.47**	**5.57**	**5.68**	**5.78**	**5.89**	**-----**
Substation Coincident Factor		100.14%	100.14%	100.14%	100.14%	100.14%	100.14%	100.14%	100.14%	100.14%	100.14%	100.14%	-----
Maceo	**10.0**	3.42	3.45	3.48	3.52	3.55	3.58	3.62	3.65	3.69	3.72	3.75	0.94%
28-1	5.00	0.28	0.28	0.29	0.29	0.29	0.29	0.30	0.30	0.30	0.30	0.31	0.94%
28-2	5.00	0.80	0.81	0.82	0.83	0.83	0.84	0.85	0.86	0.87	0.87	0.88	0.94%
28-3	5.00	0.93	0.94	0.95	0.96	0.97	0.98	0.99	1.00	1.01	1.02	1.02	0.94%
28-4	5.00	1.01	1.02	1.03	1.04	1.05	1.06	1.07	1.08	1.09	1.10	1.11	0.94%
28-5	5.00	0.39	0.40	0.40	0.40	0.41	0.41	0.42	0.42	0.42	0.43	0.43	0.94%
Total Feeder Load		**3.42**	**3.45**	**3.48**	**3.52**	**3.55**	**3.58**	**3.62**	**3.65**	**3.68**	**3.72**	**3.75**	**-----**
Substation Coincident Factor		100.04%	100.04%	100.04%	100.04%	100.04%	100.04%	100.04%	100.04%	100.04%	100.04%	100.04%	-----
Madisonville	**10.0**	4.42	4.51	4.59	4.68	4.77	4.86	4.95	5.04	5.13	5.23	5.33	1.88%
49-1	5.00	1.08	1.10	1.12	1.14	1.17	1.19	1.21	1.23	1.26	1.28	1.30	1.88%
49-2	5.00	1.69	1.72	1.75	1.79	1.82	1.86	1.89	1.93	1.96	2.00	2.04	1.88%
49-3	5.00	1.65	1.68	1.71	1.75	1.78	1.81	1.85	1.88	1.92	1.95	1.99	1.88%
Total Feeder Load		**4.42**	**4.51**	**4.59**	**4.68**	**4.77**	**4.86**	**4.95**	**5.04**	**5.13**	**5.23**	**5.33**	**-----**
Substation Coincident Factor		99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	-----
Marion	**10.0**	5.60	5.66	5.71	5.76	5.82	5.87	5.93	5.99	6.04	6.10	6.15	0.94%
70-1	5.00	1.49	1.51	1.52	1.53	1.55	1.56	1.58	1.59	1.61	1.62	1.64	0.94%
70-2	5.00	1.07	1.08	1.09	1.10	1.11	1.12	1.13	1.14	1.15	1.16	1.17	0.94%
70-3	5.00	2.34	2.36	2.38	2.40	2.43	2.45	2.47	2.50	2.52	2.54	2.57	0.94%
70-4	5.00	0.69	0.70	0.71	0.71	0.72	0.73	0.73	0.74	0.75	0.75	0.76	0.94%
Total Feeder Load		**5.59**	**5.64**	**5.70**	**5.75**	**5.80**	**5.86**	**5.91**	**5.97**	**6.03**	**6.08**	**6.14**	**-----**
Substation Coincident Factor		100.25%	100.25%	100.25%	100.25%	100.25%	100.25%	100.25%	100.25%	100.25%	100.25%	100.25%	-----

KENERGY Corporation
Summer Substation and Feeder Load Forecast - Totals

SUBSTATION / FEEDER NAME	TOTAL CAPACITY (MVA)	2018 PEAK (MW)	PROJECTED LOADS (MW) LL1 2020	LL2 2021	LL3 2022	LL4 2023	LL5 2024	LL6 2025	LL7 2026	LL8 2027	LL9 2028	LL10 2029	COMP. ANNUAL GROWTH
Masonville	**10.0**	6.69	6.81	6.94	7.08	7.21	7.35	7.48	7.62	7.77	7.91	8.06	1.88%
23-1	5.00	1.11	1.14	1.16	1.18	1.20	1.22	1.25	1.27	1.29	1.32	1.34	1.88%
23-2	5.00	2.68	2.73	2.78	2.83	2.89	2.94	3.00	3.05	3.11	3.17	3.23	1.88%
23-3	5.00	2.88	2.94	2.99	3.05	3.11	3.17	3.23	3.29	3.35	3.41	3.48	1.88%
23-4	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%
Total Feeder Load		**6.67**	**6.80**	**6.93**	**7.06**	**7.20**	**7.33**	**7.47**	**7.61**	**7.75**	**7.90**	**8.05**	**-----**
Substation Coincident Factor		100.17%	100.17%	100.17%	100.17%	100.17%	100.17%	100.17%	100.17%	100.17%	100.17%	100.17%	-----
Morganfield	**10.0**	9.08	9.16	9.25	**9.34**	**9.43**	**9.52**	**9.60**	**9.70**	**9.79**	**9.88**	**9.97**	0.94%
71-1	5.00	3.84	3.88	3.92	3.95	3.99	4.03	4.07	4.11	4.14	4.18	4.22	0.94%
71-2	5.00	2.20	2.22	2.25	2.27	2.29	2.31	2.33	2.35	2.37	2.40	2.42	0.94%
71-3	5.00	1.67	1.69	1.70	1.72	1.74	1.75	1.77	1.79	1.80	1.82	1.84	0.94%
71-4	5.00	1.38	1.39	1.40	1.42	1.43	1.44	1.46	1.47	1.48	1.50	1.51	0.94%
Total Feeder Load		**9.09**	**9.18**	**9.27**	**9.36**	**9.45**	**9.53**	**9.62**	**9.71**	**9.81**	**9.90**	**9.99**	**-----**
Substation Coincident Factor		99.80%	99.80%	99.80%	99.80%	99.80%	99.80%	99.80%	99.80%	99.80%	99.80%	99.80%	-----
Niagra	**10.0**	5.82	7.48	7.54	7.59	7.65	7.71	7.76	7.82	7.88	7.94	8.00	0.74%
80-1	5.00	2.57	2.60	2.62	2.65	2.67	2.70	2.72	2.75	2.77	2.80	2.83	0.94%
80-2	5.00	1.66	3.28	3.29	3.31	3.33	3.34	3.36	3.37	3.39	3.41	3.42	0.49%
80-3	5.00	1.57	1.58	1.60	1.61	1.63	1.64	1.66	1.68	1.69	1.71	1.72	0.94%
Total Feeder Load		**5.80**	**7.46**	**7.51**	**7.57**	**7.63**	**7.68**	**7.74**	**7.80**	**7.86**	**7.92**	**7.97**	**-----**
Substation Coincident Factor		100.28%	100.28%	100.28%	100.28%	100.28%	100.28%	100.28%	100.28%	100.28%	100.28%	100.28%	-----
Nuckols	**10.0**	4.54	4.63	4.71	4.80	4.89	4.99	5.08	5.18	5.27	5.37	5.47	1.88%
42-1	5.00	0.05	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.07	1.88%
42-2	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%
42-3	5.00	2.15	2.19	2.23	2.27	2.31	2.36	2.40	2.45	2.49	2.54	2.59	1.88%
42-4	5.00	2.33	2.38	2.42	2.47	2.51	2.56	2.61	2.66	2.71	2.76	2.81	1.88%
Total Feeder Load		**4.53**	**4.62**	**4.71**	**4.80**	**4.89**	**4.98**	**5.07**	**5.17**	**5.27**	**5.36**	**5.46**	**-----**
Substation Coincident Factor		100.15%	100.15%	100.15%	100.15%	100.15%	100.15%	100.15%	100.15%	100.15%	100.15%	100.15%	-----
Onton	**10.0**	4.84	4.88	4.93	4.98	5.02	5.07	5.12	5.17	5.21	5.26	5.31	0.94%
52-1	5.00	1.81	1.83	1.85	1.86	1.88	1.90	1.92	1.93	1.95	1.97	1.99	0.94%
52-2	5.00	2.10	2.12	2.14	2.16	2.18	2.21	2.23	2.25	2.27	2.29	2.31	0.94%
52-3	5.00	0.86	0.86	0.87	0.88	0.89	0.90	0.90	0.91	0.92	0.93	0.94	0.94%
Total Feeder Load		**4.77**	**4.82**	**4.86**	**4.91**	**4.95**	**5.00**	**5.05**	**5.09**	**5.14**	**5.19**	**5.24**	**-----**
Substation Coincident Factor		101.39%	101.39%	101.39%	101.39%	101.39%	101.39%	101.39%	101.39%	101.39%	101.39%	101.39%	-----
Philpot 1	**10.0**	5.13	5.22	5.32	5.42	5.53	5.63	5.74	5.84	5.95	6.07	6.18	1.88%
25-1	5.00	2.09	2.13	2.17	2.21	2.25	2.29	2.34	2.38	2.43	2.47	2.52	1.88%
25-3	5.00	1.44	1.47	1.50	1.53	1.56	1.59	1.62	1.65	1.68	1.71	1.74	1.88%
25-4	5.00	1.60	1.63	1.66	1.69	1.72	1.75	1.79	1.82	1.85	1.89	1.92	1.88%
Total Feeder Load		**5.13**	**5.23**	**5.33**	**5.43**	**5.53**	**5.63**	**5.74**	**5.85**	**5.96**	**6.07**	**6.18**	**-----**
Substation Coincident Factor		99.95%	99.95%	99.95%	99.95%	99.95%	99.95%	99.95%	99.95%	99.95%	99.95%	99.95%	-----
Philpot 2	**10.0**	3.58	3.65	3.72	3.79	3.86	3.93	4.01	4.08	4.16	4.24	4.31	1.88%
25-5	5.00	1.62	1.65	1.68	1.71	1.74	1.78	1.81	1.84	1.88	1.91	1.95	1.88%
25-7	5.00	1.96	2.00	2.04	2.08	2.12	2.16	2.20	2.24	2.28	2.32	2.37	1.88%
Total Feeder Load		**3.58**	**3.65**	**3.72**	**3.79**	**3.86**	**3.93**	**4.01**	**4.08**	**4.16**	**4.24**	**4.31**	**-----**
Substation Coincident Factor		100.01%	100.01%	100.01%	100.01%	100.01%	100.01%	100.01%	100.01%	100.01%	100.01%	100.01%	-----

KENERGY Corporation
Summer Substation and Feeder Load Forecast - Totals

SUBSTATION / FEEDER NAME	TOTAL CAPACITY (MVA)	2018 PEAK (MW)	PROJECTED LOADS (MW) LL1 2020	LL2 2021	LL3 2022	LL4 2023	LL5 2024	LL6 2025	LL7 2026	LL8 2027	LL9 2028	LL10 2029	COMP. ANNUAL GROWTH
Pleasant Ridge	**10.0**	4.33	4.38	4.42	4.46	4.50	4.54	4.59	4.63	4.67	4.72	4.76	0.94%
26-1	5.00	0.77	0.77	0.78	0.79	0.80	0.80	0.81	0.82	0.83	0.83	0.84	0.94%
26-2	5.00	1.96	1.98	2.00	2.02	2.04	2.06	2.08	2.10	2.12	2.13	2.15	0.94%
26-3	5.00	1.04	1.05	1.06	1.07	1.08	1.09	1.11	1.12	1.13	1.14	1.15	0.94%
26-4	5.00	0.56	0.56	0.57	0.58	0.58	0.59	0.59	0.60	0.60	0.61	0.61	0.94%
Total Feeder Load		**4.33**	**4.37**	**4.42**	**4.46**	**4.50**	**4.54**	**4.58**	**4.63**	**4.67**	**4.71**	**4.76**	-----
Substation Coincident Factor		100.03%	100.03%	100.03%	100.03%	100.03%	100.03%	100.03%	100.03%	100.03%	100.03%	100.03%	-----
Providence	**10.0**	4.13	4.17	4.21	4.25	4.29	4.33	4.37	4.41	4.45	4.49	4.53	0.94%
81-1	5.00	1.16	1.18	1.19	1.20	1.21	1.22	1.23	1.24	1.26	1.27	1.28	0.94%
81-2	5.00	1.21	1.22	1.23	1.24	1.25	1.26	1.28	1.29	1.30	1.31	1.32	0.94%
81-4	5.00	1.81	1.82	1.84	1.86	1.88	1.89	1.91	1.93	1.95	1.96	1.98	0.94%
Total Feeder Load		**4.17**	**4.22**	**4.26**	**4.30**	**4.34**	**4.38**	**4.42**	**4.46**	**4.50**	**4.54**	**4.59**	-----
Substation Coincident Factor		98.85%	98.85%	98.85%	98.85%	98.85%	98.85%	98.85%	98.85%	98.85%	98.85%	98.85%	-----
Race Creek	**10.0**	5.03	5.07	5.12	5.17	5.22	5.27	5.32	5.37	5.42	5.47	5.52	0.94%
82-1	5.00	1.18	1.19	1.20	1.22	1.23	1.24	1.25	1.26	1.27	1.29	1.30	0.94%
82-2	5.00	2.16	2.18	2.21	2.23	2.25	2.27	2.29	2.31	2.33	2.35	2.38	0.94%
82-3	5.00	1.67	1.69	1.71	1.72	1.74	1.76	1.77	1.79	1.81	1.82	1.84	0.94%
Total Feeder Load		**5.02**	**5.07**	**5.12**	**5.17**	**5.21**	**5.26**	**5.31**	**5.36**	**5.41**	**5.46**	**5.51**	-----
Substation Coincident Factor		100.10%	100.10%	100.10%	100.10%	100.10%	100.10%	100.10%	100.10%	100.10%	100.10%	100.10%	-----
Riverport	**10.0**	3.73	3.73	3.73	3.73	3.73	3.73	3.73	3.73	3.73	3.73	3.73	0.01%
83-1	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01%
83-2	5.00	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	3.08	0.01%
83-3	5.00	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.01%
Total Feeder Load		**3.73**	**3.73**	**3.73**	**3.73**	**3.73**	**3.73**	**3.73**	**3.73**	**3.73**	**3.73**	**3.73**	-----
Substation Coincident Factor		99.97%	99.97%	99.97%	99.97%	99.97%	99.97%	99.97%	99.97%	99.97%	99.97%	99.97%	-----
S. Hanson 1	**10.0**	3.78	3.85	3.93	4.00	4.08	4.15	4.23	4.31	4.39	4.48	4.56	1.88%
53-1	5.00	1.13	1.15	1.18	1.20	1.22	1.24	1.27	1.29	1.32	1.34	1.37	1.88%
53-4	5.00	0.77	0.79	0.80	0.82	0.83	0.85	0.86	0.88	0.90	0.91	0.93	1.88%
53-5	5.00	1.88	1.91	1.95	1.99	2.02	2.06	2.10	2.14	2.18	2.22	2.26	1.88%
Total Feeder Load		**3.78**	**3.85**	**3.93**	**4.00**	**4.08**	**4.15**	**4.23**	**4.31**	**4.39**	**4.47**	**4.56**	-----
Substation Coincident Factor		100.02%	100.02%	100.02%	100.02%	100.02%	100.02%	100.02%	100.02%	100.02%	100.02%	100.02%	-----
S. Hanson 2	**10.0**	5.46	5.57	5.68	5.78	5.89	6.00	6.12	6.23	6.35	6.47	6.59	1.88%
53-2	5.00	1.25	1.27	1.30	1.32	1.34	1.37	1.40	1.42	1.45	1.48	1.50	1.88%
53-3	5.00	1.83	1.86	1.90	1.94	1.97	2.01	2.05	2.09	2.12	2.16	2.20	1.88%
53-6	5.00	2.39	2.43	2.48	2.52	2.57	2.62	2.67	2.72	2.77	2.82	2.88	1.88%
Total Feeder Load		**5.46**	**5.57**	**5.67**	**5.78**	**5.89**	**6.00**	**6.11**	**6.23**	**6.34**	**6.46**	**6.58**	-----
Substation Coincident Factor		100.06%	100.06%	100.06%	100.06%	100.06%	100.06%	100.06%	100.06%	100.06%	100.06%	100.06%	-----
S. Owensboro 1	**10.0**	4.51	4.55	4.59	4.64	4.68	4.72	4.77	4.81	4.86	4.90	4.95	0.94%
58-3	5.00	0.54	0.54	0.55	0.55	0.56	0.56	0.57	0.57	0.58	0.58	0.59	0.94%
58-4	5.00	0.41	0.42	0.42	0.42	0.43	0.43	0.44	0.44	0.45	0.45	0.45	0.94%
58-6	5.00	2.14	2.16	2.18	2.20	2.22	2.24	2.27	2.29	2.31	2.33	2.35	0.94%
58-7	5.00	1.42	1.43	1.45	1.46	1.47	1.49	1.50	1.52	1.53	1.54	1.56	0.94%
Total Feeder Load		**4.51**	**4.55**	**4.60**	**4.64**	**4.68**	**4.73**	**4.77**	**4.82**	**4.86**	**4.91**	**4.95**	-----
Substation Coincident Factor		99.90%	99.90%	99.90%	99.90%	99.90%	99.90%	99.90%	99.90%	99.90%	99.90%	99.90%	-----

KENERGY Corporation
Summer Substation and Feeder Load Forecast - Totals

SUBSTATION / FEEDER NAME	TOTAL CAPACITY (MVA)	2018 PEAK (MW)	PROJECTED LOADS (MW) LL1 2020	LL2 2021	LL3 2022	LL4 2023	LL5 2024	LL6 2025	LL7 2026	LL8 2027	LL9 2028	LL10 2029	COMP. ANNUAL GROWTH
S. Owensboro 2	**10.0**	5.04	5.09	5.14	5.19	5.24	5.29	5.34	5.39	5.44	5.49	5.54	0.94%
58-1	5.00	1.69	1.71	1.73	1.74	1.76	1.78	1.79	1.81	1.83	1.84	1.86	0.94%
58-2	5.00	0.58	0.58	0.59	0.59	0.60	0.60	0.61	0.62	0.62	0.63	0.63	0.94%
58-5	5.00	2.77	2.80	2.83	2.85	2.88	2.91	2.94	2.96	2.99	3.02	3.05	0.94%
Total Feeder Load		**5.04**	**5.09**	**5.14**	**5.19**	**5.24**	**5.29**	**5.34**	**5.39**	**5.44**	**5.49**	**5.54**	-----
Substation Coincident Factor		99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	-----
Sacramento	**3.8**	3.37	3.37	3.37	3.37	3.37	3.37	3.37	3.37	3.37	3.37	3.37	0.01%
50-1	5.00	1.12	1.12	1.12	1.12	1.12	1.12	1.13	1.13	1.13	1.13	1.13	0.01%
50-3	5.00	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.01%
50-4	5.00	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58	1.58	0.01%
Total Feeder Load		**3.37**	**3.37**	**3.37**	**3.37**	**3.37**	**3.37**	**3.37**	**3.37**	**3.37**	**3.37**	**3.37**	-----
Substation Coincident Factor		100.03%	100.03%	100.03%	100.03%	100.03%	100.03%	100.03%	100.03%	100.03%	100.03%	100.03%	-----
Sebree	**5.0**	3.50	3.53	3.57	3.60	3.64	3.67	3.70	3.74	3.77	3.81	3.85	0.94%
84-1	5.00	0.54	0.55	0.55	0.56	0.56	0.57	0.57	0.58	0.58	0.59	0.59	0.94%
84-2	5.00	0.75	0.76	0.77	0.78	0.78	0.79	0.80	0.81	0.81	0.82	0.83	0.94%
84-3	5.00	1.70	1.72	1.74	1.75	1.77	1.78	1.80	1.82	1.84	1.85	1.87	0.94%
84-4	5.00	0.50	0.51	0.51	0.52	0.52	0.53	0.53	0.54	0.54	0.55	0.55	0.94%
Total Feeder Load		**3.50**	**3.53**	**3.57**	**3.60**	**3.63**	**3.67**	**3.70**	**3.74**	**3.77**	**3.81**	**3.84**	-----
Substation Coincident Factor		100.02%	100.02%	100.02%	100.02%	100.02%	100.02%	100.02%	100.02%	100.02%	100.02%	100.02%	-----
S. Dermont 1	**10.0**	**9.74**	**9.93**	**10.12**	**10.31**	**10.51**	**10.70**	**10.91**	**11.11**	**11.32**	**11.53**	**11.75**	1.88%
18-1	5.00	3.63	3.70	3.77	3.84	3.91	3.99	4.06	4.14	4.21	4.29	4.37	1.88%
18-2	5.00	1.84	1.87	1.91	1.94	1.98	2.02	2.05	2.09	2.13	2.17	2.21	1.88%
18-4	5.00	4.26	4.34	4.42	4.51	4.59	**4.68**	**4.77**	**4.86**	**4.95**	**5.04**	**5.13**	1.88%
Total Feeder Load		**9.72**	**9.91**	**10.10**	**10.29**	**10.48**	**10.68**	**10.88**	**11.09**	**11.29**	**11.51**	**11.72**	-----
Substation Coincident Factor		100.21%	100.21%	100.21%	100.21%	100.21%	100.21%	100.21%	100.21%	100.21%	100.21%	100.21%	-----
S. Dermont 2	**10.0**	7.05	7.19	7.33	7.46	7.61	7.75	7.90	8.04	8.19	8.35	8.50	1.88%
18-3	5.00	1.52	1.55	1.58	1.61	1.64	1.67	1.70	1.73	1.76	1.80	1.83	1.88%
18-5	5.00	3.04	3.10	3.16	3.22	3.28	3.34	3.41	3.47	3.54	3.60	3.67	1.88%
18-6	5.00	2.49	2.54	2.59	2.64	2.69	2.74	2.79	2.84	2.90	2.95	3.01	1.88%
Total Feeder Load		**7.05**	**7.19**	**7.33**	**7.47**	**7.61**	**7.75**	**7.90**	**8.04**	**8.19**	**8.35**	**8.50**	-----
Substation Coincident Factor		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	-----
St. Joe	**7.5**	5.61	5.66	5.71	5.77	5.82	5.88	5.93	5.99	6.04	6.10	6.16	0.94%
32-1	5.00	2.77	2.80	2.82	2.85	2.88	2.91	2.93	2.96	2.99	3.02	3.04	0.94%
32-2	5.00	1.89	1.90	1.92	1.94	1.96	1.98	2.00	2.01	2.03	2.05	2.07	0.94%
32-3	5.00	0.95	0.96	0.97	0.98	0.99	0.99	1.00	1.01	1.02	1.03	1.04	0.94%
Total Feeder Load		**5.61**	**5.66**	**5.71**	**5.77**	**5.82**	**5.88**	**5.93**	**5.99**	**6.04**	**6.10**	**6.16**	-----
Substation Coincident Factor		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	-----
Stanley	**5.0**	2.95	2.97	3.00	3.03	3.06	3.09	3.12	3.15	3.18	3.21	3.24	0.94%
21-1	5.00	1.99	2.01	2.03	2.05	2.07	2.09	2.11	2.13	2.15	2.17	2.19	0.94%
21-2	5.00	0.34	0.35	0.35	0.35	0.36	0.36	0.36	0.37	0.37	0.37	0.38	0.94%
21-3	5.00	0.61	0.61	0.62	0.62	0.63	0.64	0.64	0.65	0.65	0.66	0.67	0.94%
Total Feeder Load		**2.94**	**2.97**	**3.00**	**3.02**	**3.05**	**3.08**	**3.11**	**3.14**	**3.17**	**3.20**	**3.23**	-----
Substation Coincident Factor		100.21%	100.21%	100.21%	100.21%	100.21%	100.21%	100.21%	100.21%	100.21%	100.21%	100.21%	-----

KENERGY Corporation
Summer Substation and Feeder Load Forecast - Totals

SUBSTATION / FEEDER NAME	TOTAL CAPACITY (MVA)	2018 PEAK (MW)	PROJECTED LOADS (MW)										COMP. ANNUAL GROWTH
			LL1	LL2	LL3	LL4	LL5	LL6	LL7	LL8	LL9	LL10	
			2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	
Sullivan	**10.0**	2.93	2.95	2.98	3.01	3.04	3.07	3.10	3.12	3.15	3.18	3.21	0.94%
85-1	5.00	0.77	0.77	0.78	0.79	0.79	0.80	0.81	0.82	0.83	0.83	0.84	0.94%
85-2	5.00	1.13	1.14	1.15	1.16	1.17	1.18	1.19	1.21	1.22	1.23	1.24	0.94%
85-3	5.00	1.03	1.04	1.05	1.06	1.07	1.08	1.09	1.10	1.11	1.12	1.13	0.94%
Total Feeder Load		**2.92**	**2.95**	**2.98**	**3.01**	**3.04**	**3.07**	**3.10**	**3.12**	**3.15**	**3.18**	**3.21**	**-----**
Substation Coincident Factor		100.01%	100.01%	100.01%	100.01%	100.01%	100.01%	100.01%	100.01%	100.01%	100.01%	100.01%	-----
Thruston 1	**10.0**	4.96	5.01	5.05	5.10	5.15	5.20	5.25	5.30	5.35	5.40	5.45	0.94%
11-1	5.00	0.60	0.61	0.61	0.62	0.62	0.63	0.63	0.64	0.65	0.65	0.66	0.94%
11-2	5.00	2.82	2.85	2.88	2.90	2.93	2.96	2.99	3.01	3.04	3.07	3.10	0.94%
11-3	5.00	1.59	1.60	1.62	1.63	1.65	1.66	1.68	1.70	1.71	1.73	1.74	0.94%
Total Feeder Load		**5.01**	**5.06**	**5.11**	**5.15**	**5.20**	**5.25**	**5.30**	**5.35**	**5.40**	**5.45**	**5.50**	**-----**
Substation Coincident Factor		99.00%	99.00%	99.00%	99.00%	99.00%	99.00%	99.00%	99.00%	99.00%	99.00%	99.00%	-----
Thruston 2	**10.0**	3.71	3.75	3.78	3.82	3.85	3.89	3.93	3.96	4.00	4.04	4.08	0.94%
11-4	5.00	0.50	0.50	0.51	0.51	0.52	0.52	0.53	0.53	0.54	0.54	0.55	0.94%
11-5	5.00	3.24	3.27	3.30	3.34	3.37	3.40	3.43	3.46	3.50	3.53	3.56	0.94%
Total Feeder Load		**3.74**	**3.78**	**3.81**	**3.85**	**3.89**	**3.92**	**3.96**	**4.00**	**4.03**	**4.07**	**4.11**	**-----**
Substation Coincident Factor		99.19%	99.19%	99.19%	99.19%	99.19%	99.19%	99.19%	99.19%	99.19%	99.19%	99.19%	-----
Utica	**10.0**	5.67	5.72	5.78	5.83	5.89	5.94	6.00	6.05	6.11	6.17	6.22	0.94%
24-1	5.00	1.68	1.69	1.71	1.73	1.74	1.76	1.78	1.79	1.81	1.83	1.84	0.94%
24-2	5.00	1.75	1.76	1.78	1.80	1.81	1.83	1.85	1.87	1.88	1.90	1.92	0.94%
24-3	5.00	1.21	1.22	1.23	1.25	1.26	1.27	1.28	1.29	1.30	1.32	1.33	0.94%
24-4	5.00	0.97	0.98	0.99	1.00	1.01	1.02	1.03	1.04	1.05	1.06	1.07	0.94%
24-5	5.00	0.05	0.05	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.94%
Total Feeder Load		**5.66**	**5.72**	**5.77**	**5.83**	**5.88**	**5.94**	**5.99**	**6.05**	**6.11**	**6.16**	**6.22**	**-----**
Substation Coincident Factor		100.06%	100.06%	100.06%	100.06%	100.06%	100.06%	100.06%	100.06%	100.06%	100.06%	100.06%	-----
W. Owensboro	**12.0**	8.02	8.18	8.33	8.49	8.65	8.82	8.98	9.15	9.32	9.50	9.67	1.88%
22-1	5.00	0.09	0.09	0.09	0.09	0.10	0.10	0.10	0.10	0.10	0.11	0.11	1.88%
22-2	5.00	0.76	0.78	0.79	0.81	0.82	0.84	0.85	0.87	0.89	0.90	0.92	1.88%
22-3	5.00	2.96	3.02	3.08	3.14	3.19	3.25	3.32	3.38	3.44	3.51	3.57	1.88%
22-4	5.00	0.70	0.71	0.73	0.74	0.75	0.77	0.78	0.80	0.81	0.83	0.84	1.88%
22-5	5.00	3.50	3.57	3.63	3.70	3.77	3.84	3.92	3.99	4.06	4.14	4.22	1.88%
Total Feeder Load		**8.01**	**8.17**	**8.32**	**8.48**	**8.64**	**8.80**	**8.97**	**9.14**	**9.31**	**9.48**	**9.66**	**-----**
Substation Coincident Factor		100.16%	100.16%	100.16%	100.16%	100.16%	100.16%	100.16%	100.16%	100.16%	100.16%	100.16%	-----
Weaverton	**10.0**	3.76	3.80	3.83	3.87	3.91	3.94	3.98	4.02	4.05	4.09	4.13	0.94%
64-1	5.00	0.10	0.10	0.10	0.10	0.10	0.11	0.11	0.11	0.11	0.11	0.11	0.94%
64-2	5.00	1.75	1.76	1.78	1.80	1.81	1.83	1.85	1.86	1.88	1.90	1.92	0.94%
64-3	5.00	0.96	0.97	0.98	0.99	1.00	1.01	1.02	1.03	1.04	1.05	1.06	0.94%
64-4	5.00	0.94	0.95	0.96	0.97	0.98	0.99	1.00	1.01	1.02	1.03	1.04	0.94%
Total Feeder Load		**3.75**	**3.79**	**3.82**	**3.86**	**3.90**	**3.93**	**3.97**	**4.01**	**4.05**	**4.08**	**4.12**	**-----**
Substation Coincident Factor		100.23%	100.23%	100.23%	100.23%	100.23%	100.23%	100.23%	100.23%	100.23%	100.23%	100.23%	-----

KENERGY Corporation
Summer Substation and Feeder Load Forecast - Totals

SUBSTATION / FEEDER NAME	TOTAL CAPACITY (MVA)	2018 PEAK (MW)	PROJECTED LOADS (MW) LL1 2020	LL2 2021	LL3 2022	LL4 2023	LL5 2024	LL6 2025	LL7 2026	LL8 2027	LL9 2028	LL10 2029	COMP. ANNUAL GROWTH
Weberstown	**10.0**	5.40	5.45	5.50	5.56	5.61	5.66	5.72	5.77	5.82	5.88	5.93	0.94%
14-1	5.00	2.04	2.06	2.07	2.09	2.11	2.13	2.15	2.17	2.19	2.22	2.24	0.94%
14-2	5.00	1.46	1.48	1.49	1.50	1.52	1.53	1.55	1.56	1.58	1.59	1.61	0.94%
14-3	5.00	1.90	1.92	1.94	1.96	1.98	1.99	2.01	2.03	2.05	2.07	2.09	0.94%
14-4	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.94%
Total Feeder Load		**5.40**	**5.45**	**5.50**	**5.56**	**5.61**	**5.66**	**5.72**	**5.77**	**5.82**	**5.88**	**5.93**	-----
Substation Coincident Factor		100.01%	100.01%	100.01%	100.01%	100.01%	100.01%	100.01%	100.01%	100.01%	100.01%	100.01%	-----
Whitesville	**10.0**	6.94	7.01	7.07	7.14	7.21	7.28	7.35	7.41	7.48	7.55	7.62	0.94%
15-1	5.00	1.04	1.05	1.06	1.07	1.08	1.09	1.10	1.11	1.12	1.13	1.14	0.94%
15-2	5.00	2.79	2.82	2.84	2.87	2.90	2.92	2.95	2.98	3.01	3.04	3.06	0.94%
15-3	5.00	1.85	1.87	1.89	1.91	1.93	1.94	1.96	1.98	2.00	2.02	2.04	0.94%
15-4	5.00	1.26	1.27	1.28	1.30	1.31	1.32	1.33	1.34	1.36	1.37	1.38	0.94%
Total Feeder Load		**6.94**	**7.01**	**7.07**	**7.14**	**7.21**	**7.28**	**7.34**	**7.41**	**7.48**	**7.55**	**7.62**	-----
Substation Coincident Factor		100.01%	100.01%	100.01%	100.01%	100.01%	100.01%	100.01%	100.01%	100.01%	100.01%	100.01%	-----
Wolf Hills	**10.0**	2.89	3.91	5.93	6.95	6.98	7.00	7.03	7.06	7.09	7.12	7.15	6.93%
91-1	5.00	0.09	0.09	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.94%
91-3	5.00	1.58	1.60	1.61	1.63	1.64	1.66	1.68	1.69	1.71	1.72	1.74	0.94%
91-4	5.00	1.24	2.25	4.26	**5.27**	**5.28**	**5.29**	**5.31**	**5.32**	**5.33**	**5.34**	**5.36**	10.13%
Total Feeder Load		**2.91**	**3.94**	**5.97**	**7.00**	**7.02**	**7.05**	**7.08**	**7.11**	**7.14**	**7.17**	**7.20**	-----
Substation Coincident Factor		99.30%	99.30%	99.30%	99.30%	99.30%	99.30%	99.30%	99.30%	99.30%	99.30%	99.30%	-----
Yeager	**5.0**	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.01%
99-1	5.00	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.01%
Total Feeder Load		**0.10**	**0.10**	**0.10**	**0.10**	**0.10**	**0.10**	**0.10**	**0.10**	**0.10**	**0.10**	**0.10**	-----
Substation Coincident Factor		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	-----
Zion	**10.0**	6.23	6.29	6.35	6.41	6.47	6.54	6.60	6.66	6.72	6.78	6.85	0.94%
90-1	5.00	0.89	0.90	0.91	0.92	0.93	0.94	0.95	0.95	0.96	0.97	0.98	0.94%
90-2	5.00	1.69	1.71	1.73	1.74	1.76	1.77	1.79	1.81	1.83	1.84	1.86	0.94%
90-3	5.00	2.49	2.51	2.53	2.56	2.58	2.61	2.63	2.66	2.68	2.71	2.73	0.94%
90-4	5.00	1.16	1.17	1.18	1.20	1.21	1.22	1.23	1.24	1.25	1.26	1.28	0.94%
Total Feeder Load		**6.24**	**6.30**	**6.36**	**6.42**	**6.48**	**6.54**	**6.60**	**6.66**	**6.72**	**6.79**	**6.85**	-----
Substation Coincident Factor		99.98%	99.98%	99.98%	99.98%	99.98%	99.98%	99.98%	99.98%	99.98%	99.98%	99.98%	-----
COINCIDENT SYSTEM PEAK		**250.15**	**258.15**	**264.38**	**269.74**	**274.25**	**277.54**	**280.87**	**284.24**	**287.65**	**291.10**	**294.60**	-----
TOT. NON-COINCIDENT SUB. PEAK		**276.95**	**285.86**	**292.75**	**298.70**	**303.69**	**307.33**	**311.01**	**314.74**	**318.52**	**322.34**	**326.21**	-----
SYSTEM COINCIDENT FACTOR		90.32%	90.32%	90.32%	90.32%	90.32%	90.32%	90.32%	90.32%	90.32%	90.32%	90.32%	-----

Notes: (1) Historical system coincident and substation/feeder non-coincident peak loads provided by **Kenergy**
(2) Projected coincident system peak from **[2017 Big Rivers Load Forecast]**.

Feeder capacity exceeds:	100%
Feeder capacity exceeds:	100%
Transformer capacity exceeds:	100%

KENERGY Corporation
Winter Substation and Feeder Load Forecast - Totals

SUBSTATION / FEEDER NAME	TOTAL CAPACITY (MVA)	2018 PEAK (MW)	PROJECTED LOADS (MW) LL1 2020	LL2 2021	LL3 2022	LL4 2023	LL5 2024	LL6 2025	LL7 2026	LL8 2027	LL9 2028	LL10 2029	COMP. ANNUAL GROWTH
PROJECTED SYSTEM COINCIDENT PEAK		**275.80**	**279.2**	**282.7**	**286.3**	**289.9**	**293.5**	**297.1**	**300.9**	**304.6**	**308.4**	**312.3**	1.25%
PROJECTED SYSTEM COINCIDENT PEAK (w/Spot Loads)		**275.80**	**284.5**	**291.2**	**297.1**	**302.0**	**305.6**	**309.3**	**313.0**	**316.8**	**320.6**	**324.4**	1.47%
Adams Lane	**13.0**	5.30	5.36	5.41	5.46	5.52	5.57	5.63	5.68	5.74	5.79	5.85	0.98%
106-1	5.00	1.06	1.07	1.08	1.09	1.10	1.11	1.13	1.14	1.15	1.16	1.17	0.98%
106-2	5.00	3.64	3.67	3.71	3.75	3.78	3.82	3.86	3.90	3.93	3.97	4.01	0.98%
106-3	5.00	0.61	0.61	0.62	0.62	0.63	0.64	0.64	0.65	0.66	0.66	0.67	0.98%
Total Feeder Load		**5.31**	**5.36**	**5.41**	**5.46**	**5.52**	**5.57**	**5.63**	**5.68**	**5.74**	**5.79**	**5.85**	-----
Substation Coincident Factor		99.97%	99.97%	99.97%	99.97%	99.97%	99.97%	99.97%	99.97%	99.97%	99.97%	99.97%	-----
BEDA	**13.0**	7.43	7.51	7.58	7.66	7.73	7.81	7.88	7.96	8.04	8.12	8.20	0.98%
41-1	5.00	2.72	2.75	2.78	2.80	2.83	2.86	2.89	2.92	2.94	2.97	3.00	0.98%
41-2	5.00	1.54	1.56	1.57	1.59	1.60	1.62	1.63	1.65	1.67	1.68	1.70	0.98%
41-3	5.00	1.48	1.49	1.50	1.52	1.53	1.55	1.56	1.58	1.60	1.61	1.63	0.98%
41-4	5.00	1.70	1.72	1.74	1.76	1.77	1.79	1.81	1.82	1.84	1.86	1.88	0.98%
Total Feeder Load		**7.44**	**7.52**	**7.59**	**7.67**	**7.74**	**7.82**	**7.89**	**7.97**	**8.05**	**8.13**	**8.21**	-----
Substation Coincident Factor		99.89%	99.89%	99.89%	99.89%	99.89%	99.89%	99.89%	99.89%	99.89%	99.89%	99.89%	-----
Beech Grove	**13.0**	4.55	4.60	4.64	4.69	4.73	4.78	4.83	4.88	4.92	4.97	5.02	0.98%
33-1	5.00	0.95	0.96	0.97	0.98	0.99	1.00	1.01	1.02	1.03	1.04	1.05	0.98%
33-2	5.00	0.89	0.90	0.91	0.92	0.93	0.93	0.94	0.95	0.96	0.97	0.98	0.98%
33-3	5.00	1.27	1.28	1.30	1.31	1.32	1.33	1.35	1.36	1.37	1.39	1.40	0.98%
33-4	5.00	1.44	1.46	1.47	1.49	1.50	1.52	1.53	1.55	1.56	1.58	1.59	0.98%
Total Feeder Load		**4.56**	**4.60**	**4.65**	**4.69**	**4.74**	**4.79**	**4.83**	**4.88**	**4.93**	**4.98**	**5.03**	-----
Substation Coincident Factor		99.87%	99.87%	99.87%	99.87%	99.87%	99.87%	99.87%	99.87%	99.87%	99.87%	99.87%	-----
Bon Harbor	**13.0**	5.47	5.58	5.69	5.80	5.92	6.03	6.15	6.27	6.40	6.52	6.65	1.96%
27-1	5.00	0.72	0.73	0.75	0.76	0.78	0.79	0.81	0.83	0.84	0.86	0.88	1.96%
27-2	5.00	1.37	1.40	1.43	1.45	1.48	1.51	1.54	1.57	1.60	1.63	1.67	1.96%
27-3	5.00	0.18	0.18	0.18	0.19	0.19	0.20	0.20	0.20	0.21	0.21	0.22	1.96%
27-4	5.00	1.99	2.03	2.07	2.11	2.15	2.20	2.24	2.28	2.33	2.37	2.42	1.96%
27-5	5.00	1.21	1.24	1.26	1.29	1.31	1.34	1.36	1.39	1.42	1.44	1.47	1.96%
Total Feeder Load		**5.47**	**5.58**	**5.69**	**5.81**	**5.92**	**6.04**	**6.15**	**6.27**	**6.40**	**6.52**	**6.65**	-----
Substation Coincident Factor		99.98%	99.98%	99.98%	99.98%	99.98%	99.98%	99.98%	99.98%	99.98%	99.98%	99.98%	-----
Caldwell Springs	**13.0**	2.48	2.51	2.53	2.56	2.58	2.61	2.63	2.66	2.68	2.71	2.74	0.98%
60-1	5.00	0.40	0.40	0.40	0.41	0.41	0.42	0.42	0.43	0.43	0.43	0.44	0.98%
60-2	5.00	1.11	1.12	1.13	1.14	1.16	1.17	1.18	1.19	1.20	1.21	1.22	0.98%
60-3	5.00	0.99	1.00	1.01	1.02	1.03	1.04	1.05	1.06	1.07	1.08	1.09	0.98%
Total Feeder Load		**2.49**	**2.52**	**2.54**	**2.57**	**2.59**	**2.62**	**2.65**	**2.67**	**2.70**	**2.72**	**2.75**	-----
Substation Coincident Factor		99.52%	99.52%	99.52%	99.52%	99.52%	99.52%	99.52%	99.52%	99.52%	99.52%	99.52%	-----
Centertown	**4.9**	3.12	3.12	3.12	3.12	3.12	3.12	3.12	3.12	3.12	3.12	3.12	0.01%
40-1	5.00	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.01%
40-2	5.00	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.01%
40-3	5.00	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73	1.73	0.01%
40-4	5.00	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.01%
Total Feeder Load		**3.12**	**3.12**	**3.12**	**3.12**	**3.12**	**3.12**	**3.12**	**3.12**	**3.12**	**3.12**	**3.12**	-----
Substation Coincident Factor		99.97%	99.97%	99.97%	99.97%	99.97%	99.97%	99.97%	99.97%	99.97%	99.97%	99.97%	-----

KENERGY Corporation
Winter Substation and Feeder Load Forecast - Totals

SUBSTATION / FEEDER NAME	TOTAL CAPACITY (MVA)	2018 PEAK (MW)	PROJECTED LOADS (MW) LL1 2020	LL2 2021	LL3 2022	LL4 2023	LL5 2024	LL6 2025	LL7 2026	LL8 2027	LL9 2028	LL10 2029	COMP. ANNUAL GROWTH
Crossroads	**13.0**	6.36	6.43	6.49	6.55	6.62	6.68	6.75	6.81	6.88	6.95	7.02	0.98%
61-1	5.00	1.91	1.93	1.94	1.96	1.98	2.00	2.02	2.04	2.06	2.08	2.10	0.98%
61-2	5.00	0.75	0.76	0.76	0.77	0.78	0.79	0.79	0.80	0.81	0.82	0.83	0.98%
61-3	5.00	3.09	3.13	3.16	3.19	3.22	3.25	3.28	3.31	3.35	3.38	3.41	0.98%
61-4	5.00	0.63	0.64	0.65	0.65	0.66	0.66	0.67	0.68	0.68	0.69	0.70	0.98%
Total Feeder Load		**6.38**	**6.45**	**6.51**	**6.57**	**6.64**	**6.70**	**6.77**	**6.84**	**6.90**	**6.97**	**7.04**	**-----**
Substation Coincident Factor		99.70%	99.70%	99.70%	99.70%	99.70%	99.70%	99.70%	99.70%	99.70%	99.70%	99.70%	-----
Dermont	**13.0**	5.54	5.65	5.76	5.87	5.99	6.11	6.23	6.35	6.47	6.60	6.73	1.96%
17-1	5.00	0.68	0.69	0.70	0.72	0.73	0.75	0.76	0.77	0.79	0.80	0.82	1.96%
17-2	5.00	0.43	0.44	0.45	0.46	0.47	0.48	0.49	0.50	0.51	0.52	0.53	1.96%
17-3	5.00	0.84	0.85	0.87	0.89	0.90	0.92	0.94	0.96	0.98	1.00	1.02	1.96%
17-4	5.00	1.45	1.48	1.51	1.54	1.57	1.60	1.63	1.67	1.70	1.73	1.76	1.96%
17-5	5.00	2.14	2.18	2.23	2.27	2.31	2.36	2.41	2.45	2.50	2.55	2.60	1.96%
Total Feeder Load		**5.54**	**5.65**	**5.76**	**5.87**	**5.99**	**6.11**	**6.23**	**6.35**	**6.47**	**6.60**	**6.73**	**-----**
Substation Coincident Factor		99.98%	99.98%	99.98%	99.98%	99.98%	99.98%	99.98%	99.98%	99.98%	99.98%	99.98%	-----
Dixon	**13.0**	4.93	5.23	5.28	5.33	5.38	5.43	5.48	5.53	5.59	5.64	5.69	0.93%
62-1	5.00	1.57	1.58	1.60	1.62	1.63	1.65	1.66	1.68	1.70	1.71	1.73	0.98%
62-2	5.00	1.65	1.66	1.68	1.70	1.71	1.73	1.75	1.76	1.78	1.80	1.81	0.98%
62-3	5.00	1.72	1.99	2.01	2.03	2.04	2.06	2.08	2.10	2.11	2.13	2.15	0.86%
Total Feeder Load		**4.94**	**5.24**	**5.29**	**5.34**	**5.39**	**5.44**	**5.49**	**5.54**	**5.59**	**5.64**	**5.70**	**-----**
Substation Coincident Factor		99.91%	99.91%	99.91%	99.91%	99.91%	99.91%	99.91%	99.91%	99.91%	99.91%	99.91%	-----
East Owensboro	**13.0**	4.44	5.43	5.52	5.61	5.71	5.80	5.90	5.99	6.09	6.20	6.30	1.65%
19-1	5.00	0.00	**0.90**	**0.90**	**0.90**	**0.90**	**0.90**	**0.90**	**0.90**	**0.90**	**0.90**	**0.90**	0.00%
19-2	5.00	1.57	1.60	1.63	1.66	1.70	1.73	1.76	1.80	1.83	1.87	1.90	1.96%
19-3	5.00	0.45	0.46	0.47	0.48	0.48	0.49	0.50	0.51	0.52	0.53	0.54	1.96%
19-4	5.00	0.64	0.65	0.67	0.68	0.69	0.71	0.72	0.73	0.75	0.76	0.78	1.96%
19-5	5.00	1.79	1.82	1.86	1.90	1.93	1.97	2.01	2.05	2.09	2.13	2.17	1.96%
Total Feeder Load		**4.45**	**5.44**	**5.52**	**5.62**	**5.71**	**5.80**	**5.90**	**6.00**	**6.10**	**6.20**	**6.30**	**-----**
Substation Coincident Factor		99.96%	99.96%	99.96%	99.96%	99.96%	99.96%	99.96%	99.96%	99.96%	99.96%	99.96%	-----
Geneva	**13.0**	6.95	7.02	7.08	7.15	7.22	7.30	7.37	7.44	7.51	7.58	7.66	0.98%
63-1	5.00	0.99	1.00	1.01	1.02	1.03	1.04	1.05	1.06	1.07	1.08	1.09	0.98%
63-2	5.00	2.81	2.84	2.87	2.89	2.92	2.95	2.98	3.01	3.04	3.07	3.10	0.98%
63-3	5.00	3.15	3.18	3.21	3.24	3.28	3.31	3.34	3.37	3.41	3.44	3.47	0.98%
Total Feeder Load		**6.95**	**7.02**	**7.09**	**7.16**	**7.23**	**7.30**	**7.37**	**7.44**	**7.51**	**7.59**	**7.66**	**-----**
Substation Coincident Factor		99.98%	99.98%	99.98%	99.98%	99.98%	99.98%	99.98%	99.98%	99.98%	99.98%	99.98%	-----
Guffie	**13.0**	6.91	6.98	7.05	7.12	7.19	7.26	7.33	7.40	7.47	7.55	7.62	0.98%
31-1	5.00	3.53	3.56	3.60	3.63	3.67	3.70	3.74	3.78	3.81	3.85	3.89	0.98%
31-2	5.00	2.48	2.51	2.53	2.56	2.58	2.61	2.63	2.66	2.68	2.71	2.74	0.98%
31-3	5.00	0.32	0.33	0.33	0.33	0.34	0.34	0.34	0.35	0.35	0.35	0.36	0.98%
31-4	5.00	0.59	0.59	0.60	0.60	0.61	0.62	0.62	0.63	0.63	0.64	0.65	0.98%
Total Feeder Load		**6.92**	**6.99**	**7.06**	**7.13**	**7.20**	**7.27**	**7.34**	**7.41**	**7.48**	**7.55**	**7.63**	**-----**
Substation Coincident Factor		99.90%	99.90%	99.90%	99.90%	99.90%	99.90%	99.90%	99.90%	99.90%	99.90%	99.90%	-----

KENERGY Corporation
Winter Substation and Feeder Load Forecast - Totals

SUBSTATION / FEEDER NAME	TOTAL CAPACITY (MVA)	2018 PEAK (MW)	PROJECTED LOADS (MW) LL1 2020	LL2 2021	LL3 2022	LL4 2023	LL5 2024	LL6 2025	LL7 2026	LL8 2027	LL9 2028	LL10 2029	COMP. ANNUAL GROWTH
Hanson	**4.9**	4.16	**5.60**	**7.04**	**8.48**	**9.92**	**9.96**	**10.01**	**10.05**	**10.09**	**10.14**	**10.18**	6.87%
51-3	5.00	0.29	1.70	3.10	4.50	**5.90**	**5.91**	**5.91**	**5.91**	**5.92**	**5.92**	**5.92**	14.91%
51-4	5.00	3.86	3.90	3.94	3.98	4.02	4.06	4.10	4.14	4.18	4.22	4.26	0.98%
Total Feeder Load		**4.16**	**5.60**	**7.04**	**8.48**	**9.92**	**9.97**	**10.01**	**10.05**	**10.09**	**10.14**	**10.18**	-----
Substation Coincident Factor		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	-----
Hawesville	**13.0**	7.15	7.29	7.43	7.58	7.73	7.88	8.04	8.19	8.35	8.52	8.68	1.96%
13-1	5.00	0.76	0.77	0.79	0.80	0.82	0.83	0.85	0.87	0.88	0.90	0.92	1.96%
13-2	5.00	1.59	1.63	1.66	1.69	1.72	1.76	1.79	1.83	1.86	1.90	1.94	1.96%
13-3	5.00	2.21	2.25	2.29	2.34	2.39	2.43	2.48	2.53	2.58	2.63	2.68	1.96%
13-4	5.00	1.73	1.76	1.80	1.83	1.87	1.91	1.94	1.98	2.02	2.06	2.10	1.96%
13-5	5.00	0.86	0.88	0.90	0.92	0.93	0.95	0.97	0.99	1.01	1.03	1.05	1.96%
Total Feeder Load		**7.15**	**7.29**	**7.44**	**7.58**	**7.73**	**7.88**	**8.04**	**8.20**	**8.35**	**8.52**	**8.68**	-----
Substation Coincident Factor		99.98%	99.98%	99.98%	99.98%	99.98%	99.98%	99.98%	99.98%	99.98%	99.98%	99.98%	-----
Horse Fork 1	**15.6**	3.54	3.57	3.61	3.64	3.68	3.71	3.75	3.79	3.82	3.86	3.90	0.98%
20-1	5.00	1.31	1.32	1.33	1.35	1.36	1.37	1.39	1.40	1.41	1.43	1.44	0.98%
20-2	5.00	2.19	2.21	2.23	2.25	2.28	2.30	2.32	2.34	2.37	2.39	2.41	0.98%
20-3	5.00	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.05	0.05	0.98%
Total Feeder Load		**3.54**	**3.57**	**3.61**	**3.64**	**3.68**	**3.72**	**3.75**	**3.79**	**3.83**	**3.86**	**3.90**	-----
Substation Coincident Factor		99.91%	99.91%	99.91%	99.91%	99.91%	99.91%	99.91%	99.91%	99.91%	99.91%	99.91%	-----
Horse Fork 2	**15.6**	3.76	3.80	3.84	3.87	3.91	3.95	3.99	4.03	4.07	4.11	4.15	0.98%
20-4	5.00	1.71	1.73	1.75	1.76	1.78	1.80	1.82	1.83	1.85	1.87	1.89	0.98%
20-5	5.00	2.05	2.07	2.09	2.11	2.13	2.15	2.17	2.20	2.22	2.24	2.26	0.98%
Total Feeder Load		**3.76**	**3.80**	**3.84**	**3.87**	**3.91**	**3.95**	**3.99**	**4.03**	**4.07**	**4.11**	**4.15**	-----
Substation Coincident Factor		99.96%	99.96%	99.96%	99.96%	99.96%	99.96%	99.96%	99.96%	99.96%	99.96%	99.96%	-----
Hudson 1	**13.0**	2.04	2.31	2.33	2.35	2.37	2.39	2.41	2.43	2.45	2.48	2.50	0.88%
65-1	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%
65-2	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%
65-3	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%
65-4	5.00	2.04	2.31	2.33	2.35	2.37	2.39	2.41	2.43	2.45	2.48	2.50	0.88%
Total Feeder Load		**2.04**	**2.31**	**2.33**	**2.35**	**2.37**	**2.39**	**2.41**	**2.43**	**2.45**	**2.48**	**2.50**	-----
Substation Coincident Factor		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	-----
Hudson 2	**13.0**	2.18	2.20	2.22	2.24	2.27	2.29	2.31	2.33	2.35	2.38	2.40	0.98%
65-5	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%
65-6	5.00	2.18	2.20	2.22	2.24	2.27	2.29	2.31	2.33	2.35	2.38	2.40	0.98%
65-7	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%
Total Feeder Load		**2.18**	**2.20**	**2.22**	**2.24**	**2.27**	**2.29**	**2.31**	**2.33**	**2.35**	**2.38**	**2.40**	-----
Substation Coincident Factor		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	-----
Lewisport 1	**13.0**	5.19	5.29	5.40	5.50	5.61	5.72	5.83	5.95	6.06	6.18	6.30	1.96%
12-1	5.00	1.11	1.14	1.16	1.18	1.21	1.23	1.25	1.28	1.30	1.33	1.35	1.96%
12-2	5.00	1.36	1.38	1.41	1.44	1.47	1.50	1.53	1.56	1.59	1.62	1.65	1.96%
12-3	5.00	1.17	1.20	1.22	1.24	1.27	1.29	1.32	1.35	1.37	1.40	1.43	1.96%
12-7	5.00	1.54	1.57	1.60	1.64	1.67	1.70	1.73	1.77	1.80	1.84	1.87	1.96%
Total Feeder Load		**5.19**	**5.29**	**5.40**	**5.50**	**5.61**	**5.72**	**5.83**	**5.95**	**6.06**	**6.18**	**6.30**	-----
Substation Coincident Factor		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	-----

KENERGY Corporation
Winter Substation and Feeder Load Forecast - Totals

SUBSTATION / FEEDER NAME	TOTAL CAPACITY (MVA)	2018 PEAK (MW)	PROJECTED LOADS (MW) LL1 2020	LL2 2021	LL3 2022	LL4 2023	LL5 2024	LL6 2025	LL7 2026	LL8 2027	LL9 2028	LL10 2029	COMP. ANNUAL GROWTH
Lewisport 2	**13.0**	2.46	2.51	2.56	2.61	2.66	2.71	2.76	2.82	2.87	2.93	2.98	1.96%
12-4	5.00	1.34	1.36	1.39	1.42	1.44	1.47	1.50	1.53	1.56	1.59	1.62	1.96%
12-5	5.00	0.66	0.67	0.68	0.70	0.71	0.72	0.74	0.75	0.77	0.78	0.80	1.96%
12-6	5.00	0.46	0.47	0.48	0.49	0.50	0.51	0.52	0.53	0.54	0.55	0.56	1.96%
Total Feeder Load		**2.46**	**2.51**	**2.56**	**2.61**	**2.66**	**2.71**	**2.76**	**2.82**	**2.87**	**2.93**	**2.98**	**-----**
Substation Coincident Factor		99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	-----
Little Dixie	**9.8**	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80	0.01%
66-1	5.00	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	0.01%
66-2	5.00	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	0.01%
66-3	5.00	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.01%
Total Feeder Load		**3.80**	**3.80**	**3.80**	**3.80**	**3.81**	**3.81**	**3.81**	**3.81**	**3.81**	**3.81**	**3.81**	**-----**
Substation Coincident Factor		99.91%	99.91%	99.91%	99.91%	99.91%	99.91%	99.91%	99.91%	99.91%	99.91%	99.91%	-----
Lyon	**13.0**	5.63	5.75	5.86	5.98	6.09	6.21	6.34	6.46	6.59	6.71	6.84	1.96%
69-1	5.00	1.29	1.32	1.34	1.37	1.40	1.43	1.45	1.48	1.51	1.54	1.57	1.96%
69-2	5.00	3.34	3.41	3.48	3.55	3.62	3.69	3.76	3.83	3.91	3.99	4.06	1.96%
69-3	5.00	1.00	1.02	1.04	1.06	1.08	1.10	1.12	1.15	1.17	1.19	1.21	1.96%
Total Feeder Load		**5.64**	**5.75**	**5.86**	**5.98**	**6.10**	**6.22**	**6.34**	**6.46**	**6.59**	**6.72**	**6.85**	**-----**
Substation Coincident Factor		99.97%	99.97%	99.97%	99.97%	99.97%	99.97%	99.97%	99.97%	99.97%	99.97%	99.97%	-----
Maceo	**13.0**	3.60	3.63	3.67	3.71	3.74	3.78	3.82	3.85	3.89	3.93	3.97	0.98%
28-1	5.00	0.37	0.37	0.38	0.38	0.38	0.39	0.39	0.39	0.40	0.40	0.41	0.98%
28-2	5.00	0.63	0.63	0.64	0.64	0.65	0.66	0.66	0.67	0.68	0.68	0.69	0.98%
28-3	5.00	1.01	1.02	1.03	1.05	1.06	1.07	1.08	1.09	1.10	1.11	1.12	0.98%
28-4	5.00	0.99	0.99	1.00	1.01	1.02	1.03	1.04	1.06	1.07	1.08	1.09	0.98%
28-5	5.00	0.60	0.61	0.62	0.62	0.63	0.63	0.64	0.65	0.65	0.66	0.67	0.98%
Total Feeder Load		**3.60**	**3.63**	**3.67**	**3.71**	**3.74**	**3.78**	**3.82**	**3.85**	**3.89**	**3.93**	**3.97**	**-----**
Substation Coincident Factor		99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	-----
Madisonville	**13.0**	5.20	5.30	5.41	5.51	5.62	5.73	5.85	5.96	6.08	6.19	6.31	1.96%
49-1	5.00	1.56	1.59	1.62	1.66	1.69	1.72	1.76	1.79	1.83	1.86	1.90	1.96%
49-2	5.00	2.77	2.83	2.89	2.94	3.00	3.06	3.12	3.18	3.24	3.30	3.37	1.96%
49-3	5.00	0.86	0.88	0.90	0.92	0.93	0.95	0.97	0.99	1.01	1.03	1.05	1.96%
Total Feeder Load		**5.20**	**5.30**	**5.41**	**5.52**	**5.62**	**5.73**	**5.85**	**5.96**	**6.08**	**6.20**	**6.32**	**-----**
Substation Coincident Factor		99.98%	99.98%	99.98%	99.98%	99.98%	99.98%	99.98%	99.98%	99.98%	99.98%	99.98%	-----
Marion	**13.0**	7.17	7.24	7.32	7.39	7.46	7.53	7.61	7.68	7.76	7.83	7.91	0.98%
70-1	5.00	2.13	2.15	2.17	2.19	2.21	2.23	2.25	2.28	2.30	2.32	2.34	0.98%
70-2	5.00	1.43	1.44	1.46	1.47	1.48	1.50	1.51	1.53	1.54	1.56	1.57	0.98%
70-3	5.00	2.74	2.76	2.79	2.82	2.85	2.87	2.90	2.93	2.96	2.99	3.02	0.98%
70-4	5.00	0.89	0.90	0.91	0.92	0.93	0.94	0.94	0.95	0.96	0.97	0.98	0.98%
Total Feeder Load		**7.18**	**7.25**	**7.32**	**7.40**	**7.47**	**7.54**	**7.62**	**7.69**	**7.76**	**7.84**	**7.92**	**-----**
Substation Coincident Factor		99.91%	99.91%	99.91%	99.91%	99.91%	99.91%	99.91%	99.91%	99.91%	99.91%	99.91%	-----

KENERGY Corporation
Winter Substation and Feeder Load Forecast - Totals

SUBSTATION / FEEDER NAME	TOTAL CAPACITY (MVA)	2018 PEAK (MW)	PROJECTED LOADS (MW) LL1 2020	LL2 2021	LL3 2022	LL4 2023	LL5 2024	LL6 2025	LL7 2026	LL8 2027	LL9 2028	LL10 2029	COMP. ANNUAL GROWTH
Masonville	**13.0**	4.21	4.29	4.38	4.46	4.55	4.64	4.73	4.82	4.92	5.01	5.11	1.96%
23-1	5.00	0.66	0.68	0.69	0.71	0.72	0.73	0.75	0.76	0.78	0.79	0.81	1.96%
23-2	5.00	1.56	1.59	1.62	1.65	1.68	1.72	1.75	1.78	1.82	1.85	1.89	1.96%
23-3	5.00	1.99	2.03	2.07	2.11	2.15	2.19	2.24	2.28	2.32	2.37	2.41	1.96%
23-4	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%
Total Feeder Load		**4.21**	**4.29**	**4.38**	**4.46**	**4.55**	**4.64**	**4.73**	**4.82**	**4.92**	**5.01**	**5.11**	**-----**
Substation Coincident Factor		99.98%	99.98%	99.98%	99.98%	99.98%	99.98%	99.98%	99.98%	99.98%	99.98%	99.98%	-----
Morganfield	**13.0**	9.32	9.42	9.51	9.60	9.70	9.79	9.89	9.99	10.08	10.18	10.28	0.98%
71-1	5.00	3.16	3.19	3.22	3.25	3.28	3.32	3.35	3.38	3.41	3.45	3.48	0.98%
71-2	5.00	2.78	2.81	2.84	2.87	2.89	2.92	2.95	2.98	3.01	3.04	3.07	0.98%
71-3	5.00	2.08	2.11	2.13	2.15	2.17	2.19	2.21	2.23	2.25	2.28	2.30	0.98%
71-4	5.00	1.31	1.33	1.34	1.35	1.36	1.38	1.39	1.41	1.42	1.43	1.45	0.98%
Total Feeder Load		**9.33**	**9.43**	**9.52**	**9.61**	**9.71**	**9.80**	**9.90**	**10.00**	**10.09**	**10.19**	**10.29**	**-----**
Substation Coincident Factor		99.90%	99.90%	99.90%	99.90%	99.90%	99.90%	99.90%	99.90%	99.90%	99.90%	99.90%	-----
Niagara	**13.0**	8.11	9.79	9.87	9.95	10.03	10.12	10.20	10.28	10.37	10.45	10.54	0.82%
80-1	5.00	3.68	3.72	3.75	3.79	3.83	3.87	3.90	3.94	3.98	4.02	4.06	0.98%
80-2	5.00	2.53	4.16	4.18	4.21	4.23	4.26	4.28	4.31	4.34	4.36	4.39	0.61%
80-3	5.00	1.90	1.92	1.94	1.95	1.97	1.99	2.01	2.03	2.05	2.07	2.09	0.98%
Total Feeder Load		**8.11**	**9.79**	**9.87**	**9.95**	**10.04**	**10.12**	**10.20**	**10.29**	**10.37**	**10.46**	**10.54**	**-----**
Substation Coincident Factor		99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	-----
Nuckols	**13.0**	5.04	5.14	5.24	5.34	5.45	5.56	5.66	5.78	5.89	6.00	6.12	1.96%
42-1	5.00	0.06	0.06	0.06	0.06	0.06	0.07	0.07	0.07	0.07	0.07	0.07	1.96%
42-2	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00%
42-3	5.00	2.62	2.67	2.72	2.78	2.83	2.89	2.94	3.00	3.06	3.12	3.18	1.96%
42-4	5.00	2.36	2.41	2.46	2.51	2.56	2.61	2.66	2.71	2.76	2.82	2.87	1.96%
Total Feeder Load		**5.04**	**5.14**	**5.24**	**5.35**	**5.45**	**5.56**	**5.67**	**5.78**	**5.89**	**6.01**	**6.12**	**-----**
Substation Coincident Factor		99.95%	99.95%	99.95%	99.95%	99.95%	99.95%	99.95%	99.95%	99.95%	99.95%	99.95%	-----
Onton	**13.0**	7.25	7.32	7.39	7.47	7.54	7.61	7.69	7.76	7.84	7.92	7.99	0.98%
52-1	5.00	2.97	3.00	3.03	3.06	3.09	3.12	3.15	3.19	3.22	3.25	3.28	0.98%
52-2	5.00	2.78	2.81	2.84	2.86	2.89	2.92	2.95	2.98	3.01	3.04	3.07	0.98%
52-3	5.00	1.50	1.52	1.53	1.55	1.56	1.58	1.59	1.61	1.62	1.64	1.66	0.98%
Total Feeder Load		**7.26**	**7.33**	**7.40**	**7.47**	**7.55**	**7.62**	**7.70**	**7.77**	**7.85**	**7.92**	**8.00**	**-----**
Substation Coincident Factor		99.90%	99.90%	99.90%	99.90%	99.90%	99.90%	99.90%	99.90%	99.90%	99.90%	99.90%	-----
Philpot 1	**13.0**	4.17	4.25	4.34	4.42	4.51	4.60	4.69	4.78	4.87	4.97	5.06	1.96%
25-1	5.00	2.05	2.09	2.13	2.18	2.22	2.26	2.31	2.35	2.40	2.44	2.49	1.96%
25-3	5.00	1.07	1.09	1.11	1.13	1.16	1.18	1.20	1.22	1.25	1.27	1.30	1.96%
25-4	5.00	1.06	1.08	1.10	1.12	1.14	1.16	1.19	1.21	1.23	1.26	1.28	1.96%
Total Feeder Load		**4.17**	**4.26**	**4.34**	**4.43**	**4.51**	**4.60**	**4.69**	**4.78**	**4.88**	**4.97**	**5.07**	**-----**
Substation Coincident Factor		99.90%	99.90%	99.90%	99.90%	99.90%	99.90%	99.90%	99.90%	99.90%	99.90%	99.90%	-----
Philpot 2	**13.0**	3.24	3.31	3.37	3.44	3.51	3.58	3.65	3.72	3.79	3.86	3.94	1.96%
25-5	5.00	1.50	1.53	1.56	1.59	1.62	1.65	1.69	1.72	1.75	1.79	1.82	1.96%
25-7	5.00	1.74	1.78	1.81	1.85	1.88	1.92	1.96	2.00	2.04	2.08	2.12	1.96%
Total Feeder Load		**3.24**	**3.31**	**3.37**	**3.44**	**3.51**	**3.58**	**3.65**	**3.72**	**3.79**	**3.86**	**3.94**	**-----**
Substation Coincident Factor		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	-----

KENERGY Corporation
Winter Substation and Feeder Load Forecast - Totals

SUBSTATION / FEEDER NAME	TOTAL CAPACITY (MVA)	2018 PEAK (MW)	PROJECTED LOADS (MW) LL1 2020	LL2 2021	LL3 2022	LL4 2023	LL5 2024	LL6 2025	LL7 2026	LL8 2027	LL9 2028	LL10 2029	COMP. ANNUAL GROWTH
Pleasant Ridge	**13.0**	5.51	5.56	5.62	5.67	5.73	5.78	5.84	5.90	5.95	6.01	6.07	0.98%
26-1	5.00	1.27	1.28	1.29	1.30	1.32	1.33	1.34	1.36	1.37	1.38	1.40	0.98%
26-2	5.00	2.36	2.38	2.40	2.43	2.45	2.48	2.50	2.52	2.55	2.57	2.60	0.98%
26-3	5.00	1.16	1.17	1.18	1.20	1.21	1.22	1.23	1.24	1.26	1.27	1.28	0.98%
26-4	5.00	0.72	0.73	0.74	0.74	0.75	0.76	0.77	0.77	0.78	0.79	0.80	0.98%
Total Feeder Load		**5.51**	**5.56**	**5.62**	**5.67**	**5.73**	**5.78**	**5.84**	**5.90**	**5.96**	**6.01**	**6.07**	-----
Substation Coincident Factor		99.98%	99.98%	99.98%	99.98%	99.98%	99.98%	99.98%	99.98%	99.98%	99.98%	99.98%	-----
Providence	**13.0**	6.40	6.46	6.52	6.59	6.65	6.72	6.78	6.85	6.92	6.98	7.05	0.98%
81-1	5.00	1.74	1.76	1.78	1.79	1.81	1.83	1.85	1.87	1.88	1.90	1.92	0.98%
81-2	5.00	2.08	2.10	2.12	2.14	2.16	2.18	2.20	2.23	2.25	2.27	2.29	0.98%
81-4	5.00	2.61	2.64	2.66	2.69	2.72	2.74	2.77	2.80	2.83	2.85	2.88	0.98%
Total Feeder Load		**6.43**	**6.50**	**6.56**	**6.63**	**6.69**	**6.76**	**6.82**	**6.89**	**6.96**	**7.02**	**7.09**	-----
Substation Coincident Factor		99.43%	99.43%	99.43%	99.43%	99.43%	99.43%	99.43%	99.43%	99.43%	99.43%	99.43%	-----
Race Creek	**13.0**	6.03	6.09	6.15	6.21	6.27	6.33	6.39	6.45	6.52	6.58	6.64	0.98%
82-1	5.00	1.70	1.72	1.73	1.75	1.77	1.78	1.80	1.82	1.84	1.86	1.87	0.98%
82-2	5.00	2.60	2.63	2.65	2.68	2.70	2.73	2.76	2.78	2.81	2.84	2.87	0.98%
82-3	5.00	1.73	1.74	1.76	1.78	1.80	1.81	1.83	1.85	1.87	1.89	1.90	0.98%
Total Feeder Load		**6.03**	**6.09**	**6.15**	**6.21**	**6.27**	**6.33**	**6.39**	**6.45**	**6.52**	**6.58**	**6.64**	-----
Substation Coincident Factor		99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	-----
Riverport	**13.0**	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.10	0.01%
83-1	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01%
83-2	5.00	3.51	3.51	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	3.52	0.01%
83-3	5.00	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.58	0.01%
Total Feeder Load		**4.10**	**4.10**	**4.10**	**4.10**	**4.10**	**4.10**	**4.10**	**4.10**	**4.10**	**4.10**	**4.10**	-----
Substation Coincident Factor		99.98%	99.98%	99.98%	99.98%	99.98%	99.98%	99.98%	99.98%	99.98%	99.98%	99.98%	-----
S. Hanson 1	**13.0**	7.45	7.60	7.75	7.90	8.06	8.22	8.38	8.54	8.71	8.88	9.05	1.96%
53-1	5.00	2.39	2.44	2.49	2.54	2.59	2.64	2.69	2.74	2.80	2.85	2.91	1.96%
53-4	5.00	1.78	1.82	1.85	1.89	1.93	1.96	2.00	2.04	2.08	2.12	2.16	1.96%
53-5	5.00	3.28	3.34	3.41	3.48	3.54	3.61	3.68	3.76	3.83	3.90	3.98	1.96%
Total Feeder Load		**7.45**	**7.60**	**7.75**	**7.90**	**8.06**	**8.22**	**8.38**	**8.54**	**8.71**	**8.88**	**9.05**	-----
Substation Coincident Factor		99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	-----
S. Hanson 2	**13.0**	8.27	8.43	8.60	8.77	8.94	9.12	9.30	9.48	9.66	9.85	10.04	1.96%
53-2	5.00	2.03	2.07	2.11	2.15	2.19	2.24	2.28	2.32	2.37	2.42	2.46	1.96%
53-3	5.00	2.21	2.26	2.30	2.35	2.39	2.44	2.49	2.54	2.58	2.63	2.69	1.96%
53-6	5.00	4.03	4.11	4.19	4.28	4.36	4.45	4.53	4.62	4.71	4.80	4.90	1.96%
Total Feeder Load		**8.27**	**8.44**	**8.60**	**8.77**	**8.94**	**9.12**	**9.30**	**9.48**	**9.66**	**9.85**	**10.04**	-----
Substation Coincident Factor		99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	-----
S. Owensboro 1	**13.0**	3.23	3.26	3.29	3.32	3.36	3.39	3.42	3.46	3.49	3.52	3.56	0.98%
58-3	5.00	0.41	0.41	0.41	0.42	0.42	0.43	0.43	0.43	0.44	0.44	0.45	0.98%
58-4	5.00	0.42	0.42	0.42	0.43	0.43	0.44	0.44	0.45	0.45	0.45	0.46	0.98%
58-6	5.00	1.19	1.21	1.22	1.23	1.24	1.25	1.27	1.28	1.29	1.30	1.32	0.98%
58-7	5.00	1.22	1.23	1.25	1.26	1.27	1.28	1.30	1.31	1.32	1.34	1.35	0.98%
Total Feeder Load		**3.24**	**3.27**	**3.30**	**3.34**	**3.37**	**3.40**	**3.44**	**3.47**	**3.50**	**3.54**	**3.57**	-----
Substation Coincident Factor		99.62%	99.62%	99.62%	99.62%	99.62%	99.62%	99.62%	99.62%	99.62%	99.62%	99.62%	-----

KENERGY Corporation
Winter Substation and Feeder Load Forecast - Totals

SUBSTATION / FEEDER NAME	TOTAL CAPACITY (MVA)	2018 PEAK (MW)	PROJECTED LOADS (MW) LL1 2020	LL2 2021	LL3 2022	LL4 2023	LL5 2024	LL6 2025	LL7 2026	LL8 2027	LL9 2028	LL10 2029	COMP. ANNUAL GROWTH
S. Owensboro 2	**13.0**	3.87	3.91	3.95	3.98	4.02	4.06	4.10	4.14	4.18	4.22	4.27	0.98%
58-1	5.00	1.55	1.57	1.58	1.60	1.61	1.63	1.65	1.66	1.68	1.69	1.71	0.98%
58-2	5.00	0.77	0.78	0.78	0.79	0.80	0.81	0.82	0.82	0.83	0.84	0.85	0.98%
58-5	5.00	1.55	1.56	1.58	1.60	1.61	1.63	1.64	1.66	1.68	1.69	1.71	0.98%
Total Feeder Load		**3.87**	**3.91**	**3.95**	**3.98**	**4.02**	**4.06**	**4.10**	**4.14**	**4.18**	**4.22**	**4.27**	-----
Substation Coincident Factor		99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	-----
Sacramento	**4.9**	3.49	3.49	3.49	3.49	3.49	3.49	3.49	3.49	3.49	3.49	3.49	0.01%
50-1	5.00	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	0.01%
50-3	5.00	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.01%
50-4	5.00	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	0.01%
Total Feeder Load		**3.49**	**3.49**	**3.49**	**3.49**	**3.49**	**3.49**	**3.49**	**3.49**	**3.49**	**3.49**	**3.49**	-----
Substation Coincident Factor		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	-----
Sebree	**6.5**	4.26	4.30	4.34	4.39	4.43	4.47	4.52	4.56	4.60	4.65	4.69	0.98%
84-1	5.00	0.80	0.80	0.81	0.82	0.83	0.84	0.84	0.85	0.86	0.87	0.88	0.98%
84-2	5.00	1.05	1.06	1.07	1.08	1.09	1.10	1.11	1.12	1.13	1.15	1.16	0.98%
84-3	5.00	1.78	1.79	1.81	1.83	1.85	1.87	1.88	1.90	1.92	1.94	1.96	0.98%
84-4	5.00	0.64	0.65	0.65	0.66	0.67	0.67	0.68	0.69	0.69	0.70	0.71	0.98%
Total Feeder Load		**4.26**	**4.31**	**4.35**	**4.39**	**4.43**	**4.48**	**4.52**	**4.57**	**4.61**	**4.66**	**4.70**	-----
Substation Coincident Factor		99.87%	99.87%	99.87%	99.87%	99.87%	99.87%	99.87%	99.87%	99.87%	99.87%	99.87%	-----
S. Dermont 1	**13.0**	5.73	5.84	5.96	6.07	6.19	6.31	6.44	6.56	6.69	6.82	6.96	1.96%
18-1	5.00	3.23	3.30	3.36	3.43	3.50	3.57	3.64	3.71	3.78	3.85	3.93	1.96%
18-2	5.00	0.75	0.76	0.78	0.79	0.81	0.82	0.84	0.86	0.87	0.89	0.91	1.96%
18-4	5.00	1.75	1.78	1.82	1.85	1.89	1.93	1.96	2.00	2.04	2.08	2.12	1.96%
Total Feeder Load		**5.73**	**5.84**	**5.96**	**6.07**	**6.19**	**6.32**	**6.44**	**6.57**	**6.69**	**6.82**	**6.96**	-----
Substation Coincident Factor		99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	-----
S. Dermont 2	**13.0**	3.98	4.06	4.14	4.22	4.31	4.39	4.48	4.56	4.65	4.74	4.83	1.96%
18-3	5.00	0.98	1.00	1.02	1.04	1.06	1.08	1.11	1.13	1.15	1.17	1.19	1.96%
18-5	5.00	1.47	1.50	1.53	1.56	1.59	1.62	1.66	1.69	1.72	1.76	1.79	1.96%
18-6	5.00	1.52	1.55	1.59	1.62	1.65	1.68	1.71	1.75	1.78	1.82	1.85	1.96%
Total Feeder Load		**3.98**	**4.06**	**4.14**	**4.22**	**4.31**	**4.39**	**4.48**	**4.56**	**4.65**	**4.74**	**4.84**	-----
Substation Coincident Factor		99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	-----
St. Joe	**9.8**	4.85	4.89	4.94	4.99	5.04	5.09	5.14	5.19	5.24	5.29	5.34	0.98%
32-1	5.00	2.37	2.39	2.42	2.44	2.47	2.49	2.51	2.54	2.56	2.59	2.61	0.98%
32-2	5.00	1.48	1.50	1.51	1.53	1.54	1.56	1.57	1.59	1.60	1.62	1.63	0.98%
32-3	5.00	1.00	1.01	1.02	1.03	1.04	1.05	1.06	1.07	1.08	1.09	1.10	0.98%
Total Feeder Load		**4.85**	**4.90**	**4.95**	**4.99**	**5.04**	**5.09**	**5.14**	**5.19**	**5.24**	**5.29**	**5.35**	-----
Substation Coincident Factor		99.93%	99.93%	99.93%	99.93%	99.93%	99.93%	99.93%	99.93%	99.93%	99.93%	99.93%	-----
Stanley	**6.5**	3.06	3.09	3.12	3.15	3.18	3.22	3.25	3.28	3.31	3.34	3.38	0.98%
21-1	5.00	2.11	2.13	2.15	2.17	2.20	2.22	2.24	2.26	2.28	2.31	2.33	0.98%
21-2	5.00	0.28	0.29	0.29	0.29	0.30	0.30	0.30	0.30	0.31	0.31	0.31	0.98%
21-3	5.00	0.67	0.67	0.68	0.69	0.69	0.70	0.71	0.71	0.72	0.73	0.74	0.98%
Total Feeder Load		**3.06**	**3.09**	**3.12**	**3.15**	**3.19**	**3.22**	**3.25**	**3.28**	**3.31**	**3.34**	**3.38**	-----
Substation Coincident Factor		99.97%	99.97%	99.97%	99.97%	99.97%	99.97%	99.97%	99.97%	99.97%	99.97%	99.97%	-----

KENERGY Corporation
Winter Substation and Feeder Load Forecast - Totals

SUBSTATION / FEEDER NAME	TOTAL CAPACITY (MVA)	2018 PEAK (MW)	PROJECTED LOADS (MW) LL1 2020	LL2 2021	LL3 2022	LL4 2023	LL5 2024	LL6 2025	LL7 2026	LL8 2027	LL9 2028	LL10 2029	COMP. ANNUAL GROWTH
Sullivan	**13.0**	3.01	3.04	3.07	3.10	3.13	3.17	3.20	3.23	3.26	3.29	3.32	0.98%
85-1	5.00	0.81	0.82	0.83	0.83	0.84	0.85	0.86	0.87	0.88	0.89	0.89	0.98%
85-2	5.00	1.14	1.15	1.16	1.17	1.18	1.19	1.20	1.22	1.23	1.24	1.25	0.98%
85-3	5.00	1.06	1.07	1.08	1.09	1.10	1.11	1.12	1.13	1.14	1.15	1.17	0.98%
Total Feeder Load		**3.00**	**3.03**	**3.06**	**3.09**	**3.12**	**3.15**	**3.18**	**3.22**	**3.25**	**3.28**	**3.31**	**-----**
Substation Coincident Factor		100.37%	100.37%	100.37%	100.37%	100.37%	100.37%	100.37%	100.37%	100.37%	100.37%	100.37%	-----
Thruston 1	**13.0**	4.76	4.81	4.86	4.90	4.95	5.00	5.05	5.10	5.15	5.20	5.25	0.98%
11-1	5.00	0.87	0.88	0.89	0.89	0.90	0.91	0.92	0.93	0.94	0.95	0.96	0.98%
11-2	5.00	2.63	2.66	2.68	2.71	2.74	2.76	2.79	2.82	2.84	2.87	2.90	0.98%
11-3	5.00	1.28	1.29	1.31	1.32	1.33	1.35	1.36	1.37	1.39	1.40	1.41	0.98%
Total Feeder Load		**4.78**	**4.83**	**4.88**	**4.92**	**4.97**	**5.02**	**5.07**	**5.12**	**5.17**	**5.22**	**5.27**	**-----**
Substation Coincident Factor		99.60%	99.60%	99.60%	99.60%	99.60%	99.60%	99.60%	99.60%	99.60%	99.60%	99.60%	-----
Thruston 2	**13.0**	3.41	3.44	3.48	3.51	3.54	3.58	3.61	3.65	3.69	3.72	3.76	0.98%
11-4	5.00	0.26	0.26	0.26	0.26	0.27	0.27	0.27	0.28	0.28	0.28	0.28	0.98%
11-5	5.00	3.15	3.18	3.22	3.25	3.28	3.31	3.34	3.38	3.41	3.44	3.48	0.98%
Total Feeder Load		**3.41**	**3.44**	**3.48**	**3.51**	**3.55**	**3.58**	**3.62**	**3.65**	**3.69**	**3.72**	**3.76**	**-----**
Substation Coincident Factor		99.97%	99.97%	99.97%	99.97%	99.97%	99.97%	99.97%	99.97%	99.97%	99.97%	99.97%	-----
Utica	**13.0**	6.91	6.98	7.05	7.12	7.19	7.26	7.33	7.41	7.48	7.55	7.62	0.98%
24-1	5.00	1.69	1.71	1.73	1.75	1.76	1.78	1.80	1.82	1.83	1.85	1.87	0.98%
24-2	5.00	2.51	2.54	2.56	2.59	2.61	2.64	2.67	2.69	2.72	2.75	2.77	0.98%
24-3	5.00	1.60	1.61	1.63	1.65	1.66	1.68	1.69	1.71	1.73	1.74	1.76	0.98%
24-4	5.00	1.05	1.06	1.07	1.08	1.09	1.10	1.12	1.13	1.14	1.15	1.16	0.98%
24-5	5.00	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.98%
Total Feeder Load		**6.91**	**6.98**	**7.05**	**7.12**	**7.19**	**7.26**	**7.33**	**7.41**	**7.48**	**7.55**	**7.62**	**-----**
Substation Coincident Factor		99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	-----
W. Owensboro	**15.6**	6.18	6.30	6.43	6.56	6.68	6.82	6.95	7.09	7.22	7.36	7.51	1.96%
22-1	5.00	0.05	0.05	0.05	0.05	0.05	0.06	0.06	0.06	0.06	0.06	0.06	1.96%
22-2	5.00	0.48	0.49	0.50	0.51	0.52	0.53	0.54	0.56	0.57	0.58	0.59	1.96%
22-3	5.00	2.67	2.72	2.78	2.83	2.89	2.94	3.00	3.06	3.12	3.18	3.24	1.96%
22-4	5.00	0.79	0.81	0.82	0.84	0.86	0.87	0.89	0.91	0.93	0.94	0.96	1.96%
22-5	5.00	2.19	2.23	2.28	2.32	2.37	2.41	2.46	2.51	2.56	2.61	2.66	1.96%
Total Feeder Load		**6.18**	**6.31**	**6.43**	**6.56**	**6.69**	**6.82**	**6.95**	**7.09**	**7.23**	**7.37**	**7.51**	**-----**
Substation Coincident Factor		99.96%	99.96%	99.96%	99.96%	99.96%	99.96%	99.96%	99.96%	99.96%	99.96%	99.96%	-----
Weaverton	**13.0**	4.75	4.80	4.84	4.89	4.94	4.99	5.04	5.09	5.14	5.19	5.24	0.98%
64-1	5.00	0.14	0.14	0.14	0.14	0.15	0.15	0.15	0.15	0.15	0.15	0.16	0.98%
64-2	5.00	2.75	2.77	2.80	2.83	2.86	2.88	2.91	2.94	2.97	3.00	3.03	0.98%
64-3	5.00	0.77	0.77	0.78	0.79	0.80	0.80	0.81	0.82	0.83	0.84	0.84	0.98%
64-4	5.00	1.10	1.11	1.12	1.13	1.14	1.15	1.16	1.18	1.19	1.20	1.21	0.98%
Total Feeder Load		**4.75**	**4.80**	**4.84**	**4.89**	**4.94**	**4.99**	**5.04**	**5.09**	**5.14**	**5.19**	**5.24**	**-----**
Substation Coincident Factor		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	-----

KENERGY Corporation
Winter Substation and Feeder Load Forecast - Totals

SUBSTATION / FEEDER NAME	TOTAL CAPACITY (MVA)	2018 PEAK (MW)	PROJECTED LOADS (MW) LL1 2020	LL2 2021	LL3 2022	LL4 2023	LL5 2024	LL6 2025	LL7 2026	LL8 2027	LL9 2028	LL10 2029	COMP. ANNUAL GROWTH
Weberstown	**13.0**	7.25	7.33	7.40	7.47	7.55	7.62	7.70	7.77	7.85	7.92	8.00	0.98%
14-1	5.00	2.99	3.02	3.05	3.08	3.11	3.14	3.17	3.20	3.23	3.27	3.30	0.98%
14-2	5.00	1.98	2.00	2.02	2.04	2.06	2.08	2.10	2.12	2.14	2.16	2.19	0.98%
14-3	5.00	2.28	2.31	2.33	2.35	2.37	2.40	2.42	2.45	2.47	2.49	2.52	0.98%
14-4	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.98%
Total Feeder Load		**7.26**	**7.33**	**7.40**	**7.47**	**7.55**	**7.62**	**7.70**	**7.77**	**7.85**	**7.92**	**8.00**	-----
Substation Coincident Factor		99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	99.99%	-----
Whitesville	**13.0**	7.61	7.69	7.77	7.84	7.92	8.00	8.08	8.15	8.23	8.31	8.40	0.98%
15-1	5.00	1.12	1.13	1.14	1.15	1.16	1.17	1.19	1.20	1.21	1.22	1.23	0.98%
15-2	5.00	2.14	2.17	2.19	2.21	2.23	2.25	2.27	2.30	2.32	2.34	2.36	0.98%
15-3	5.00	2.74	2.76	2.79	2.82	2.85	2.87	2.90	2.93	2.96	2.99	3.02	0.98%
15-4	5.00	1.62	1.63	1.65	1.67	1.68	1.70	1.72	1.73	1.75	1.77	1.78	0.98%
Total Feeder Load		**7.62**	**7.69**	**7.77**	**7.84**	**7.92**	**8.00**	**8.08**	**8.16**	**8.24**	**8.32**	**8.40**	-----
Substation Coincident Factor		99.98%	99.98%	99.98%	99.98%	99.98%	99.98%	99.98%	99.98%	99.98%	99.98%	99.98%	-----
Wolf Hills	**13.0**	2.71	3.74	5.77	6.80	6.83	6.86	6.89	6.91	6.94	6.97	7.00	7.21%
91-1	5.00	0.06	0.06	0.06	0.06	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.98%
91-3	5.00	1.71	1.72	1.74	1.76	1.78	1.79	1.81	1.83	1.85	1.86	1.88	0.98%
91-4	5.00	0.94	1.94	3.95	**4.96**	**4.97**	**4.98**	**4.99**	**5.00**	**5.01**	**5.02**	**5.03**	11.14%
Total Feeder Load		**2.70**	**3.73**	**5.76**	**6.79**	**6.81**	**6.84**	**6.87**	**6.90**	**6.93**	**6.95**	**6.98**	-----
Substation Coincident Factor		100.24%	100.24%	100.24%	100.24%	100.24%	100.24%	100.24%	100.24%	100.24%	100.24%	100.24%	-----
Yeager	**6.5**	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.01%
99-1	5.00	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.01%
Total Feeder Load		**0.11**	**0.11**	**0.11**	**0.11**	**0.11**	**0.11**	**0.11**	**0.11**	**0.11**	**0.11**	**0.11**	-----
Substation Coincident Factor		100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	-----
Zion	**13.0**	8.37	8.46	8.54	8.62	8.71	8.79	8.88	8.97	9.05	9.14	9.23	0.98%
90-1	5.00	1.63	1.65	1.66	1.68	1.70	1.71	1.73	1.75	1.76	1.78	1.80	0.98%
90-2	5.00	2.66	2.68	2.71	2.74	2.76	2.79	2.82	2.85	2.87	2.90	2.93	0.98%
90-3	5.00	3.39	3.42	3.45	3.49	3.52	3.56	3.59	3.63	3.66	3.70	3.73	0.98%
90-4	5.00	0.70	0.71	0.72	0.72	0.73	0.74	0.75	0.75	0.76	0.77	0.78	0.98%
Total Feeder Load		**8.38**	**8.46**	**8.55**	**8.63**	**8.71**	**8.80**	**8.89**	**8.97**	**9.06**	**9.15**	**9.24**	-----
Substation Coincident Factor		99.93%	99.93%	99.93%	99.93%	99.93%	99.93%	99.93%	99.93%	99.93%	99.93%	99.93%	-----
COINCIDENT SYSTEM PEAK		**275.80**	**284.46**	**291.23**	**297.08**	**302.01**	**305.63**	**309.30**	**313.02**	**316.78**	**320.58**	**324.44**	-----
TOT. NON-COINCIDENT SUB. PEAK		**285.99**	**295.00**	**302.03**	**308.10**	**313.21**	**316.96**	**320.77**	**324.62**	**328.52**	**332.47**	**336.47**	-----
SYSTEM COINCIDENT FACTOR		96.44%	96.44%	96.44%	96.44%	96.44%	96.44%	96.44%	96.44%	96.44%	96.44%	96.44%	-----

Notes: (1) Historical system coincident and substation/feeder non-coincident peak loads provided by **Kenergy**
(2) Projected coincident system peak from **2017 Big Rivers Load Forecast**.

Feeder capacity exceeds:	100%
Feeder capacity exceeds:	100%
Transformer capacity exceeds:	100%

KENERGY Corporation
Spot Loads

FEEDER / CUSTOMER NAME	LOCATION	ININTIAL CONNECTION LL	FULLY DEVELOPED LL	TOTAL LOAD (MW)
19-1				
Daviess Co Middle School	UG13110001	1	1	0.40
Gateway Commons	UG13110001	1	1	0.50
51-3				
Rickard Hemp Farm	OH520154	1	4	5.60
62-3				
Mitchell Bros	UG42083001	1	1	0.25
65-4				
BREC Water Pumps	OH323689	1	1	0.25
80-2				
Jeff Brady Hemp Farm	OH325656	1	1	1.60
91-4				
Ellis Park Load Phase 1	OH329103	1	1	1.00
Ellis Park Load Phase 2	OH329103	2	2	2.00
Ellis Park Load Phase 3	OH329103	3	3	1.00

KENERGY Corporation
Targeted Growth Areas

FEEDER/ CUSTOMER NAME	LOCATION	LOAD (MW)	2018 LOAD	2023 LOAD	GROWTH CHECK
11-2			2.63	2.74	0.07
Summit Estates	UG723754	37.7			
11-3			1.28	1.33	-0.07
Park Haven	OH723488	120.6			
12-1			1.11	1.21	0.02
Hancock Park	UG717162	75.4			
17-4			1.45	1.57	-0.18
Saddle Point	OH728697	301.6			
18-3			0.98	1.06	0.00
Bridgewood	UG1497411789	75.4			
19-2			1.57	1.70	-0.10
Brookfield	UG13201001	226.2			
22-5			2.19	2.37	-0.04
Woodland Ridge	UG28603334, UG-74029976-S1952, UG-2140567190	139.5			
Whispering Meadows	OH532705	75.4			
23-1			0.66	0.72	-0.25
Deer Valley	UG17110114	301.6			
23-2			1.56	1.68	0.07
Stonecrest	UG15110015	56.6			
53-3			2.21	2.39	0.09
Yorktown	UG102657, UG27953	94.3			
58-5			1.55	1.61	-0.04
Keeneland Trace	UG2055794361, UG15012018, UG1760599253	100.0			

Appendix C
RUS FORM 300

UNITED STATES DEPARTMENT OF AGRICULTURE
RURAL UTILITIES SERVICE

REVIEW RATING SUMMARY

BORROWER DESIGNATION: KY 65

DATE PREPARED: July 31, 2019

Ratings on form are: 0: Unsatisfactory -- No Records; 1: Corrective Action Needed; 2: Acceptable, but Should be Improved -- See Attached Recommendations; 3: Satisfactory -- No Additional Action Required at this Time; NA: Not Applicable

PART I. TRANSMISSION and DISTRIBUTION FACILITIES

1. Substations (Transmission and Distribution)	(Rating)
a. Safety, Clearance, Code Compliance	3
b. Physical Conditions: Structure, Major Equipment, Appearance	2
c. Inspection Records - Each Substation	3
d. Oil Spill Prevention	3
2. Transmission Lines	
a. Right-of-Way: Clearing, Erosion, Appearance, Intrusions	NA
b. Physical Condition: Structure, Conductor, Guying	NA
c. Inspection Program and Records	NA
3. Distribution Lines - Overhead	
a. Inspection Program and Records	3
b. Compliance with Safety Codes: Clearances	3
Foreign Structures	2
Attachments	2
c. Observed Physical Condition from Field Checking:	
Right-of-Way	2
Other	NA

4. Distribution - Underground Cable	(Rating)
a. Grounding and Corrosion Control	3
b. Surface Grading, Appearance	3
c. Riser Pole: Hazards, Guying, Condition	3
5. Distribution Line Equipment: Conditions and Records	
a. Voltage Regulators	3
b. Sectionalizing Equipment	3
c. Distribution Transformers	3
d. Pad Mounted Equipment	
Safety: Locking, Dead Front, Barriers	3
Appearance: Settlement, Condition	3
Other	NA
e. Kilowatt-hour and Demand Meter Reading and Testing	3

PART II. OPERATIONS and MAINTENANCE

6. Line Maintenance and Work Order Procedures	(Rating)
a. Work Planning & Scheduling	3
b. Work Backlogs: Right-of-Way Maintenance	3
Poles	3
Retirement of Idle Services	2
Other	NA

7. Service Interruptions

a. Average Annual Minutes/Consumer (Complete for each of the previous 5 years)

PREVIOUS 5 YEARS (Year)	POWER SUPPLIER a.	MAJOR STORM b.	PLANNED c.	ALL OTHER d.	TOTAL e.	(Rating)
2018	3.2	131.4	5.0	99.2	238.7	3
2017	6.2	38.5	3.2	62.7	110.7	3
2016	1.4	130.6	1.1	81.0	214.2	3
2015	3.6	12.6	1.1	77.5	94.8	3
2014	1.8	27.5	6.1	90.6	126.0	3

b. Emergency Restoration Plan: 3

8. Power Quality	(Rating)
a. General Freedom from Complaints	3
9. Loading and Load Balance	
a. Distribution Transformer Loading	3
b. Load Control Apparatus	3
c. Substation and Feeder Loading	3
10. Maps and Plant Records	
a. Operating Maps: Accurate and Up-to-Date	3
b. Circuit Diagrams	3
c. Staking Sheets	3

PART III. ENGINEERING

11. System Load Conditions and Losses		(Rating)
a. Annual System Losses	0.6%	3
b. Annual Load Factor	78%	3
c. Power Factor at Monthly Peak	95+%	3
d. Ratios of Individual Substation Annual Peak kW to kVA		3
12. Voltage Conditions		
a. Voltage Surveys		3
b. Substation Transformer Output Voltage Spread		3

13. Load Studies and Planning	(Rating)
a. Long Range Engineering Plan	3
b. Construction Work Plan	3
c. Sectionalizing Study	3
d. Load Data for Engineering Studies	3
e. Load Forecasting Data	3

PART IV. OPERATION AND MAINTENANCE BUDGETS

YEAR	For Previous 2 Years		For Present Year	For Future 3 Years		
	2017	2018	2019	2020	2021	2023
	Actual $ Thousands	Actual $ Thousands	Budget $ Thousands	Budget $ Thousands	Budget $ Thousands	Budget $ Thousands
Normal Operation	4,469	4,796	4,932	5,080	5,232	5,389
Normal Maintenance	8,389	8,937	8,323	8,573	8,830	9,095
Additional (Deferred) Maintenance						
Total	12,858	13,733	13,255	13,653	14,062	14,484

14. Budgeting: Adequacy of Budgets for Needed Work 3 *(Rating)*

15. Date Discussed with Board of Directors 8/13/2019 *(Date)*

EXPLANATORY NOTES

ITEM NO.	COMMENTS
1b.	Trees growing at one substation fence need to be trimmed.
3b.	Telephone and cable TV poles left standing next to electric poles should be removed promptly following line changes. Telephone and cable TV attachments require frequent follow-up to ensure contract compliance.
3c.	A more aggressive program is recommended to remove yard trees close to the lines.
6b.	The coop has a program in place to reduce idle services and correct the report on the Form 7.

		TITLE	DATE
RATED BY:	Rob Stumpf	VP ENGINEERING	07/31/19
REVIEWED BY:	Jeff Hohn	PRESIDENT AND CEO	07/31/19
REVIEWED BY:	[signature]	RUS GFR	07/31/19

Appendix D
EXAMPLE FORM 740C

This data will be used by RUS to review your financial situation. Your response is required (7 USC 901 et seq.) and is not confidential.

USDA-RUS

Form Approved
OMB No. 0572-0032

COST ESTIMATES AND LOAN BUDGET FOR ELECTRIC BORROWERS

BORROWER AND LOAN DESIGNATION: Kenergy, Kentucky 65 Henderson

To: U.S. Dept. of Agriculture, RUS, Washington, D. C. 20250

COST ESTIMATES AS OF: (Month, Year)

INSTRUCTIONS *See EOM-4 Guideline for the Implementation of 7 CFR 1711.1*

SECTION A. COST ESTIMATES

LOAN PERIOD 4 **YEARS**

					BORROWER'S COST ESTIMATES	RUS USE ONLY
1. DISTRIBUTION						
100	a. New Line: (Excluding Tie-Lines)					
Construction		Consumers		Miles		
	Underground	1000		52.50	$6,497,500	
	Overhead	1428		49.16	6,898,311	
	Total Consumers	2428	Total Miles	101.66		
			Less Contributions		0	
	Subtotal (New Line)				$13,395,811	
	a.(1) Major Development : (site specific code 100)					
103					$0	
104					0	
105					0	
	Subtotal (Major Development)				$0	
	Subtotal All code 100				$13,395,811	
200	b. New Tie-Lines					
	Line Designation			Miles		
201				0.00	$0	
202				0.00	0	
203				0.00	0	
204				0.00	0	
205				0.00	0	
206				0.00	0	
	Subtotal from page 1A Miles			0.00	0	
	Subtotal (Includes subtotals from pages 1A) Miles			0.00	$0	
300	c. Conversion and Line Changes					
	Line Designation			Miles		
301-16	Lyon 6902			0.50	$57,500	
301-20	Adams Lane 10602			0.25	42,025	
302-20	Guffie 3101			0.90	111,458	
303-20	St. Joe 3201 & 3203			0.90	145,380	
304-20	Hanson 5103			3.70	1,069,011	
305-20	Little Dixie 6601			1.00	172,303	
307-20	Morganfield 7101			1.50	242,300	
308-20	Morganfield 7102			0.90	111,458	
309-20	Sullivan 8503			1.40	173,379	
310-16	Philpot 1 2501			0.40	46,000	
	Subtotal from page 1A Miles			12.80	1,892,738	
	Subtotal (Includes subtotals from pages 1A) Miles			24.25	$4,063,552	
400	d. New Substations, Switching Stations, Metering Points, etc.					
	Station Designation	kVA		kV to kV		
401					$0	
402					0	
403					0	
404					0	
405					0	
406					0	
	Subtotal				$0	

COST ESTIMATE AND LOAN BUDGET FOR ELECTRIC BORROWERS	BORROWER AND LOAN DESIGNATION	Kenergy, Kentucky 65 Henderson

SECTION A. COST ESTIMATES (Page 1 Continuation Sheet)			BORROWER'S COST ESTIMATES	RUS USE ONLY
200	b. New Tie-Lines *(Continued)*			
	Line Designation	Miles		
	Miles			
	Subtotal (transfers to page 1)			
300	c. Conversion and Line Changes *(Continued)*			
	Line Designation	Miles		
310-20	Wolf Hills 9104	4.20	752,000	
313-16	Adams Lane 10602	0.60	69,000	
374-16	South Dermont 1 1801	1.20	196,800	
386-16	Niagara 8002	0.60	69,000	
387-16	Niagara 8002	0.60	69,000	
388-16	Niagara 8002	0.80	62,000	
390-16	Niagara 8001	0.10	11,788	
391-16	Onton 5203 & South Hanson 5306	2.70	432,000	
394-16	Weaverton 6402	1.40	161,000	
397-16	Zion 9001	0.20	23,000	
399-16	Lyon 6902	0.40	47,150	
	Subtotal (transfers to page 1).	12.80	$1,892,738	

	SECTION A. COST ESTIMATES *(cont.)*				BORROWER'S COST ESTIMATES	RUS USE ONLY
500	e. Substation, Switching Station, Metering Point Changes					
	Station Designation		Description of Changes			
501-2(	Hanson		Upgrade transformer to 10/12.5/14.4 MVA, Upgrade Regula		$321,700	
502-2(	Hudson 1		Upgrade transformer to 10/13/16 MVA		256,800	
503-2(	Morganfield		Upgrade transformer to 12/14/16 MVA		1,119,500	
					0	
					0	
					0	
					0	
					0	
					0	
	Subtotal				$1,698,000	
600	f. Miscellaneous Distribution Equipment					
601	(1) Transformers and Meters					
	Construction	Transformers		Meters		
	Underground	20 $196,800		0 $0	$196,800	
	Overhead	3096 $5,203,602		5372 $1,784,847	6,988,449	
	Subtotal code 601 . . . (included in total of all 600 codes below)				$7,185,249	
602	(2) Sets of Service Wires to increase Capacity	404			1,457,430	
603	(3) Sectionalizing Equipment	300 Devices			1,558,050	
604	(4) Regulators	10 projects			672,825	
605	(5) Capacitors				50,000	
606	(6) Pole Replacements	2,300			8,313,350	
607	(7) Miscellaneous Construction				800,000	
608	(8) Conductor Replacements	121 miles			9,941,598	
	(9)				0	
	(10)				0	
	(11)				0	
	Subtotal ***ALL*** *600 codes*				$29,978,502	
700	g. Other Distribution Items					
701	(1) Engineering Fees				$0	
702	(2) Security Lights	5196			4,171,089	
703	(3) Reimbursement of General Funds (see attached)				0	
705					0	
	Subtotal				$4,171,089	
	TOTAL DISTRIBUTION.				**$53,306,954**	
800	2. Transmission					
	a. New Line					
	Line Designation	Voltage	Wire Size	Miles		
801					$0	
802					0	
803					0	
804					0	
805					0	
806					0	
807					0	
808					0	
809					0	
810					0	
	Total Miles			0.00		
	Subtotal				$0	

COST ESTIMATE AND LOAN BUDGET FOR ELECTRIC BORROWERS	BORROWER AND LOAN DESIGNATION	Kenergy, Kentucky 65 Henderson

SECTION A. COST ESTIMATES *(cont.)*				BORROWER'S COST ESTIMATES	RUS USE ONLY
900	b. New Substation, Switching Station, etc.				
	Station Designation	**kVA**	**kV TO kV**		
901				$0	
902				0	
903				0	
904				0	
905				0	
906				0	
907				0	
908				0	
	Subtotal			$0	
1000	c. Line and Station Changes				
	Line/Station Designation	Description of Changes			
1001				$0	
1002				0	
1003				0	
1004				0	
1005				0	
1006				0	
1007				0	
1008				0	
1009				0	
	Subtotal			$0	
1100	d. Other Transmission Items				
1101	(1) R/W Procurement			$0	
1102	(2) Engineering Fees			0	
1103	(3) Reimbursement of General Funds (see schedule)			0	
1104	(4)			0	
	Subtotal			$0	
	TOTAL TRANSMISSION.			**$0**	
1200	3. GENERATION (including Step-up Station at Plant)				
1201	a Fuel	Nameplate Rating	kW	$0	
1202	b.			0	
	TOTAL GENERATION.			**$0**	
1300	4. HEADQUARTERS FACILITIES				
1301	a. New or additional Facilities (Attach RUS Form 740g)			$0	
1302	b.			0	
	TOTAL HEADQUARTERS FACILITIES			**$0**	

COST ESTIMATE AND LOAN BUDGET FOR ELECTRIC BORROWERS	BORROWER AND LOAN DESIGNATION Kenergy, Kentucky 65 Henderson

SECTION A. COST ESTIMATES *(cont.)*			BORROWER'S COST ESTIMATES	RUS USE ONLY
1400	5. ACQUISITIONS			
1401	a. _____ Consumers	_____ Miles	$0	
1402	b. _____		0	
	TOTAL ACQUISITIONS.		**$0**	
1500	6. ALL OTHER			
1501	a. _____		$0	
1502	b. _____		0	
1503	c. _____		0	
1504	d. _____		0	
1505	e. _____		0	
	TOTAL ALL OTHER.		**$0**	

SECTION B. SUMMARY OF AMOUNTS AND SOURCES OF FINANCING

1. GRAND TOTAL - ALL COSTS			$53,307,000	
2. FUNDS AND MATERIALS AVAILABLE FOR FACILITIES				
a. Loan Funds		$0		
b. Materials and Special Equipment		0		
c. General Funds	Purpose 1 $0			
	Purpose 2 $0			
	Purpose 3 $0			
	Purpose 4 $0			
	Total General Funds Applied	$0		
d. Total Available Funds and Materials			$0	
3. NEW FINANCING REQUESTED FOR FACILITIES			$53,307,000	
4. RUS LOAN REQUESTED FOR FACILITIES.		100%	$53,307,000	
5. TOTAL SUPPLEMENTAL LOAN REQUESTED			$0	
National Rural Utilities Cooperative Finance Corporation				
Name of Supplemental Lender				
6. CAPITAL TERM CERTIFICATE PURCHASES (CFC Loan only) . .		0%	$0	
7. SUPPLEMENTAL LOAN REQUESTED FOR FACILITIES.		0%	$0	
8. 100% SUPPLEMENTAL LOANS (SEE RUS Bulletin 20-40,Att. C)*			$0	

** Identify in section A by budget purpose and separate subtotals.*

SECTION C. CERTIFICATION

We, the undersigned, certify that:

1. Upon completion of the electrical facilities contained herein and any others uncompleted at this time but for which financing is available, the system will be capable of adequately and dependably serving the projected load for the loan period as contained in our current RUS approved Power Requirement Study and Construction Work Plan.

2. Negotiations have been or will be initiated with our power supplier, where necessary, to obtain new delivery points and/or additional capacity at existing ones to adequately supply the projected load upon which this loan application is based.

3. The data contained herein and all supporting documents have, to the best of my knowledge, been prepared correctly and in accordance with RUS Bulletin 20-2.

_____ _____

Date *Signature of Borrower's Manager*

_____ _____

Date *Signature of Borrower's President*

Kenergy

Corporate Name of Borrower

GFR Initials _____

Attachment to 740c
Kenergy, Kentucky 65 Henderson

STATEMENT

Statement certifying that at least 90% of the Loan funds are for facilities with a useful life of 33 years or longer as required by 7 CFR 1710.115.

To facilitate the determination of the final maturity for this RUS Loan,
Kenergy
does hereby certify that:

☐ At least 90% of the Loan funds requested as part of this loan application and included on the RUS Form 740c (Cost Estimates and Loan Budget for Electric Borrowers) are for facilities with an anticipated useful life of 33 years or longer.

☐ Less than 90% of the Loan funds requested as part of this loan application and included on the RUS Form 740c (Cost Estimates and Loan Budget for Electric Borrowers) are for facilities with an anticipated useful life of 33 years or longer. A schedule has been attached to this statement listing the facilities with an anticipated useful life of less than 33 years, the anticipated useful life of those facilities and the associated cost estimates (see attached).

Date

Title:

Appendix E
ENVIRONMENTAL CLEARANCE

KY 65 – Kenergy Corp.

Environmental Report

March 2020

Code 200

The proposed construction includes several tie-lines (see below), however they will not be financed by RUS. The cooperative understands that new lines sited outside of utility or road ROW require a site-specific environmental report (ER).

Code 300

The proposed construction will consist of approximately **24.25 miles** of overhead line conversions. Line conversions include line re-conductors and phase changes. All line conversions will be performed within existing utility ROW (which is 30 feet in width). Access would be from public and private roads and through utility ROW. No additional easements or tree clearing is needed to perform this work. The attached 740c environmental worksheet provides more site specific information about each project.

Environmental Commitments

If streams and/or wetlands are located in the right-of-way of new lines, relocations, or line conversions, appropriate best management practices (such as establishing a 25-foot buffer around these water features) will be implemented. Unless authorized by state and/or federal permits or licenses, vehicles will not traverse these water features. If it is determined that poles need to be sited in protected streams or wetlands or that culverts need to be built over these features, the cooperative will acquire the appropriate permits from the U.S. Army Corps of Engineers and/or the applicable state agency.

The cooperative has reviewed the most recent species list from the U.S. Fish and Wildlife Service, covering Breckinridge, Caldwell, Crittenden, Daviess, Hancock, Henderson, Hopkins, Livingston, Lyon, McLean, Muhlenberg, Ohio, Union and Webster counties. Species on this list include: Indiana bat, Gray bat, Northern Long-Eared Bat, etc. The proposed project areas (i.e., utility and road ROW) are not suitable habitat for the other listed species; therefore, no effects to listed species are expected.

The following tie-line projects are included in the Kenergy Mid 2020-Mid 2024 Construction Work Plan, however RUS loan funds will not be requested for these projects.

Project Code	Project Location
201-16	Weaverton 6403
201-20	St. Joe 3201 & 3203
202-20	St. Joe 3201 & 3203
203-20	South Hanson 5303
204-20	Geneva 6303

KY 65 Mid 2020 - Mid 2024 WORK PLAN
FORM 740c - ENVIRONMENTAL CHECKLIST

1. DISTRIBUTION

100 a. New Line: (Excluding Tie-Lines)

Construction	Consumers	Miles	Was project approved in a previous CWP or Amendment? If yes: provide status. If no: provide anticipated classification (per 7CFR1970)	Will work be entirely within existing ROW, generating station, industrial park, or substation fencing? If no: see next column. If yes: (1) is there new land disturbance? has SHPO provided feedback? (2) Are T&E species occurrences or habitat in/near project area? (3) Are federal/state lands (including wildife refuges), floodplains or wetlands crossed?	For substations: will new land disturbance be <1 acre, 1-5 acres, or >5 acres? For lines: provide the voltage, length, ROW width, & ROW type (road vs private; if road, distance from road).	Does the project require preparation of an Environmental Assessment or Environmental Impact Statement? If yes, the environmental work must be approved before the application submittal or removed from loan.
Underground	1000	52.50	1970.53(c)(8)	NA-See Categorical Exclusion	NA	No
Overhead	1428	49.16	1970.53(c)(8)	NA-See Categorical Exclusion	NA	No
Total Consumers	2428	101.66				

200 b. New Tie-Lines

Line Designation	Miles				

300 c. Conversion and Line Changes

	Line Designation	Miles					
301-16	Lyon 6902 Conv 1Ph 2 ACSR to 3Ph 1/0 ACSR	0.50	No-1970.53(d)(4)	Existing ROW - Yes No Tree Clearing Required SHPO - NA T&E Species - NA Federal/State lands, floodplains, wetlands - NA	NA	No
301-20	Adams Lane 10602 Conv 3Ph 3/0 ACSR to 3Ph 336 ACSR	0.25	No-1970.53(d)(4)	Existing ROW - Yes No Tree Clearing Required SHPO - NA T&E Species - NA Federal/State lands, floodplains, wetlands - NA	NA	No
302-20	Guffie 3101 Conv 1Ph 1/0 ACSR to 3Ph 1/0 ACSR	0.90	No-1970.53(d)(4)	Existing ROW - Yes No Tree Clearing Required SHPO - NA T&E Species - NA Federal/State lands, floodplains, wetlands - NA	NA	No
303-20	St. Joe 3201 and 3203 Conv 1Ph 4 ACSR to 3Ph 4/0 ACSR	0.90	No-1970.53(d)(4)	Existing ROW - Yes No Tree Clearing Required SHPO - NA T&E Species - NA Federal/State lands, floodplains, wetlands - NA	NA	No
304-20	Hanson 5103 Conv 3Ph 336 ACSR to 3Ph DC 336 ACSR	3.70	No-1970.53(d)(4)	Existing ROW - Yes No Tree Clearing Required SHPO - NA T&E Species - NA Federal/State lands, floodplains, wetlands - NA	NA	No
305-20	Little Dixie 6601 Conv 3Ph 1/0 ACSR to 3Ph 336 ACSR	1.00	No-1970.53(d)(4)	Existing ROW - Yes No Tree Clearing Required SHPO - NA T&E Species - NA Federal/State lands, floodplains, wetlands - NA	NA	No
307-20	Morganfield 7101 Conv 3Ph 1/0 ACSR to 3Ph 4/0 ACSR	1.50	No-1970.53(d)(4)	Existing ROW - Yes No Tree Clearing Required SHPO - NA T&E Species - NA Federal/State lands, floodplains, wetlands - NA	NA	No
308-20	Morganfield 7102 Conv 1Ph and 2Ph 2 ACSR to 3Ph 1/0 ACSR	0.90	No-1970.53(d)(4)	Existing ROW - Yes No Tree Clearing Required SHPO - NA T&E Species - NA Federal/State lands, floodplains, wetlands - NA	NA	No
309-20	Sullivan 309-20 Conv 1Ph 2 ACSR to 3Ph 1/0 ACSR	1.40	No-1970.53(d)(4)	Existing ROW - Yes No Tree Clearing Required SHPO - NA T&E Species - NA Federal/State lands, floodplains, wetlands - NA	NA	No
310-16	Philpot 1 2501 Conv 1Ph 1/0 ACSR to 3Ph 1/0 ACSR	0.40	No-1970.53(d)(4)	Existing ROW - Yes No Tree Clearing Required SHPO - NA T&E Species - NA Federal/State lands, floodplains, wetlands - NA	NA	No
310-20	Wolf Hills 9104 Conv 3Ph 1/0 ACSR to 3Ph 336 ACSR	4.20	No-1970.53(d)(4)	Existing ROW - Yes No Tree Clearing Required SHPO - NA T&E Species - NA Federal/State lands, floodplains, wetlands - NA	NA	No
313-16	Adams Lane 10602 Conv 1Ph 2 ACSR to 3Ph 1/0 ACSR	0.60	No-1970.53(d)(4)	Existing ROW - Yes No Tree Clearing Required SHPO - NA T&E Species - NA Federal/State lands, floodplains, wetlands - NA	NA	No
374-16	South Dermont 1 1801 Conv 3Ph 1/0 STR CU to 3Ph 336 ACSR	1.20	No-1970.53(d)(4)	Existing ROW - Yes No Tree Clearing Required SHPO - NA T&E Species - NA Federal/State lands, floodplains, wetlands - NA	NA	No

386-16	Niagara 8002 Conv 1Ph 2 ACSR to 3Ph 1/0 ACSR	0.60		No-1970.53(d)(4)	Existing ROW - Yes No Tree Clearing Required SHPO - NA T&E Species - NA Federal/State lands, floodplains, wetlands - NA	NA	No
387-16	Niagara 8002 Conv 1Ph 2 ACSR 3Ph 1/0 ACSR	0.60		No-1970.53(d)(4)	Existing ROW - Yes No Tree Clearing Required SHPO - NA T&E Species - NA Federal/State lands, floodplains, wetlands - NA	NA	No
388-16	Niagara 8002 Conv 1Ph to 3Ph 1/0 ACSR	0.80		No-1970.53(d)(4)	Existing ROW - Yes No Tree Clearing Required SHPO - NA T&E Species - NA Federal/State lands, floodplains, wetlands - NA	NA	No
390-16	Niagara 8003 Conv 1Ph 2 ACSR to 3Ph 1/0 ACSR	0.10		No-1970.53(d)(4)	Existing ROW - Yes No Tree Clearing Required SHPO - NA T&E Species - NA Federal/State lands, floodplains, wetlands - NA	NA	No
391-16	Onton 5203 and South Hanson 5306 Conv 3Ph 4A CU and 1/0 ACSR to 3Ph 336 ACSR	2.70		No-1970.53(d)(4)	Existing ROW - Yes No Tree Clearing Required SHPO - NA T&E Species - NA Federal/State lands, floodplains, wetlands - NA	NA	No
394-16	Weaverton 6402 Conv 1Ph 2 ACSR to 3Ph 1/0 ACSR	1.40		No-1970.53(d)(4)	Existing ROW - Yes No Tree Clearing Required SHPO - NA T&E Species - NA Federal/State lands, floodplains, wetlands - NA	NA	No
397-16	Zion 9001 Conv 1Ph 2 ACSR to 3Ph 1/0 ACSR	0.20		No-1970.53(d)(4)	Existing ROW - Yes No Tree Clearing Required SHPO - NA T&E Species - NA Federal/State lands, floodplains, wetlands - NA	NA	No
399-16	Lyon 6902 Conv 3Ph 2 ACSR to 3Ph 1/0 ACSR	0.40		No-1970.53(d)(4)	Existing ROW - Yes No Tree Clearing Required SHPO - NA T&E Species - NA Federal/State lands, floodplains, wetlands - NA	NA	No

400 d. New Substations, Switching Stations, Metering Points, etc.

Station Designation	kVA	kV to kV				

500 e. Substation, Switching Station, Metering Point Changes

	Station Designation	Description of Changes				
501-20	Hanson	Upgrade transformer to 10/12.5/14.4 MVA, Regulators	No - 1970.53(d)(10)	Existing Substation Fencing - Yes No Tree Clearing Required SHPO - NA T&E Species - NA Federal/State lands, floodplains, wetlands - NA	NA	No
502-20	Hudson 1	Upgrade transformer to 10/13/16 MVA	No - 1970.53(d)(10)	Existing Substation Fencing - Yes No Tree Clearing Required SHPO - NA T&E Species - NA Federal/State lands, floodplains, wetlands - NA	NA	No
503-20	Morganfield	Upgrade transformer to 12/14/16 MVA	No - 1970.53(d)(10)	Existing Substation Fencing - Yes No Tree Clearing Required SHPO - NA T&E Species - NA Federal/State lands, floodplains, wetlands - NA	NA	No

600 f. Miscellaneous Distribution Equipment

601 (1) Transformers

Transformers					
UG		No - 1970.53(c)(8)		NA	No
OH		No - 1970.53(c)(8)		NA	No
Meters		No - 1970.53(c)(8)		NA	No
(7) Meter Repalcements		No - 1970.53(c)(8)		NA	No
(8) Transformer Replacement		No - 1970.53(c)(8)		NA	No

602 (2) Sets of Service Wires to increase Capacity		No-1970.53(d)(4)	Existing ROW - Yes No Tree Clearing Required SHPO - NA T&E Species - NA Federal/State lands, floodplains, wetlands - NA	NA	No
603 (3) Sectionalizing Equipment		No-1970.53(d)(4)	Existing ROW - Yes No Tree Clearing Required SHPO - NA T&E Species - NA Federal/State lands, floodplains, wetlands - NA	NA	No
604 (4) Regulators		No-1970.53(d)(4)	Existing ROW - Yes No Tree Clearing Required SHPO - NA T&E Species - NA Federal/State lands, floodplains, wetlands - NA	NA	No
605 (5) Capacitors		No-1970.53(d)(4)	Existing ROW - Yes No Tree Clearing Required SHPO - NA T&E Species - NA Federal/State lands, floodplains, wetlands - NA	NA	No

					Existing ROW - Yes No Tree Clearing Required SHPO - NA T&E Species - NA		
606	(6) Pole Replacement			No-1970.53(d)(4)	Federal/State lands, floodplains, wetlands - NA	NA	No
					Existing ROW - Yes No Tree Clearing Required SHPO - NA T&E Species - NA		
607	(7) Miscellaneous Construction			No-1970.53(d)(4)	Federal/State lands, floodplains, wetlands - NA	NA	No
					Existing ROW - Yes No Tree Clearing Required SHPO - NA T&E Species - NA		
608	(8) Conductor Replacement		121 miles	No-1970.53(d)(4)	Federal/State lands, floodplains, wetlands - NA	NA	No
700	g. Other Distribution Items						
					Existing ROW - Yes No Tree Clearing Required SHPO - NA T&E Species - NA		
702	(2) Outdoor Lighting			No-1970.53(d)(4)	Federal/State lands, floodplains, wetlands - NA	NA	No
2. TRANSMISSION							
800	a. New Line						
	Line Designation						
900	b. New Substation, Switching Station, etc.						
1000	c. Line and Station Changes						
1100	d. Other Transmission Items						
1200	e. GENERATION (including Step-up Station at Plant)						
1300	f. HEADQUARTERS FACILITIES						
1301	New or additional Facilities	(Attach RUS Form 740g)					
1302							
1400	g. ACQUISITIONS						
1401		Consumers	Miles				
1402							
1500	h. ALL OTHER						
1501				NA	NA	NA	NA
1502				NA	NA	NA	NA

Appendix F
COST OF LOSSES

All information in BLUE text requires input data.

LOAD LOSS CALCULATION

ANNUAL COST OF LOSS PER kW:

Cost for Demand:	1kW*DR*DF	$125.17 /kW
Cost for Energy:	(.84(LF^2) + .16(LF))*1kW*(ER)*8760 hours	$205.23 /kW

DR = Existing Power Demand Rate (1)
= $13.81 /kW
LF = Three Year Average Annual Load Factor
= 50.92%
ER = Existing Power Energy Rate (1)
= $0.07829 /kWh
DF = Three Year Average Annual Demand Factor
= 9.06

ANNUAL COST FOR 1kW OF PEAK LOSSES: $330.40 /kW

CORE LOSS CALCULATION

ANNUAL COST OF LOSS PER kW:

Cost for Demand:	1kW*DR*12 months	$165.72 /kW
Cost for Energy	1kW*ER*8760 hours	$685.82 /kW

DR = Existing Power Demand Rate (1)
= $13.81 /kW
ER = Existing Power Energy Rate (1)
= $0.07829 /kWh

ANNUAL COST FOR 1kW OF PEAK LOSSES: $851.54 /kW

LOAD FACTOR CALCULATION (2)

Month	Peak Load (kW) 2017	2018	2019	Three Year Average	Percent of Peak	Percent of Peak Squared
January	239,614	275,802	246,399	253,938	99.48%	0.99
February	198,879	225,565	202,575	209,006	81.88%	0.67
March	197,130	186,155	228,287	203,857	79.86%	0.64
April	154,200	168,832	159,366	160,799	62.99%	0.40
May	191,477	216,876	209,178	205,844	80.64%	0.65
June	239,369	244,535	234,470	239,458	93.81%	0.88
July	259,800	259,789	246,193	255,261	100.00%	1.00
August	235,160	249,123	250,150	244,811	95.91%	0.92
September	229,188	246,698	244,185	240,024	94.03%	0.88
October	181,721	205,267	236,038	207,675	81.36%	0.66
November	179,019	217,333	226,900	207,751	81.39%	0.66
December	238,709	202,654	203,928	215,097	84.27%	0.71
System Peak	259,800	275,802	250,150	255,261	100.00%	9.06
Ann. MWh Purch.	1,132,856	1,212,570	1,156,733	1,167,386		
Ann. Load Factor	49.78%	50.19%	52.79%	50.92%		

Notes : (1) Based on the annual energy purchases and power cost as provided by Kenergy
(2) MWh Purch. and Peak Loading was taken from Kenergy data.

Appendix G
LIST OF OVERLOADED DEVICES

Element Name	Upline Source	Upline Feeder	Device Type	Max Summer Loading (%)	Max Winter Loading (%)
REC09417002	11-THRUSTON1	1102	Recloser	97.562	161.143
FUS2140629995	11-THRUSTON1	1102	Fuse	89.454	157.948
FUS702123	11-THRUSTON1	1102	Fuse	86.95	20.242
REC11315001	11-THRUSTON1	1102	Recloser	60.144	100.47
FUS480442047	11-THRUSTON1	1102	Fuse	40.853	96.619
REC11303001	11-THRUSTON1	1102	Recloser	59.09	96.19
OCD11307001	11-THRUSTON1	1102	Recloser	52.629	84.931
FUS701951	11-THRUSTON1	1103	Fuse	67.188	91.66
FUS702067	11-THRUSTON1	1103	Fuse	49.309	85.697
FUS-70650842	11-THRUSTON2	1105	Fuse	113.351	55.202
FUS-1934505332	11-THRUSTON2	1105	Fuse	53.5	82.96
REC03424004	12-LEWISPORT1	1202	Recloser	90.252	74.046
REC05501001	12-LEWISPORT1	1203	Recloser	104.911	104.582
REC05425001	12-LEWISPORT2	1204	Recloser	98.602	121.692
REC07512001	12-LEWISPORT2	1204	Recloser	64.587	101.552
REC07511001	12-LEWISPORT2	1204	Recloser	65.519	86.556
REC07704001	13-HAWESVILLE	1302	Recloser	56.5	93.738
REC07716001	13-HAWESVILLE	1303	Recloser	89.732	90.168
REC07713001	13-HAWESVILLE	1303	Recloser	84.543	105.329
REC11821002	14-WEBERSTOWN	1401	Recloser	66.333	102.425
SEC11822001	14-WEBERSTOWN	1401	Sectionalizer	49.29	85.893
REC15713005	14-WEBERSTOWN	1402	Recloser	72.41	86.901
REC15513001	15-WHITESVILLE	1502	Recloser	56.129	88.713
REC21606001	15-WHITESVILLE	1503	Recloser	84.999	125.917
REC19405002	15-WHITESVILLE	1504	Recloser	79.316	82.827
REC11317001	17-DERMONT	1705	Recloser	101.353	71.239
REC11220002	17-DERMONT	1705	Recloser	98.636	57.762
FUS702369	18-SOUTH DERMONT1	1801	Fuse	80.442	24.627
FUS-1756249799	18-SOUTH DERMONT1	1801	Fuse	80.194	47.707
FUS702445	18-SOUTH DERMONT1	1801	Fuse	58.507	149.126
FUS700473	18-SOUTH DERMONT1	1804	Fuse	81.769	28.504
FUS15134001	18-SOUTH DERMONT2	1805	Fuse	188.066	71.113
OCD13115001	19-EAST OWENSBORO	1901	Fuse	306.102	169.357
OCD13115002	19-EAST OWENSBORO	1901	Fuse	172.52	86.202
FUS702026	19-EAST OWENSBORO	1905	Fuse	91.113	57.874
FUS700327	20-HORSE FORK	2001	Fuse	92.466	24.866
FUS700314	20-HORSE FORK	2002	Fuse	122.227	59.485
OCD12920003	22-WEST OWENSBORO	2202	Fuse	87.072	65.432
REC14924004	22-WEST OWENSBORO	2203	Recloser	96.815	123.84
FUS501339	22-WEST OWENSBORO	2205	Fuse	112.648	45.815
REC12815001	22-WEST OWENSBORO	2205	Recloser	106.627	110.473
FUS700471	23-MASONVILLE	2302	Fuse	120.467	40.939
REC15109004	23-MASONVILLE	2302	Recloser	85.268	27.445
REC19010002	24-UTICA	2401	Recloser	86.417	95.501
FUS503545	24-UTICA	2401	Fuse	73.761	84.429
REC21212001	24-UTICA	2402	Recloser	73.533	117.73

Element Name	Upline Source	Upline Feeder	Device Type	Max Summer Loading (%)	Max Winter Loading (%)
REC23213001	24-UTICA	2402	Recloser	52.791	85.739
REC23203002	24-UTICA	2402	Recloser	52.519	85.358
REC23111001	24-UTICA	2403	Recloser	48.43	92.171
REC13305001	25-PHILPOT1	2501	Recloser	108.927	91.133
REC13310002	25-PHILPOT1	2501	Recloser	73.472	107.401
REC15506001	25-PHILPOT2	2507	Recloser	70.232	94.956
FUS501082	27-BON HARBOR	2701	Fuse	92.741	31.19
REC10919006	27-BON HARBOR	2702	Recloser	83.587	102.005
REC07401001	28-MACEO	2803	Recloser	109.962	48.669
FUS07320001	28-MACEO	2803	Fuse	106.739	157.034
REC18923001	31-GUFFIE	3101	Recloser	72.831	121.476
REC18823001	31-GUFFIE	3101	Recloser	61.234	101.759
REC18820001	31-GUFFIE	3101	Recloser	67.158	85.902
REC22812001	31-GUFFIE	3102	Recloser	62.415	89.74
REC18717001	31-GUFFIE	3104	Recloser	121.992	49.994
FUS501674	31-GUFFIE	3104	Fuse	86.486	28.072
FUS500994	31-GUFFIE	3104	Fuse	82.074	51.976
FUS1607189823	31-GUFFIE	3104	Fuse	80.62	15.366
REC14711002	32-ST. JOE	3201	Recloser	80.737	86.795
FUS718456352	32-ST. JOE	3202	Fuse	178.835	260.665
OCD16710001	32-ST. JOE	3202	Fuse	92.829	36.686
FUS-963667230	32-ST. JOE	3203	Fuse	129.982	31.051
FUS1594303644	32-ST. JOE	3203	Fuse	125.627	39.234
SEC16604001	32-ST. JOE	3203	Sectionalizer	110.482	44.767
FUS1763994793	32-ST. JOE	3203	Fuse	88.784	38.415
FUS500800	33-BEECH GROVE	3303	Fuse	99.415	49.581
REC16621001	33-BEECH GROVE	3303	Recloser	96.638	59.109
FUS500857	33-BEECH GROVE	3303	Fuse	89.714	25.253
REC31322002	40-CENTERTOWN	4003	Recloser	45.622	91.205
OCD31311002	40-CENTERTOWN	4003	Recloser	40.639	81.874
REC25319001	41-BEDA	4101	Recloser	102.181	144.03
REC25308001	41-BEDA	4101	Recloser	55.728	92.277
REC25421002	41-BEDA	4101	Recloser	46.26	89.357
REC25415002	41-BEDA	4102	Recloser	84.905	113.657
REC27410002	41-BEDA	4102	Recloser	74.977	99.892
REC29512001	41-BEDA	4104	Recloser	132.656	78.987
OCD25020001	42-NUCKOLS	4203	Fuse	199.966	260.573
REC25106001	42-NUCKOLS	4203	Recloser	105.907	79.066
FUS25110001	42-NUCKOLS	4203	Fuse	96.047	52.278
FUS503491	42-NUCKOLS	4203	Fuse	91.389	49.114
REC25116003	42-NUCKOLS	4203	Recloser	89.529	108.931
REC22922002	42-NUCKOLS	4204	Recloser	51.588	83.432
REC22924001	42-NUCKOLS	4204	Recloser	48.422	80.028
FUS79753818	49-MADISONVILLE	4901	Fuse	47.832	110.571
FUS1940432932	49-MADISONVILLE	4901	Fuse	69.192	100.673
FUS7519	49-MADISONVILLE	4901	Fuse	53.29	94.694

Element Name	Upline Source	Upline Feeder	Device Type	Max Summer Loading (%)	Max Winter Loading (%)
FUS7815	49-MADISONVILLE	4901	Fuse	36.257	92.998
REC32225001	49-MADISONVILLE	4902	Recloser	55.243	103.582
FUS500126	50-SACRAMENTO	5004	Fuse	80.837	25.484
OCD32515001	51-HANSON	5104	Recloser	62.874	94.057
FUS-268516160	51-HANSON	5104	Fuse	46.855	90.827
REC34509002	51-HANSON	5104	Recloser	46.085	85.063
FUS1074668160	52-ONTON	5201	Fuse	92.005	157.225
REC26310001	52-ONTON	5201	Recloser	77.395	115.091
REC24314001	52-ONTON	5201	Recloser	58.547	99.663
REC26321001	52-ONTON	5201	Recloser	54.794	93.681
REC42184001	52-ONTON	5201	Recloser	52.901	86.348
OCD26219002	52-ONTON	5201	Fuse	36.98	80.561
REC22309001	52-ONTON	5202	Recloser	86.574	49.005
REC22314001	52-ONTON	5202	Recloser	83.105	95.79
REC26423001	52-ONTON	5203	Recloser	76.095	164.813
REC28412001	52-ONTON	5203	Recloser	61.08	134.417
FUS867629945	52-ONTON	5203	Fuse	54.202	110.014
FUS1540509666	53-SOUTH HANSON1	5301	Fuse	66.053	133.773
FUS-668356116	53-SOUTH HANSON1	5301	Fuse	48.544	121.543
REC30415003	53-SOUTH HANSON2	5302	Recloser	50.883	80.553
REC32404004	53-SOUTH HANSON2	5303	Recloser	103.468	97.051
REC32501001	53-SOUTH HANSON2	5303	Recloser	56.09	112.232
FUS7613	53-SOUTH HANSON2	5303	Fuse	45.076	94.627
REC30322001	53-SOUTH HANSON1	5305	Recloser	160.096	275.822
FUS1252312103	53-SOUTH HANSON1	5305	Fuse	60.278	128.634
FUS482517087	53-SOUTH HANSON1	5305	Fuse	52.663	104.995
REC182378198	53-SOUTH HANSON1	5305	Recloser	47.412	101.73
REC30304001	53-SOUTH HANSON2	5306	Recloser	50.002	96.904
OCD134679	53-SOUTH HANSON2	5306	Recloser	41.709	86.846
REC28325002	53-SOUTH HANSON2	5306	Recloser	70.441	82.709
FUS500022	58-SOUTH OWENSBORO2	5801	Fuse	86.877	56.929
FUS1150457869	58-SOUTH OWENSBORO2	5805	Fuse	98.883	55.944
FUS503809	58-SOUTH OWENSBORO1	5806	Fuse	300.649	170.794
REC44264001	60-CALDWELL SPRINGS	6002	Recloser	58.354	81.191
REC43852002	61-CROSSROADS	6103	Recloser	60.066	90.93
REC42618001	62-DIXON	6202	Recloser	58.888	88.139
REC42712001	62-DIXON	6202	Recloser	54.68	87.828
FUS42083001	62-DIXON	6203	Fuse	123.653	122.073
FUS252012371	63-GENEVA	6302	Fuse	145.002	177.819
FUS116039339	63-GENEVA	6302	Fuse	115.903	148.758
FUS301083	63-GENEVA	6303	Fuse	85.761	98.765
REC40865001	63-GENEVA	6303	Recloser	68.318	90.337
FUS300529	64-WEAVERTON	6402	Fuse	41.213	109.528
REC41502001	64-WEAVERTON	6402	Recloser	54.532	94.309
FUS300525	64-WEAVERTON	6402	Fuse	42.826	92.315
REC41522001	64-WEAVERTON	6402	Recloser	46.603	90.454

Element Name	Upline Source	Upline Feeder	Device Type	Max Summer Loading (%)	Max Winter Loading (%)
FUS117551607	65-HUDSON1	6504	Fuse	217.374	202.221
REC41553001	66-LITTLE DIXIE	6601	Recloser	88.039	43.95
REC41439001	66-LITTLE DIXIE	6601	Recloser	81.909	88.286
REC42016001	66-LITTLE DIXIE	6602	Recloser	84.902	79.01
REC44832001	69-LYON	6901	Recloser	81.707	70.512
REC44872001	69-LYON	6902	Recloser	125.701	92.043
FUS301320	69-LYON	6902	Fuse	26.928	86.055
REC44872002	69-LYON	6902	Recloser	42.416	84.208
REC41314001	71-MORGANFIELD	7101	Recloser	97.63	49.85
REC41624001	80-NIAGARA	8001	Recloser	47.164	99.711
REC41084002	80-NIAGARA	8001	Recloser	44.741	86.247
REC41535002	80-NIAGARA	8002	Recloser	253.552	261.293
REC41547001	80-NIAGARA	8002	Recloser	150.206	168.185
REC41529001	80-NIAGARA	8002	Recloser	77.213	113.751
REC41537001	80-NIAGARA	8002	Recloser	64.07	90.015
REC41508002	80-NIAGARA	8003	Recloser	53.284	94.601
OCD41016001	82-RACE CREEK	8201	Fuse	52.397	99.052
FUS302211	82-RACE CREEK	8202	Fuse	83.526	43.027
FUS-1660685053	82-RACE CREEK	8202	Fuse	69.46	154.773
FUS302241	82-RACE CREEK	8202	Fuse	55.711	124.246
FUS-280258397	82-RACE CREEK	8202	Fuse	52.324	113.732
REC40919004	82-RACE CREEK	8202	Recloser	51.454	99.678
FUS2002798926	82-RACE CREEK	8202	Fuse	50.658	88.294
REC40493001	82-RACE CREEK	8203	Recloser	55.619	100.11
REC42117001	84-SEBREE	8402	Recloser	60.688	80.041
REC42154002	84-SEBREE	8403	Recloser	88.088	81.07
REC42134001	84-SEBREE	8403	Recloser	87.412	57.5
REC42173001	84-SEBREE	8403	Recloser	64.821	103.347
REC42527001	85-SULLIVAN	8502	Recloser	99.239	85.478
REC42545001	85-SULLIVAN	8502	Recloser	81.104	76.543
REC41024001	90-ZION	9001	Recloser	62.787	107.278
REC41016004	90-ZION	9002	Recloser	55.949	87.415
REC41077003	90-ZION	9003	Recloser	53.463	81.492
FUS-1760284384	90-ZION	9004	Fuse	83.554	34.974
FUS659483819	90-ZION	9004	Fuse	41.385	83.199
FUS302065	91-WOLF HILLS	9103	Fuse	64.841	118.058
FUS205896879	91-WOLF HILLS	9103	Fuse	52.716	115.118
REC40977001	106-ADAMS LANE	10601	Recloser	96.215	105.243
REC40976001	106-ADAMS LANE	10601	Recloser	85.32	50.949
FUS1156061174	106-ADAMS LANE	10602	Fuse	128.203	137.564
OCD40957001	106-ADAMS LANE	10602	Recloser	124.177	66.823
FUS674278277	106-ADAMS LANE	10602	Fuse	90.893	115.745