GOVERNMENT OF PUERTO RICO
PUERTO RICO PUBLIC SERVICE REGULATORY BOARD
PUERTO RICO ENERGY BUREAU

IN RE:

PROCESS FOR THE ADOPTION OF REGULATION FOR DISTRIBUTION RESOURCE PLANNING

CASE NO.: NEPR-MI-2019-0011

SUBJECT:

Motion submitting presentation in anticipation for compliance hearing of April 13, 2021.

JOINT MOTION SUBMITTING PRESENTATION IN ANTICIPATION FOR COMPLIANCE HEARING SCHEDULED FOR APRIL 13, 2021

TO THE PUERTO RICO ENERGY BUREAU:

COME NOW, LUMA ENERGY, LLC as Management Co., and **LUMA ENERGY SERVCO, LLC** (collectively, LUMA), and the **PUERTO RICO ELECTRIC POWER AUTHORITY** (PREPA) (jointly "LUMA and PREPA"), through their respective undersigned legal counsel and respectfully state and request the following:

1. In compliance with the Energy Bureau's Resolution and Order of December 31, 2020 ("December 31st Resolution and Order"), setting, among others, a second compliance hearing for April 13, 2021, and directing that copies of the presentation to be offered on Distribution Planning and of other related documents shall be filed at least three days prior to each compliance hearing, LUMA and PREPA hereby submit a Power Point™ presentation in pdf format entitled *"Plan for Distribution System Interconnection Capacity Map & Power System Inventory-Compliance Hearing*," April 13, 2021. *See* Exhibit 1.
2. The presentation includes updates on the status of the work schedules to complete the three tasks that this Energy Bureau identified in the December 31st Resolution and Order: (1) creation of voltage level maps, to be completed by May 31, 2021; (2) creation of preliminary maps of interconnection capacity, to be completed by September 30, 2021; and

(3) updating and completing a power grid inventory, to be completed by December 31, 2021. *See* Resolution and Order of December 31, 2020, pages 8-10. Comments and notes on next steps are also included.

3. Finally, the presentation provides clarifications in response to questions posed by Commissioners during the first compliance hearing that was held on February 10, 2021. *See* Exhibit 1, slides 16-19.

WHEREFORE, LUMA and PREPA respectfully request that the Energy Bureau **accept** and **consider** this filing of the Power Point™ presentation in pdf format for the compliance hearing scheduled for April 13, 2021, and **deem** that LUMA and PREPA timely filed the same for consideration by the Energy Bureau in preparation for the upcoming compliance hearing on Distribution Planning.

RESPECTFULLY SUBMITTED.

In San Juan, Puerto Rico, this 8th day of April 2021.

We certify that We filed this motion using the electronic filing system of the Puerto Rico Energy Bureau.

Counsel for LUMA Energy LLC as Management Co. and LUMA Energy ServCo LLC

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Exhibit 1

Presentation
Plan for Distribution System Interconnection Capacity Map & Power System Inventory-Compliance Hearing, April 13, 2021

Plan for Distribution System Interconnection Capacity Map & Power System Inventory – Compliance Hearing

NEPR-MI-2019-0011
April 13, 2021

Agenda

- Overall Status
- Status Updates by Order
  - Order 1: Voltage level maps
  - Order 2: Preliminary maps of interconnection capacity
  - Order 3: Power grid inventory
- Compliance Hearing 1 – Follow Ups
  - Timeline – Scenarios 1-4
  - Technical and Non-technical Loss Methodology

Overall Status

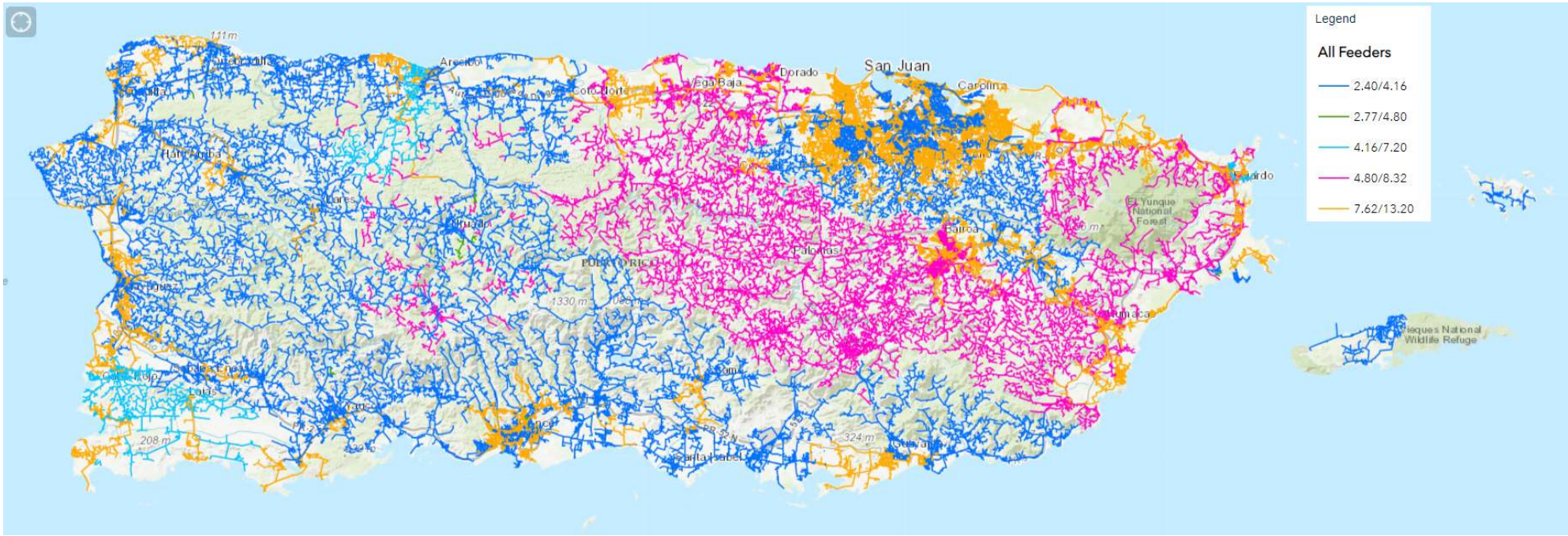
Order	Overall Status	Risks	Next Steps
Order 1 – Voltage Level Maps		• None to report	• Strengthen IT infrastructure; purchase ESRI licenses • Publish ArcGIS from DG Portal
Order 2 – Preliminary Maps of Interconnection Capacity • DG and load per feeder data review • Synergi modeling process review		• Gaps identified with DG and load data, there is DG with no feeder id or coordinates data • Gaps discovered in Synergi modeling	• Prepare process to identify DG per feeder data using available data base (e.g.,Gtech, CC&B, PREP-AEE). Missing data will be completed during field inventory. • Prepare process to extract and cleanse 1-ph load data per feeder (PI Historian). Missing 3-ph data to be collected during field inventory • Prepare process and tools to include DG and load to Synergi Models
Order 3 – Power Grid Inventory • Assessing data sources • Assessing data storage plan		• Information gaps have been discovered relating to DGs and backup generation. The team is exploring options to fill this gap.	• For all items: Complete the discussion for data storage, prepare the selected systems accordingly, and proceed with data collection / input plans. • For DGs: Consolidate data sources and determine plan for misaligned or missing data.

Order 1: Voltage Level Map

Task	Detail	Assessment Status
1	GIS Layer with Feeder Number and voltage level map	Complete
2	Zoom in up to street level	Complete, as part of the GIS
3	GIS Layer identifying feeders that required supplementary studies	Complete
4	Strengthen IT Infrastructure and purchase ESRI licenses.	In Progress
5	Publish ArcGIS from DG Portal	In Development

Order 1: Voltage Level Map

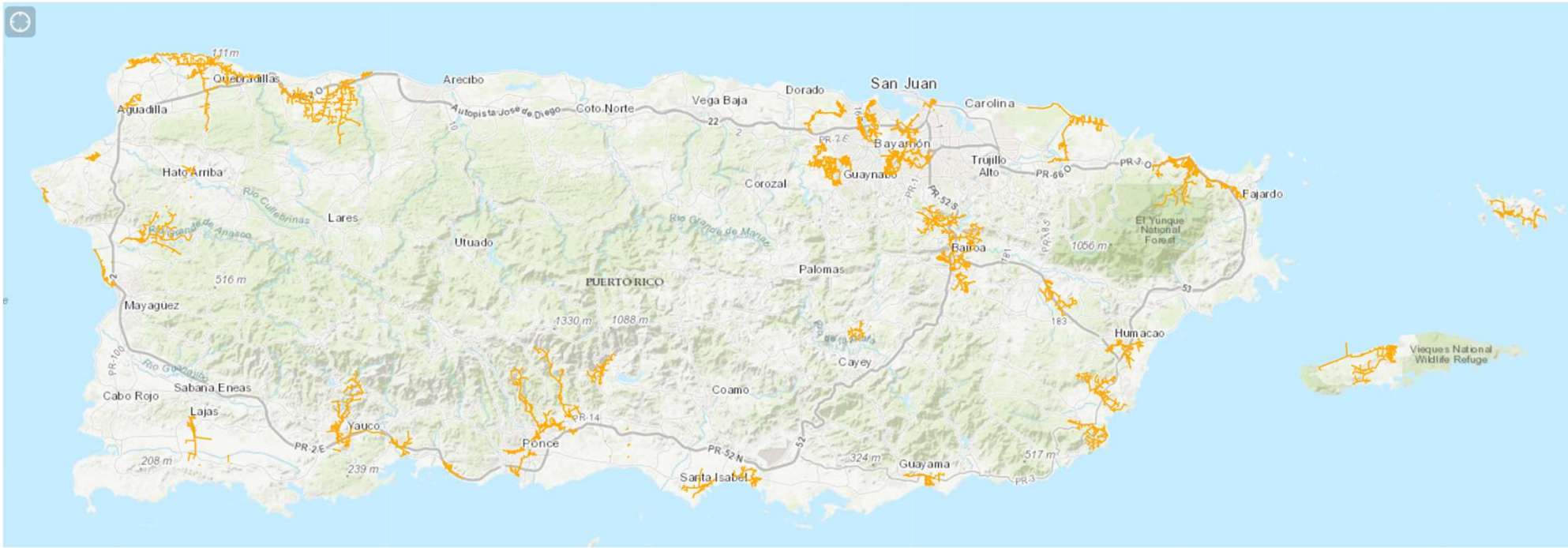
- Voltage Level Map using ESRI ArcGIS



Note: The above feeder layout is as digitized and does not reflect actual configuration, it will progressively be updated with field inventory work

Order 1: Voltage Level Map

- Feeders with Supplementary Study Required

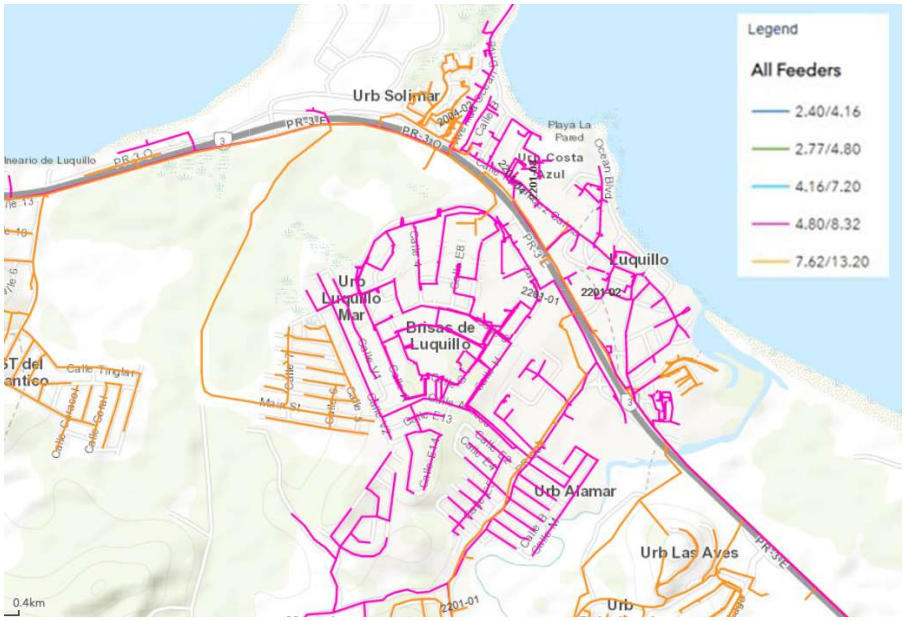


Note: The above feeder layout is as digitized and does not reflect actual configuration, it will progressively be updated with field inventory work

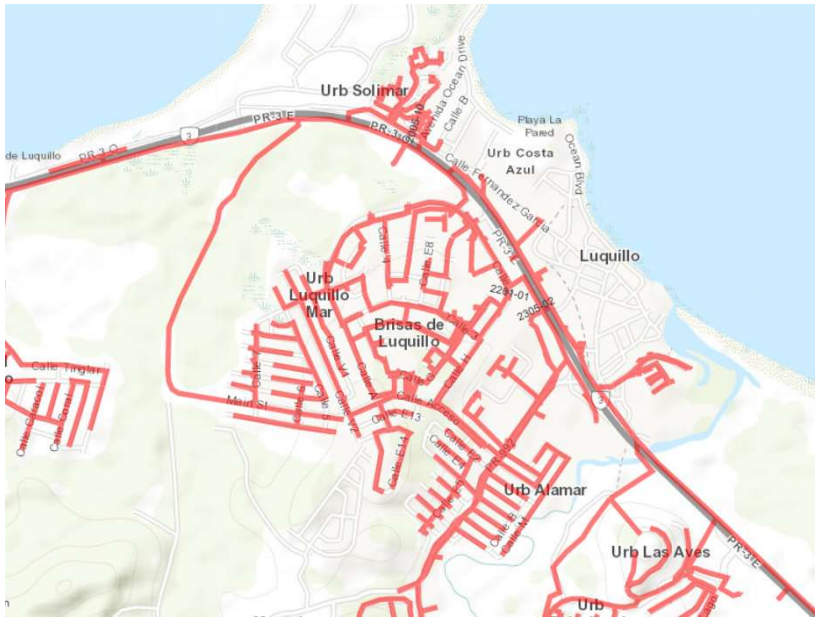
Order 1: Voltage Level Map

- Voltage Level Map and Supplementary Study Requirement – Street Level

Voltage Level



Supplementary Study Required



Note: The above feeder layout is as digitized and does not reflect actual configuration, it will progressively be updated with field inventory work

Order 2: Interconnection Capacity

Highlights – Data Assessment

Task	Detail	Assessment Status	Notes / Next Steps
1	Load Profile per feeder	In progress	• Load profile data extraction tool was created, and sample report runs are in progress. • Data cleansing tool created and in testing mode. • Data reconstruction tool in progress and will be based on existing profile and weather records. **Next steps:** • Analyze the sample reports to determine if they have sufficient information to create a demand profile (Amps, Volts, etc.). • Analyze cleansing results and adjust it based on available data (e.g., amps, volts, etc.). • Investigate weather station data to be used in the profile reconstruction process.

Order 2: Interconnection Capacity

Highlights – Data Assessment

Task	Detail	Assessment Status	Notes / Next Steps
2	DG data per Feeder	In progress	• Various sources located and examined. Some misalignments found; some DERs identified to be missing capacity, phasing and feeder ID data. **Next steps:** • Consolidate sources and determine plan for misaligned or missing data, e.g., field data collection, review DG data collection process via PREPA DG Portal to GIS and CC&B.
3	Synergi Model Assessment	In progress	• Synergi model collected and being tested. GIS topology is well captured in Synergi. Missing data is identified e.g., load, DG, equipment rating, status and settings (e.g., Reclosers, Voltage Regulators, Capacitor Banks, Fuses, etc.). **Next steps:** • Analyze process to convert DG data recorded in GIS to geographically convert it into Synergi.

Order 3: Power Grid Inventory

Highlights – Assess Data Availability

Order	Data	Assessment Status	Notes / Next Steps
a	Understanding of quality of extant location data in GIS	Complete	Samples of feeders were assessed and found to have location errors. **Next steps:** Proceed with collecting this data during the field verification initiative.
b	List of distribution device SCADA points	Complete	Received a report of distribution device points in PREPA SCADA. **Next steps**: Analyze to assess visibility level of each distribution device.
c	Hourly load profile at the start of each feeder	In progress	A data extraction tool was created, and sample report runs are in progress. **Next steps:** Analyze the sample reports to determine if they have sufficient information to create a demand profile.

Order 3: Power Grid Inventory

Highlights – Assess Data Availability

Order	Data	Assessment Status	Notes / Next Steps
d	List of DERs, including type, capacity, and feeder; including industrial and institutional back gen	In progress	Various sources located and examined. Some misalignments found; some DERs identified to be missing capacity and feeder data. No records found for backup generation. **Next steps:** Consolidate sources and determine plan for misaligned or missing data. E.g. field data collection, survey or inquiry with large customers.
e	DER profile data from industry standard datasets	Complete	Datasets identified and located. **Next steps:** Complete calculations to create regional profiles.

Order 3: Power Grid Inventory

Highlights – Assess Data Availability

Order	Data	Assessment Status	Notes / Next Steps
f	Age data for distribution substation and service transformers	Complete	Data found for most substation transformers. Confirmed that data is not available for service transformers. **Next steps:** Include status as "in-service" or "out of service," proceed with collecting this data during the field verification initiative. This data will be combined with industry data to estimate remaining service life under ideal maintenance practices.
g	Hourly load profile at the start of each feeder Monthly kWh meter reads for each customer	In progress	Hourly load profile at the start of each feeder: see item c. Monthly kWh meter reads: Data located. Developing tool for extracting the data. **Next steps:** Complete the tool for monthly meter reads and perform the data extraction in line with customer privacy requirements. Use the data, in addition to the feeder load data, to calculate technical and non-technical losses.

Order 3: Power Grid Inventory

Highlights – Assess Data Availability

Order	Data	Assessment Status	Notes / Next Steps
h	Physical and cyber vulnerability information	Complete	Usable data not found. **Next steps:** Create physical and cyber checklists to be carried out during upcoming substation inspections.
i	List of critical and priority loads, including feeder identification	Complete	Lists obtained and deemed to be usable. **Next steps**: Decide on data archiving system. Prepare data for storage in the selected system.
	List of feeders requiring supplementary studies	In progress	Present list obtained. List will be further developed during execution of order 2. **Next steps:** Wait for updated list from order 2.
j	Understanding of quality of extant location data in GIS	Complete	See item a.

Order 3: Power Grid Inventory

Highlights – Define Archiving System

Order	System Definition Status	Notes / Next Steps
All	In progress	Presently discussing options with the team for storing each data item. **Next steps:** Select the option for each item. Prepare the selected systems as needed. Proceed with data collection / input plans.

Licensing Confirmations

System	Required For	Sufficient Licenses	Notes
G/Technology	System of record for some of the collected data (e.g. locations). Office personnel to use during execution of order 3.	Yes	500 licenses available; expected to need 50-100.
GTViewer	Field personnel to use during data collection for order 3.	No	50 licenses available; expected to need 150-250 depending on timing. Expected cost $53-106k up front, + $11-22k / year
Synergi	Planning personnel to use for hosting capacity calculations for order 2.	Yes	
Pi Datalink	Office personnel to use for extracting data supporting order 2 and 3 calculations. (E.g. historical loading)	No	Quote requested from vendor.

Compliance Hearing 1 – Follow-ups

Timeline – Scenarios 1-4

Technical and Non-Technical Loss Methodology

Timeline - Scenarios 1 - 4

- The RFP for field data collection is currently in progress; contractors will provide quotes for the following scenarios:

Base Figures	
Number of Poles	725,000
Productive Weeks Per Year	45
Work Days Per Week	5
Weeks for Pre-Project Meetings	2
Weeks for Post-Project Meetings	2
Poles Per Crew Per Day	6
Field Crew Size	2
Field: Office Ratio	3

	Scenario 1 End of 2021	Scenario 2 2.5 years	Scenario 3 3.5 years	Scenario 4 5 years
Duration (years)	0.5	2.5	3.5	5.0
Productive Weeks	19	109	154	221
Poles Per Week	39,189	6,682	4,723	3,281
Poles Per Day	7,838	1,336	945	656
Crews Required	1,307	223	158	110
Field Personnel Required	**2,614**	**446**	**316**	**220**
Office Personnel Required	**436**	**75**	**53**	**37**
Total Personnel Required	**3,050**	**521**	**369**	**257**

Note: Accelerated Scenarios 1 and 2 have not been considered in the previously submitted initial budgets.

Timeline for Transition from Rudimentary to Hosting Capacity:

- Once the above timeline scenario is confirmed based on the RFP response, this will inform the timeline for the transition from rudimentary to hosting capacity

Cost Detail:

- Additional cost detail for third-party contractor cost will be provided once the RFP response is received and scenario confirmed

GIS Data from Damage Assessment Documents:

- The LUMA and PREPA teams are currently reviewing available GIS data from the damage assessment documents and will potentially incorporate into the data gathering process pending location accuracy of the data

Technical and Non-Technical Loss Methodology

The distribution feeder technical and non-technical losses will be approximated using the methodologies described below. There is a lack of data in the present system. The loss calculations will only be improved once high-quality SCADA metering equipment is installed per feeder and an advanced metering system is installed at the customer's location.

Technical Loss:

Power profiles and peak demand are the basis of the study. At each interval, the 6.54% distribution loss factor at peak, will proportionally be allocated to the power at the interval i (P_i), and normalized to the average feeder length as following:

$$\%Tec_{Loss}at\ Pi = \frac{P_i}{P_{\ Peak}} * \frac{Feeder\ Lenght}{Avg\ Feeder\ Lenght} * 6.54\%$$

The feeder technical losses will then be annualized as following:

$$Tec_{Loss} = \sum (\%Te_{\ Loss}at\ Pi) * Pi$$

Technical and Non-Technical Loss Methodology

Non-Technical Loss (NTL):

Distribution feeder NTL is estimated by extracting energy consumed at the distribution feeder head based on current single-phase information available from SCADA then subtracting the estimated technical losses and the estimated energy consumed by the customers revenue meters on that feeder. The energy consumed by the customers is estimated because it must be synchronized at the feeder head by estimating their usage at the same time period of consumption. This estimated step is needed since meters are read at different day intervals during a month. Another source of estimation is the meter tied to a feeder. The customer meters are currently not associated with distribution feeders, so therefore, the customer meters will have to be approximately tied to a distribution feeder.

$$NTL = E_{feeder\ head} - Tec_{Loss} - \sum E_{Customers}$$

Thank you