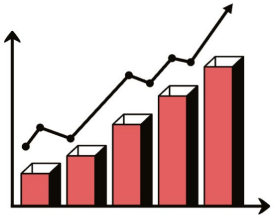
A DATA-DRIVEN CONSULT FOR THE ITTY-BITTY ELECTRIC COMPANY



DATA FIENDS

BY: THE DATA FIENDS

MEET THE TEAM

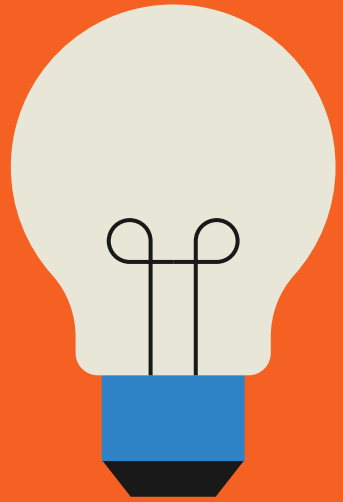
Alison Ching

Fayre-Ella Ooi

Jessica Pinto

Leila Corrales

Louisa Anjanette Auwila



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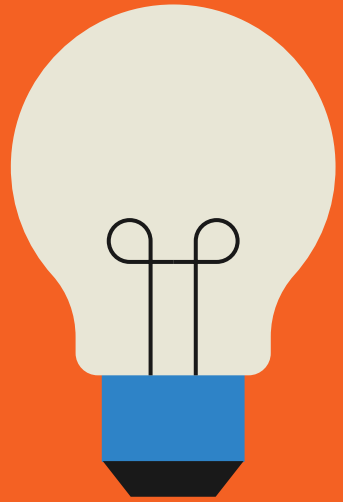

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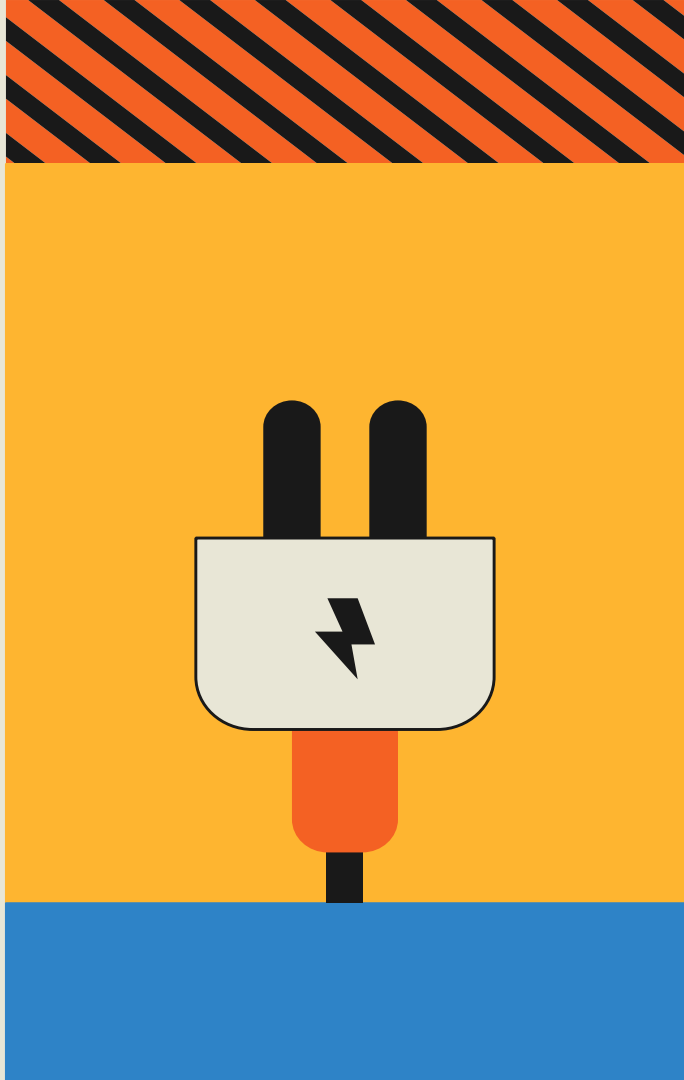
01

BACKGROUND OBSERVATIONS



SWOT ANALYSIS

STRENGTHS

- Extensive Service Coverage
- Strong Customer Relationships

WEAKNESSES

- Limited Technological Expertise
- Outdated Infrastructure

OPPORTUNITIES

- Technological Adoption
- Data-Driven Decision Making

THREATS

- Environmental Risks
- Budget Constraints

KEY OBSERVATIONS

CMI

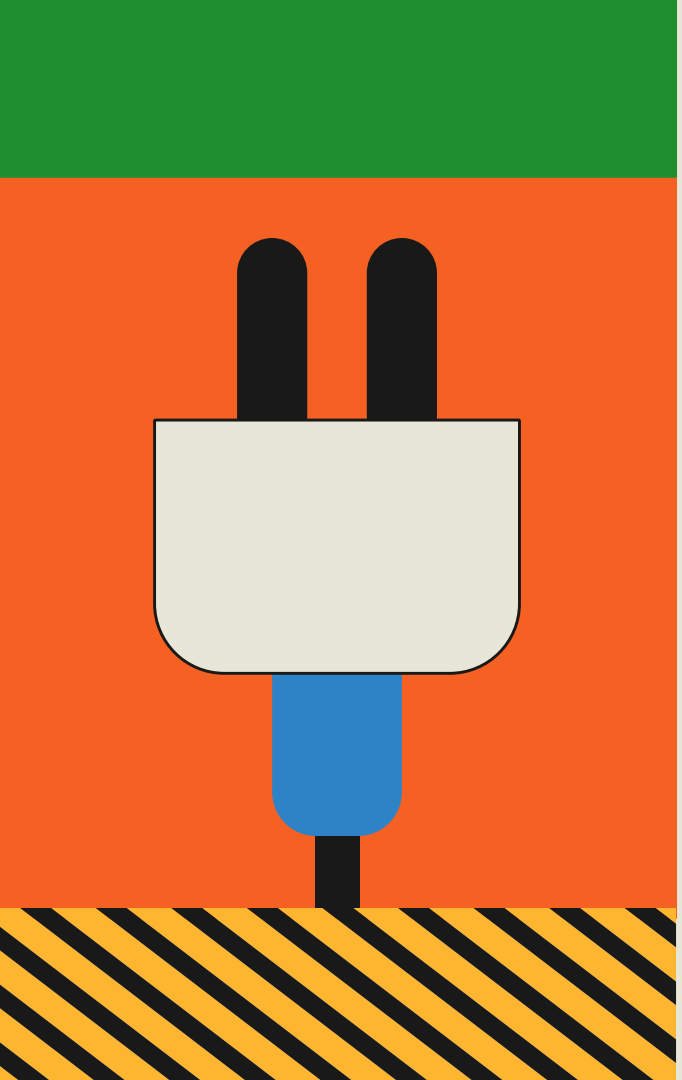
- Influenced by # of customers affected by an outage and duration of interruption.

Data Concerns

- Data set does not include a specific geolocation
- Limited Data
- Formatting Issues

Risks and Impact

- Inaccurate or missing data could lead to misallocation of budget
- Data bias on selected reported outages may underestimate critical weak points



02

THE DATA

OUR PROCESS

1. Background observations on dataset and research
2. Clean data
3. Create visualizations and conduct statistical tests
4. Analyze and create a business plan

OVERVIEW OF THE DATASET

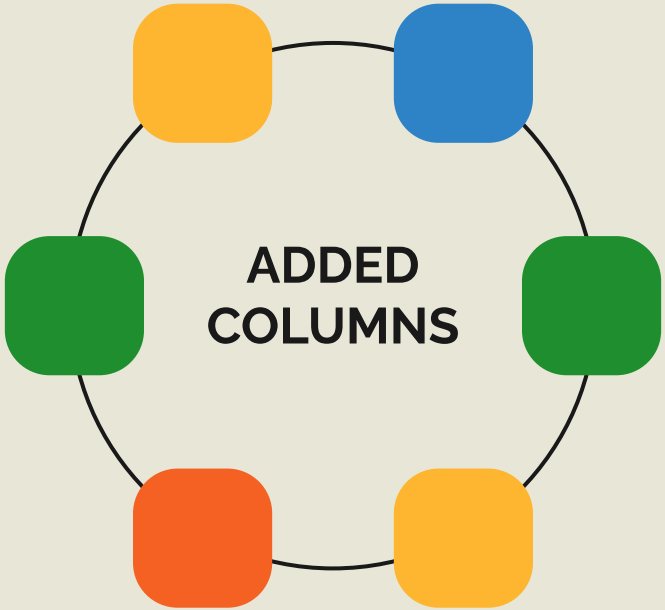
Number of Outage per Region

Overhead Miles

% of Overhead * Total Miles

Underground Miles

% of Underground * Total Miles



SAIDI 2024

Total Outage Duration / Customer Count

SAIFI 2024

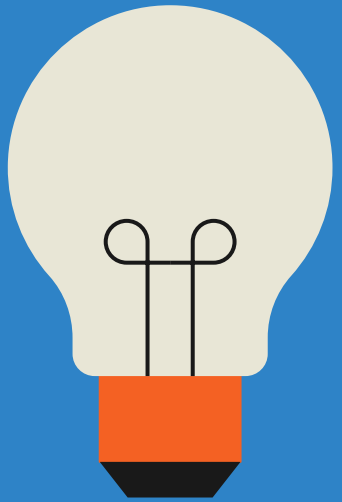
Number of Outages / Customer Count

KV-Miles

Kilovolts * Total Miles

03

DATA ANALYSIS & INSIGHTS



PINPOINTING CIRCUITS ANALYSIS

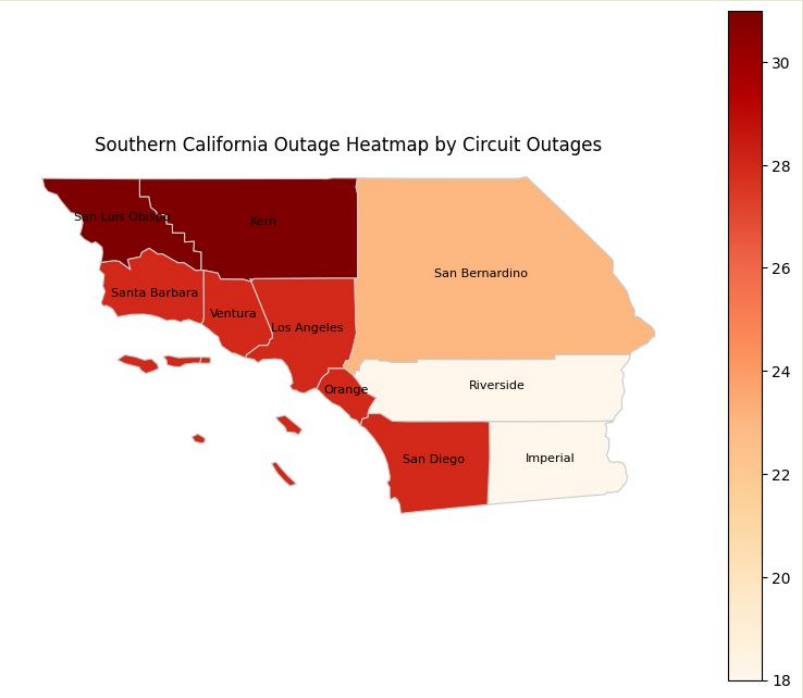
Number of Circuit Outages Per County/Region

North Region: San Luis Obispo, Kern County

Coastal Region: Santa Barbara, Ventura, Los Angeles, Orange, San Diego County

Mountain Region: San Bernardino County

Desert Region: Riverside, Imperial County

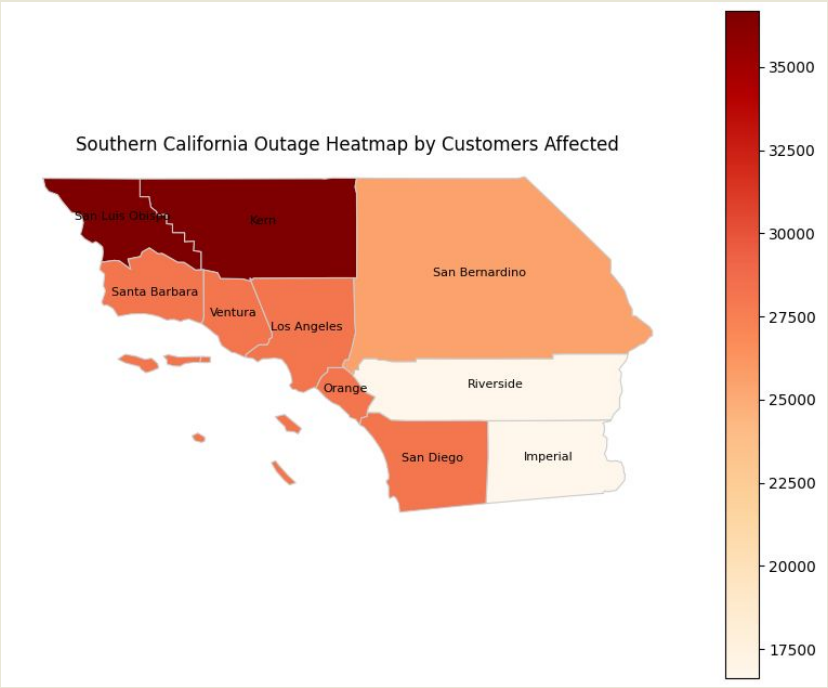


PINPOINTING CIRCUITS ANALYSIS

Customers Affected by County/Region

Number of Circuit Outages and Customers Affected are directly correlated (same trends)

We found statistically significant evidence that the North Region has a significant amount of average customers affected



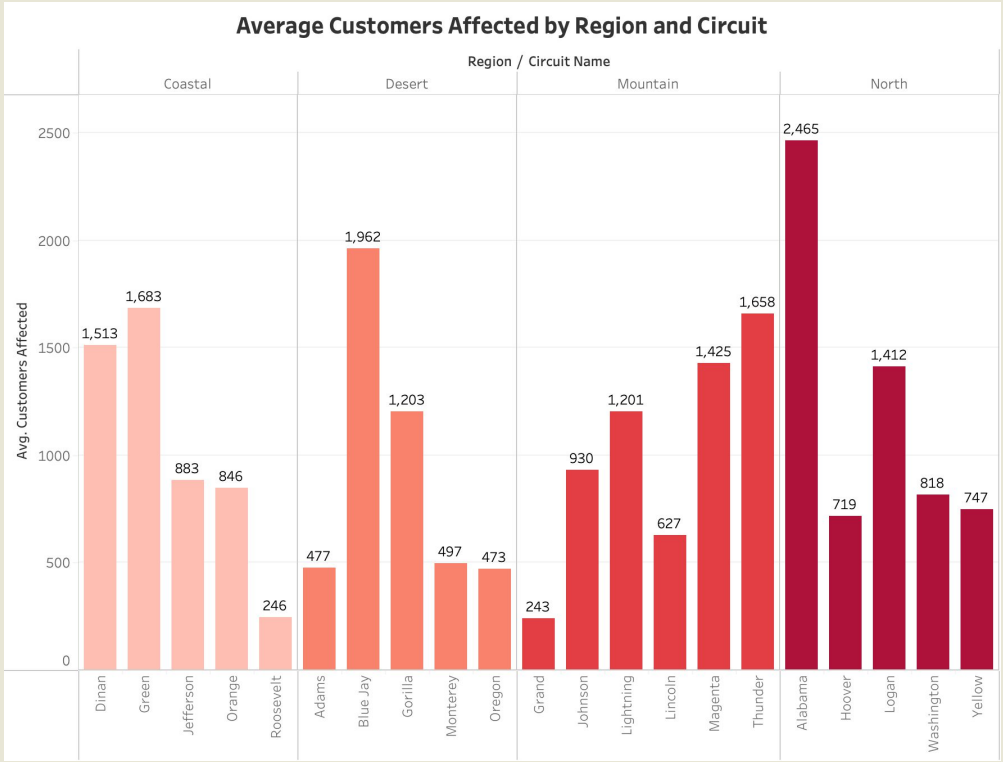
PINPOINTING CIRCUITS ANALYSIS

Average Customers Affected by Region and Circuit

We ran statistical testing for each region to find which circuits were the most problematic in terms of Customers Affected.

Top 9 Circuits:

- Alabama, Blue Jay, Green, Thunder, Dinan, Magenta, Logan, Gorilla, and Lightning

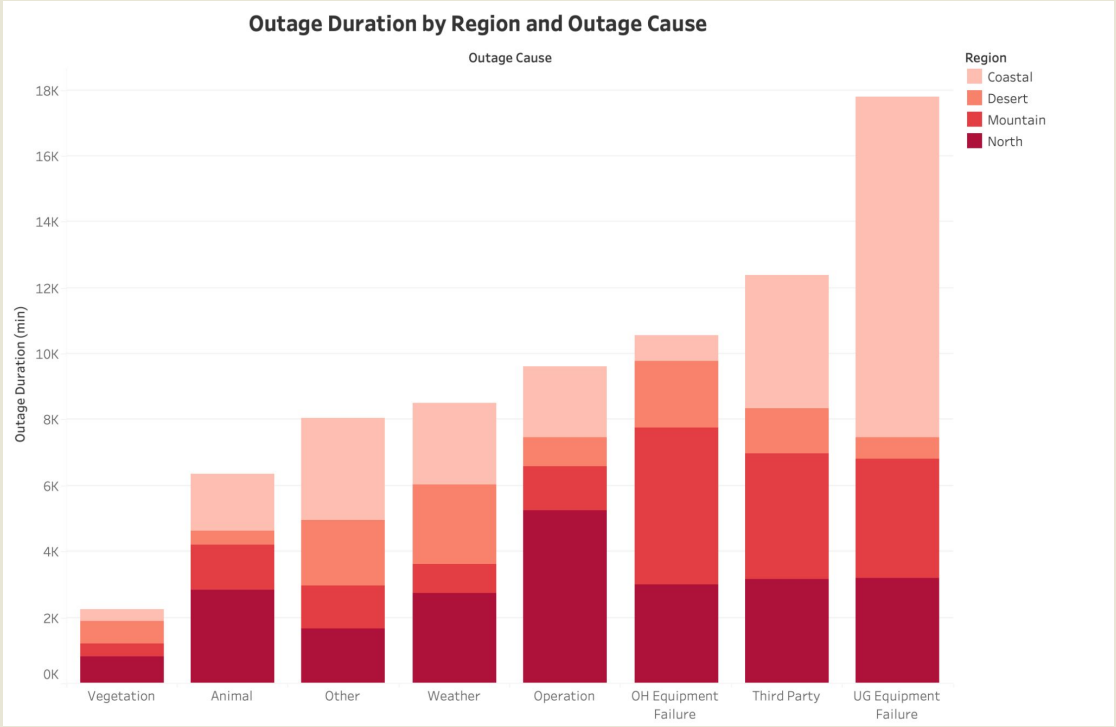


CIRCUIT OUTAGE CAUSE ANALYSIS

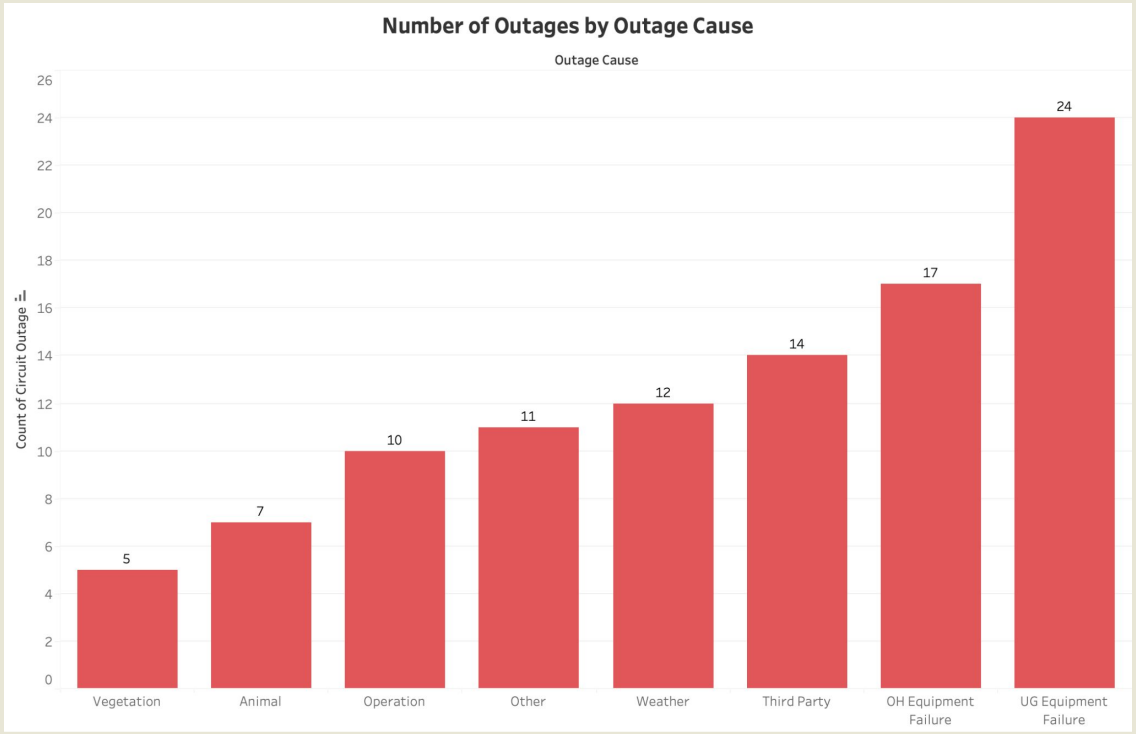
Outage Duration by Region and Outage Cause

UG Equipment Failure contributes the most minutes of outage.

Third Party and OH Equipment Failure coming in second and third, respectively.



CIRCUIT OUTAGE CAUSE ANALYSIS



Number of Outages by Outage Cause

UG Equipment Failure is the cause for the most number of outages.

OH Equipment Failure and Third Party causes coming in second and third, respectively

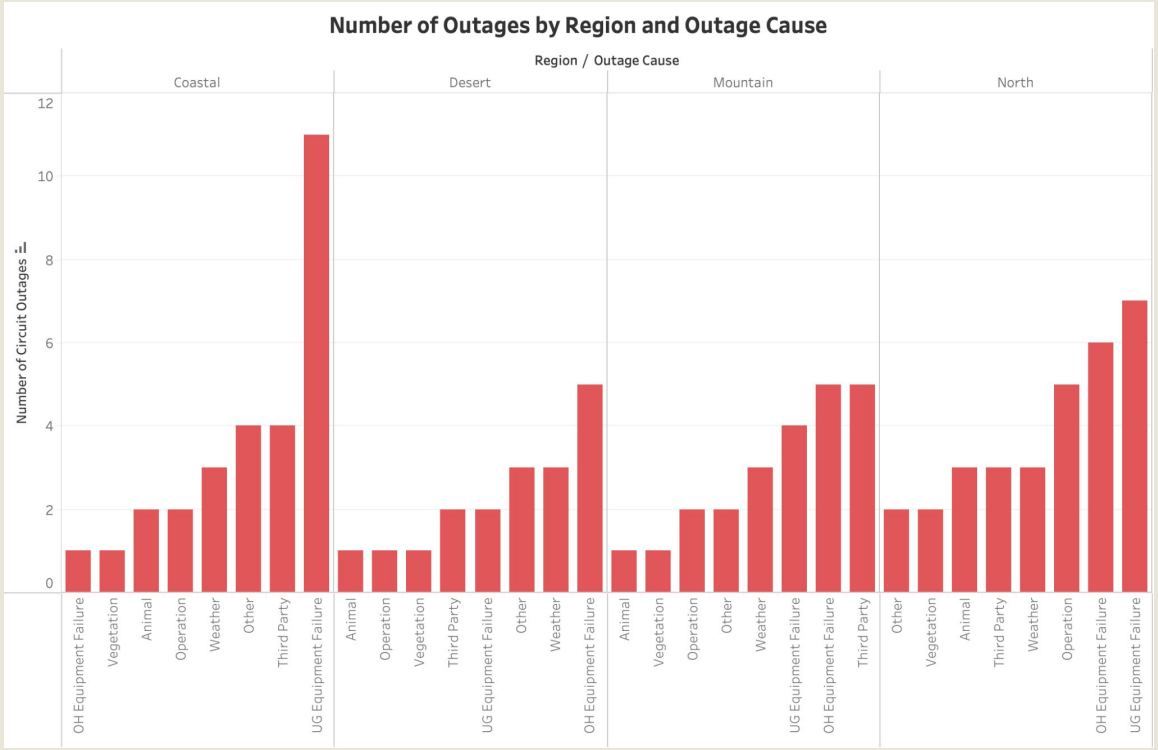
CIRCUIT OUTAGE CAUSE ANALYSIS

Coastal's Main Causes:
1. UG Equipment Failure
2. Third Party
3. Other

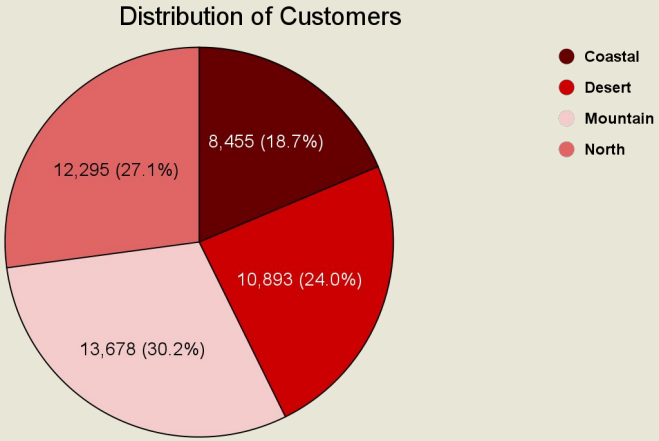
Desert's Main Causes:
1. OH Equipment Failure
2. Weather
3. Other

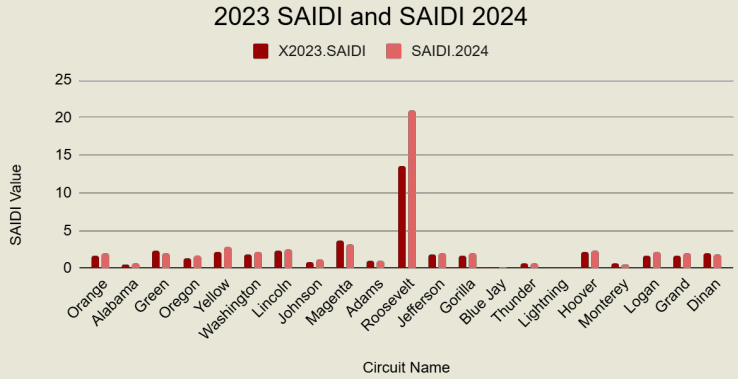
Mountain's Main Causes:
1. Third Party
2. OH Equipment Failure
3. UG Equipment Failure

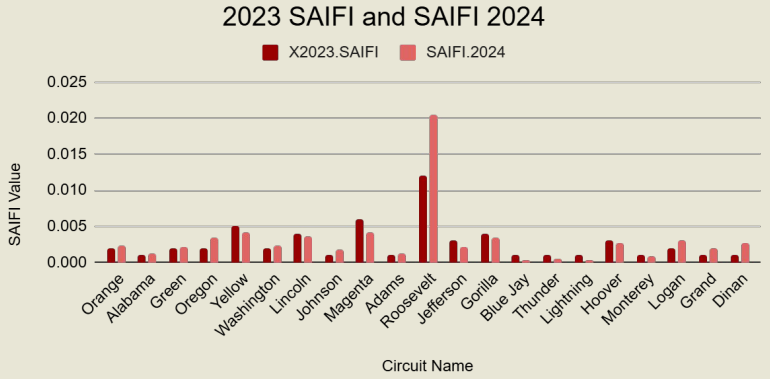
North's Main Causes:
1. UG Equipment Failure
2. OH Equipment Failure
3. Operation



SAIFI AND SAIDI ANALYSIS





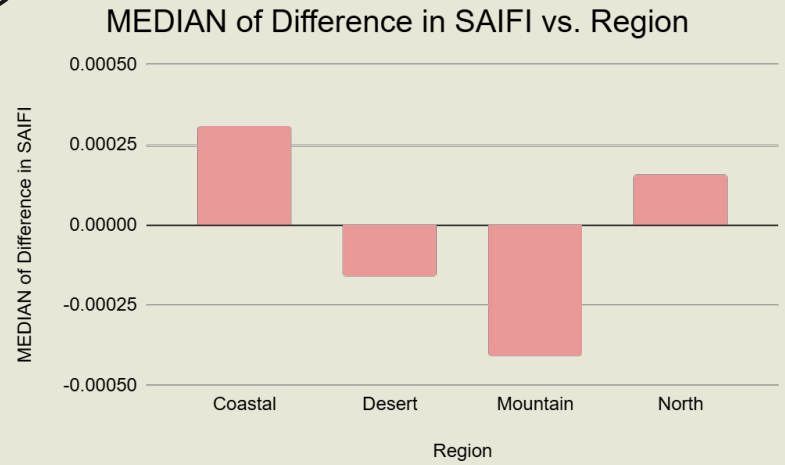


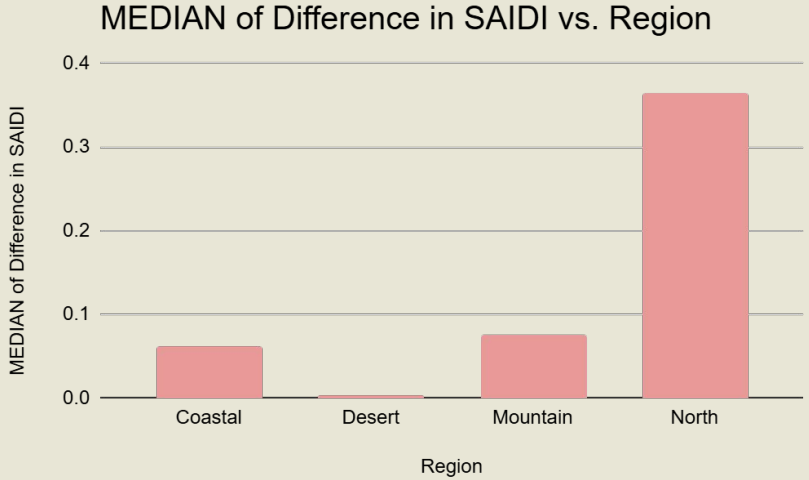
A total of 45,321 customers.

Roosevelt has the highest SAIFI and SAIDI

Roosevelt has the largest different in 2023 and 2024 SAIFI and SAIDI

SAIFI AND SAIDI ANALYSIS





Positive = increase in Number of Outages
Negative = decrease in Number of Outages

- Coastal has the highest increase in SAIFI and North had the second highest increase

Positive = increase in Outage Duration
Negative = decrease in Outage Duration

- North has the highest increase in SAIDI while Desert had the least increase.

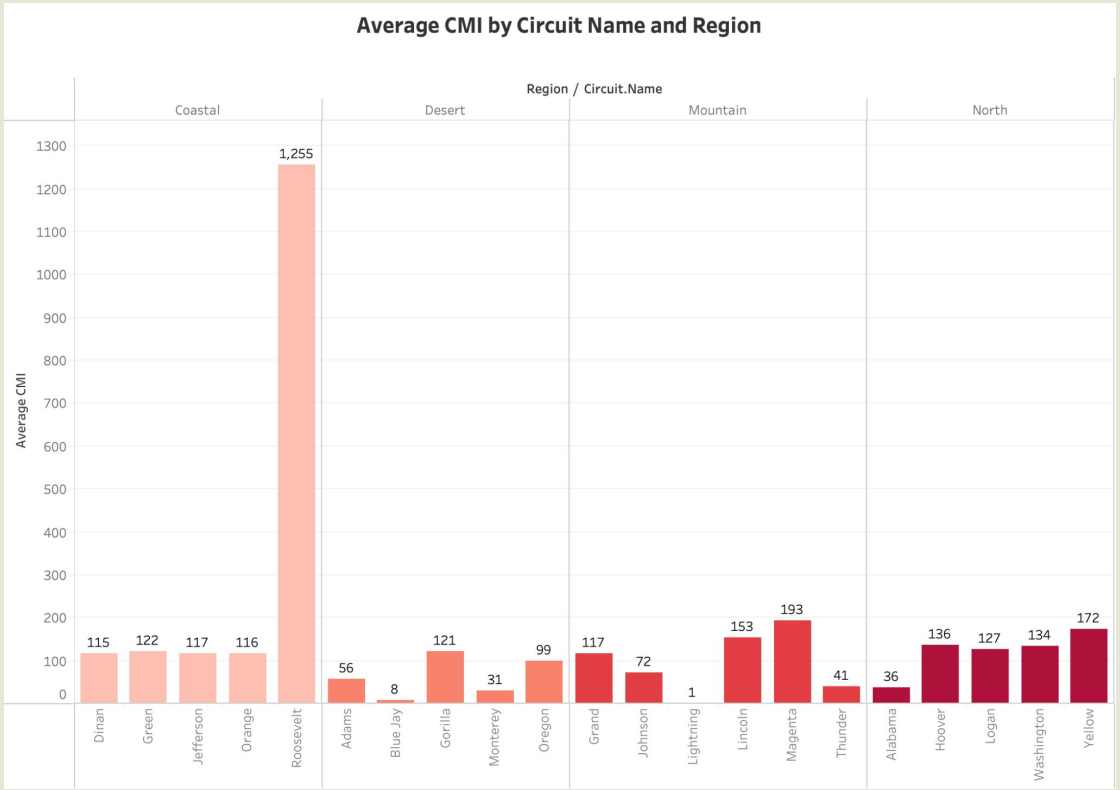
CUSTOMER MINUTES ANALYSIS

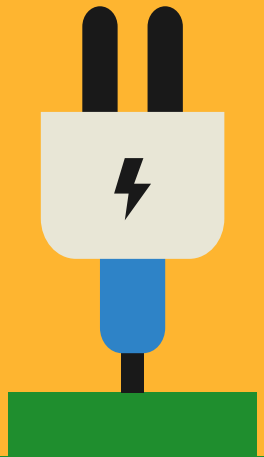
Coastal:
1. Roosevelt
2. Green
3. Jefferson

Desert :
1. Gorilla
2. Oregon
3. Adams

Mountain:
1. Magenta
2. Lincoln
3. Grand

North:
1. Yellow
2. Hoover
3. Washington





04

BUSINESS STRATEGY

NORTH

Observations:

- **Most** changes in **SAIDI** from 2023-2024
- **Most** in the **Customers Affected**
- **Most** in **Number of outages**
- Underground Equipment Failure and Overhead Equipment Failure is the top cause of outages
- Operation causes are second
- Outages caused by Operation failures has longest duration

Changes to be made:

- Major Equipment Upgrades on Underground Equipment and Overhead Equipment
- Improved dispatch of outage response time

Priority:

Alabama > Yellow > **Logan** > Washington & Hoover

COASTAL

Observations:

- **Most** change in **SAIFI** from 2023-2024
- **2nd most** in **Customers Affected**
- **2nd most** in terms of **Number of outages**
- Underground Equipment Failure is the top cause of outages

Changes to be made:

- Major Equipment Upgrades on Underground Equipment
- Installing Protective Infrastructure
- Roosevelt Plan - outlier circuit

Roosevelt Plan:

Prioritizing Budget:

- Terminating Roosevelt Circuit.
- Least amount of Customers Served
- May receive negative feedback from Public

Prioritizing Customer Satisfaction:

- Case Worker for inspection and data collection
- Increases loyalty from customers
- More expensive

Priority:

Green > **Dinan** > Jefferson> Orange

MOUNTAIN

Observations:

- **kV miles** affect the number of outages: *for every 1000 unit increase in kV-miles, the number of outages increases by 3.9*
- Underground Equipment Failure and Overhead Equipment Failure is the top cause of outages
- Overhead Equipment Failure cause the longest outages

Changes to be made:

- Reducing circuit miles for Magenta Circuit
- Minor Overhead Equipment Repairs

Priority:

Magenta > Lincoln > Johnson > Grand > **Thunder** > **Lightning**

DESERT

Observations:

- Poses the **least** problematic region
- **Least** in the Number of **Customers Affected**
- Overhead Equipment Failure, Weather and Other are the top causes of outages

Changes to be made:

- Installing Back-up generators & Solar Panels
- Minor Overhead Equipment repairs
- Improved dispatch outage response time

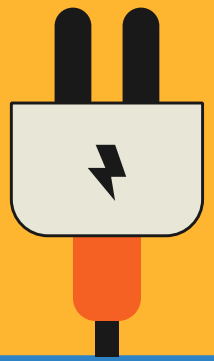
Priority:

Blue Jay > **Gorilla** > Oregon and Adams > Monterey

05

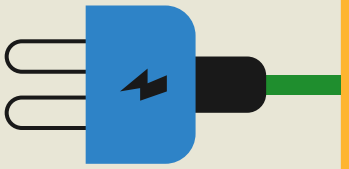
IMPLEMENTATIO N PLAN

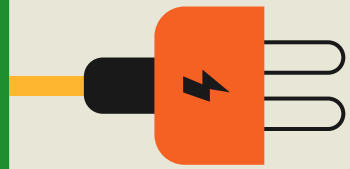
Methods through which IBEC can accomplish their goals by optimizing their resources, efficiently responding to issues, and taking preemptive steps to prevent problems before they arise.



GOALS & OBJECTIVES

- Reduce the number of circuit outages that are occurring
- Make a solid plan to identify where to allocate funds
- Establish and train teams to begin repairing the most critical circuits
- Maintain well performing circuits to prevent outages due to deterioration
- Improve customer satisfaction

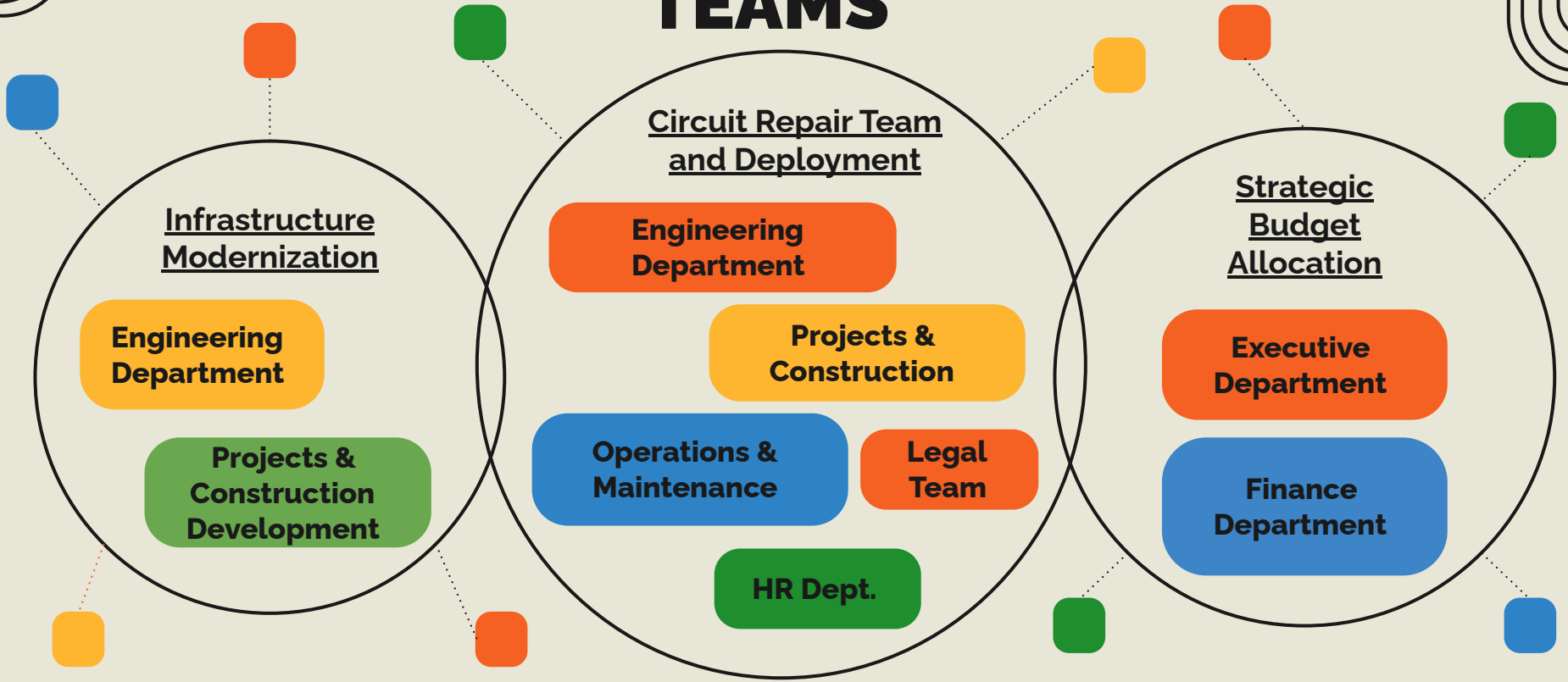




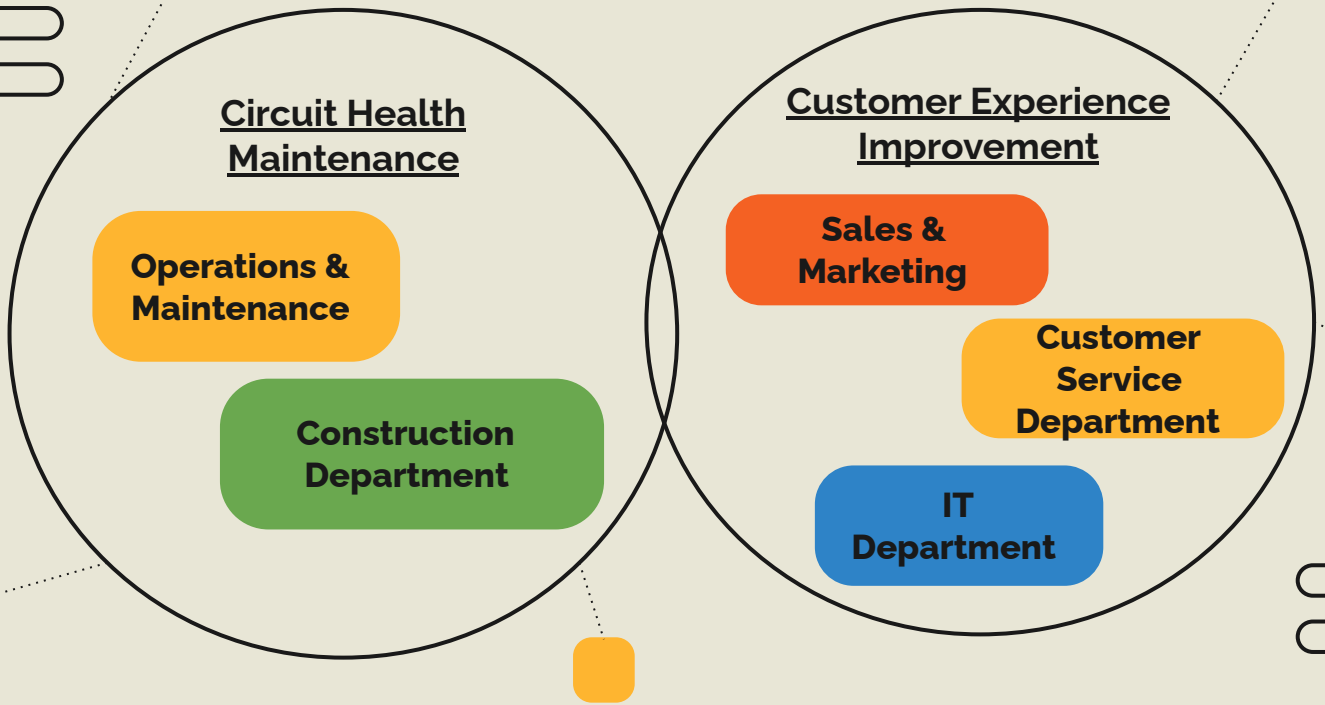
KEY IMPLEMENTATION AREAS

	INITIATIVE NAME	TASKS
1	**Infrastructure Modernization**	Update outdated circuit components to obviate replacement
2	**Strategic Budget Allocation**	Identify where to allocate the budget based on circuit loss & criticality
3	**Circuit Repair Team and Deployment**	Train and deploy teams of experts to begin repairs swiftly
4	**Circuit Health Maintenance**	Create regular maintenance plans and send small teams for checks
5	**Customer Experience Improvement**	Be transparent about repairs and outline specific steps to prevent outages

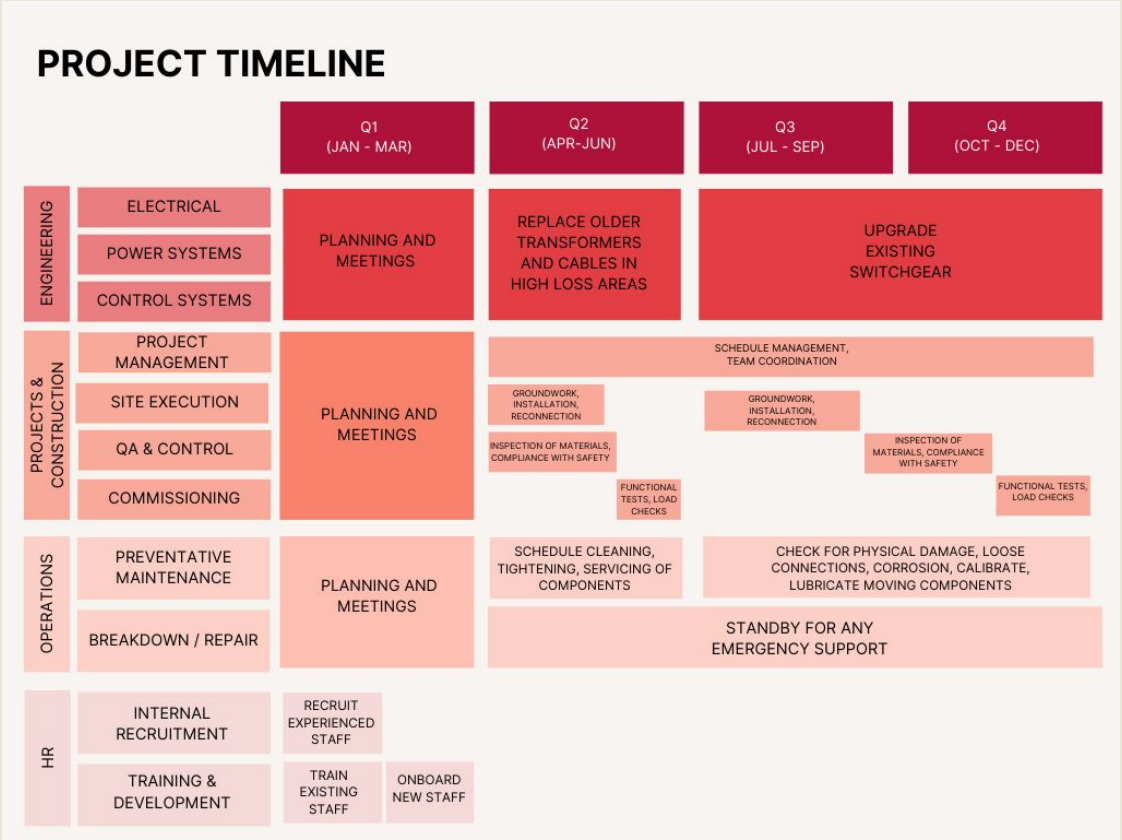
RESPONSIBLE DEPARTMENTS & TEAMS



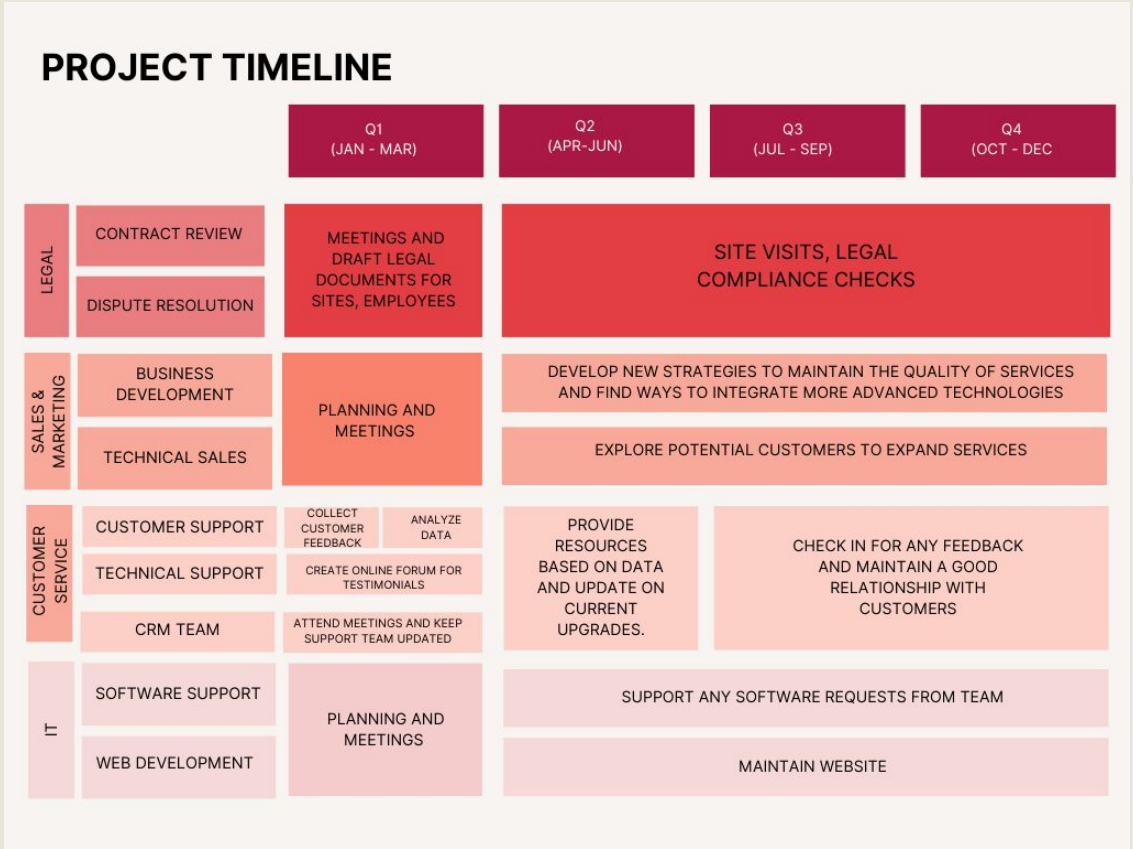
RESPONSIBLE DEPARTMENTS & TEAMS



TIMELINE


PROJECT TIMELINE
Q1 (JAN - MAR)
Q2 (APR-JUN)
Q3 (JUL - SEP)
Q4 (OCT - DEC)
ENGINEERING
ELECTRICAL
POWER SYSTEMS
CONTROL SYSTEMS
PLANNING AND MEETINGS
REPLACE OLDER TRANSFORMERS AND CABLES IN HIGH LOSS AREAS
UPGRADE EXISTING SWITCHGEAR
PROJECTS & CONSTRUCTION
PROJECT MANAGEMENT
SITE EXECUTION
QA & CONTROL
COMMISSIONING
PLANNING AND MEETINGS
SCHEDULE MANAGEMENT, TEAM COORDINATION
GROUNDWORK, INSTALLATION, RECONNECTION
INSPECTION OF MATERIALS, COMPLIANCE WITH SAFETY
FUNCTIONAL TESTS, LOAD CHECKS
GROUNDWORK, INSTALLATION, RECONNECTION
INSPECTION OF MATERIALS, COMPLIANCE WITH SAFETY
FUNCTIONAL TESTS, LOAD CHECKS
OPERATIONS
PREVENTATIVE MAINTENANCE
BREAKDOWN / REPAIR
PLANNING AND MEETINGS
SCHEDULE CLEANING, TIGHTENING, SERVICING OF COMPONENTS
CHECK FOR PHYSICAL DAMAGE, LOOSE CONNECTIONS, CORROSION, CALIBRATE, LUBRICATE MOVING COMPONENTS
STANDBY FOR ANY EMERGENCY SUPPORT
HR
INTERNAL RECRUITMENT
TRAINING & DEVELOPMENT
RECRUIT EXPERIENCED STAFF
TRAIN EXISTING STAFF
ONBOARD NEW STAFF

TIMELINE


PROJECT TIMELINE
Q1 (JAN - MAR)
Q2 (APR-JUN)
Q3 (JUL - SEP)
Q4 (OCT - DEC)
LEGAL
CONTRACT REVIEW
DISPUTE RESOLUTION
MEETINGS AND DRAFT LEGAL DOCUMENTS FOR SITES, EMPLOYEES
SITE VISITS, LEGAL COMPLIANCE CHECKS
SALES & MARKETING
BUSINESS DEVELOPMENT
TECHNICAL SALES
PLANNING AND MEETINGS
DEVELOP NEW STRATEGIES TO MAINTAIN THE QUALITY OF SERVICES AND FIND WAYS TO INTEGRATE MORE ADVANCED TECHNOLOGIES
EXPLORE POTENTIAL CUSTOMERS TO EXPAND SERVICES
CUSTOMER SERVICE
CUSTOMER SUPPORT
TECHNICAL SUPPORT
CRM TEAM
COLLECT CUSTOMER FEEDBACK
ANALYZE DATA
CREATE ONLINE FORUM FOR TESTIMONIALS
ATTEND MEETINGS AND KEEP SUPPORT TEAM UPDATED
PROVIDE RESOURCES BASED ON DATA AND UPDATE ON CURRENT UPGRADES.
CHECK IN FOR ANY FEEDBACK AND MAINTAIN A GOOD RELATIONSHIP WITH CUSTOMERS
IT
SOFTWARE SUPPORT
WEB DEVELOPMENT
PLANNING AND MEETINGS
SUPPORT ANY SOFTWARE REQUESTS FROM TEAM
MAINTAIN WEBSITE

RISK ASSESSMENT

RISK	CIRCUIT TYPE	LIKELIHOOD	RISK LEVEL
FALLS FROM HEIGHT	Aboveground		High
CONFINED SPACE HAZARDS	Underground		High
NATURE INTERFERENCE	Aboveground		Low to Medium
ACCESS DIFFICULTY FOR EMERGENCIES	Underground		Medium to HIgh
SOIL COLLAPSE	Underground		Medium

KEY PERFORMANCE INDICATORS

Circuit Repairs and Maintenance

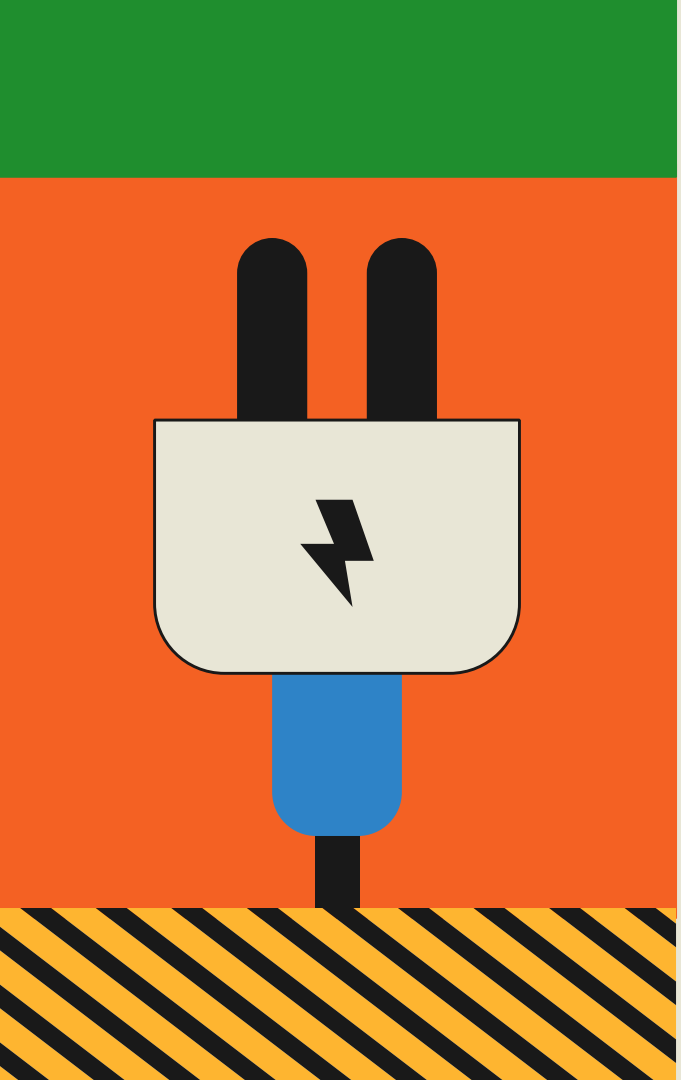
- Outage repair duration
- Circuit health
- Repair time

Budget Allocation

- Funds for critical vs. non-critical circuits
- Funds for training teams
- Team performance
- Projects completed within or over budget

Customer Experience

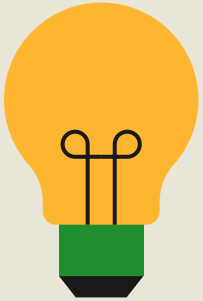
- Internal team response time
- Complaint resolution time
- Number of customers



06

LIMITATION S

LIMITATIONS



1. Low Resolution Data

- Some circuits only have one power outage recorded, making it difficult to evaluate and meaningfully interpret
- It is not possible to consider the performance of the circuit with other conditions since there is only one instance

2. Insufficient Data

- Predictions can be extremely useful to analyze what locations should be chosen for new circuits
- Unfortunately, with a very limited dataset, a machine learning model is not able to make accurate predictions consistently

FUTURE WORK

Dense Data Collection

Include more information for each outage such as circuit structure, environment, and historical performance.

Machine Learning Models

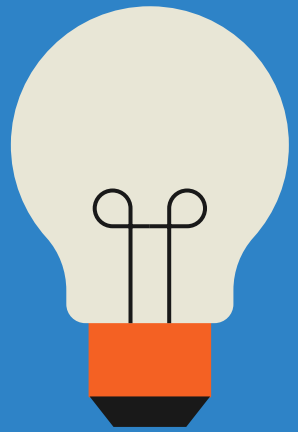
With the new information gathered, incorporate machine learning for accurate performance predictions

Upgrade Infrastructure

Incorporate tools that allow for more intensive monitoring services and in depth analysis

07 CONCLUSION

- Data-driven approach empowers smarter investment
- Focus on customer impact: prioritize upgrades based on CMI
- Clear path for reducing interruptions and boosting satisfaction



THANK YOU!

QUESTIONS?