

EMERGING LEADERS FORUM



Distribution Program Creation

A deeper look at initiating a holistic rebuild program

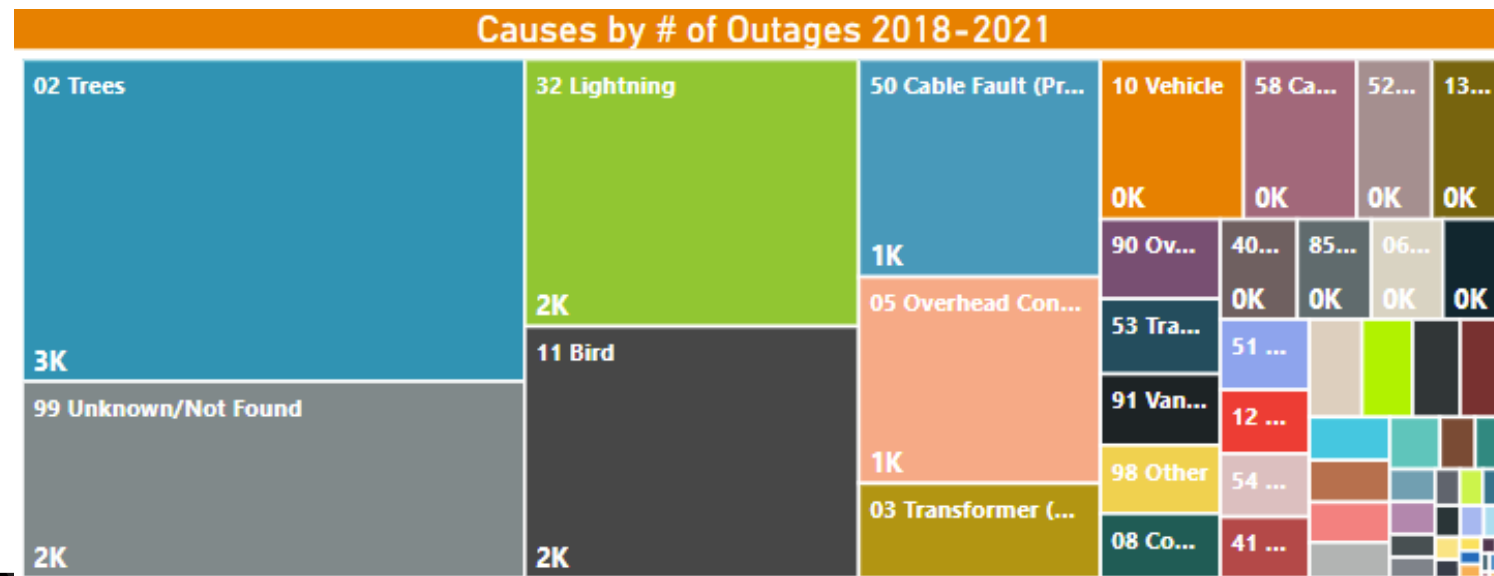
Public Service New Mexico (PNM)

- 198 Substations and Switching Stations
- 345kV to 2.4kV
- 2,982 MW Generation Capacity
- 15,428 Miles of Transmission & Distribution
- Serving approximately 574,000 meters



Drivers for PNM's Distribution Rebuilding Program

- Aging Infrastructure
- Reliability (Outages & Failures)
- Grid Modernization Goals
- Backlog of Projects
- Staffing

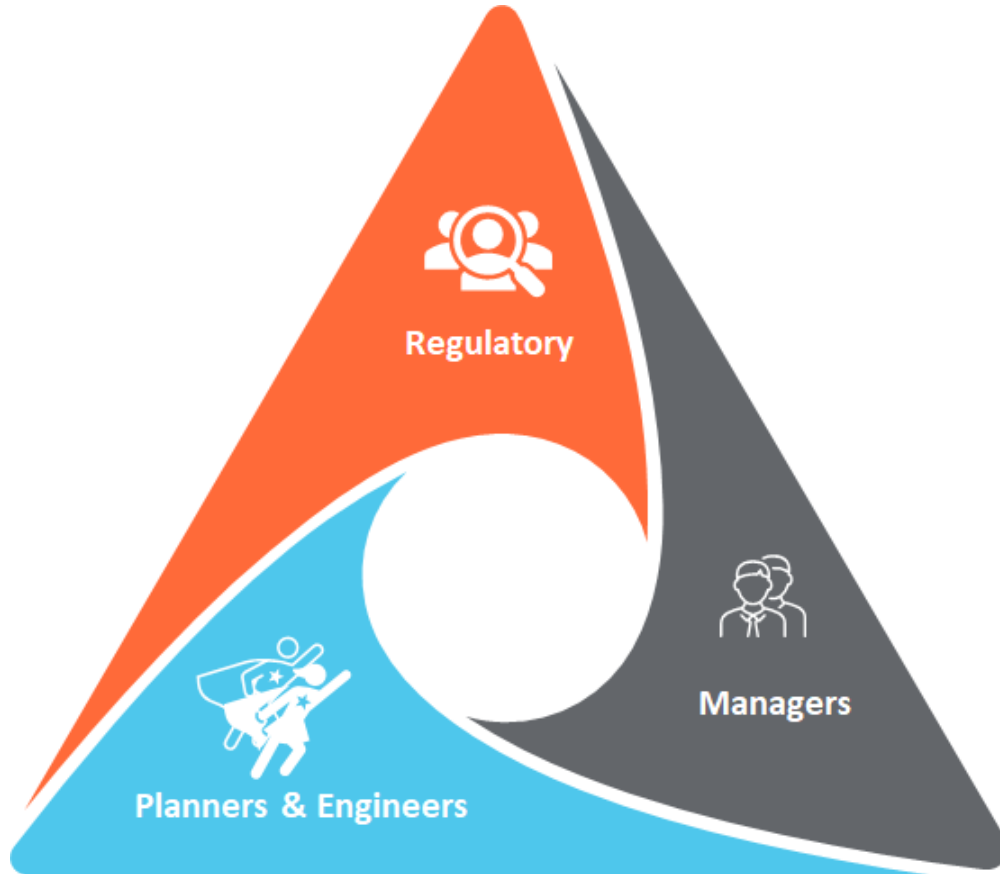


Roadmap to Rebuilding

- Asset Assessment
- Reliability Assessment
- AOP Planning



Investment Portfolio Stakeholders



Regulatory Stakeholders

Investments will have regulatory scrutiny and need to show prudence. Repeatable and data driven process for project identification and justification key to gaining approvals for overall investment level and even specific investments. Linking investments to customer benefit is key.

Managers

Investment Needs >>> available funds. Decision makers need to balance investment across the asset base and establish overall investment levels. Whole system analysis and consistent value framework across the asset base key to enabling optimization of performance, cost, and risk.

System Planners & Engineers

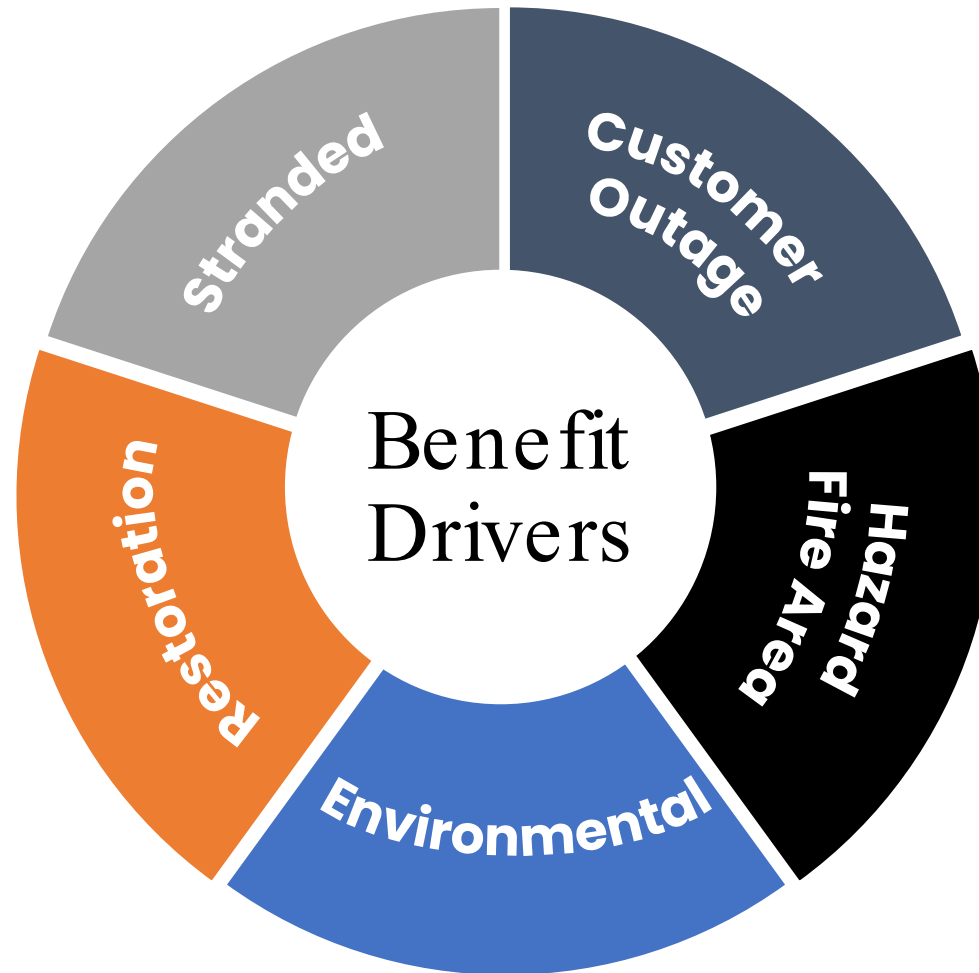
Executing investment requires high-level scoping definition to develop work orders and perform preliminary design. Portfolio needs to include enough definition to decrease time planners/engineers spend in developing detailed scoping.

Range of stakeholders and their needs create unique challenge in developing investment options and

Investment Benefit Drivers

When non-standard assets fail, they could be replaced with non-standard assets. Higher risk that these assets will need to be re-replaced in the future. Example is non-standard poles or extra long spans or Copper or small wire

Replacing infrastructure reactively costs more than fully planned at scale. This benefit driver calculates the expected decrease in life-cycle restoration cost for planned vs. unplanned asset replacements.



Customers impacted with equipment fail. Duration of outage is dependent on asset and failure type. Customer impacted based on upstream protection device. Dollar value based on ICE Calculator.

Mitigating conductor failures in hazard fire areas that could potentially cause a fire. These are Low Probability High Impact (HILP) events.

Potential oil remediation costs for catastrophic equipment failure (power transformers, OCB, line transformers).

Data & Analysis Overview



Asset Register Data

GIS and Cascade data is the foundation for the analysis. Performed many joins and other geospatial analysis to evaluate probability and consequence of failure.



Asset Age

Age gaps existed. Filled gaps based on known data at the protection zone level. Use oldest asset on a protection zone to estimate age of unknown assets. Gaps still exist, have plan to bridge.



Protection Zone

Utilized Synergy circuit models to build linkage between conductor and protection devices. Batch processed all circuit models. Critical for gaining relationship between asset & customers and defining distribution projects.



Asset Health (TBD)

Data available to perform asset health to evaluate the condition based age for power transformers, breakers, wood poles (minimal), and conductor (OMS data).



Customers

Leveraged CIS to link customer counts and types to transformers. Utilized protection zone hierarchy to develop relationship between customer and assets all the way to transmission circuits.



Vegetation Density

Utilize GIS and 3rd party tree canopy layers to identify span vegetation density. Vegetation Density a main driver of expected lives for wood poles and pole tops.



Physical Connectivity

'Snapped' poles to conductor and divided up GIS conductorIDs into spans. Analysis provides sufficient modeling results but not perfect. Some 'odd' span results exist.



Road Access

Utilize GIS and 3rd party street layers to understand where poles are in relation to the road for street access. Impacts project and reactive costs.



Hazard Fire Area

Included HFA areas (Tier 1 & 2) and asset mapping to incorporate fire risk into asset investment prioritization. Modified risk framework to include this High Impact Low Probability (HILP) event.



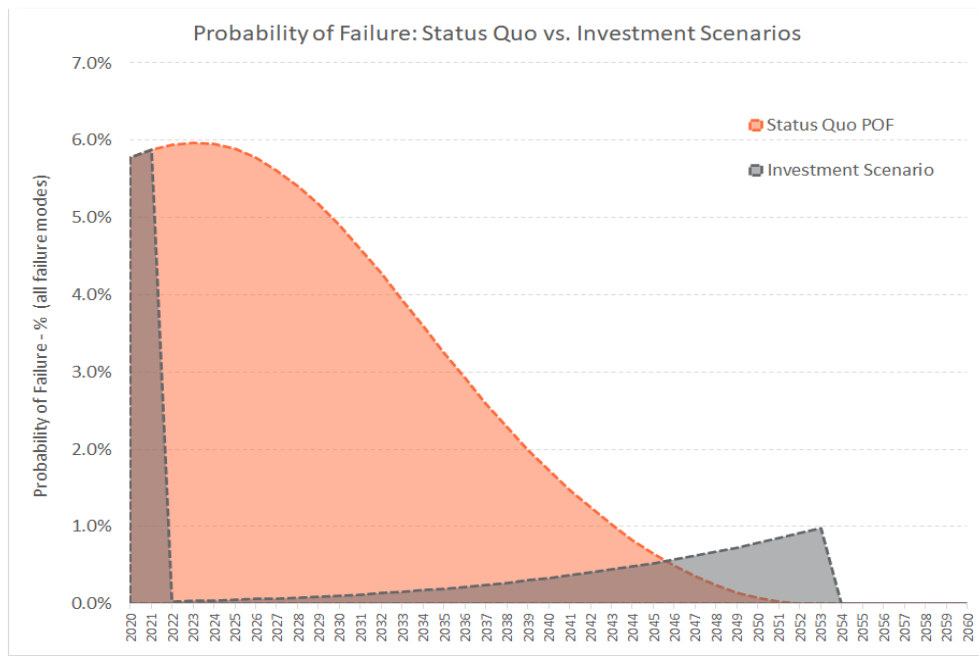
Projects

Projects include all the assets within the protection zone (after automation). Modeling assumes the entire protection zone is rebuilt to a new standard. Projects and assets will be shown geospatially in scoping documents.

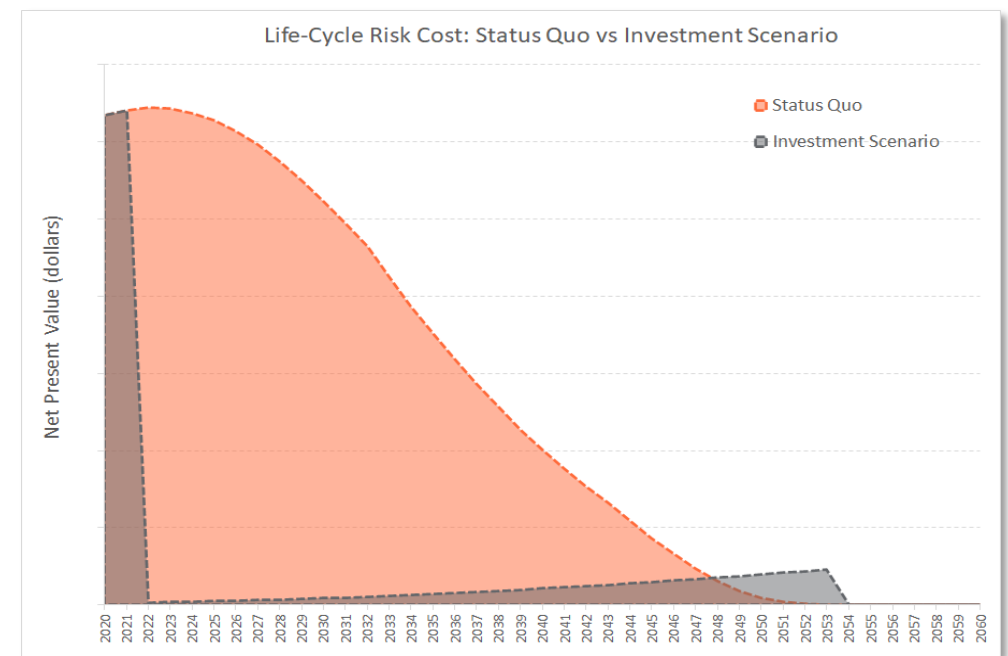
Asset/Project Replacement Benefit

- Main Benefit of Asset Replacement is decrease in POF
- AssetLens can factor in changes in Consequences of Failure
- Benefit Erodes as Project is delayed, significant impact for investment planning

Probability of Failure



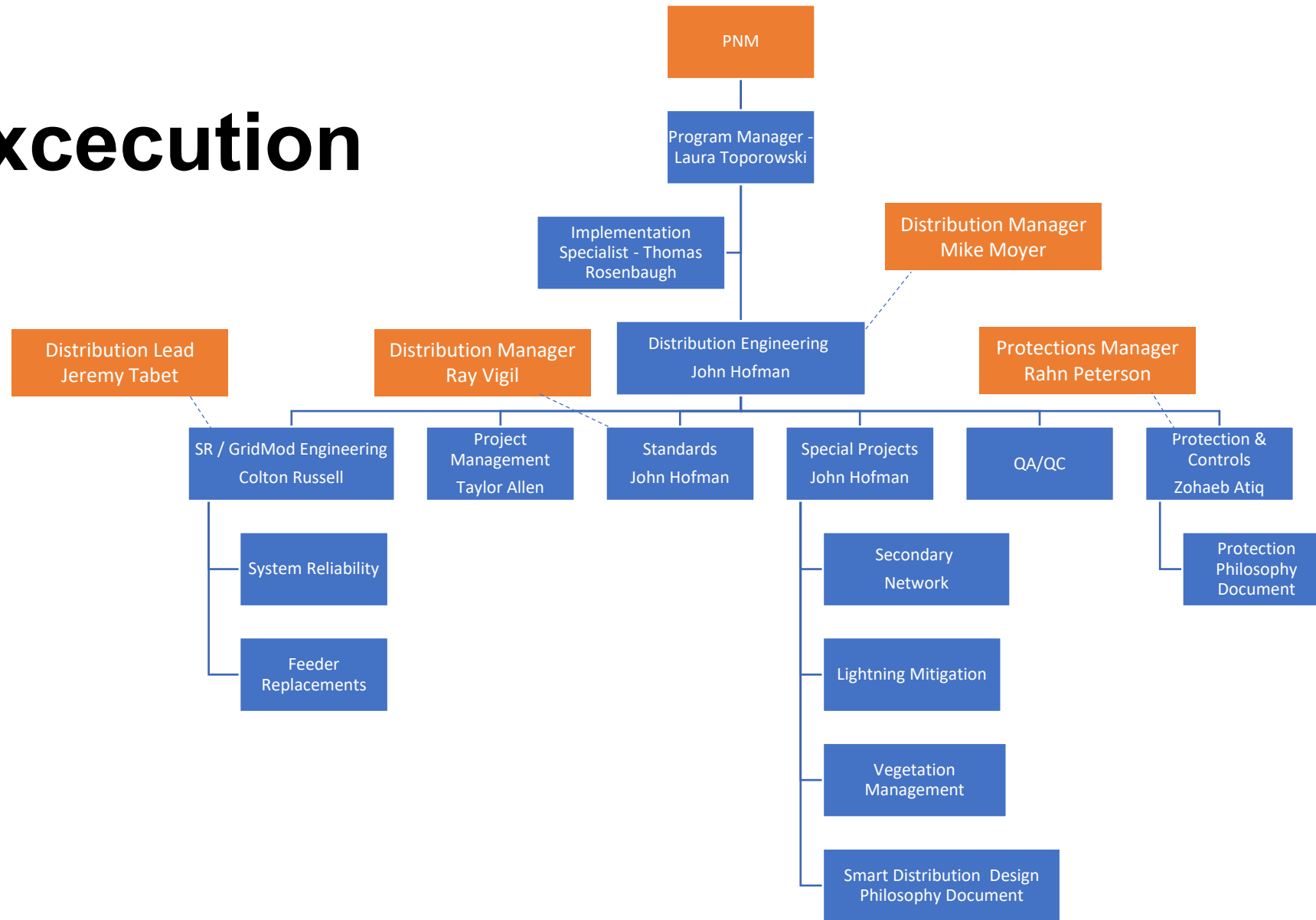
Risk Cost Profile



Challenges



Execution



Change Management



Questions