Grid Enhancing Technologies Under High Penetration of Distributed Energy Resources

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Grid Modernization will help enable the energy transition and advance smarter asset management.

The **Intelligent Power Network** is key to deploying innovations that will enable utilities to manage their network smarter utilizing real-time data to make better decisions and lower the cost to serve. Deploying new technologies is also essential to enabling the clean energy future. Such technologies as power flow control devices, energy storage, and digital substations will allow us to operate networks and change settings that optimize the flow of variable renewable generation, while intelligent smart design will enable us to build quicker and realize capex efficiencies.

Technologies we are currently deploying:

Real-time Intelligence

Digital Substations

Online Monitoring

- As we address asset condition issues and build new substations, we are deploying those stations to be Digital Substations with Online Monitoring.
- These stations will allow for ***quicker deployment*** and provide ***insight*** into our assets to make ***better asset decisions.***
- ***Flow power more efficiently*** despite sudden changes due to variable generation and dynamic loads.
- We have deployed dynamic line and transformer rating technologies to demonstrate the utilization of greater line and transformer capacity.

New Tools

Asset Health Tech (AI/ML/UAS/Robotics)

Intelligent Design

- We are testing new innovations in Machine Learning and Robotics. Every year, ***we must inspect thousands of circuit miles to look for defects.*** We walk and fly our lines looking for these faults.
- We are testing robots that will crawl the line conductor evaluating the integrity of the conductor, while also testing Machine Learning to scan through millions of helicopter and ***unmanned aerial vehicles*** images to look for faults. Over time, the data will give us ***predictive data to forecast*** asset conditions.

Renewable Integration

Energy Storage

Power Flow Control

- Our networks will need to deliver ***much higher amounts of variable generation*** in the future.
- We are deploying technologies such as energy storage and Power Flow Control devices. These technologies allow to i***ncrease the capacity of our networks*** and ***deferring the need for new lines.***
- Essentially ***mitigating the need to obtain new rights of way***, and enabling connection of renewables to the network at a ***lower cost to interconnect.***

Grid Modernization for Luma

Building capabilities within our transmission and distribution networks will help enable the energy transition and will advance our smart grid management

Intelligent Transmission and Distribution network is key to deploy innovation that will enable LUMA to manage its network utilizing real-time data to make better decisions and increase system reliability. Deploying these innovative new technologies is an essential step towards enabling net zero greenhouse gas emission targets.

Asset Management

- Transmission line health, rating and condition monitoring provides insight on asset prioritization for repair or rebuild.
- As we address asset condition issues and build new substations, we are deploying transformer online monitoring that includes DGA analysis.
- Arrestor monitoring and incipient failure analysis avoids many unexpected outages related to station and line arrestors.
- Transmission tower condition and corrosion assessment, as well as distribution pole testing will also be used to prioritize asset replacement.
- Distribution Transformer Loading Management that allows to monitor transformer operation and ongoing stress.

Transmission and Distribution Planning

- Three phase readings at the feeder head enables planning with correct quantities.
- Controlled capacitor bank deployment.
- Phasor Measurement Units and unleashing their benefits to a system wide operation.
- DERMS deployment

Reliability

- All initiatives lead to improved reliability.
- Other reliability initiatives are already underway in other programs.


Thank
you