A utility worker wearing a yellow safety vest, a yellow hard hat with the Ameren logo, and safety glasses is working on a power line tower. The worker is looking off to the side. The background shows other power line towers and a blurred worker in the distance.

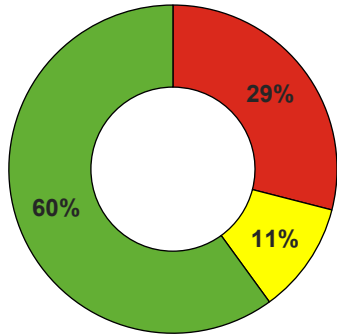
# Ameren Missouri Update to Public Service Commission On Smart Energy Plan

December 13, 2023

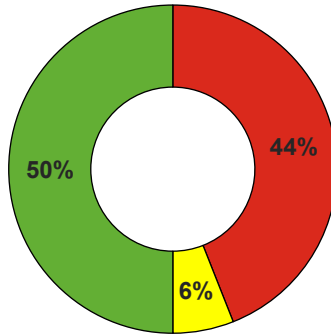
# Modernizing An Aging Grid Through Smart Energy Plan

Before the Smart Energy Plan started in 2019, capital investments in the Distribution System were limited and were leading to an aging system

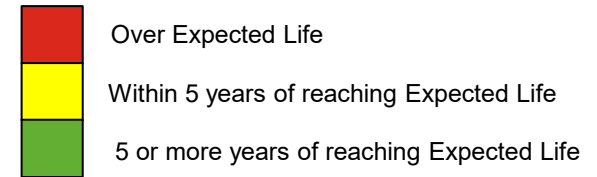
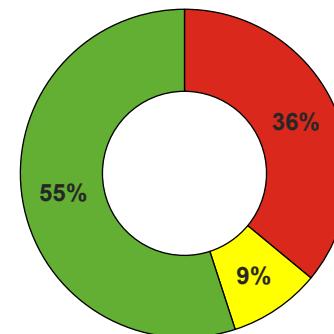
**Distribution Substations**  
**Current Average Age (Yrs.):** 34  
**Expected Life (Yrs.):** 50-55  
**Total Distribution Subs** ~530  
**Subs Over Expected Life** ~150



**Overhead**  
**Current Average Age (Yrs.):** 39  
**Expected Life (Yrs.):** 45-50  
**Total Miles** ~4,200  
**Miles Over Expected Life** ~1,800



**Underground**  
**Current Average Age (Yrs.):** 30  
**Expected Life (Yrs.):** 40-45  
**Total Miles** ~7,900  
**Miles Over Expected Life** ~2,800



Asset Age data as of 12.31.22

Category	2018	Smart Energy Plan					2023
		2019	2020	2021	2022		
Energy Delivery	Pre-SEP Forecast	\$215	\$233	\$217	\$230	\$229	-
	Actuals	\$247	\$399	\$447	\$651	\$733	-
	Planned			-			\$713

\*All \$ in M's



# We Are Upgrading The System With A Modern Design Standard



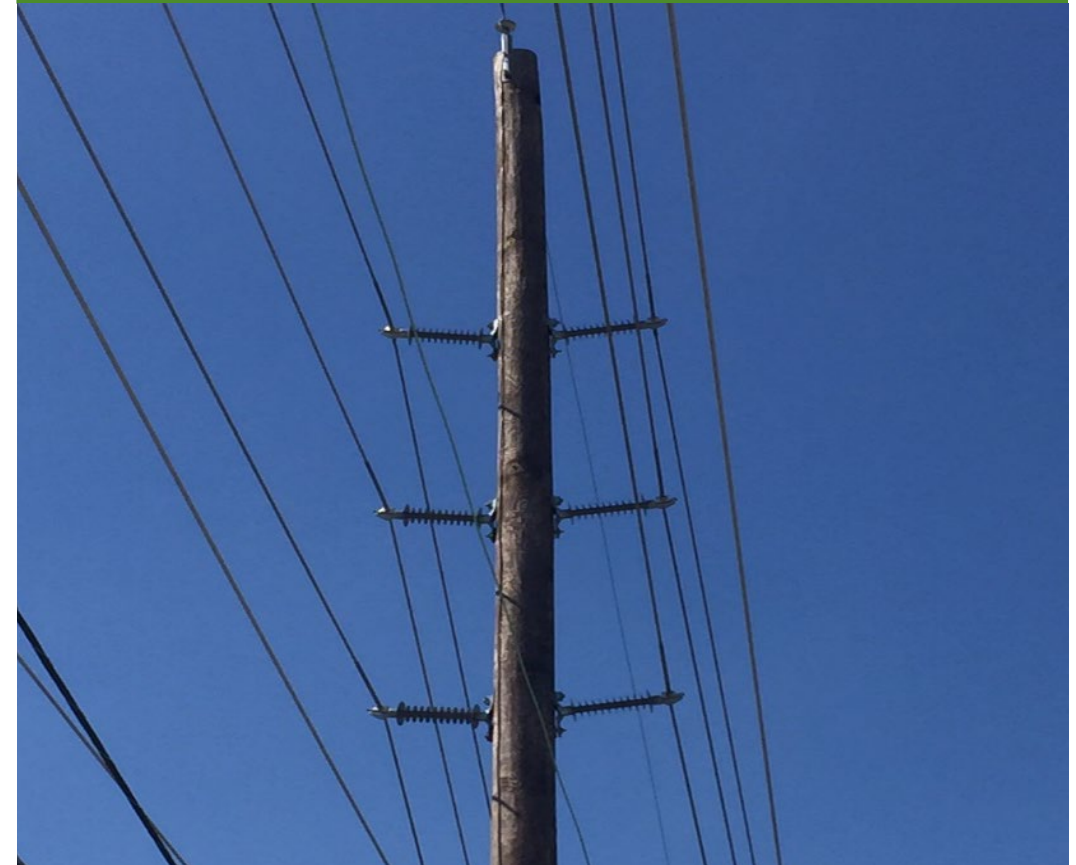
The new standard reduces the number of potential failure points, increasing the resiliency of the system, while making it easier and safer to operate

Before: Previous Design Standard



**15 total pieces of hardware (minus bolts)**

After: Updated Hardened Design Standard



**6 total pieces of hardware (minus bolts)**

# Decades of age on our system has taken its toll on assets

## Aged Underground Cables at or near failure point present risk to customer reliability across our system

Exposed concentric neutral cable in ground with the neutral eroded away



Faulted Direct buried #2 Al Cable with exposed concentric neutral



**Paper Insulated Lead Cable (PILC)**

Conductor is wrapped in oil impregnated paper which is surrounded by a lead jacket  
Becomes very brittle with age  
Leaking oil causes this cable to present an environmental hazard



**New cable installed within protective conduit**  
*Note: Illustrative only, not from Ameren Missouri system*



# Substation Upgrades Reduce Risk of Customer Outages

Fewer exposed components which can be impacted by weather, animals and other factors negatively impacting Customer Reliability

Before: Previous Design Standard



Many exposed components

After: Updated Design Standard

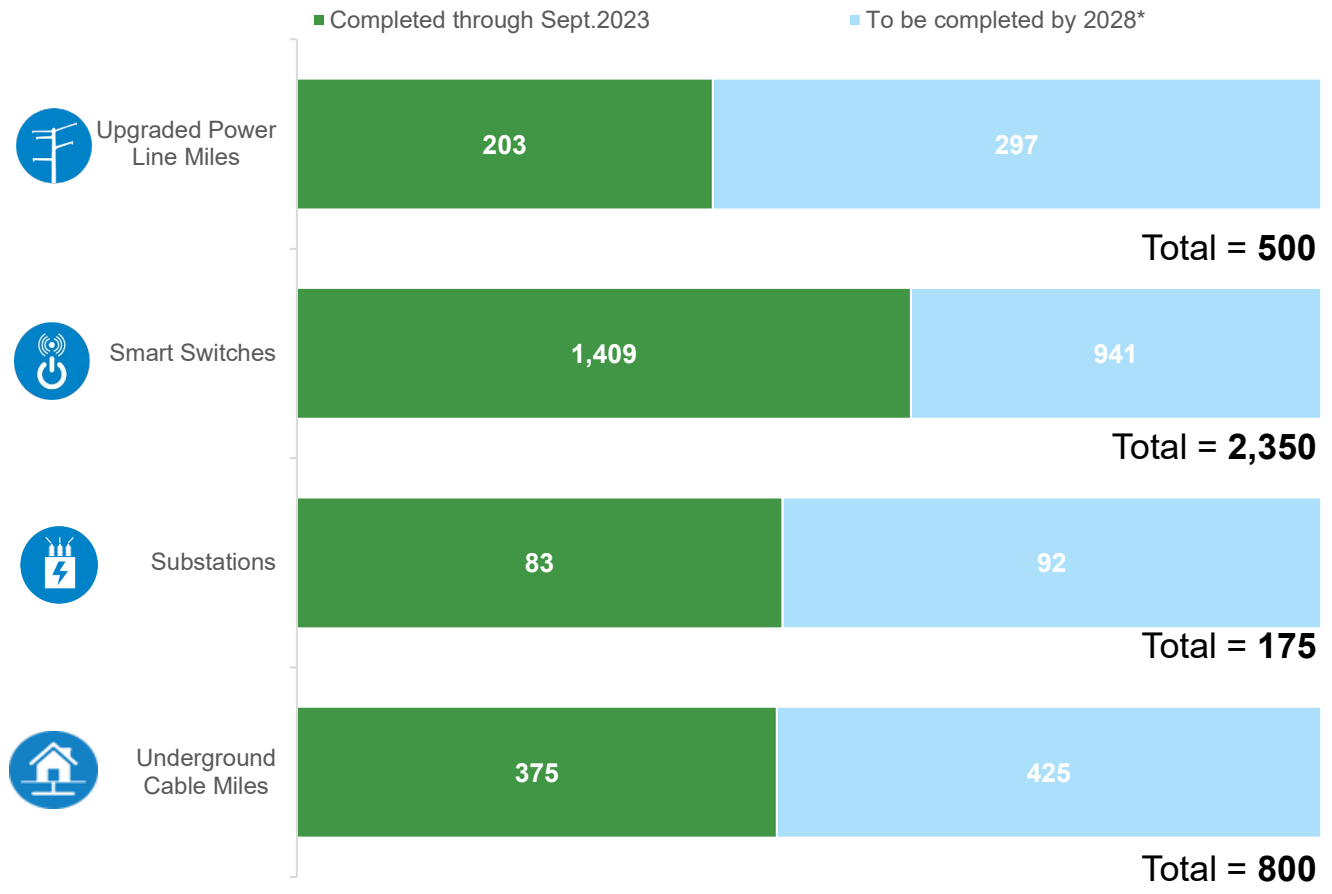
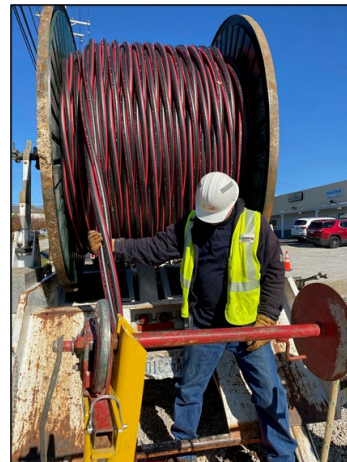


Largely Self-Contained Design

# Strategic Investment Plan

With the extension of the Smart Energy Plan, Ameren Missouri is ready to continue this work for the benefit of our customers, upholding our mission to power the quality of life

We are working diligently to create a **more resilient, more reliable and more sustainable energy system** while empowering you and your community every step of the way.



\*Long-term targets are estimates and contingent on funding levels.



# SEP Investment Impact on Storm Performance

The investments made are having a direct positive impact on our customers lives



Summer 2023

**55,000**  
Customer  
Outages  
Prevented

**27,000,000**  
Minutes Out  
Prevented

**0**  
Outages on  
hardened  
parts of lines



**50-70 Mph**  
Winds

**96,000**  
Customers  
Out at Peak

# Collaboration with PSC Staff and OPC

AMO, PSC Staff, and OPC collaborated to develop clear and simple frameworks to evaluate the justification for \$1M+ Energy Delivery investments

## Key Questions Raised

1. How did Ameren determine distribution system projects were necessary?
2. What metrics or operational thresholds are used in identifying a project?
3. How does Ameren evaluate potential distribution system investment?

## Settlement Requirements

- **Met** with the PSC Staff and OPC three times in '22
  - ✓ 1<sup>st</sup> Meeting – Informational Session (ED Investments)
  - ✓ 2<sup>nd</sup> Meeting – Ameren Missouri proposed Evaluation Methodologies and Site Visits
  - ✓ 3<sup>rd</sup> Meeting – Stakeholder Feedback Session

Project Justification Framework Example

Criteria	Variable	Definition	Threshold	Documentation / Data Required
<b>Age/Asset Vintage</b>	Exceeding Expected Engineered/Useful Life	Age of critical components	<ul style="list-style-type: none"> <li>✓ Beyond expected life</li> <li>✓ &gt;1.5x beyond expected life</li> </ul>	Quantify age; Include documentation on which quantification is based.
<b>Asset Condition</b>	Engineering Risk Assessment	Estimated asset health and risk of failure based on inspection results and/or operating history of similar vintages	<ul style="list-style-type: none"> <li>✓ Failed or unfavorable tests/inspections; likelihood of near-term failure</li> </ul>	Test/inspection records required if criteria is to be used as a justification factor
<b>Asset Performance</b>	Circuit Interruption(s)	The number of times asset-driven circuit interruption(s) have occurred	<ul style="list-style-type: none"> <li>✓ 2 interruptions in a year or 5 interruptions over 3 years</li> </ul>	Quantify historical interruptions; Include documentation of specific interruptions.
<b>Potential for Community Impact</b>	Number or type of potentially-affected customers	High-impact customers (e.g. school or university, hospital, airport), a large employer, or a large number of individual customers (~>1,000)	<ul style="list-style-type: none"> <li>✓ Potential for substantial community impact</li> </ul>	Documented impact to the local community is required
<b>Final Evaluation</b>	Two check marks result in eligibility for a System Hardening capital project			



# Ameren Missouri's IJA GRIP Topic 2 Proposal: Rural Modernization



An innovative, impactful solution that improves reliability and resiliency, simplifies operations, and brings smart technology to better serve rural, disadvantaged communities (DACs)

<p><b>Project Title: Rural Modernization Program</b></p>	<p><b>Targeted Substations*</b></p>
<p><b>U.S. Department of Energy Selection</b></p>	
<p>Ameren Missouri was 1 of 34 awards out of 326 nationwide proposals</p>	
<p><b>Targeted Substation Upgrades</b></p>	
<p>16 Total Substations (13 Pad-Mounts and Three 22 MVA Substations)</p>	
<p><b>Grant Amount /Ameren Missouri Share of Costs/Total Investment</b></p>	
<p>~\$47M / ~\$54M / ~\$101M</p>	
<p><b>Customer Benefits</b></p>	
<p>Supporting Reliability through:</p> <ul style="list-style-type: none"> <li>• Greater grid resiliency, flexibility, and visibility</li> <li>• Faster fault clearing times</li> <li>• Shorter and less frequent outages</li> <li>• Simplified outage restoration efforts and fewer maintenance requests</li> </ul>	<p>* New Hayti, Miner, and Mineral Point Substations are considered large substations and will be replaced with modern 22 MVA substations due to a current/anticipated load growth of &gt;5 MVA which is not suitable for pad-mount upgrades. These 22 MVA substations will utilize enclosed substation switchgear design with Smart Switches downstream.</p>

