



Overview of Ameren Missouri's
Smart Energy Plan

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Smart Energy Plan

A Forward-Looking, 5-Year Plan Designed to Modernize the Electric Grid, Drive Customer Benefits and Ensure Stable and Predictable Rates



Senate Bill 564 made possible Ameren Missouri's Smart Energy Plan. This plan is transforming the grid to ensure customers have affordable, reliable and cleaner energy that meets their growing needs and expectations.

Key Elements of the Smart Energy Plan

- \$5.3B in electric investments over the next 5 years
 - Requires a minimum of 25% annual investment in Grid Modernization
 - Allows up to 6% of capital for smart meter program
 - Encourages renewable energy by providing up to \$28M in solar rebates to customers, and requiring a minimum \$14M investment in Ameren owned solar
- Catalyzes economic development and provides job creation
- Delivered a ~6% rate cut in August 2018, and freezes rates until April 2020

Public Stakeholder Meeting: March 4th

- Millbottom Event Center in Jefferson City
- Doors open at 5:30 PM
- Mark Birk to give overview at 6:00 PM



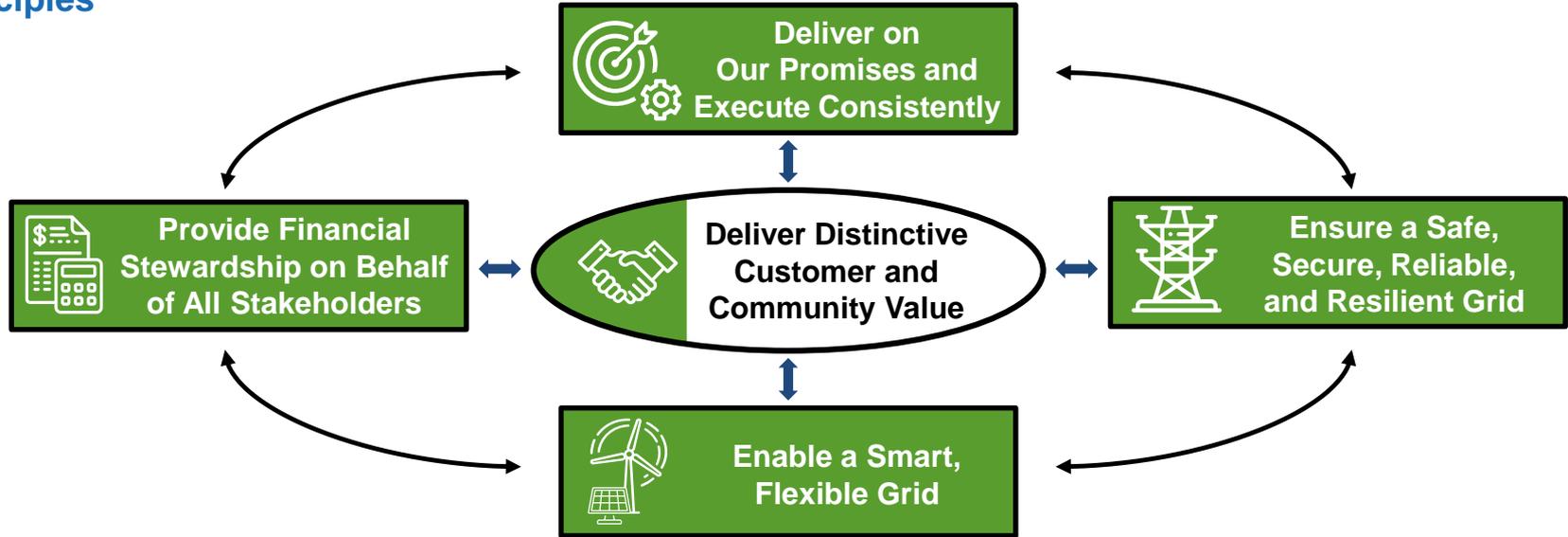
Ameren Missouri's Smart Energy Plan Vision is Driven by Customers



Vision

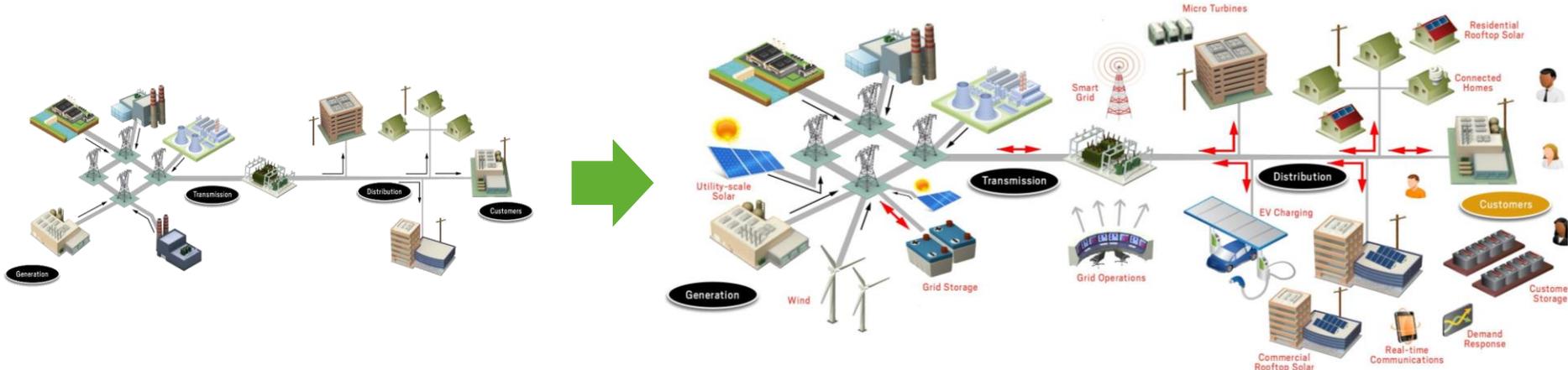
Ameren Missouri's grid is secure, modern, affordable, resilient and reliable, which enables transformational choices and benefits for our Customers, Communities, and Co-workers.

Principles



It will Transform Today's Grid into the Grid of the Future

Customers are counting on a grid that will be smarter, self-healing, more robust, resilient, and secure



Today

- Grid – Reliable, efficient, meets peak demand, aging infrastructure, one directional energy flow
- Generation Portfolio – Heavy coal-based, limited renewables, distributed energy resources
- Customer – Homogenous service, few special offerings

Tomorrow

- Grid – Upgraded infrastructure, smart meters, smart technology, sensors and data analytics to drive reliability, efficiencies, and resiliency
- Generation Portfolio – Cleaner, more diverse, expansion of renewable and distributed energy resources
- Customer – Customer centric services and product offerings delivering affordable electricity to consumers where they want it, when they want it, and how they want it

Smart Energy Plan 5YR Total Capital Overview (Thousands \$)



A 5-year average of 37% of capital investments will go toward grid modernization

	2019	2020	2021	2022	2023	Grand Total
Smart, Reliable Grid Operations	\$335,042	\$451,058	\$406,117	\$391,472	\$360,506	\$1,944,195
Smart Meter Program	\$30,034	\$54,870	\$51,966	\$55,995	\$52,117	\$244,982
Non-Nuclear Generation & Environmental	\$186,348	\$176,756	\$182,326	\$196,643	\$226,609	\$968,682
Nuclear Generation	\$74,684	\$65,896	\$61,411	\$76,451	\$73,984	\$352,426
Hydro Generation	\$34,825	\$33,627	\$43,395	\$33,499	\$14,955	\$160,301
Renewable & Gas Turbine Generation	\$11,948	\$21,782	\$20,104	\$25,732	\$19,339	\$98,905
Secure & Reliable Transmission	\$141,184	\$135,658	\$153,958	\$148,264	\$154,070	\$733,134
Cyber & Technology Upgrades	\$88,542	\$89,955	\$89,849	\$89,877	\$89,873	\$448,096
Operational & Customer Support Facilities	\$54,393	\$96,518	\$58,560	\$50,817	\$53,505	\$313,793
Innovative Opportunities	\$14,302	\$9,064	\$5,799	\$4,947	\$3,852	\$37,964
Grand Total - Capital	\$971,302	\$1,135,184	\$1,073,485	\$1,073,697	\$1,048,810	\$5,302,478
Wind Asset Acquisition (two sites)		\$1,000,000				\$1,000,000
Grand Total, Including Wind	\$971,302	\$2,135,184	\$1,073,485	\$1,073,697	\$1,048,810	\$6,302,478

Top Smart, Reliable Grid Operations Investment Categories (Millions \$)

Our investment strategy establishes a modern grid to address the needs of our communities and businesses



2019	2019 - 2023		Plan	Customer Value
\$69	\$267	Substations	70+ new or upgraded substations; Optimize system by reducing the overall number of substations by 5-10% in the long-term	State-of-the-art design features that enable optimal long term performance and customer affordability benefits
\$30	\$245	Smart Meter Program	Deploy more than 800K smart meters of Ameren MO's 1.2M electric meter population in the next 5 years	Faster connect/reconnect, decreased overall meter reading cost, and improved outage communications
\$24	\$142	Smart Grid	By 2023, deploy ~600 switching devices and accompanying communications technologies to limit the impact of an outage	Deploying self-healing equipment to rapidly detect and isolate storm-related and other circuit interruptions, speeding power restoration for customers
\$16	\$121	System Hardening	Target Worst Performing Sub-Transmission Circuits	Boost reliability to communities, critical facilities (e.g., hospitals, water/treatment facilities), major employers, and manufacturers
\$12	\$95	Solar	Community Solar & Solar Partnership projects, plus other solar opportunities	Meets growing renewable & sustainability interests

Grid Operations Key Investments



Planned Execution Examples

Substation Modernization Pershall (North St. Louis County)

- Consolidate four end-of-life substations to one modern, smart substation
 - Outage performance for this class of modern substations is 88% better than the 4 current substations
 - Significant reliability improvements for 12,000+ customers with a history of frequent outages
- In addition to the substation upgrade, significant circuit improvements are planned which include building in redundancies and self-healing technologies, and partial undergrounding
- Construction begins Q1 2020

Downtown Jefferson City Smart Grid Project

- Construct a self-healing grid by upgrading eight manual switchpads to automated switchpads
 - In the last 5 years, eight unplanned extended outages resulted in 784 customer interruptions; most less than one hour
 - New equipment locates the outage and isolates the fault, allowing power restoration to customers on the working cable sections
 - The self-healing grid creates significant customer benefits, with outage time for some customers reduced from hours to seconds
- Construction begins Q1 2019

System Hardening Conway 81

- Upgrade 10.5 miles of subtransmission lines with more resilient assets to better serve Missouri Baptist, Mercy, BJC Children's hospitals and 400+ residential customers
- Install 20 new composite poles (stronger material, storm hardening) and 115 new wooden poles, install fiber conductors for communications, upgrade to more effective lightning protection equipment, and install self-healing DA devices
 - Reduce momentaries that can impact direct and indirect customers (e.g., hospital patients)
- Construction begins Q1 2019

Customer Benefits

-  Reduced Frequency & Duration of Outages
-  Reduction of Momentary Outages

-  Fewer Truck Rolls
-  Faster Restoration Time

-  Improved Resiliency

Innovative Solar Solutions

Objectives:

- **Customer Affordability** – Provide opportunities for customers to participate in and contribute to community solar programs and Ameren Missouri-owned solar projects
- **Renewable Penetration** – Increase solar energy production to give our customers clean energy options
- **Reliability** – Look to evaluate future project opportunities that could provide reliability benefits

Community Solar

Monitor progress and interest in Community Solar Pilot Program

- Install a 1-MW solar facility at Lambert Airport and offer solar energy to smallest rate classes
- Fully subscribed in <8 weeks, with waitlist increasing daily

Distributed Solar Partnership

Develop relationships with customers for solar partnerships

- Develop 1.8 MW solar car port canopy at BJC HealthCare
- Pursuing other similarly sized solar opportunities with customers

Other Solar Opportunities

Explore non-wire alternatives for clean energy

Year	2019	2020	2021	2022	2023	Total
Investment	\$12M	\$83M	--	--	--	\$95M

Smart Meter Program

Objectives:

- **Technology Upgrade** – Current meter system is approaching end-of-life and will not be supported by vendor after 2025
- **Customer Affordability** – Keep customer rates affordable through reduced meter infrastructure operating costs (e.g., eliminating the existing AMR system reduces meter reading costs per customer by ~40%) once fully implemented
- **Customer Experience** – Provide customers more options and control through enhanced product and service offerings, e.g., improved outage communications, rate options, and superior online energy usage visibility
- **Operational Performance** – Eliminate truck rolls associated with move in/move out and other remote connect/reconnect processes to significantly decrease customers’ wait time for service connection changes (e.g., reconnecting service after moving into a home)

Deployment Goals

- Install the first smart meter in July 2020
- AMI deployment of ~67% of Ameren MO’s electric meter population by EOY 2023
- Install 120,000 electric meters in 2020; install 240,000 electric meters annually between 2021 - 2023
- Full deployment completed in 2025

Year	2019	2020	2021	2022	2023	Total
Investment	\$30M	\$55M	\$52M	\$56M	\$52M	\$245M

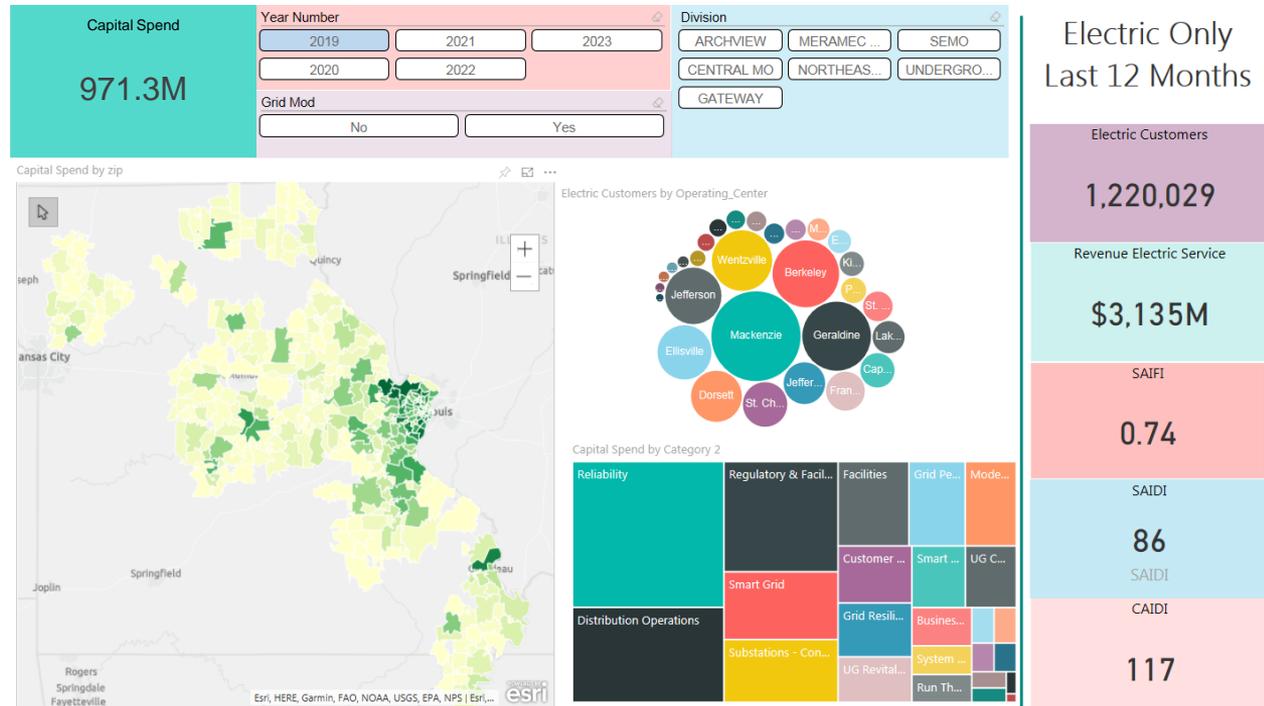
* All estimates based on pending contracts



Tying Investments to Customer Value

This interactive dashboard will be used to track key components of our Smart Energy Plan by Division, Operating Center, and Zip Code

- Project / Category
- Customer
- Reliability data
- Outage causes



The Smart Energy Plan

Transforming the energy grid of today, powering the quality of life for our customers, communities, and co-workers for generations to come

Customers



- Stable and predictable rates
- More options and controls as a result of enhanced product and service offerings

Communities



- Greater reliability and resiliency
- Job creation (direct & indirect)
- Access to cleaner energy sources

Co-workers



- Enhanced safety & security
- Help our co-workers deliver on our customer-first commitments with new tools and technologies