



Overview of Ameren Missouri's
Smart Energy Plan

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Smart Energy 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

- \$6.4B in electric investments from 2020 to 2024*
 - 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 froze rates until April 2020
- Delivered a 1.5% rate cut in 2020

*Assumes extension of Senate Bill 564

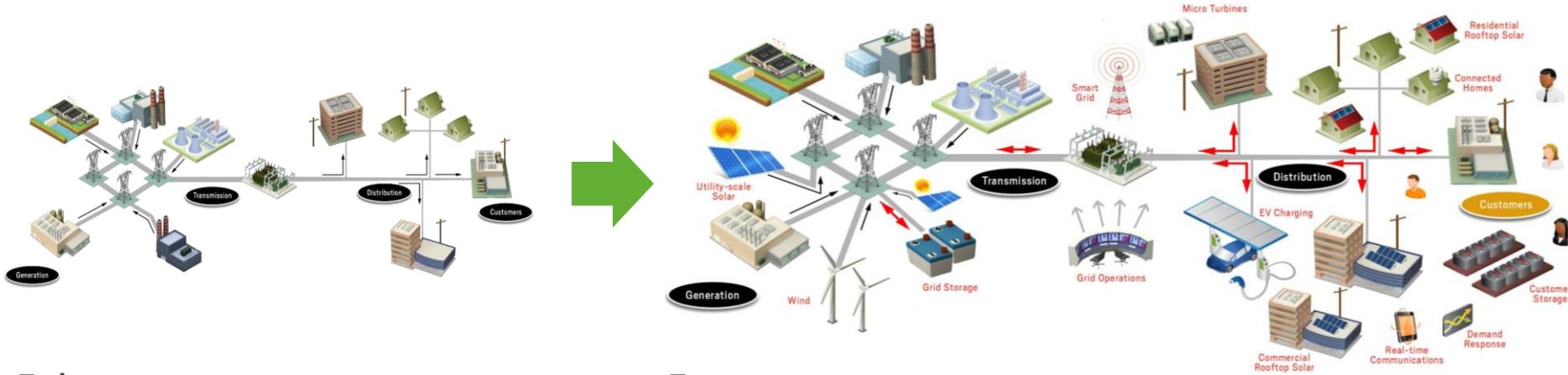
**For those customers with upgraded smart switches in 2019

Executed First Year of SEP

- 2019 accomplishments
 - 38% invested in Grid Modernization
 - \$8M in Solar Rebates paid
 - 900+ projects completed
 - As many as, 30,000 hours in avoided outages for customers in 2020. **
- Economic impact
 - Supported business growth throughout Missouri and was instrumental in job creation throughout the state
 - \$5M+ increased tax revenue for local communities
 - ~55% of suppliers are Missouri-based

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



2019 Results

2019 Results

Building a brighter energy future for the communities we serve

Investment Category	2019 Progress to Plan	Expected Benefit	Status* (vs long-term goals)	2019 Capital Spend (\$M)
 Substations	Constructed 13 new or upgraded substations, targeting aging substations, capacity limited or had operational issues.	Reductions in the frequency and duration of outages and improved operating flexibility.	 7% (175 substations)	\$51
 UG Cable Upgrades	Proactively upgraded 70+ miles of aging lead exit cables and direct bury cables with modern cables encased by protective conduit.	Reductions in the frequency and duration of outages; higher reliability.	 7% (1,000 miles)	\$25
 System Hardening	Upgrades to 25 miles of the sub-transmission system via 9,000 strengthened wood or composite poles, upgraded fiberglass cross-arms and insulators.	Hardening to better withstand the impact of severe weather events; Reductions in the frequency and duration of outages.	 4% (570 miles)	\$17
 Distribution Automation	Placed 180+ smart, automated switching devices to enable the system to more rapidly detect & isolate outages, reroute power flow and restore service to a larger number of customers.	DA switches and control systems drive an average reliability improvement of 40% on the circuits they are installed on.	 8% (2,350 switches)	\$10

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

Continuing Operations through COVID-19

How we're keeping customers, co-workers safe while fulfilling SEP commitments

Crews have continued working on energy delivery projects to improve reliability with new protocols in place, including:

- Split crews
 - Co-workers reporting to only one work location
 - New work schedules
 - Wearing facemasks/coverings where social distancing cannot be practiced; maintaining social distance
 - Evaluating hot spot ZIP codes and reshuffled work
 - Using multiple channels of communications to customers encouraging social distancing
- Leadership continues to monitor numbers of cases and hospitalizations in our service territory
 - Close to 500 employees across 75 Ameren facilities will return to facilities in June
 - **We are committed to safely executing our Smart Energy Plan**



A utility worker wearing a bright yellow-green hard hat with the Ameren logo, safety glasses, a high-visibility yellow-green vest over a tan long-sleeved shirt, and a brown leather tool belt. He is looking off to the side with a focused expression. The background shows a blurred utility site with power lines and a worker on a lift.

The Next 5 Years

Smart Energy Plan Capital Overview (Thousands \$)

~44% of capital investments will go toward grid modernization over the next 5 years

Smart Energy Plan Categories	Actual	5-Yr Plan					5-Yr Total
	2019	2020	2021	2022	2023	2024*	
Smart, Reliable Grid Operations	\$398,973	\$461,673	\$529,686	\$574,949	\$674,199	\$663,653	\$2,904,160
Smart Meter Program	\$48,330	\$55,494	\$60,902	\$64,357	\$55,209	\$43,315	\$279,277
Non-Nuclear Generation & Environmental	\$183,687	\$149,149	\$219,950	\$200,609	\$114,415	\$141,101	\$825,224
Nuclear Generation	\$74,049	\$71,007	\$80,176	\$95,310	\$91,064	\$66,926	\$404,483
Hydro Generation	\$36,342	\$26,161	\$37,653	\$37,091	\$34,414	\$25,523	\$160,842
Renewable & Gas Turbine Generation	\$12,258	\$24,127	\$30,838	\$25,345	\$24,718	\$16,955	\$121,983
Secure & Reliable Transmission	\$142,183	\$133,447	\$174,196	\$175,220	\$176,245	\$183,561	\$842,669
Cyber & Technology Upgrades	\$96,222	\$101,905	\$105,113	\$101,534	\$96,064	\$88,761	\$493,377
Operational & Customer Support Facilities	\$43,875	\$81,705	\$74,228	\$82,926	\$66,635	\$55,069	\$360,563
Innovative Opportunities	\$8,934	\$7,901	\$12,496	\$5,888	\$3,814	\$2,435	\$32,534
Subtotal	\$1,044,853	\$1,112,569	\$1,325,238	\$1,363,229	\$1,336,777	\$1,287,299	\$6,425,112
Wind Asset Acquisition (two sites)		\$1,203,000					\$1,203,000
Grand Total	\$1,044,853	\$2,315,569	\$1,325,238	\$1,363,229	\$1,336,777	\$1,287,299	\$7,628,112

Grid Modernization

38%

44%

Top Smart, Reliable Grid Operations Investment Categories

Our investment strategy establishes a modern and reliable grid for our customers & communities

Category	2020 (\$M)	2020-24 (\$M)	Plan	Customer Value
 Grid Resiliency	\$107	\$563	Upgrade capacity of substations and subtransmission lines and add new distribution ties to provide additional system capacity and enable increased operating flexibility.	Reduction in the frequency and duration of outages, improved operating flexibility, increased capacity to support DER implementations.
 Substations	\$55	\$378	70+ new or upgraded substations targeting ones approaching end of life.	State-of-the-art design features that enable optimal long-term performance and customer affordability benefits from fewer required maintenance activities.
 Smart Grid	\$26	\$294	Deploy over 800 smart and automated switching devices, 1,200 cutout reclosers, and a private fiber wireless communication network in St Louis to enable remote visibility and control of the grid.	Deploying self-healing equipment to rapidly detect and isolate storm-related and other circuit interruptions, speeding power restoration for customers, while requiring fewer resources to do so.
 UG Cable Upgrades	\$28	\$230	Upgrade 400 miles of end-of-life lead exit cables and direct-bury cables with modern cables encased by protective conduit.	Reduction in the frequency and duration of outages; lower ongoing operating costs.

Grid Operations Key Investments

Planned Execution Examples

Substation Modernization

Pershall [North St. Louis County]



- Enable replacement of aging substations with one state-of-the-art substation to increase power and reliability for thousands of residents and businesses of North County
- Miles of power lines will be upgraded to minimize storm damage and increase reliability for customers
- Construction start: 2021
- Customers helped: 3,600+

Smart Grid

Brennan Intelliruptor [High Ridge]



- Establish self-healing grid by replacing four manual switches with distribution automation switches on two circuits
 - Self-healing grid can reduce outage time by 40% on average
- Smart, automated equipment will create a system that more rapidly detects outages, reroutes power and restores service
- Customers helped: 2,400
- Construction start: 2020

System Hardening

Franklin 71 [Washington]



- Upgrade circuit west of Washington serving residential and industrial customers in northern Franklin and southern Warren counties
- Upgrades will include 2 miles of hardened circuit, 95 wooden poles, lightning protection, and switching
- Customers helped: 4,500
- Construction start: 2020

Customer Benefits

- Frequency & Duration of Outages
- Momentary Outages
- Faster response method that drives operational efficiencies

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Smart Meter Program

Benefits:

- **Improved Visibility** - will allow customers greater control to manage their energy usage and costs
- **Alternative Rate Choices** – new rate options
- **Outage Detection** – meters communicate with the Ameren Missouri network to rapidly detect and isolate outages. Outage notifications sent to both Ameren Missouri and the Customer
- **Easier Transfer of Service** – quicker/more convenient process during moves
- **Customer Affordability** – lower cost of operation

Customer Experience:

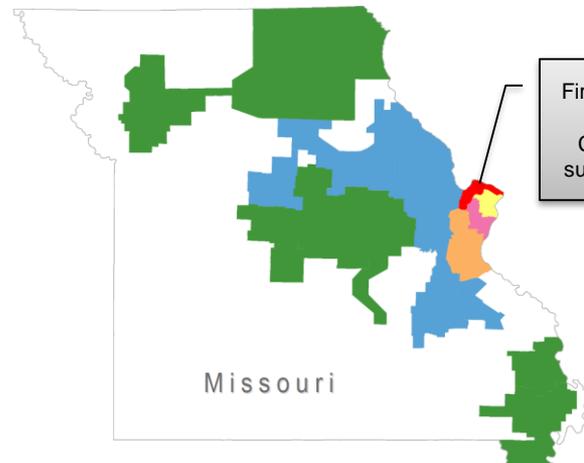
- **Communications with Customers throughout the Process**
 - **Pre-Deployment** – how smart meters work & overall benefits
 - **Deployment**
 - *90/60/30 days prior* – when and what to expect for meter installation
 - **Post-Install** – what rate options and energy saving tools/products are available

Operations:

- **Network deployment and meter installation schedule on plan**



First network device installed in St Charles County (January 2020)



Percent of Total Ameren Missouri Meter Upgrades by Year



*Gas module deployments are not funded through the Smart Energy Plan

Powering up to the Grid of the Future

Our current plan takes us through 2023, but there will be more work to do



Smart Switches

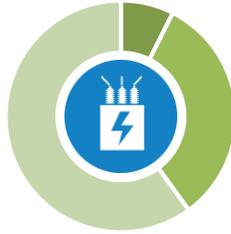


Smart Meters

■ 2019 ■ 2023 ■ Long-Term Goal



Upgraded Power Lines



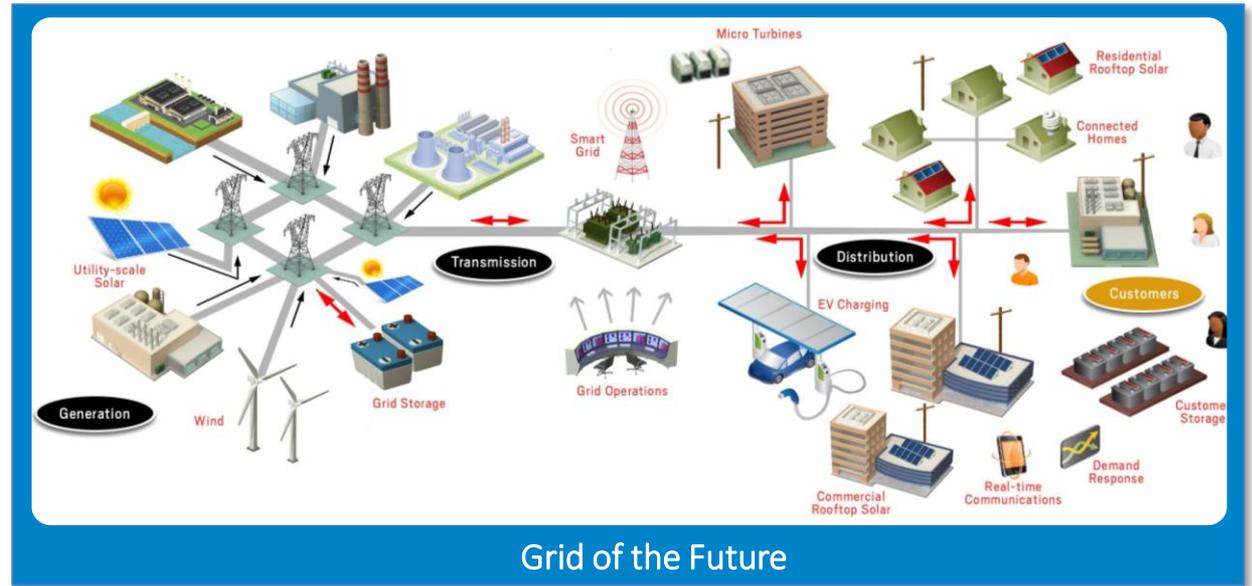
Substations

**TARGETING SUBSTANTIAL REDUCTIONS
IN CARBON EMISSIONS** (From 2005 levels)

35%
REDUCTION
BY 2030

50%
REDUCTION
BY 2040

80%
REDUCTION
BY 2050



Grid of the Future