# OG&E Grid Modernization Overview November 2019

POSITIVE ENERGY TOGETHER



## **Evolution of OG&E System Investments**

Smart Meters \$45M Investment								
\$3350M Investment Smart Meters   95 FTEs Reduced     \$233,000 Truck Rolls Avoided through Dec 2011   \$45M Investment on 103 Circuits   55% Reliability Improvement 80% Reduction in Storm Outages     Distribution Mgmt. System Integrated Volt/Var Control Automated Switches   956 Theft/Tamper Incidents Detected   Sfid Reinforcement Aggressive Vegetation Mgmt   90% Reduction in Storm Damage     2% Demand Reduction from IVVC   2% Demand Reduction from IVVC   2013 - Current   Implementation     Verified Service Outage Customer Notifications On Ne Network Model Fault Location   Increased Customer Satisfaction   Increased Customer Satisfaction     Reduction in Restoration Automated Restoration Smart Lateral Fuses   Increased Customer Satisfaction   Reduction in Customers Impacted by Momentariae						S		
Smart Meters   > 233,000 Truck Rolls Avoided through Dec 2011   \$45M Investment on 103 Circuits   55% Reliability Improvement 80% Reduction in Storm Outages     Distribution Mgmt. System   956 Theft/Tamper Incidents Detected   \$45M Investment on 103 Circuits   90% Reduction in Storm Outages     Integrated Volt/Var Control Automated Switches   2% Demand Reduction from IVVC   Technology Growth   90% Reduction in Storm Outages     Verified Service Outage Customer Notifications   Verified Service Outage Customer Notifications   Impreased Customer Satisfaction     Neduction in Restoration Smart Lateral Fuses   Feduction in Restoration Time Reduction in Customers   Reduction in Customers	Implementation		Impact			Deployment	Ţ	Circuit Impact
Smart Meters   225,000 Huck Kolis Avoided through Dec 2011   \$45M Investment on 103 Circuits   80% Reduction in Storm Outages     Distribution Mgmt. System Integrated Volt/Var Control Automated Switches   956 Theft/Tamper Incidents Detected   Sfrid Reinforcement Aggressive Vegetation Mgmt   90% Reduction in Storm Damage     2% Demand Reduction from IVVC   2% Demand Reduction from IVVC   2013 - Current   90% Reduction in Storm Damage     Increased Customer Satisfaction     Verified Service Outage Customer Notifications One Network Model Fault Location Automated Restoration Smart Lateral Fuses   Increased Customer Satisfaction   Increased Customer Satisfaction	\$350M Investment	95	FTEs Reduced					
2013 - CurrentImplementationImpactVerified Service Outage Customer Notifications One Network Model Fault Location Automated Restoration Smart Lateral FusesIncreased Customer SatisfactionReduction in Restoration Time Reduction in Customers Impacted by Momentaries	Field Communications System Distribution Mgmt. System Integrated Volt/Var Control	thr 956 The	ough Dec 2011 ft/Tamper Incidents Detected and Reduction from IVVC	chnolog	y Growt	on 103 Circui Grid Reinforcen Aggressive Vegetatio	ts nent	80% Reduction in Storm Outages 90% Reduction in Storm
Customer Notifications Satisfaction   One Network Model Satisfaction   Fault Location Reduction in Restoration Time   Automated Restoration Reduction in Customers   Smart Lateral Fuses Impacted by Momentaries				2013 - C				
			Customer Notifica One Network Mo Fault Location Automated Restor Smart Lateral Fu	tions odel n ation ses	Reduction Reduc	Satisfaction n in Restoration Time tion in Customers		





#### **Grid Resiliency**

- Distribution line reliability
- Underground cable
- Overhead conductor
- Transformer replacement
- Breaker replacement
- Animal protection
- Lightning arrestors

## Distribution Automation

- Automated circuit tie lines
- Smart lateral fuses
- Communications to capacitors

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Communications to voltage

#### regulators

## **Multi-Year Focused Asset Deployment**

#### **Substation Automation**

- Fault location SCADA inputs
- Substation relay replacement
- SCADA
- Substation meter replacement

#### Technology Platforms and Applications

- Digital field services management
- Digital workforce optimization
- Distribution planning tools
- Transmission emergency management system





#### **Benefits of Grid Modernization**

- Improve grid reliability and resiliency
- Improved visibility and control
- Enhance grid flexibility
- Streamline operations
- Prepare for two-way flow
- Increase grid security
- Increase customer satisfaction





## **Customer Benefits of Grid Modernization**

#### Reliability Improvement

- Reduction in Customer Minutes of Interruption (CMI) due to technology and automation
- Improved storm resiliency (poles withstand higher wind speeds)

#### Cost savings

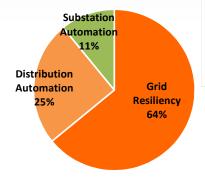
- Avoided customer lost revenue
- Annual avoided O&M & Capital maintenance
- Avoided storm costs
- Streamlined Operations
  - Integration with existing Smart Grid investment
  - Faster outage response time (Distribution Management System, fault location, etc.)
  - Decrease in annual truck rolls
- Stronger Oklahoma Communities
  - Lost customer revenue
  - Economic development





- Arkansas Series I completed Q1 2019
- Modernization of 14 circuits and 6 substations
- Preliminary results exceeding expectations
- Deployment of Series II currently underway

Category	Investments	2018	
Grid Resiliency	#1 Animal Protection	\$ 20,421,622	
	#2 Conductor Upgrades		
	#3 Equipment Upgrades		
	#4 Storm Reinforcement		
Distribution Automation	#5 Automated Circuit Tie Lines	ć c 200 254	
	#6 Automated Lateral Lines	\$ 6,280,354	
Substation	#7 Modern Protection Relays	<u>.</u>	
Automation	#8 Substation Automation	\$ 396,733	
	\$ 27,098,709		



#### **Proven Results-Arkansas Series I**

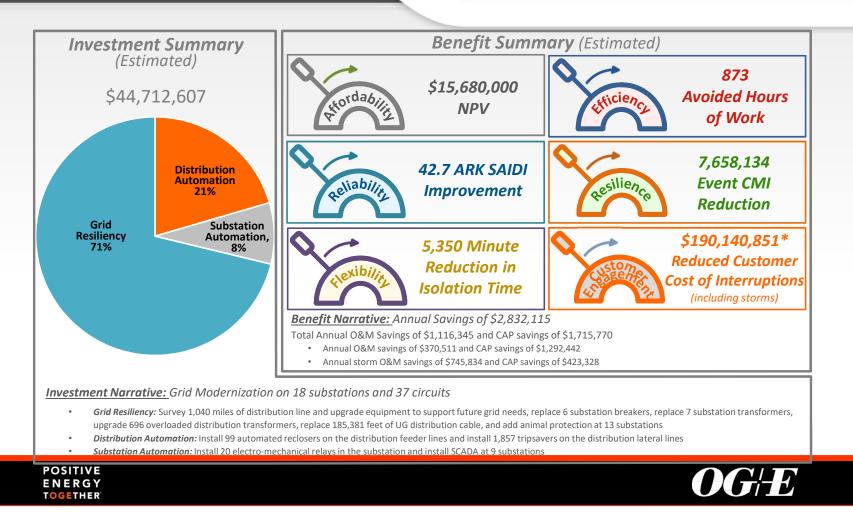
#### <u>Results from Ft. Smith Weather Event –</u> <u>May 18, 2019</u>:

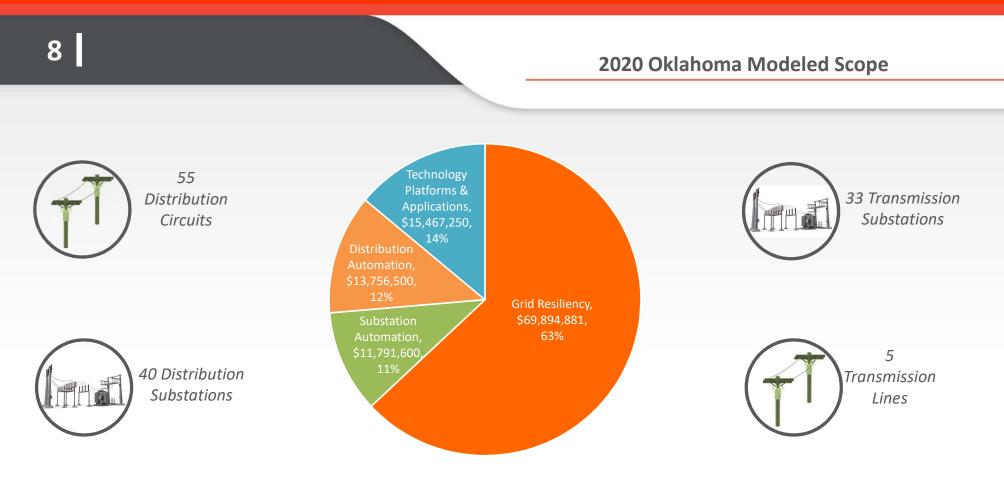
- Intense lightning and winds in excess of 70 MPH
- Modernized circuits had 89% less CMI than other circuits
- Modernized circuits had 28 minutes of SAIDI compared to 234 on other circuits
- 4% of customers on modernized circuits experienced a sustained outage compared to 50% on other circuits
- Minimal structural damage on modernized circuits when compared to other circuits





#### Arkansas Grid Mod Series II - Scorecard





Forecasted Investment of \$90M - \$110M

