

BUILDING A WORLD OF DIFFERENCE

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2014 BLACK & VEATCH STRATEGIC DIRECTIONS: U.S. ELECTRIC INDUSTRY

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AGENDA

Industry Overview

Change is Accelerating

Industry Shifts

Markets & Economics

Technology

Policy

Crossroads



INDUSTRY OVERVIEW

Change is accelerating



TOP 10 INDUSTRY ISSUES REFLECT SHIFTING PRIORITIES

Natural Gas Prices
Cyber Security
Economic Regulation
RELIABILITY
Physical Security
Environmental Regulation
FUEL POLICY
Aging Infrastructure
Natural Gas Fuel Supply Reliability
Long-Term Investment



BIGGEST THREATS TO LONG-TERM MODEL

42%



Environmental Regulation

21%



Aging Infrastructure

BALANCE OF REGULATION AND OPERATIONS IS CRITICAL TO SUSTAINABILITY



- Reliability
- Emissions standards
- Security mandates

- Infrastructure upgrades
- Changing workforce
- Customer demand

Regulatory imperatives and operational needs impact capital allocation

HOW CAN THE INDUSTRY BEGIN TO TACKLE CURRENT AND EMERGING ISSUES?



TECHNOLOGY

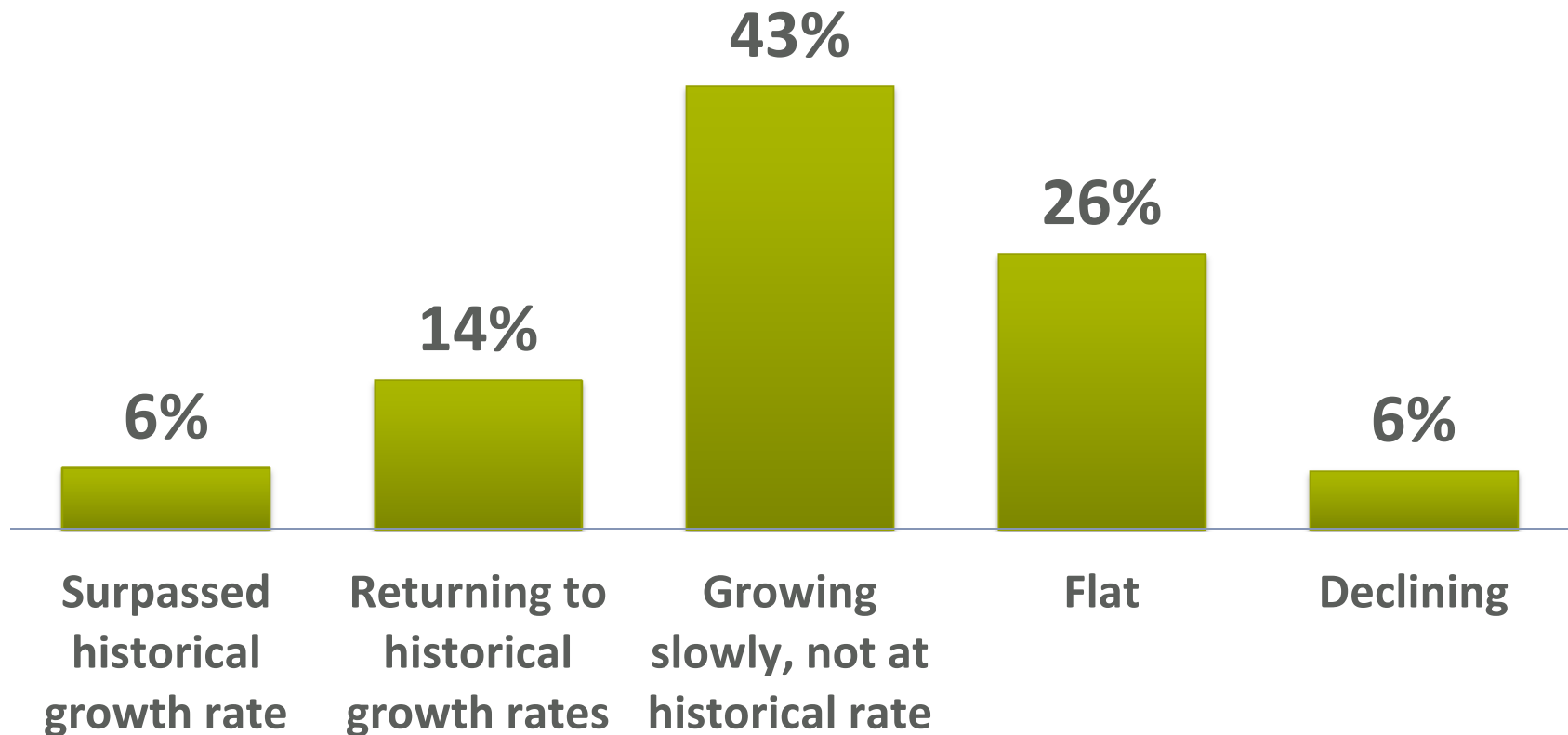


INDUSTRY SHIFTS

Markets & Economics

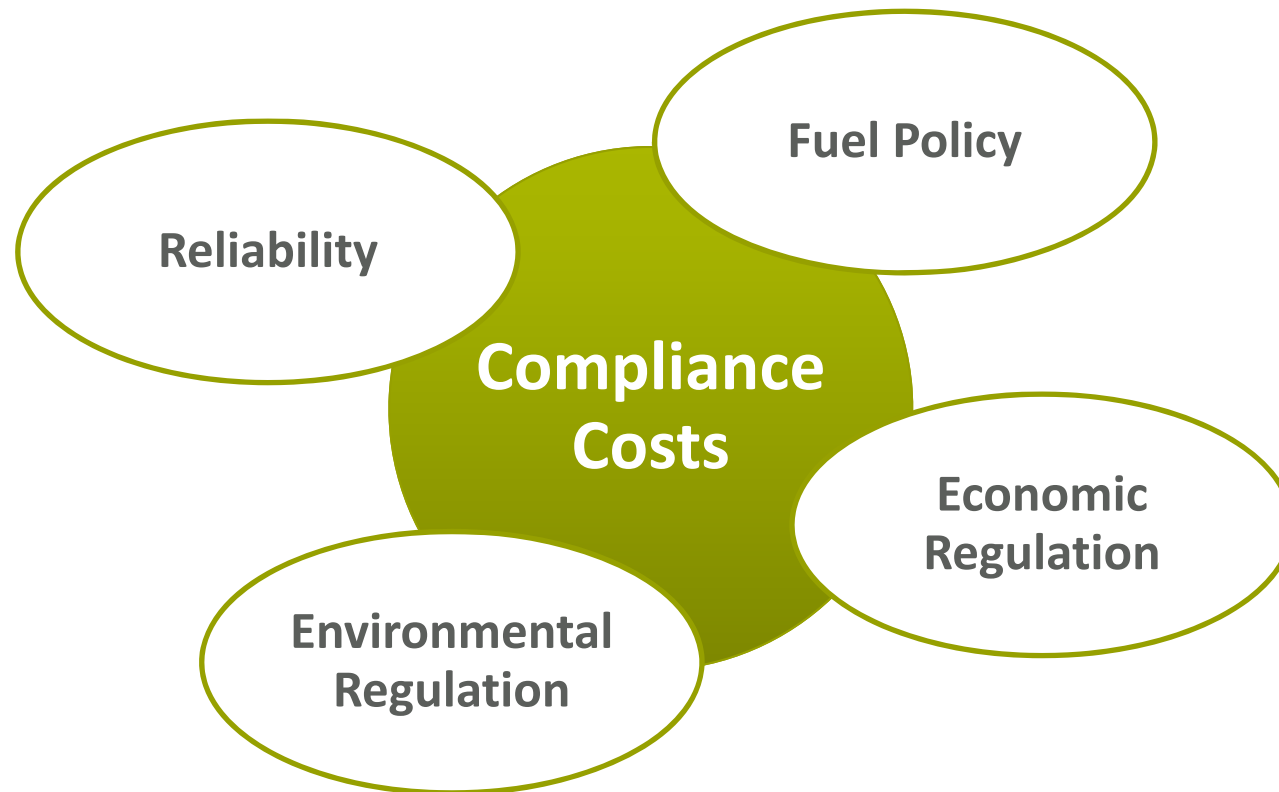


EVOLVING MARKETS AND ECONOMICS DRIVE INDUSTRY SHIFTS



Slow demand growth is challenging capital investment

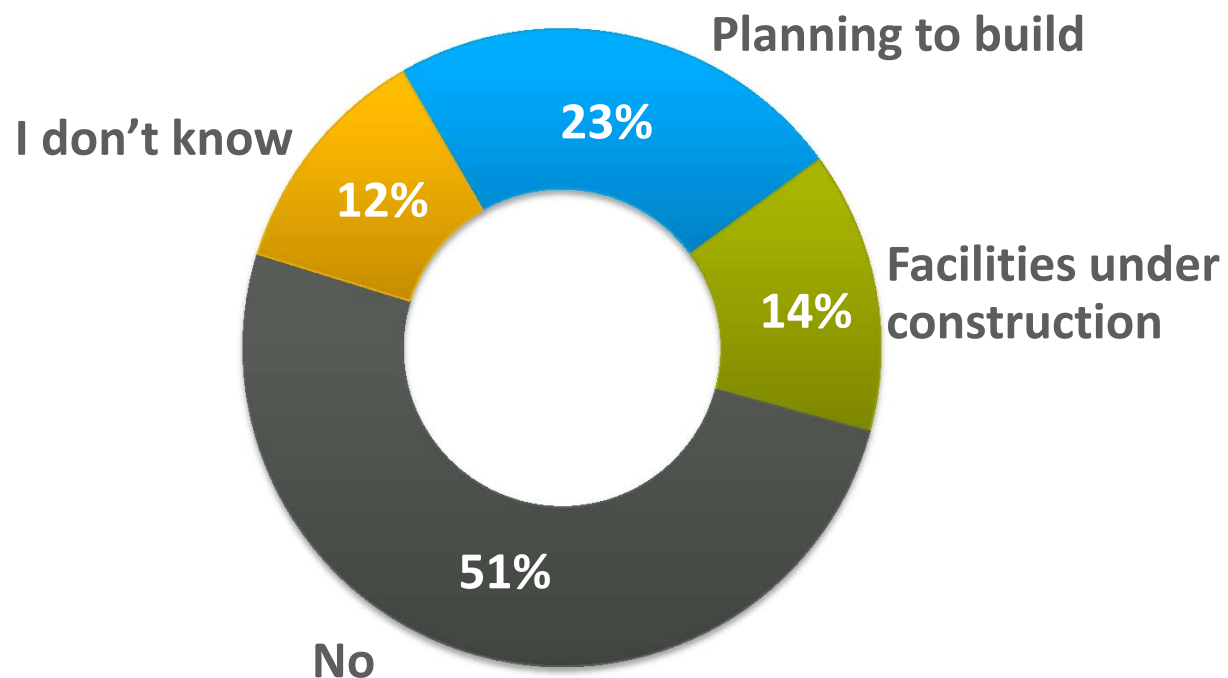
COMPLIANCE COSTS ARE TOP OF MIND



Market forces impact long term planning

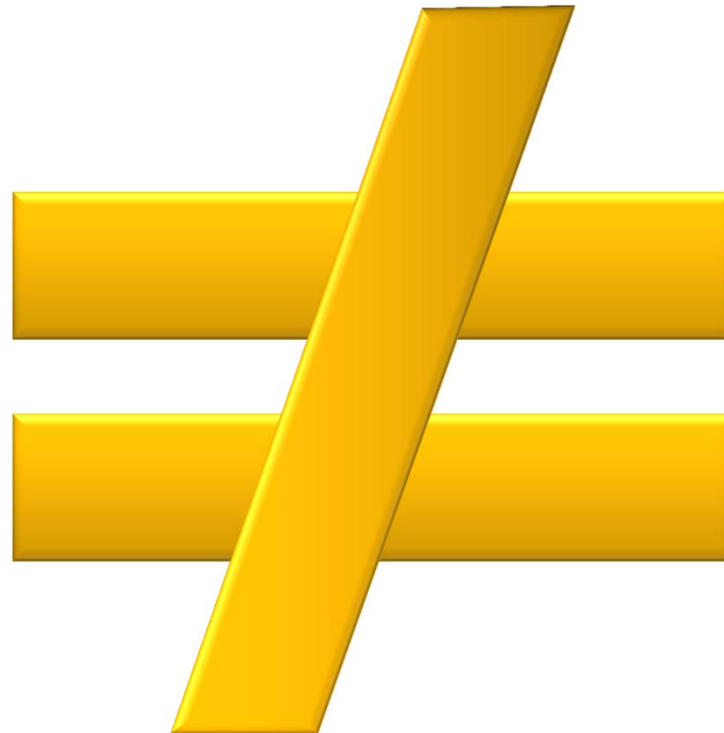
NATURAL GAS REVOLUTION TO RESHAPE POWER SECTOR

Plan for Natural Gas Fueled Generation



Shale gas revolution impacts power producers

REPLACEMENT MAY NOT BE ONE TO ONE



REGULATION, FIXED COSTS AND NEW GENERATION TO DRIVE RATE INCREASES

\$50,000,000,000

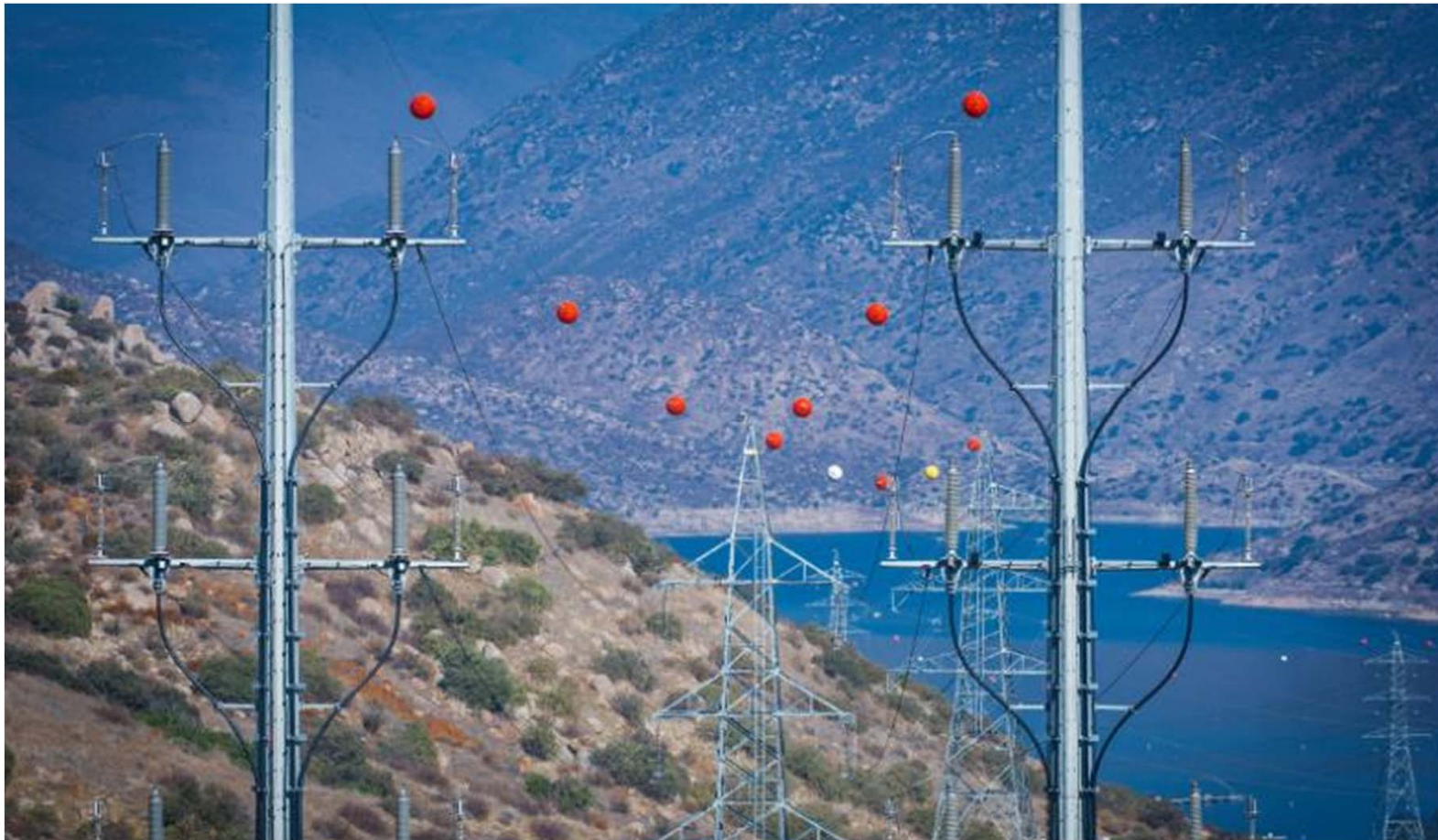


Estimated cost of 50GW of replacement NGCC

Rate structures will need to evolve



FORMAL ASSET MANAGEMENT PROGRAMS CAN HELP UTILITIES STRETCH CAPITAL

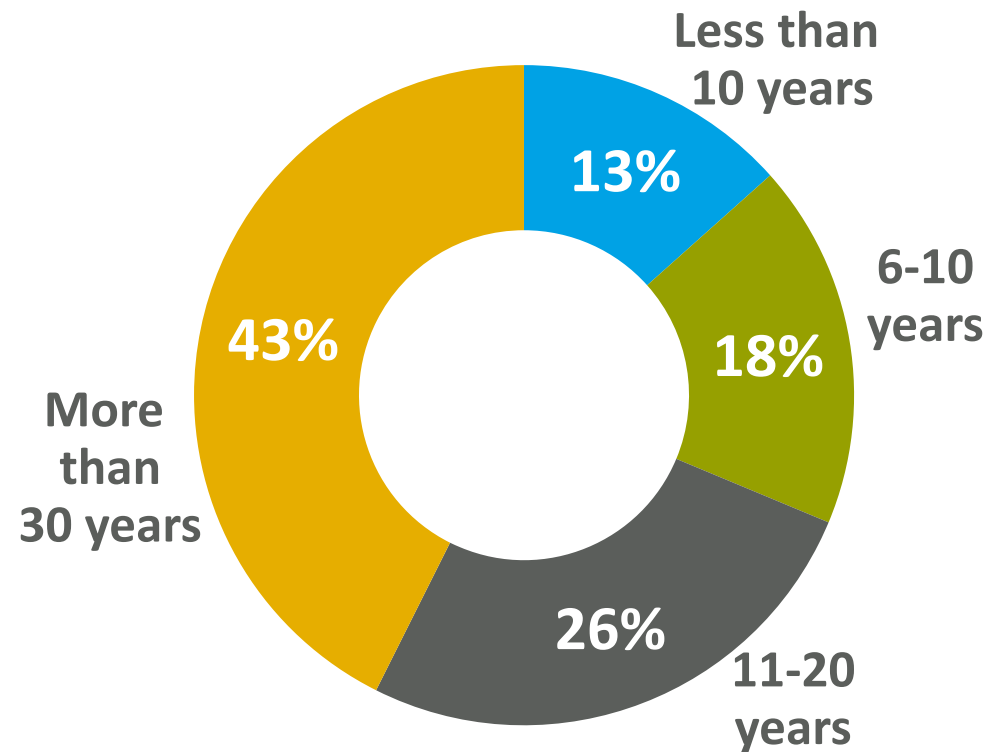


Risk-based approaches are key to future capital planning





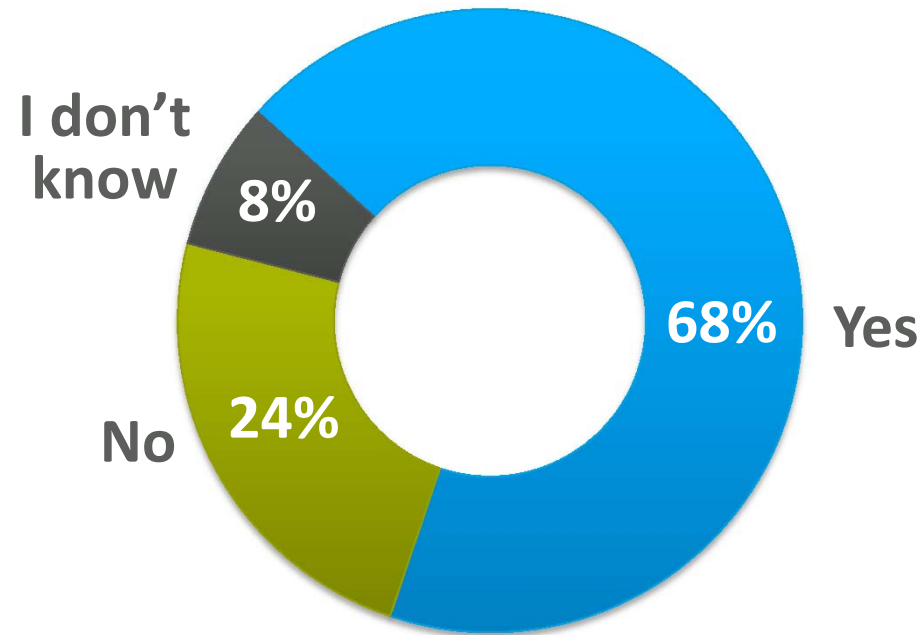
SYSTEMS AREN'T THE ONLY THING GETTING OLDER ...



Aging assets extend beyond copper and steel

MASS RETIREMENTS LOOM CREATING NEW CHALLENGES FOR OPERATORS

Organization Impacted by Workforce Retirements



Focus on STEM education and craft training

INDUSTRY SHIFTS

Technology





RISE OF DG RESHAPING CUSTOMER PROFILES

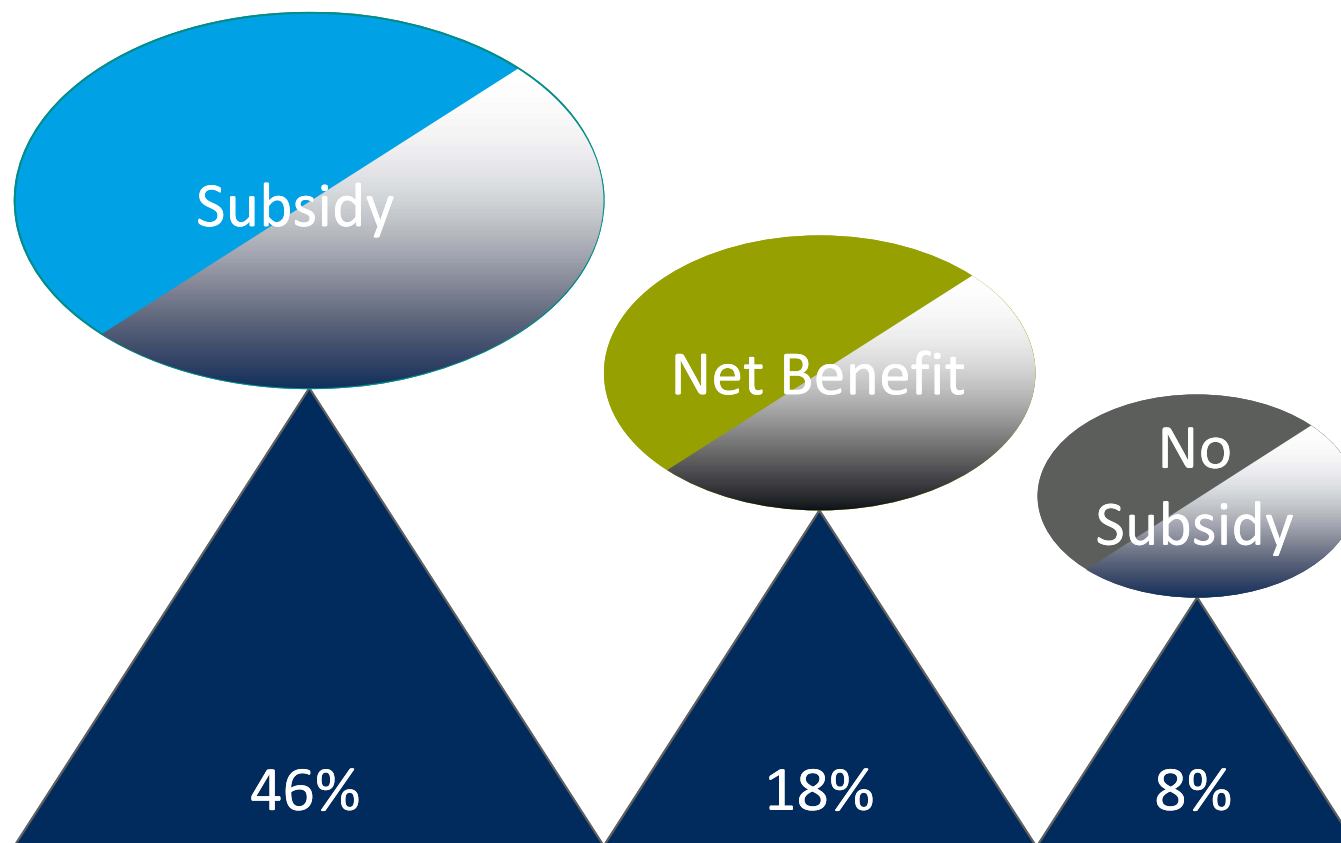
Anticipated DG Market Share	% Responding
More than 20%	5%
11-20%	14%
6-10%	43%
Approximately 5% (current market share)	12%
Less than 5%	15%

Distributed generation is having a profound impact on utility planning



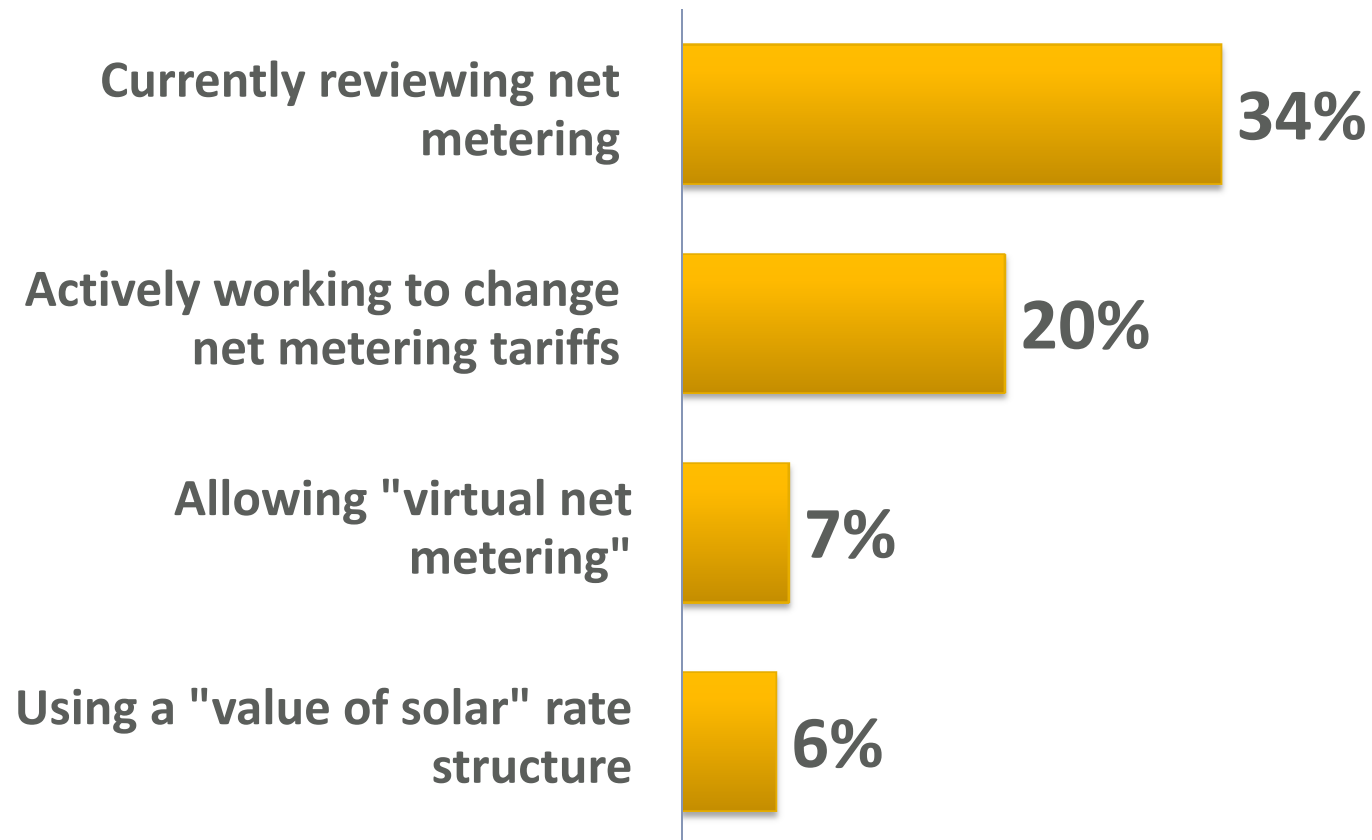
NET METERING CREATES REVENUE CHALLENGES FOR MANY UTILITIES

Utility Leaders' View of Net Metering



Current solar incentives can lead to higher rates for on-grid customers

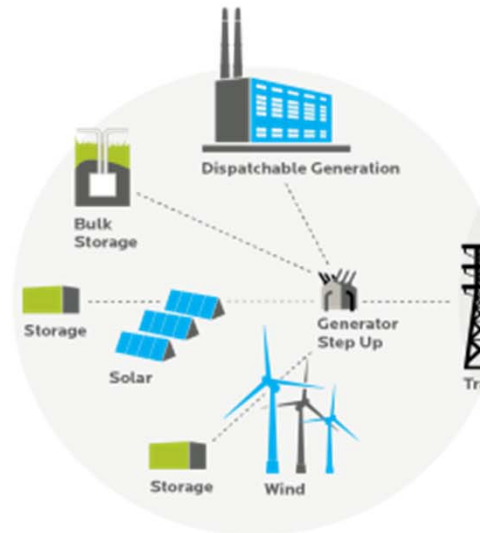
GROWTH IN NON-UTILITY SOLAR ASSETS IS DRIVING REVIEWS OF DG POLICIES



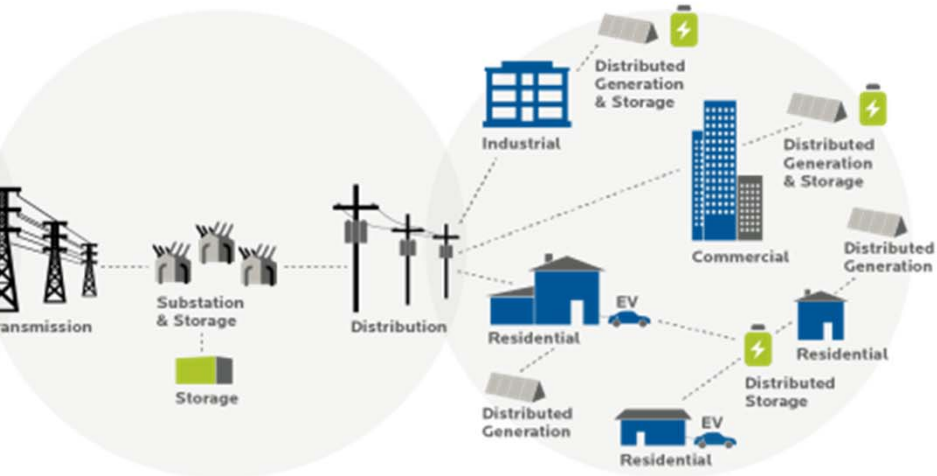
New approach requires fair distribution of costs among all customers

HIGH HOPES THAT ENERGY STORAGE WILL SMOOTH POWER FLOWS

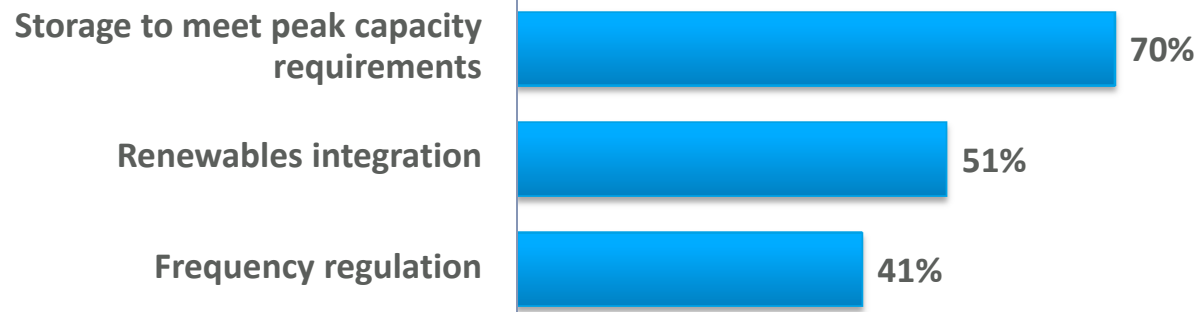
BULK STORAGE



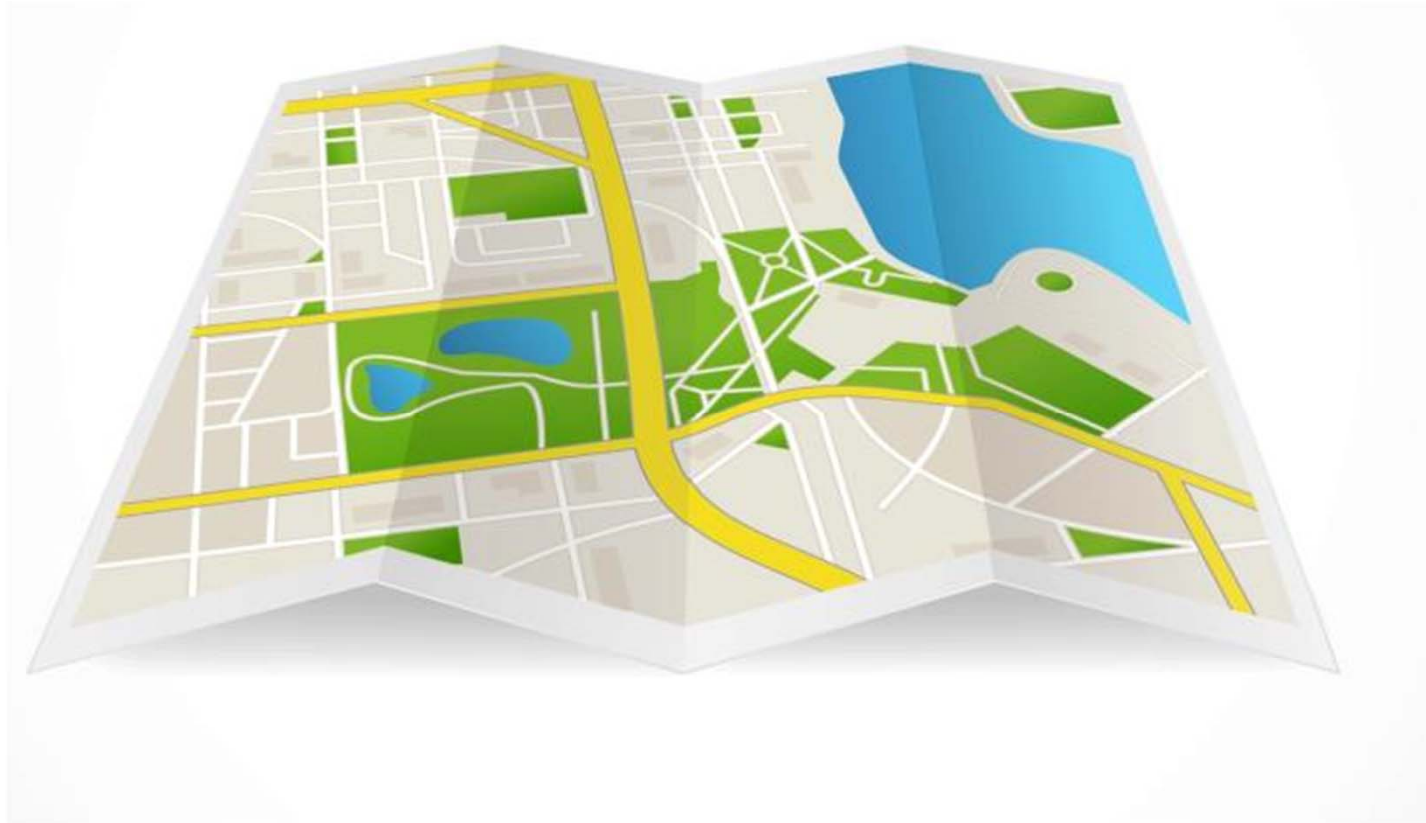
DISTRIBUTED STORAGE



PURPOSE OF ENERGY STORAGE



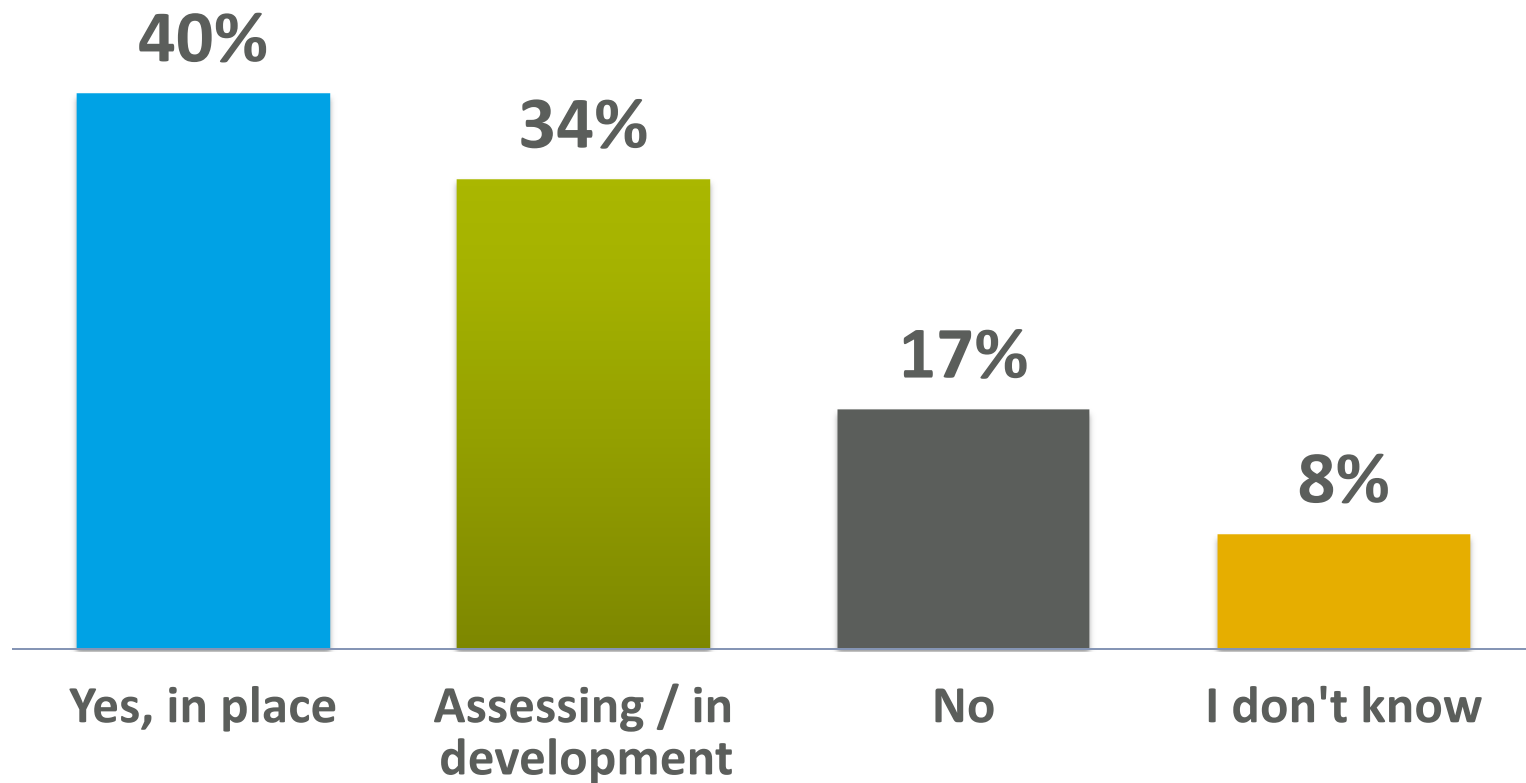
ADVANCED METERING CREATING MORE INTELLIGENT NETWORKS



Electric Grid catching up to telecom and ISPs



UTILITIES EMBRACING DATA, BUT ROOM TO GROW



Electric Utilities lag retail / banking sectors in use of big data

VALUE FOUND IN AMI AND DATA ANALYTICS ACROSS THE ORGANIZATION

Smart Network | Smart Information | Smart Utility | Smart Integrated Infrastructure



Growing recognition of the role of data across the organization



TECHNOLOGY IS CHANGING THE UTILITY-CUSTOMER RELATIONSHIP



Programmable,
controllable thermostats

Direct load control

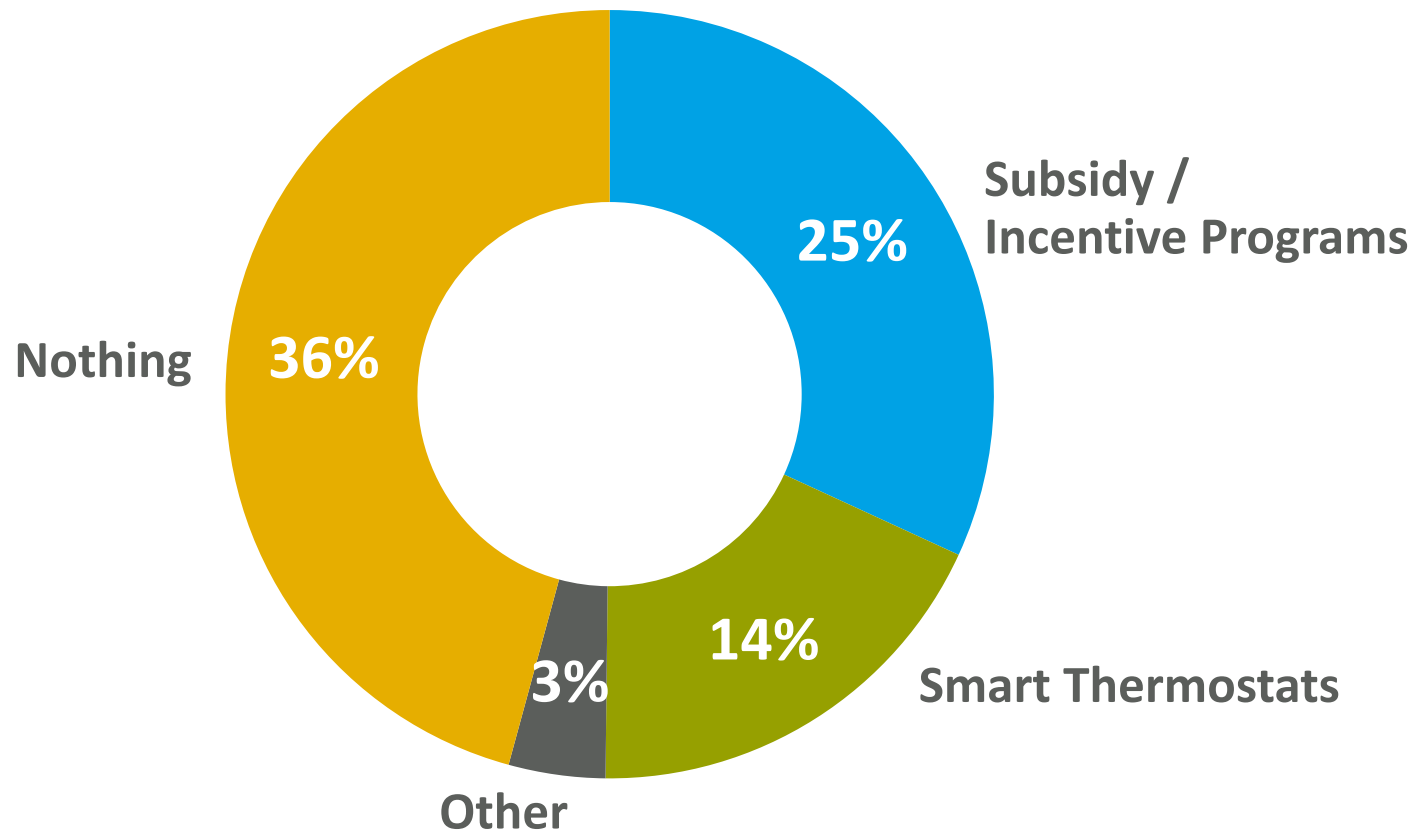
In-home displays

Pricing signals to
connected devices

Consumers are becoming more active in home energy management



UTILITIES SLOWLY EMBRACING RESIDENTIAL DEMAND-SIDE MANAGEMENT



Utilities are engaging customers to meet efficiency goals

INDUSTRY SHIFTS

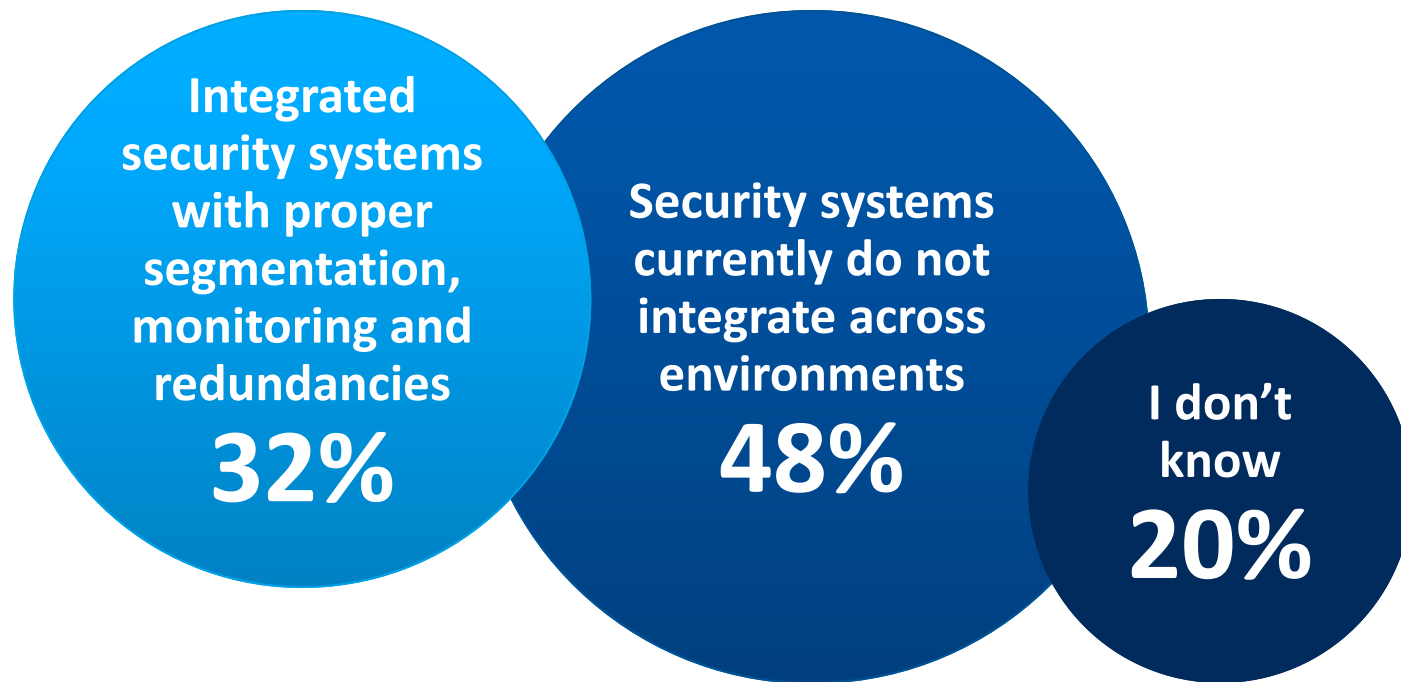
Policy



FEDERAL POLICIES ARE DRIVING CHANGES IN THE FUEL MIX AND INVESTMENT MODEL



CYBER SECURITY POLICIES DIRECTED AT PROTECTING CRITICAL INFRASTRUCTURE



New technology can increase system risk



PHYSICAL ASSET SECURITY GAINS PROFILE, WILL FUNDING FOLLOW?



Attacks / Threats	Investment Need	% View
↑	↑	42%
↔	↔	46%

Coverage of attacks are on the rise

CROSSROADS



UTILITIES MUST EVOLVE IN ORDER TO THRIVE



CAPACITY MODEL

ENERGY MODEL

Building a **world** of difference.®

Together



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