Building Resilience in Critical Public Infrastructure

Role of Government in Disaster Mitigation, Recovery and Response

Gaurav Gujral
Global Sustainability Lead for Public Services

July 28, 2021

accenture

Agenda

01 Global View: Recognising vulnerabilities and the impact on our communities around the world

02 Building resilience and sustainability in critical Government infrastructure

03 Understanding the complex pressures facing the U.S. Utility industry

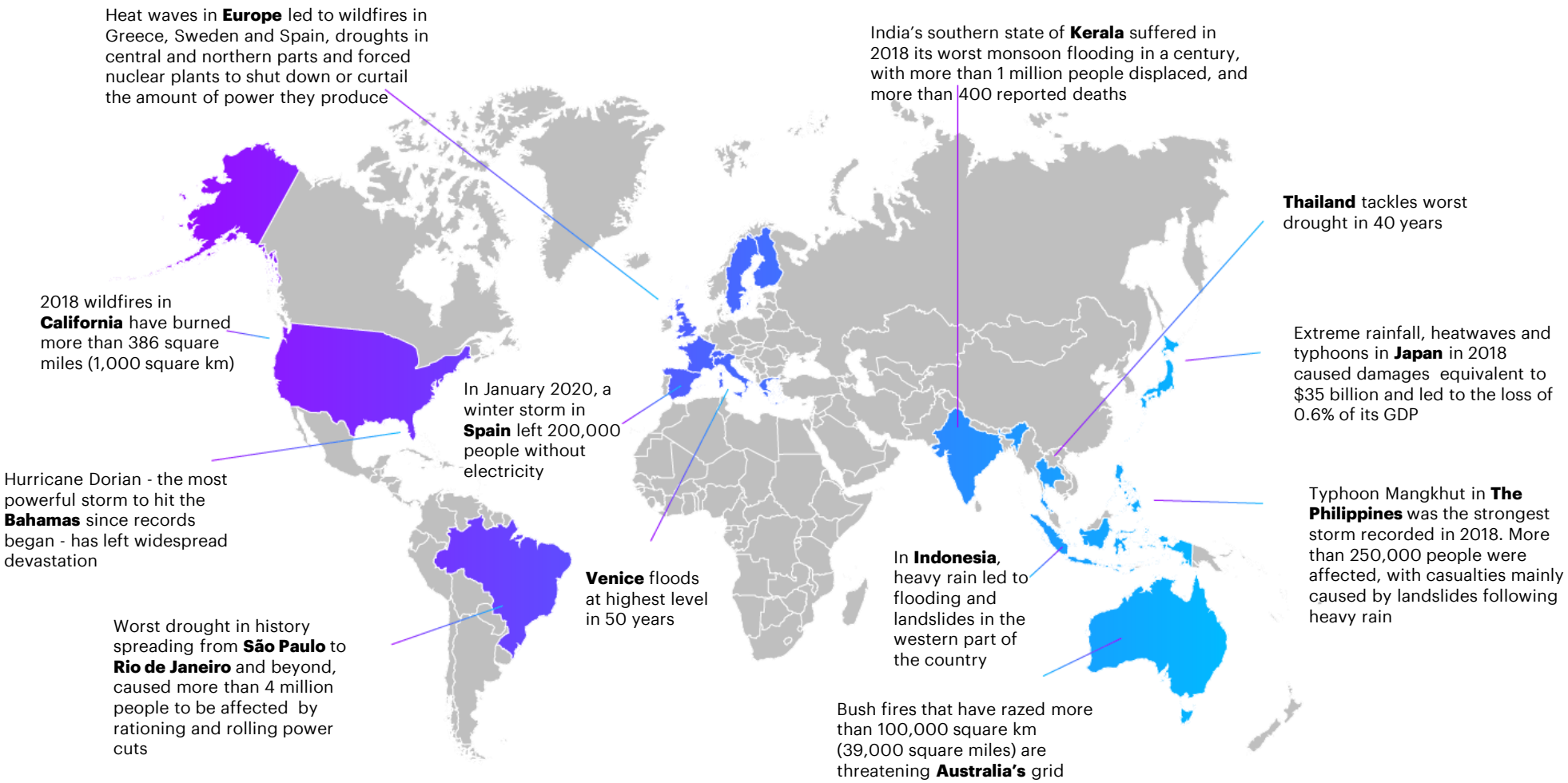
04 Strengths, challenges, and opportunities

>

Why?

Recognising vulnerabilities and the impact on our communities

Around the world, high-impact weather-related events are becoming more frequent and more severe



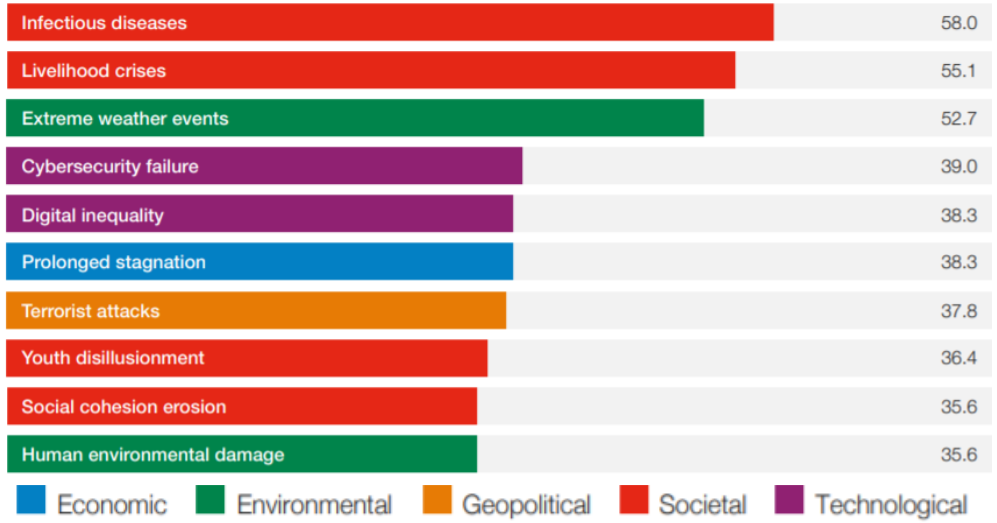
We have entered an epoch of increasing vulnerability

+475.000 people lost their lives worldwide and losses of US$ 2.56 trillion (in PPP) as a direct result of more than 11.000 extreme weather events between 2000 and 2019 – Germanwatch

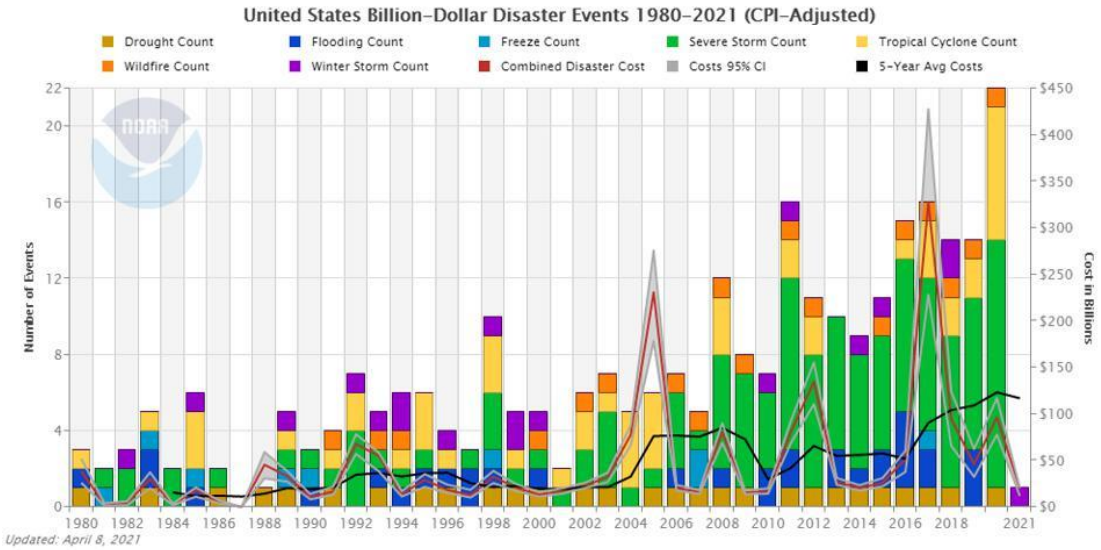
Global cybercrime costs expected to grow 15% per year, reaching $10.5 trillion USD annually by 2025 - Cybersecurity Ventures

NOAA alerts for an above-normal hurricane season in the Atlantic basin. Also forecasting models anticipate more intense hurricanes

Our economies and sectors are increasingly interconnected and uninterrupted energy supplies are the bedrock of the digital society



WEF - Global Risks Perception Survey 2020
% of respondents - Short-term risks (0 – 2 years)



Number of events (bars, left axis) and total cost (lines, right axis) of billion-dollar

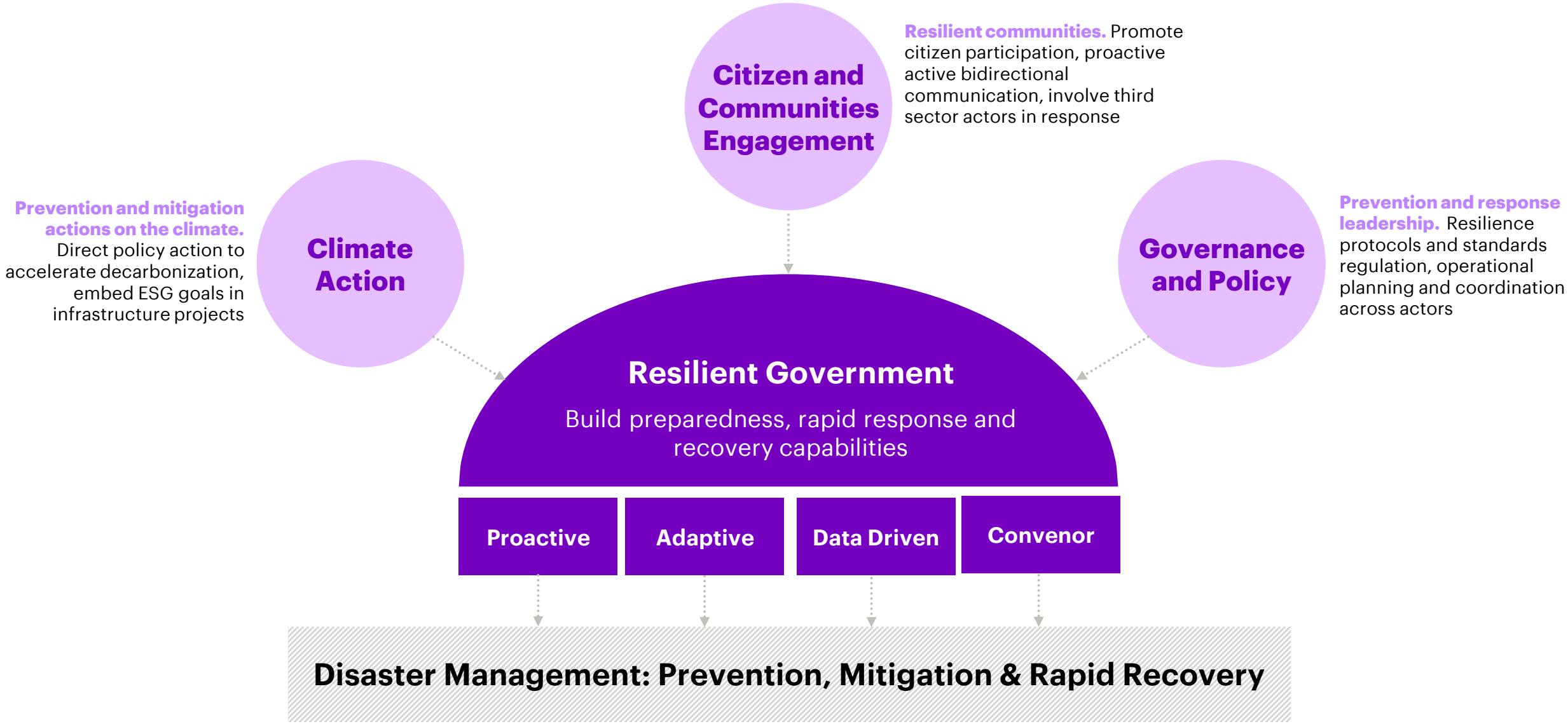
World Economic Forum The Global Risks Report 2021 and NOAA National Centers for Environmental Information (NCEI) U.S. Billion-Dollar Weather and Climate Disasters (2021).

The figures reported tell a human tale...

What?

Building resilience and sustainability in critical Government infrastructure

Characteristics of a Resilient Government



Increasing preparedness to unexpected events

Establish the foundations of resilience

- Strengthen institutional and coordination capacity
- Regulatory frameworks and standards for resilience and disaster reduction
- Response protocols and action plans
- Measurement, forecasting, modeling and risk assessment capabilities

Build resilient operations

- Increase flexibility and adaptability leveraging data-driven and technology solutions
- Invest in risk reduction measures and develop resilient infrastructure
- De-risk private investment in resilient infrastructure
- Collaborate with ecosystem partners
- Diversify operations and supply of critical resources

Future-proof and deliver resilience services

- Providing emissions, weather and risk data, real time alerts, and relevant insights in a timely and actionable matter
- Raise citizen awareness, participation and engagement building a resilient society / communities

Denmark
National Crisis Management System
Sector responsibility and a central Agency providing coordination, with regular risk assessments and contingency plans for known vulnerabilities.

Australia
National Disaster Risk Reduction Framework
Outlines a comprehensive approach to proactively reducing disaster risk based in the shared responsibility principle.

Paris
Climate Action Plan
Carbon-neutral by 2050 and resilient to crises and extreme weather. Fosters civic action, communication, plans to provide extensive data services and training.

EU countries allocations for reforms and investments supports climate objectives

Government stimulus plans helping build foundations for the future

France

- **Renovation of buildings:** financing a large-scale renovation programme to increase the energy efficiency of buildings. **€5.8 billion**
- **Modernisation of the rail network:** improving the rail network increasing the use of railway as an alternative to road transport. **€4.4 billion**
- **Decarbonised hydrogen:** development of value chains for decarbonised hydrogen. **€1.9 billion**
- **Climate and Resilience Law:** national legislation to contribute to the greenhouse gas emissions reduction target for 2030.

Germany

- **Hydrogen leap:** investing in green hydrogen at all stages of the value chain to help decarbonise the German economy. **€1.5 billion**
- **Support for electric cars:** helping citizens shift to clean electric vehicles by giving financial support for more than 800,000 decarbonised vehicles. **€2.5 billion**
- **Energy efficiency in residential buildings:** financing a large-scale renovation programme to increase the energy efficiency of residential buildings. **€2.5 billion**

Italy

- **Sustainable mobility:** integrate more regions into the high-speed rail network and complete the rail freight corridors; boost sustainable local transport through the extension of cycle lanes, metros, tramways and zero-emission buses, including the construction of electric charging stations across the country and hydrogen refuelling points for road and rail transport. **€32.1 billion**
- **Energy efficiency in residential buildings:** financing large-scale renovation of residential buildings to make them more energy efficient.. **€12.1 billion**
- **Renewable energy and circular economy:** developing the production and incentivising the use of renewable energies including green hydrogen as well as increasing recycling, reducing landfill waste and improving water management. **€11.2 billion**

Spain

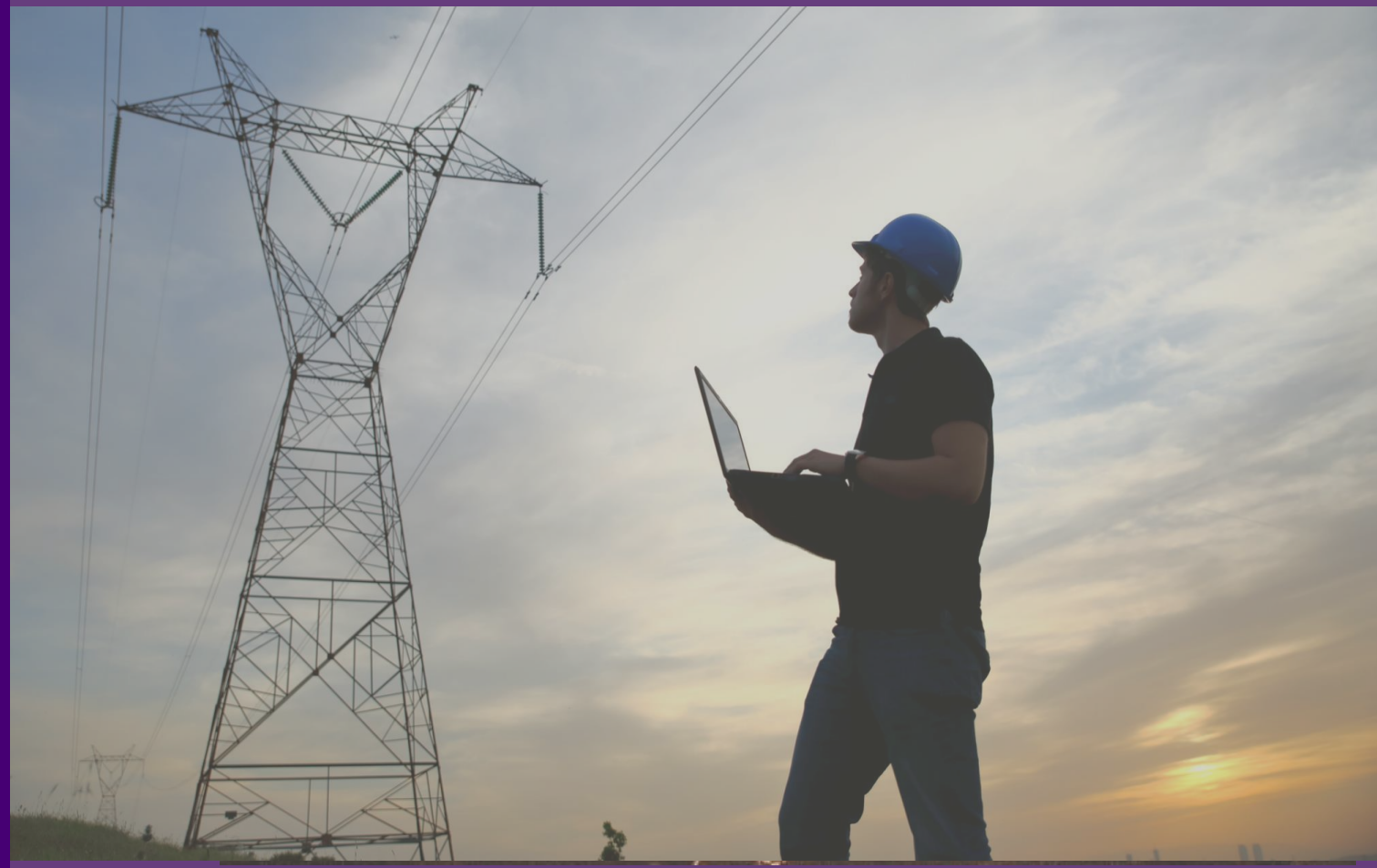
- **Law on climate change and energy transition:** establishing into law the renewable targets for 2030 and the objective of climate neutrality by 2050, including a 100% renewable electricity system.
- **Innovative renewable energy sources:** developing innovative renewable energy sources, integrated into buildings and production processes, including the implementation of the renewable hydrogen roadmap. **€3.9 billion**
- **Energy efficiency residential renovations:** supporting more than half a million energy efficiency renovations in residential buildings to achieve, on average a primary energy demand reduction of at least 30%. **€3.4 billion**

European Commission. *Recovery and Resilience Plans' assessments.*

Resiliency & U.S. Utilities

Daniel Stevens

accenture



Challenges facing the utility industry

CLIMATE UNCERTAINTY

Increased frequency and severity of severe weather

EXPECTATIONS & INTERDEPENDENCY

Demand for accurate and transparent comms to support customer and cross-sector expectations

REGULATORY

Storm-related mandates and fines have increased pressure

ADVANCED TECHNOLOGY

Ambiguity around emerging storm technologies; Gaps across existing foundational tools

SECURITY

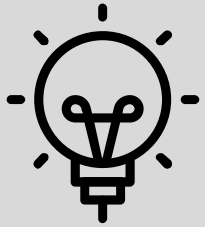
Third-party access & supply chain risks, increased vulnerability during storm

ENERGY TRANSITION

Renewables and market competitors create complex grid operations and restoration challenges

Strengths & Challenges

STRENGTHS



- Blue and gray sky reliability
- Mutual assistance
- Operations

CHALLENGES

Response

- Crisis communication & stakeholder engagement
- Integrated technology and field mobility
- Forensics analysis

Resiliency

- Making risk-based decisions to invest in mitigation

Opportunities

Response

- Leverage ESF12 (Energy)
- Help deconflict priorities
- Support response messaging

Mitigation

- Include utilities in the conversation – beyond just energy topics
- Understand the costs and benefits of enhanced vegetation mgmt. vs. undergrounding vs. asset hardening

Resiliency

- Develop a recovery plan with a resiliency mind-set
  - *How will you use federal aid?*
  - *What will the grid look like?*
  - *Repair vs. replace*

Q&A

accenture

APPENDIX

Select Slides from Digitally Enabled Grid Report 6.0 – 2020 report on grid resiliency

Hyper Link to Full Report

Source: https://www.accenture.com/_acnmedia/PDF-124/Accenture-Resilience-Extreme-Weather-POV.pdf#zoom=40

Digitally Enabled Grid (DEG) 6.0

Accenture's Annual Research Program– 2020 Topic was Resiliency

Respondent Function	
COO	27%
CFO	17%
CIO	17%
SVP/Director Networks	9%
CDO (or equivalent)	5%
SVP/VP/Director smart grid	5%
SVP/VP/Director customer ops	5%
SVP/VP/Director of strategy	4%
SVP/VP/Director grid ops	3%
SVP/VP/Director system planning	3%
SVP/VP/Director field force	2%
SVP/VP/Director regulation	1%
SVP/VP/Director power delivery	1%

NORTH AMERICA

83 respondents

- **Canada 20**
- **USA 63 + 6 interviews with executives**

LATAM

8 respondents

- Argentina 2
- Brazil 6

EUROPE

67 respondents

- Belgium 6
- Denmark 2
- France 5
- Germany 6
- Ireland 4
- Italy 3
- Netherlands 3
- Norway 6
- Poland 5
- Portugal 3
- Spain 8
- Sweden 4
- Switzerland 5
- United Kingdom 6

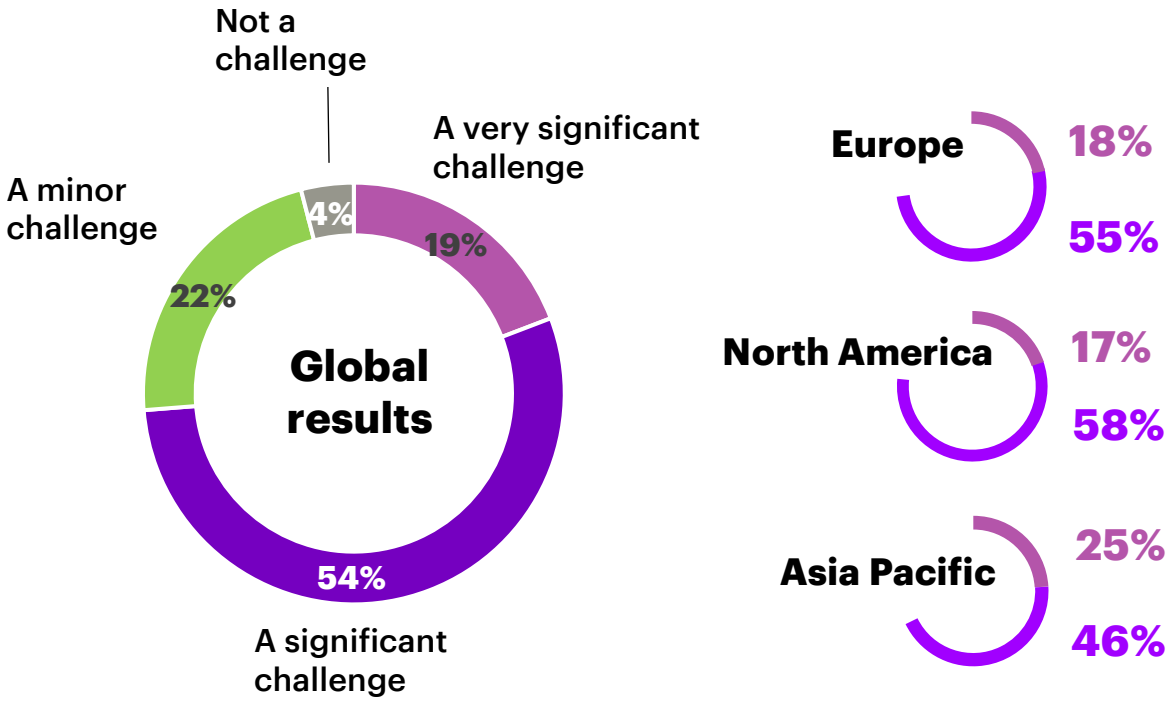
AAPAC

48 respondents

- Australia 10
- China 7
- Hong Kong 3
- India 6
- Indonesia 4
- Japan 5
- Malaysia 3
- Philippines 4
- Singapore 4
- Thailand 2

Less Then a Quarter Feel Well Prepared to Manage Extreme Weather

How challenging is it to maintain your network operations and safety during extreme weather events?



How prepared is your business to manage your expected changes to extreme weather events over the next 10 years?

	Very well-prepared
Global results	24%
North America	24%
Europe	18%
Asia Pacific	27%

And Core Resilience Investments Are Being Made

Which of the following resilience improvement areas do you expect to be your greatest priority over the **next 10 years**?

	Global	North America	Europe	APAC
Increased system flexibility	35%	30%	43%	33%
Restoration effectiveness	24%	27%	25%	21%
Network hardening	19%	20%	15%	23%
Effective communication with customers and other stakeholders	11%	13%	6%	8%
Accurate forecasting of weather and its impacts on your network	11%	10%	10%	15%

Priority resilience improvement areas

System operational flexibility
Utilization of network redundancy, reconfiguration, microgrids, distributed generation (DG), storage, etc.

Restoration effectiveness
Emergency processes, restoration, optimization, training, strategic spares, etc.

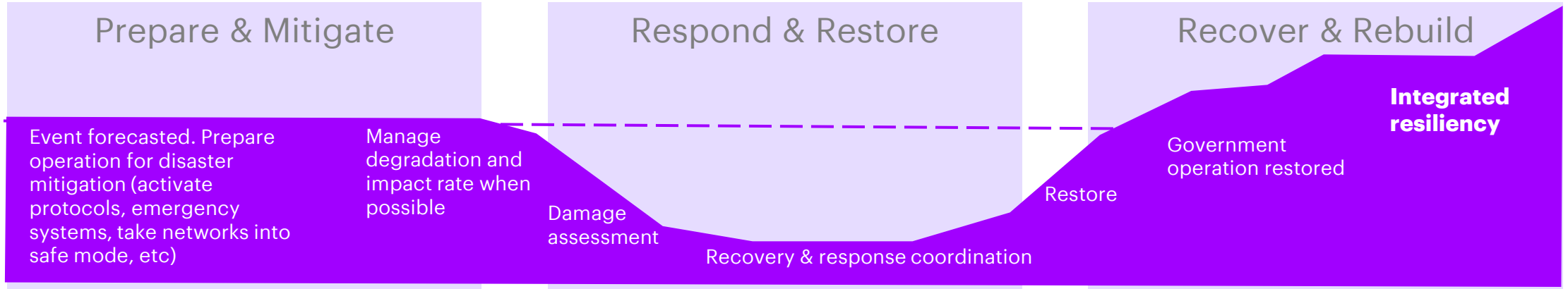
Network hardening
Undergrounding, flood protection, overhead line strength, etc.

Examples – network islanding
- Network sensors and control
- Network analysis (power flow, contingency analysis, etc.)
- Network automation
- Distributed energy resource (DER) control systems
- Incentive model/grid code modifications

Examples – supply chain logistics
- Supply chain sourcing diversity
- Strategic spares strategy
- Spares sharing agreements with other utilities
- Pre-staging parts prior to the event

Examples – substation flooding
- Re-siting
- Raise assets
- Flood barriers
- Sump pumps
- Local land drainage
- Local vegetation management

Disaster risk management & resiliency



Operation

Prepare & Mitigate

- Local, State and National coordination
- Forecast events and develop early warning capabilities
- Minimize impact
  - Citizen and businesses notification
  - Emergency operation planning

Respond & Restore

- Adapt to event impacts
  - Reconfigure services as required
  - Manage communications
  - Maintain safety

Recover & Rebuild

- Restore Government operation
- Optimize restoration tactics
- Recovery stimulus packages
- Restore degraded resilience

Objectives

Forecast, prepare and prevent to minimize impacts

Build the resilient **infrastructure**

Mitigate the ongoing event to maintain safety and limit further impact on businesses, citizens and Government operation

Adapt to restore systems, services or supply, minimizing value loss

Intervene in emergencies

Build & Recover Stronger, leveraging recovery dollars to invest in greater resiliency capabilities