Resources

- The *Help Them Help Themselves* toolkit focuses on participatory and co-creation methods for adaptation, enabling local governments to engage civil society & local experts in governance of adaptation.
- This United Nations Department of Economic and Social Affairs (UNDESA) *Handbook on Effective National to Local Governance for Climate Change Mitigation & Adaptation* provides a governance framework for vertical and horizontal integration of adaptation policy. Helpful for sub-national governments establishing local adaptation governance with civil society input.
- The Cities and Towns Urban Adaptation Support Tool of the European Environment Agency (EEA) offers local authorities frameworks and case-studies for adaptation planning and inclusive governance; useful for participatory governance structures.

KPIs

INPUT INDICATORS
Measure the resources required to deliver

- Number of public-private partnerships (PPPs) and community adaptation projects initiated

LEADING INDICATORS
Looks forward at future outcomes and events

- % of local adaptation projects co-funded by non-public actors
- % of projects including public consultations and number of stakeholders engaged

LAGGING INDICATORS
Looks back at whether the intended result was achieved

- Improvement in neighborhood-level adaptive infrastructure coverage

Action 3

Deliver Targeted Public Awareness and Outreach Campaigns

Goal: Build social acceptance and active participation in local adaptation measures.

Description: Subnational governments should roll out targeted outreach campaigns that inform citizens about local climate risks (e.g., flood-prone zones, heat islands, drought conditions) and promote adaptive behaviors such as water conservation, vegetation management, or emergency preparedness. Campaigns should use schools, neighborhood associations, and local media to reach diverse audiences, and emphasize household- and community-level resilience actions that complement municipal measures. By making risks tangible and showing clear pathways for action, these campaigns foster public engagement and support for local adaptation initiatives. Well-informed citizens are more likely to comply with new regulations, apply for retrofit incentives, and actively participate in collective adaptation efforts.

Resources

- International Day for Building Safety, a global initiative to highlight the importance of building safety and the steps different actors can take to achieve it.
- C40 Cities' Integrating Climate Adaptation toolkit contains modules for engaging stakeholders, public workshops and translating hazard data for local audiences. (available in multiple languages)
- WRI's Locally Led Adaptation page contains multiple resources around the topic (e.g. a *Principles to Practice* paper, a technical paper C*an the Global Goal on Adaptation Be Locally Led?*, etc.). While focused on broader adaptation, they highlight inclusion, outreach and community-based engagement.
- The Climate Adaptation in Cities resources of the European Commission offers examples of city-level outreach, awareness-raising and public engagement on urban adaptation initiatives.

KPIs

INPUT INDICATORS
Measure the resources required to deliver

- Number of awareness campaigns and public events held per year

LEADING INDICATORS
Looks forward at future outcomes and events

- % of population reached through communication campaigns

LAGGING INDICATORS
Looks back at whether the intended result was achieved

- Increase in citizen participation in resilience or emergency planning programs

Link Climate Resilience with Urbanization Efforts

Goal: Incorporate climate adaptation measures into urban planning processes, ensuring that new developments and infrastructure projects consider urban resilience in the face of climate change.

Description: As urban areas grow, it is critical to embed resilience into the fabric of urbanization strategies to safeguard against climate risks such as flooding, heatwaves, and other extreme weather events and help assure the community remains vibrant and can recover quickly

- C40 Cities' *Integrating Climate Adaptation* toolkit directly supports linking adaptation with urban development/ urbanisation strategies by integrating resilience into urban planning and land-use.
- UNDESA : Governance and institutional frameworks outlined support ensuring adaptation is embedded in urbanisation and local planning processes rather than treated as an add-on.

INPUT INDICATORS
Measure the resources required to deliver

- Inclusion of climate adaptation criteria in municipal procurement guidelines

LEADING INDICATORS
Looks forward at future outcomes and events

- % of public projects evaluated using resilience criteria

LAGGING INDICATORS
Looks back at whether the intended result was achieved

- Reduction in lifecycle costs and risk exposure of public infrastructure

UTILITY& ENERGY COMPANIES

Who is this pathway for?

This pathway is designed for energy providers, grid operators, utility companies (electricity, gas, water), and energy service companies that support buildings and infrastructure. It targets both public and private actors managing centralized and decentralized energy systems. The pathway is particularly relevant to departments in charge of grid resilience, customer programs, and strategic innovation, providing a roadmap to ensure energy systems enable, rather than hinder, climate-resilient buildings and communities.

As the backbone of modern society, utility and energy companies face rising pressure from climate-driven disruptions: extreme heat waves strain cooling demand, floods damage distribution networks, and droughts affect hydropower and water supplies. These impacts not only affect the reliability of energy systems but also expose utilities to financial losses, reputational damage, and regulatory scrutiny. Simultaneously, the transition to electrification, decarbonization, and distributed energy systems makes resilience a strategic imperative.

Utilities must ensure continuity of service, safeguard infrastructure, and support customer adaptation. Beyond grid stability, they can play a key role in equity: by offering tailored programs for vulnerable households, utilities help ensure the benefits of resilience are widely shared. Whether through adaptation audits, targeted subsidies, or climate-informed infrastructure planning, utility companies hold both the tools and responsibility to accelerate resilience in the built environment. Their role is pivotal in making the buildings sector ready for an increasingly volatile climate.

Ensure grid resilience while enabling climate-ready buildings and communities.

Most utilities have yet to fully integrate adaptation into planning, budgeting, and service design. In the short term, they must build internal expertise, begin climate-informed audits, and pilot adaptive solutions. Medium term, they should develop new products, engage regulators, and embed resilience into system upgrades. By 2050, utilities should act as resilience enablers, actively co-designing adaptive systems with cities, developers, and regulators, and supporting equitable access to resilient energy solutions.

UTILITY & ENERGY COMPANIES

Short-Term Actions

Actions	Resources & case studies	KPIs
Set Up or Support Climate Resilience Financing Instruments	CPI's *Building Financial Instruments for Climate Adaptation report*	Total amount of capital mobilized for decentralized or resilient energy and water infrastructure
Build Capacity and Tools for Adaptation Audits	EPRI's Climate READi	% of audit tools and templates standardized across departments
Map Vulnerabilities and Strengthen Emergency Preparedness Across Networks	Ouranos's *Monitoring and Evaluation for a Resilient Electricity Sector* Report	Frequency of updates to climate vulnerability maps and asset-level assessments

Medium-Term Actions

Actions	Resources & case studies	KPIs
Influence Infrastructure and Urban Design Toward Resilience	Rocky Mountain Institute (RMI)'s *Reimagining Utility Climate Risk Planning*	Number of operational decentralized systems or community microgrids launched
Detect Community Level Stress and Strengthen Emergency Preparedness	UNEP's *Climate Information and Early Warning System*	Number of communication campaigns or alerts issued annually on heatwaves, grid stress, or drought
Support Clients Through Adaptation Audits and Targeted Climate Risk Communication	PNNL's *Emerging Best Practices for Electric Utility Planning with Climate Variability*	Number of commercial or industrial clients receiving adaptation audits or technical resilience advice

Long-Term Actions

Actions	Resources & case studies	KPIs
Deliver Incentives and Programs for Vulnerable Households	UNDP's *Empowering Vulnerable Households to Access Affordable and Clean Energy*	% of targeted vulnerable households enrolled in programs
Establish Community-Based and Community-Led Resilience Programs	SEPA *Resilient by Design* report	Number of active partnerships with municipalities or communities for shared energy resilience projects (e.g., microgrids, cooling centers)
Integrate Adaptation into National Energy Planning and Forecasting	The *Climate resilience* section of *Power Systems in Transition*, IEA	Leading Evidence of collaboration with regulators on integrating adaptation into long-term energy demand models
Drive Innovation Through Pilots and Standards	PNNL's *Climate Adaptation Approaches for Water and Electric Utilities* report	Development of draft or revised resilience standards submitted to regulators

Short-term actions

Set Up or Support Climate Resilience Financing Instruments

Action 1

Goal: Enable investment in decentralized and resilient energy systems by lowering financial barriers.

Description: Utilities should collaborate with financial institutions, (re)insurance institutions, regulators, and development banks to create financing mechanisms such as leasing programs, ESCO (energy service company) models, targeted subsidies, and preferential loan products, that support the deployment of resilient energy solutions. These may include solar & storage systems, microgrids, smart thermostats, and demand-response technologies.

Resources

- Climate Policy Initiative (CPI)'s *Building Financial Instruments for Climate Adaptation* report provides detailed guidance on how to structure and scale adaptation-finance instruments (e.g., for energy networks). Utilities can use this to partner with financiers and set up leasing or subsidy programmes for resilient energy solutions.
- International Institute for Sustainable Development (IISD)'s *Innovative Financial Instruments and Their Potential to Finance Climate Change Adaptation* report focuses on how adaptation-finance is often under-invested, especially in developing countries, and gives examples that utilities in the Global South or North can follow for financing resilient energy-infrastructure.
- This article highlights the rise of resilience bonds and blended finance for adaptation. Demonstrates market-trends utilities can tap into (e.g., issuing resilience-bonds to fund microgrids or resilient energy storage for communities).

KPIs

INPUT INDICATORS
Measure the resources required to deliver

- Number of dedicated financing instruments or partnerships established to fund resilience projects (e.g., ESCOs, leasing models, subsidies)

LEADING INDICATORS
Looks forward at future outcomes and events

- Total amount of capital mobilized for decentralized or resilient energy infrastructure

LAGGING INDICATORS
Looks back at whether the intended result was achieved

- Increase in deployment of climate-resilient technologies (e.g., solar+storage systems) financed through these mechanisms

Build Capacity and Tools for Adaptation Audits

Action 2

Goal: Develop standardized tools, maps, training programs, and a skilled workforce to perform adaptation-focused energy audits.

Description: Utilities should develop internal expertise, tools, and staff training to perform adaptation-focused audits. They should allocate staff and funding, and pilot the integration of audits into existing client services. In the immediate term, audits may be outsourced to third parties, but governments and regulators should provide resources, maps, and climate data to accelerate internal capacity-building.

Resources

- Rocky Mountain Institute (RMI)'s *Reimagining Utility Climate Risk Planning* describes a structured framework for utilities to perform climate risk assessments (identify, quantify, integrate into planning)
- Electric Power Research Institute (EPRI)'s Climate READi provides a large library of guidance, references and tools to help companies plan, design and operate their infrastructure with resilience in mind.
- Electricity Sector Council of Canada's *Adaptation through Risk Management: Electricity Sector Climate Adaptation Planning Guide* is a detailed sector-specific guide for utilities to integrate adaptation into business-planning, valuable for building internal audit and adaptation-capacity.

KPIs

INPUT INDICATORS
Measure the resources required to deliver

- Budget allocated to staff training and audit tool development
- % of employees trained on adaptation audit methodologies
- Number of partnerships established with research institutions or technical agencies

LEADING INDICATORS
Looks forward at future outcomes and events

- Number of adaptation audits performed per quarter
- % of audit tools and templates standardized across departments
- Integration of climate risk datasets into audit models or GIS systems

LAGGING INDICATORS
Looks back at whether the intended result was achieved

- Share of audited clients implementing recommended resilience measures
- Reduction in energy service disruptions or performance loss during extreme events
- Demonstrated cost savings or avoided damages for clients implementing audit recommendations

Action 3

Map Vulnerabilities and Strengthen Emergency Preparedness Across Networks

Goal: Anticipate risks to critical infrastructure and ensure effective response to climate-related disruptions.

Description: Utilities should conduct a comprehensive mapping of vulnerabilities across their networks, including substations, pipelines, power plants, and transmission lines, under different climate scenarios. This mapping must draw on downscaled data and probabilistic risk models provided by governments, regulators, and research institutions.
Based on these assessments, companies should revise and update emergency preparedness protocols, including outage response, load-shedding priorities, and disaster recovery plans. Tools to track service interruptions and early warning systems should be integrated into daily operations, allowing utilities to detect stress in communities and respond proactively.

Resources

- WRI *Aqueduct Water Risk Atlas*: Portfolio-screening tool for current/future water stress, flooding, and drought. Helps triage assets and set site-level KPIs.
- EPRI's *Costs and Benefits of Proactive Climate Adaptation in the Electric Sector*
- Ouranos's *Monitoring and Evaluation for a Resilient Electricity Sector Report* details how utilities can build monitoring and evaluation frameworks, map vulnerabilities, integrate climate-scenario data into network planning and emergency response.
- This Adaptation Community's *Climate Risk Sourcebook* provides modular templates for risk assessment which utilities can adapt for network-vulnerability mapping (e.g., identifying substations at flood risk or transmission lines exposed to wildfire).

KPIs

INPUT INDICATORS
Measure the resources required to deliver

- Completion of a comprehensive climate risk and asset vulnerability map covering all critical infrastructure

LEADING INDICATORS
Looks forward at future outcomes and events

- Frequency of updates to climate vulnerability maps and asset-level assessments

LAGGING INDICATORS
Looks back at whether the intended result was achieved

- % reduction in service interruptions or damage incidents linked to climate events

Medium-term actions

Influence Infrastructure and Urban Design Toward Resilience

Action 1

Goal: Align energy infrastructure planning with resilient urban development.

Description: Utility infrastructure decisions (grid upgrades, substation location, decentralization strategies) shape long-term energy access and resilience. Utilities must proactively engage in territorial planning, advocating for microgrids, local production, and resilient system design. This is especially crucial in areas where grid reliability is already under strain or central systems are vulnerable. Utilities should collaborate with municipalities, developers, and insurers to support climate-smart infrastructure decisions.

Resources

- Rocky Mountain Institute (RMI)'s *Reimagining Utility Climate Risk Planning* brief examines how utilities can integrate climate risk assessment frameworks into infrastructure planning processes (grid upgrades, microgrids, network design). Directly relevant when utilities engage with urban and infrastructure planning to align energy infrastructure with resilient urban development.
- European Environment Agency (EEA)'s broad handbook on integrating climate resilience into infrastructure (including energy) across planning, design and implementation. Utilities can use it to influence urban/energy infrastructure decision-making in collaboration with municipalities and developers.
- Although focused on water and sanitation utilities, the principles of resilient infrastructure, decentralised services and utility-territory planning detailed in the International Water Association's Climate Smart Utilities Initiative also apply strongly to energy utilities as they participate in urban/territorial planning.

KPIs

INPUT INDICATORS
Measure the resources required to deliver

- Regulatory and technical feasibility studies completed for microgrid deployment

LEADING INDICATORS
Looks forward at future outcomes and events

- Number of operational decentralized systems or community microgrids launched

LAGGING INDICATORS
Looks back at whether the intended result was achieved

- % reduction in outage duration or grid recovery time after climate shocks

Detect Community-Level Stress and Strengthen Emergency Preparedness

Action 2

Goal: Anticipate risks to critical infrastructure and ensure effective response to climate-related disruptions.

Description: Utilities can analyze usage anomalies, service interruptions, and outage reports to detect early signs of stress in neighborhoods especially under heat or cold extremes. Combined with updated load-shedding protocols and disaster recovery plans, this action enhances adaptive capacity both for the company and the communities they serve.

- This National Renewable Energy Laboratory (NREL)'s *Power Sector Resilience Planning Guidebook* for utilities on resilience planning that includes mapping vulnerabilities, asset-risk assessment, and scenario planning is essential for utilities to detect stress signals across networks and strengthen preparedness protocols.
- United Nations Environment Programme (UNEP)'s *Climate Information and Early Warning Systems* highlights the role of early warning systems (EWS) in adaptation. Utilities can reference this to build or integrate early warning/monitoring systems that detect community stress (e.g., peak loads, outage precursors) in advance of extreme climate events.
- Smart Electric Power Alliance (SEPA)'s *Resilient by Design: Utility Strategies for Climate-Ready Distribution* describes how utilities are embedding resilience into distribution planning and operations, including practices for detecting operational stress and building emergency response readiness.

Resources

KPIs

INPUT INDICATORS Measure the resources required to deliver	LEADING INDICATORS Looks forward at future outcomes and events	LAGGING INDICATORS Looks back at whether the intended result was achieved
• Establishment of a structured communication plan for climate risk alerts (via SMS, bills, apps, etc.)	• Number of communication campaigns or alerts issued annually on heatwaves, grid stress, or drought	• Documented improvement in client-side adaptive behaviors (e.g., reduced consumption during grid stress)

Support Clients Through Adaptation Audits and Targeted Climate Risk Communication

Action 3

Goal: Enable commercial and industrial clients to identify vulnerabilities, adopt adaptive measures, and respond to climate-related energy risks through a combination of tailored audits and proactive communication.

Description: By offering or facilitating audits that assess climate vulnerabilities (such as exposure to heatwaves, grid instability, or water stress) utilities can help clients prioritize resilience upgrades, from equipment cooling to backup power solutions. While third-party providers may initially lead these audits, utilities should work toward internalizing this capacity, leveraging their access to energy use data and infrastructure insights. At the same time, embedding climate risk messaging into routine client communications (such as energy bills, mobile apps, or SMS alerts) enables clients to anticipate and respond to extreme weather events, adopt adaptive behaviors, and improve energy efficiency under stress conditions. Together, these strategies position utilities as trusted, forward-looking partners in resilience, offering both practical guidance and timely signals to empower their customers.

- Pacific Northwest National Laboratory (PNNL)'s *Emerging Best Practices for Electric Utility Planning with Climate Variability* is a resource for utilities and regulators focusing on planning, asset management and contingency measures under climate risk. Useful for utilities developing audit tools and client-services around resilience.

Resources

KPIs

INPUT INDICATORS Measure the resources required to deliver	LEADING INDICATORS Looks forward at future outcomes and events	LAGGING INDICATORS Looks back at whether the intended result was achieved
• Development of in-house or partner-supported adaptation audit protocols and tools	• Number of commercial or industrial clients receiving adaptation audits or technical resilience advice	• % of audited clients implementing recommended adaptation measures

Long-term actions

Deliver Incentives and Programs for Vulnerable Households

Action 1

Goal: Ensure equitable access to resilience solutions.

Description: Utilities should develop targeted subsidy or leasing programs for low-income households to access decentralized energy and adaptive technologies. These programs must be coordinated with national and local social equity goals.

Resources

- Energy cities' *Engaging with Vulnerable Households Guidance and Toolkit* provides a practitioner-toolkit for utilities (or local energy actors) on how to engage vulnerable households, design inclusive service models, and deliver benefits to low-income consumers
- United Nations Development Programme (UNDP)'s *Empowering Vulnerable Households to Access Affordable and Clean Energy* focuses on access to clean energy for vulnerable households, including frameworks for utilities and governments to coordinate on equitable access. Useful for utilities developing programs aligned with social equity.
- This *Energy efficiency support schemes for energy poor consumers* study from SciencePo's European Chair for Sustainable Development and Climate Transition of how utilities in Europe are targeting vulnerable households with efficiency and support schemes provides examples of how utilities can structure programs for resilience and affordability.

KPIs

INPUT INDICATORS
Measure the resources required to deliver

- Amount of funding allocated to household resilience programs
- Number of partnerships with social housing providers or local governments
- Number of adaptive technologies included in eligible incentive schemes

LEADING INDICATORS
Looks forward at future outcomes and events

- % of targeted vulnerable households enrolled in programs
- Average time between application and delivery of adaptive solutions
- Level of community awareness and satisfaction with offered programs (survey-based)

LAGGING INDICATORS
Looks back at whether the intended result was achieved

- Reduction in reported energy vulnerability or outages among participating households
- Measurable improvement in adaptive capacity or reduction in indoor overheating events
- Sustained use and maintenance rate of adaptive technologies over 3+ years

Establish Community-Based and Community-Led Resilience Programs

Action 2

Goal: Move beyond individual buildings to foster community-wide resilience and ensure adaptation efforts reach the most vulnerable.

Description: Utilities should partner with municipalities, civil society, and local communities to co-design and implement neighborhood-scale resilience initiatives. These programs could include shared battery storage systems, community-managed microgrids, public cooling centers, early-warning alert systems, and grassroots emergency preparedness networks. By supporting community-led governance, utilities help ensure that resilience efforts are rooted in local priorities, foster social cohesion, and provide energy, health, and spatial co-benefits. Examples include community-managed early warning systems, locally maintained energy hubs, and participatory demand-response strategies that integrate resilience into local planning. Empowering communities to lead adaptation builds stronger systems of mutual support, enhances accountability, and ensures sustainability over the long term. Utilities, in this model, act not only as infrastructure providers but also as partners in building the social and institutional fabric of resilience.