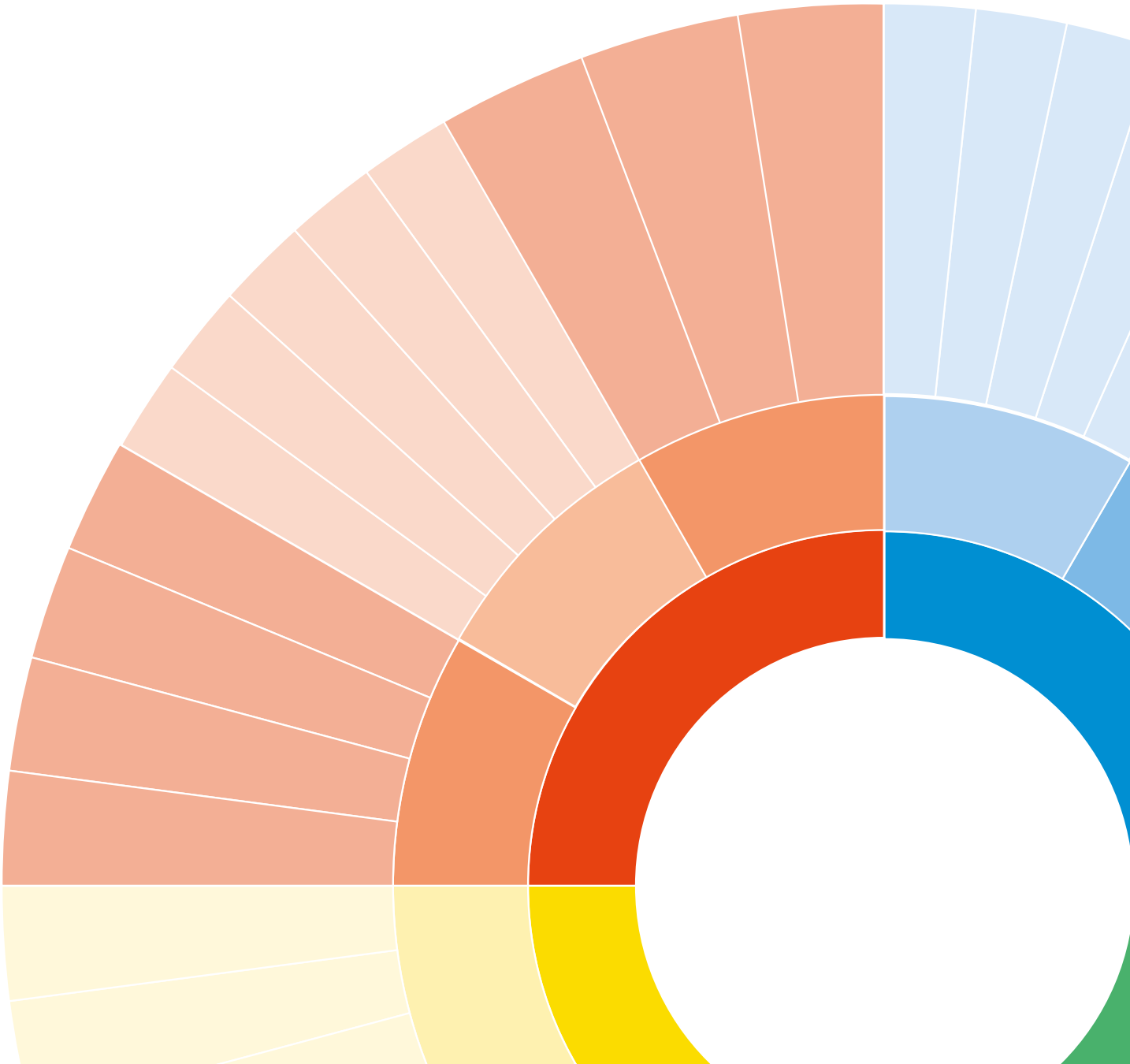
City Energy Resilience Framework

Discussion Guide

RESILIENT CITIES NETWORK

URBAN POWER



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OVERVIEW OF DISCUSSION GUIDE

The **City Energy Resilience Framework (CERF) Discussion Guide** is an engagement tool designed to help cities drive and facilitate a discussion on the resilience of their power system. The Discussion Guide follows the structure of the CERF, with four dimensions, 12 levers and 48 goals, and was created to enable cities to identify priority areas for improvement based on the CERF goals.

The CERF Discussion Guide aims:

- To guide city governments in applying a resilience lens to their power system and assessing where they are in terms of meeting their overall energy transition and urban resilience goals.
- To enable city governments to bring together stakeholders from various sectors to assess the gaps and challenges, and the goals and opportunities, for a more resilient energy system based on local policies, plans and initiatives.
- To spark conversations, guided by case studies from around the globe, about driving the uptake of energy solutions that have multiple benefits, which enhance the ability of urban communities to adapt, survive and thrive in the face of shocks and stresses.

HOW TO UTILIZE THE CERF DISCUSSION GUIDE

The Discussion Guide is designed to be used in workshops that bring together a wide array of stakeholders who influence both directly and indirectly the resilience of the energy system. Stakeholders should include, but are not limited to, city staff engaged in energy, urban planning and emergency management; electric utilities and other energy service providers (owners and operators) and regulators; community organizations and/or representatives of local communities; non-governmental organizations; technical and subject-matter experts from academia; and private sector entities across the power system supply chain (from fuel/generation to retail), including owners, operators and financiers. Special attention should be paid to communities that are historically underserved by electric utilities and other energy service providers and are underrepresented in decision-making processes that affect the energy sector.

Cities can enlist independent/external facilitators to guide workshop assessments and evaluations. Figure 1 shows potential stakeholders to include in the discussion.

Figure 1: Stakeholder map for urban energy systems

GOVERNANCE BY FUNCTION

- Planning
- Policy and strategy
- Regulation
- Financing
- Housing
- Resilience
- Disaster management
- Environmental protection and conservation

ELECTRICITY SERVICE

- Electricity supplier/generation
- Electricity transmission network operator
- Electricity distribution and retail provider
- Energy service companies
- Off-grid and mini-grid operators and service providers

COMMUNITY

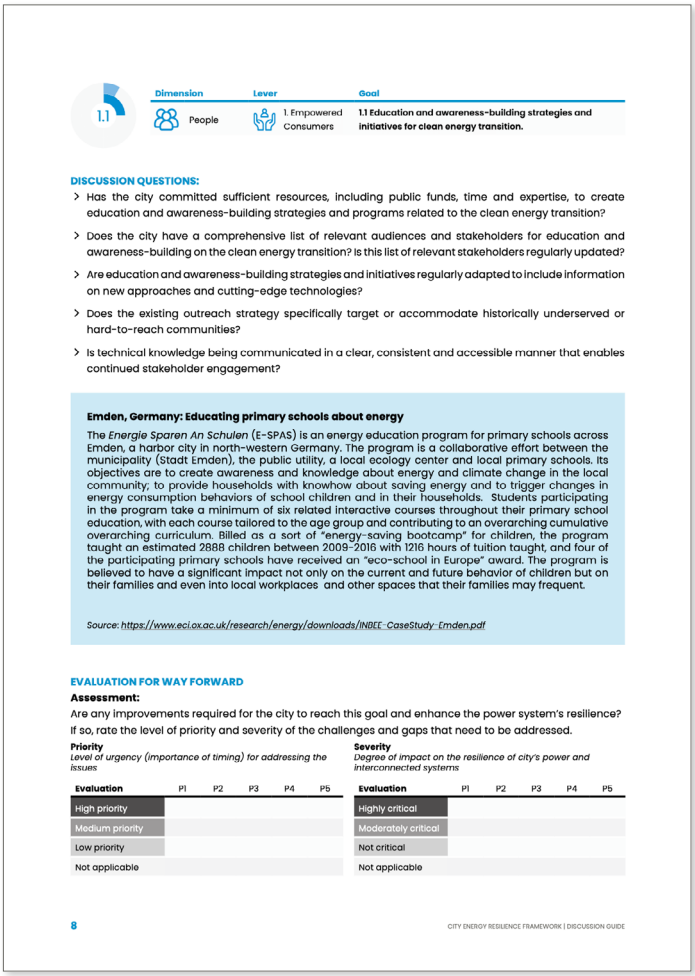
- End users (residential, commercial and industrial)
- Consumer advocacy groups
- Community organizations and representatives

PARTNERS

- Non-governmental organizations
- Industry associations
- Academia
- Financial institutions
- Development organizations/donors

STRUCTURE OF THE DISCUSSION GUIDE

Each page of the Discussion Guide corresponds to one goal from the CERF. These pages are designed to facilitate focused conversations among participants based on three components: discussion questions, case studies and evaluation for the way forward.



1.1

Dimension	Lever	Goal
People	1. Empowered Consumers	**1.1 Education and awareness-building strategies and initiatives for clean energy transition.**

DISCUSSION QUESTIONS:

- Has the city committed sufficient resources, including public funds, time and expertise, to create education and awareness-building strategies and programs related to the clean energy transition?
- Does the city have a comprehensive list of relevant audiences and stakeholders for education and awareness-building on the clean energy transition? Is this list of relevant stakeholders regularly updated?
- Are education and awareness-building strategies and initiatives regularly adapted to include information on new approaches and cutting-edge technologies?
- Does the existing outreach strategy specifically target or accommodate historically underserved or hard-to-reach communities?
- Is technical knowledge being communicated in a clear, consistent and accessible manner that enables continued stakeholder engagement?

Emden, Germany: Educating primary schools about energy

The *Energie Sparen An Schulen* (E-SPAS) is an energy education program for primary schools across Emden, a harbor city in north-western Germany. The program is a collaborative effort between the municipality (Stadt Emden), the public utility, a local ecology center and local primary schools. Its objectives are to create awareness and knowledge about energy and climate change in the local community; to provide households with knowhow about saving energy and to trigger changes in energy consumption behaviors of school children and in their households. Students participating in the program take a minimum of six related interactive courses throughout their primary school education, with each course tailored to the age group and contributing to an overarching cumulative overarching curriculum. Billed as a sort of "energy-saving bootcamp" for children, the program taught an estimated 2888 children between 2009-2016 with 1216 hours of tuition taught, and four of the participating primary schools have received an "eco-school in Europe" award. The program is believed to have a significant impact not only on the current and future behavior of children but on their families and even into local workplaces and other spaces that their families may frequent.

Source: https://www.eci.ox.ac.uk/research/energy/downloads/INBEE_CaseStudy_Emden.pdf

EVALUATION FOR WAY FORWARD

Assessment:

Are any improvements required for the city to reach this goal and enhance the power system's resilience? If so, rate the level of priority and severity of the challenges and gaps that need to be addressed.

Priority
Level of urgency (importance of timing) for addressing the issues

Evaluation	P1	P2	P3	P4	P5
High priority					
Medium priority					
Low priority					
Not applicable					

Severity
Degree of impact on the resilience of city's power and interconnected systems

Evaluation	P1	P2	P3	P4	P5
Highly critical					
Moderately critical					
Not critical					
Not applicable					

8 CITY ENERGY RESILIENCE FRAMEWORK | DISCUSSION GUIDE

Discussion questions are prompts for the facilitators and participants and include pointed questions for assessing whether the city has taken steps to achieve the specific CERF goal.

Case studies highlight good practices for achieving the specific CERF goal, drawn from various cities across the globe.

Evaluation for way forward provides a structure for participants to ask if their city needs to make improvements to reach the CERF goal and to rate the levels of priority and severity.

EVALUATION RATINGS

On the worksheets provided, participants independently rate the goal's severity and priority according to the definitions noted below.

Priority refers to the level of urgency and importance that the CERF goal and corresponding gap have relative to the city context and administrative goals.

- **High priority:** gap that must be addressed immediately, as it is fundamental to achieving the city's energy and resilience goals. Not addressing this gap will block the city's progress towards resilience.
- **Medium priority:** gap that should be addressed in the near to medium term but is not urgent. Not addressing this gap will impede the city's progress towards resilience in the next 0–5 years.
- **Low priority:** gap that should be addressed to optimize the city's progress towards resilience over the medium to long term. Not addressing this gap might impede the city's progress toward resilience in the next 5–10 years.

Severity refers to the degree of impact that the CERF goal and corresponding gap have on the overall resilience of city's power system and interdependent urban systems.

- **Highly critical:** gap that must be addressed, as it is critical to the overall functioning of the city's power system and interdependent urban systems. Not addressing this gap endangers the stability and functionality of the power system, and failure to achieve this goal will result in large or city-wide disruptions across systems.
- **Moderately critical:** gap that needs to be addressed given its impact on parts of the power system and interdependent urban systems. Not addressing this gap will cause a portion of the power system and its interdependencies to underperform or fail to meet certain needs but will not cause a system or city-wide failure.
- **Not critical:** gap that should be addressed, but whose impact on the city's power system and its interdependent urban systems is minimal.

Answers from the participants (P) are then collated to achieve a common rating (Figure 2).

Figure 2: Collating input from participants

Evaluation	P1	P2	P3	P4	P5
High priority					
Moderate priority					
Not critical					
Not applicable					

Evaluation	P1	P2	P3	P4	P5
Highly critical					
Moderately critical					
Not critical					
Not applicable					

Following the full evaluation of the city's power system resilience based on the CERF goals, facilitators will collect and rank the priority and severity of goals identified, from high priority <> highly critical to high priority <> moderately critical and medium priority <> highly critical. This ranking will allow the city government to identify the areas that need improvements in the near to medium term (Figure 3).

Figure 3: Severity/Priority matrix

PRIORITY	SEVERITY: Not critical	Moderately critical	Highly critical
High priority	MEDIUM	HIGH	HIGH
Medium priority	LOW	MEDIUM	HIGH
Low priority	LOW	LOW	MEDIUM

PEOPLE


PEOPLE
Endusers and Stakeholders
Empowered Consumers
1.1 Education and awareness-building strategies and initiatives for clean energy transition.
1.2 Communication of available resources, programs and opportunities to all stakeholders.
1.3 Active engagement of communities in the decision-making process and throughout the power infrastructure and project lifecycles.
1.4 Education programs on climate risks and vulnerabilities of the power system.
1.5 Promotion of accessible and affordable hazard insurance and emergency savings for consumers.
Engaged Stakeholders
2.1 Resource mobilization informed by local, regional and national policies and long-term plans.
2.2 Coordination and collaboration among government, private sector, civil society and academia in short- and long-term strategy development and planning.
2.3 Accessible incentives and public resources to drive innovation and investment in research and development of new technologies.
Sustained Human Capacity
3.1 Education and training strategies developed based on labor needs throughout the power system.
3.2 Capacity-building strategies for community preparedness and response to power-system-related shocks and stresses.
3.3 Targeted education strategies and dedicated public resources to encourage the participation of historically disadvantaged groups in the labor force.
3.4 Consistent knowledge exchange within city government and with peer cities to build the capacity of municipal staff.

Dimension	Lever	Goal
People	1. Empowered Consumers	**1.1 Education and awareness-building strategies and initiatives for clean energy transition.**

DISCUSSION QUESTIONS:

- Has the city committed sufficient resources, including public funds, time and expertise, to create education and awareness-building strategies and programs related to the clean energy transition?
- Does the city have a comprehensive list of relevant audiences and stakeholders for education and awareness-building on the clean energy transition? Is this list of relevant stakeholders regularly updated?
- Are education and awareness-building strategies and initiatives regularly adapted to include information on new approaches and cutting-edge technologies?
- Does the existing outreach strategy specifically target or accommodate historically underserved or hard-to-reach communities?
- Is technical knowledge being communicated in a clear, consistent and accessible manner that enables continued stakeholder engagement?

Emden, Germany: Educating primary schools about energy

The *Energie Sparen An Schulen* (E-SPAS) is an energy education program for primary schools across Emden, a harbor city in north-western Germany. The program is a collaborative effort between the municipality (Stadt Emden), the public utility, a local ecology center and local primary schools. Its objectives are to create awareness and knowledge about energy and climate change in the local community; to provide households with knowhow about saving energy and to trigger changes in energy consumption behaviors of school children and in their households. Students participating in the program take a minimum of six related interactive courses throughout their primary school education, with each course tailored to the age group and contributing to an overarching curriculum. Billed as an "energy-saving bootcamp" for children, the program taught an estimated 2888 children between 2009-2016 with 1216 hours of tuition taught, and four of the participating primary schools have received an "eco-school in Europe" award. The program is believed to have a significant impact not only on the current and future behavior of children but on their families and even into on workplaces and other spaces that their families may frequent.

Source: *https://www.eci.ox.ac.uk/research/energy/downloads/INBEE-CaseStudy-Emden.pdf*

EVALUATION FOR WAY FORWARD

Assessment:

Are any improvements required for the city to reach this goal and enhance the power system's resilience? If so, rate the level of priority and severity of the challenges and gaps that need to be addressed.

Priority
Level of urgency (importance of timing) for addressing the issues

Evaluation	P1	P2	P3	P4	P5
High priority					
Medium priority					
Low priority					
Not applicable					

Severity
Degree of impact on the resilience of city's power and interconnected systems

Evaluation	P1	P2	P3	P4	P5
Highly critical					
Moderately critical					
Not critical					
Not applicable					

Dimension	Lever	Goal
People	1. Empowered Consumers	**1.2 Communication of available resources, programs and opportunities to all stakeholders.**

DISCUSSION QUESTIONS:

- Are effective communication channels and forums in place to ensure public resources, programs and incentives are clearly communicated and accessible to potential beneficiaries?
- Has the city committed sufficient time and resources to mapping relevant stakeholders and beneficiaries for energy services? Is this stakeholder mapping regularly updated?
- Has the city committed sufficient time and resources to ensure the accessibility of resources? Is there targeted outreach for hard-to-reach communities, for example by translating resources into additional languages if necessary?
- Do existing outreach and communication strategies specifically target or accommodate historically underserved or hard-to-reach communities?

Edmonton, Canada: Providing citizens with accessible communication about energy transition

In 2021, the City of Edmonton launched its Community Energy Transition Strategy, which aims to transform energy generation, transportation and construction in the city, focusing on a just and equitable transition to improve the city's economy. As part of its effort to accelerate the energy transition, the city government launched *A Tiny Explanation*, a series of short and instructive videos and infographics to help citizens understand climate change and take action through adopting sustainable and resilient energy solutions. In addition to the how-to guides and advice on energy efficiency and clean energy solutions, the communication tools provide guidance to citizens on how to prepare their homes for extreme weather conditions and information on incentives and rebates available from the city government.

Source: https://www.edmonton.ca/city_government/environmental_stewardship/a-tiny-explanation-how-to-videos-and-infographics

EVALUATION FOR WAY FORWARD

Assessment:

Are any improvements required for the city to reach this goal and enhance the power system's resilience? If so, rate the level of priority and severity of the challenges and gaps that need to be addressed.

Priority
Level of urgency (importance of timing) for addressing the issues

Evaluation	P1	P2	P3	P4	P5
High priority					
Medium priority					
Low priority					
Not applicable					

Severity
Degree of impact on the resilience of city's power and interconnected systems

Evaluation	P1	P2	P3	P4	P5
Highly critical					
Moderately critical					
Not critical					
Not applicable					

Dimension	Lever	Goal
People	1. Empowered Consumers	**1.3 Active engagement of communities in the decision-making process and throughout the power infrastructure and project lifecycles.**

DISCUSSION QUESTIONS:

- Has the city allocated sufficient time and resources to facilitate constructive dialogue with communities, especially those historically underserved and vulnerable during the development of long-term strategies as well as the design, construction and operation of energy projects?
- Is technical knowledge being communicated in a clear, consistent and accessible manner that enables diverse stakeholders to participate in decision-making across the power-system?
- Are non-governmental organizations and community associations able to effectively influence decisions?
- Are mechanisms in place to ensure that governmental institutions are accountable for creating consultative and reflective strategies and plans?

Kenya: Actively engaging communities in large-scale infrastructure projects

The Constitution of Kenya and other laws and regulations contain provisions requiring developers to proactively engage communities when developing large-scale infrastructure projects, including power generation and transmission projects. Communities must be involved in decision-making throughout the project's lifecycle, from early stage to project development, project construction and completion. As part of the community engagement process, developers have to inform, consult and collaborate with community members, grassroot organizations, civil society partners, country governments, as well as national government partners. This public participation requirement is enforced through various mechanisms. For example, the Kenyan Ministry of Energy and Petroleum and the Energy Regulatory Commission require all developers to submit a record of "no objection" from the community where the project will be located. Developers must also meet the stakeholder-engagement requirements of international finance institutions and proactively initiate public participation for all projects that affect communities.

Source: https://2017-2020.usaid.gov/documents/1860/guide-community-engagement-power-projects-kenya

EVALUATION FOR WAY FORWARD

Assessment:

Are any improvements required for the city to reach this goal and enhance the power system's resilience? If so, rate the level of priority and severity of the challenges and gaps that need to be addressed.

Priority
Level of urgency (importance of timing) for addressing the issues

Evaluation	P1	P2	P3	P4	P5
High priority					
Medium priority					
Low priority					
Not applicable					

Severity
Degree of impact on the resilience of city's power and interconnected systems

Evaluation	P1	P2	P3	P4	P5
Highly critical					
Moderately critical					
Not critical					
Not applicable					

Dimension	Lever	Goal
People	1. Empowered Consumers	**1.4 Education programs on climate risks and vulnerabilities of the power system.**

DISCUSSION QUESTIONS:

- Has the city committed sufficient resources including time, funding and expertise to create education programs and awareness campaigns on climate risks and vulnerabilities of the power system?
- Are the education and communication strategies regularly updated to include new data and information on emerging risks and vulnerabilities?
- Are educational and communication strategies flexible, to include a wide range of audiences including diverse age groups or educational levels?
- Do existing educational programs specifically target or accommodate historically underserved or hard-to-reach communities?
- Is technical knowledge being communicated in a clear, consistent and accessible manner that engages diverse audiences?

British Columbia, Canada: Educating citizens about preparing for emergencies

The Government of British Columbia has developed an education and awareness-building program to prepare citizens for emergencies and seasonal hazards. It has an online platform, ClimateReadyBC, that is aimed at assisting residents to understand disaster and climate risks and to access funding and support to enhance resilience. In addition, the Prepared BC program supports and educates communities on emergency management and preparedness through various means, including social media content, community events like the state's Emergency Preparedness Week, specific resources for teachers, education programs for primary school students and guides on disaster preparedness and mitigation. The government aims to build capacity and resilience in the face of current climate-related challenges and prepare communities to mitigate risk from future disasters.

Source: https://alpha.gov.bc.ca/gov/content/safety/emergency-management/education-programs-toolkits

EVALUATION FOR WAY FORWARD

Assessment:

Are any improvements required for the city to reach this goal and enhance the power system's resilience? If so, rate the level of priority and severity of the challenges and gaps that need to be addressed.

Priority
Level of urgency (importance of timing) for addressing the issues

Evaluation	P1	P2	P3	P4	P5
High priority					
Medium priority					
Low priority					
Not applicable					

Severity
Degree of impact on the resilience of city's power and interconnected systems

Evaluation	P1	P2	P3	P4	P5
Highly critical					
Moderately critical					
Not critical					
Not applicable					

Dimension	Lever	Goal
People	1. Empowered Consumers	**1.5 Promotion of accessible and affordable hazard insurance and emergency savings for consumers.**

DISCUSSION QUESTIONS:

- Has the city committed sufficient resources, including time, funding and expertise, to identify strategies and mechanisms that increase accessibility and affordability of hazard insurance or emergency savings for diverse stakeholders?
- Are there effective and accessible communication channels and forums to ensure available financial resources and insurance mechanisms are being clearly communicated and potential beneficiaries can easily find the information they need?
- Are communication channels accessible for hard-to-reach communities, including to disabled populations, and available in the predominant languages spoken in the city?
- Has the city committed resources, including time, funding and expertise, to identify partners for community outreach and promotion of accessible insurance and emergency savings, including community-based organizations and/or community leaders?

New York City, USA: Providing affordable hazard insurance to low- and moderate-income households

In partnership with Wharton Risk Center at the University of Pennsylvania and the Center for New York City Neighborhoods (CNYCN), the New York City Mayor's Office of Climate Resiliency launched a community-based catastrophe insurance pilot project. The program uses inclusive insurance to increase the financial resilience of low- and moderate-income households that are at risk of coastal and inland flooding. As part of the pilot project, the CNYCN purchased a parametric flood insurance policy, which is designed to rapidly provide cash grants to low- and moderate-income households in the event of a flood, but the program also focused on improving literacy and capacity at the household level to ensure understanding and buy in. This included providing pre=disaster consultations to fifty NYC households on risk reduction and insurance, as well as expanding the information available on the city's flood risk awareness platform, FloodHelpNY.com. The program also created a community of practice to increase the knowledge base around parametric and innovative climate insurance mechanisms to create case studies and educational tools to share across information platforms. With parametric insurance policies, payouts are based on the occurrence of the disaster, rather than on the value of loss, enabling faster payouts and covering losses that are difficult to quantify. In addition, households are provided with pre-disaster consultations on risk reduction and insurance. This model is intended to encourage private insurance providers to back inclusive insurance programs and create an affordable insurance option for low-income households. New York City is one of the first local governments in the United States to explore this mechanism.

Source: *https://riskcenter.wharton.upenn.edu/civicinnovations/*

EVALUATION FOR WAY FORWARD

Assessment:

Are any improvements required for the city to reach this goal and enhance the power system's resilience? If so, rate the level of priority and severity of the challenges and gaps that need to be addressed.

Priority
Level of urgency (importance of timing) for addressing the issues

Evaluation	P1	P2	P3	P4	P5
High priority					
Medium priority					
Low priority					
Not applicable					

Severity
Degree of impact on the resilience of city's power and interconnected systems

Evaluation	P1	P2	P3	P4	P5
Highly critical					
Moderately critical					
Not critical					
Not applicable					

Dimension	Lever	Goal
People	2. Engaged Stakeholders	**2.1 Resource mobilization informed by local, regional and national policies and long-term plans.**

DISCUSSION QUESTIONS:

- Has the city put in place mechanisms, such as engagement platforms and forums, and allocated sufficient funding to facilitate constructive dialogue, collaboration and resource-sharing among all stakeholders who are directly and indirectly impacted by the power system?
- Are these mechanisms regularly and effectively utilized to mobilize financial and human resources for building the power system's resilience?
- Are all relevant governmental and non-governmental institutions involved in the power system broadly known? Is the city aware of the current and future investment plans of these institutions?
- Are voluntary commitments from government and non-government actors known, and are these clearly and consistently communicated to the different stakeholders, including citizens?
- Are local data and plans elevated to national and regional levels and accurately reflected in resource mobilization and investment plans?

Singapore: Mobilizing public-private collaboration to mainstream green finance

To accelerate the development of green and transition finance, the Monetary Authority of Singapore convenes the Green Finance Industry Taskforce (GFIT), which comprises representatives from financial institutions, corporates, non-governmental organizations and financial industry associations. The GFIT is developing a taxonomy to guide financial institutions that identifies sustainable activities. The taxonomy takes reference from international best practices but is adapted to the local Singaporean context where relevant. It classified activities according to a "traffic light" system, where sustainable activities are classified as green, transition activities as amber and unsustainable activities as red. The inclusion of transition activities has allowed for a progressive shift toward greater sustainability which supports inclusive economic development.

Source: https://www.mas.gov.sg/development/sustainable-finance/green-finance-industry-taskforce

EVALUATION FOR WAY FORWARD

Assessment:

Are any improvements required for the city to reach this goal and enhance the power system's resilience? If so, rate the level of priority and severity of the challenges and gaps that need to be addressed.

Priority
Level of urgency (importance of timing) for addressing the issues

Evaluation	P1	P2	P3	P4	P5
High priority					
Medium priority					
Low priority					
Not applicable					

Severity
Degree of impact on the resilience of city's power and interconnected systems

Evaluation	P1	P2	P3	P4	P5
Highly critical					
Moderately critical					
Not critical					
Not applicable					

Dimension	Lever	Goal
People	2. Engaged Stakeholders	**2.2 Coordination and collaboration among government, private sector, civil society and academia in short- and long-term strategy development and planning.**

DISCUSSION QUESTIONS:

- Has the city committed sufficient resources, including time, funding and expertise, to identify the governmental and non-governmental institutions involved in the power sector?
- Are mechanisms, such as laws, processes and forums, in place so that stakeholders are able to actively coordinate collaborate and influence short- and long-term strategies and plans for power system development, clean energy transition, disaster management planning and preparedness?
- Are mechanisms, such as policies, laws, or norms, in place to ensure that government institutions are accountable for creating consultative and reflective strategies and plans?

Sydney, Australia: Collaborating with stakeholders to develop sector sustainability plans

The City of Sydney undertook a comprehensive consultation with communities and stakeholders over several years when developing *Sustainable Sydney 2030-2050*, a blueprint for an environmentally, economically, socially and culturally sustainable city. The unique community engagement approach targeted all stakeholders, including those that traditionally do not participate, to of catalyze the uptake of climate-change solutions and behavior change. The approaches included:

• Surveys and pop-up events in villages and libraries.

• Community workshops with First Peoples of Australia, small businesses, cultural and nightlife sectors, and multi-disciplinary stakeholders.

• Community surveys of over 5,000 people, consultations with young people and a citizens' jury.

Through these engagements, the city enabled stakeholders to understand the impact, drivers and barriers in each sector (e.g., apartments, office, hotels, retail etc.). The aim was to motivate stakeholders to act to expedite progress and deliver emission reductions more quickly and efficiently than would otherwise be possible by the city alone. The result was collective ownership of the city's vision for a Green, Global and Connected City and plans that reflect the ideas and ambitions of those consulted.

Source: *https://www.cityofsydney.nsw.gov.au/sustainable-sydney-2030-2050*

EVALUATION FOR WAY FORWARD

Assessment:

Are any improvements required for the city to reach this goal and enhance the power system's resilience? If so, rate the level of priority and severity of the challenges and gaps that need to be addressed.

Priority
Level of urgency (importance of timing) for addressing the issues

Evaluation	P1	P2	P3	P4	P5
High priority					
Medium priority					
Low priority					
Not applicable					

Severity
Degree of impact on the resilience of city's power and interconnected systems

Evaluation	P1	P2	P3	P4	P5
Highly critical					
Moderately critical					
Not critical					
Not applicable					

Dimension	Lever	Goal
People	2. Engaged Stakeholders	**2.3 Accessible incentives and public resources to drive innovation and investment in research and development of new technologies.**

DISCUSSION QUESTIONS:

- Has the city committed adequate resources, including time, funding and expertise, to develop or support programs that promote research and investment in new technologies to enhance overall power system resilience?
- Are incentives and organizational processes in place to foster relationships among government, academia and the private sector, to enable effective knowledge and data exchange and to foster a culture of learning and innovation?
- Does the city have incentives and programs in place to promote and uplift new ideas and build technical capacity for innovation? If so, are there clear and consistent guidelines for accessing these incentives?
- Does the city have capacity-building programs and knowledge-exchange platforms in place, to promote, uplift and scale new business models for advancing a clean energy transition?

Lagos, Nigeria: Using a hackathon to drive innovation in smart meters

Over 60 percent of users in Lagos are estimated to be unmetered, which not only affects the supply of constant and stable electricity but also results in significant revenue loss for local electric utilities. Eko Innovation Centre, with the Lagos State Ministry of Energy and Mineral Resources as its main sponsor, is promoting efforts to provide affordable meters to users by facilitating a meter-design hackathon to improve energy distribution and monitoring and prevent revenue loss. The hackathon is open to entrepreneurs, software enthusiasts, hackers and developers who want to contribute to an improved electricity supply in Lagos. It seeks to drive local participation and technology contribution in developing the most viable concept for a smart meter that can be commercialized. The 2020 winners of the hackathon provided a smart meter that can be monitored and controlled remotely, with tamper-proof functionalities, as well as a software solution that fixes tariffs and usage restrictions to guide electricity consumption by users.

Source: https://mytopschools.com/lagos-smart-meter-hackathon/
https://businessday.ng/technology/article/lagos-crowns-two-winners-at-smart-meter-hackathon/

EVALUATION FOR WAY FORWARD

Assessment:

Are any improvements required for the city to reach this goal and enhance the power system's resilience? If so, rate the level of priority and severity of the challenges and gaps that need to be addressed.

Priority
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High priority					
Medium priority					
Low priority					
Not applicable					

Severity
Degree of impact on the resilience of city's power and interconnected systems

Evaluation	P1	P2	P3	P4	P5
Highly critical					
Moderately critical					
Not critical					
Not applicable					

Dimension	Lever	Goal
People	3. Sustained Human Capacity	**3.1 Education and training strategies developed based on labor needs throughout the power system.**

DISCUSSION QUESTIONS:

- Has the city committed sufficient resources, including time, funding and expertise, to identify needed skills and existing gaps in the labor force across the power system supply chain?
- Are there capacity-building strategies and programs that address skill demand and existing gaps in the power system supply chain, including strategies for supporting vocational and higher education programs?
- Do existing strategies specifically target historically underrepresented groups across the power system supply chain?
- Do existing strategies consider a wide range of formal and informal livelihoods, markets and industries related to the power system?
- Are existing education and training strategies regularly updated to reflect labor needs from new and emerging technologies across the power system?

New York, USA: Training and developing the clean energy workforce

The New York State Energy Research and Development Authority (NYSERDA) has dedicated more than $120 million in funding to support the development and training of a clean energy workforce. This funding is intended to create a skilled operations and maintenance workforce equipped to holistic energy management. The funding and resources supports activities across the power system from training for building and operations staff to properly operate and maintain building energy systems to internships for students seeking hands-on experience at a clean energy company to career pathway training for high efficiency heating, ventilation and air conditioning, and heat pumps. The funding will also support curriculum development to smeet skill and expertise needs identified by clean energy employers. Through this funding NYSERDA is able to create a sustainable talent pipeline that can reduce the costs and risk of hiring new employees.

Source: https://www.nyserda.ny.gov/All-Programs/Clean-Energy-Workforce-Development-and-Training

EVALUATION FOR WAY FORWARD

Assessment:

Are any improvements required for the city to reach this goal and enhance the power system's resilience? If so, rate the level of priority and severity of the challenges and gaps that need to be addressed.

Priority
Level of urgency (importance of timing) for addressing the issues

Evaluation	P1	P2	P3	P4	P5
High priority					
Medium priority					
Low priority					
Not applicable					

Severity
Degree of impact on the resilience of city's power and interconnected systems

Evaluation	P1	P2	P3	P4	P5
Highly critical					
Moderately critical					
Not critical					
Not applicable					

Dimension	Lever	Goal
People	3. Sustained Human Capacity	**3.2 Capacity-building strategies for community preparedness and response to power-system-related shocks and stresses.**

DISCUSSION QUESTIONS:

- Has the city committed adequate resources, including time, funding and expertise, to identify groups and individuals who are vulnerable to energy-related shocks and stresses and to better understand their risks and identify capacity gaps?
- Have preparedness strategies been developed to address the needs and vulnerabilities of these groups with the input of of diverse stakeholders, including citizens and community partners, such as schools, faith-based groups, community organizations and homeless shelters?
- Are there mechanisms in place and public funds allocated to provide residents and community partners with training and educational resources on how to prepare for and cope with prevalent shocks and stresses?
- Do existing capacity-building efforts and preparedness strategies pay specific attention to high-risk residents or residents with special needs, such as seniors, children or disabled citizens?

New Orleans, USA: Enhancing electricity system resilience to hurricanes

Energy Smart New Orleans was designed to fortify the city against the threat of power system shortages and surges during hurricanes in response to the city losing power for over five days during Hurricane Katrina in 2005. The program provides households and businesses with subsidized energy audits, weatherization upgrades and energy efficiency improvement, not only building hurricane resilience but also enabling energy savings, reducing overall energy consumption and stress on the grid and decreasing the likelihood of a power outage during peak demand. To ensure that information is accessible to the different urban communities, the city centralized all information related to preparedness and translated its preparedness guide into three languages.

Source: resilience-strategies-power-outages.pdf (c2es.org)

EVALUATION FOR WAY FORWARD

Assessment:

Are any improvements required for the city to reach this goal and enhance the power system's resilience? If so, rate the level of priority and severity of the challenges and gaps that need to be addressed.

Priority
Level of urgency (importance of timing) for addressing the issues

Evaluation	P1	P2	P3	P4	P5
High priority					
Medium priority					
Low priority					
Not applicable					

Severity
Degree of impact on the resilience of city's power and interconnected systems

Evaluation	P1	P2	P3	P4	P5
Highly critical					
Moderately critical					
Not critical					
Not applicable					

Dimension	Lever	Goal
People	3. Sustained Human Capacity	**3.3 Targeted education strategies and dedicated public resources to encourage the participation of historically disadvantaged groups in the labor force.**

DISCUSSION QUESTIONS:

- Has the city committed adequate resources, including time, funding and expertise, to identify groups that have been historically underrepresented in the labor force across the power system supply chain?
- Are current training and education strategies crafted in a reflective and targeted way that encourages the participation of historically underrepresented groups in the labor force across all skill/management levels and in both technical and non-technical segments of the power system supply chain?
- Have current education and training strategies been co-created with historically underrepresented communities, to ensure community input, identification and buy-in?

Africa/USA: Promoting the participation of women in energy regulation

In 2017, the U.S. National Association of Regulatory Utility Commissioners launched the Women in Energy Regulation Internship Program to aid several African countries in creating educational and training opportunities for young women in energy regulation. The program is designed to promote gender equity, as women are significantly underrepresented in senior management roles in the power and utilities industry across these countries and globally. The program facilitates the placement of women in short-term (six months to one year) positions in energy commissions to help them acquire foundational technical skills and institutional knowledge needed to pursue careers in energy regulatory agencies and electric utilities. After completing their internships, participants may stay with their host institutions, if offered a full-time position, or use the hands-on training and experience gained to pursue employment in other institutions within the same sector. As of 2020, the programs had supported 14 interns across Zambia, Kenya, Tanzania, Ethiopia and Senegal.

Source: https://www.naruc.org/international/where-we-work/global-initiatives/gender/women-in-energy-regulation-internship/

EVALUATION FOR WAY FORWARD

Assessment:

Are any improvements required for the city to reach this goal and enhance the power system's resilience? If so, rate the level of priority and severity of the challenges and gaps that need to be addressed.

Priority
Level of urgency (importance of timing) for addressing the issues

Evaluation	P1	P2	P3	P4	P5
High priority					
Medium priority					
Low priority					
Not applicable					

Severity
Degree of impact on the resilience of city's power and interconnected systems

Evaluation	P1	P2	P3	P4	P5
Highly critical					
Moderately critical					
Not critical					
Not applicable					

Dimension	Lever	Goal
People	3. Sustained Human Capacity	**3.4 Consistent knowledge exchange within city government and with peer cities to build the capacity of municipal staff.**

DISCUSSION QUESTIONS:

- Are communication channels and forums in place to enable municipal departments to share knowledge about power system development, clean energy transition, disaster management and preparedness across different skill and management levels?
- Are there mechanisms that enable municipal governments to engage regularly and actively in intra- and international knowledge exchange on power system development, clean energy transition, disaster management and preparedness with peer cities?
- Has the city committed sufficient resources, including time, funding and expertise, for developing and sharing best practices and lessons learned across municipal government departments and with peer cities?
- Has the city committed sufficient funding and incentives for municipal staff to pursue educational and professional development opportunities related to their role and responsibilities within the municipal government?

Denmark: Networking across peer cities

The national-based SmartEnCity Network (*Energibyerne*) is a network of seven Danish cities (Frederikshavn, Horsens, Hoje-Taastrup, Middelfart, Ringkobing-Skjern, Skive and Sonderborg) that work together to set binding targets towards the Danish Climate Act, which aims to reduce Denmark's emissions by 70 percent by 2030. Their goal is to achieve a fossil-free environment in their cities as soon as possible. To this end, they carry out joint projects and share knowledge about energy-efficient solutions, citizen engagement and strategic energy planning. The network also disseminates knowledge to other cities in Denmark and throughout the European Union. In particular, *Energibyerne* has started discussions with the three leading Danish green islands, Samsø, *Ærø* and Bornholm, to share their learnings with a focus on the barriers, challenges and opportunities that the islands face in achieving energy transition.

Source: *https://energibyerne.dk/vi-arbejder* (In Danish)

EVALUATION FOR WAY FORWARD

Assessment:

Are any improvements required for the city to reach this goal and enhance the power system's resilience? If so, rate the level of priority and severity of the challenges and gaps that need to be addressed.

Priority
Level of urgency (importance of timing) for addressing the issues

Evaluation	P1	P2	P3	P4	P5
High priority					
Medium priority					
Low priority					
Not applicable					

Severity
Degree of impact on the resilience of city's power and interconnected systems

Evaluation	P1	P2	P3	P4	P5
Highly critical					
Moderately critical					
Not critical					
Not applicable					


GOVERNANCE
Leadership and Strategy
Transparent & Enabling Regulations
Coordinated & Committed Leadership
Integrated Infrastructure Planning
4.1 Consultative and transparent regulatory processes and labor policies that engage vulnerable and historically disadvantaged communities.
4.2 Transparent and enforced electricity service quality standards.
4.3 Transparent decision-making on public spending and disbursement procedures for power system development and clean energy transition.
4.4 Enabling regulations and labor policies for the development of the local clean energy market.
5.1 Coordination and collaboration among different levels of government to achieve power-related goals.
5.2 Alignment of clean energy transition goals with city's long-term development objectives.
5.3 Official and publicly available climate and resilience strategies and plans.
5.4 Clearly defined institutional roles for managing the impact of power-related shocks and stresses.
6.1 Collaborative power infrastructure planning informed by development plans of interconnected urban systems.
6.2 Power infrastructure planning that considers new and disruptive technologies and innovative service delivery models.
6.3 Data-driven power infrastructure planning informed by inclusive and multi-stakeholder data collection processes.
6.4 Short- and long-term strategies aligned across timescales and informed by scenario planning and prevalent shocks and stresses.

GOVERNANCE

Dimension	Lever	Goal
Governance	4.Transparent & Enabling Regulations	**4.1 Consultative and transparent regulatory processes and labor policies that engage vulnerable and historically disadvantaged communities.**

DISCUSSION QUESTIONS:

- Have labor policies been developed in consultation with labor unions and/or other groups representing workers across the power supply chain to ensure the input of worker voices, especially those from vulnerable or historically disadvantaged communities?
- Are existing labor policies designed to ensure and enforce the fair and equitable treatment of workers across the power system supply chain, regardless of their identity and background?
- Are mechanisms, such as engagement forums and comment-submission platforms, in place to ensure that historically underrepresented groups participate in regulatory and policy development processes?
- Has the city committed sufficient resources, such as time, funding and expertise, for communicating new and upcoming labor policies and regulations to relevant stakeholders, to ensure workers are aware of their rights?

Australia: Consulting with stakeholders to develop regulations and labor standards

The Clean Energy Council is a non-profit industry association representing and working with renewable-energy and energy-storage businesses in Australia. As part of its advocacy for Australia's clean energy workforce, the Council engages with governments, businesses, academic and training institutions to build a dynamic and skilled workforce, with a focus on the safety, quality and sustainability of jobs. The Council's Clean Energy Workforce Reference Group, which includes members from labor unions, clean energy financial investors, regulators and interest groups supporting diversity and equity in employment, identifies major challenges and opportunities for improving workforce development and employment outcomes; and informing policy, regulatory reform, programs and communications strategies relating to the Australian clean energy workforce. In addition to supporting workforce development, the Council works closely with local, state and federal governments to support the clean energy market and advocate for effective policy and industry standards.

Source: https://www.cleanenergycouncil.org.au/advocacy-initiatives/workforce-development

EVALUATION FOR WAY FORWARD

Assessment:

Are there any improvements required for the city to reach this goal and enhance power system resilience? If so, rate the level of priority and severity of the issues that need to be addressed.

Priority
Level of urgency (importance of timing) for addressing the issues

Evaluation	P1	P2	P3	P4	P5
High priority					
Medium priority					
Low priority					
Not applicable					

Severity
Degree of impact on the resilience of city's power and interconnected systems

Evaluation	P1	P2	P3	P4	P5
Highly critical					
Moderately critical					
Not critical					
Not applicable					

Dimension	Lever	Goal
Governance	4.Transparent & Enabling Regulations	**4.2 Transparent and enforced electricity service quality standards.**

DISCUSSION QUESTIONS:

- Are rules, norms and standards in place to set, update and monitor electricity service quality standards? Are the standards based on benchmarks and in line with the city's service quality goals?
- Have standards been crafted in consultation with energy providers, to ensure that they are both realistic and ambitious?
- Have clear roles and responsibilities been defined for organizations responsible for maintaining these service quality standards, including an independent regulator free from political interference?
- Are enforcement mechanisms, such as sanctions and penalties, in place to ensure compliance with service quality standards? Are the consequences of noncompliance clearly communicated to service providers?
- Are accessible mechanisms in place for users to learn about the minimum electricity service quality standards within their service territory? Are there accessible and well-advertised channels for users to report services that perform below the minimum quality standards?

Mexico: Enforcing electricity service quality

The Energy Regulatory Commission (CRE) has the power to issue, monitor and ensure compliance with the regulatory framework on electricity reliability in Mexico. The CRE's main instrument in terms of reliability is the Network Code, which establishes minimum technical requirements that all users of the National Electric System (SEN) must comply with, to ensure the efficiency, quality, reliability, continuity, safety and sustainability of the SEN. Users include the National Energy Control Centre, transporters, distributors, power plants, suppliers and all load centers connected at medium and high tension, regardless of their consumption levels. The CRE has developed an easy-to-understand guide that explains the technical requirements of the Network Code applicable to different users, including load centers.

Source: https://www.gob.mx/cre/documentos/guia-sobre-los-requerimientos-tecnicos-del-codigo-de-red-aplicables-a-centros-de-carga (In Spanish)

EVALUATION FOR WAY FORWARD

Assessment:

Are there any improvements required for the city to reach this goal and enhance power system resilience? If so, rate the level of priority and severity of the issues that need to be addressed.

Priority
Level of urgency (importance of timing) for addressing the issues

Evaluation	P1	P2	P3	P4	P5
High priority					
Medium priority					
Low priority					
Not applicable					

Severity
Degree of impact on the resilience of city's power and interconnected systems

Evaluation	P1	P2	P3	P4	P5
Highly critical					
Moderately critical					
Not critical					
Not applicable					

Dimension	Lever	Goal
Governance	4.Transparent & Enabling Regulations	**4.3 Transparent decision-making on public spending and disbursement procedures for power system development and clean energy transition.**

DISCUSSION QUESTIONS:

- Are mechanisms, such as engagement platforms and forums, in place to enable transparent and consultative decision-making on public spending and disbursement for projects and initiatives related to power system development and clean energy transition?
- Are these mechanisms inclusive, enabling the participation of various stakeholders, including community organizations that represent vulnerable and historically disadvantaged groups?
- Are comments and inputs from non-governmental organizations and community groups accounted for and reflected in public spending and disbursement procedures?
- Does the city clearly and regularly communicate information about its overall budget, public spending and disbursement procedures to all relevant stakeholders, including citizens, through accessible and centralized platforms (such as easy-to-use portals or downloadable fact sheets)?

Madrid, Spain: Enabling citizen participation in decision-making and budgeting

Decide Madrid is a web-based platform that enables city residents to participate in the governance and budgeting of the Madrid City Council. Launched in 2015, the platform allows citizens to share their ideas and needs, submit proposals for city-led initiatives and debate municipal regulations. Through this platform, the Council aims to promote direct democracy and increase participation by giving citizens a voice in its decisions. One of the platform's features is Participatory Budgets, which lets citizens decide how to spend a part of the municipal budget on projects that they propose and vote for. For instance, in September 2021, the Council allocated 50 million Euros for projects submitted by citizens on the platform. After consulting, evaluating and voting on the projects, the Council selected the winners to implement in 2023 and 2024. Out of the total budget, 30 percent was reserved for city-wide projects and the rest for district-level projects. *Decide Madrid* is available as an open and free-to-use version, which several other city governments have adopted.

Source: https://decide.madrid.es/

EVALUATION FOR WAY FORWARD

Assessment:

Are there any improvements required for the city to reach this goal and enhance power system resilience? If so, rate the level of priority and severity of the issues that need to be addressed.

Priority
Level of urgency (importance of timing) for addressing the issues

Evaluation	P1	P2	P3	P4	P5
High priority					
Medium priority					
Low priority					
Not applicable					

Severity
Degree of impact on the resilience of city's power and interconnected systems

Evaluation	P1	P2	P3	P4	P5
Highly critical					
Moderately critical					
Not critical					
Not applicable					

Dimension	Lever	Goal
Governance	4.Transparent & Enabling Regulations	**4.4 Enabling regulations and labor policies for the development of the local clean energy market.**

DISCUSSION QUESTIONS:

- Does the city have well-defined development and employment targets for local clean energy market, aligned with emission reduction and energy transition targets, that have been integrated into local economic development plans?
- Does the city have standards, policies and incentives in place to encourage clean energy market development? Are the incentives diverse and inclusive, to accommodate beneficiaries from a variety of sectors and types of businesses?
- Are there effective communication channels and forums to ensure available resources, such as programs and incentives, are clearly communicated and accessible to potential beneficiaries?
- Has the city committed sufficient resources, including time, funding and expertise, to identify and alleviate potential barriers to clean energy market development, including technical and procedural barriers such as zoning ordinances, permitting and inspection processes, interconnection procedures, and design requirements that may delay or hinder installation and operation of clean energy systems?
- Has the city committed sufficient resources, including time, funding and expertise, to attract or train skilled labor to meet existing and potential skill needs in the energy market?

Victoria State, Australia: Establishing regulations to empower local renewable energy market

The Victoria State Government's Renewable Energy Action Plan aims to chart a course for a clean energy future in the state. This ambitious plan seeks to significantly boost renewable energy generation and empower the local clean energy market through a combination of regulations and financial incentives. The plan outlines the State's main goal: to achieve 95% of electricity generation from clean sources by 2035. To support this objective, the plan utilizes a combination of regulations and financial incentives. These include legislation that ensures households and businesses with on-site renewable energy generation are paid a fair price for the electricity they export to the grid through a feed-in tariff scheme. The State has also passed legislation that requires all retailers to offer rooftop solar PV and other renewable energy customers the same rates, terms, and conditions as they offer other customers. Additionally, the state allows residents to access solar power directly from solar businesses through power purchasing agreements (PPAs). Finally, the plan highlights the state's efforts to streamline permitting processes for renewable energy projects, removing barriers to clean energy development. By combining clear targets, supportive regulations, financial incentives, and streamlined processes, the Renewable Energy Action Plan empowers the local clean energy market and paves the way for a sustainable future.

Source: https://www.melbourne.vic.gov.au/news-and-media/Pages/Backing-business-events-to-support-jobs-and-innovation.aspx

EVALUATION FOR WAY FORWARD

Assessment:

Are there any improvements required for the city to reach this goal and enhance power system resilience? If so, rate the level of priority and severity of the issues that need to be addressed.

Priority
Level of urgency (importance of timing) for addressing the issues

Evaluation	P1	P2	P3	P4	P5
High priority					
Medium priority					
Low priority					
Not applicable					

Severity
Degree of impact on the resilience of city's power and interconnected systems

Evaluation	P1	P2	P3	P4	P5
Highly critical					
Moderately critical					
Not critical					
Not applicable					

Dimension	Lever	Goal
Governance	5. Coordinated & Committed Leadership	**5.1 Coordination and collaboration among different levels of government to achieve power-related goals**

DISCUSSION QUESTIONS:

- Has the city put mechanisms in place and allocated adequate resources to identify local, regional and national government actors who directly or indirectly impact the city's power system?
- Do government agencies across different government levels share common objectives related to power system resilience and the clean energy transition?
- Do current organizational structures encourage coordination among government agencies, including between managerial and technical staff and across municipal departments?
- Are there accessible and well-utilized mechanisms that allow municipal government staff to collaborate and share resources?
- Are operational procedures established to ensure that government agencies at different levels can share information about programs and projects related to the power system?

Germany: Coordinating and supporting local climate activities

Germany has no national legal provisions that oblige local governments to put in place specific climate change plans and measures. Instead, the national government has adopted an enabling governance approach, providing support and funding for local government's voluntary climate actions. In 2008, the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety set up the National Climate Initiative (NCI), which is Germany's main support program dedicated to strengthening local climate mitigation capacity. As of 2018, the NCI had funded about 12,500 strategic and investment projects in 3,000 local governments, with the local government usually co-financing between 20 and 65 percent of the project cost. The NCI also provides co-funding to local governments for up to six years to hire an expert to coordinate local climate activities, supporting more than 760 climate manager positions in municipalities across the country since 2008. In addition, the NCI has established the Service- und Kompetenzzentrum: Kommunaler Klimaschutz (Service and Competence Centre for Local Climate Action), which offers capacity-building, networking activities and guidelines to local governments.

Source: https://www.climate-chance.org/wp-content/uploads/2021/03/germany-climate-governance-climate-chance-2.pdf

EVALUATION FOR WAY FORWARD

Assessment:

Are there any improvements required for the city to reach this goal and enhance power system resilience? If so, rate the level of priority and severity of the issues that need to be addressed.

Priority
Level of urgency (importance of timing) for addressing the issues

Evaluation	P1	P2	P3	P4	P5
High priority					
Medium priority					
Low priority					
Not applicable					

Severity
Degree of impact on the resilience of city's power and interconnected systems

Evaluation	P1	P2	P3	P4	P5
Highly critical					
Moderately critical					
Not critical					
Not applicable					

Dimension	Lever	Goal
Governance	5. Coordinated & Committed Leadership	**5.2 Alignment of clean energy transition goals with long-term development objectives.**

DISCUSSION QUESTIONS:

- Does the city have clear and ambitious clean energy transition goals informed by good practices and guidelines and appropriate to the city context?
- Have clean energy transition goals been effectively communicated to relevant stakeholders, including citizens?
- Has the city outlined plans for reaching these targets, including high-consuming or interconnected urban sectors and services external to the energy sector, such as housing and development, mobility and provision of essential services?
- Are established mechanisms in place for monitoring progress towards long-term energy transition goals and the impact of specific strategies and policies on achieving these?

Orlando, USA: Aligning long and short-term clean energy targets

The City of Orlando's 2018 Community Action Plan for Climate and Energy updates the city's 2013 plan, setting out new strategies for achieving its 2040 goals and incorporating new overarching themes of social equity, climate resilience, smart technology and innovation, as a guiding framework to advance sustainability. This plan is one of the first in United States to be informed by and aligned with the United Nations Sustainable Development Goals and is in line with the Paris Agreement to limit global warming to well below 2°C above pre-industrial levels. The city is also a signatory to the Under2 Coalition, which is a global network of subnational governments that aim to reach net-zero greenhouse gas emissions by 2050. The city's official targets include achieving net-zero greenhouse gas emissions city-wide by 2050, with an interim target of 90 percent emissions reduction from 2007 levels by 2040; obtaining 100 percent of electricity from clean, renewal sources city-wide with a rapid ramp-up of renewables, storage, energy efficiency and electric vehicles and phasing out two coal power plants in the region by 2027; and ensuring that 100 percent of new and existing buildings meet green building standards by 2040.

Source: https://www.orlando.gov/Initiatives/2018-Community-Action-Plan

EVALUATION FOR WAY FORWARD

Assessment:

Are there any improvements required for the city to reach this goal and enhance power system resilience? If so, rate the level of priority and severity of the issues that need to be addressed.

Priority
Level of urgency (importance of timing) for addressing the issues

Evaluation	P1	P2	P3	P4	P5
High priority					
Medium priority					
Low priority					
Not applicable					

Severity
Degree of impact on the resilience of city's power and interconnected systems

Evaluation	P1	P2	P3	P4	P5
Highly critical					
Moderately critical					
Not critical					
Not applicable					

Dimension	Lever	Goal
Governance	5. Coordinated & Committed Leadership	**5.3 Official and publicly available climate and resilience strategies and plans.**

DISCUSSION QUESTIONS:

- Does the city have official climate and resilience strategies that have been adopted and ratified/ recognized by all relevant departments and across government?
- Has the city committed resources to ensure that all relevant stakeholders are aware of climate and resilience strategies and plans through communication mechanisms, such as formal public announcements, awareness campaigns and engagement forums to familiarize targeted communities and stakeholders with such plans?
- Has the city committed adequate resources, such as public funds, time and expertise, so that these communication mechanisms are accessible to various groups, such as translation into additional languages as necessary?

Addis Ababa, Ethiopia: Developing a Climate Action Plan

Addis Ababa's Climate Action Plan (2021–2025) is the city's official commitment to tackle climate change and achieve a climate-resilient, inclusive and carbon-neutral city by 2050. This plan is compatible with the Paris Agreement and its vision includes setting out a "green path" that safeguards resources for future generations. It focuses on high-impact, city-specific mitigation and adaptation actions that can transform society and the environment and includes goals and targets for achieving change by 2030, 2040 and 2050. The actions, pathways and implementation strategies cover various sectors, including urban planning, critical ecosystems, food security, health, infrastructure, and energy and water. Education and awareness campaigns form part of all the action items included in the document. The plan was developed by the City Administration (Mayor's Office), Addis Ababa Environmental Protection and Green Development Commission and C40 Cities Climate Leadership Group.

Source: https://addisenviroment.gov.et

EVALUATION FOR WAY FORWARD

Assessment:

Are there any improvements required for the city to reach this goal and enhance power system resilience? If so, rate the level of priority and severity of the issues that need to be addressed.

Priority
Level of urgency (importance of timing) for addressing the issues

Evaluation	P1	P2	P3	P4	P5
High priority					
Medium priority					
Low priority					
Not applicable					

Severity
Degree of impact on the resilience of city's power and interconnected systems

Evaluation	P1	P2	P3	P4	P5
Highly critical					
Moderately critical					
Not critical					
Not applicable					

Dimension	Lever	Goal
Governance	5. Coordinated & Committed Leadership	**5.4 Clearly defined institutional roles for managing the impact of power-related shocks and stresses.**

DISCUSSION QUESTIONS:

- Have roles and responsibilities been allocated to the relevant governmental and non-governmental institutions to ensure efficient disaster preparedness, response and recovery from shocks and stress that affect the power system and its interdependencies? Are these roles and responsibilities outlined in detail in the city's disaster management plan(s)?
- Are disaster management roles and responsibilities clearly communicated to relevant stakeholders, especially groups at high risk of being impacted by shocks and stresses that affect the power system?
- Is there adequate institutional capacity, including funds and human resources, for all actors who are assigned key roles and responsibilities in the city's disaster management plans?
- Are there institutional redundancies to ensure continuity of preparedness, response and recovery procedures should an institution not be able to assume its allocated role and responsibilities?

Florida, USA: Defining institutional roles for disaster management

The Division of Emergency Management plans for and responds to both natural and manmade disasters, which range from floods and hurricanes to incidents involving hazardous materials or nuclear power. It is the state's liaison with federal and local agencies for emergencies of all kinds, while its partner in emergency management, the State Emergency Response Team (SERT), is tasked with providing disaster assistance to Florida residents. The SERT comprised of branches and emergency support functions working closely together and include:

- Transportation
- Communications
- Public works
- Firefighting
- Information and planning
- Mass care
- Resource support
- Health and medical
- Search and rescue
- Hazmat
- Food and water
- Energy
- Military support
- Public information
- Volunteers and donations
- Law enforcement
- Animal protection
- Business, industry and economic stabilization
- Fuels
- Cybersecurity

Source: https://www.floridadisaster.org/sert/

EVALUATION FOR WAY FORWARD

Assessment:

Are there any improvements required for the city to reach this goal and enhance power system resilience? If so, rate the level of priority and severity of the issues that need to be addressed.

Priority
Level of urgency (importance of timing) for addressing the issues

Evaluation	P1	P2	P3	P4	P5
High priority					
Medium priority					
Low priority					
Not applicable					

Severity
Degree of impact on the resilience of city's power and interconnected systems

Evaluation	P1	P2	P3	P4	P5
Highly critical					
Moderately critical					
Not critical					
Not applicable					

Dimension	Lever	Goal
Governance	6. Integrated System Planning	**6.1 Collaborative power infrastructure planning informed by development plans of interconnected urban systems.**

DISCUSSION QUESTIONS:

- Does the city have power infrastructure plan(s) that consider interconnected urban systems, such as electrification and digitalization plans in the information and communication, healthcare and transportation sectors?
- Are mechanisms, such as engagement platforms and forums, in place to encourage coordinated infrastructure planning between electric utilities and other energy service providers, and relevant infrastructure owners/operators that rely on the city's power system? These should include, but are not limited to, transportation, housing and development, information and communication.
- Are mechanisms and guidelines in place to ensure that planned power infrastructure projects consider the development plans of interconnected urban systems, such as transportation, water and sanitation, housing, information and communication?
- Do power infrastructure plans align with the city's long-term decarbonization or clean energy goals?

Saint Lucia: Integrated resource planning

In 2016, as part of developing the National Energy Transition Strategy (NETS) and Integrated Resource Plan, the Government of Saint Lucia and St. Lucia Electricity Services Limited (LUCELEC) led an integrated resource planning process. The first step was to identify the primary goals and objectives of stakeholders for the NETS, and to agree on the questions that the Integrated Resource Plan should answer. Among the important stakeholders involved in developing the NETS were developers of energy and infrastructure projects being considered in Saint Lucia, including geothermal and wind generation. Several stakeholders raised questions around the potential adoption and impact of electric vehicles (EVs). Based on that, the core NETS team opted to include EV questions in their information gathering and analysis. Maintaining stakeholder engagement facilitated the successful assessment of opportunity pathways in Saint Lucia.

Source: *https://www.govt.lc/media.govt.lc/www/resources/publications/saint-lucia-nets-executive-summary-final.pdf*

EVALUATION FOR WAY FORWARD

Assessment:

Are there any improvements required for the city to reach this goal and enhance power system resilience? If so, rate the level of priority and severity of the issues that need to be addressed.

Priority
Level of urgency (importance of timing) for addressing the issues

Evaluation	P1	P2	P3	P4	P5
High priority					
Medium priority					
Low priority					
Not applicable					

Severity
Degree of impact on the resilience of city's power and interconnected systems

Evaluation	P1	P2	P3	P4	P5
Highly critical					
Moderately critical					
Not critical					
Not applicable					

Dimension	Lever	Goal
Governance	6. Integrated System Planning	**6.2 Power infrastructure planning that considers new and disruptive technologies and innovative service delivery models.**

DISCUSSION QUESTIONS:

- Does the city have power infrastructure plan(s) that consider all relevant technologies, industries and innovations across interconnected urban systems, such as smart grid technologies, electrification of public transportation, digitalization of the financial sector, interconnectivity and associated data storage needs?
- Are power infrastructure plans regularly reviewed and revised, to allow for the integration of new technologies, business and partnership models, as well as service-delivery approaches that can improve overall system efficiency and resilience?
- Are power infrastructure planning methodologies consultative, transparent and reflective enough to allow for efficient upgrades, grid modernization and the integration of new technologies or service-delivery models?

Lancaster, USA: Integrating cutting-edge technology and innovative service models

In a decade, by embracing unconventional ideas, cutting-edge technology and unique partnerships, the City of Lancaster became the world's solar capital and the first city in the United States to be net-zero, producing more clean energy than it consumes. Lancaster was the first city to create an ordinance that require solar on all new residential rooftops and to have the nation's first all-electric bus fleet, in partnership with Antelope Valley Transit Authority and BYD, a local manufacturer. Building on over a decade of green energy development, the city plans to be the first hydrogen-powered city and is attracting various producers of hydrogen, including from organic waste and recycled mixed paper. It is also seeking to be designated as a centre for hydrogen development and to showcase successful uses of hydrogen in the municipality. In 2022, the City of Lancaster signed a Memorandum of Understand (MOU) with Heliogen, Inc., which will serve as the technology provider, project developer, builder, operator and equity partner for a green hydrogen facility in the city.

Source: https://www.cityoflancasterca.org/our-city/about-us/advanced-energy-community; https://www.cityoflancasterca.org/home/showpublisheddocument/44720/637976322371312403

EVALUATION FOR WAY FORWARD

Assessment:

Are there any improvements required for the city to reach this goal and enhance power system resilience? If so, rate the level of priority and severity of the issues that need to be addressed.

Priority
Level of urgency (importance of timing) for addressing the issues

Evaluation	P1	P2	P3	P4	P5
High priority					
Medium priority					
Low priority					
Not applicable					

Severity
Degree of impact on the resilience of city's power and interconnected systems

Evaluation	P1	P2	P3	P4	P5
Highly critical					
Moderately critical					
Not critical					
Not applicable					

Dimension	Lever	Goal
Governance	6. Integrated System Planning	**6.3 Data-driven power infrastructure planning informed by inclusive and multi-stakeholder data collection processes.**

DISCUSSION QUESTIONS:

- Are institutional roles and responsibilities clearly defined for the collection and analysis of data related to power infrastructure operation as well as service delivery?
- Are mechanisms in place, including guidelines and metrics, to ensure that data is collected from a diverse array of communities and stakeholders and includes data on access and quality of service in vulnerable and historically underserved communities; performance of all infrastructure operators and service providers; demand and consumption patterns across different types of end-user (residential, commercial, industry) and across different urban systems (transportation, healthcare, communication, education, etc.)?
- Are there sufficient resources, including time, funding and expertise, committed to synthesizing data and analysis to inform infrastructure planning?
- Are mechanisms in place to ensure that data is accurate and regularly collected and processed in a timely manner to ensure that planning reflects the most up-to-date power system data?

Boston, USA: Gathering data to deliver utilities more smartly

The City of Boston partners with outside organizations to incorporate data into public life, especially into public planning, and has established an open data platform. The city compiled and analyzed the best available data on climate change impacts to create the "Climate Ready Boston" report, released in 2016, that includes city-wide vulnerabilities and how to address them. In partnership with the Boston Planning and Development Agency, the city has explored the potential for local energy generation, district energy, microgrids and utility corridors, and is studying how to improve the way public utilities are maintained and delivered. The use of data-driven programs to help identify potential sources of energy savings has contributed to Boston becoming a national leader in energy efficiency, topping the list in 2015 and 2017 of US cities on the City Energy Efficiency Scorecard published by the American Council for an Energy-Efficient Economy. For instance, data analysis led to changes that reduced the annual energy usage of just one building (the 200 Clarendon skyscraper, formerly the Hancock Tower) by three million kilowatt-hours. Another data-driven initiative is Carbon Free Boston, which explores cost-efficient ways to achieve the city's goal of being carbon neutral by 2050.

Source: https://www.usgbc.org/articles/city-boston-uses-data-improve-quality-life-residents

EVALUATION FOR WAY FORWARD

Assessment:

Are there any improvements required for the city to reach this goal and enhance power system resilience? If so, rate the level of priority and severity of the issues that need to be addressed.

Priority
Level of urgency (importance of timing) for addressing the issues

Evaluation	P1	P2	P3	P4	P5
High priority					
Medium priority					
Low priority					
Not applicable					

Severity
Degree of impact on the resilience of city's power and interconnected systems

Evaluation	P1	P2	P3	P4	P5
Highly critical					
Moderately critical					
Not critical					
Not applicable					

Dimension	Lever	Goal
Governance	6. Integrated System Planning	**6.4 Short- and long-term strategies aligned across timescales and informed by scenario planning and prevalent shocks and stresses.**

DISCUSSION QUESTIONS:

- Do the city's short-term energy and economic development strategies help the city make progress towards its long-term vision and goals, such as low-carbon or carbon neutral economy, significant or full transition towards clean energy, as well as electrification, digitalization and interconnection of various urban systems?
- Are the city's energy and economic development strategies/plans informed by climate risk analysis and scenario planning of prevalent shocks and stresses? Are these strategies informed by the most up-to-date climate data for risk modeling?
- Does the city use risk modeling or scenario planning to inform the planning and design of power infrastructure projects that have long lifespans, i.e., more than 10 years?

Amsterdam, Netherlands: Aligning strategies and goals for long-term success

The City of Amsterdam has ambitious climate goals to ensure the city stays in line with its sustainability plans and strategies. These goals are staggered across ten-year timeframes, with mid-term goals for 2030 and 2040 paving the way for full city-wide climate neutrality in 2050. For example, the city aims to ensure that 80% of household energy use comes from solar and wind by 2030, and to ensure all suitable roofs are being used by solar for 2040. These goals have been carefully curated to respond to the most pressing vulnerabilities, as well as the highest sources of CO2 emissions and are embedded in the city's "City of Tomorrow" plan, which identifies the most prevalent shocks and stresses as well as likely scenarios for the coming years.

Source: *https://www.amsterdam.nl/en/policy/sustainability/*

EVALUATION FOR WAY FORWARD

Assessment:

Are there any improvements required for the city to reach this goal and enhance power system resilience? If so, rate the level of priority and severity of the issues that need to be addressed.

Priority
Level of urgency (importance of timing) for addressing the issues

Evaluation	P1	P2	P3	P4	P5
High priority					
Medium priority					
Low priority					
Not applicable					

Severity
Degree of impact on the resilience of city's power and interconnected systems

Evaluation	P1	P2	P3	P4	P5
Highly critical					
Moderately critical					
Not critical					
Not applicable					


RESOURCES
Infrastructure and Natural Resources
Effective Supply Chain Management
Risk-Informed Infrastructure Management
Responsible Natural Resource Use
9.4
Regular monitoring and replenishment of resources and emergency reserves across the power supply chain.
9.3
Established communication channels for diverse stakeholders in the power system that enable coordinated response and recovery from shocks and stresses.
9.2
Guidance on allocation of infrastructure risk and resilience responsibilities across stakeholders in the power system during project development.
9.1
Regular and open data-sharing across key decision-makers and operators throughout the power system.
8.4
Integration of secure and up-to-date digital systems for infrastructure management, monitoring, forecasting and early warning.
8.3
Identification of critical power system components and services for pre-disaster preparedness and effective response and recovery.
8.2
Incorporation of operational redundancies at infrastructure level to ensure reliable services during shocks and stresses.
8.1
Enforcement of infrastructure design and construction standards, informed by assessments of prevalent shocks and stresses.
7.4
Guidance and incentives for energy-sensitive design principles in new developments.
7.3
Natural resources development plan in line with environmental sustainability and biodiversity goals.
7.2
Guidance and incentives for sustainable resource use and demand management in energy-intensive facilities and urban systems.
7.1
Public land development plans for power infrastructure based on environmental and social impact assessments.

RESOURCES

Dimension	Lever	Goal
Resources	7. Responsible Natural Resource Use	**7.1 Public land development plans for power infrastructure based on environmental and social impact assessments.**

DISCUSSION QUESTIONS:

- Are regulations and mechanisms in place to assess the social and environmental impacts of all new power infrastructure projects?
- Does land-use planning inform power infrastructure expansion plans, particularly in hard-to-reach areas or areas at high risk of shocks and stresses that affect the power system?
- Has the city committed sufficient resources, including time, funding and expertise, to enforce regulations on power infrastructure placement/siting, design, construction and operation based on environmental and social impact assessments?
- Has the city committed sufficient resources, including time, funding and expertise, to build awareness among decision-makers and relevant stakeholders of the social and environmental impacts of power infrastructure projects?

Seattle, USA: Developing power infrastructure that benefits communities

In 2018, Seattle's electric utility, Seattle City Light, energized its first new substation in 30 years, on Denny Way in the South Lake neighborhood. The substation is an example of innovative infrastructure built in the middle of a dense and diverse neighborhood. Working with the community, City Light designed a substation that fits the neighborhood's character, provides much-needed community amenities and is a model of environmental sustainability. The substation is both a practical building and a civic destination, incorporating a public park, an off-leash dog park, public art installations, a museum and gallery space, a public plaza for food trucks and multiple terraced walkways with views into the workings of the substation itself. In addition, the complex is energy net positive, creating more energy than it needs. It is a community meeting space, a workspace area and home to a local nonprofit that seeks to end youth homelessness, which is a chronic stress in Seattle. The substation is an example of how infrastructure developments are opportunities for civic engagement.

Source: https://www.seattle.gov/city-light/in-the-community/tours-recreation-and-education/denny-substation; https://slate.com/human-interest/2016/09/denny-substation-in-seattle-is-an-electrical-substation-with-a-dog-park-and-public-art.html

EVALUATION FOR WAY FORWARD

Assessment:

Are there any improvements required for the city to reach this goal and enhance power system resilience? If so, rate the level of priority and severity of the issues that need to be addressed.

Priority
Level of urgency (importance of timing) for addressing the issues

Evaluation	P1	P2	P3	P4	P5
High priority					
Medium priority					
Low priority					
Not applicable					

Severity
Degree of impact on the resilience of city's power and interconnected systems

Evaluation	P1	P2	P3	P4	P5
Highly critical					
Moderately critical					
Not critical					
Not applicable					

Dimension	Lever	Goal
Resources	7. Responsible Natural Resource Use	**7.2 Guidance and incentives for sustainable resource use and demand management in energy-intensive facilities and urban systems.**

DISCUSSION QUESTIONS:

- Has the city committed adequate resources, such as public funds, time and expertise, for identifying and mapping energy-intensive urban systems?
- Does the city provide public funds and incentives to alleviate barriers to the large-scale adoption of technologies and approaches for efficient resource use and demand management across urban systems (e.g., buildings or facilities, industries or sectors)?
- Does the city provide public funds and incentives for fostering innovation and research in new methods and business models to advance efficient use of resources and energy demand management?
- Does the city provide guidance on sustainable resource use and demand management in energy-intensive urban systems?
- Are existing guidance and incentives disseminated and communicated to relevant stakeholders and potential beneficiaries?

Ann Arbor, USA: Incentivizing energy efficiency projects and retrofits

To overcome the lack of financing for energy efficiency (EE) projects and retrofits, the City of Ann Arbor established the Municipal Energy Efficiency Fund, demonstrating how local governments can showcase the value and benefit of EE for communities and citizens. In 1998, the city issued a 10-year bond to fund EE retrofits, setting aside an initial $500,000 that would provide upfront capital for municipal EE projects (US$100,000 each year). At the end of the 10 years, Ann Arbor decided to redirect half of the budget allocated to servicing the bond to use to build up an energy fund that operates as an internal revolving fund for EE projects. Municipal agencies and departments can apply for a loan to finance EE investments, and their repayments are used to recapitalize the fund. Through this Fund, the city has financed LED traffic and pedestrian lights, street light improvements, parking garage lighting, a building level boiler, electric vehicles and rooftop solar PV. Projects completed over the period 1998-2008 not only improved city facilities but also resulted in almost $0.86 million in energy cost reductions and 10.7 GWh in energy savings. The Fund demonstrates how cities can motivate citizens to adopt EE and that EE investments can pay for themselves in the long term.

Source: https://www.esmap.org/sites/default/files/esmap-files/Ann%20Arbor%20EE%20Fund%20final.pdf; https://openknowledge.worldbank.org/entities/publication/12014f71-1e06-5db6-acac-c6f83c45d3d4

EVALUATION FOR WAY FORWARD

Assessment:

Are there any improvements required for the city to reach this goal and enhance power system resilience? If so, rate the level of priority and severity of the issues that need to be addressed.

Priority
Level of urgency (importance of timing) for addressing the issues

Evaluation	P1	P2	P3	P4	P5
High priority					
Medium priority					
Low priority					
Not applicable					

Severity
Degree of impact on the resilience of city's power and interconnected systems

Evaluation	P1	P2	P3	P4	P5
Highly critical					
Moderately critical					
Not critical					
Not applicable					

Dimension	Lever	Goal
Resources	7. Responsible Natural Resource Use	**7.3 Natural resources development plan in line with environmental sustainability and biodiversity goals.**

DISCUSSION QUESTIONS:

- Is there clear and consistent guidance on natural resource use for power generation, including rules and standards, in accordance with environmental sustainability principles and the protection of biodiversity?
- Is the guidance reflected in the natural resources' development plan utilized by the local/national electric utility and other energy companies?
- Are mechanisms in place to ensure that all new power infrastructure projects comply with existing natural resources plans and policies? Are the consequences of non-compliance clearly communicated to all relevant stakeholders?

California, USA: Aligning conservation and renewable energy development plan

The California Energy Commission, US Bureau of Land Management, California Department of Fish and Wildlife, and the US Fish and Wildlife collaboratively developed the Desert Renewable Energy Conservation Plan (DRECP), a landscape-scale plan covering 22.5 million acres across seven California counties: Imperial, Inyo, Kern, Los Angeles, Riverside, San Bernardino and San Diego. The DRECP identifies specific focus areas in the desert that are appropriate for utility-scale development of wind, solar and geothermal projects, while providing for the long-term conservation and management of local wildlife, national resources and recreational areas. Although the plan technically applies only to land managed by the US Bureau of Land Management, partner agencies also use it for planning throughout the desert area. The DRECP demonstrates both that large-scale renewable energy projects can be developed without damaging sensitive ecosystems and the importance of including all stakeholders (federal and state agencies, industry, conservation groups and local communities).

Source: *https://drecp.databasin.org/pages/about-drecp/; https://www.energy.ca.gov/programs-and-topics/programs/desert-renewable-energy-conservation-plan*

EVALUATION FOR WAY FORWARD

Assessment:

Are there any improvements required for the city to reach this goal and enhance power system resilience? If so, rate the level of priority and severity of the issues that need to be addressed.

Priority
Level of urgency (importance of timing) for addressing the issues

Evaluation	P1	P2	P3	P4	P5
High priority					
Medium priority					
Low priority					
Not applicable					

Severity
Degree of impact on the resilience of city's power and interconnected systems

Evaluation	P1	P2	P3	P4	P5
Highly critical					
Moderately critical					
Not critical					
Not applicable					

Dimension	Lever	Goal
Resources	7. Responsible Natural Resource Use	**7.4 Guidance and incentives for energy-sensitive design principles in new developments.**

DISCUSSION QUESTIONS:

- Do the city's building and infrastructure design standards reflect industry best practices, adapted to the local context?
- Is energy-sensitive design guidance clear and easy to understand by intended users, including building owners, residents and developers? Is the scope broad enough for a range of development types, including residential, commercial and institutional buildings at multiple scales?
- Does the city provide public funds and incentives to encourage the use of energy-sensitive design? If so, are there clear and consistent guidelines for developers who seek to access these incentives?
- Has the city committed sufficient resources, including time, funding and expertise, to increase citizen awareness on energy-sensitive design principles?

Vancouver, Canada: Incentivizing energy-sensitive developments

The City of Vancouver has pledged to become carbon neutral and achieve 100 percent renewable energy status by 2050. To achieve this, the city is targeting its building sector, which accounts for 54 percent of the city's greenhouse gas (GHG) emissions. Vancouver's Greenest City Action Plan (2011) calls for all buildings constructed from 2020 onward to achieve carbon neutrality in their operations through emissions reductions or offsets, while its 2016 Zero Emissions Building Plan (ZEBP) sets the target for all new buildings to have zero GHG emissions by 2030. The ZEBP is a roadmap for the transition of the building sector and includes incremental updates to the city's building bylaws and rezoning policy to reflect increasingly strict GHG intensity and thermal energy demand intensity targets. To encourage innovation, the city uses catalytic tools that reduce overall project costs for developers, such as streamlining the application process, giving density bonuses and expediting the permitting process for leading developers in exchange for developments that include zero-emissions buildings. Vancouver's approach has led the way for the province-wide BC Energy Step Code, which is modeled on the ZEBP and provides guidelines for local governments to incentivize or mandate energy efficiency standards for new buildings.

Source: https://vancouver.ca/green-vancouver/buildings.aspx; https://renewablesroadmap.iclei.org/wp-content/uploads/2021/11/Vancouver-case-study_final_compressed-1.pdf

EVALUATION FOR WAY FORWARD

Assessment:

Are there any improvements required for the city to reach this goal and enhance power system resilience? If so, rate the level of priority and severity of the issues that need to be addressed.

Priority
Level of urgency (importance of timing) for addressing the issues

Evaluation	P1	P2	P3	P4	P5
High priority					
Medium priority					
Low priority					
Not applicable					

Severity
Degree of impact on the resilience of city's power and interconnected systems

Evaluation	P1	P2	P3	P4	P5
Highly critical					
Moderately critical					
Not critical					
Not applicable					

Dimension	Lever	Goal
Resources	8. Risk-Informed Infrastructure Management	**8.1 Enforcement of infrastructure design and construction standards, informed by assessments of prevalent shocks and stresses.**

DISCUSSION QUESTIONS:

- Has the city committed sufficient resources, including time, funding and expertise, to identify the most prevalent shocks and stresses that impact the power system and influence power infrastructure construction and maintenance?
- Are technical standards and design guidelines in place to ensure the performance, efficiency and safety of critical power infrastructure, based on an assessment of prevalent shocks and stresses that impact the power system?
- Are standards and guidelines developed with input from technical experts and to reflect best practices and up-to-date data?
- Are these design and construction standards easily accessible to relevant stakeholders?
- Are mechanisms, such as sanctions and penalties, in place to ensure compliance with design and construction standards? Are the consequences of noncompliance clearly communicated to relevant stakeholders?

Cali, Columbia: Designing resilience into the electrical distribution network

Cali's local utility, EMCALI, has invested heavily in building the resilience of its electricity distribution network and its monitoring and control infrastructure. The city of Cali is highly vulnerable to climate change impacts, including increased rainfall, earthquakes and windstorms, that can put its energy infrastructure at great risk. Heavy rainfall, especially during La Niña years, may lead to flooding that can severely damage local energy distribution infrastructure. To address this, EMCALI has developed a substation design in which all active infrastructure is located on the top floor of the buildings in order to reduce the risk of damage in the case of flooding. Furthermore, all buildings are earthquake resistant, and the utility is increasingly using semi-isolated cables, which reduce outages caused by fallen trees. EMCALI has also set up a control center that provides detailed real-time information about the grid and participates in the District Risk Committee, which brings together utility representatives, local government actors and other relevant stakeholders to review and provide distributed renewable energy solutions.

Source: https://resilientcitiesnetwork.org/urban-power-cali/

EVALUATION FOR WAY FORWARD

Assessment:

Are there any improvements required for the city to reach this goal and enhance power system resilience? If so, rate the level of priority and severity of the issues that need to be addressed.

Priority
Level of urgency (importance of timing) for addressing the issues

Evaluation	P1	P2	P3	P4	P5
High priority					
Medium priority					
Low priority					
Not applicable					

Severity
Degree of impact on the resilience of city's power and interconnected systems

Evaluation	P1	P2	P3	P4	P5
Highly critical					
Moderately critical					
Not critical					
Not applicable					

Dimension	Lever	Goal
Resources	8. Risk-Informed Infrastructure Management	**8.2 Incorporation of operational redundancies at infrastructure level to ensure reliable services during shocks and stresses.**

DISCUSSION QUESTIONS:

- Are all critical power infrastructure assets within the city network monitored to assess and mitigate risk, and ensure continued power supply during shocks and stresses?
- Can the power system continue to function when one part of the network is disrupted? Are buffers or redundant infrastructure in place to compensate for nonfunctioning or damaged infrastructure?
- Does planning for resources and power system operations incorporate learnings from past failures and successes?

Colombia: Assessing climate change risk in the power sector

The Colombian Ministry of Mines and Energy (MME) has developed a climate risk assessment methodology for the power sector that incorporates climate change scenario uncertainties and strengthens the links between climate data and risk assessments. The methodology allows stakeholders to identify the threats and risks that are relevant for power generation and transmission. Given the country's strong reliance on hydropower, assessing the impact of drought on the power system is crucial to understanding how to adjust operations to ensure safe and reliable power provision. The methodology was adapted to examine climate change hazards that have historically had the largest impact on the mines and energy sector. It takes a holistic perspective of risk, looking at not only the impacts on sector operations but also the possibility that operating conditions could exacerbate climate change impacts on the broader environment. Understanding the impacts on the power system will help inform potential adaptation strategies for the design, planning and operation of the power sector. Following an initial assessment, the MME recognized the need to diversify its energy mix to reduce risk and uncertainty and designed 29 actions within four categories: resilient infrastructure, short- and long-term planning, landscape management and information. The MME is using the results of the methodology to develop a new early warning system for the energy sector and an adaptation project to protect ecosystems, which will produce data to improve the methodology.

Source: https://www.nrel.gov/docs/fy21osti/77289.pdf

EVALUATION FOR WAY FORWARD

Assessment:

Are there any improvements required for the city to reach this goal and enhance power system resilience? If so, rate the level of priority and severity of the issues that need to be addressed.

Priority
Level of urgency (importance of timing) for addressing the issues

Evaluation	P1	P2	P3	P4	P5
High priority					
Medium priority					
Low priority					
Not applicable					

Severity
Degree of impact on the resilience of city's power and interconnected systems

Evaluation	P1	P2	P3	P4	P5
Highly critical					
Moderately critical					
Not critical					
Not applicable					

Dimension	Lever	Goal
Resources	8. Risk-Informed Infrastructure Management	**8.3 Identification of critical power system components and services for pre-disaster preparedness and effective response and recovery.**

DISCUSSION QUESTIONS:

- Has the city committed sufficient resources, including time, funding and expertise, to identify and map critical power systems components and services that need to be prioritized during disaster response and recovery?
- Is a broad range of stakeholders involved in the mapping and prioritizing of critical power system components and services to ensure an inclusive and effective pre-disaster preparedness and planning?
- Have clear roles and responsibilities been allocated to relevant electric utilities and other energy service providers, private sector actors and city actors to ensure the continued functioning of critical services during and post disasters?
- Are these roles and responsibilities clearly communicated to relevant stakeholders, especially to vulnerable communities?

New York, USA: Prioritizing the protection of vulnerable neighborhoods during disasters

In 2019, the Governor's Office of Storm Recovery of the State of New York launched the Solar Power and Battery Backup Power Program, which aims to protect flood-prone neighborhoods from power failures and to maintain power for critical disaster services. Several community facilities and public libraries in vulnerable areas received renewable energy upgrades that ensure power and the maintenance of essential services in the case of a storm or grid failure. The $4 million initiative targeted neighborhood facilities that experienced power outages during Superstorm Sandy and which provide essential disaster services to the communities. Renewable solar energy systems were installed at four library branches and seven community centers across Brooklyn and the Bronx, comprising solar panels that will generate 345 kW of power and battery storage units that will hold 583 kWh. During storm events, these systems will enable the centers to continue providing services, ranging from residential care for patients with disabilities to volunteer ambulance services, and allow the libraries to serve as resilience hubs where communities can congregate during emergencies.

Source: https://on.ny.gov/3oIT1wX

EVALUATION FOR WAY FORWARD

Assessment:

Are there any improvements required for the city to reach this goal and enhance power system resilience? If so, rate the level of priority and severity of the issues that need to be addressed.

Priority
Level of urgency (importance of timing) for addressing the issues

Evaluation	P1	P2	P3	P4	P5
High priority					
Medium priority					
Low priority					
Not applicable					

Severity
Degree of impact on the resilience of city's power and interconnected systems

Evaluation	P1	P2	P3	P4	P5
Highly critical					
Moderately critical					
Not critical					
Not applicable					

Dimension	Lever	Goal
Resources	8. Risk-Informed Infrastructure Management	**8.4 Integration of secure and up-to-date digital systems for infrastructure management, monitoring, forecasting and early warning.**

DISCUSSION QUESTIONS:

- Does the city have a monitoring and evaluation program in place to assess power-system-related infrastructure, including disaster risk reduction for energy-related hazards?
- Has the city committed adequate resources, such as public funds, time and expertise, for programs that promote research and investment in new technologies to enhance power system monitoring?
- Has the city committed adequate resources, such as public funds, time and expertise, to ensure that energy data is up-to-date and accurately reflects system functionality?
- Does the city have mechanisms in place to ensure the digital security of all energy-related systems, including clearly identified best practices guided by industry standards?

Cali, Colombia: Installing a cutting-edge energy monitoring and control system

The municipal government of Cali, Colombia, is responsible for providing various public services to its residents through EMCALI, a government-owned multiservice utility that holds a local monopoly on power distribution and retail. In 2010, EMCALI installed a Supervisory Control and Data Acquisition system (SCADA), a cutting-edge power system monitoring and control system, which allows it to gather and analyze energy data in real time, optimize maintenance activities, and reduce response times during power outages that may result from internal/technical and external disruptions. EMCALI has invested nearly $1.75 million to update its SCADA and continues to install smart meters for bi-directional information exchange with consumers. These investments help EMCALI detect and reduce energy losses and mitigate its vulnerabilities through data-driven strategies and advanced digital systems.

Source: https://www.cali.gov.co/publicaciones/142095/emcali-se-prepara-para-la-actualizacion-tecnologica-del-centro-de-control-de-energia/ (In Spanish)

EVALUATION FOR WAY FORWARD

Assessment:

Are there any improvements required for the city to reach this goal and enhance power system resilience? If so, rate the level of priority and severity of the issues that need to be addressed.

Priority
Level of urgency (importance of timing) for addressing the issues

Evaluation	P1	P2	P3	P4	P5
High priority					
Medium priority					
Low priority					
Not applicable					

Severity
Degree of impact on the resilience of city's power and interconnected systems

Evaluation	P1	P2	P3	P4	P5
Highly critical					
Moderately critical					
Not critical					
Not applicable					

Dimension	Lever	Goal
Resources	9. Effective Supply Chain Management	**9.1 Regular and open data-sharing across key decision-makers and operators throughout the power system.**

DISCUSSION QUESTIONS:

- Has the city committed sufficient resources, including time, funding and expertise, to identify and collect key data necessary for effective power system operation?
- Is data being shared in a regular and timely manner for informed decision-making regarding power system management and operation?
- Does the city have dedicated and accessible portals for storing and sharing energy data? Are there public resources dedicated to ensuring relevant stakeholders are aware and able to access these portals?
- Is energy-related data disseminated to relevant decision-makers in a clear and accessible manner, formatted according to industry standards? Are public resources dedicated to making this data more accessible to a diverse set of stakeholders (such as translation, if necessary)?

Amsterdam, Netherlands: Empowering decision-making through open data

Developed through a collaboration between the City of Amsterdam and its partners, the groundbreaking Amsterdam Energy Atlas acts as a central data hub, making crucial energy-related data readily available. The Energy Atlas includes detailed breakdowns of energy consumption across sectors, locations of renewable sources, and a comprehensive map of the city's energy infrastructure. Open data empowers policymakers to leverage data for guiding decisions on energy efficiency initiatives and strategic investments. The Atlas also allows residents and businesses to explore their own energy use and the potential for renewables, driving informed choices. Through its interactive and user-friendly map, this resource also highlights the power of data transparency in paving the way for a cleaner and more efficient energy future.

Source: https://amsterdamsmartcity.com/updates/project/energy-atlas

EVALUATION FOR WAY FORWARD

Assessment:

Are there any improvements required for the city to reach this goal and enhance power system resilience? If so, rate the level of priority and severity of the issues that need to be addressed.

Priority
Level of urgency (importance of timing) for addressing the issues

Evaluation	P1	P2	P3	P4	P5
High priority					
Medium priority					
Low priority					
Not applicable					

Severity
Degree of impact on the resilience of city's power and interconnected systems

Evaluation	P1	P2	P3	P4	P5
Highly critical					
Moderately critical					
Not critical					
Not applicable					

Dimension	Lever	Goal
Resources	9. Effective Supply Chain Management	**9.2 Guidance on allocation of infrastructure risk and resilience responsibilities across stakeholders in the power system during project development.**

DISCUSSION QUESTIONS:

- Does clear and accessible guidance exist on the allocation of infrastructure risk and resilience responsibilities across stakeholders in the power system?
- Does the guidance outline who is responsible for investing and integrating resilience features in new power system infrastructure projects and/or who should absorb costs of potential failures due to shocks and stresses?
- Is the guidance based on up-to-date information about infrastructure risks and regularly updated or flexible enough to ensure responsibilities for mitigating new and emerging risks are fairly allocated across stakeholders?
- Are mechanisms, such as sanctions or penalties, in place to ensure that actors are assuming their allocated responsibilities? Are the consequences of noncompliance clearly communicated with the relevant actors?
- Does the guidance consider the cascading impacts of power infrastructure failure, including on interconnected sectors such as transportation, communications and healthcare?

United Kingdom: Ensuring compliance with policies related to power infrastructures

The energy National Policy Statements (NPS) set out the government's policy for the delivery of energy infrastructure and provide the legal framework for planning decisions. The Planning Inspectorate reviews all major infrastructure projects in the United Kingdom, to evaluate their compliance with the requirements set forth in the NPS, whereby infrastructure developers must show that their proposals have considered the latest climate projections and robustness to extreme climate-related shocks and stresses. Five national policy statements are specific to power infrastructure: EN-1, the overarching policy for energy; EN-2, for natural gas electricity generating infrastructure; EN-3, for renewable energy infrastructure; EN-4, for natural gas supply infrastructure and gas and oil pipelines; and EN-5, for electricity networks infrastructure. First published in 2011, the NPS were reviewed in 2021, to reflect national priorities regarding energy security, reducing costs and delivering on net zero, while creating new green jobs and industries for the UK.

Source: https://www.gov.uk/government/consultations/planning-for-new-energy-infrastructure-revisions-to-national-policy-statements

EVALUATION FOR WAY FORWARD

Assessment:

Are there any improvements required for the city to reach this goal and enhance power system resilience? If so, rate the level of priority and severity of the issues that need to be addressed.

Priority
Level of urgency (importance of timing) for addressing the issues

Evaluation	P1	P2	P3	P4	P5
High priority					
Medium priority					
Low priority					
Not applicable					

Severity
Degree of impact on the resilience of city's power and interconnected systems

Evaluation	P1	P2	P3	P4	P5
Highly critical					
Moderately critical					
Not critical					
Not applicable					

Dimension	Lever	Goal
Resources	9. Effective Supply Chain Management	**9.3 Established communication channels across diverse stakeholders in the power system that enable coordinated response and recovery from shocks and stresses.**

DISCUSSION QUESTIONS:

- Are there mechanisms and sufficient funds to enable constructive dialogue and collaboration across various stakeholders for coordinated disaster response and recovery?
- Are non-governmental institutions able to effectively influence decisions?
- Are there laws, policies or institutionalized norms in place to guide both formal and informal coordination between different types of stakeholders?
- Are mechanisms in place to ensure that government institutions are accountable for creating consultative and reflective disaster response and recovery plans?
- Are fail-safe mechanisms in place to ensure the continued functioning of communication channels in the case of infrastructure or power system failure?

Japan: Establishing communication channels for disaster management

Japan is in a volcanic zone and prone to a wide variety of extreme weather and natural disaster events. In February 2007, the country's Meteorological Agency developed an extensive emergency warning system that links and coordinates municipal governments, local and national agencies, emergency services, citizens and energy providers. The system relies on observation and information-gathering capabilities, data analysis and decision-making aids coupled with an intelligent warning system. During the major earthquake in 2011, the system automatically relayed messages to citizens via the country's cell service system, broadcast alerts over national TV and radio, alerted the country's bullet trains and municipal transportation systems, disconnected gas and instigated the shutdown process for nuclear reactors. It enabled the Tokyo Electric Power Company to start preparing for a power outage and prioritize power distribution to essential services and infrastructure, such as hospitals, nuclear plants, traffic control agencies and data analysis centers.

Source: https://www.itu.int/ITU-D/tech/OLD_TND_WEBSITE/StandardizationGap_OLD/Tokyo2007/Presentations/9.MIC%20Murakami.pdf

EVALUATION FOR WAY FORWARD

Assessment:

Are there any improvements required for the city to reach this goal and enhance power system resilience? If so, rate the level of priority and severity of the issues that need to be addressed.

Priority
Level of urgency (importance of timing) for addressing the issues

Evaluation	P1	P2	P3	P4	P5
High priority					
Medium priority					
Low priority					
Not applicable					

Severity
Degree of impact on the resilience of city's power and interconnected systems

Evaluation	P1	P2	P3	P4	P5
Highly critical					
Moderately critical					
Not critical					
Not applicable					

Dimension	Lever	Goal
Resources	9. Effective Supply Chain Management	**9.4 Regular monitoring and replenishment of resources and emergency reserves across the power supply chain.**

DISCUSSION QUESTIONS:

- Are there clear roles and responsibilities for monitoring resources and emergency reserves across the power system supply chain, especially for resources that will be in high demand during acute shocks/disasters? Are these roles and responsibilities outlined in the city's disaster management plan and communicated to the relevant stakeholders?
- Has the city committed adequate resources, such as public funds, to support regular verification and replenishment of resources and contingency reserves across the power supply chain?
- Do decisions made about the level of resources and contingency reserves consider the potential unique and elevated needs of vulnerable and low-income communities before, during and after acute shocks/disasters?

Texas, USA: Monitoring the power grid

The Texas Interconnection is one of the three main grid systems in the United States and exclusively serves the State of Texas, covering 213 of the state's 254 counties. The Electric Reliability Council of Texas (ERCOT) is an independent system operator that manages the Texas grid and whose main responsibility is to ensure power reliability in the state. This task is made more challenging by extreme temperatures, which threaten grid infrastructure, and stresses, such as the Covid-19 pandemic, that make demand more difficult to predict. ERCOT monitors demand and load impacts in the event of a stress or an extreme weather event. Should reserves fall below a certain level, ERCOT has the power to declare an Energy Emergency Alert, which triggers procedures that include rotating outages and public advisories to conserve energy, all of which help to manage the supply-to-demand ratio and prevent uncontrolled outages.

Source: *https://comptroller.texas.gov/economy/fiscal-notes/2020/august/ercot.php*
https://www.edf.org/sites/default/files/documents/EDF-ERCOT-Report.pdf

EVALUATION FOR WAY FORWARD

Assessment:

Are there any improvements required for the city to reach this goal and enhance power system resilience? If so, rate the level of priority and severity of the issues that need to be addressed.

Priority
Level of urgency (importance of timing) for addressing the issues

Evaluation	P1	P2	P3	P4	P5
High priority					
Medium priority					
Low priority					
Not applicable					

Severity
Degree of impact on the resilience of city's power and interconnected systems

Evaluation	P1	P2	P3	P4	P5
Highly critical					
Moderately critical					
Not critical					
Not applicable					

SYSTEMS


SYSTEMS
Operations and Management
Inclusive Service Provision
Sustainable Finance
Adaptive System Operation
10.1
Inclusive electrification plan for universal access to clean, affordable, reliable and modern energy services.
10.2
Disaster management plans co-created with vulnerable and hard-to-reach communities.
10.3
Established channels for community input to ensure iterative and inclusive service planning.
10.4
Accessible financial solutions and incentives for consumers to participate in clean energy transitions.
11.1
Guidance on sustainable business models and financial management for key institutions across the power system.
11.2
Guidance and enforcement of infrastructure investment criteria based on social, environmental and economic assessment.
11.3
Guidance on assessing and disclosing climate risk for all power system investments.
11.4
Guidance on allocating emergency resources for coordinated response and recovery from shocks and stresses.
11.5
Dedicated funds for system maintenance, upgrades and grid modernization based on emerging risks.
12.1
Enforcement of standards for effective system operations and service delivery, informed by prevalent shocks and stresses.
12.2
Disaster management plans informed by climate risks and post-disaster reflection.
12.3
Alignment of recovery processes with long-term power system development and resilience goals.

Dimension	Lever	Goal
Systems	10. Inclusive Service Provision	**10.1 Inclusive electrification plan for universal access to clean, affordable, reliable and modern energy services.**

DISCUSSION QUESTIONS:

- Has the city stated its commitment to increase access to electricity, with the goal of achieving universal access, including in hard-to-reach areas and vulnerable communities?
- Did the city co-create its plan to expand access with diverse stakeholders, including electric utilities and other energy service providers, relevant private institutions, community organizations and, in particular, representatives of hard-to-reach or historically underserved communities?
- Does the city have clear guidelines, definitions and standards covering the sustainability, affordability and reliability of electricity supply and retail, based on up-to-date data on households and businesses (socio-economic status and demand/consumption patterns)?
- Does the existing electrification plan identify priority groups and outline actionable steps for expanding access, including plans for targeted financial assistance?

New York City, USA: Developing an inclusive plan for a clean, resilient and equitable energy future

In 2022, the New York City (NYC) Mayor's Office of Climate and Environmental Justice launched PowerUp NYC, an inclusive, year-long planning study to develop actions for the city government, with the aim of cleaning up the city's air, making energy bills more affordable and creating both good-paying jobs and opportunities for local, community-owned clean energy. The Mayor's Office works with community leaders, energy experts and residents to develop short-term actionable strategies to help the city achieve a just energy transition, with the objective of achieving 100 percent clean electricity by 2040 and decarbonizing the building and transportation sectors by 2050. The planning study will synthesize existing technical analyses of the city's energy systems and integrate community feedback to develop a set of recommendations that:

- Are aligned with city and state energy and equity policy mandates and targets.
- Reflect an inclusive approach to energy leadership and governance.
- Are grounded in the needs of NYC residents, prioritizing frontline communities and communities that have been historically underserved.

Source: *https://climate.cityofnewyork.us/initiatives/powerupnyc/*

EVALUATION FOR WAY FORWARD

Assessment:

Are there any improvements required for the city to reach this goal and enhance power system resilience? If so, rate the level of priority and severity of the issues that need to be addressed.

Priority
Level of urgency (importance of timing) for addressing the issues

Evaluation	P1	P2	P3	P4	P5
High priority					
Medium priority					
Low priority					
Not applicable					

Severity
Degree of impact on the resilience of city's power and interconnected systems

Evaluation	P1	P2	P3	P4	P5
Highly critical					
Moderately critical					
Not critical					
Not applicable					

Dimension	Lever	Goal
Systems	10. Inclusive Service Provision	**10.2 Disaster management plans co-created with vulnerable and hard-to-reach communities**

DISCUSSION QUESTIONS:

- Are mechanisms, such as guidelines, processes, and forums, in place for co-creating disaster management plans that encourage the active participation of vulnerable and hard-to-reach communities?
- Has the city dedicated adequate resources for outreach, to promote engagement and co-creation of disaster management plans?
- Are disaster management plans regularly reviewed and updated to account for emerging shocks and stresses, especially those that disproportionately affect vulnerable communities?
- Are the roles of various stakeholders, including government agencies, electric utilities and other energy service providers, community-based organizations and mutual aid groups, clearly defined in existing disaster management plans?

Sendai City, Japan: Co-creating disaster risk management with communities

In 2013, Katahira, a district in Sendai City, Japan, established the Katahira Community Development Association (KCDA), as the district's main body for community-focused disaster risk management. The KCDA aims to establish safety and security, energize the local community, conserve and make use of history and the environment, and develop a sustainable community development system. It actively co-creates its disaster-management approaches with community members and organizations, including developing disaster survival and shelter management manuals and emergency drills, and disseminating disaster risk information to residents. The KCDA's initiatives are directly supported by community disaster management leaders who receive training from the city government. The KCDA also conducts disaster risk reduction activities for vulnerable populations, children and youth, in partnership with the Katahira Children's Board for Community Development.

Source: https://policystudies.blogs.bristol.ac.uk/2023/03/23/how-co-creation-may-help-prevent-deaths-caused-by-natural-disasters-in-indonesia/

EVALUATION FOR WAY FORWARD

Assessment:

Are there any improvements required for the city to reach this goal and enhance power system resilience? If so, rate the level of priority and severity of the issues that need to be addressed.

Priority
Level of urgency (importance of timing) for addressing the issues

Evaluation	P1	P2	P3	P4	P5
High priority					
Medium priority					
Low priority					
Not applicable					

Severity
Degree of impact on the resilience of city's power and interconnected systems

Evaluation	P1	P2	P3	P4	P5
Highly critical					
Moderately critical					
Not critical					
Not applicable					

Dimension	Lever	Goal
Systems	10. Inclusive Service Provision	**10.3 Established channels for community input to ensure iterative and inclusive service planning.**

DISCUSSION QUESTIONS:

- Are effective and well-utilized communication channels and forums in place that allow stakeholders and end users/consumers to report on electricity service planning needs and concerns?
- Are these channels accessible to diverse groups across the city through, for example, translation, accessibility assistance and various communication mediums, including social media, paper-based and telecommunications?
- Do these communication channels ensure anonymity or confidentiality where necessary?
- Are adequate resources committed to reviewing and incorporating community feedback, to ensure accountability and responsive electricity service planning?

Dubai: Establishing community feedback channels for energy and water services

The Dubai Electricity and Water Authority (DEWA) provides end users with a comprehensive web-based platform to access and monitor their energy and water services, with functions customized for consumers, builders and service providers, as well as a full section dedicated to suggestions, comments and customer complaints. These functions allow end users to directly engage with the utility and to suggest ideas for improving service delivery. DEWA's platform also includes Smart Response, a feature that allows customers to report and track incidents related to their own service or that of other accounts, as well as any problems that they witness in public spaces. This function is available in the five main languages spoken in Dubai and is also available to non-DEWA customers. The Smart Response feature uses an AI-powered function called "smart self-diagnosis" to help customers identify the root cause of their issue.

Source: *https://www.dewa.gov.ae/en/about-us/service-guide/consumer-services; https://www.dewa.gov.ae/en/consumer/supply-management/smart-response-intro*

EVALUATION FOR WAY FORWARD

Assessment:

Are there any improvements required for the city to reach this goal and enhance power system resilience? If so, rate the level of priority and severity of the issues that need to be addressed.

Priority
Level of urgency (importance of timing) for addressing the issues

Evaluation	P1	P2	P3	P4	P5
High priority					
Medium priority					
Low priority					
Not applicable					

Severity
Degree of impact on the resilience of city's power and interconnected systems

Evaluation	P1	P2	P3	P4	P5
Highly critical					
Moderately critical					
Not critical					
Not applicable					

Dimension	Lever	Goal
Systems	10. Inclusive Service Provision	**10.4 Accessible financial solutions and incentives for consumers to participate in clean energy transitions.**

DISCUSSION QUESTIONS:

- Are there financial solutions and incentives aimed at alleviating barriers to adopting clean energy solutions by households, small and large businesses, governmental and non-governmental organizations?
- Has the city committed adequate resources, such as public funds, time and expertise, to research and innovation, including new financial solutions and incentive structures to address the unique challenges of consumers across different sectors, levels of demand and consumption patterns?
- Are financial solutions and incentives diverse and inclusive, to accommodate end users/consumers across a variety of income levels, especially those in vulnerable and low-income communities?
- Are effective communication channels and forums in place to ensure clear and accessible communication about public resources, programs and incentives to potential beneficiaries?

Palmas, Brazil: Incentivizing solar generation by consumers

In 2015, to increase solar generation capacity, the City of Palmas launched the Palmas Solar Program, which incentivizes private electricity consumers to adopt solar energy. Consumers who purchase a solar PV system receive a reduction of up to 80 percent in municipal taxes, i.e., the property and urban land tax, which is paid by property owners in urban areas, and the real estate transfer tax that is paid on property sales. Consumers are also compensated for any surplus electricity generated from their solar PV system, through the city's net metering tariff scheme. To set up this program, the City of Palmas amended the local tax code, to make the tax reductions legal, and included the cost of the solar program in the official municipal budget. Although consumers bear the cost of the solar PV panels, local banks are available to help households and businesses finance their solar PV system. The program led to a significant decline in electricity service rates, with households achieving a return on investment in just two years. The tax incentives were instrumental in residents' decisions to participate in the program. Palma's local economy has also benefited from the program, with over 20 local solar PV enterprises established, and the city realizing an overall greenhouse gas emission reduction, estimated at 16,000 tCO_2.

Source: https://renewablesroadmap.iclei.org/wp-content/uploads/2021/11/Palmas-solar-program-case-study.pdf

EVALUATION FOR WAY FORWARD

Assessment:

Are there any improvements required for the city to reach this goal and enhance power system resilience? If so, rate the level of priority and severity of the issues that need to be addressed.

Priority
Level of urgency (importance of timing) for addressing the issues

Evaluation	P1	P2	P3	P4	P5
High priority					
Medium priority					
Low priority					
Not applicable					

Severity
Degree of impact on the resilience of city's power and interconnected systems

Evaluation	P1	P2	P3	P4	P5
Highly critical					
Moderately critical					
Not critical					
Not applicable					

Dimension	Lever	Goal
Systems	11. Sustainable Finance	**11.1 Guidance on sustainable business models and financial management for key institutions across the power system**

DISCUSSION QUESTIONS:

- Is there clear and accessible guidance on financial management for institutions that own and operate segments of the power system, such as on infrastructure investments, tariff setting and revenue collection? Is the guidance aligned with the city's short- and long-term goals towards clean energy transition, resilience-building and low-carbon development?
- Are there clear and accessible guidance and standards on financial thresholds and operational/budget requirements that key institutions must meet to ensure sustainability of their business and continued electricity service provision?
- Has the city committed adequate resources, such as public funds, time and expertise, to assess the financial implications of new and disruptive clean energy technologies and provide guidance to existing service providers and new businesses across the power system supply chain?

Argentina: Providing guidance on sustainable financial management practices

The Government of Argentina, through its National Securities and Exchange Commission, provides detailed guidelines on financial management practices in line with its core mission to promote the development of a transparent, inclusive and sustainable capital market that contributes to the country's economic and social progress. The Commission has developed a set of guidelines for investors to encourage transparency and identification of green and socially responsible financing opportunities in the local capital market. Notably, the Commission has published the following:

- Guidance for Voluntary Reporting and Disclosure of Environmental, Social, and Governance.
- Guidelines for issuing social, green and sustainable marketable securities.
- Guide for socially responsible investment in the Argentine capital market.
- Guide for external evaluators of social, green and sustainable bonds.

The guidelines provide the market with best practices and standards for "green" securities, which focus on projects or activities with environmental benefits; "social" securities, which focus on projects or activities with social benefits; and "sustainable" securities, which are a combination of both.

Source : https ://www.argentina.gob.ar/cnv/finanzas-sostenibles/guias

EVALUATION FOR WAY FORWARD

Assessment:

Are there any improvements required for the city to reach this goal and enhance power system resilience? If so, rate the level of priority and severity of the issues that need to be addressed.

Priority
Level of urgency (importance of timing) for addressing the issues

Evaluation	P1	P2	P3	P4	P5
High priority					
Medium priority					
Low priority					
Not applicable					

Severity
Degree of impact on the resilience of city's power and interconnected systems

Evaluation	P1	P2	P3	P4	P5
Highly critical					
Moderately critical					
Not critical					
Not applicable					

Dimension	Lever	Goal
Systems	11. Sustainable Finance	**11.2 Guidance and enforcement of infrastructure investment criteria based on social, environmental and economic assessment.**

DISCUSSION QUESTIONS:

- Is there clear and accessible guidance on the social, environmental and economic assessments that developers must conduct when designing power infrastructure projects?
- Does the guidance outline specific metrics and thresholds for potential social, environmental and economic impacts of infrastructure projects?
- Are mechanisms, such as laws, policy and penalties, in place to regulate infrastructure investment based on social, environmental and economic assessments?
- Is there an independent institution, free from political interference, responsible for regulating and enforcing placement/siting, design, and construction of infrastructure investments based on robust social, environmental and economic assessments?
- Are infrastructure investment criteria clear and effectively communicated to relevant stakeholders? Are the consequences of noncompliance clear?

United Kingdom: Maximizing social, economic and environmental value of public spending

In 2013, the Public Services (Social Value) Act came into effect in the United Kingdom. It requires public servants to consider potential social, economic and environmental benefits before starting the procurement process, with the aim of maximizing the social value of public spending, including infrastructure investments. Several municipalities have institutionalized the legislation into their own by-laws, including the City of Greater Manchester, which includes a social value element of 20 percent in all its contracts with suppliers. Taking this further, Bristol City Council uses 20 percent as the basis and aims to spend more than 40 percent of its total procurement budget on micro, small and medium-sized businesses, social enterprises and the voluntary sector. In 2016, to ensure enforcement and effective implementation of this policy across local governments, the national government set up the National Social Value Taskforce and established a Framework for Measuring Social Value.

Source: https://infrastructure.aecom.com/2020/unlocking-the-social-value-of-infrastructure-investment

EVALUATION FOR WAY FORWARD

Assessment:

Are there any improvements required for the city to reach this goal and enhance power system resilience? If so, rate the level of priority and severity of the issues that need to be addressed.

Priority
Level of urgency (importance of timing) for addressing the issues

Evaluation	P1	P2	P3	P4	P5
High priority					
Medium priority					
Low priority					
Not applicable					

Severity
Degree of impact on the resilience of city's power and interconnected systems

Evaluation	P1	P2	P3	P4	P5
Highly critical					
Moderately critical					
Not critical					
Not applicable					

Dimension	Lever	Goal
Systems	11. Sustainable Finance	**11.3 Guidance on assessing and disclosing climate risk for all power system investments.**

DISCUSSION QUESTIONS:

- Is there clear and accessible guidance on assessing and integrating climate risk into power system infrastructure investment decisions?
- Does the guidance provide metrics for quantifying both short- and long-term climate risks, to integrate sustainability into financial management and accounting practices?
- Are mechanisms, such as laws and policies, in place that require or encourage the disclosure of climate risk and potential financial impact by owners and operators of infrastructure across the power system supply chain?
- Is there clear and accessible guidance on expanding traditional risk assessment approaches to incorporate emerging shocks and stresses that will have significant financial impacts, to encourage investments in resilience measures?

Brittany, France: Managing green budgeting at the highest political and administrative levels

In 2020, the region of Brittany began developing a local green budgeting methodology and piloted a climate budget tagging methodology. The approach helps identify innovative tools and engagement opportunities to mobilize stakeholders and align public expenditure with climate and environmental goals. The green budget is embedded in Breizh COP, the regional project for the climate and the environment, which defined a Regional Scheme for Spatial Planning, Sustainable Development and Territorial Equality, consisting of 38 objectives and six transversal commitments: Healthy eating standards for everyone, a strategy for energy and climate efficiency, carbon-free sustainable mobility, a responsible digital agenda, the conservation and valorization of biodiversity and resources, and cohesion between territories goals for carbon emissions reduction and clean energy production. The green-budgeting methodology helps local governments to identify expenditures that may have a negative or positive impact on the environment and that contribute to local climate adaptation. As a result, it has increased the number of green projects that can be funded as part of the regional budget, facilitating the reduction of regional greenhouse gas emissions and allowing the region to assess the environmental impact of regional policies and to engage with a wide range of stakeholders on environmental issues.

Source: https://www.oecd-ilibrary.org/sites/93b4036f-en/1/3/6/index.html?itemId=/content/publication/93b4036f-en&_csp_=3079c8aa9e9ed932fd18d69dde0f905e&itemIGO=oecd&itemContentType=book

EVALUATION FOR WAY FORWARD

Assessment:

Are there any improvements required for the city to reach this goal and enhance power system resilience? If so, rate the level of priority and severity of the issues that need to be addressed.

Priority
Level of urgency (importance of timing) for addressing the issues

Evaluation	P1	P2	P3	P4	P5
High priority					
Medium priority					
Low priority					
Not applicable					

Severity
Degree of impact on the resilience of city's power and interconnected systems

Evaluation	P1	P2	P3	P4	P5
Highly critical					
Moderately critical					
Not critical					
Not applicable					

Dimension	Lever	Goal
Systems	11. Sustainable Finance	**11.4 Guidance on allocating emergency resources for coordinated response and recovery from shocks and stresses.**

DISCUSSION QUESTIONS:

- Is clear and accessible guidance available on the source and allocation of resources for emergencies, including roles and responsibilities of key institutions for coordinated response and recovery from shocks and stresses? Is this guidance effectively communicated to relevant stakeholders, including potential beneficiaries?
- Has the city committed resources to identify key hazards and allocate appropriate contingencies and financial mechanisms to support citizens in need, especially those at high-risk of prevalent shocks and stresses?
- Is the contingency fund adequate to withstand not only shocks or stresses that impact the power system, but the potential cascading impacts and disruptions across interconnected urban systems?
- Are contingency funds readily available and accessible to relevant stakeholders to ensure swift and effective response and recovery from shocks and stresses?

Denmark: Planning for resource-efficient disaster management and contingencies

To ensure a swift response to emergencies, Denmark's national disaster management system coordinates the various organizations within the energy system. The Danish Energy Agency is responsible for cross-cutting and regulatory emergency tasks and coordinates the Danish Emergency Management Agency, the Defense Command and the National Police, as well as with individual energy sectors. It also supervises preparedness work across emergency service providers, and reviews contingency plans in order to ensure they are continuously updated to reflect local conditions and adapt to new and emerging threats.

Source: https://ens-dk.translate.goog/ansvarsomraader/beredskab/sammenhaengende-beredskabsplanlaegning-med-og-i-energisektorerne?_x_tr_sl=auto&_x_tr_tl=en&_x_tr_hl=es&_x_tr_pto=wapp

EVALUATION FOR WAY FORWARD

Assessment:

Are there any improvements required for the city to reach this goal and enhance power system resilience? If so, rate the level of priority and severity of the issues that need to be addressed.

Priority
Level of urgency (importance of timing) for addressing the issues

Evaluation	P1	P2	P3	P4	P5
High priority					
Medium priority					
Low priority					
Not applicable					

Severity
Degree of impact on the resilience of city's power and interconnected systems

Evaluation	P1	P2	P3	P4	P5
Highly critical					
Moderately critical					
Not critical					
Not applicable					

Dimension	Lever	Goal
Systems	11. Sustainable Finance	**11.5 Dedicated funds for system maintenance, upgrades and grid modernization based on emerging risks.**

DISCUSSION QUESTIONS:

- Has the city allocated sufficient resources, including time, funding and expertise, for identifying emerging risks and corresponding system vulnerabilities?
- Does the city have adequate funds for regular system upgrades and grid modernization efforts, including integrating new clean energy technologies, digital solutions for efficiency and interconnectivity, resilience measures for efficient response and rapid recovery?
- Are these upgrades and modernization investments in line with industry standards?
- Are funds for system upgrades and modernization allocated consistently and in line with infrastructure master plans or other system-wide plans that account for emerging risks?

Seattle, USA: Investing in grid modernization for affordability, resilience and security

Seattle City Light, a customer-owned electric utility operating in Seattle and neighboring suburbs, is actively investing in upgrading and modernizing the local grid, to enhance infrastructural reliability and resilience. As part of this effort, in 2021, the utility developed the *Grid Modernization Plan and Roadmap*, which outlines its planned grid modernization and lays the foundation for future initiatives. This plan was developed based on industry best practices and will be regularly updated to reflect changing circumstances and technological advancements. In addition to concentrating on modernizing the grid and other physical assets, the plan identifies areas where legislative, regulatory or rate design changes will be implemented to support projects. An important part of the plan is to enhance and accelerate the utility's ability to meet its mission of delivering safe, reliable and affordable power to its customers. Seattle City Light has already updated its billing system and installed advanced metering infrastructure meters throughout its service territory. It is also working on improving the grid's capacity to support distributed renewable energy technologies.

Source: https://www.seattle.gov/city-light/energy/grid-modernization

EVALUATION FOR WAY FORWARD

Assessment:

Are there any improvements required for the city to reach this goal and enhance power system resilience? If so, rate the level of priority and severity of the issues that need to be addressed.

Priority
Level of urgency (importance of timing) for addressing the issues

Evaluation	P1	P2	P3	P4	P5
High priority					
Medium priority					
Low priority					
Not applicable					

Severity
Degree of impact on the resilience of city's power and interconnected systems

Evaluation	P1	P2	P3	P4	P5
Highly critical					
Moderately critical					
Not critical					
Not applicable					

Dimension	Lever	Goal
Systems	12. Adaptive System Operations	**12.1 Enforcement of standards for effective system operations and service delivery, informed by prevalent shocks and stresses.**

DISCUSSION QUESTIONS:

- Are there sufficient resources, including time, funding and expertise, for identifying prevalent shocks and stresses and corresponding operations and service delivery vulnerabilities? Is this process informed by scenario planning and risk modeling?
- Do mechanisms, such as laws, policy and penalties, exist for enforcing effective system operations and service delivery, to ensure the power system's resilience against prevalent shocks and stresses, including the integration of necessary redundancies, delivery of safe and quality electricity based on industry standards, interconnection and regular maintenance based on standards, regular disaster response drills and exercises, as well as risk mitigation measures such as vegetation management?
- Is there an independent institution, free from political interference, responsible for monitoring and regulating the quality of power system operation and service delivery?

California, USA: Enforcement of safety, reliability and service quality

Strong enforcement is essential to protect consumers from safety, service quality and other violations. The California Public Utilities Commission regulates privately owned utility companies that provide electricity, natural gas, telecommunications, water, railroad, rail transit and passenger transportation. It is responsible for ensuring that consumers receive safe, clean and affordable utility services, protecting against fraud and promoting the health of California's economy. For example, the Commission requires utilities to regularly remove vegetation from around electric poles, towers and other electric facilities to reduce risk of wildfires and authorizes funding for this work as part of the approved electricity tariffs paid by consumers. The Commission has the authority to conduct formal investigations into violations of rules and regulations and to issue citations for non-compliance. Building on these tools, in 2020, the Commission adopted an Enforcement Policy, which provides guidance for achieving a consistent approach to enforcement, through standardizing existing procedures where possible and establishing nine enforcement principles: Ensuring compliance, consistent enforcement, meaningful deterrence, timely enforcement, progressive enforcement, transparency, environmental justice and disadvantaged communities consideration, adaptive management and enforcement prioritization.

Source: https://www.cpuc.ca.gov/regulatory-services/enforcement-and-citations

EVALUATION FOR WAY FORWARD

Assessment:

Are there any improvements required for the city to reach this goal and enhance power system resilience? If so, rate the level of priority and severity of the issues that need to be addressed.

Priority
Level of urgency (importance of timing) for addressing the issues

Evaluation	P1	P2	P3	P4	P5
High priority					
Medium priority					
Low priority					
Not applicable					

Severity
Degree of impact on the resilience of city's power and interconnected systems

Evaluation	P1	P2	P3	P4	P5
Highly critical					
Moderately critical					
Not critical					
Not applicable					

Dimension	Lever	Goal
Systems	12. Adaptive System Operations	**12.2 Disaster management plans informed by climate risks and post-disaster reflection.**

DISCUSSION QUESTIONS:

- Does the city have a disaster management plan that is informed by scenario planning and climate-risk modeling?
- Does the plan outline the necessary contingencies, pre- and post-disaster activities, and the roles and responsibilities of key institutions, including governmental agencies, electric utilities and other energy service providers, relevant private institutions, community organizations and citizens?
- Does the city have dedicated platforms, including communication channels, forums or others, for collecting feedback and reflections from various stakeholders after disaster events?
- Are these platforms inclusive and accessible, ensuring the participation of a wide range of stakeholders, from energy-sector institutions to communities that are affected?
- Are disaster management plans regularly updated to reflect post-disaster reflections and learnings, and emerging risks?

Logan City, Australia: Reflective, multi-stakeholder disaster management planning

In 2022, Logan City Council released its updated Local Disaster Management Plan (LDMP), which outlines how to prevent, prepare for, respond to and recover from a disaster or emergency. The plan considers all types of disasters, including natural and human-induced disasters that disrupt essential services or involve a direct attack or threat against the city. The entity responsible for disaster management in Logan is the Local Disaster Management Group, comprising:

- Logan City Council
- Department of Communities, Housing and Digital Economy
- Department of Transport and Main Roads
- Queensland Fire and Emergency Services
- Queensland Police Service
- Queensland Health
- Energex
- State Emergency Service
- Red Cross
- Queensland Ambulance Service.

The Group is also responsible for the annual review of the LDMP, ensuring that data from census and risk assessment is integrated in the prevention, preparedness, response and recovery guidelines contained in the LDMP.

Source: https://www.logan.qld.gov.au/disasters-and-emergencies/disaster-management-plan

EVALUATION FOR WAY FORWARD

Assessment:

Are there any improvements required for the city to reach this goal and enhance power system resilience? If so, rate the level of priority and severity of the issues that need to be addressed.

Priority
Level of urgency (importance of timing) for addressing the issues

Evaluation	P1	P2	P3	P4	P5
High priority					
Medium priority					
Low priority					
Not applicable					

Severity
Degree of impact on the resilience of city's power and interconnected systems

Evaluation	P1	P2	P3	P4	P5
Highly critical					
Moderately critical					
Not critical					
Not applicable					

Dimension	Lever	Goal
Systems	12. Adaptive System Operations	**12.3 Alignment of recovery processes with long-term power system development and resilience goals.**

DISCUSSION QUESTIONS:

- Are disaster management and recovery plans consistent with the long-term power system resilience goals, and do they consider the short- and long-term environmental, social and economic impacts of recovery decisions?
- Do mechanisms, laws, policies or norms exist that help to align long-term power system resilience goals with short-term recovery decisions, such as allocating funds for clean energy and resilience measures within economic recovery packages?
- Are mechanisms in place to ensure that the long-term impacts of recovery-related investments are appropriately evaluated during the decision-making and resource-allocation process for recovery?
- Are sufficient contingency funds dedicated to integrating resilience measures during the recovery stage following an acute shock or stress?

El Savador: Adapting a Disaster Recovery Framework

In 2020, El Salvador needed to strengthen its overall approach to recovery, following the impact of three disasters: Covid-19 pandemic and two tropical storms, which resulted in extensive damages and were the start of the most active hurricane season on record. In 2022, the country released its Post-Disaster Recovery Framework (DRF), which was adapted following an impact assessment of the three disasters, an assessment of the country's long-term socio-economic and preparedness needs, and a review of its post-disaster recovery policies and operations. It was based on national and international expertise, the national context and institutional framework, and the Government of El Salvador's priorities, informed by the priorities of the Sendai Framework for Disaster Risk Reduction. The DRF's general vision is to implement a resilient recovery in El Salvador, through improving infrastructure, services, livelihoods and living conditions of the population affected by the disaster; reducing risk factors; promoting sustainable development and building a more equitable society. Among the instruments to emerge from the DRF process was a Sectoral Investment Plan for Economic Revitalization and Disaster Resilience, with the objectives of economic revitalization and disaster resilience. The plan prioritized the tourism, transportation, agroindustry and water and sanitation sectors, which together represent 25 percent of the country's GDP, and projects were chosen according to their contribution to the generation of economic activity, closing existing gaps in basic needs, and reducing risks and building resilience to disaster.

Source: *https://www.undp.org/sites/g/files/zskgke326/files/2022-11/Case%20Study%20El%20Salvador%20ingles.pdf*

EVALUATION FOR WAY FORWARD

Assessment:

Are there any improvements required for the city to reach this goal and enhance power system resilience? If so, rate the level of priority and severity of the issues that need to be addressed.

Priority
Level of urgency (importance of timing) for addressing the issues

Evaluation	P1	P2	P3	P4	P5
High priority					
Medium priority					
Low priority					
Not applicable					

Severity
Degree of impact on the resilience of city's power and interconnected systems

Evaluation	P1	P2	P3	P4	P5
Highly critical					
Moderately critical					
Not critical					
Not applicable					


RESILIENT
CITIES
NETWORK


URBAN
POWER