

Power Sector Resilience - Regulator and Financiers

AECOM has been engaged by the World Bank's Energy Sector Management Assistance Program (ESMAP) to collate information and analyse current and emerging practices to manage risks associated with natural hazards in the power sector.

The objective of this work is to document experience and facilitate future dialogue between utilities and stakeholders with the ultimate aim of assisting to increase the resilience of the sector to natural disasters.

We are seeking your participation in answering a short survey which seeks to identify the risk management practices which your organisation is using to manage risks from natural hazards.

Throughout this survey our focus is to discover practices that you believe are relatively new or novel that may assist organisations to improve power sector resilience.

1. Which of the following organisations best describes your organisation? (tick all that apply)

- Power sector regulator
- Financial institution providing finance to power sector projects / companies
- Insurance company which insures power sector assets / companies
- Other (please specify)

*2. In which region is your organisation based?

- North Africa
- Central or Southern Africa
- Western Europe
- Central Europe
- Middle East
- Asia
- East Asia
- South Asia
- Australia or New Zealand
- Pacific
- Latin America and Caribbean
- North America

We are considering the effects of natural hazards in this study.

The Centre for Research on the Epidemiology of Disaster uses the following definitions when considering natural hazards and disasters.

Geophysical

Events originating from geological processes

Meteorological

Events caused by short lived weather events ranging from minutes to days

Hydrological

Events caused by the inundation, flooding and/or overflow of surface water bodies.

Climatological

Events caused by long lived climate events ranging (seasons to long term)

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3. Does your organisation require a formal, documented risk management approach used to identify, assess and treat risks associated with natural hazards for power sector companies which you have influence over?

- No – no risk management approaches are used
- Yes – aligned to ISO31001 Risk Management or other risk standard (please specify)
- Yes – internal risk management policy / procedure or similar which are organisation specific
- Yes – Other (please specify)

Other (please specify)

Risk Management Approaches

We would appreciate understanding more about the risk management approaches used in your country/ies.

Consider the influence that your organisation, as a regulator, insurer or financier, has on service providers. Service providers may include generators, retailers, transmission owners/operators, distribution owners/operators, market operators and power system operators.

When answering these questions, please consider both "hard" and "soft" measures.

Hard measures include practices centred on engineering or technological solutions such as risk proofing infrastructure, asset redundancy, risk protection assets such as flood levees, early warning systems, etc.

Soft measures involve solutions focusing on governance, institutional and non-physical interventions such as planning, coordination, social considerations, etc.

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4. What risk identification approaches (recognizing, assessing, and understanding risks from natural hazards) are used by power sector companies which you have influence over, to manage risks associated with the natural hazards in the power sector? (tick all that apply)

- None
- Review of historical records, such as meteorological, geological and/or operational data
- Online monitoring to develop long term meteorological and/or geological databases
- Probabilistic modelling of hazards and risks
- Conduct internal risk identification and risk review studies and maintain risk register considering natural hazards (including at the operational and board level)
- Engaging specialist services to analyse or model hazard(s), identify and assess risks, etc.
- Other (please specify)

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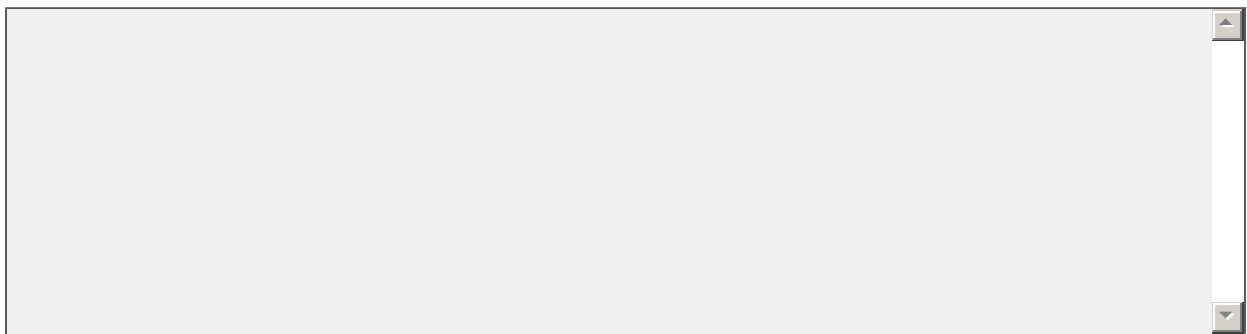
5. What risk reduction approaches are used by power sector companies which you have influence over, to manage risks associated with natural hazards? (tick all that apply)

- None
- Risk proofing infrastructure through design and material selection, including for the development of New assets and retrofitting existing assets
- Improved maintenance practices
- Change site selection of new assets or considered relocation of existing assets
- Organisational capacity building (training)
- Diversification or identification of alternate fuel suppliers
- Alternative energy supply/distribution arrangements
- Economic valuation of the energy supply that is lost during a power system event is used in cost benefit analyses for potential power supply system improvements rather than the price of the energy lost.
- Mandatory information transparency enforced on market participants, such as energy availability for generation plant.
- Regular electricity industry consultation of electricity supply risks.
- Public education on electricity supply risks
- Penalties/ incentives regimes for service providers
- Auditing of Service Providers to ensure appropriate risk management practices
- Other (please specify)

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6. What methods do power sector companies which you have influence over, use to increase its risk preparedness? (tick all that apply)

- None
- Forecasting and early warning systems
- Contingency plan
- Emergency management plan (including governance arrangements)
- Business continuity plan
- Communications plan
- Drills and response training
- Other (please specify)

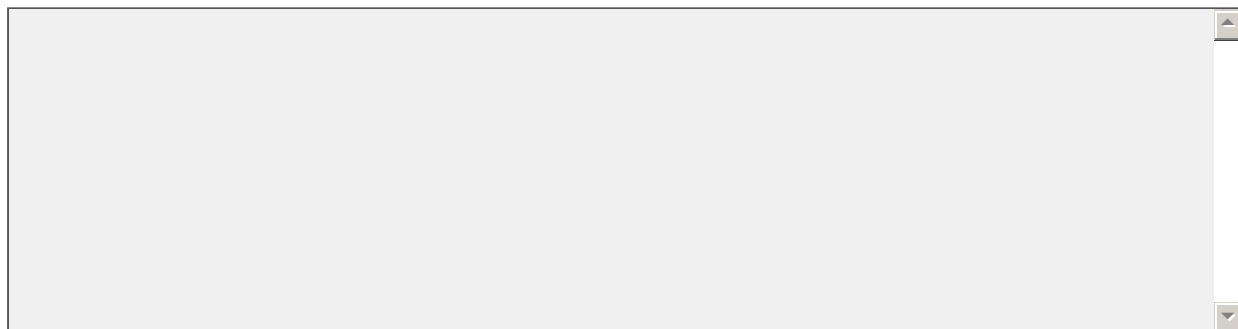


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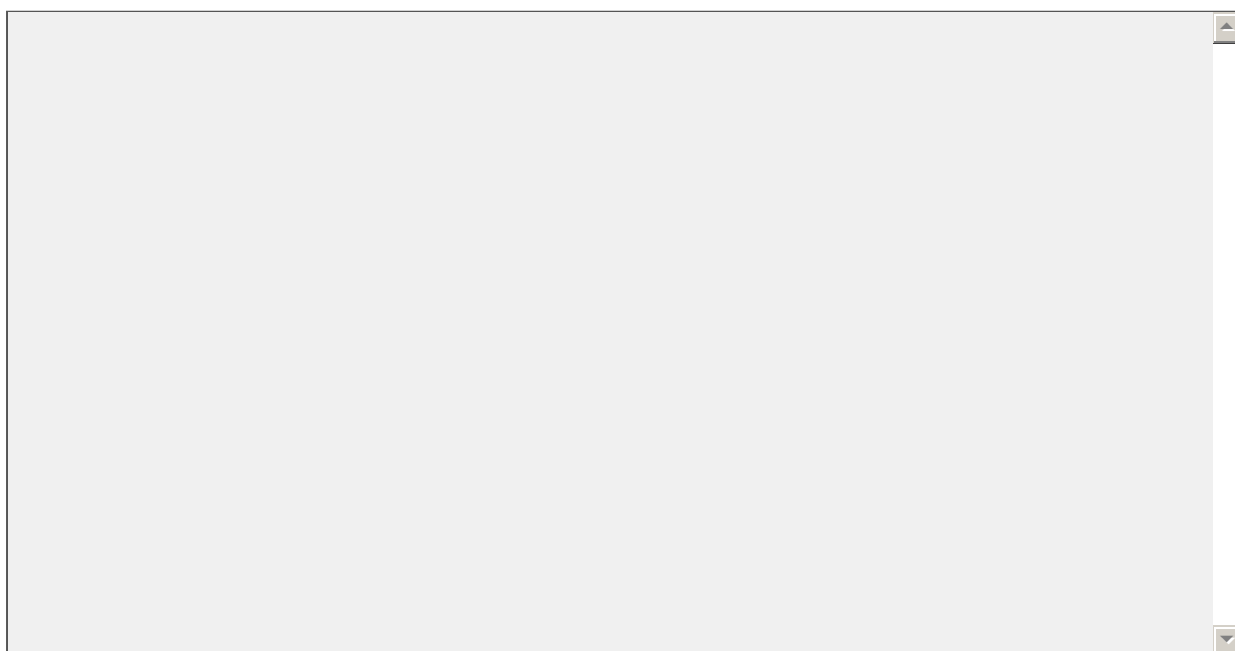
7. What financial approaches are used by power sector companies which you have influence over, to manage risks associated with natural hazards/disasters? (tick all that apply)

Risk financing and insurance can help to relieve financial pressures from loss and damages associated with natural hazards.

- No financial protection approaches are used
- Risk financing
- Increased depreciation of assets (reduced asset lifetime)
- Asset insurance
- Parametric (defined event) insurance
- Direct pass through of costs to customers
- Other (please specify)

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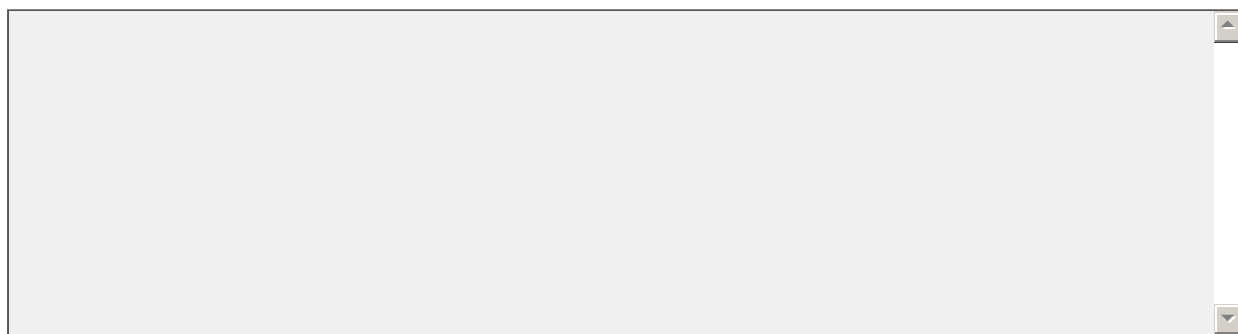
8. Please describe any other approaches used by power sector companies which you have influence over, to manage risks associated with the natural hazards/disasters, which have not previously been discussed.

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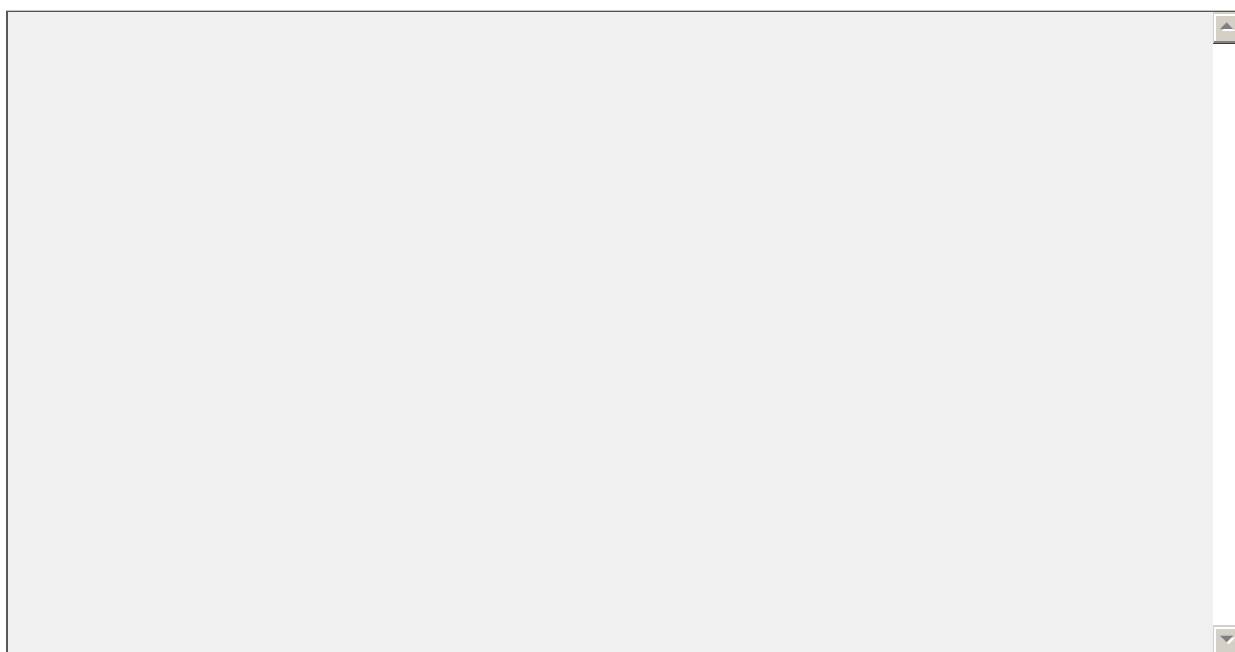
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9. What are the main constraints that may prevent power sector companies which you have influence over, from implementing natural disaster planning, risk reduction or recovery? (tick all that apply)

- The organisation has not considered the need previously
- The organisation does not have the necessary skills and experience to undertake risk preparedness activities no budget available within the organisation to support planning and risk reduction activities
- The organisation is not able to enforce other aspects of the power sector supply chain to ensure that planning, reduction and recovery are coordinated
- The regulatory framework does not support planning and risk reduction activities
- There is no incentive for the organisation either because costs are passed through to customers or there are no penalties for disruption to supply
- There is no established supply chain to assist recovery and reconstruction efforts
- Other (please specify)



10. What do you believe are useful emerging practices to develop resilience in the power supply sector?



Recovery and Restoration

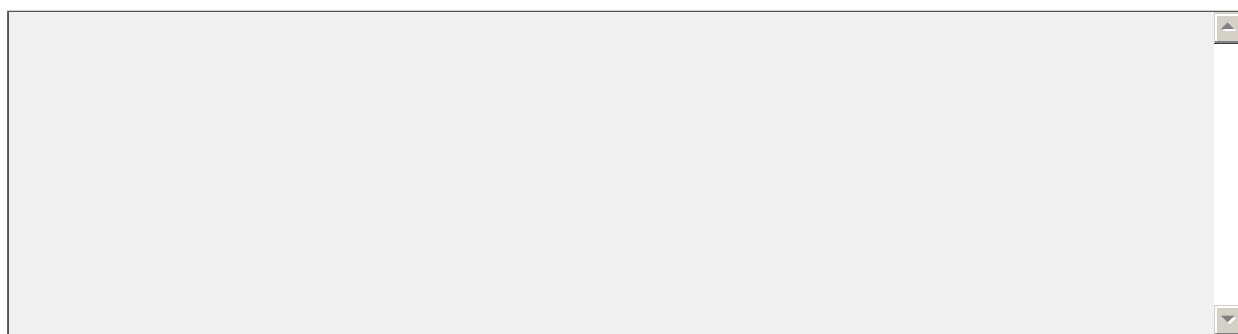
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Recovery and reconstruction includes actions to improve the quality and timeliness of recovery and reconstruction in disaster-affected areas (including skills and resources to conduct post-disaster assessments, planning and implementation of large and long term reconstruction programs).

11. Disruption of supply and damage to infrastructure and assets are frequently associated with natural disasters.

What are the approaches used by power sector companies which you have influence over, or are required from Service Providers by your organisation, to improve the recovery and reconstruction in disaster affected areas associated with natural hazards? (tick all that apply)

- No recovery and / or reconstruction planning is undertaken
- Demand side management or other automated reduction of demand in order to maintain the power system within its capability in order to avoid wider loss of supply than would otherwise occur
- Centralised rapid response or other 'on call' maintenance and construction crews
- Decentralised on call maintenance and construction crews
- Built in redundancy in systems and supply
- Portable and/or other forms of temporary supply / transmission infrastructure (i.e. generator sets)
- Stocking of spare parts, especially commonly damaged equipment
- Engagement with equipment manufacturers and/or resellers to identify opportunities for long lead time equipment to be replaced quickly
- Response and/or recovery planning
- Plan for damage assessment post disasters
- Mechanisms and funding for reconstruction programs
- Other (please specify)

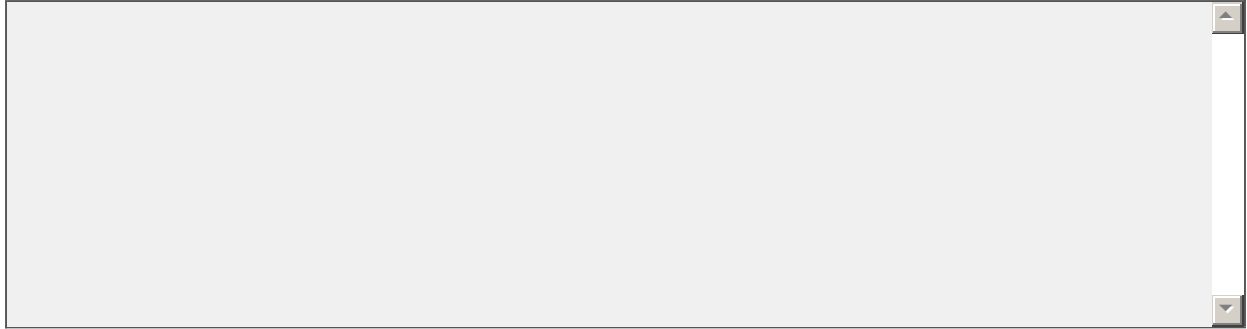


Relationships and Interactions

We are also interested in understanding the relationships which exist between organisations as they relate to natural hazard preparation and recovery

12. How would you describe the level of interaction you have with the power sector Service Providers in your country? (tick all that apply)

- Partners relationship with frequent discussions initiated by both partners
- Reactive relationship with discussions only in response to issue raised by one party
- Highly structured around regulatory reporting requirements
- Limited relationship with infrequent or ad-hoc discussions
- Other (please specify)



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13. Does your organisation have relationships with third parties in regards to identifying and managing risks associated with natural hazards? (tick all that apply)

- No
- Local meteorological agency, research organisation or university
- Regional or national disaster agencies
- Regional or national recovery agencies
- Other power sector organisations in your country
- Other power sector organisations outside of your country
- Private sector financial institutions
- World Bank
- Development Bank or similar non profit lending agency
- Insurance companies (including brokers)
- Other Regulators
- Other regional or national government agencies
- Other United Nations organisation
- Other (please specify)

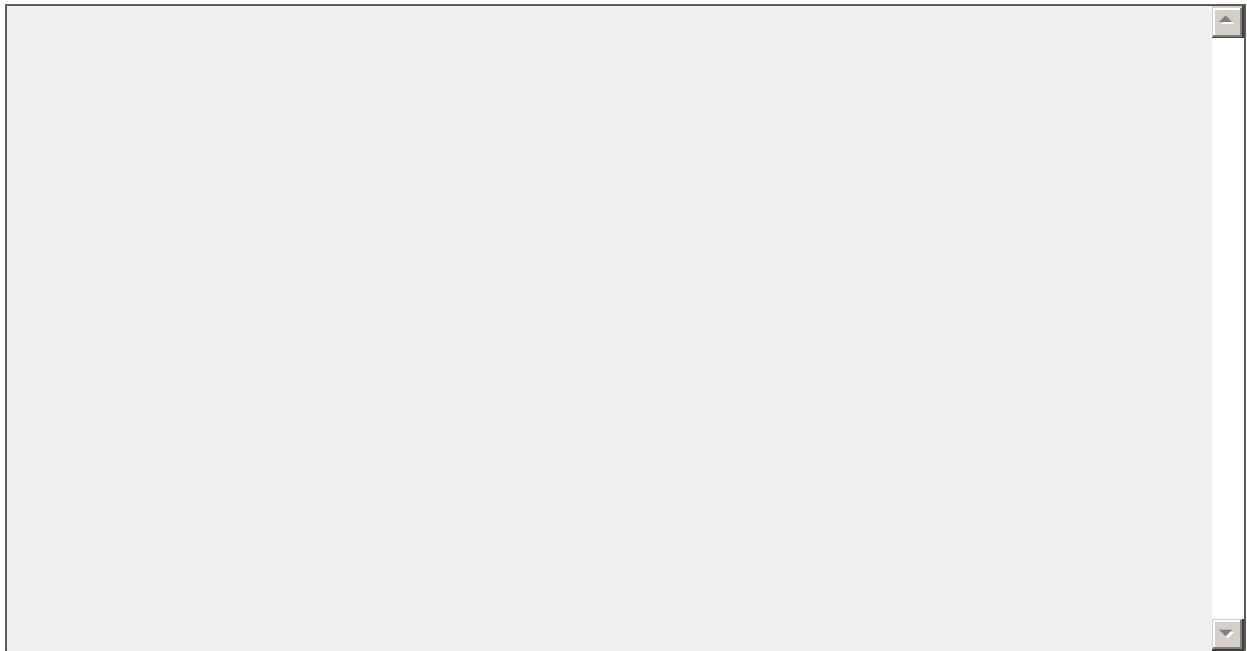
Future Participation

The World Bank is seeking to develop case studies to facilitate future discussions by working with the power sector to aid in developing resilience to natural hazards.

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14. If you wish to participate in future discussions, or provide more details, please select the appropriate option(s) below and provide your contact details in the following question.

- I am available to discuss my organisation's risk management approaches to assist with developing case studies
- I wish to participate in future discussions and events organized by the World Bank on the topic of developing resilience in the power sector to natural hazards.
- I'd like to recommend my colleague is invited to participate in future events. (Please provide their details in the space provided



***15. Please leave your contact details below if you have indicated you would like to be contacted.**

Name:	<input type="text"/>
Company:	<input type="text"/>
Address 1:	<input type="text"/>
Address 2:	<input type="text"/>
City/Town:	<input type="text"/>
State/Province:	<input type="text"/>
ZIP/Postal Code:	<input type="text"/>
Country:	<input type="text"/>
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