

SUMMARY

Strengthening Capacity of Power Sector Practitioners in the Indo-Pacific Region: Physical Workshop under the Quad Infrastructure Coordination Group (QICG)

The Indo-Pacific region is highly disaster-prone and faces a wide range of challenges, including rising temperatures, unusual fluctuations in rainfall, and devastating cyclones. The region has densely populated cities, many of which are coastal and vulnerable to various hazards. Due to accentuated disaster and climate risks posing significant threats to infrastructure in the Indo-Pacific, the countries in the region should take a proactive stance on disaster preparedness, resilience, and climate change adaptation, especially in the context of key infrastructure sectors such as power, transport, health, and telecom.

India's leadership in bolstering power infrastructure is exemplified through its initiatives to build robust power infrastructure systems and effectively manage disaster risks within the power sector, coupled with its commitment to combating climate change, is indeed noteworthy. As of 2024, India boasts a total installed capacity of 429 gigawatts (GW) for power stations, of which a total installed capacity of 135 GW is dedicated to renewable energy sources, showcasing India's robust and diverse energy infrastructure.

Against this backdrop, the **Coalition for Disaster Resilient Infrastructure (CDRI) proposes to host and organise a four-day in-person regional workshop in New Delhi, India**, that will provide an excellent platform to delve into the Indo-Pacific region's action in making the power sector more resilient in the face of frequent disasters. During the workshop, participants can gain insights into India's experiences, challenges, and successes towards a more disaster-resilient and energy-transition landscape.

In addition to this, a two-day site visit (tentatively to Agra) can offer a comprehensive outlook regarding innovative solutions, technological advancements, and policy frameworks contributing to India's leadership in the field. We can also leverage Quad partners' deep expertise and knowledge to enhance collaborative efforts during workshops.

Timeline and Expected Outcomes

CDRI proposes to organise and host this workshop during 4 to 7 June 2024. The expected outcome of the workshop will be to strengthen disaster risk governance around the power sector's disaster preparedness and management policies to prevent new and reduce existing disaster risks in the Indo-Pacific region.

Workshop Agenda and Participation

The sessions in the four-day workshop (in-person) will be divided into five separate sub-sessions, including a two-day site visit. This will include discussions on Climate Risk Data & Guidelines, Power Asset Vulnerability Assessment, Resilience Planning & Investment, Infrastructure Resilience Case Studies as well as a site visit to showcase disaster-resilient power infrastructure strategies, thereby highlighting successful strategies and technologies.

Each sub-session will include 2-3 presentations (45 minutes to 60 minutes), a moderated panel discussion, and a Q&A session. The panelists are open to slide shows and may supplement their presentation with videos and photos.

DETAILED AGENDA

Strengthening Capacity of Power Sector Practitioners in the Indo-Pacific Region: Physical Workshop under the Quad Infrastructure Coordination Group (QICG)

The Indo-Pacific region is highly disaster-prone and faces a wide range of challenges, including rising temperatures, unusual fluctuations in rainfall, and devastating cyclones. The region has densely populated cities, many of which are coastal and vulnerable to various hazards. Moreover, extreme events' frequency and severity have increased due to climate change. As a result, the accentuated disaster and climate risks pose significant threats to infrastructure in the Indo-Pacific. Hence, countries in the region should take a proactive stance on disaster preparedness, resilience, and climate change adaptation, especially in the context of key infrastructure sectors such as power, transport, health, and telecom. Reducing the risks of disaster and climate change would also enable sustainable development in the Indo-Pacific region.

India's leadership in bolstering power infrastructure is exemplified through its initiatives to build robust power infrastructure systems and effectively manage disaster risks within the power sector, coupled with its commitment to combating climate change, is indeed noteworthy. As of 2024, India boasts a total installed capacity of 429 gigawatts (GW) for power stations, of which a total installed capacity of 135 GW is dedicated to renewable energy sources, showcasing India's robust and diverse energy infrastructure.

Against this backdrop, **the Coalition for Disaster Resilient Infrastructure (CDRI) proposes to host and organise a four-day in-person regional workshop in New Delhi, India**, that will provide an excellent platform to delve into the Indo-Pacific region's action in making the power sector more resilient in the face of frequent disasters. During the workshop, participants can gain insights into India's experiences, challenges, and successes towards a more disaster-resilient and energy-transition landscape.

Further, a site visit (tentatively in Agra) can offer a comprehensive outlook regarding innovative solutions, technological advancements, and policy frameworks contributing to India's leadership in the field. India's ability to map and estimate climate risks associated with the power sector value chain further underscores its holistic approach towards building resilience in the face of climate change impacts.

We can also leverage Quad partners' deep expertise and knowledge to enhance collaborative efforts during workshops. This collaborative approach ensures that the workshop benefits from the participating nations' extensive expertise and diverse perspectives, fostering a dynamic and enriched learning experience for the Indo-Pacific region.

Impact of Disasters in the Indo-Pacific Region

According to the UN Global Assessment Report on Disaster Risk Reduction (GAR) 2022, disaster events reported per year have increased significantly in the last two decades.¹ Between 1970 and 2000, reports of medium and large-scale disasters averaged around 90–100 per year; between 2001 and 2020, the reported number of such events increased to 350–500 per year.

¹ The UN Global Assessment Report on Disaster Risk Reduction (GAR), 2022 [Weblink https://www.undrr.org/publication/global-assessment-report-disaster-risk-reduction-2022](https://www.undrr.org/publication/global-assessment-report-disaster-risk-reduction-2022)

Based on the current trends, the number of disasters annually may increase from around 400 in 2015 to 560 per year by 2030 – a projected increase of 40 per cent during the lifetime of the Sendai Framework (see Figure 1). This is further substantiated by the scientific evidence-based projections of extreme events in the IPCC Sixth Assessment Report.²

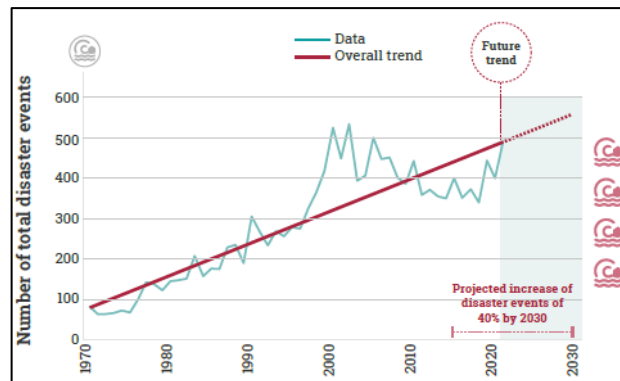


Figure 1: Number of disaster events 1970–2020 and projected increase 2021–2030 (Source: GAR 2022)

According to the World Risk Report 2021, a total of nine island states are among the top 15 countries with the highest disaster risk. Among the nine island states, some are Small Island Developing States (SIDS) in the Pacific region, including Tonga (ranked 3rd), Papua New Guinea (ranked 9th), and Fiji (ranked 14th).³ In the Pacific SIDS, annual economic losses due to disasters are estimated at USD 1.075 billion, or nearly 5 per cent of the combined GDP for the Pacific SIDS.⁴ For instance, in 2016, Cyclone Winston in Fiji affected approximately 540,400 people, equivalent to 62 per cent of the country's total population, and an estimated 41 per cent of Fiji's national power grid was damaged.⁵

Impact on Power Sector Infrastructure

The “last mile” power transmission and distribution (T&D) infrastructure is frequently damaged by extreme events like cyclones, volcanic eruptions, or floods. Apart from disruptions to economic and industrial activities, the damage to power infrastructure has multiple cascading effects on other infrastructure and public services. Interdependent infrastructure services like transportation, telecom, water supply, medical, and banking services are also interrupted by the need for more power. This limits people's access to critical resources required to cope with and recover from the devastation. While more robust designs and standards should be prioritized, these large investments necessitate complex regulatory interventions and significant implementation time. Meanwhile, communities continue to suffer yearly without an essential power supply in the aftermath of disasters.

Risk-proofing the Power Sector Infrastructure

Comprehensive planning, delivery, financing, operation, and management of power infrastructure are critical in preparing for impacts and reducing vulnerabilities. Therefore, there is an urgent need for a systematic approach toward preparing for inevitable power infrastructure damages in the short term, followed by long-term planning to build a resilient power sector (See Figure 2), especially in remote and human resource-scarce contexts.

² Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report [Weblink https://www.ipcc.ch/assessment-report/ar6/](https://www.ipcc.ch/assessment-report/ar6/)

³ World Risk Report 2021 [Weblink https://weltrisikobericht.de/wp-content/uploads/2021/09/WorldRiskReport_2021_Online.pdf](https://weltrisikobericht.de/wp-content/uploads/2021/09/WorldRiskReport_2021_Online.pdf)

⁴ UNESCAP (2019): The Disaster Riskscape across the Pacific Small Island Developing States [Weblink https://www.unescap.org/sites/default/files/IDD-APDR-Subreport-Pacific-SIDS.pdf](https://www.unescap.org/sites/default/files/IDD-APDR-Subreport-Pacific-SIDS.pdf)

⁵ Govt. of Fiji: Post-Disaster Needs Assessment - Tropical Cyclone Winston (2016) [Weblink https://reliefweb.int/report/fiji/fiji-post-disaster-needs-assessment-may-2016-tropical-cyclone-winston-february-20-2016](https://reliefweb.int/report/fiji/fiji-post-disaster-needs-assessment-may-2016-tropical-cyclone-winston-february-20-2016)

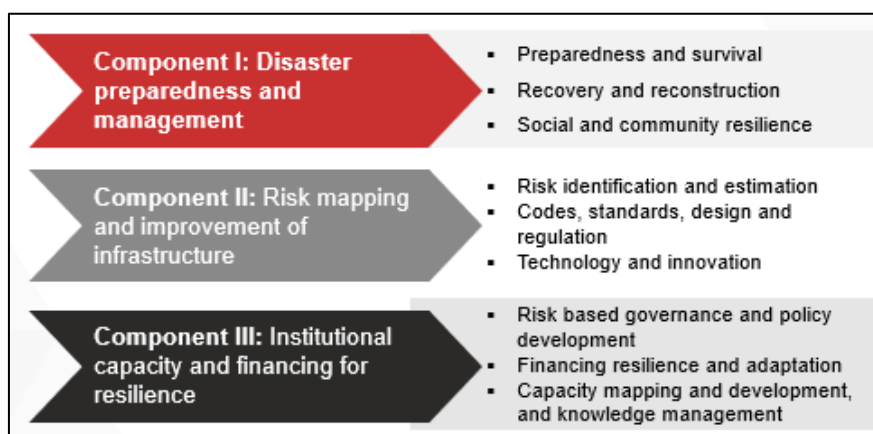


Figure 2: Key Components of Programme toward Building Resilient Power Infrastructure

It is critical to devise mechanisms for ensuring preparedness, including contingency plans and Standard Operating Procedures (SOPs), preventing grid collapse, assessing losses, estimating needs, and channeling adequate funds to disaster-affected areas promptly for early restoration and resilient recovery and reconstruction.

Community engagement is also crucial for disaster preparedness and subsequent recovery and reconstruction. Strengthening the disaster preparedness capacity of power sector practitioners can help protect the grid against supply disruptions due to physical and climate-induced extreme weather, minimise the impact of supply disruptions, and restore electricity more quickly when outages occur.

In-person Regional Workshop on Building Capacity of Power Sector Practitioners in the Indo-Pacific Region

CDRI proposes to organise a **four-day in-person regional workshop, including a two-day field visit to Agra**, to deliberate on disaster preparedness in the power sector by exchanging best practices and successful case studies. Upon deliberation with the Ministry of Power and the Ministry of New and Renewable Energy, the in-person workshop will build upon the success of the virtual workshop held under the Quad Infrastructure Coordination Group leadership in January 2023. The workshop will facilitate incremental changes in existing processes and policies to improve the power sector's institutional capacity to design disaster preparedness programmes.

Further, the workshop and the site visit will bring together representatives from the Indo-Pacific region, including utilities, power sector practitioners from Pacific SIDS, and leading experts from Australia, India, Japan, and the US.

Expected Outcomes

The workshop's expected outcome is to strengthen disaster risk governance around the power sector's disaster preparedness and management policies to prevent new and reduce existing disaster risks in the Indo-Pacific region.

Timeline

The workshop is proposed to be scheduled during 4 to 7 June 2024 and will be held in New Delhi.

Workshop Agenda

Each sub-session will include 2-3 presentations (45 minutes to 60 minutes), a moderated panel discussion, and a Q&A session. The panelists are open to slide shows and may supplement their presentation with videos and photos.

The sessions in the **four-day workshop (in-person)** will be divided into five separate sub-sessions, including a two-day site visit to Agra:

Day 1		
Workshop Session 1	Physical Climate Risk: Data and Guidelines	<p>The power sector needs access to decision-relevant climate data to be able to assess and proactively plan for potentially changing climate conditions.</p> <p>Mounting evidence suggests that we have experienced and will continue to experience changes in mean climate (chronic) and extreme weather conditions (acute). To adequately anticipate and respond to these changes, the energy sector needs appropriate information on historical climate trends (which can capture observed climate change) for short-term planning and potential future climate patterns for longer-term planning.</p> <p>The session will develop an understanding of gaps by identifying, sourcing, or developing climate datasets and variables specifically tailored to the needs of the Power sector. In addition, the session focuses on providing the necessary guidance for the effective use of such data products across planning and operations.</p>
Workshop Session 2	Power System & Asset Vulnerability Assessment	<p>The session will focus on developing a framework that can be used to develop practices and approaches to address future climate impacts on power system assets and cross-cutting operations such as personnel safety and communications.</p> <p>This framework applies to all parts of the asset lifecycle from acquisition through operation and maintenance to disposal. The framework is intended to be structured as guidance to allow facility owners and/or operators to tailor to their specific situation (e.g., Location and facility type) when assessing vulnerability to current and future climate risks.</p>
Day 2		
Workshop Session 3	Resilience Planning and Investment Prioritization	<p>As extreme weather conditions and climate change-related threats continue to evolve, the potential for more frequent stressors and disruptions to the power system must be considered in both design and operation. At the same time, it is crucial to also identify and prioritize investments to support decarbonization goals while ensuring reliability and resilience to these changing climate conditions.</p> <p>The session provides approaches to identify, assess and prioritize investments in infrastructure resilience, covering the full range of relevant goals in grid planning and operations.</p>
Workshop Session 4	Case Studies that Prioritize Infrastructure Resilience Policies and Action-Based Solutions	<p>The session will highlight success stories from the globe in restoring and building back better power infrastructure and minimizing the suffering of local populations due to disruption of power supply because of extreme events.</p>
Workshop Session 5	Recommendations and the way forward	<p>To further enhance and learn from the best practices and global case studies, the session will bring forth a plethora of</p>

	to identify interventions and scalable programmes in the Indo-Pacific region.	recommendations and suggestions to identify power sector infrastructure resilience intervention pathways as well as to map the scalability of solutions across varying geographies in the Indo-Pacific region.
Site Visit		
Site Visit (tentatively to Agra)	A two-day site visit highlighting the implementation of Disaster-Resilient Infrastructure in the Power Sector	The site visit will showcase the imperative for disaster-resilient power infrastructure and focus on state-of-the-art coastal power infrastructure (e.g. Solar/Wind Parks on the coast of Gujarat). Collaborating with PSUs under the Ministry of Power (Government of India), the event will highlight successful case studies, innovative technologies, and future strategies, emphasizing the commitment to safeguarding power infrastructure systems and assets and ensuring uninterrupted service in the face of unforeseen disasters.

Participants

The workshop is expected to attract up to 50 delegates from 20-24 countries in the Indo-Pacific region and regional organisations. High-level participants from power utilities, disaster management agencies, the Ministry of Power, power regulators, and regional Indo-Pacific organisations are expected to participate.

Further, resource people from Quad partners will also participate as technical experts in the workshop.

Countries*
(Two representatives from Utilities and/or Nodal Ministries for Power and Energy in the Indo-Pacific. Representatives from the following countries can be included):
Indian Ocean Region:
Maldives, Mauritius, Seychelles, Madagascar, Comoros
Pacific Region:
Timor-Leste, Philippines, Fiji, Kiribati, Samoa, Tonga, Vanuatu, Papua New Guinea, Niue, Nauru The Cook Islands, Micronesia, The Republic of the Marshall Islands, Palau, Solomon Islands, Tuvalu
Africa:
Kenya, Mozambique, Tanzania

*This list is indicative.

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