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ISGF
India Smart Grid Forum

DISTRIBUTION UTILITY MEET DUM 2023

Session : Disaster Management and Climate Readiness of Utilities

Building Resilient Power Infrastructure

Presented By

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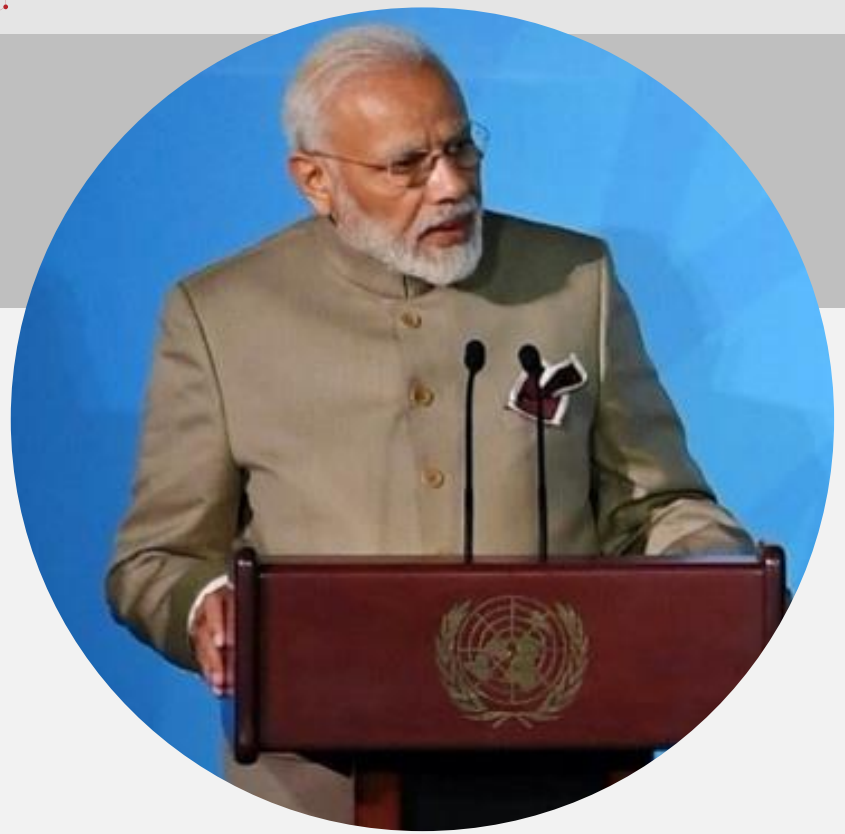
Distribution Utility Meet | 02 - 03 November 2023 | www.dumindia.in







Shri Narendra Modi
Hon. Prime Minister of India

Launched at

UN Climate Action Summit in 2019

"What we need is a global people's movement to bring about behavioral change…….therefore India is here today to present a practical approach and roadmap. In order to make our infrastructure resilient in the face of disasters, India is launching a Coalition for Disaster Resilient Infrastructure. I invite all member states to join this Coalition."

Coalition Membership and Governance

CDRI
Coalition for Disaster Resilient Infrastructure

- AFGHANISTAN
- ARGENTINA
- AUSTRALIA
- BANGLADESH
- BHUTAN
- BRAZIL
- CANADA
- CHILE
- DOMINICAN REPUBLIC
- FIJI
- FRANCE
- GERMANY
- GHANA
- HAITI
- HONDURAS
- INDIA
- ITALY
- JAMAICA
- JAPAN
- MALDIVES
- MADAGASCAR
- MAURITIUS
- MONGOLIA
- NAURU
- NEPAL
- NETHERLANDS
- PERU
- SAMOA
- SOUTH SUDAN
- SRI LANKA
- TAJIKISTAN
- TÜRKIYE
- UNITED KINGDOM
- UNITED STATES OF AMERICA

34 COUNTRIES

6 INTERNATIONAL ORGANIZATIONS

1 PRIVATE SECTOR ORGANIZATION

1. Asian Development Bank (ADB)
2. European Union
3. The Private Sector Alliance for Disaster Resilient Societies
4. United Nations Development Programme (UNDP)
5. United Nations Office for Disaster Risk Reduction (UNDRR)
6. World Bank Group
7. European Investment Bank (EIB)

Governing Council (all members, Co-Chairs: **India (permanent); USA (current)**
Executive Committee (representatives from select constituencies)

“

The increased frequency, severity, and impact of physical events highlight the growing concerns facing energy production, distribution & critical infrastructure

Overview- Disaster & impact on community, critical power infra & economy

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Resources (fuels, HR, equipment	Transport & Logistics	Generation	Transmission	Distribution	End-User
Disruption to supply chain	Disruption of logistics network & transport	Disruption to supplies and reduced efficiency due to extreme temperatures, very high winds, drought & floods			Changes in demand; ability to recover from extreme events

Cyclone Fani, India (2019)

Economic Impact- $ 9 billion

Cyclone Winston, Fiji (2017)

Economic Impact- $ 1.3 bn (31% GDP)

Hurricane Maria, Puerto Rico (2017)

Economic Impact- $ 91 billion

Superstorm Sandy, USA

Economic Impact- $ 65 billion

Annual economic losses in Pacific SIDS- **$ 1 Bn--5%** of combined GDP- World Risk Index 2021

40 % ↑ no. of disasters during 2015-2030- GARR 2022

Economic Impact on developing countries-

Pvt Sector Sale Losses of **$ 82 Bn per year**

Household losses- **$ 2.3 bn -190 Bn per year**

Stronger Power, World Bank 2019

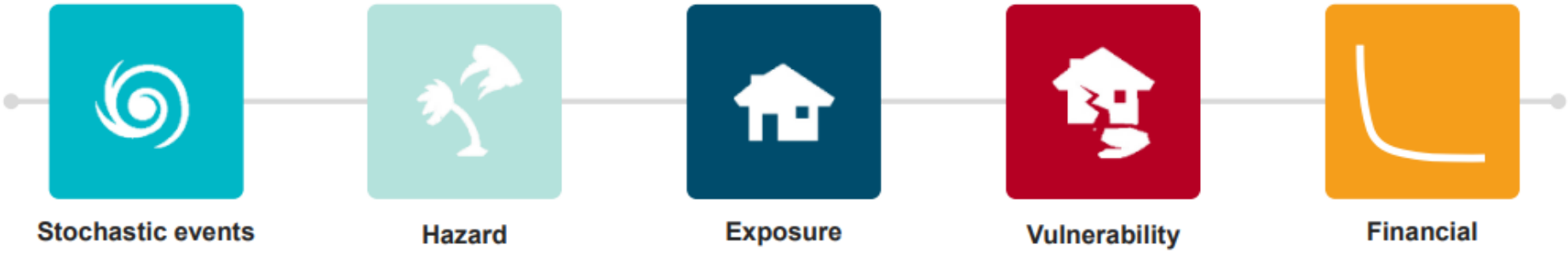
How to ensure resilience

Dynamic trends-

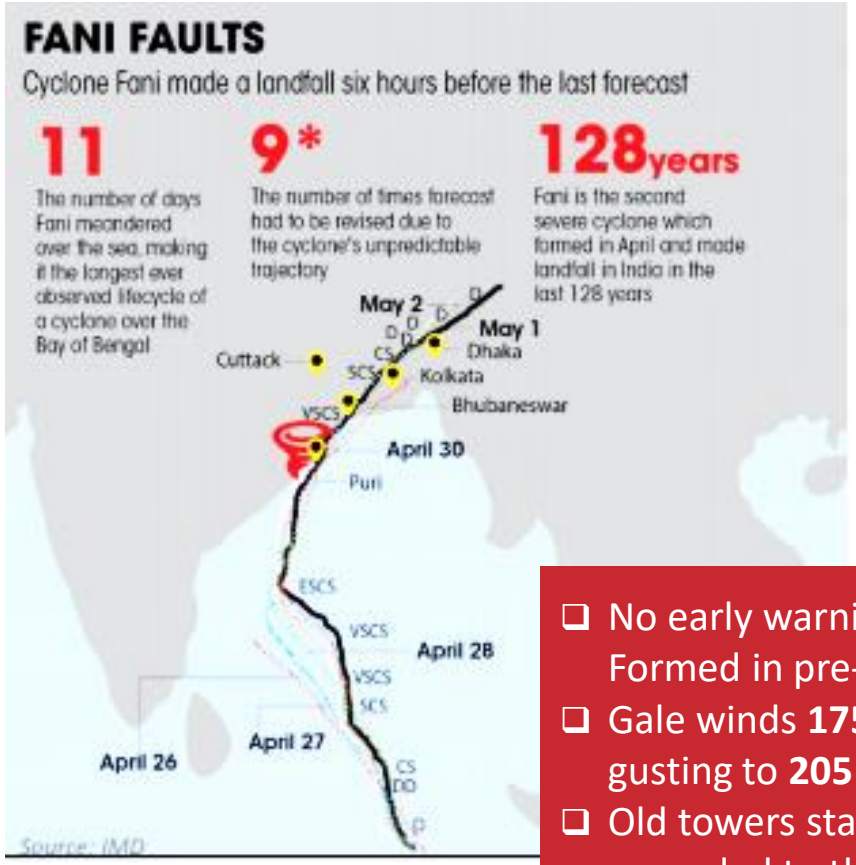
- **Risks are driving system design and adaptation** in warped and critical ways
- Interactions across **multi-jurisdictional and subsystems critical**
- **Overcoming:** System vulnerabilities, Supply chain vulnerabilities, Resource vulnerabilities, and Market vulnerabilities
- **Integrating equity** considerations requires new questions, linkages, and supports

Things to consider-

- Where in my network is at greatest risk?
- What infrastructure should be prioritized for hardening? How much downtime can be expected for critical infrastructure?
- How to conduct criticality analysis: Target investment where it matters most? How should it be invested?
- What changes call for shifting perspectives in order to broaden our perspectives?



Case Study-Cyclone Fani: Impact on Odisha power infra



Damage to power infrastructure: INR 8,139 Crs (USD 1.2 Bn)

Transmission (440, 220 and 132kV)
- **116** towers
- **2** Grids and **250 km** lines

Distribution (33kV, 11kV and LT)
- **2.2 lakh** poles
- **1.1 lakh km** lines
- **12,064** Transformers

Estimated revenue loss: INR 254 Crs (USD 36 Mn)

Electricity consumers impacted: 4.63 Mn

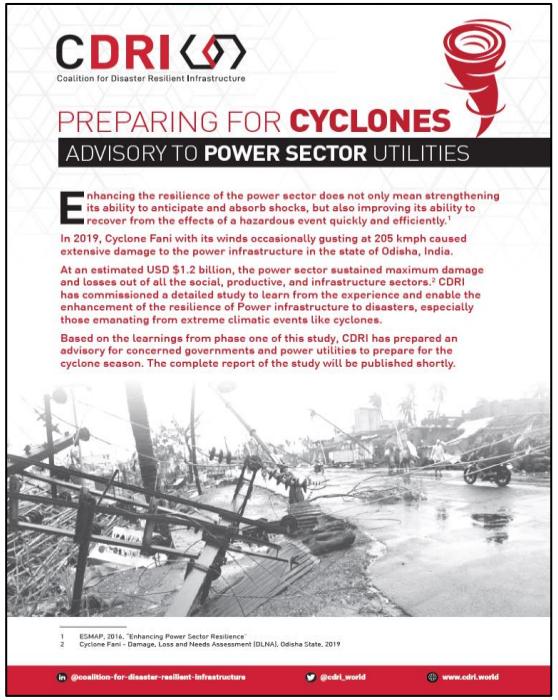
- ❑ No early warning indicator- Formed in pre-monsoon (April)
- ❑ Gale winds **175-185 kmph;** gusting to **205 kmph**
- ❑ Old towers standards not upgraded to the above wind speed
- ❑ High winds and torrential rains in Puri & Bhubaneswar

- ❑ Major damage to distribution infrastructure; transmission impact was limited
- ❑ Power disruption to critical consumers like hospitals, water pumps, state dept. offices
- ❑ Clogged roads and highways due to fallen trees, electricity poles, and lines

Case Study/Project- Towards Resilient Power Infrastructure in Odisha

Component I: Disaster preparedness and management

- Preparedness and survival
- Recovery and reconstruction
- Social and community resilience



Component II: Risk mapping and improvement of infrastructure

- Risk identification and estimation
- Codes, standards, design and regulation
- Technology and innovation

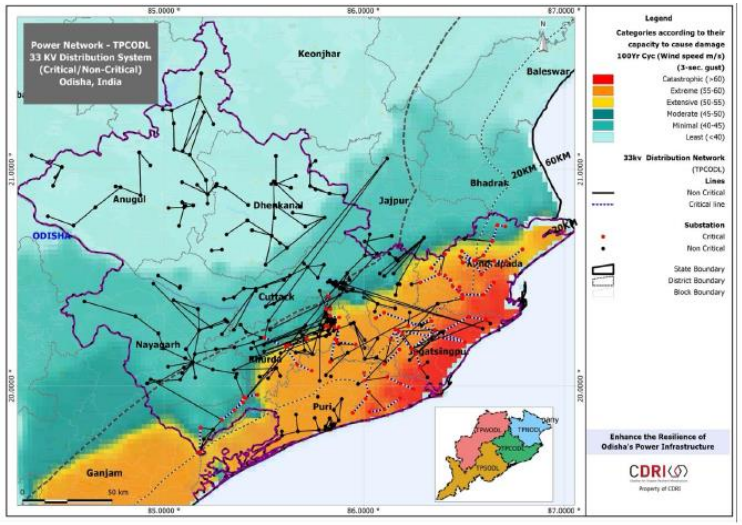
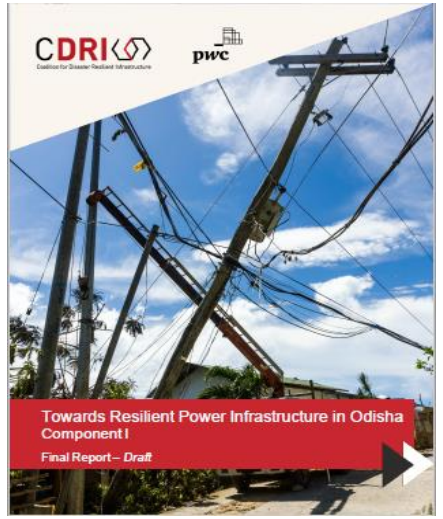


Figure 51 TPCODL 33 kV system Map: Critical / Non-Critical (100 year return period – 3 sec gust speed)

Component III: Institutional capacity and financing for resilience

- Risk based governance and policy development
- Financing resilience and adaptation
- Capacity mapping and development, and knowledge management



KEY TAKEAWAYS / RECOMMENDATIONS

Strengthen infra-resilience governance

Improve outcomes

Create comprehensive roadmaps

Integrate Resilience

Tool to support legislations & regulations

Risk Assessment & Resilience Planning

Identify & manage risks.

Update & Introduce regulations/codes/std

Adopt whole of system approach
Align outcomes for regulators/utility/Owners

Improve data collection and sharing

Integrate disaster & climate risk into the maps

Equitable access & standardize natural hazards/climate risk data & EWS

Adequate financing mechanism

Incorporate resilience risk into infrastructure investment

Adequate financing

Develop tools to justify resilience's economic benefits that outweigh its costs.

Capacity Building

Support knowledge development /building capacity of local institutions

Develop capacity for interpreting climate and disaster risk for infrastructure

THANK YOU

For discussions/suggestions/queries email: ***dum@indiasmartgrid.org***

www.isuw.in

Links/References (If any)

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