Enhancing the Utility System Resiliency
Moderator Pitch

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The increased frequency, severity, and impact of physical events highlight the growing concerns facing energy production, distribution & critical infrastructure.
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?
Call for Actions & Way Forward

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
Grid Operation

**Major grid disturbances across the globe**

<table>
<thead>
<tr>
<th>Sl. no</th>
<th>Black out</th>
<th>Population affected - Millions</th>
<th>Country</th>
<th>Incidence date</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>2023 Pakistan blackout</td>
<td>230</td>
<td>Pakistan</td>
<td>January 23, 2023</td>
</tr>
<tr>
<td>2</td>
<td>2022 Pakistan blackout</td>
<td>200</td>
<td>Pakistan</td>
<td>October 13, 2022</td>
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<tr>
<td>3</td>
<td>2022 Bangladesh blackout</td>
<td>140</td>
<td>Bangladesh</td>
<td>October 4, 2022</td>
</tr>
<tr>
<td>4</td>
<td>2021 Pakistan blackout</td>
<td>200</td>
<td>Pakistan</td>
<td>January 9, 2021</td>
</tr>
<tr>
<td>5</td>
<td>2020 Sri Lankan blackouts</td>
<td>21</td>
<td>Sri Lanka</td>
<td>August 17, 2020</td>
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<tr>
<td>6</td>
<td>2019 Venezuelan blackouts</td>
<td>30</td>
<td>Venezuela</td>
<td>March 7, 2019–July 23, 2019</td>
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<td>2019 Java blackout</td>
<td>120</td>
<td>Indonesia</td>
<td>August 4–5, 2019</td>
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<tr>
<td>8</td>
<td>2019 Argentina, Paraguay, and Uruguay blackout</td>
<td>48</td>
<td>Argentina, Paraguay, Uruguay</td>
<td>June 16, 2019</td>
</tr>
</tbody>
</table>

- Interconnection of the power utility networks, has resulted in the better usage of the natural resources, optimization in the infrastructure, and enhancing the security and stability of the grid.
- However, this interconnection has also resulted in affecting the major population when un-foreseen grid disturbances occur.
- It can be observed that with higher interconnection, if the grid disturbance results in the major cascaded tripping in the network, more and more populations are vulnerable to such disturbances.
Disaster Funding

- In many countries the disaster risk concerns are integrated into the government budgets to ensure that levels of public expenditure on risk reduction are sufficient and that there are adequate financial arrangements to manage the residual risk.

- The schema of funding for disasters is expected to provide a dependable source of assistance to meet their disaster response, relief, recovery, and reconstruction needs.