



Session 4.1

Strengthening Urban Resilience: Integrating Inclusive Infrastructure, Energy and Health systems

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I. Study Aims

To develop an integrated multi-disciplinary approach to strengthening urban and community resilience to climatic, biological, economic and social challenges with a focus on gender equality and social inclusion (GESI) impacts.

The country of focus will be India.



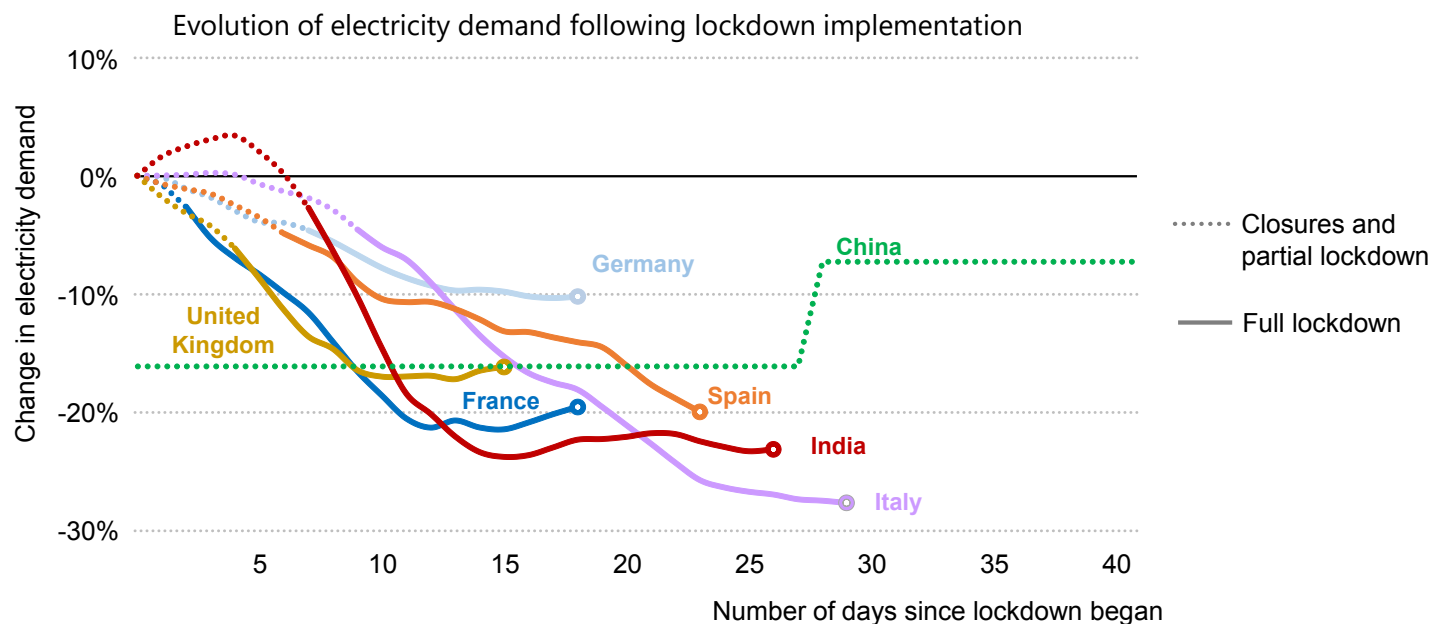
II. Rationale



III. Covid-19 Impacts

a. Electricity demand

Lockdowns are sharply reducing electricity demand



Electricity demand drops to Sunday levels under lockdown, with dramatic reductions in services and industry only partially offset by higher residential use. Service-based economies suffer the most.

Gender, Women, Vulnerable Groups

- *UN: “a horrifying surge in domestic violence”*
- *A majority of frontline healthcare workers are women*
- *Social distancing measures have a large impact on female employment*
- *Women have increasing unpaid work burden*
- *Negatively affecting people with disability, severe health problems, isolated populations, elderly, etc.*



IV. Infrastructure, health and gender equality

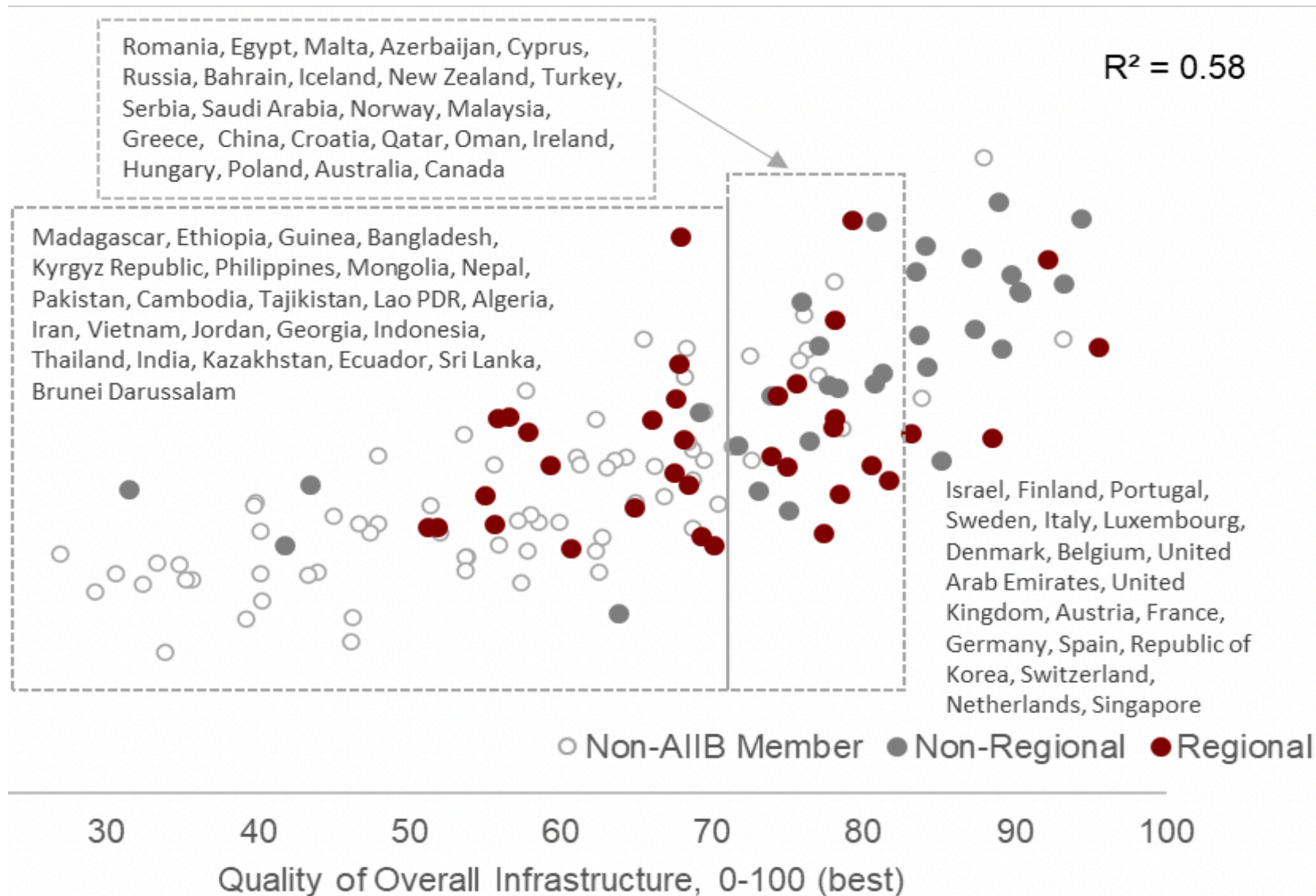
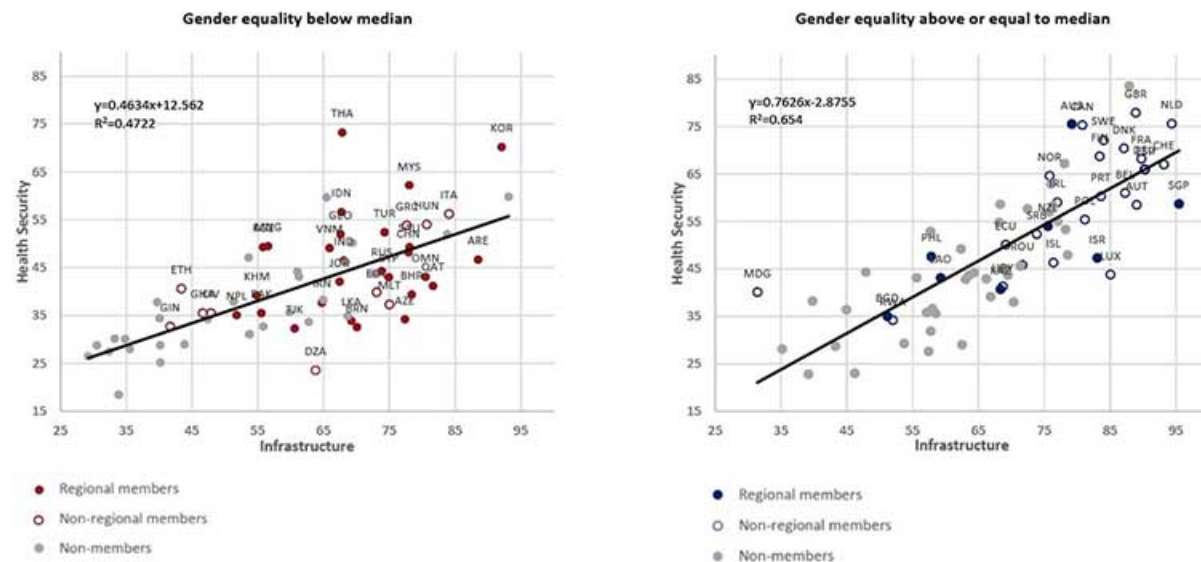




Figure: Correlation between Infrastructure and Health Security, in Countries with High and Low Gender Equality, 2019



V. Resilience: Guidelines, concepts

Multi-disciplinary, Multi-sectoral

OECD Guidelines

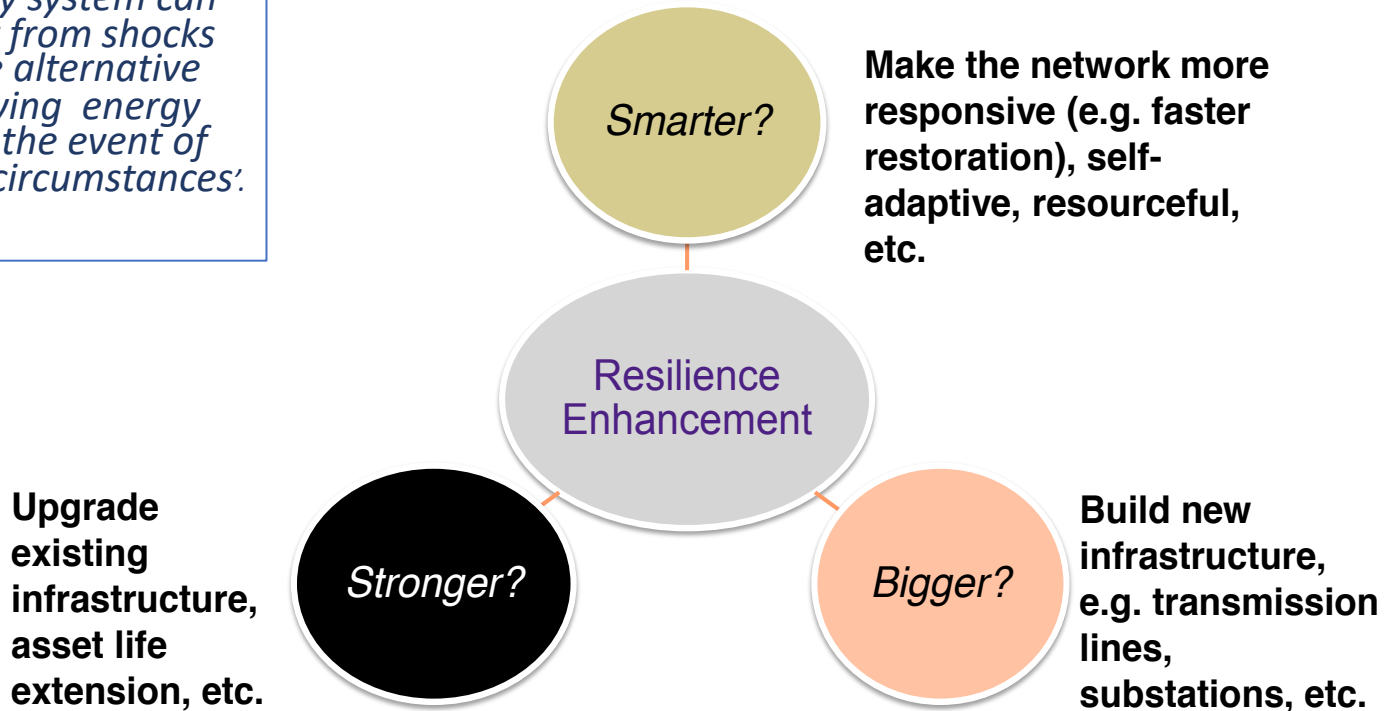
- Different types of risks, shocks and stresses -- acute shocks, seasonal shocks, and long-term stresses
- Sustainable livelihoods framework
- Six different types of capital – financial, human, natural, physical, political and social
- Three different capacities: absorptive, adaptive, and transformative
- Participatory process



Power systems resilience

- UK Energy Research Centre
'A resilient energy system can speedily recover from shocks and can provide alternative means of satisfying energy service needs in the event of changed external circumstances.'

Planning for Resilience: The Resilience Trilemma



**Need for advanced mathematical modelling
(simulation and optimization)**

M. Panteli and P. Mancarella, The Grid: Stronger, Bigger, Smarter? Presenting a conceptual framework of power system resilience, *IEEE Power and Energy Magazine*, May/June 2015, *Invited Paper*.

VI. Community Resilience: Some criteria

- Household employment & income
- Access to information and communication
- Early warning systems & shelters
- Local skilled labor
- Access to backup local power generation
- Ongoing operation of & access to health facilities
- Access to water & sanitation, transport, healthcare, food and housing.
- Capacity of local government institutions

Take-Aways

- Being better prepared & learning how to become more resilient, is a more viable long-term option than waiting for disasters to occur.
- The Covid-19 pandemic has shown the importance of multi-sectoral approaches required for building resilience.
- Preparedness requires an integrated approach that combines infrastructure, service delivery and population response initiatives.
- Resilience depends on the capacity of government to provide effective leadership & to develop appropriate strategies & policies.





Thank you!
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