

## Incentivizing Grid Reliability—Roundtable Discussion Takeaways and Path Forward October 30, 2025

Electricity reliability remains an intractable problem in many countries, with over three billion people still lacking reasonably reliable service. On October 14, 2025, an in-person [roundtable discussion](#) in Washington D.C. unpacked the power reliability challenge in low- and middle-income countries and pressure-tested ideas from the newly released working paper [Incentivizing Reliability: A Framework for Performance-Linked Electricity Improvements](#). The event convened operators, regulators, funders, and researchers to explore how locally tailored, performance-based incentives—paired with practical measurement and verification—can translate reliability from aspiration into accountability and quality service.

### 1) **Headline takeaways—key areas that advanced the white paper**

- **Outcome-first, evidence-backed.** Reliability incentives are structured so that a funding entity (e.g., a regulator-managed pool, national development bank, ministry, industrial park authority, development partner) makes outcome payments to the utility or network operator after verified service-quality improvements (fewer/shorter outages, more stable voltage) on agreed feeders or priority sites. Verification uses pragmatic measurement: blending utility data—for example outage and restoration logs (often called SCADA or OMS data), substation and feeder meters, smart-meter reads where available—with low-cost sensors and transparent methods. This enables feeder-level baselines and credible verification with no need to wait for system-wide Advanced Metering Infrastructure (AMI) to continuously collect detailed longitudinal reliability data.
- **Build on regulatory momentum.** In many countries, regulators and utilities are already under pressure to improve reliability and to demonstrate that approved investments are delivering better service. These efforts can be strengthened with additional resources for baseline data collection, innovations in system planning, and more rigorous monitoring. Some LMIC regulators already run investment verification and reward/penalty regimes. Reliability incentives can plug directly into this machinery by linking clear targets, transparent monitoring and publication, and tariff treatment. The approach is to approve investments, monitor regularly, publish results, and then reward or penalize accordingly. Pairing this with public dashboards of project-by-project results would add reputational pressure that reinforces formal incentives. This is important because in many systems utility budgets are not fully ring-fenced and purely financial rewards can otherwise be diluted.
- **Context-led innovation and country-level competition.** Invite country teams to submit tailored pilot proposals and compete for inclusion in an initial wave of pilots. Proposals would build on each country's existing reliability programs, regulatory capacity, and political realities, and would need to show how performance-linked incentives could secure buy-in and alignment across government, regulators, utilities, key productive power users. The competitive element is intended to surface creative, context-specific designs and identify a small number of geographies where reliability can realistically improve within 12-18 months.

- **Pilots should leverage regulator-university–utility partnerships to build the innovation ecosystem.** Local researchers can serve as independent verifiers and design partners, and utilities and regulators can be directly involved in shaping and testing innovative solutions. This keeps the work focused on policy-relevant questions—for example, monitoring and verification (M&V) methods, tariff and equity impacts, anti-gaming safeguards—and roots it in domestic expertise, which builds credibility and durability. These partnerships can also support evaluations that connect reliability gains to broader macro outcomes like industrialization, productivity, profitability, and job creation.
- **Establish a Global Reliability Data Initiative:** Developing a coordinated, multi-country effort to collect, standardize, and share real-time power quality and reliability data would represent a near-term step toward a performance-based reliability framework, improving grid visibility while strengthening local capacity for data-driven regulation and planning. Building on recent advances in remote-sensing and feeder-level monitoring, such as Ghana’s nLine-supported work under the MCC compact, the initiative would aim to (1) harmonize reliability metrics across utilities and regulators, (2) provide an open-access data platform that maps reliability problems at the system and end-user levels to help identify investment priorities, and (3) support verification systems and establish clear data ownership, stewardship, and access arrangements needed for incentive-linked finance.
- **Who already pays for poor reliability?** Unreliable power systems impose real costs on firms, clinics, households, utilities, and governments through spoiled vaccines, canceled procedures, damaged equipment, emergency diesel spending, production downtime, lost output, and other impacts. Quantifying the cost of unreliability is essential to designing incentives that target the parts of the economy where unreliable power is constraining productivity and industrial competitiveness.
- **Guardrails against gaming.** Reliability incentives shouldn’t just reward a utility for shifting crews, equipment upgrades, and vegetation management from one feeder to another and calling it improvement. Pilot projects should build in basic safeguards, including system-wide maintenance floors and public reporting outside the pilot footprint with the goal of preventing negative spillovers on the rest of the system while rewarding real improvements. Targeted data collection allows for rapid innovation in the design and verification of these guardrails.
- **System-design frictions.** In vertically integrated utilities, divisions can work at cross-purposes. Small, outcome-tied resources can unlock coordination and outperform minimum compliance. Those outcomes, such as fewer and shorter outages, faster restoration, better voltage at priority sites, can be measured with targeted power-quality studies on specific feeders, so performance is visible and can be rewarded.

**2) Emerging Pilot Concept.** Over ~3 years, demonstrate in ~3 country pilots that performance-linked incentives can deliver measurable reliability and quality gains while building local capability, credibility, and a path to scale. In some LMICs, low-cost field sensors, combined with the utility’s existing feeder/substation data, are already good enough to establish feeder-level baselines and verify improvement. Regulators in several countries also already have review/penalty mechanisms. This is where pilots could be run near-term, without waiting for full smart-meter/AMI rollout. The approach would feature:

- **Utility–regulator–university partnerships.** Regulators integrate incentives into existing investment-verification and tariff mechanisms; utilities implement; local researchers act as independent verifiers and design partners, building durable domestic capacity to help answer policy-relevant questions (M&V methods, tariff and equity impacts, anti-gaming safeguards). Learnings across pilots are synthesized and impact evaluations assess linkages between reliability and firm productivity, job creation, wages, profits, health service utilization, and mortality.
- **Country readiness criteria.** Pilots should start in settings where reliability problems are meaningful and politically visible, but they are not so structurally overwhelming that no amount of feeder-level operational work will matter in the next 12–18 months. In practice, that means:
  - There is already some supply and network functionality to work with. The constraint is poor distribution performance, outages, voltage instability, weak maintenance, etc., rather than insufficient generation capacity).
  - There is an identified cluster of feeders where targeted operational and tech upgrades could credibly improve SAIDI/SAIFI, time-to-restore, and voltage quality.
  - The government has signaled in national energy strategies, M300 Compacts, or ministerial statements that reliability (not just new connections) is a political priority, increasing likelihood of sustained cooperation across the utility, regulator, and relevant ministries.
  - There is at least a baseline ability to measure and enforce results: some access to utility data, an independent regulator that already runs investment verification / performance review cycles, and one or more universities or technical partners that can act as independent verifiers.

The goal: identify countries where an incentive program can, one, feasibly demonstrate improved reliability outcomes under realistic institutional conditions, and, two, support learning to inform future program design and generate evidence on cost of unreliability and links to growth, job creation, and industrialization.

- **Country-level competition and context-led innovation.** Invite country teams to submit bespoke designs that build on their existing reliability programs, regulatory strengths/weaknesses, and political realities, showing how incentives will secure buy-in and alignment across government, regulators, utilities, and key beneficiaries (health facilities, industrials, etc). Design proposals should:
  - Establish the pilot program footprint (e.g., select 10–20 feeders), and specify stakeholder roles and responsibilities
  - Detail bundled operations and technical plans
  - Present a practical operating model and theory of impact (inputs, activities, anticipated outcomes, management and governance, learning and scale pathway)
  - Consistent with that theory, specify the core reliability (SAIDI, SAIFI, time-to-restore, voltage quality, etc) and development outcomes to measure (e.g., industrial park downtime avoided, SME production hours recovered, output losses averted, job retention and creation in priority sectors, continuity of critical services that enable productive activity)

- Detail how a program area will be ring-fenced and include anti-gaming safeguards.
- Include a plan for accessing and standardizing existing datasets and establishing a dashboard to share key information.
- Include performance timelines and milestones.
- Consider context-specific incentive designs (e.g., health-corridor uptime, industrial-park reliability, worst-served feeder equity goals) and demonstrate inter-agency alignment and political buy-in.

### 3) How we'll keep this moving forward

**Working group.** A small group will meet monthly to iterate on the pilot concept and design options, explore funding pathways, advise student researchers, and collaborate on written pieces.

**Graduate research bench.** Five Duke graduate students are digging into open questions raised in the white paper and at the roundtable in order to support pilot country screening criteria and program design. Initial assignments include reviewing M300 Country Energy Compacts and other national commitments to map how reliability (not just access) is being prioritized and framed politically; developing readiness screens related to regulator capacity and independence; evaluating recent cases and drivers of reliability improvements in LMICs; and identifying options for outcome co-pays at health and industrial anchors. The team will produce short memos and briefs that the working group can use in country conversations, regulatory engagement, and fundraising.

**Short article series.** Pending interest and bandwidth, we will iterate on concise written pieces that tackle specific parts of the agenda, for example:

- Reliability trends in selected markets and what they imply for incentives
- Tools, technologies, and methods that are changing verification and operations
- Tracking reliability within the SDG7 context
- Status and trends in LIC/LMIC power regulatory bodies

**Stakeholder engagement.** This concept needs broader in-country dialogue and bottom-up demand from countries. Pending availability and resources, we will engage with utilities, regulators, relevant ministries, industrial groups, and other stakeholders to surface political and operational constraints, pressure-test feasibility, gauge interest, and refine the incentive curve and guardrails.

**Want to plug in?** Reach out to [mirna.elsharief@duke.edu](mailto:mirna.elsharief@duke.edu) or [Jonathan.phillips@duke.edu](mailto:Jonathan.phillips@duke.edu) if you would like to join the working group, advise the graduate research threads, explore co-authoring a short article, or help convene in-country conversations.