Mini-grid Opportunities: Policy and Regulatory Issues

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CHALLENGES

• Centralized power system paradigm makes commercially unattractive “off-grid” power compared with grid supply; Bias towards grid extension, lacking policies or capacity to support mini-grids;
• Many areas lack energy access, underserved, face system blackouts/brownouts;
• Market structures for distributed energy built upon grants/subsidies for initial costs are not self-sustaining;
• Uniform tariff and payment methods with subsidies for low income populace not adequate or realistic solution with market distortions;
• Upstream and Downstream challenges: On supply side, DG custom-built, hard to replicate; On demand side, legal and regulatory frameworks impede mini-grid deployment, difficult to make business case and to bundle opportunities;
• Existing distribution networks lock in use of traditional fuels;
• Demand-side and distributed energy resources relatively untapped;
• Lack of business models for mini-grid operation: Community, private, utility or PPP models;
• Seizing high impact opportunities through enabling policy and regulatory frameworks and standards and testing: Need certain level of standardization; streamlined processes that recognize benefits and unique characteristics of small generation/load resources to enhance replicability and reduce transactional costs
REGULATORY SOLUTIONS to Address BARRIERS AND RISKS

• Policy and regulatory frameworks must address upstream and downstream systems considerations and put into play an evolutionary process:

• Policy, regulatory and institutional frameworks are needed that can support a market for economically and ecologically viable rural electrification, using mini-grids that can manage local renewable energy, loads and storage; ADB
• Policy and Financing Intervention Models need to be “symbiotic” with each other to attract investment, support bankable projects, generate viable revenue streams;
• Policy interventions need to support productive uses/enterprise development to increase ability to pay and boost demand;
• Develop policy and regulatory frameworks that can capture the benefits and characteristics of “decentralized” energy/distributed energy resources/demand-side management through providing true costing/pricing and streamlined processes for mini-grid deployment;
• Frameworks that enable small power producers and small power distributors to “electrify” rural areas with renewable energy, using “smart” mini-grid technologies that can interconnect/island from the grid or operate independently;
• Frameworks needed to support both capital and operational/maintenance costs;
• Remove overtime existing subsidies for traditional fuels and centralized generation paradigm;
• Support access to carbon markets and carbon finance;
• Use smarter, new technologies to provide viable opportunities to both large and small developers, provide customer differentiation yet equitable treatment; and support aggregation and integration into the grid, utility planning and operations, and the market;
• Well-funded national programs that support regulatory and policy development processes; monitoring and benchmarking; new performance metrics and ME&V;
• Policies to support robust power markets that would allow small power distributors to sell wholesale to national utility, as well as retail (directly to final customers);
• Support for streamlined permitting, clearances, application procedures for interconnection, and integrated resources planning and assessments for least cost investment decision-making;
Policy and Regulatory Planning and Frameworks: Integrated Energy Systems Capabilities and Solutions

- **Holistic, Dynamic/Transactive and Systemic Balancing of S/D:** Not technology, facility or sector “silied”
- Develop **Resilient, Reliable, Flexible, Scalable, Sustainable Micro/Mini-grid “Eco-systems” and Critical Infrastructure Networks**, anchored in government planning, solid frameworks and processes across entire power value chain;
- Clarify government/S/H grid extension plans to identify cost-effective microgrid development opportunities (low reliability or under-served energy areas); Legal frameworks for ownership and governance of microgrids (utility, collective/community; private; PPP); Regulation, Obligations to serve, Cost recovery and fair return; if Collective, terms of governance, etc. (Government, Central Utility (Privatized), Cooperative/Collective, Company/Individual ownership models);
- Promote the development of “needs and resource assessments” and standards to address health and safety; reliability, resource availability and power quality; air quality; meeting current demand and planning for future customer requirements and load growth; and supplying services and training using “smart grid” technologies; Programs for technical assistance and capacity-building;
- Establish mutual obligations between the microgrid/mini-grid and its customers; use best available technologies in structuring customer payments (new control and communications infrastructure (AMI), appropriate models;
- Regulating and collecting the costs of building and operating a micro-minigrid: Who will regulate the microgrid?, Where will the capital come from?, How will the costs be paid? (Fixed, operating, connection fees), Effective rule of law, contract sanctity; (Depends on type of ownership) UNF Jimison
- Regulating the technical operation and obligations of the micro-minigrid, operating in islanded or grid-connected modes (balancing S/D, voltage and frequency regulation, testing/certification of devices, DG, system for measuring, managing and monitoring the microgrid, system size and efficiency (efficient configuration and settings), commands/switching order, etc. ;
- Setting the technical and financial relationship between the microgrid and a central higher-voltage utility, if any; “Scaling” the legal and regulatory structure to the scale of the functional “utility” service, “offering the equivalent of full electric utility service and covering its costs, while taking on an electric utility’s normal legal and regulatory rights and obligations.
REGULATORY SOLUTIONS

- Energy delivery regulations to promote smaller grid systems and attract private investors to areas not covered by conventional grid; Encourage common supply/usage arrangements between providers to achieve savings in providing services and alleviate migration to cities;
- Promote clean energy options; Reduce/eliminate import tariffs on clean energy technologies;
- Regulatory Framework for Small Power Producers and Small Power Distributors: Standardized PPAs (on grid and off-grid; Standardized Tariff Methodologies for sales to grid (Feed-in Tariffs) and to mini-grids; Process guidelines and rules for SPP developers; Interconnection Guidelines and Rules, etc.; WB
- Promote Sustainable Rural Community level planning, zoning, siting and permitting processes, to support financing of microgrids (generation, distribution, metering and smart control systems) and “multiple service aggregation” (gas, power, water, telecommunications);
- Sound Policy and Regulatory Development Processes; Policy Guidance and Toolkits; Enabling policy/regulatory environment indicators/indices (e.g., ClimateScope); Administration and Institution building at all governmental levels (DFID/UK)

- Overall, legal and regulatory issues vary as a function of: Size and scale of microgrid and services; type of ownership/governance of microgrid; obligations of microgrid to its customers; relationship of microgrid to any central utility.
- “Hybrid” types of legal/regulatory models need to be examined to better position mini/microgrids within centralized power systems through legal vehicles/instruments such as distribution franchises or joint ventures between the Operator of the Power Supply System and Mini-grid Operator; legal and business models that achieve a “constellation of stakeholder interests” at all levels. ADB