Effective Deployment of Distributed Small Wind Power Systems in Asian Rural Areas

-- A Proposed ADB Technical Assistance

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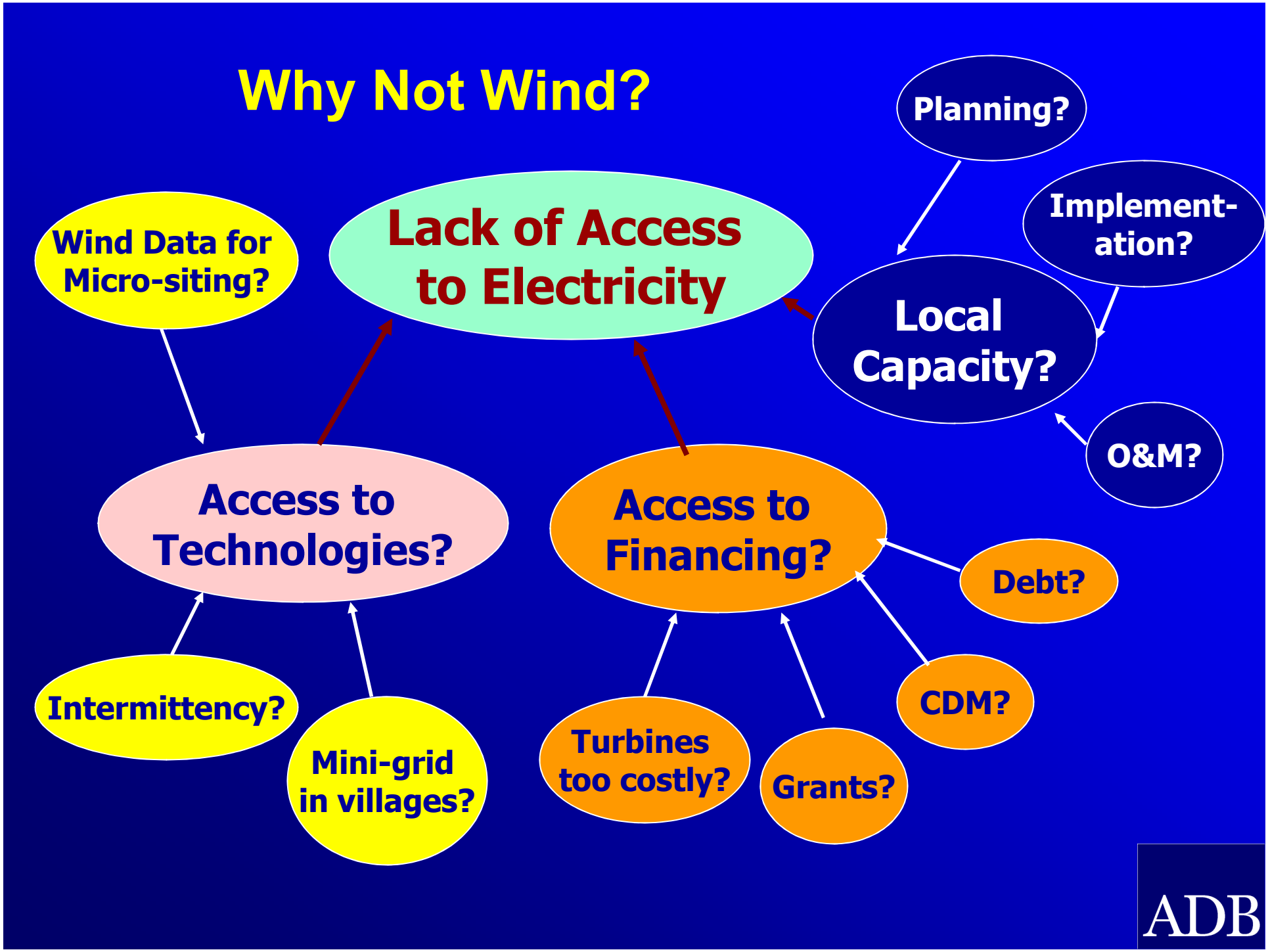
Why Not Wind?
Planning?
Implement-ation?
Wind Data for Micro-siting?
Lack of Access to Electricity
Local Capacity?
O&M?
Access to Technologies?
Access to Financing?
Debt?
Intermittency?
Mini-grid in villages?
Turbines too costly?
Grants?
CDM?
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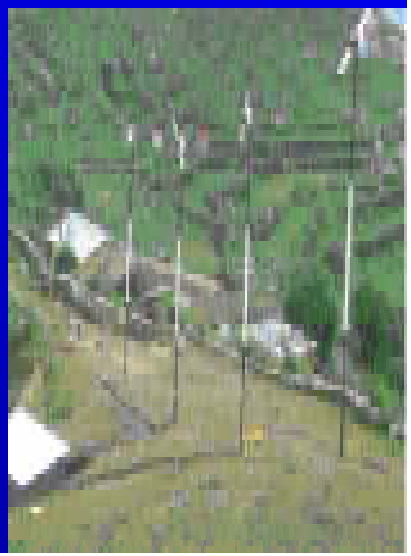
Objective

- Enhancing access to electricity in windy poor villages currently without electricity by effectively deploying small wind power systems.
  - clean,
  - reliable
  - affordable
- By 2020, small wind power systems will
  - reduce the energy cost by 50%
  - serve at least 2.5 million poor people
  - avoid about 1.25 million tons of carbon dioxide emissions per year.



Implementation

- The TA will be implemented in four DMCs to be determined during the TA implementation.
- The participating DMCs shall have
  - demonstrated strong commitment to developing renewable energy and increasing access of the poor to modern energy services;
  - clearly identified poor communities with abundant wind resources; and
  - established stable macroeconomic and conducive business environments for developing, manufacturing, or deploying small wind power technologies and systems.

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Implementation

- The TA will be implemented over 2.5 years, between January 2010 and June 2012.
- ADB will be the executing agency for the TA, jointly implemented by
  - The Private Sector Operations Department,
  - East Asia Department, and Regional and
  - Sustainable Development Department
- Each participating DMC may designate an existing agency responsible for providing energy to the rural people as the implementing agency for the TA project.
  - ADB will start TA activities in a DMC only after receiving a TA support letter from its government.

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Needs and Resource Assessment

- assessing socioeconomic conditions and infrastructure bases in typical windy poor rural communities currently lacking access to electricity;
- identifying and selecting priority locations for effectively deploying small wind power systems;
- analyzing demand patterns and load management requirements to improve the efficiency of future electricity uses, such as utilization of the most efficient lighting, pumping, and refrigeration facilities; and
- mapping wind, solar, and biogas resources and load distribution in selected poor communities for adequacy verification, system configuration, mini-grid planning, and optimal micro-siting of small wind power systems.

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Integration and optimization of the system supply chain

- evaluating technical designs, installation requirements, and operational processes of small wind power systems, and exploring possibilities to increase electricity output, simplify maintenance, minimize capital and operational expenses, and improve system reliability and durability;
- comparing different approaches to energy storage and balancing to cope with intermittency difficulties of stochastic wind power;
- examining suitable ways to integrate the complementary benefits of wind, solar, and biogas resources to optimize cost-effective energy systems, and improve predictability and reliability of electricity supply;
- addressing negative environmental impact of conventional batteries that have been used in many off-grid renewable energy projects; and scrutinizing possibilities to improve their efficiency, safety, and environmental friendliness; and
- reviewing manufacturing, delivery, and servicing procedures to seek opportunities to cut energy costs, through, for instance, modularized and standardized design, manufacturing localization, and achievement of economies of scale in mass production.

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Improvement in financing instruments and delivery mechanisms

- designing innovative financing mechanisms to reduce capital costs, mitigate risks, and enhance financial viability;
- exploring ways to mobilize grant assistance, activate carbon credits in a programmatic way, and secure regulatory incentives;
- experimenting with a financial leasing modality to minimize collateral requirements and enable periodic debt amortization through the collection of service charges; and
- assisting in building public–private partnerships and the build-own-operate-transfer modality for smooth implementation and sustainable operation.

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Construction of six pilot projects

- in the following areas to generate demonstration effects for rapid replication in other suitable locations:
  - remote mountainous areas,
  - deserts and grasslands, and
  - ocean islands.



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Policy recommendations and capacity building activities

- recommending policies to DMCs and the international community on how to facilitate transfers of low-carbon technologies and strengthen regional cooperation to create a favorable regulatory framework and business environment for maximizing the use of indigenous renewable resources, and to produce global public goods in clean energy to mitigate global warming and climate change; and
- conducting dissemination and capacity building activities to engage more poor communities, financial institutions, private sector partners, and nongovernment organizations; and to expedite deployment of distributed power generation systems exploiting wind and other indigenous renewable energy resources.

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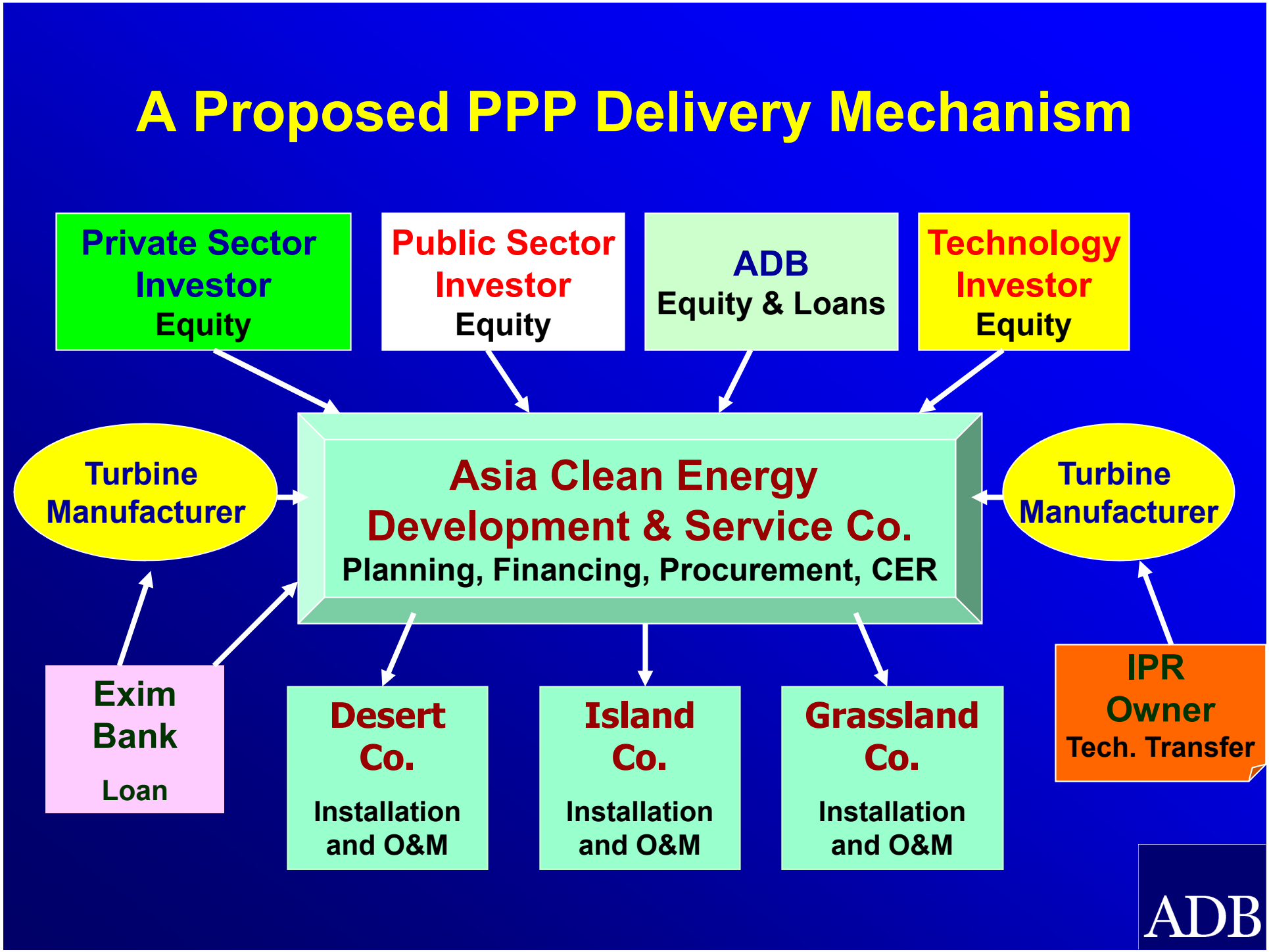
A Proposed PPP Delivery Mechanism



A Proposed PPP Delivery Mechanism

- **Planning for large-scale and long-term deployment**
  - Optimal resource mobilization and allocation
  - Phased implementation
- **Aggregated Procurement**
  - More bargaining power vis-à-vis equipment suppliers
  - Better quality control and monitoring
  - Improved O&M arrangements
- **Financing:**
  - Reducing transaction costs
  - Better accesses to debt-financing
  - Better utilization of CERs

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A Proposed PPP Delivery Mechanism

- **Public Support:**
  - Needs Assessment:
    - Target Clients: 5,000 villages/2.5 million people
  - Wind Resource Assessment:
    - sufficient to reach a capacity factor > 30%
  - Technology Survey:
    - Most appropriate system design
    - Environmentally friendly energy storage
  - Assistance in manufacturing optimization

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A Proposed PPP Delivery Mechanism

- **Public Support:**
  - Awareness and community participation
  - Grant support
  - Seed equity in the delivery company
  - Design and implantation of pragmatic CDM approach
  - Suppliers' credits to equipment manufacturers

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A Proposed PPP Delivery Mechanism

- **Private Sector Participation**
  - Technology transfer
  - Equity contribution to the delivery company
  - Aggregation in planning, financing, procumbent and obtaining CER credits
  - Installation, and O&M of the systems in villages
  - Corporate citizenship in determining BOOT terms

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A Possible Build-Own-Operate-Transfer (BOOT) Scheme

- **Why BOOT?**
  - **Quick and effective deployment**
    - Build in a modular way
  - **Capacity building for villages**
    - Learning by Doing
- **How BOOT?**
  - **Reasonable returns for the delivery company**
    - 5% above the WACC?
  - **Own and operation for about 7 years?**
  - **Transfer to the village at the residual values**

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Possible Cooperation

- **ADB:**
  - Financing a pre-feasibility study of the approach
  - Establishing 3 pilot projects
  - Bridging technology transfers
  - Mobilizing public/private equity investors
  - Proposing the governance structure and operation strategies of the delivery company
  - Collaborating with its member countries to design and refine implementation plans
- **Partners:**
  - Stimulating community participation
  - Mobilization of resources
  - …..

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Only Results Matter!

- Can the proposed approach improve access of the poor to energy services?
  - Technically reliable and robust?
  - Financially affordable and competitive?
  - Economically viable and rational?
  - Socially acceptable and sustainable?
  - Environmentally sound?

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Thank you!

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