Webinar on “Mobilizing International and Regional Finances/Funding for Implementation of Renewable Energy Projects in SAARC Member States” 11, Feb., 2020

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Financial Incentives & Mechanisms to Encourage Private Investment In Renewable Energy Sector
Renewable Energy Market Financing

Grid Off Take

Distributed Generation/Community Power

Alternating Current (AC)
Direct Current (DC)

Prevalent Worldwide

Mostly Africa

Household Solutions (Grid Quality Access)
Household Products

Household
Types of Financing in Renewable Energy

- **Equity Finance**
- **Project Development Capital**
- **Debt Finance**
- **Off-balance sheet project financing**
- **Corporate finance** (small projects; less than $15 million)
- **On-balance sheet corporate finance**
## The Range Of Financial Instruments

### Financial Instrument Addresses:

<table>
<thead>
<tr>
<th>Project/Programme Financing</th>
<th>Financing Barriers</th>
<th>Both Barriers &amp; Risks</th>
<th>Project Risks</th>
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<tr>
<td>Grants</td>
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<td>-</td>
<td>Capital Grants</td>
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<tr>
<td>Equity</td>
<td>Equity (Venture Capital)</td>
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<td>-</td>
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<tr>
<td>Debt</td>
<td>Senior Debt (Credit Line)</td>
<td>Subordinated Debt</td>
<td>Senior Debt (Project Loan)</td>
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<tr>
<td>Asset-Backed</td>
<td>Asset-Backed Securities</td>
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<tr>
<td>Guarantees &amp; Insurance</td>
<td>Liquidity Guarantee</td>
<td>Pari-Passu/Subordinated Guarantees</td>
<td>Political Risk Insurance/Partial Risk Guarantee</td>
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<tr>
<td></td>
<td></td>
<td>Wind/Solar Insurance</td>
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<tr>
<td></td>
<td></td>
<td>Contingent Resource Insurance</td>
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</table>

### Targeted Instruments

<table>
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<tr>
<th></th>
<th>Result-Based Financing</th>
<th>Carbon Financing</th>
<th>Small-Scale Project Financing</th>
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<tr>
<td></td>
<td>-</td>
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<td>Microfinancing for Customers</td>
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<td>Aggregation</td>
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<td></td>
<td>Contingent Project Development Grants</td>
<td>-</td>
<td>Portfolio Guarantees/Loss Reserves</td>
</tr>
<tr>
<td></td>
<td>Carbon Delivery Guarantees</td>
<td>-</td>
<td>-</td>
</tr>
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<td></td>
<td>Advance Sales of CERs</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

World Bank, 2012
## Financing and associated risks taken…

<table>
<thead>
<tr>
<th>Type:</th>
<th>Venture Capital</th>
<th>Private Equity</th>
<th>Infrastructure Funds</th>
<th>Pension Funds</th>
<th>Bank Mezzanine Debt</th>
<th>Bank Senior Debt</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Risk Taken:</strong></td>
<td>Start ups, new technology, prototypes</td>
<td>Pre IPO Companies, demonstrator technology</td>
<td>Proven technology, private companies</td>
<td>Proven technology</td>
<td>Demonstrator/ proven technology, new companies</td>
<td>Proven technology, established companies</td>
</tr>
<tr>
<td><strong>Approximate level of return, or margin</strong></td>
<td>&gt;50% IRR</td>
<td>35% IRR</td>
<td>15% IRR</td>
<td>15% IRR</td>
<td>LIBOR + 700bps</td>
<td>LIBOR + 300 bps</td>
</tr>
</tbody>
</table>
Grid Offtake Projects
Grid Offtake Projects

Traditional Off taker
Utilities Serving Retail Load

Driver: Compliance
Off taker: Integrated utilities and large retail electric providers

Other Common Off taker
Power Marketers

Driver: Profit
Off taker: Bank affiliated trading shops – Bank of America Merrill Lynch – Citigroup Energy – Morgan Stanley Commodities Group

New Market Entrant
Corporate Purchasers

Driver: Sustainability — Demonstrate commitment to the environment —
RE100: global initiative of influential businesses to go “100% renewable”
Off taker: includes Microsoft, Google, Starbucks, Nike, Nestle, Goldman Sachs, Bloomberg, Credit Agricole, UBS

New Market Entrant Risk Solution Providers

Driver: Profit
Off-Take Structures

- Traditional Power Purchase Agreement
- Synthetic Power Purchase Agreement
- Hedge (Physical and Financial)
- Other Structures and Trends
Overview of Corporate Power Purchase Agreements in the US (2013 – 2018)

Driver: sustainability – demonstrate commitment to the environment

As of October 16, 2018. Publicly announced contracted capacity of corporate Power Purchase Agreements, Green Power Purchases, Green Tariffs, and Outright Project Ownership in the US, 2013 – 2018 YTD. Excludes on-site generation (e.g., rooftop solar PV) and deals with operating plants. (4) indicates number of deals each year by individual companies.

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## The On-Grid Finance Continuum

<table>
<thead>
<tr>
<th>Project Development</th>
<th>Financial Structuring</th>
<th>Risk Management</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Often Secured</strong></td>
<td><strong>Developers/Sponsors</strong></td>
<td><strong>Corporate/Project</strong></td>
</tr>
<tr>
<td>Equity</td>
<td>Financed Loans</td>
<td></td>
</tr>
<tr>
<td><strong>Occasionally Secured</strong></td>
<td>Grants</td>
<td>Mezzanine Finance</td>
</tr>
<tr>
<td><strong>Gaps and Barriers</strong></td>
<td></td>
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</tr>
<tr>
<td>Under-financed Project Developers</td>
<td>Wider Debt/Equity Gap</td>
<td>Bankers Lacking Experience with RE</td>
</tr>
<tr>
<td>Public Participation in Private Equity Funds</td>
<td>Public Participation in Mezzanine Funds</td>
<td>Elevated Transaction Costs</td>
</tr>
<tr>
<td>Tax Incentives for 3rd Party Investors</td>
<td>Banker Training and Awareness raising</td>
<td>Investment transaction support</td>
</tr>
<tr>
<td><strong>Proposed Interventions</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contingent Project Development Grants</td>
<td>Change underwriter risk perceptions and rating methodologies</td>
<td>Extend existing insurance products to RE</td>
</tr>
<tr>
<td>Public Participation in Private Equity Funds</td>
<td>Promote new non-insurance products</td>
<td></td>
</tr>
<tr>
<td>Public Participation in Mezzanine Funds</td>
<td>Public/Private partnerships to share risks and cost/benefits of innovation</td>
<td></td>
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</tbody>
</table>
Distributed Generation
Securing financing for mini-grid development is challenging, partly because of the inherent weaknesses of mini-grid financial models and partly because of risk perceptions.
Current Distributed Generation Financing…

Grants and Subsidies
- International development agencies
- Local government agencies
- Trusts and foundations, Private individuals and others.

Equity Investors
- Early stage seed capital
- Expansion capital
- Impact investors
- Development financing institutions (DFIs)

Loans
- DFIs – Short term/concessional loan providers
- Commercial banks - only in case of proven business models mitigated project risks.
- International lenders – usually concerned about foreign exchange risks

Guarantees
- Loan guarantees
- Risk guarantees

Foreign Exchange Risk
Case Study: Sub Saharan Africa
Capital Cost: hard Currency
Revenues: local currency
A yieldco is a dividend-paying company created for the long-term ownership of assets.

**The American Experience:**

- Various states with different capacities for wind and solar power.

**The European Experience:**

- ✓ performed much better than their U.S. counterparts
- ✓ minimal stock growth
- ✓ reliable dividends of about 6 percent per annum.

Restructuring In The Yieldco Space:

Improvements required to the corporate governance structure, project valuation methods, and "end game" strategy of YieldCos.
Institutional debt: $1 billion-plus in solar securitizations

CHALLENGES

- Collection, organization & communication of data
- Achieving sufficient scale
- Standardizing the underwriting process

ASSET-BACKED SECURITIZATION (ABS)/INSTITUTIONAL BOND OFFERINGS:

In a securitization, the issuer creates a large enough pool of similar assets such that no single asset should affect debt repayment. Investors purchase bonds or notes that are repaid through the cash flows of the underlying assets.
Drivers for issuing Green Bonds...

- Attract environmentally-conscious investor
- Growing investor demand for green/sustainable financial instruments.
- Stakeholder demand for responsible business practices are growing
- Help project the company environmental-conscious organization thereby enhancing the brand
- Almost all green bonds issued in past have been oversubscribed
- Competition from lending agencies that have issued green bonds
- Accessible and powerful instrument for financing a sustainable low carbon economy.
- Economical and convenient financial model by product developers

Economical and convenient financial model by product developers

- Debt instrument
- Offers fixed return
- European Investment Bank (EIB) First issuer of Green bond

Economical and convenient financial model by product developers

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Green Bond Working Group of the Sustainable Banking Network (SBN) - 2019

Green Bond – Investors Demand

Supply of Green Bonds

Use of green bond proceeds - 2018

Emerging Markets

USD5.3bn

2017

20%

7%

44%

18%

7%

4%

Emerging Markets

2018

USD8.4bn

33%

30%

16%

8%

13%

Energy

Buildings

Transport

Water

Waste

Land Use

Adaptation

Industry

ICT
The Off-Grid Finance Continuum

Upstream

- Start-up Capital
- Operating Capital
- End-user Finance

Downstream

Often Secured
- Entrepreneurs Equity
- Supplier Credit

Occasionally Secured
- Grants
- Bank Loans

Gaps
- Lack of Business Development Support
- Lack of Seed and Early Stage Risk Capital
- Lack of Appropriately Priced Growth Capital
- Lack of Support from Local Banks in Local Currency
- Lack of Consumer/Micro Transaction Finance to Pay for RE Products and Services

Proposed Interventions
- Enterprise Development Services
- Donor supported Seed Capital Funds managed by specialised entities
- Public-Private SME Growth Capital Funds
- Support to local banks through capacity building, lines of credit and credit enhancements
- Policy support to increase role of SMEs in energy service delivery
- Consumer Finance
- Micro-Credit
- Leasing/Rental/ Fees for Service
- 3rd Party Finance
The On-Grid and Off-Grid Finance Continuum—A Comparison
Global Off Grid Renewable Energy Projects
Private, Public and PPP led DG Projects

Private Sector Led Projects

Donor/Government Funded and Private/Multi Party Led Projects

Government Led Projects
Globally Only A Few Private Sector Led Projects Exist Focused in Regions with Electricity Shortage—South Asia and Africa

- **PowerCorner/ENGIE-Tanzania**
  - SHSs, PAYG
  - Total capacity of 16 kW
  - 45 kWh Lithium batteries
  - Benefiting 50 households
  - Project cost of 140,000 Euros

- **RahimAfrooz Solar Irrigation System—Bangladesh**
  - Solar powered pumps for irrigation
  - Total capacity of 11.5 kW
  - Benefiting 50 acres rice fields of 30 farmers

- **Mlinda Solar Mini Grids—West Bengal and Jharkhand, India**
  - Rent to Own
  - 310 mini-grids
  - Total capacity of 92 kW
  - Benefiting 2,750 households
Successful Examples Of Public-Private Partnership Projects

- **Mexico**
  - ACCIONA Micro energy Foundation-Mexico
    - SHSs, Rent to Own
    - 25 W panel
    - Benefiting 7,500 households
    - Project cost 2.5 million Euros

- **Mali**
  - Foundation Rural Energy Services (FRES)-Mali
    - Postpaid
    - Solar Mini-grids
    - Total Capacity of 553 kW
    - Benefiting 7,480 consumers

- **Uganda**
  - Tiger Power SHSs-Uganda
    - SHSs
    - Foldable PV with battery bank
    - Benefiting 4 trading centers
    - Project cost 600,000 Euros

- **Bangladesh**
  - IDCOL Mini-grid Projects-Bangladesh
    - 18 Solar Mini-grids
    - Solar PV, battery banks and diesel back up
    - Benefiting 2,243 households
Worldwide Government Led Projects Concentrate On SHS Provision

- **Bangladesh**: Infrastructure Development Company Ltd (IDCOL) - Bangladesh
  - SHS, Rent to Own
  - 10% down payment
  - Micro-credit with 10-15% interest

- **Philippines**: Solar Power Technology Support (SPOTS) - Department of Energy (DoE), Philippines
  - SHS, Flat Subscription
  - Monthly subscription of $4.7
  - Benefiting 187 households

- **Fiji**: Solar Home Solutions by Department of Energy - Fiji
  - SHS, Flat Subscription
  - 135 W solar panels
  - Benefiting 28,000 people
A Case Study of Pakistan’s Off-Grid Distributed Generation Models

Learnings from Pakistan Poverty Alleviation Fund’s (PPAF) Projects
Covering North and South...
Models Formulated Based on Following Parameters

**Finance**
- All grant
- Public Private Partnership (PPP) - Government with Local Community (LC)/ Private Agency (PA)
- Microfinance Institutions + Local Community

**Business Model**
- Pay as you go (PAYG)
- Rent to own
- Postpaid

**Design**
- Mini-grid
- Solar Home Systems (SHS)
- Central Grid Connectivity

**Villages Scenarios**
- Private Agency + Local Community (PA+LC)
- Local Community trained by the service provider
- End User

**O & M**
- Private Agency + Local Community (PA+LC)
- Local Community trained by the service provider
- End User
Village Scenarios in terms of population density and economic conditions

- Low income - densely populated - cluster of villages
- Relatively High income - densely populated - cluster of villages
- Low income - sparsely populated - cluster of villages
- Relatively High income - sparsely populated - single village
**Key For Village Scenarios**

**Economic Status**
- Based on poverty score ranges developed by World Bank
- Mean score 0-34
- **High income**
- Mean score 35-100
- **Low income**

**Population Density**
- Compared to Pakistan’s average population density
- More than 281 inhabitants per square km
- **Dense**
- Less than 281 inhabitants per square km
- **Sparse**

**Village Design**
- Based on mini-grid transmission design
- Village falls within 500-700 meters radius for transmission
- **Cluster**
- No other village within 500-700 meters design radius
- **Single Village**
Scoring Mechanism

Scoring on the basis of international, regional, national and JLINE HRE experiences

Likelihood of success

- 3
- 6
- 9

Availability of the model in current time period

- 5
- 10
- 15
## Formula and Calculation

<table>
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<tr>
<th>Private-Public Partnership</th>
<th>Mini-grid</th>
<th>Pay As You Go</th>
<th>Private Agency + Local Community</th>
<th>Likelihood of Success Score</th>
<th>Availability Score</th>
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<tr>
<td>9</td>
<td>9</td>
<td>9</td>
<td>9</td>
<td>36</td>
<td>10</td>
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</tbody>
</table>

**Finance**

**Design**

**Business Model**

**O&M Management**
How To Increase Private Sector’s Involvement In Off Grid RE Projects In Pakistan

• There is a dire need to develop an off-grid electrification policy

• Models being developed by microfinance service providers need to understand that they are expensive and are not considering the household’s pathway to the complete energy access spectrum

• Rural electrification models need to learn from micro-finance: need/utility results in payment, willingness to pay higher interest rates, social capital leading to better recovery

• The current models in off grid rural electrification in Pakistan are missing a critical partner—the technical partner—ideally a common equity partnership between the local PO and the community and a technical partner requires nurturing
Setting electricity markets to Increase Private Sector Involvement

- Improve risk appetite in local financial markets
- Hedge risk by encouraging local RE products manufacturing finance
- Bespoke financial solutions for each demography and locality
- No off-take guarantees and capacity payments rather profit based subsidies for distributed generation
- Let markets define tariffs rather only regulate quality
- Renegotiate the overall energy mix—REBA
THANK YOU!!