Derisking Renewable Energy Investment

Africa LEDS Partnership meeting

27 June 2016
UNDP-GEF vision

UNDP Vision
Helping countries achieve the simultaneous eradication of poverty and significant reduction of inequalities and exclusion

UNDP – GEF Objective
Assisting countries to access environmental finance for sustainable development

- Sustainable management of ecosystem goods and services
- Sustainable, affordable and accessible energy services
- Scaling up climate change adaptation and mitigation
- Sustainable management of chemicals and waste
- Improved water and ocean governance
Paris Agreement

New, global treaty where all countries agreed to take action on climate change in order to keep global temperature rise below 2 degrees C and aim for 1.5 degrees C.
I. Utility-Scale Renewable Energy
**Derisking Renewable Energy Investment**

High financing costs penalise renewable energy

---

**UTILITY SCALE**

LEVELIZED COSTS OF RENEWABLE ENERGY VS FOSSIL-FUEL ENERGY

DEVELOPED VS. DEVELOPING COUNTRIES

---


All assumptions (technology costs, capital structure etc.) except for financing costs are kept constant between the developed and developing country. Operating costs appear as a lower contribution to LCOE in developing countries due to discounting effects from higher financing costs.
Derisking Renewable Energy Investment
Public instrument packages

Select Cornerstone Instrument
Examples:
- Feed-in tariff
- PPA-based bidding process

Select Policy Derisking Instruments
Examples:
- Long-term RE targets
- Streamlined permits process
- Improved O&M skills

Select Financial Derisking Instruments
Examples:
- Public loans
- Partial loan guarantees
- Political risk insurance

Direct Financial Incentives (If positive incremental cost)
Examples:
- FIT/PPA price premium
- Tax credits
- Carbon offsets

DREI Nigeria (Solar PV, 2020 1.2GW Target) (1) Pre-derisking financing cost waterfall

### Preliminary Findings

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>8.0%</td>
<td>1.3%</td>
<td>0.4%</td>
<td>0.4%</td>
<td>0.5%</td>
<td>1.1%</td>
<td>1.8%</td>
<td>1.5%</td>
<td>1.4%</td>
<td>1.6%</td>
<td>18.0%</td>
<td>18.0%</td>
</tr>
</tbody>
</table>

Source: UNDP, 2015/2016 Preliminary data

Empowered lives. Resilient nations.
### PRELIMINARY FINDINGS

<table>
<thead>
<tr>
<th>RISK CATEGORY</th>
<th>POLICY DERISKING INSTRUMENTS</th>
<th>FINANCIAL DERISKING INSTRUMENTS</th>
</tr>
</thead>
</table>
| Power Market Risk               | • Long term renewable energy targets  
• Regulatory framework  
• FIT/PPA tender (standardised PPA)  
• Independent regulator        | NA                              |
| Permits Risk                    | • Streamlined permitting; one-stop shop; recourse mechanism                                  | NA                              |
| Social Acceptance Risk          | • Awareness-raising campaigns  
• Promote/pilot community-based approaches                                                  | NA                              |
| Resource & Technology Risk      | • Resource assessment  
• Technology support (solar PV)                                                              | NA                              |
| Grid/Transmission Risk          | • Transparent, up-to-date grid code  
• Grid management/planning                                                                | • Take or pay clause in PPA¹¹ |
| Counterparty Risk               | • Strengthen utility’s management                                                           | • Government guarantee of PPA   |
| Financial Sector Risk           | • Domestic financial sector reform                                                         | • Concessional public loans to IPPs |
| Political Risk                  |                                                                                             | NA                              |
| Currency/Macroeconomic Risk     |                                                                                             | • Partial indexing of PPA tariffs to foreign currencies¹² |

Source: UNDP, 2015/2016 Preliminary data
DREI Nigeria (Solar PV, 2020 1.2GW Target)
(2) Post-derisking financing cost waterfall

PRELIMINARY FINDINGS

Source: UNDP, 2015/2016 Preliminary data
DREI Nigeria (Solar PV, 2020 1.2GW Target)
(3) Measuring impact – levelised costs

LEVELISED COST OF ELECTRICITY (LCOE)

<table>
<thead>
<tr>
<th></th>
<th>Baseline</th>
<th>Investment</th>
<th>Solar PV Investment BAU</th>
<th>Solar PV Investment Post-Derisking</th>
</tr>
</thead>
<tbody>
<tr>
<td>LCOE (USD cents/kWh)</td>
<td>4.0</td>
<td>10.5</td>
<td>7.7</td>
<td></td>
</tr>
</tbody>
</table>

Source: UNDP, 2015/2016 Preliminary data
If USD 301 m is invested in public derisking measures to promote utility scale in Nigeria, this can have the following impacts:

**Catalysing private sector funding**
- USD 1.869 billion in private sector investment

**Generating economy-wide savings**
- USD 960 million in lower premium prices for Solar PV over the next 20 yrs

**Better affordability for end-users**
- Solar PV generation costs decrease from USD 10.5 cents/kWh to USD 7.7 cents/kWh

**Benefit the environment**
- Emission reductions of 26 Mt CO$_2$e over next 20 years

Source: UNDP, 2015/2016 Preliminary data
II. Small-Scale Renewable Energy
**Derisking Renewable Energy Investment**

Mini grid – impact of financing costs

**PRELIMINARY FINDINGS**

**LEVELIZED COSTS OF OFF-GRID SOLAR PV/BATTERY VS DIESEL GENERATOR MINIGRIDS**

<table>
<thead>
<tr>
<th>higher financing cost environment</th>
<th>lower financing cost environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solar PV/Battery (off-grid)</td>
<td>51.4</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Higher Financing Cost Environment</td>
<td></td>
</tr>
<tr>
<td>33.8</td>
<td>40.1</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating Cost (incl. fuel cost)</td>
<td>6%</td>
</tr>
<tr>
<td>5.0</td>
<td>4%</td>
</tr>
<tr>
<td>Maintenance CapEx</td>
<td>23%</td>
</tr>
<tr>
<td>3.2</td>
<td>1%</td>
</tr>
<tr>
<td>Investment Cost/Depreciation</td>
<td>66%</td>
</tr>
<tr>
<td>9.7</td>
<td>4%</td>
</tr>
<tr>
<td>Higher Financing Costs, Developing country Capital Structure: 100% Equity: 0% Debt Cost of Equity = 22%</td>
<td>Lower Financing Costs, Developing country Capital Structure: 50% Equity: 50% Debt Cost of Equity = 18%, Cost of Debt =10%</td>
</tr>
</tbody>
</table>

Source: UNDP/ETH Zurich, Preliminary calculations

Generation costs only; Assumes equal annual electricity output; Solar PV/Battery System Size @25 kW, Diesel System Size @ 14 kW, Investment Life= 20 years, Replacement: Battery (5 years), Inverters (10 years), Generator (10 years), Diesel Fuel Price:$0.81/L, Inflation:2%; Loan tenor = 10 years, where applicable
# Derisking Renewable Energy Investment

## Mini grid barrier/risk table (excerpt)

### Preliminary Findings

<table>
<thead>
<tr>
<th>RISK CATEGORY</th>
<th>DESCRIPTION</th>
<th>UNDERLYING BARRIERS</th>
<th>KEY STAKEHOLDER GROUP</th>
<th>POLICY DERISKING INSTRUMENTS</th>
<th>FINANCIAL DERISKING INSTRUMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Power Market Risk</td>
<td>Risk arising from limitations and uncertainty in the energy market (off and on-grid) regarding market outlook, access and competition</td>
<td>Market outlook: Uncertainty regarding national/state-level targets for renewable energy and electrification</td>
<td>Power market-related policymakers (civil servants); legislators; regulators</td>
<td>Develop transparent, long-term national/(state) targets for electrification and renewable energy</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Market access, competition and grid expansion: Limitations in ability of mini-grid developers to access the electrification market; Uncertainty regarding potential future competition in electrification; Unclear, or lack of, grid planning and expansion policies</td>
<td>Tariffs: Uncertainty or inflexibility in electricity tariff regulations for mini-grids</td>
<td></td>
<td>Establish and build capacity of institutional infrastructure; determine off-grid service areas; define concessions; implement well designed mechanism to grant concessions; implement compensation scheme in case of grid expansion.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Standards: Lack of clarity, uncertainty and/or inconsistent government technical requirements regarding (i) quality and (ii) grid integration</td>
<td>Competing subsidies: Competition from subsidised diesel and kerosene power sources; negative perceptions of mini-grid tariffs due to subsidised grid-distributed electricity</td>
<td></td>
<td>Establish balanced and well-designed regulated tariffs, either through (i) tariff tables or (ii) price discovery via auctions.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Develop balanced technical standards/requirements, with active enforcement.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Reform fossil fuel and grid-distributed electricity subsidies</td>
<td></td>
</tr>
</tbody>
</table>

Source: UNDP/ETH Zurich (2016)
Derisking Renewable Energy Investment
Mini-grid Kenya – financing cost waterfall

PRELIMINARY FINDINGS

Source: UNDP/ETH Zurich (2015), based on preliminary data collected through interviews with investors and developers of mini-grids. Please do not use without authors’ permission.
III. Conclusions
Conclusions
Key take-aways

• A key opportunity for policymakers is to address the high financing costs for renewable energy in developing countries

• The best outcomes occur when policymakers address the risks to renewable energy investment in a systematic and integrated way

• Risks can be addressed in one of three ways:
  ➢ Reducing risk (policy derisking)
  ➢ Transferring risk (financial derisking)
  ➢ Compensating for risk (direct incentives)

• Investing in derisking (risk reduction or risk transfer) is more cost effective when measured against paying direct financial incentives, such as a premium price
Derisking Renewable Energy Investment
Website, reports & financial tools

www.undp.org/DREI
Thank you!

Faris Khader
RTA Climate Change Mitigation
UNDP Regional Service Centre for Africa
faris.khader@undp.org