Derisking Renewable Energy Investment

A framework to support policymakers in selecting public instruments to promote renewable energy investment in developing countries

CESC Webinar – Policy Derisking for Renewable Energy
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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.
Key concepts: Selecting a package of public instruments

- **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

# Key concepts:
## Public instrument table for renewable energy (Pt 1)

<table>
<thead>
<tr>
<th>Risk Category</th>
<th>Description</th>
<th>Underlying Barriers</th>
<th>Key Stakeholder Group</th>
<th>Menu of Selected Public Instruments</th>
<th>Financial Derisking Instruments</th>
</tr>
</thead>
</table>
| **1. Power Market Risk** | Risk arising from limitations and uncertainties in the energy market, and/or sub-optimal regulations to address these limitations and promote renewable energy markets | • Market outlook: lack of or uncertainties regarding governmental renewable energy strategy and targets  
  • Market access and prices: limitations related to energy market liberalization, uncertainty related to access to the competitive landscape and price outlook for renewable energy, limitations in designs of standard PPA’s and/or PPA tendering procedures | Public sector (policymakers, legislators, regulators) | Establish transparent, long term national renewable energy strategy and targets  
  National-level resource inventory/mapping, establish national energy efficiency/involve technology options; renewable energy target formulation (as part of national energy planning) |                                          |
|                     |                                                                             | • Market distortions: such as high fossil fuel subsidies                           |                                             | Establish a harmonised, well-regulated and unbundled energy market, with more competitive instruments to address price and market access risk for renewable energy projects  
  Unbundling of the energy market (generation, transmission, distribution); establish well-designed and transparent procedures for FIT, PPA tendering (or similar); well-designed, transparent policy on key clauses for standard PPA | Reform of fossil fuel subsidies  
  Assessment of fuel subsidies; phase-out of subsidies; awareness campaigns, design of transfer programs to vulnerable social groups |
| **2. Permits Risk** | Risk arising from the public sector’s inability to efficiently and transparently administer renewable energy-related licensing and permits | • Labour-intensive, complex processes and long time-frames for obtaining licenses and permits (generation, EIA, land title) for renewable energy projects  
  • High levels of corruption. No clear recourse mechanisms | Public sector (administration) | Establish a one-stop-shop for renewable energy permits; streamline processes for permits  
  Establish institutional champions with clear accountability and appropriate expertise for renewable energy; harmonization of requirements; reduction of procedural steps; training of staff in renewable energy | Contract enforcement and recourse mechanisms  
  Enforce transparent practices, renewable energy-related corruption control and fraud prevention mechanisms; establish effective recourse mechanisms |
| **3. Social Acceptance Risk** | Risks arising from lack of awareness and resistance to renewable energy in communities and end-users | • Lack of awareness of wind energy amongst consumers, end-users, and local residents  
  • Social and political resistance related to NIMBY concerns, special interest groups | End-users, general public | Awareness campaigns targeting communities and end-users  
  Awareness campaigns, stakeholder dialogue and workshops with end-users, policymakers, and local residents | Pilot models for community involvement at project sites  
  Community consultations including piloting models, such as in-kind services (energy access, local employment, etc.) or equity stakes in renewable energy projects |
| **4. Resource & Technology Risk** | Risks arising from use of the renewable energy resource and technology (resource assessment; construction and operational use; hardware purchase and manufacturing) | • For resource assessment and supply uncertainty: in early-stage assessment of renewable energy resource; where applicable (e.g. bioenergy), uncertainties related to future supply and cost of resource  
  • For planning, construction, operations and maintenance: uncertainties related to securing land, sub-optimal plant design; lack of local firms offering construction, maintenance services; lack of skilled and experienced local staff; limitations in civil infrastructure (roads etc.)  
  • For the purchase and, if applicable, local manufacture of hardware: purchaser’s lack of information on quality, reliability and cost of hardware; lack of local industrial presence and experience with hardware, including skilled and experienced local workforce | Project developers, supply chain | Project development facility; capacity building for resource assessment  
  Dissemination of top-level, national resource assessment findings; grant funding for on-site resource assessment depending on technology; capacity building for resource assessment | Project development facility; feasibility studies; networking; training and qualifications  
  Industry conferences; grant funding for pre-feasibility studies (depending on technology); training, apprenticeships and university programmes to build skills in planning, construction, O&M |
|                     |                                                                             | • For the purchase and, if applicable, local manufacture of hardware: purchaser’s lack of information on quality, reliability and cost of hardware; lack of local industrial presence and experience with hardware, including skilled and experienced local workforce |                                             | Research and development; technology standards; exchange of market information (e.g. via trade fairs)  
  Test centres for research and development into long-term supply of equipment; standards, testing and certification; awareness campaigns and trade fairs | Financial products by development banks to assist manufacturers in gaining access to capital/funding  
  Depends on specific financial circumstances. Can include as necessary: public loans; public loan guarantees; public equity |

### Key concepts: Public instrument table for renewable energy (Pt 2)

<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>
<th>Menu of Selected Public Instruments</th>
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<tbody>
<tr>
<td><strong>5. Grid/Transmission Risk</strong></td>
<td>Risks arising from limitations in grid management and transmission infrastructure in the particular country</td>
<td>• Grid code and management; limited experience of suboptimal operational track-record of grid operator with intermittent sources (e.g., grid management and stability); lack of standards for the integration of intermittent, renewable energy sources into the grid. • Transmission infrastructure: inadequate or antiquated grid infrastructure, including lack of transmission lines from the renewable energy source to load centres; uncertainties for construction of new transmission infrastructure.</td>
<td>Utility, transmission company, grid operator</td>
<td>Strengthen transmission company’s operational performance; grid management and formulation of grid code.</td>
<td>Develop a gridcode for new renewable energy technologies; sharing of international best practices in grid management.</td>
<td>Policy support for national grid infrastructure development. Develop a long-term national transmission grid roadmap to include intermittent renewable energy. Financial products by development banks to assist transmission companies in gaining access to capital/funding. Depends on specific financial circumstances. Can include: public loans; public loan guarantees; equity.</td>
</tr>
<tr>
<td><strong>6. Counterparty Risk</strong></td>
<td>Risks arising from the utility’s poor credit quality and its PPAs’ reliance on payments</td>
<td>• Limitations in the utility’s electricity purchases (cost quality, corporate governance, management, and operational track-record or outlook); unfavorable policies regarding utility’s cost recovery arrangements.</td>
<td>Utility (electricity purchaser)</td>
<td>Strengthen utility/distribution company’s performance.</td>
<td>Establish international best practices in utility/distribution company’s management, operations and corporate governance; implement sustainable cost recovery policies.</td>
<td>Government guarantees or backing for PPAs’ payments; counterparty guarantees offered by development banks. Depends on specific circumstances and division of risks in PPA. Can include: as necessary; partial risk guarantees; PPA counterparty guarantees as part of political risk insurance (PRI).</td>
</tr>
<tr>
<td><strong>7. Financial Sector Risk</strong></td>
<td>Risks arising from general scarcity of investor capital (debt and equity) in the particular country, and investors’ lack of information and track record on renewable energy</td>
<td>• Capital scarcity: Limited availability of local or international capital (equity and/or debt) for green infrastructure due to, for example, under-developed local financial sector; policy bias against investors in green energy. • Limited experience with renewable energy. Lack of information, assessment skills and track-record for renewable energy projects amongst investor community, lack of network effects (investor, investment opportunities) found in established markets; lack of familiarity and skills with project finance structures.</td>
<td>Investors (equity and debt)</td>
<td>Financial sector policy reforms.</td>
<td>Assess trade-offs between financial stability regulation and renewable energy objectives (e.g., liquidity treatment; promote financial sector policy favorable to long-term infrastructure, including project finance.</td>
<td>Financial products by development banks to assist project developers to gain access to capital/funding. Depends on specific financial circumstances. Can include: as necessary; public loans; public loan guarantees; equity.</td>
</tr>
<tr>
<td><strong>8. Political Risk</strong></td>
<td>Risks arising from country-specific governance and legal characteristics</td>
<td>• Uncertainty or impediments due to war, terrorism, and/or civil disturbance. • Uncertainty due to high political instability; poor governance; poor rule of law and institutions. • Uncertainty or impediments due to government policy (currency restrictions, corporate taxes).</td>
<td>National level</td>
<td>Link sharing products by development banks to address political risk.</td>
<td>Provision of political risk insurance (PRI) covering (i) expropriation; (ii) political violence; (iii) currency restrictions.</td>
<td></td>
</tr>
<tr>
<td><strong>9. Currency/ Macroeconomic Risk</strong></td>
<td>Risks arising from the broader macro-economic environment and market dynamics</td>
<td>• Uncertainty due to volatile local currency, unfavorable currency exchange rate movements. • Uncertainty around inflation, interest rate movements due to an unstable macro-economic environment.</td>
<td>National level</td>
<td>Private sector instruments, such as hedging for currency risk or interest rate swaps, are commonly used to address this risk category but are not shown in this public instrument table.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Illustrative case-study - Kenya (1 GW, wind)
Risk waterfalls

Source: UNDP, Derisking Renewable Energy Investment (2013). Data obtained from interviews with wind investors and developers. See Annex A of the report for full assumptions. The post-derisking cost of debt and equity show the average impacts over a 20 year modelling period, assuming linear timing effects.
Illustrative case-study - Kenya (1 GW, wind) Modeling results

LEVELISED COST OF ELECTRICITY

<table>
<thead>
<tr>
<th>LCOE (USD CENTS/kWh)</th>
<th>Baseline Activity (Unsubsidised)</th>
<th>Wind Investment BAU</th>
<th>Wind Investment Post-Derisking</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>17.1</td>
<td>8.7</td>
<td>8.1</td>
</tr>
</tbody>
</table>

MODELING RESULTS

INVESTMENT LEVERAGE RATIO (Metric 1)

<table>
<thead>
<tr>
<th>MILLION USD</th>
<th>Cost of BAU Instruments</th>
<th>Cost of Post-Derisking Instruments</th>
<th>Wind Energy Investments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Present value of costs over 20 years</td>
<td>x 8.0</td>
<td>x 15.1</td>
<td>19</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MILLION USD</th>
<th>Cost of Policy Derisking</th>
<th>Incremental Costs - BAU</th>
<th>Savings</th>
<th>Incremental Costs - Post-Derisking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Present value over 20 yrs</td>
<td>4,241</td>
<td>275</td>
<td>4,516</td>
<td></td>
</tr>
</tbody>
</table>

Derisking Renewable Energy Investment
Reports & Financial Tool

Available at www.undp.org
Derisking Renewable Energy Investment
Key take-aways

• Theory of change: With technology costs for renewable energy having fallen in recent years, a key opportunity is to address the high financing costs for renewable energy in developing countries.

• Some key findings from the report:
  • The best outcomes occur when policymakers address the risks to renewable energy investment in a systematic and integrated way
  • Investing in derisking measures appears to be cost effective when measured against paying direct financial incentives, such as a feed-in tariff premium
Supplementary Slides
Key concepts
Policy vs. financial derisking

The post-derisking cost of debt and equity show the average impacts over a 20 year modelling period, assuming linear timing effects.

Illustrative case study – South Africa (8.4 GW, wind) Risk waterfalls

Source: UNDP, Derisking Renewable Energy Investment (2013). Data obtained from interviews with wind investors and developers. See Annex A of the report for full assumptions. The post-derisking cost of debt and equity show the average impacts over a 20 year modelling period, assuming linear timing effects.
Illustrative case study – South Africa (8.4 GW, wind)

Modeling results