World Bank’s Engagement on Renewable Energy in Central Asia

Mits Motohashi
Senior Energy Specialist
World Bank Group Energy & Extractives
1. Overview of World Bank’s Renewable Energy Portfolio
# Renewable Energy-related Targets in Climate Change Action Plan

<table>
<thead>
<tr>
<th>Targets</th>
<th>Progress</th>
<th>Next Steps</th>
</tr>
</thead>
</table>
| De-risk Renewable Energy (RE) investments, add 20 GW RE generation and enable 10 GW RE integrated into grids by 2020 | • In 2016-2017, approximately 10 GW of RE approved or under advanced stages of preparation (hydro, geothermal, with solar PV contributing the largest share) | • Scale up solar PV, wind and geothermal by crowding in the private sector through risk mitigation and buying down cost  
• Expand into newer riskier markets (storage, floating solar PV, hybrid systems) |
| Mobilizing US$25 billion commercial funds for clean energy over FY16-20 | • In 2016-2017, projects approved and under advanced stages of preparation expected to mobilize $6.5 billion | • Expanded use of guarantees  
• Scale up of climate funds necessary for continued mobilization ($1 of climate funds have leveraged up to $4 of private financing) |
World Bank’s Financial Instruments for Renewable Energy Development

Financing Modalities

- Direct Loan
- Lines of Credits
- Dedicated Debt or Equity/Quasi-Equity Funds
- Competitive Subsidies
- Output Based Aid (OBA)
- Matching Grants
- First or Second Loss Guarantees
- Risk Sharing Products
- ...and many more tailored ones
Share of Renewable Energy: $9.6 billion out of $45 billion (Energy and Extractives Lending FY10-16)
Hydro is the Dominant Sub-technology (Energy and Extractives FY10-16)

- Hydropower: 42%
- Solar: 22%
- Unspecified RE: 21%
- Technical Assistance: 3%
- Wind: 4%
- Geothermal: 7%
- Bioenergy: 1%

$9.6 billion
# Share of Non-Hydro Renewable Energy is Increasing (Energy and Extractives Lending FY10-16)

<table>
<thead>
<tr>
<th>Year</th>
<th>Hydropower</th>
<th>Solar PV</th>
<th>Wind</th>
<th>Solar CSP</th>
<th>Geothermal</th>
<th>Bioenergy</th>
<th>Technical Assistance</th>
<th>Unspecified RE</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY10</td>
<td>1257</td>
<td>447</td>
<td>300</td>
<td>1040</td>
<td>1262</td>
<td>0</td>
<td>0</td>
<td>1805</td>
</tr>
<tr>
<td>FY11</td>
<td>1805</td>
<td>736</td>
<td>170</td>
<td>1436</td>
<td>1262</td>
<td>0</td>
<td>0</td>
<td>1257</td>
</tr>
<tr>
<td>FY12</td>
<td>1740</td>
<td>700</td>
<td>140</td>
<td>1262</td>
<td>1262</td>
<td>0</td>
<td>0</td>
<td>1805</td>
</tr>
<tr>
<td>FY13</td>
<td>447</td>
<td>300</td>
<td>1040</td>
<td>1262</td>
<td>1262</td>
<td>0</td>
<td>0</td>
<td>1740</td>
</tr>
<tr>
<td>FY14</td>
<td>2044</td>
<td>1060</td>
<td>447</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>FY15</td>
<td>1040</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>FY16</td>
<td>1262</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

*USDm*
Regional Shares of Non-Hydro Renewable Energy
(Energy and Extractives FY10-16)

- Africa: 23%
- East Asia and Pacific: 22%
- Europe and Central Asia: 9%
- Latin America and the Caribbean: 11%
- Middle East and North Africa: 5%
- South Asia: 29%
2. Regulatory Indicators for Sustainable Energy (RISE) – with Special Reference to Renewable Energy in Central Asia
Regulatory Indicators for Sustainable Energy (RISE)

- Pilot was conducted in 17 countries in 2014, first global edition was published early 2017.
- 27 indicators and 80 sub-indicators to capture the quality of policies and regulations for energy access, renewable energy and energy efficiency.
- Covers 111 countries across the developed and developing countries, accounting for more than 90 percent of global population and energy consumption.
- Will be published biennially (next report scheduled in 2018).

http://rise.esmap.org/
## RISE Indicators

### Policies and Regulations

<table>
<thead>
<tr>
<th>Energy Access</th>
<th>Policies and Regulations</th>
<th>Administrative Procedures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existence and monitoring of officially approved electrification plan</td>
<td>Framework for grid electrification</td>
<td>Establishing a new household grid connection</td>
</tr>
<tr>
<td>Scope and officially approved electrification plan</td>
<td>Framework for mini-grids</td>
<td>Permitting a new mini-grid</td>
</tr>
<tr>
<td>•</td>
<td>Framework for stand-alone systems</td>
<td>•</td>
</tr>
<tr>
<td>•</td>
<td>Consumer affordability of electricity</td>
<td>•</td>
</tr>
<tr>
<td>•</td>
<td>Utility transparency and monitoring</td>
<td>•</td>
</tr>
<tr>
<td>•</td>
<td>Utility creditworthiness</td>
<td>•</td>
</tr>
</tbody>
</table>

### Energy Efficiency

<table>
<thead>
<tr>
<th>Energy Efficiency</th>
<th>Policies and Regulations</th>
<th>Administrative Procedures</th>
</tr>
</thead>
<tbody>
<tr>
<td>National energy efficiency planning</td>
<td>Mandates &amp; incentives: large consumers</td>
<td>Minimum energy performance standards</td>
</tr>
<tr>
<td>Energy efficiency entities</td>
<td>Mandates &amp; incentives: public sector</td>
<td>Energy labeling systems</td>
</tr>
<tr>
<td>Information provided to electricity consumers</td>
<td>Mandates &amp; incentives: utilities</td>
<td>Building energy codes</td>
</tr>
<tr>
<td>Incentives from electricity rate structures</td>
<td>Financing mechanisms for energy efficiency</td>
<td>Carbon pricing and monitoring</td>
</tr>
<tr>
<td>•</td>
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<td>•</td>
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<td>•</td>
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</tbody>
</table>

### Renewable Energy

<table>
<thead>
<tr>
<th>Renewable Energy</th>
<th>Policies and Regulations</th>
<th>Administrative Procedures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Legal framework for renewable energy</td>
<td>Incentives &amp; regulatory support for renewable energy</td>
<td>Network connection and access</td>
</tr>
<tr>
<td>Planning for renewable energy expansion</td>
<td>Attributes of financial and regulatory incentives</td>
<td>Counterparty risk</td>
</tr>
<tr>
<td>•</td>
<td>•</td>
<td>Carbon pricing and monitoring</td>
</tr>
<tr>
<td>•</td>
<td>•</td>
<td>•</td>
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<tr>
<td>•</td>
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<td>•</td>
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<tr>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
</tbody>
</table>

• Electrical grid connection
• Permitting a new mini-grid
• Establishing a new household grid connection
• Securing energy efficiency appliance standards certification
• Network connection and access
• Counterparty risk
• Carbon pricing and monitoring
• Permitting a new renewable energy project
# RISE Renewable Energy Indicators

## Policies and Regulations

- **Legal framework for renewable energy**
  - Primary legislation
  - Legal private ownership of generation

- **Planning for renewable energy expansion**
  - Renewable energy targets and plans
  - Renewable energy in generation planning
  - Renewable energy in transmission planning
  - Resource data and siting

- **Incentives & regulatory support for renewable energy**
  - Financial and regulatory incentives
  - Grid access and dispatch

- **Attributes of financial and regulatory incentives**
  - Predictability and efficiency (policy-neutral)
  - Predictability and efficiency (policy-specific)
  - Long-term sustainability

- **Network connection and access**
  - Connection cost allocation
  - Network usage and pricing
  - Renewable grid integration

- **Counterparty Risk**
  - Payment risk reduction
  - Utility creditworthiness
  - Utility transparency and monitoring

- **Carbon pricing and monitoring**
  - Carbon pricing mechanism
  - Monitoring, reporting and verification (MRV) system

## Administrative Procedures

- **Permitting a new renewable energy project**
  - Time and number of procedures

## RISE score: 7 indicators and 18 sub-indicators

Not scored: 1 indicator and 1 sub-indicator
### RISE Renewable Energy Indicators

#### Scoring Calculation Details

## Legal framework for renewable energy

<table>
<thead>
<tr>
<th>Questions</th>
<th>Scoring</th>
<th>Traffic light</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>I. Legal framework for renewable energy</strong></td>
<td>Sum and divide by 2</td>
<td></td>
</tr>
<tr>
<td><strong>1. Primary legislation</strong></td>
<td>Yes – 100, No – 0</td>
<td>If the score X is:</td>
</tr>
<tr>
<td>1.1 Does a legal framework for renewable energy development exist?</td>
<td></td>
<td>$x \geq 67$ ●</td>
</tr>
<tr>
<td><strong>2. Legal private ownership of generation</strong></td>
<td>Yes – 100, No – 0</td>
<td>$33 &lt; x &lt; 67$ ●</td>
</tr>
<tr>
<td>2.1 Is the private sector ownership of renewable energy generation legally authorized?</td>
<td></td>
<td>$33 \leq x$ ●</td>
</tr>
</tbody>
</table>
## Planning for renewable energy expansion

### 3. Renewable energy targets and plans
- **3.1** Does an official renewable energy target exist?  
  **Yes – 25, No – 0**
- **3.2** Does a renewable energy action plan or strategy to attain the target exist?  
  **Yes – 25, No – 0**
- **3.3** Does the plan or strategy define the amount of investment necessary to meet the RE target?  
  **Yes – 25, No – 0**
- **3.4** Is there an institution responsible for tracking progress in renewable energy development?  
  **Yes – 25, No – 0**

### 4. Renewable energy in generation planning
- **4.1** Does an electricity generation plan that includes renewable energy development exist?  
  **Yes – 50, No – 0**
- **4.2** Is the generation plan based on a probabilistic approach?  
  **Yes – 50, No – 0**

### 5. Renewable energy in transmission planning
- **5.1** Does the current transmission planning consider renewable energy scale-up?  
  **Yes – 50, No – 0**
- **5.2** Has the country conducted a variable renewable energy integration study?  
  **Yes – 50, No – 0**

---

If the score X is:
- $x \geq 67$ ⚫
- $33 < x < 67$ ⚫
- $33 \leq x$ ●
## Planning for renewable energy expansion

### II. Planning for renewable energy expansion

#### 6. Resource data and siting

For each relevant RE technology:*  
6.1 Does the government publish or endorse a resource atlas or other data on the abundance and quality of the resource?  
6.2 To what extent does the map follow best practices of data quality and availability?  
6.3 Has the country carried out strategic planning or produced zoning guidance to inform the commercial development of the resource?  
6.4 Has the planning or zoning guidance been carried out according to best practice by 1) being undertaken as part of a strategic environmental and social assessment or equivalent process; and 2) making the outputs publically available?

* A relevant technology is one for which the country has a specific resource target or, if no resource targets exist, has high resource potential according to IRENA country profiles.

<table>
<thead>
<tr>
<th>Questions</th>
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</thead>
<tbody>
<tr>
<td>6. Resource data and siting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>For each relevant RE technology:*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.1 Does the government publish or endorse a resource atlas or other data</td>
<td>Yes – 25, No – 0</td>
<td></td>
</tr>
<tr>
<td>on the abundance and quality of the resource?</td>
<td>0–25 – scale</td>
<td></td>
</tr>
<tr>
<td>6.2 To what extent does the map follow best practices of data quality</td>
<td>Yes – 25, No – 0</td>
<td></td>
</tr>
<tr>
<td>and availability?</td>
<td>0–25 – scale</td>
<td></td>
</tr>
</tbody>
</table>
| 6.3 Has the country carried out strategic planning or produced zoning    | Sum and divide by number of relevant technologies | If the score X is:
| guidance to inform the commercial development of the resource?           |         | $x \geq 67$ | • |
| 6.4 Has the planning or zoning guidance been carried out according to     |         | $33 < x < 67$ | • |
| best practice by 1) being undertaken as part of a strategic environmental |         | $33 \leq x$ | • |
| and social assessment or equivalent process; and 2) making the outputs   |         |               |
| publically available?                                                     |         |               |
|                                                                           |         |               |
# Incentives and regulatory support for renewable energy

## III. Incentives and regulatory support for renewable energy

### 7. Financial and regulatory incentives for renewable energy

7.1 Is there at least one scheme to support renewable energy per unit of electricity generated? (e.g. feed-in tariff, competitive bidding/auction, mandates, generation premiums, production tax credits)?

7.2 Does the government offer other direct fiscal incentives for renewable energy (e.g. capital subsidies, grants or rebates, investment tax credits, tax reductions?)

<table>
<thead>
<tr>
<th>Questions</th>
<th>Scoring</th>
<th>Traffic light</th>
</tr>
</thead>
<tbody>
<tr>
<td>7. Financial and regulatory incentives for renewable energy</td>
<td><strong>Sum and divide by 2</strong></td>
<td></td>
</tr>
<tr>
<td>7.1 Is there at least one scheme to support renewable energy per unit of</td>
<td>Yes – 50, No – 0</td>
<td></td>
</tr>
<tr>
<td>electricity generated? (e.g. feed-in tariff, competitive bidding/auction,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>mandates, generation premiums, production tax credits)?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.2 Does the government offer other direct fiscal incentives for</td>
<td>Yes – 50, No – 0</td>
<td></td>
</tr>
<tr>
<td>renewable energy (e.g. capital subsidies, grants or rebates, investment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>tax credits, tax reductions?)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 8. Grid access and dispatch

8.1 Does the country provide guaranteed access to the grid for RE?
8.2 Do RE projects receive priority in dispatch?
8.3 Are there provisions to compensate seller if offtake infrastructure is not built in time?
8.4 Are there mechanisms to compensate RE projects for lost generation due to certain curtailments after project commissioning?

<table>
<thead>
<tr>
<th>Questions</th>
<th>Scoring</th>
<th>Traffic light</th>
</tr>
</thead>
<tbody>
<tr>
<td>8. Grid access and dispatch</td>
<td><strong>Yes – 25, No – 0</strong></td>
<td></td>
</tr>
<tr>
<td>8.1 Does the country provide guaranteed access to the grid for RE?</td>
<td>Yes – 25, No – 0</td>
<td></td>
</tr>
<tr>
<td>8.2 Do RE projects receive priority in dispatch?</td>
<td>Yes – 25, No – 0</td>
<td></td>
</tr>
<tr>
<td>8.3 Are there provisions to compensate seller if offtake infrastructure is</td>
<td>Yes – 25, No – 0</td>
<td></td>
</tr>
<tr>
<td>not built in time?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.4 Are there mechanisms to compensate RE projects for lost generation</td>
<td>Yes – 25, No – 0</td>
<td></td>
</tr>
<tr>
<td>due to certain curtailments after project commissioning?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*If the score X is:*

- **x ≥ 67**
- **33 < x < 67**
- **33 ≤ x**
### Attributes of financial and regulatory incentives

<table>
<thead>
<tr>
<th>Questions</th>
<th>Scoring</th>
<th>Traffic light</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>IV. Attributes of financial and regulatory incentives</strong></td>
<td></td>
<td>Sum and divide by 3</td>
</tr>
<tr>
<td><strong>9. Predictability and efficiency (policy-neutral)</strong></td>
<td></td>
<td>Yes – 33.3, No – 0</td>
</tr>
<tr>
<td>9.1 Is the market entry mechanism for private RE projects defined? (e.g. 1st come 1st served, tenders)</td>
<td>Yes – 33.3, No – 0</td>
<td>Yes – 33.3, No – 0</td>
</tr>
<tr>
<td>9.2 Are projects subject to development timelines or milestones?</td>
<td>Yes – 33.3, No – 0</td>
<td>Yes – 33.3, No – 0</td>
</tr>
<tr>
<td>9.3 Are tariffs indexed (in part or in whole) to an international currency or to inflation?</td>
<td>Yes – 33.3, No – 0</td>
<td>Yes – 33.3, No – 0</td>
</tr>
<tr>
<td><strong>10. Predictability and efficiency (policy-specific)</strong></td>
<td></td>
<td>Yes – 100, No – 0</td>
</tr>
<tr>
<td>10.1 If there is a guaranteed tariff, is there a mechanism to adjust the level of the tariff for new entrants (e.g. declination)?</td>
<td>Yes – 100, No – 0</td>
<td>Yes – 100, No – 0</td>
</tr>
<tr>
<td>10.2 If there is a guaranteed tariff, is there a mechanism to differentiate tariffs based on the size of the generation plant?</td>
<td>Yes – 100, No – 0</td>
<td>If the score X is: x ≥ 67 •</td>
</tr>
<tr>
<td>10.3 If there is competitive bidding/auctions, are there provisions to ensure full and timely project completion (e.g. bid-bonds, project milestones, eligibility requirements)</td>
<td>Yes – 100, No – 0</td>
<td>33 &lt; x &lt; 67 •</td>
</tr>
<tr>
<td>10.4 If there is a renewable energy mandate, can it be met with tradable certificates (e.g. RECs, ROCs, TECs)</td>
<td>Yes – 100, No – 0</td>
<td>33 ≤ x •</td>
</tr>
<tr>
<td><strong>11. Long-term Sustainability</strong></td>
<td></td>
<td>Yes – 100, No – 0</td>
</tr>
<tr>
<td>11.1 Is the price subsidy/benefit implied by a renewable energy incentive program passed through in full or in part to the final electricity consumer?</td>
<td>Yes – 100, No – 0</td>
<td>Divide by the number of relevant incentives in place</td>
</tr>
</tbody>
</table>
### Network connection and access

#### Questions

<table>
<thead>
<tr>
<th>Questions</th>
<th>Scoring</th>
<th>Traffic light</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>V. Network connection and access</strong></td>
<td><em>Sum and divide by 3</em></td>
<td></td>
</tr>
<tr>
<td><strong>12. Connection cost allocation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12.1 Are there rules defining the allocation of connection costs?</td>
<td>Yes – 50, No – 0</td>
<td></td>
</tr>
<tr>
<td>12.2 What is the type of the connection cost allocation policy (i.e. shallow/deep)?</td>
<td>Shallow – 50, Deep – 0</td>
<td></td>
</tr>
<tr>
<td><strong>13. Network usage and pricing</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13.1 Are there rules that allow electricity customers to purchase power directly from a third party (i.e. an entity other than the designated utility in a service area)?</td>
<td>Yes – 50, No – 0</td>
<td></td>
</tr>
<tr>
<td>13.2 Do the rules define the size and allocation of costs for use of the transmission and distribution system (e.g. wheeling charges, locational pricing?)</td>
<td>Yes – 50, No – 0</td>
<td></td>
</tr>
<tr>
<td><strong>14. Renewable grid integration</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14.1 Does the country have a grid code that includes measures or standards addressing variable renewable energy?</td>
<td>Yes – 33.3, No – 0</td>
<td></td>
</tr>
<tr>
<td>14.2 Are there rules for exchanging power between balancing areas that penalize variable renewable energy (e.g. through imbalance penalties)?</td>
<td>Yes – 0, No – 33.3</td>
<td></td>
</tr>
<tr>
<td>14.3 Are there provisions in the power exchange rules that allow for plant forecasting?*</td>
<td>Yes – 33.3, No – 0</td>
<td></td>
</tr>
</tbody>
</table>

*Only scored in countries with multiple balancing areas.

**If the score X is:**

- $X \geq 67$ •
- $33 < X < 67$ •
- $33 \leq X$ •
## Counterparty risk

### VI. Counterparty risk

#### 15. Payment risk mitigation
15.1 Does the government offer or allow backing of utility power purchase payments (e.g. through a letter of credit, escrow account, payment guarantee, or other)?

Yes – 100, No – 0

#### 16. Utility Transparency and Monitoring
16.1. Are the financial statements of the largest utility publicly available?

<table>
<thead>
<tr>
<th>Questions</th>
<th>Scoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) generation</td>
<td>Yes – 25/8, No – 0</td>
</tr>
<tr>
<td>b) transmission</td>
<td>Yes – 25/8, No – 0</td>
</tr>
<tr>
<td>c) distribution</td>
<td>Yes – 25/8, No – 0</td>
</tr>
<tr>
<td>d) retail sales</td>
<td>Yes – 25/8, No – 0</td>
</tr>
</tbody>
</table>

If yes, are they audited by an independent auditor?

<table>
<thead>
<tr>
<th>Questions</th>
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</tr>
</thead>
<tbody>
<tr>
<td>e) generation</td>
<td>Yes – 25/8, No – 0</td>
</tr>
<tr>
<td>f) transmission</td>
<td>Yes – 25/8, No – 0</td>
</tr>
<tr>
<td>g) distribution</td>
<td>Yes – 25/8, No – 0</td>
</tr>
<tr>
<td>h) retail sales</td>
<td>Yes – 25/8, No – 0</td>
</tr>
</tbody>
</table>

If the score $X$ is:

- $x \geq 67$
- $33 < x < 67$
- $33 \leq x$
## VI. Counterparty risk

### 16.2. Are the following metrics published in a primary official document (by the utility, regulator or ministry and/or government)?

<table>
<thead>
<tr>
<th>Questions</th>
<th>Scoring</th>
<th>Traffic light</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Transmission - Transmission loss rate</td>
<td>Yes – 25/4, No – 0</td>
<td></td>
</tr>
<tr>
<td>b) Distribution - Distribution loss rate</td>
<td>Yes – 25/4, No – 0</td>
<td></td>
</tr>
<tr>
<td>c) Retail sales – Bill collection rate</td>
<td>Yes – 25/4, No – 0</td>
<td></td>
</tr>
<tr>
<td>d) Retail sales – Energy available to end users</td>
<td>Yes – 25/4, No – 0</td>
<td></td>
</tr>
</tbody>
</table>

If the score
X is:

- $x \geq 67$ ●
- $33 < x < 67$
- $33 \leq x$ ●

### 16.3. Is the utility operating an incidence/outage recording system (or SCADA/EMS with such functionality)?

- Yes – 25, No – 0

### 16.4. Is the utility measuring the SAIDI and SAIFI or any other measurements for service reliability?

<table>
<thead>
<tr>
<th>Questions</th>
<th>Scoring</th>
<th>Traffic light</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Are the measurements reported to the regulatory body?</td>
<td>Yes – 25/3, No – 0</td>
<td></td>
</tr>
<tr>
<td>a) Are the measurements available to public?</td>
<td>Yes – 25/3, No – 0</td>
<td></td>
</tr>
</tbody>
</table>
## VI. Counterparty Risk

### 17. Utility Financial Viability

<table>
<thead>
<tr>
<th>Questions</th>
<th>Scoring</th>
<th>Traffic light</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>17.1. Current ratio</strong></td>
<td>$&lt;1$ -- 0</td>
<td><strong>Sum</strong></td>
</tr>
<tr>
<td></td>
<td>in between -- scale</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$\geq 1.2$ -- 25</td>
<td></td>
</tr>
<tr>
<td><strong>17.2. EBITDA margin</strong></td>
<td>$&lt;0$ -- 0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>in between -- scale</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$\geq 15%$ -- 25</td>
<td></td>
</tr>
<tr>
<td><strong>17.3. Debt service coverage ratio</strong></td>
<td>$&lt;1$ -- 0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>in between -- scale</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$\geq 1.2$ -- 25</td>
<td></td>
</tr>
<tr>
<td><strong>17.4. Days payable outstanding</strong></td>
<td>$&gt;180$ -- 0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>in between -- scale</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$\leq 90$ -- 25</td>
<td></td>
</tr>
</tbody>
</table>

If the score $X$ is:
- $x \geq 67$ •
- $33 < x < 67$ •
- $33 \leq x$ •
# Carbon Pricing and Monitoring

<table>
<thead>
<tr>
<th>Questions</th>
<th>Scoring</th>
<th>Traffi7 light</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>VII. Carbon pricing and monitoring</strong></td>
<td><strong>Sum</strong></td>
<td>If the score $X$ is:</td>
</tr>
<tr>
<td>18.1 GHG emissions coverage under any carbon pricing mechanism</td>
<td>100% coverage – 50, ( &lt; 100% – \text{scaled} )</td>
<td>$x \geq 67$ •</td>
</tr>
<tr>
<td>18.2 Monitoring, reporting and verification system for greenhouse gas emissions in place</td>
<td>Yes – 50, No – 0</td>
<td>$33 &lt; x &lt; 67$ •</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$33 \leq x$ •</td>
</tr>
</tbody>
</table>
RISE Renewable Energy Score Distribution by Indicators – Global (1/2)
RISE Renewable Energy Score Distribution by Indicators – Global (2/2)
# RISE Renewable Energy Score Distribution by Indicators – Central Asia

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Kazakhstan</th>
<th>Kyrgyz Republic</th>
<th>Tajikistan</th>
<th>Uzbekistan</th>
<th>Global Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Legal framework for renewable energy</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>83</td>
</tr>
<tr>
<td>2. Planning for renewable energy expansion</td>
<td>65</td>
<td>43</td>
<td>38</td>
<td>31</td>
<td>53</td>
</tr>
<tr>
<td>3. Incentives and regulatory support for renewable energy</td>
<td>75</td>
<td>75</td>
<td>38</td>
<td>38</td>
<td>59</td>
</tr>
<tr>
<td>4. Attributes of financial and regulatory incentives</td>
<td>83</td>
<td>33</td>
<td>67</td>
<td>33</td>
<td>57</td>
</tr>
<tr>
<td>5. Network connection and pricing</td>
<td>92</td>
<td>58</td>
<td>0</td>
<td>0</td>
<td>43</td>
</tr>
<tr>
<td>6. Counterparty risk</td>
<td>36</td>
<td>64</td>
<td>12</td>
<td>8</td>
<td>54</td>
</tr>
<tr>
<td>7. Carbon pricing and monitoring</td>
<td>78</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>16</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>76</strong></td>
<td><strong>53</strong></td>
<td><strong>36</strong></td>
<td><strong>30</strong></td>
<td><strong>52</strong></td>
</tr>
</tbody>
</table>
3. World Bank Energy Program in Central Asia
### Examples of World Bank Energy Program in Central Asia

<table>
<thead>
<tr>
<th>Category</th>
<th>Projects/Activities</th>
</tr>
</thead>
</table>
| **Diversification of Energy-mix**| • Renewable energy development (Wind resource assessment and proposed development in UZB, IFC’s proposed solar advisory in UZB)  
• Regional cooperation (below) |
| **Demand-side Energy Efficiency**| • Energy efficiency for industrial enterprises (UZB)  
• District heating and building energy efficiency (KAZ, KYR, TAJ, UZB) |
| **Supply Adequacy and Efficiency**| • Renewable energy generation (SHPP TA in KYR, HPP in TAJ)  
• Modernization of key transmission and distribution networks (KYR, UZB) |
| **Institutional Development**     | • Power system planning (KAZ, UZB) and dispatch efficiency assessment (UZB)  
• Tariff and subsidies studies (KYR, TAJ, UZB)  
• Support to regulator (KYR)  
• Advanced metering (KYR, UZB)  
• Support to utility corporate governance (KYR, UZB) |
| **Regional Cooperation**          | • Central Asia Regional Economic Cooperation Program (CAREC)  
• Central Asia Energy and Water Development Program (CAEWDP)  
• Regional interconnection (CASA-1000) |
4. Cases from Other Regions
De-risking: Maldives Accelerating Sustainable Private Investment in RE (ASPIRE)

- Up to 35-50MW of PV
- WB provides off-take and liquidity guarantee
- Potential subsidy for smaller islands and batteries

Source: World Bank
De-risking: Scaling Solar (Zambia Case)

- Projects were developed and tender was prepared and executed to conclusion in 9 months; round 2 for 200MW already announced
- USc 6/kWh non-indexed is equivalent to an average in current dollars over contract lifetime of USc 4.7/kWh

<table>
<thead>
<tr>
<th>Sites:</th>
<th>West Lunga</th>
<th>Mosi-oa Tunya</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neoen/ First Solar</td>
<td>Usc 6.02/kWh</td>
<td></td>
</tr>
<tr>
<td>ENEL Green Power</td>
<td>Usc 7.84/kWh</td>
<td></td>
</tr>
</tbody>
</table>

- All bidders who submitted an offer requested the IDA payment guarantee; no IDA loan guarantee was needed
De-risking: Geothermal Resource Risk

<table>
<thead>
<tr>
<th>Development Phases</th>
<th>Type of Risk</th>
<th>Cumulative Costs of Development</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Identification of Resource</td>
<td>High Resource Risk</td>
</tr>
<tr>
<td>II</td>
<td>Exploration Drilling ($20-30 mil)</td>
<td>Lower Resource Risk Financing Risk</td>
</tr>
<tr>
<td>III</td>
<td>Production Drilling (~$20-120 mil)</td>
<td>Financing Risk</td>
</tr>
<tr>
<td>IV</td>
<td>SAGS + Power Plant (~$20-200 mil)</td>
<td>Operational Risk</td>
</tr>
<tr>
<td>V</td>
<td>Operation + Maintenance</td>
<td></td>
</tr>
</tbody>
</table>

Cumulative Costs of Development: Cost US$ 196m total

Risk Levels: Low, Moderate, High

March 2015 Global Geothermal Development Plan

Source: Energy Sector Management Assistance Program

About $1 billion

5-8 times leverage
Reducing Financing Cost: Morocco Noor CSP Complex

- 2,000 MW target
- 500 MW plus storage under development
- WB financing only $400 million
- About $3 billion financing
- Tariff evolution:
Reducing Financing Cost: Solar Rooftops in India

- $500 million World Bank (IBRD)
- $125 million Clean Technology Fund
- $25 million Global Environmental Fund
- 1,000MW (Government target is 40,000GW)
- State Bank of India is the borrower and implementing agency
- Multiple delivery models

Picture credit: Renewable Energy Magazine
Greening Grid: Solar Parks in India

- World Bank to support over 3,000MW of utility scale solar power
- Provision of critical infrastructure

Charanka solar park (224MW) for comparison
Greening Grid: Smart grids in Ukraine, Vietnam and Turkey

Traditional Distribution System

Distribution System of the Future

Source: World Bank
THANK YOU!