Republic of Armenia (RA) has significant renewable energy resources, utilization of which will make possible to cover 30% of national electricity demand by 2025.

Renewable energy is declared as one of priorities in development of economy of Armenia.

All electricity generated from renewables shall be mandatory purchased pursuant to the Law with fixed tariff during 15 years from the operation starts.

Despite not having natural resources of oil and gas Armenia is energy exporting country.
Statement of facts as of 2011

- 94 operating SHPPs
- 65 SHPPs in stage of construction
- 3 SHPPs have obtained CDM certificate

- Total output in 2010 – 385 million KW/h
- 5% of internal demand is covered by SHPPs (135 MW)
- Target - about 10% by the year 2020
RE Funding institutions:

- **IFC** – 15 million USA Dollars,
- **WB** - 5 million USA Dollars,
- **EBRD** - 7 million USA Dollars,
- **Cafesjian Foundation** through Cascade Credit - 3 million USA Dollars,
- **EBRD EE/RE** program through Anelik Bank CJSC – 3 million USA Dollars, US$; market interest APR, 5 years tenor;
- **German-Armenian Fund** from KfW -16 partner PFI, term 8-12 years
  - (GAF-RE I) - Euro 6 million
  - (GAF-RE II) - Euro 18 million
Statement of facts as of 2011

- The funds are being utilized with difficulties
- Only few banks out of 16 are active participants
- The SHPPs have difficulties in different stages of project implementation
- Overdue loan repayments
The Characteristics of RE Investments

- High up-front costs and comparably low operational costs
- Lack of experience of investors and lenders increases transaction costs.
- Long grace period necessary until revenues from sold electricity receive.
- The capital intensiveness implies a high sensitivity to capital cost financing for this kind of projects
- Business mainly has expressive seasonality
Anelik Bank is:

- One of the first banks in RA started financing the RE projects since 1998
- One of the leaders in RA banking system financing the RE projects
- Financed 6 SHPPs construction and equipment modernization projects
- Total Capacity – 14.8MwT
- The only bank Implemented CDM Project for SHPP
### The Projected Main indices of Cascade of Client 1, 2, 3

<table>
<thead>
<tr>
<th>The name of SHPP</th>
<th>Height of sea level</th>
<th>Power Capacity</th>
<th>Annual production of Energy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Client- 1</td>
<td>2,240 meters</td>
<td>2.4 MWT</td>
<td>14,000,000 KWT</td>
</tr>
<tr>
<td>Client- 2</td>
<td>1,950 meters</td>
<td>4.37 MWT</td>
<td>18,000,000 KWT</td>
</tr>
<tr>
<td>Client- 3</td>
<td>1,650 meters</td>
<td>4.87 MWT</td>
<td>22,000,000 KWT</td>
</tr>
</tbody>
</table>

**Granted Amount – 450,000 Euro**
Difficulties

- The initial costs and credits associated with the proposed SHPPs are underestimated.
- The feasibility study for existing SHPPs are not thorough and comprehensive.
- PFIs do not have methodology of project financing analyses of SHPPs.
- Lack of experience of SHPPs owners and management.
- Lack of forecasts based on seasonality of business. There are no sensitivity Analyses.
- Ineffective evaluation of projects efficiency.
How to overcome difficulties

- Introduction of International Sound practices
- Well adapted training and coaching technologies combining class-room with intensive on-the job training both for PFI and SHPPs owners and management.
- Development of RE loan related procedures, Standardizing all procedures: starting from application, finishing with monitoring
- Tailor-made Analytical Model development for SHPP lending analyses
THANK YOU
FOR YOUR ATTENTION!
Restricted role for RA banks

- Banks unwilling to fund Long term SHPPs from own sources
- Banks unable to make appropriate technical analyses, feasibility studies and financial justifications
**SHPP DEVELOPMENT**

- **15 years guaranteed purchase of 100% of generated energy**
- **Preferential feed-in tariff, reviewed annually**

![Graph showing energy tariff rates from 2007 to 2010](image-url)
Legislation

- Law on Energy, 1997
  - 15 years guaranteed purchase of 100% of generated energy from RE


- Preferential feed-in tariff, PSRC № 207N, May 4, 2007
  - Annual review based on inflation and USD/AMD exchange rate
    \[ T = T_1 \left[ K_1 \frac{P_1}{100} + K_2 \frac{E_1}{E_2} + (1 - K_1 - K_2) \right] \]

- Customs payment deferral for turbines
# CDM PROJECTS IN ARMENIA

✓ Registered by CDM Executive Board

<table>
<thead>
<tr>
<th>N</th>
<th>Project name</th>
<th>GHG reduction, tCO2/annum</th>
<th>Installed capacity, MW</th>
<th>Annual generation, GWH/annum</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Nubarashen Landfill Project</td>
<td>130,000</td>
<td>1.20</td>
<td>10</td>
</tr>
<tr>
<td>2</td>
<td>Lusakert Biogas Plant</td>
<td>62,832</td>
<td>0.85</td>
<td>7</td>
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<tr>
<td>3</td>
<td>Yeghegis SHPP</td>
<td>3,166</td>
<td>3.16</td>
<td>7.3</td>
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<tr>
<td>4</td>
<td>Argichi SHPP</td>
<td>13,331</td>
<td>8.56</td>
<td>30.5</td>
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<tr>
<td>5</td>
<td>Jradzor SHPP</td>
<td>8,734</td>
<td>5.93</td>
<td>20</td>
</tr>
</tbody>
</table>
CDM PROJECTS IN ARMENIA

✓ Approved by DNA – under validation

<table>
<thead>
<tr>
<th>N</th>
<th>Project name</th>
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<th>Installed capacity, MW</th>
<th>Annual generation, GWH/annum</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Eghvard-2 SHPP</td>
<td>8,741</td>
<td>9.0</td>
<td>18.21</td>
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<tr>
<td>2</td>
<td>Hankavan-1 SHPP</td>
<td>1,225</td>
<td>1.2</td>
<td>2.71</td>
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<td>3</td>
<td>Energocor Bundled SHPP Project</td>
<td>9,369</td>
<td>6.81</td>
<td>30.18</td>
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<tr>
<td>4</td>
<td>Saravan and Her-Her SHPPs</td>
<td>5,321</td>
<td>6.04</td>
<td>17.1</td>
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<td>5</td>
<td>Amberd SHPP Cascade</td>
<td>8,274</td>
<td>11.54</td>
<td>29.68</td>
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</tbody>
</table>

EU RES Industry Workshop: Promotion of Investment in the INOGATE countries
### CDM PROJECTS IN ARMENIA

#### Projects under development – PDD level

<table>
<thead>
<tr>
<th>N</th>
<th>Project name</th>
<th>GHG reduction, tCO2/annum</th>
<th>Installed capacity, MW</th>
<th>Annual generation, GWH/annum</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mika Cement CDM Project</td>
<td>114,793</td>
<td>-</td>
<td>-</td>
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<tr>
<td>2</td>
<td>Cascade Credit Bundled SHPP Project</td>
<td>30,137</td>
<td>14.8</td>
<td>69.5</td>
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<tr>
<td>3</td>
<td>Gegharot SHPP</td>
<td>3,395</td>
<td>2.49</td>
<td>10.61</td>
</tr>
<tr>
<td>4</td>
<td>Afforestation/reforestation Project in Lori Region</td>
<td>8,000</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>