Closing renewable energy and energy efficiency market gaps in Kyrgyzstan as approach to promoting urban sustainable development

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30/10/2015, Erevan
Background:

- **Kyrgyz Republic:** Over 90% of territory - mountains = difficulties in delivering energy.

- **Population distribution:** 5.8 mln, 66% live in the rural areas, 2 largest cities - Bishkek (16%) and Osh (4.6%).

- **Good solar, hydro and biogas potential.**
Background:

- **Energy system of the KR:**
  - 7 large HPPs (i.e. 3030 MW) dependence on water reserves=climate, depreciation of equipment over 50%
  - and 2 TPPs (i.e. 716 MW),
  - 9 small HPP (i.e. 38.5 MW) - only 3 of them private, 1 new

<table>
<thead>
<tr>
<th>Total electricity generated (GWh) in 2013 by:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coal and coal products</td>
</tr>
<tr>
<td>Hydro - small (under 50MW)</td>
</tr>
<tr>
<td>Hydro - large (over 50MW)</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

- **Energy production crisis**
  - 2013-2014 produced and consumed 14 billion kWh,
  - in 2015 already **consumption was higher than production** and around 1 bln kWh electricity was imported from Kazakhstan
Background:

- **Energy consumption structure**
  - In 1999 HH consumed 4.2 billion kWh (30% of total consumption),
  - in 2012 – already 7.2 billion kWh (63%)

- **Seasonal variations in demand**
  - During warm time of the year- 22-23 million kWh /day,
  - During cold period - 70 million kWh /day (3 times as much).

<table>
<thead>
<tr>
<th>Period</th>
<th>Price, USD</th>
<th>Type of consumer</th>
<th>% of price increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to Aug 2015</td>
<td>0.010</td>
<td>private consumers</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.028</td>
<td>other consumers</td>
<td></td>
</tr>
<tr>
<td>After Aug 2015</td>
<td>0.011</td>
<td>private consumers up to 700 kWh per month</td>
<td>10.00%</td>
</tr>
<tr>
<td></td>
<td>0.033</td>
<td>other consumers</td>
<td>15.46%</td>
</tr>
</tbody>
</table>
Examples of implemented solutions:

• **Biogas plant for utilizing up to 5 ton food waste per day = 330 hectares of fertilized land + 500 m² of heated space + cooking for 30 people**
Examples of implemented solutions:

- **Micro hydro on rivers and channels:** these micro HPP (each around 15 kW i.c.) are used for heating of the premises of Bishkek Channel Management Authority, facility also used for testing HPP equipment.
Examples of implemented solutions:

- **Solar PV and SWH**: PV system with capacity of 16.4 kW supplies electricity for Homeless Center for 108 children in Bishkek, SWH system for 500 liters is used for daily hot water, 100-liter system used for kitchen needs.
Examples of implemented solutions:

• **Hydro pumps:**
  used by cafes for drip irrigation of flowers and fountains
Examples of implemented solutions:

• **Energy efficient building:**
  
  Energy efficiency of Osh school for 850 pupils, built with support of Turkish Government and designed based on CNaR KR 23-01:2009 (Thermal protection of buildings) and CR 23-101:2009 Designing thermal protection of buildings is 50%, energy consumption is 71.8 kWh/m², EE class = B
Market gaps - policy

- **General policy exists in form of:**
  - Law on Energy System; Law on Electrical Energy System;
  - Law on Energy Saving; Law on Energy Efficiency of buildings; CNaR (SNIP) Thermal protection of buildings (EE class of buildings, establishes class definitions and minimal class for new buildings)
  - Law on Renewable Energy (2008, 2012); tariffs for 8 years for electricity from RES
  - National strategy of Sustainable Development and Program for transferring to Sustainable Development 2013-2017;

- **New developments:**
  - Concept of Developing Small Hydro Energy Sector up to 2017 (July 2015); Methodology on calculating the price to be paid for electricity generated with use of RE (Aug 2015) - contradicts Law on RES!
  - Program of the KR on Energy Saving and Planning of Energy Efficiency Policy was approved only on (Aug 2015); introduces planned energy savings, energy intensity and GHG emission decrease up to 2025, ESCOs, etc

- **No mechanisms for implementation of existing legislation, specific legislation is developing only for hydro**
Market gaps - clients

- Little information on the **benefits and costs** of the green technologies and EE solutions;
- No reliable information on the **suppliers**, no tools to access their **reliability**;
- Very few **demonstration projects**, and most all scattered across the country;
- Little access to **full services** – from system choice through to installation, maintenance, repairs;
- Misunderstanding of the technologies and subsequent intent to save money on specialists leads to **poor implementation**;
- **Little local expertise**, all experts are located in the 2 largest cities – Bishkek and Osh;
- **Low costs of electricity** make RE projects economically unviable, unless business depends on reliable constant energy supply;
Market gaps - financing

• Existing finance solutions (Kyrseff (EBRD), EE programs (IFC), etc) follow standard procedures and demand collateral for EE loans;
• Interest rates are still high – around 20%;
• No capital for early development stages of the producers/suppliers of solutions/services.

Market gaps - companies

• Limited capacity of firms in financial, operational and HR management
• Limited understanding of marketing and client service

Market gaps - technology

• Limited access to production facilities required for development/adaptation of clean energy solutions;
• Limited and decreasing expert/specialist pool, especially in rural areas
<table>
<thead>
<tr>
<th>Market development degree/area</th>
<th>No market</th>
<th>Emerging market</th>
<th>Growing market</th>
<th>Mature market</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Technology</strong></td>
<td>Proof of principle and concept, basic research</td>
<td><strong>Proof of viability</strong></td>
<td>Scale up</td>
<td>Commercial</td>
</tr>
<tr>
<td><strong>Companies</strong></td>
<td>1-2 individuals, bringing friends/family</td>
<td><strong>Start-ups, hiring first specialists</strong></td>
<td>Company growth (specialists, then operational)</td>
<td>Established</td>
</tr>
<tr>
<td><strong>Financing</strong></td>
<td>State of international organizations</td>
<td>Venture capital</td>
<td>Credit (Debt market)</td>
<td>Public equity market</td>
</tr>
<tr>
<td><strong>Clients</strong></td>
<td>No interaction</td>
<td><strong>Early adopters, pioneers</strong></td>
<td>Rational purchase</td>
<td>Interaction and feedback</td>
</tr>
<tr>
<td><strong>Policy</strong></td>
<td>General regulation</td>
<td><strong>Sectoral regulation</strong></td>
<td>Specific positive regulations</td>
<td>Comprehensive framework</td>
</tr>
</tbody>
</table>
Development priorities:

- Improvement of legislative framework, development of secondary acts and mechanisms;
- Implementation of a number of demonstrational projects in all regions of the KR;
- Monitoring, maintenance and repairs of existing equipment/buildings;
- Provision of reliable information about the suppliers and technologies for consumers;
- Creation and development of the expert network, in urban and rural areas of the KR;
- Development and provision of comprehensive services as well as standard solutions;
- Ensuring quality of services through introducing industry standards, certification/quality evaluation programs;
- Supporting existing producers and NGOs, development of sector cooperation.
Development priorities:

Implemented projects:


• Installing 12 Solar 3-kW PV systems in rural areas of the Kyrgyz Republic with JGH Group, Denmark for a UNDP/WHO/UNIDO project “Providing rural First Aid Station with reliable electricity supply», 2012-13 and 9 Solar 2-kW PV systems in Republic Karakalpakstan, Uzbekistan with JGH Group, Denmark for UNDP Uzbekistan, 2014.

• Supporting Fluid PF in implementation of 4 biogas projects with international organizations (UNDP, BAS, private companies) and overseas expansion to DPRK and Croatia, 2012-13.
Development priorities:

Implemented projects:


Current projects:

- Installation OF solar water heating systems for heating and hot water supply in FAS of Ugut and Kyzyl-Zyldyz villages of Naryn province, financed by UNDP, 2015.
Thank you for your attention!

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