Smart Cities
and
Scaling up Energy Efficiency in Armenia

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Why Goris was suggested as a pilot?

- Distance from Yerevan - 250 km, population - 25 thousand people
- Good climatic conditions and rich natural landscape
- Existence of infrastructure, strategic geographical location
- Some of the most important Armenian medieval universities and cultural centers have been located near Goris (Tatev monastery), ancient scientific and educational center
- Rich historical and cultural heritage (architectural-historical monuments in the region - 503, architectural-historical monuments in the community - 20)
- Availability of human resources
- Commitment of community and local government to the idea of Smart city development
Main recommended measures

- **Economy**
  - to regulate and improve the street network, by building ropeways, elevators and pedestrian roads
  - Technology investment program to improve infrastructure and environment
  - Tourism and culture information and promotion program
  - Support and investments to science based industry and cooperation with local university to support the establishment of SMEs

- **Environment**
  - to create new public green areas;
  - to establish a waste management system and develop a public awareness program
  - to construct a simple waste water treatment plant;
  - to repair the existing flood control facility and implement effective and well-planned anti-flood measures
  - to implement an air monitoring system.

- **Society & Culture:**
  - To improve the city’s economy and create more opportunities for people
  - To invest in social housing and in the maintenance of historical buildings
  - To invest in energy efficient and resilient housing or alternative ways of housing also through the use of ICTs
  - To promote a healthy lifestyle
  - To engage in “smart education” with the use of ICT and create courses for professionals
  - To convert the existing empty buildings in recreation or education centers
Why in Buildings

- In Armenia, about 24% of total greenhouse gas emissions originates from energy use in buildings.
- About 30% of Armenian residents are considered in energy poverty.
- More than half of energy consumed in buildings comes from imported fuel.
- Thermal insulation in buildings can ensure about 50% energy saving in energy consumption.

"De-Risking and Scaling-up Investment in Energy Efficient Building Retrofits’’ UNDP-GCF project
“De-Risking and Scaling-up Investment in Energy Efficient Building Retrofits” project

The Project objective is to achieve reduction of greenhouse gas emissions,

Where: residential and public buildings,

How: thermal insulation and improved energy efficiency

Toolkit: complex measures including legal, organizational, combination of grant and loan financial resources, active involvement of municipalities and private sector
## Basic Data

<table>
<thead>
<tr>
<th><strong>GCF Implementation Agency</strong></th>
<th>UN Development Programme</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>National Executing Entity</strong></td>
<td>Ministry of Nature Protection</td>
</tr>
<tr>
<td><strong>Principal Partner / Beneficiary</strong></td>
<td>Municipality of Yerevan and other cities</td>
</tr>
<tr>
<td><strong>Partners</strong></td>
<td>State Committee on Urban Development, Ministry of Energy Infrastructures and Natural Resources</td>
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<tr>
<td><strong>Duration</strong></td>
<td>6 years (2017 to 2023)</td>
</tr>
</tbody>
</table>
### Basic Data

#### Funding

<table>
<thead>
<tr>
<th>Source</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>GCF: grant</td>
<td>20,000,000</td>
</tr>
<tr>
<td>UNDP: grant</td>
<td>420,000</td>
</tr>
<tr>
<td>European Investment Bank: loan</td>
<td>100,000,000</td>
</tr>
</tbody>
</table>

#### Co-financing

<table>
<thead>
<tr>
<th>Source</th>
<th>Amount</th>
</tr>
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<tbody>
<tr>
<td>Yerevan city municipality</td>
<td>8,000,000</td>
</tr>
<tr>
<td>Government of Armenia (in kind)</td>
<td>400,000</td>
</tr>
<tr>
<td>UNDP (in kind)</td>
<td>1,000,000</td>
</tr>
</tbody>
</table>
The Budget by Funding Source
(in USD)

Yerevan city municipality, 8,000,000, 6%
Green Climate Fund, 20,000,000, 16%
UNDP, 1,420,000, 1%
European Investment Bank, 20,000,000, 77%
Government of Armenia, 400,000, 0.3%

"De-Risking and Scaling-up Investment in Energy Efficient Building Retrofits” UNDP-GCF project
De-risking approach for energy efficiency building retrofits

Robust MRV for Energy Use/CO₂

Examples:
- Energy Management Information System

Policy De-risking Instruments

Examples:
- EE Building Codes
- Energy Tariff Reform
- Piloting Aggregative ESCO Models

Financial De-risking Instruments

Examples:
- Credit Lines to Commercial Banks
- Guarantees for Commercial Banks
- Public Equity (e.g. for ESCOs)

Financial Incentives (if necessary)

Examples:
- Direct subsidies to building owners
- Direct subsidies to ESCOs

“De-Risking and Scaling-up Investment in Energy Efficient Building Retrofits” UNDP-GCF project
IMPACT OF GCF PROJECT

- **6,000** Single-family individual buildings
  - 10,000 average per retrofit
  - 9% average level of grant

- **290** Multi-family apartment buildings
  - 120,000 average per retrofit
  - 22% average level of grant

- **150** Public buildings (small)
  - 95,000 average per retrofit
  - 8% average level of grant

- **23** Public buildings (large)
  - 250,000 average per retrofit
  - 5% average level of grant

**TOTAL**

- **211** Energy savings (GWh/year)
- **1,104** Lifetime GHG savings, kt
Thank you!