Implementation of EE projects in Republic of Serbia

Ministry of Mining and Energy
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Baku, 19 October 2016, 7th International forum on Energy for Sustainable Development
GEEE Workshop on promoting energy efficiency in Azerbaijan and other countries in the region
Serbian Energy Efficiency Project - WB

1st Phase – Original Financing SEEP 1

- IDA Credit 3870 YF – USD 21 million
- Contributions of Serbia – USD 4 million
- Total facility: USD 25 million
- In total 28 buildings for USD 10 million (12 hospitals & 16 schools) ~ 150,000 m²
- + CC Belgrade energy system rehabilitation for USD15 million (50 MW gas fired boiler house + 4 MW CHP, 50 heat substations and 3.5 km distribution network)

2nd Phase - Additional Financing SEEP 2

- IDA Credit 3870-1 YF – USD 10 mil.
- IBRD Loan 7466 YF – USD 18 mil.
- Contribution of Serbia – USD 2 mil.
- Total facility: USD 30 million
- In total 62 buildings for USD 22 mil. (19 clinics within CC Nis + 10 more hospitals, 28 schools & 5 social care institutions) ~ 250,000 m²
+ CC Nis new energy system for USD 8 million (30 MW gas fired boiler house, 15 heat substations and 2 km distribution network)
2004 Starting point

- Serbian Economy is highly energy intensive;
- More than 30% of final energy consumed by building sector;
- More than 50% of electricity utilized by households;
- No mandatory standards for design/refurbishment of buildings
- No regulation of EE
- Large, potential for energy efficiency improvements in building sector;
- Lack of information and awareness;
- Lack of financing
- Lack of coordinated EE policy
Project Cycle

- Approval – IDA/GoS Credit Agreement & IBRD/GoS Loan Agreement
- Data Collection on Public Buildings and Technical Ranking within SEEA
- Line Ministries’ Long List of public buildings, nominated for Preliminary Energy Audits
- SEEA - Recruitment of Preliminary Energy Auditors; Field performance of preliminary energy audits
- SEEA – Short-listing and proposal to line ministries for final nomination for retrofit
- Selection of Consultant Firms
- Detailed Energy Audits
- Investment packages proposal to Line Ministries
- Final list of public buildings for retrofit
- Selection of Contractors
- Works Implementation
- Project Cycle
Process of Implementation
Structure of EE measures and indicators

Total investment by type of Works:
I Building Envelope € 8,674,731 (87.9%)
II Mechanical System € 708,031 (7.2%)
III Lighting Improvement € 482,291 (4.9%)

Average investment per m² and payback:
SEEP1 ~ 50 €/m²  SPP ~ 7.5 years
SEEP2 ~ 55 €/m²  SPP ~ 10 years

Using a typical price of heat delivered through district heating networks in Serbia of 6 € cents per kWh, or € 60 per MWh, we get a typical payback of 6.25 years. If we add project admin and consultant costs to this at 15%, we still get a very good payback of 7.2 years

The highest percentage of achieved energy savings (here it is 62%) is accomplished for the buildings at which a full set of envelope refurbishment works was performed (fasade joinery replacement, facade walls and roof insulation and instalation of TRVs)

### SEEP 1

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### SEEP 2

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Legend:
- N= number of buildings
- SPP= Single Payback Period (Area Weighted)
- Savings= Energy Savings in % (Area Weighted)
Benefits

Technical & Financial:
SEEP1 average savings 40%
SEEP2 average savings 50%

Healthcare, learning and working conditions improved:
SEEP 1 indoor comfort improved 35-50%
SEEP 2 indoor comfort improved 40-60%

Environmental concern:
SEEP1 average CO2 reduction 41%
SEEP 2 average CO2 reduction 47%

Corporate and Institutional Responsibility

Line Ministries proved as reliable decision maker
SEEP 2 Results

Overall annual energy consumption before 301.5 kWh/m²

Overall annual energy consumption after 159.3 kWh/m²
LESSONS LEARNED

• Local Self Governments not able to provide sustainable program of energy retrofit in public buildings - only ad hoc activities with limited resources.
• Lack of sound institutional support to LSGs in conducting sustainable EE programs as a part of sustainable local and regional development strategies.
• Precondition - investments to be co financed by LSGs (at least 10 to 30%) in order to have clear commitment to the project sustainability.
• **Obligatory implementation of some kind of thermal and water flow control (thermostatic radiator valves, raisers balancing valves, variable flow pumps, supply heating water temperature automatic control re air temperatures)** in order to capture savings achieved.
• Lack of technical standards for thermal characteristics of envelope/ standardized specifications for EE investments
• Energy audits good method for identification of best EE solutions etc
2016 Regulatory Framework in Republic of Serbia

- **Law on Efficient Use of Energy** ("OG RS", no 25/2013),
  - NEEAP1 and 2
  - Secondary legislation on EMS
  - Regulation on Energy Saving Monitoring, Verification and Evaluation
  - Budgetary fund for EE

- **Law on Construction and Planning** ("RS Official Gazette" no. 72/09, 81/09 – correction, 64/10-US and 24/11)
  - 2011, 2012 - Rulebook
  - Rulebook on energy efficiency of buildings ("RS Official Gazette" no. 61/2011)
  - Rulebook on the conditions, content and manner of issuance of certificates of energy performance of buildings ("RS Official Gazette", no. 69/2012)
  - 2014 - Central Registry of Energy Passports
Designation for training and qualification role

**Training Organization**
- Provision of training program
- Qualification of Energy Manager and Energy Auditor
- Dissemination programs

- Dispatching candidates of Energy Manager

**Designated Organization (above thresholds for private sector, and all the public sector)**
- Assignment of candidates of Energy Manager and dispatching them to training program for qualification
- Development of 3 year Programmes and Annual plans
- EE&C activities initiated by the qualified Energy Manager
- Making Periodical Report and submission of Periodical Report to the Ministry
- Conducting mandatory energy audit periodically by Energy Auditor

**Ministry of Mining and Energy**
- Law and regulations
- Policy making
- Registration and checking Periodical Report and making database
- Issuing license of Energy Manager and Accredited Energy Auditor
- Inspection

**Inspector**
- Random Inspection
- Instruction if necessary
- Judgment of penalty

**Summary Audit Report**
Random Inspection to check the consumer’s performance

**Energy Auditor**
Mandatory Energy Audit
(every 5 years for Industry, every 10 years for Government & Municipality buildings)

**Certificate**

**Submission of Periodical Reports**

**Registration of Designated Organizations and qualified Energy Manager**

* Designed by JICA assistance/Implementation in Municipalities assisted by UNDP (GEF)
Budgetary Fund for Energy efficiency

- The Decree on the Program for Financing Activities and Measures of Improving Energy Efficiency in 2016 ("Official Gazette" No. 13/16 of 19 February 2016) /adopted each year/
- Rulebook on conditions for allocation and use of resources of the Budgetary Fund for improvement of Energy Efficiency of the Republic of Serbia and Criteria for Exemption from Compulsory Energy Audit ("Official Gazette of RS", No. 15/16 of 25 February 2016 / replaced the one from 2014/)
- How it works
  - Budget line within the Ministry of Mining and Energy
  - Financing: Budget of RS, donations, contribution of Municipalities (contribution of at least 30%, except underdeveloped areas),
  - Award procedure: Public Calls issued by the Ministry
  - Eligible entities: Physical and Legal Persons from Republic of Serbia
Budgetary Fund Operation

Public Call
- Lists terms and conditions for application
- List of eligible EE measures (envelope, HVAC,)
- Selection criteria
- Necessary documentation (technical documentation, Energy Performance Report (before and after EE rehabilitation) construction permit, Study with short description of project, BoQ (Bill of Quantities) and techno-economical analysis, OPG forms
- Other request in order to promote EE

Evaluation
- type of EE measures (envelope, HVC, lighting or combination, RES)
- type of public building (school, kindergarten, health center, administrative building etc),
- share of Investment by Municipality in the project, etc

Implement.
- Public procurement by Municipalities/Ministry checks BoQ for contractor
- Building rehabilitation monitored by Supervision consultant
- Ministry makes periodical checks
- Issuance of Energy Passports
- OPG forms
Public calls by 2016

- **First Public Call in 2014** for Municipalities (February):
  - Signed/finalized: 11 projects in Municipalities:
    - total value of the works is about RSD 80 million
    - savings: 40%, or about 2 million kWh

- **First public call in 2016 for Municipalities** (11. April-16 May 2016) -
  - Signed: 15 projects in Municipalities:
    - total value of the works is estimated at 125 Million RSD/
      exact figures will be available after public procurement by
      Municipalities

- **Second public call for 2016 for Municipalities** – in second half of 2016
  - Expected: at least 10 projects
  - Combined financing:
    - Budget of Republic of Serbia up to 25 Million RSD
    - UNDP (GEF)* 500,000,00USD (up to 50,000USD per
      project) + TA for evaluation/monitoring
    - Municipalities contribution at least 30%

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*Removing Barriers to Promote and Support Energy Management Systems in Municipalities throughout Serbia*
Thank you for your attention

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