

# Investment project pipeline, financial analysis of selected projects and assistance in preparation of bankable projects

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# Summary

In the framework of the Global Efficiency initiative the following project pipelines submitted by UNECE and UNESCAP counties:

- Albania, Armenia, Azerbaijan, Bosnia, China, Croatia, Georgia, Kazakhstan, Macedonia, Montenegro, Pakistan, Serbia, Tajikistan, Thailand, Turkmenistan, Ukraine, Uzbekistan
- Total number of projects **32**
- Total value **190,000,000**

# Assumptions

## **Most projects are submitted with incomplete financial data:**

- Revenues, savings, other income not defined;
- Operating costs, O&M, financing costs etc not provided;
- Some projects are financed only by equity, or grants;
- For most projects it is difficult to know the cost of capital;
- For some projects it is difficult to monetise the expected benefits.

## **For consistency, the selected measures are:**

- Simple payback period (PB)
- Discounted Net Present Value (NPV) on full project cost
- Internal Rate of Return on all project investment

These are not, strictly speaking, exact measures of bankability, but allow for like-for-like comparison.

# Albania

## 1. Renovate and improve EE 10 Elementary schools

|          |            |
|----------|------------|
| • Costs  | 2,350,000  |
| • Equity | 450,000    |
| • Grants | 1,900,000  |
| • Loans  | -          |
| • PB     | >40 years  |
| • NPV    | -1,566,000 |
| • IRR    | <0         |

# Albania

## 2. Renovate and improve EE (university) buildings

|          |           |
|----------|-----------|
| • Costs  | 5,700,000 |
| • Equity | -         |
| • Grants | 5,700,000 |
| • Loans  | -         |
| • PB     | >10 years |
| • NPV    | -393,000  |
| • IRR    | 8%        |

# Armenia

## 1. Improving energy performance of typical 9 storey building

|          |                                  |
|----------|----------------------------------|
| • Costs  | \$120,000                        |
| • Equity | \$22,000 (municipal)             |
| • Grants | \$98,000                         |
| • Loans  | -                                |
| • PB     | 4 years (savings in electricity) |
| • NPV    | 109,000                          |
| • IRR    | 21%                              |

# Armenia

## 2. Efficient street lighting in Aragatsvan

- Costs \$150,000
- Equity \$150,000 (or 30,000)
- Grants
- Loans \$0 (or 120,000)
- PB 4.7 years (or 8.5 years)
- NPV \$100,000 (or -8,500)
- IRR (on equity) 20% (or 39%)

# Azerbaijan

## 1. Improvement of Azerbaijan's legislation relating to Renewable Energy Sources (RES) and Energy Efficiency

|          |          |
|----------|----------|
| • Costs  | €320,000 |
| • Equity | -        |
| • Grants | €320,000 |
| • Loans  | -        |
| • PB     | n/a      |
| • NPV    | n/a      |
| • IRR    | n/a      |



# Azerbaijan

## 2. Energy Audit at Building 27 Baku

|          |           |
|----------|-----------|
| • Costs  | \$582,000 |
| • Equity |           |
| • Grants | \$582,000 |
| • Loans  | -         |
| • PB     | 7 years   |
| • NPV    | 80,000    |
| • IRR    | 10%       |

# Bosnia

## 1. Energy Park Livno (biomass + PV)

|          |                     |
|----------|---------------------|
| • Costs  | <b>€4,226,070</b>   |
| • Equity | €1,268,000          |
| • Grants | -                   |
| • Loans  | €2,958,000 (7y @7%) |
| • PB     | 6 years             |
| • NPV    | 2,980,000           |
| • IRR    | 19%                 |

# Bosnia

## 2. Hospital Livno

# Bosnia

## 3. Biomass plant Majur

# Bosnia

## 4. Energy park Fojnica

# China

## 1. YuTeng Waste Heat to Power

# Croatia

## 1. Refurbishment of home for the elderly and infirm in City of Petrinja

|           |          |
|-----------|----------|
| • Costs   | €230,000 |
| • Equity  | €184,000 |
| • Grants  | € 45,000 |
| • Loans A | -        |
| • Loans B | -        |
| • PB      | 6 years  |
| • NPV     | 98,000   |
| • IRR     | 17%      |

# Georgia

## 1. Energy Efficient and Sustainable House

|           |            |
|-----------|------------|
| • Costs   | €1,013,000 |
| • Equity  | €265,000   |
| • Grants  | -          |
| • Loans A | €748,000   |
| • Loans B | -          |
| • PB      | 6 years    |
| • NPV     | 98,000     |
| • IRR     | 17%        |



# Kazakhstan

## 1. Energy Efficient district in Astana

|           |                      |
|-----------|----------------------|
| • Costs   | €27,850,000          |
| • Equity  | €24,500,000 (budget) |
| • Grants  | € 3,350,000          |
| • Loans A | -                    |
| • Loans B | -                    |
| • PB      | 10 years             |
| • NPV     | -3,950,000           |
| • IRR     | 8%                   |

# Kazakhstan

## 2. Replacement of irrigation equipment

|                |                      |
|----------------|----------------------|
| • Costs        | €1,010,000           |
| • Equity own   | €700,000             |
| • Equity other | €132,000             |
| • Grants       | € 13,200             |
| • Loans A      | €165,000 (4y @10%)   |
| • Loans B      | -                    |
| • PB           | 4 (10) years         |
| • NPV          | 1,400,000 (-110,000) |
| • IRR          | 30% (8%)*            |

\* (If annual savings of \$150,000 assumed)

# Macedonia

## 1. Promotion of sustainable agricultural practices, energy efficiency and usage of renewable energies in rural areas

|                |             |
|----------------|-------------|
| • Costs        | €1,112,000  |
| • Equity own   | € 20,000    |
| • Equity other | € 30,000    |
| • Grants       | € 1,062,000 |
| • Loans A      | -           |
| • Loans B      | -           |
| • PB           | 10 years    |
| • NPV          | -140,000    |
| • IRR          | 8%          |

# Montenegro

## 1. Energy efficient municipality – Bijelo Polje

# Pakistan

## 1. Load Data Improvement Project - LDIP

# Serbia

## 1. Energy Reconstruction of Dormitory

# Tajikistan

## 1. Programme for replacement of lighting with LED

# Thailand

## 1. 3.5 MW Cogeneration



# Turkmenistan

## 1. Improving energy efficiency of housing

|                     |              |
|---------------------|--------------|
| • Costs             | \$45,903,000 |
| • Equity Turkmengas | \$19,887,000 |
| • Equity Ashkhabad  | \$17,500,000 |
| • Equity Ministry   | \$ 6,000,000 |
| • Grants            | \$ 2,516,000 |
| • Loans A           | -            |
| • Loans B           | -            |
| • PB                | n/a          |
| • NPV               | n/a          |
| • IRR               | n/a          |

# Ukraine

## 1. Reconstruction of pool heat in kindergarten #11 Mirgorod city

|                |         |
|----------------|---------|
| • Costs        | €40,000 |
| • Equity       | €18,700 |
| • Equity other | € 2,600 |
| • Grants       | €18,700 |
| • Loans A      | -       |
| • Loans B      | -       |
| • PB           | 7y      |
| • NPV          | 5,000   |
| • IRR          | 12%     |

# Ukraine

## 2. Reconstruction of heat and hot water system in kindergarten #12 Mirgorod city

|                |         |
|----------------|---------|
| • Costs        | €43,000 |
| • Equity       | €18,700 |
| • Equity other | € 2,600 |
| • Grants       | €18,700 |
| • Loans A      | -       |
| • Loans B      | -       |
| • PB           | 5y      |
| • NPV          | 25,000  |
| • IRR          | 19%     |

# Ukraine

## 3. Boiler house on biomass 3 MW Lybny

# Ukraine

## 4. Generation power & heat facilities Mirgorod city

# Uzbekistan

## 1. Reconstruction of air heating at Surdarya TPP

# Uzbekistan

## 2. Reconstruction of 8 furnaces Uzbek Metallurgical Combine

|           |           |
|-----------|-----------|
| • Costs   | \$135,000 |
| • Equity  | \$135,000 |
| • Grants  | -         |
| • Loans A | -         |
| • Loans B | -         |
| • PB      | 3y        |
| • NPV     | \$130,000 |
| • IRR     | 37%       |

# Uzbekistan

## 3. Installation of air recuperation for lime kiln Uzbek Metallurgical Combine

|           |          |
|-----------|----------|
| • Costs   | \$55,000 |
| • Equity  | \$55,000 |
| • Grants  | -        |
| • Loans A | -        |
| • Loans B | -        |
| • PB      | 3y       |
| • NPV     | \$50,000 |
| • IRR     | 35%      |



# Uzbekistan

## 4. Installation of heat recuperation Uzbek Metallurgical Combine

|           |           |
|-----------|-----------|
| • Costs   | \$135,000 |
| • Equity  | \$135,000 |
| • Grants  | -         |
| • Loans A | -         |
| • Loans B | -         |
| • PB      | 3y        |
| • NPV     | \$110,000 |
| • IRR     | 33%       |

# Uzbekistan

## 5. Installation of small TPP Uzbek Metallurgical Combine

|           |             |
|-----------|-------------|
| • Costs   | \$3,400,000 |
| • Equity  | \$3,400,000 |
| • Grants  | -           |
| • Loans A | -           |
| • Loans B | -           |
| • PB      | 3y          |
| • NPV     | \$2,800,000 |
| • IRR     | 38%         |

# Uzbekistan

## 6. Improving the efficiency of use of high sulphur HFO Uzbek Metallurgical Combine

|           |                 |
|-----------|-----------------|
| • Costs   | €37,620         |
| • Equity  | €26,335         |
| • Grants  | -               |
| • Loans A | €11,285 (3y@5%) |
| • Loans B | -               |
| • PB      | 3y              |
| • NPV     | €48,000         |
| • IRR     | 39%             |

# Summary

|                                    |             |
|------------------------------------|-------------|
| Projects:                          | 32          |
| Total amount:                      | 190,000,000 |
| Total amount excluding programmes: | 74,000,000  |
| Equity financed portion:           | 51.7%       |
| Grants financed portion:           | 20.2%       |
| Loan financed portion:             | 24.5%       |
| IRR :                              | 8% to 39%   |

# Summary

## financed and partially financed projects

|  |             |                        |
|--|-------------|------------------------|
| Projects:                                | 18          |                        |
| Total amount financed:                   | 139,000,000 |                        |
| Total amount excluding large programmes: | 23,000,000  |                        |
|  |             | <b>+progr. -progr.</b> |
| Equity financed portion:                 | 61%         | 18%                    |
| Grants financed portion:                 | 32%         | 42%                    |
| Loan financed portion:                   | 7%          | 40%                    |
| IRR range:                               | 8% to 39%   |                        |

For comparison

# Summary of FEEI pipeline in 2012

|                                    |               |
|------------------------------------|---------------|
| Projects:                          | 228           |
| Total amount:                      | 6,349,160,406 |
| Total amount excluding programmes: | 6,349,160,406 |
| Equity financed portion:           | 9.9%          |
| Grants financed portion:           | ~60%          |
| Loan financed portion:             | ~30%          |
| Average IRR:                       | 17%           |

# Conclusions

- Most of the projects, particularly industrial, show good returns
- Financing structures biased towards equity and grant finance
- Not efficient use of capital and limited use of leverage

For example: LED lighting project in Aragatsavan, Armenia

Cost: \$150,000  
Annual savings: \$ 32,000

Scenario 1: Equity \$150,000 Loan \$ 0  
IRR on equity: **20%**

Scenario 2: Equity \$ 30,000 Loan \$ 120,000  
IRR on equity: **39%**

Scenario 3: Equity \$ 10,000 Loan A \$20,000 B \$120,000  
IRR on equity: **62%**

# Evaluation Summary

Analysis based on the limited information on most of the projects show:

- Some projects are too large(>US\$ 30m) so syndication may be required;
- Some projects are too small (<US\$ 5m) so bundling may be required;
- There are projects indicating the use of new/unproven technologies - they may require venture, or early stage equity investments;
- The preliminary analysis show that some projects (usually these with overall IRR<15%) do not generate sufficient cashflow and would have low DSCR, making difficult their finance under conventional financial mechanisms;



# Evaluation Summary

The total amount of the funding required indicates *potentially sufficient availability of investment opportunities*;

To facilitate their finance, the projects need to be presented in a bankable format; and

Mechanisms for easier access to finance, including supplements to the limited available equity, mechanisms to cover specific project and country risks, and efforts to build an attractive for investment pipelines of projects are necessary to tap on this vast potential of energy savings.

For more details, please contact  
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