"INOGATE Technical Secretariat & Integrated Programme in support of the Baku Initiative and the Eastern Partnership energy objectives" Project

BUILDING PARTNERSHIPS FOR ENERGY SECURITY

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EXAMPLES OF LENDING FOR EE/RES, calculation of project feasibility indicators (part 1)

AHEF AM.090 WORKSHOP:
“Industrial Energy Audit Analysis For Bankable Projects”

February 24-27, 2015
Yerevan, Armenia

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EE / RE Source Financial Training & Research Expert, INOGATE TS
Industrial boilers serve for production of heat in the form of hot water or steam.
To receive hot water and steam a company uses a gas-fired boiler. Total annual costs – $523,426.

**PROJECT IDEA**

**UPGRADE**

With minimal capital investments

Heavy and/or comprehensive

**TECHNOLOGY**

Switch to biofuel or biogas

**INVESTMENT PROJECT**

Cost estimate – $1,000/kW

Cost of equipment ~ 60-70% of the project value
<table>
<thead>
<tr>
<th><strong>Loan amount</strong></th>
<th>650 000 $</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Period</strong></td>
<td>84 months</td>
</tr>
<tr>
<td><strong>Interest rate</strong></td>
<td>12%</td>
</tr>
<tr>
<td><strong>Installment schedule</strong></td>
<td>Equal parts</td>
</tr>
<tr>
<td><strong>Grace period</strong></td>
<td>6 months</td>
</tr>
<tr>
<td><strong>Repayment schedule</strong></td>
<td>Equal parts</td>
</tr>
<tr>
<td><strong>Pledge</strong></td>
<td>Property, equipment</td>
</tr>
<tr>
<td><strong>Annual savings</strong></td>
<td>120 388 $</td>
</tr>
<tr>
<td><strong>Payback period</strong></td>
<td>65 months</td>
</tr>
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</table>
INVESTMENT STRUCTURE, $

Core equipment: 429 000; 66%

Infrastructure: 19 500; 3%

Construction: 91 000; 14%

Design works: 52 000; 8%

Commissioning / adjustment: 13 000; 2%

Ancillary equipment: 45 500; 7%
Cogeneration allows for an energy supply system being reliable and independent on external network and ensures a reserve for expansion of production capacities.
An enterprise uses electricity and hot water from external suppliers. The total annual costs – 614 550 $.

**OBJECTIVE of the PROJECT**
- Reducing the costs of consumed energy
- Ensuring an independent energy supply

**PROPOSED SOLUTION / TECHNOLOGY**
- Purchase of a cogeneration unit

**INVESTMENT PROJECT**
- Cost estimate – 1 000 $/kW
- Cost of equipment ~ 60-70 % of the project value
### Loan Terms

<table>
<thead>
<tr>
<th>Description</th>
<th>Details</th>
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</thead>
<tbody>
<tr>
<td>Loan amount</td>
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<tr>
<td>Period</td>
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<td>Interest rate</td>
<td>12%</td>
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<tr>
<td>Installment schedule</td>
<td>Equal parts</td>
</tr>
<tr>
<td>Grace period</td>
<td>6 months</td>
</tr>
<tr>
<td>Repayment schedule</td>
<td>Equal parts</td>
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<tr>
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<tr>
<td>Annual savings</td>
<td>$202,800</td>
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<td>Payback period</td>
<td>44 months</td>
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</tbody>
</table>

**Electricity** – 0.05 $/kWh  
**Gas** – 0.13 $/m³
INVESTMENT STRUCTURE, $

Core equipment: 472 500; 63%

Infrastructure: 22 500; 3%

Ancillary equipment: 67 500; 9%

Commissioning / Adjustment: 7 500; 1%

Construction: 142 500; 19%

Design works: 37 500; 5%
Refrigerator compressors ensure circulation and compression of coolant in the refrigerating system. A subcategory of refrigerating machines is absorption refrigerating machines based on the direct conversion of heat energy into the cold inside the unit.
An enterprise uses electricity for operation of the refrigeration unit. Total annual costs – 356 340 $

**OBJECTIVES of the PROJECT**

- Reduction of the cost capital investments
- Utilisation of cheaper feedstock

**PROPOSED SOLUTION / TECHNOLOGY**

- Installation of a rotary compressor

**INVESTMENT PROJECT**

- Cost estimate – 100-150 $/kWh of cold
- Cost of equipment ~ 75-85 % of the project value
## Loan Terms

<table>
<thead>
<tr>
<th>Loan amount</th>
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</thead>
<tbody>
<tr>
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<td>Interest rate</td>
<td>12%</td>
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<tr>
<td>Installment schedule</td>
<td>Equal parts</td>
</tr>
<tr>
<td>Grace period</td>
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</tr>
<tr>
<td>Repayment schedule</td>
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</tr>
<tr>
<td>Pledge</td>
<td>Property, equipment</td>
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<tr>
<td>Annual savings</td>
<td>203,110 $</td>
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<tr>
<td>Payback period</td>
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</tr>
</tbody>
</table>

**Electricity**: 0.05 $/kWh

**Gas**: 0.13 $/m³
INVESTMENT STRUCTURE, $

- **Core equipment:**
  - 332,120; 76%

- **Infrastructure:**
  - 8,740; 2%

- **Design works:**
  - 21,850; 5%

- **Commissioning/Adjustment:**
  - 8,740; 2%

- **Ancillary equipment:**
  - 26,220; 6%

- **Construction:**
  - 39,330; 9%
THANK YOU !!!

Visit our website: www.inogate.org

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