Energy management systems: role and benefits, lessons from implementation experience

6th International Forum on Energy for Sustainable Development – Yerevan, Armenia

INCLUSIVE AND SUSTAINABLE INDUSTRIAL DEVELOPMENT
Outline

1. UNIDO Global Programme on EnMS
   - Thematic focus on EnMS
   - Geographical Coverage of the UNIDO Programme

2. Focus on capacity Building
   - Training Methodology
   - Case studies

3. Results and Impacts
   - Programme results
   - Country results – South Africa
UNIDO Industrial Energy Efficiency Focus Areas

**Energy Management Systems**
- Energy System Optimization
  - Distribution
  - End Use
  - Generation
  - Recovery

Integrate Energy Efficiency
Energy Savings & Investments

N.B: Auxiliary energy systems account for over 50% of final manufacturing energy consumption

- 15-30% average efficiency gains
- 4-5% of individual components

INCLUSIVE AND SUSTAINABLE INDUSTRIAL DEVELOPMENT
UNIDO Program on Energy Management System
As of June 2014

Operational in 14 countries
Planned activities in 10 countries

Operational
South Africa  Moldova  Russia  Turkey  Ecuador  Malaysia  Thailand
Viet Nam  Philippines  Egypt  Indonesia  Iran  Ukraine  Colombia

Planned activities
Creating Market Opportunities for Energy Efficiency

1. Policy Support
Support development of Policies that Promote EE in Industry, adoption of the standard, M&V protocols and benchmarking

2. Capacity Building
Build technical capacity of key experts, service providers, vendors and enterprise personnel on EnMS and SO

3. Technology Demonstration
Providing technical services to implement demonstration project in selected enterprises

4. Knowledge Dissemination
Launch awareness-raising campaign; Recognizing best performing enterprises, encourage cooperation and partnership among sector companies (P2P networks)

**Average Project Budget**

<table>
<thead>
<tr>
<th></th>
<th>GEF grant</th>
<th>Co-financing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Av. Project Cost</td>
<td>$5 mio</td>
<td>$20 mio</td>
</tr>
</tbody>
</table>

**Sources of Co-financing**

- UNIDO
- Private Sector
- Financial Institutions
- Government (in-kind)
- NGOs
UNIDO EnMS Capacity Building & Implementation Programme

Components, Participants and Modalities

- Awareness Seminar
- USER Training
- EXPERT Training

UNIDO International EnMS Trainers

National EE-EnMS Consultants

Partner Enterprise

INCLUSIVE AND SUSTAINABLE INDUSTRIAL DEVELOPMENT
UNIDO EnMS Capacity Building & Implementation Programme

Structure and Results

Legend
- PE team: A Partner Enterprise (PE) team is formed by the PE’s staff participating in the EXPERT program plus 1-2 national consultants.
- Ongoing and periodic communication through webinars, emails, and phone calls between the international trainers and the PE teams to review progress, discuss issues, and provide guidance.

Results:
- Initial data collection
- EnMS self-assessment of PE

Results:
- Draft Energy Policy
- Draft Roles & Responsibility matrix
- Further data collection

Results:
- Energy Policy
- Roles & Responsibility matrix
- Significant Energy Uses
- Baseline
- Energy Performance Indicators
- Opportunities list & action plans
- Energy & costs savings
- Performance improvements

Results:
- Staff trained on SEUs
- Operations & controls improved
- Procurement plan
- EE measures implemented
- Energy & costs savings
- Performance improvements

Results:
- Energy performance checked, verified and reported
- Energy performance reviewed by top management
- Decisions for next period based on internal audit
- Energy & costs savings
- Performance improvements

Results:
- Trainees qualified as Energy Management System Expert
- EnMS implemented in PE
- Energy & costs savings
- Performance improvements

UNIDO
UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

INCLUSIVE AND SUSTAINABLE INDUSTRIAL DEVELOPMENT
Some Results - UNIDO IEE-EnMS Programme

- UNIDO initiated the process that led to the development of ISO 50001
- Global Programme operational in 14 countries
- Projects/activities under development in additional 10 countries

Decision-makers reached
Enterprises trained on EnMS
EnMS Experts trained
Enterprises with EnMS
Funding mobilized

- 2008:
  - Decision-makers reached: 250 +
  - Enterprises trained on EnMS: € 200K
  - Funding mobilized: € 200K

- 2010:
  - Decision-makers reached: 35
  - Enterprises trained on EnMS: 200 +
  - EnMS Experts trained: 600 +
  - Enterprises with EnMS: 3000 +
  - Funding mobilized: € 6 mil +

- 2014:
  - Decision-makers reached: 190 +
  - Enterprises trained on EnMS: 490 +
  - EnMS Experts trained: 5,000 +
  - Enterprises with EnMS: € 11 mil +
  - Funding mobilized: € 11 mil +
Pilot results: UNIDO-IEE Project in South Africa

- Electricity demand: 160 MW
- Daily water consumption: 8,000 kilo liters (world best for an integrated steel plant)
- Manpower: 548 permanent employees
- Sales output: 1,2 million ton HRC/annum

### Energy Efficiency Achievements 2011

<table>
<thead>
<tr>
<th>Energy Management System</th>
<th>Implemented</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of Projects/Measures</td>
<td>11</td>
</tr>
<tr>
<td>Total Capital Investment (USD)</td>
<td>0</td>
</tr>
<tr>
<td>2011 Gross Financial Savings (USD)</td>
<td>9,076,000</td>
</tr>
<tr>
<td>Overall Payback Period (in years)</td>
<td>0</td>
</tr>
<tr>
<td>2011 Energy Savings (GWh)</td>
<td>79.95</td>
</tr>
<tr>
<td>2011 GHG Reductions (tons CO₂)</td>
<td>77,000</td>
</tr>
</tbody>
</table>
Pilot results: UNIDO-IEE Project in Moldova

- Dairy open joint stock company (about 10% of Moldovan market)
- 185 employees
- Management started to look into EE in 2009 to reduce production costs and impact of increased energy prices

LACTIS improvements 2011-2012

<table>
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<th>Energy Management System</th>
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</tr>
</thead>
<tbody>
<tr>
<td>No. of Measures/Projects</td>
<td>11</td>
</tr>
<tr>
<td>Total Capital Investment (USD)</td>
<td>6,900</td>
</tr>
<tr>
<td>Gross Monetary Savings (USD)</td>
<td>22,000</td>
</tr>
<tr>
<td>Overall Payback Period (in years)</td>
<td>0.32</td>
</tr>
<tr>
<td>Annual Energy Savings (MWh)</td>
<td>328</td>
</tr>
<tr>
<td>2011 GHG Reductions (tons CO₂)</td>
<td>160</td>
</tr>
</tbody>
</table>

Value of EnMS/EE investments planned in 2012 for 2013-2014: 410,000 USD
Implementation by end of 2014: 80%
# South Africa Programme Results - Industry Engagement Record

<table>
<thead>
<tr>
<th>Category</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participating large companies</td>
<td>153</td>
</tr>
<tr>
<td>SME general energy assessments conducted</td>
<td>227</td>
</tr>
<tr>
<td>Companies Reporting Savings</td>
<td>62</td>
</tr>
<tr>
<td>Host Training Companies secured</td>
<td>22</td>
</tr>
<tr>
<td>Candidate Companies signed-up</td>
<td>90</td>
</tr>
<tr>
<td>Demonstration Plants</td>
<td>77</td>
</tr>
<tr>
<td>Case studies under development</td>
<td>54</td>
</tr>
</tbody>
</table>

*Some of the 54 Actively Reporting Companies has signed to be Demo Plant for more than 1 Discipline*
South Africa Programme Results - Training Outcomes

- **150** Training Workshops Nationally.
- **+2 300** Engineers, Technicians and Managers trained.
- **112** EnMS/ESO National Experts Qualified.
- **32** National EnMS/ESO Certified Trainers.
- **29** ISO 50001 Lead Auditors accredited
South Africa Programme Results

*Implementation Savings Reported*

**EnMS/ESO Implementation Savings**

<table>
<thead>
<tr>
<th>System</th>
<th>mWh</th>
<th>Tonnes CO₂</th>
</tr>
</thead>
<tbody>
<tr>
<td>EnMS</td>
<td>356 800</td>
<td>354 000</td>
</tr>
<tr>
<td>SMEs</td>
<td>1 200</td>
<td>1 200</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>570 700</strong></td>
<td><strong>566 200</strong></td>
</tr>
</tbody>
</table>

*(Payback less than 2 years)*
Thank you for your attention!

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