



UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

www.unido.org



The UNIDO approach to capacity building

Marco Matteini

UNIDO Consultant

Energy Efficiency and Policy Unit

United Nations Industrial Development
Organization

18 September 2009

Chisinau, Republic of Moldova



The UNIDO approach to capacity building for industrial energy efficiency

Presentation outline

1. Focus areas
 - Energy management and systems optimization
2. Training-the-trainers
3. How it works
4. Benefits to and estimated costs for trainees & participants
5. Case study – UNIDO Motor System Energy Conservation Program in China



The UNIDO approach to capacity building for industrial energy efficiency

1. Focus areas

1. **Energy management**
2. **Systems optimization** (steam system, pumps, compressed air, refrigeration, motors, etc.)

UNIDO focuses on these two technical areas because of their cross-cutting nature: they are not specific to particular sectors or industrial process, but they are relevant and applicable over the entire industry sector

Energy management is a prerequisite for sustainable, company wide and continual improvement of energy efficiency



The UNIDO approach to capacity building for industrial energy efficiency

2. Training-the-trainers

1. UNIDO capacity building program creates a cadre of qualified national professionals with expert capabilities in Energy Management and Industrial Energy Systems Optimization
Qualified national experts that are able to set up an energy management system; to identify and implement operational improvements; to analyze, develop and implement energy system optimization projects; and to teach/ train other on how to do it
2. The objective is NOT offering “ready-made” solutions
3. UNIDO focuses on the transfer of knowledge, skills and tools through training, on-the-job practice and international expert coaching



The UNIDO approach to capacity building for industrial energy efficiency

3. How it works – System optimization expert training

Trainees will come from a variety of backgrounds:

- Government sponsored energy centres and institutions
- Enterprise personnel
- Energy efficiency consulting companies/ experts
- Equipment manufacturers
- Engineering service companies



The UNIDO approach to capacity building for industrial energy efficiency

3. How it works – System optimization expert training

Step 1	Preparation of logistics for 1 st training session
Step 2	1 st training session – residential with exercises on-industrial-site
Step 3	Application of knowledge, skills and tools provided to identify and develop EE measures
Step 4	2 nd training session – residential with training delivery practice
Step 5	Implementation of EE measures developed by trainees and reviewed by international experts
Step 6	Reporting of energy savings and development of case studies



The UNIDO approach to capacity building for industrial energy efficiency

3. How it works – System optimization expert training

Step 1	Preparation of logistics for 1 st training session
<p>Main activities: - to identify suitable factories for the on-site exercises and collect data and measurements as appropriate - to organize training logistics</p> <p>The factory/ enterprise that would agree to receive an energy system assessment would have to make available staff time to assist project consultants in preparing as well as conducting the on-site exercise. <u>On-site exercises DO NOT INTERFERE with the production process.</u></p> <p>Such staff time would represent in-kind co-financing to the project.</p> <p>The factory/ enterprise would benefit the assessment of one or more of its energy systems free of charge.</p> <p>It is desirable that the factory hosting the on-site exercise has a staff member between the trainees, who will follow up on the results of the system assessment</p>	



The UNIDO approach to capacity building for industrial energy efficiency

3. How it works – System optimization expert training

Step 2	1 st training session – residential with exercises on-industrial-sites
<p>Main activities:</p> <ul style="list-style-type: none">- 2-3 days classroom lectures theory of operation, practical applications, common practices, data collection and measurements, data analysis, reporting- 1 day on-industrial-site evaluating systems, developing measurement plans, installing data loggers, validate and analyze data collected, developing improvement and implementation plans, reporting <p>Each trainee is required and ensures to attend the whole training session and program.</p> <p>The trainee time that will be dedicated to the whole training program will qualify as in-kind co-financing contribution to the project.</p>	



The UNIDO approach to capacity building for industrial energy efficiency

3. How it works – System optimization expert training

Step 3	Application of knowledge, skills and tools provided to identify and develop EE measures
<p>Main activities:</p> <ul style="list-style-type: none">- trainees apply theory, skills and tools provided by the 1st training session to carry out system assessments and identify & develop energy system optimization measures- trainees not working for industrial enterprises will carry out the system assessments in other factories that will be identified <p>Each trainee will be required to perform 1 system assessment and to develop 2 energy system optimization projects/measures. <u>Energy system optimization projects developed shall meet company's financial and economic requirements & capabilities</u></p> <p>The trainee will have access to remote international expert advice, if needed, via email or the web.</p>	



The UNIDO approach to capacity building for industrial energy efficiency

3. How it works – System optimization expert training

Step 4	2 nd training session – residential with on-industrial-site visits and training delivery practice
Main activities: - 1.5-2.0 days classroom lectures A selection of the energy system optimization measures developed are reviewed, discussed and refined during lectures as case studies and base for further training - 1 day training on training other people	



The UNIDO approach to capacity building for industrial energy efficiency

3. How it works – System optimization expert training

Step 5	Implementation of energy system optimization projects developed by trainees and reviewed by international experts
<p>Main activities:</p> <ul style="list-style-type: none">- trainees working for industrial enterprises go back to their companies and implement at least 1 energy system optimization project developed and reviewed- trainees not working for industrial enterprises would assist the same factories for which they carried out a system assessment, to implement at least 1 energy system optimization measure/project developed and reviewed <p><u>EE projects will be implemented company's resources permitting.</u></p> <p>Trainees will have access to remote international expert advice, if needed.</p>	



The UNIDO approach to capacity building for industrial energy efficiency

3. How it works – System optimization expert training

Step 6	Reporting of energy efficiency gain and energy savings
<p>Main activities: - trainees would need to ensure that enterprises that have implemented energy system optimization projects report efficiency gain and energy savings to the Project</p> <p>System assessments, energy system optimization projects developed and implemented, and reports of efficiency gains and energy savings would be then used by project consultants to develop case studies.</p>	



The UNIDO approach to capacity building for industrial energy efficiency

4. Benefits to and estimated costs for trainees

Industrial EE experts (consultants, NEEA, TUM, etc)

- Benefits:**
- State-of-the-art system optimization expert training worth 10,000 – 12,000 USD
 - Skills and tools for providing energy system optimization expert services and training to manufacturing industry
 - Qualification to work for the GEF-MENR-UNIDO project

- Costs:**
- 12-15 wds* for STEPs 1-4 over a period of 6-9 months
 - 10-15 wds for STEP 5 assisting one enterprise in implementing 1 system optimization project

* wds = working days



The UNIDO approach to capacity building for industrial energy efficiency

4. Benefits to and estimated costs for trainees

Industrial enterprise

- Benefits:**
- State-of-the-art system optimization expert training worth 10,000 – 12,000 USD
 - Energy system assessment worth 1,000 - 2,000 USD
 - Development and implementation of enterprise specific energy efficiency projects with less than 1-2 years payback
 - Energy and cost savings per system in the 10-30% range

- Costs:**
- 12-15 wds* for STEPs 1-4 over a period of 6-9 months
 - 5-15 wds for STEP 5
 - 10,000 – 50,000 USD investment for STEP 5 ([resources permitting](#))

* wds = working days



The UNIDO approach to capacity building for industrial energy efficiency

4. Benefits to and estimated costs for participants

Industrial enterprise without representative in the training

- Benefits:**
- Professional energy system assessment worth 1,000 - 2,000 USD
 - Development and implementation of enterprise specific energy efficiency projects with less than 1-2 years payback
 - Energy and cost savings per system in the 10-30% range

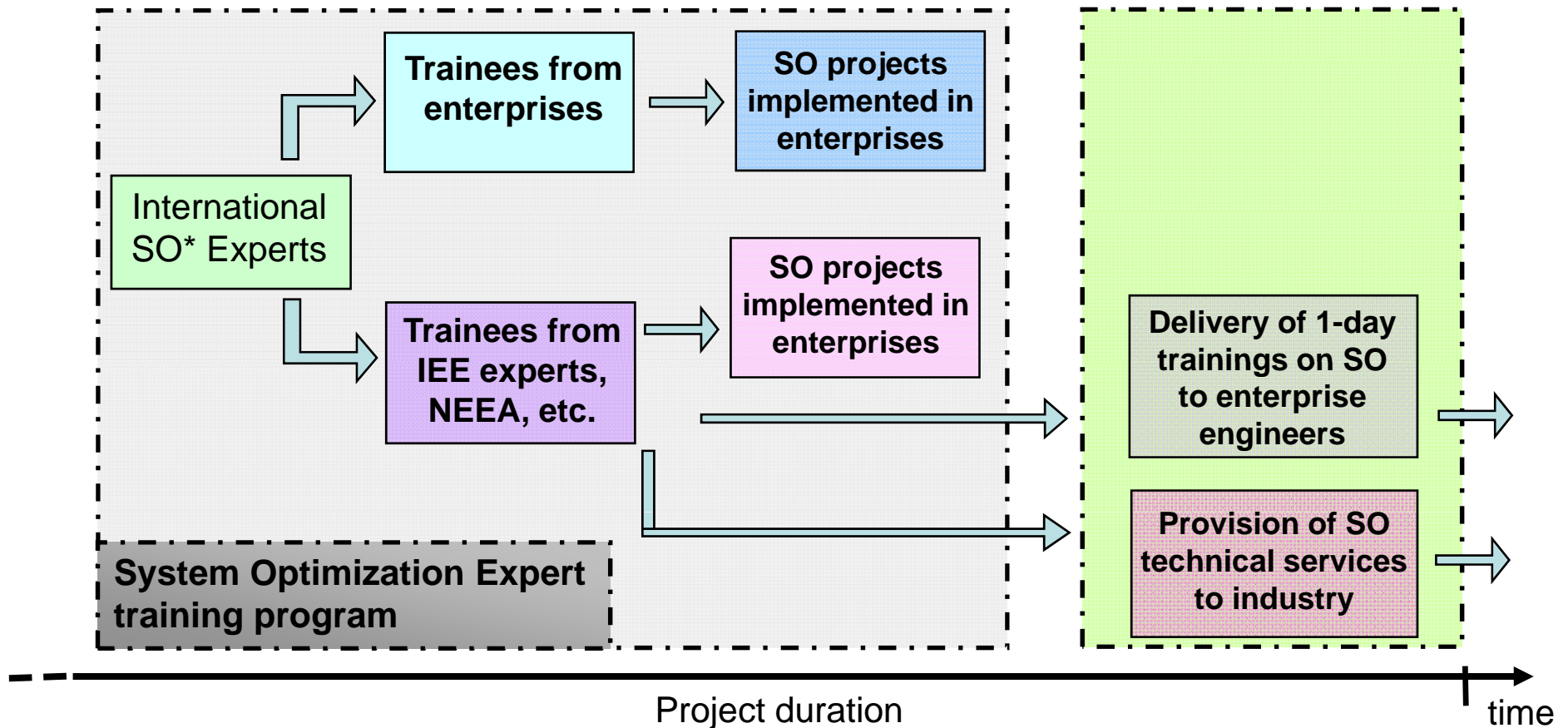
- Costs:**
- 3-7 wds* for STEP 3
 - 5-15 wds for STEP 5
 - 10,000 – 50,000 USD investment for STEP 5 ([resources permitting](#))

* wds = working days



The UNIDO approach to capacity building for industrial energy efficiency

Project capacity building scheme





The UNIDO approach to capacity building for industrial energy efficiency

5. Example – UNIDO Motor System Energy Conservation Program in China

- The program trained 22 engineers in motor-driven system optimization techniques in Jiangsu and Shanghai provinces
- Within two years after completing training these experts
 - trained more than 20 new motor systems experts
 - conducted 38 industrial plant assessments and identified nearly 40 million kWh in energy savings
 - completed 8 system optimization demonstration projects and developed additional 11
 - trained more than 900 factory enterprise personnel



The UNIDO approach to capacity building for industrial energy efficiency

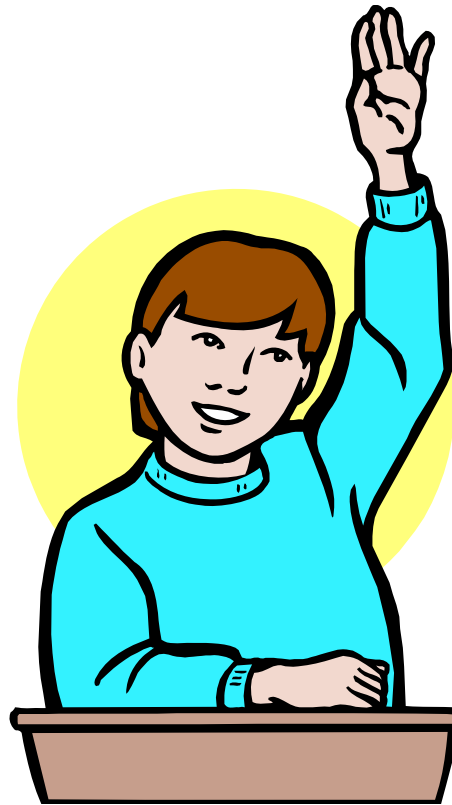
5. Example – UNIDO Motor System Energy Conservation Program in China

System / facility	Total Cost [\$US]	Energy savings [kWh/year]	Payback Period
Compressed air/forge plant	18,600	150,000	1.5 years
Compressed Air/machinery	32,400	310,800	1.3 years
Compressed air/tobacco	23,900	150,000	2.0 years
Pump system/ hospital	18,600	77,000	2.0 years
Pump system/ pharmaceuticals	150,000	1,005,000	1.8 years
Motor systems/ petrochemicals	393,000	14,100,000	0.5 years



The UNIDO approach to capacity building for industrial energy efficiency

Questions and Answers





UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

www.unido.org



The UNIDO approach to capacity building for industrial energy efficiency

Thank you for your attention!

For more information

Marco Matteini

Energy Efficiency and Policy Unit
UNIDO

Vienna International Centre

P.O. Box 300

A-1400 Vienna, Austria

Tel: 0043 1 26026 4583

E-mail: M.Matteini@unido.org