



UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

UNIDO ENERGY PROGRAMME

INDUSTRIAL ENERGY EFFICIENCY UNIT

A low-carbon path to enhanced
industrial competitiveness



Industrial Energy Efficiency

UNIDO's mandate is to promote and accelerate inclusive and sustainable industrial development (ISID) in developing countries and countries in transition. UNIDO believes that ISID is the key driver in integrating the economic, social and environmental aspects of sustainable development essential for the sustainable economic growth required to eradicate poverty.

Industrial energy efficiency (IEE) is central to achieving this mandate. UNIDO's lead role on industrial energy efficiency builds on more than three decades of experience and unique expertise in the field of sustainable industrial development, structural transformation and technology transfer.

The UNIDO IEE flagship programme combines policy and normative development support services with capacity-building for all relevant market players, demonstration and deployment of best-available technologies and practices. It aims to remove key barriers to energy efficiency improvement in industries and ultimately to transform the market for industrial energy efficiency.

Multiple benefits of industrial energy efficiency



Economic growth



Competitive-ness



Energy security



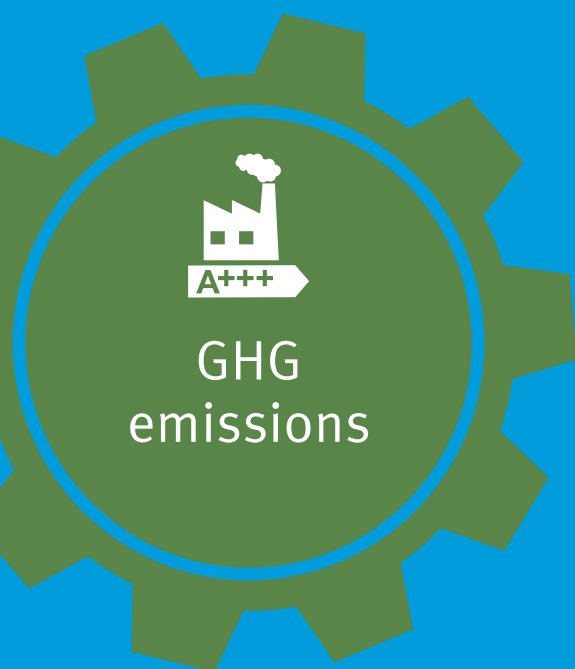
Industrial productivity



Energy and financial savings

DISCLAIMER

The views expressed in this publication are those of the authors and do not necessarily reflect the views of the United Nations Industrial Development Organization (UNIDO). UNIDO does not warrant or assume any legal liability or responsibility for the accuracy, completeness, or usefulness of any information contained in the publication.



Accelerating global uptake of industrial energy efficiency policies and programmes, UNIDO works closely with its partner organizations, key national and international stakeholders in industry, the private and public sectors and academia to deliver energy efficiency solutions that provide a broad range of environmental and socioeconomic benefits.

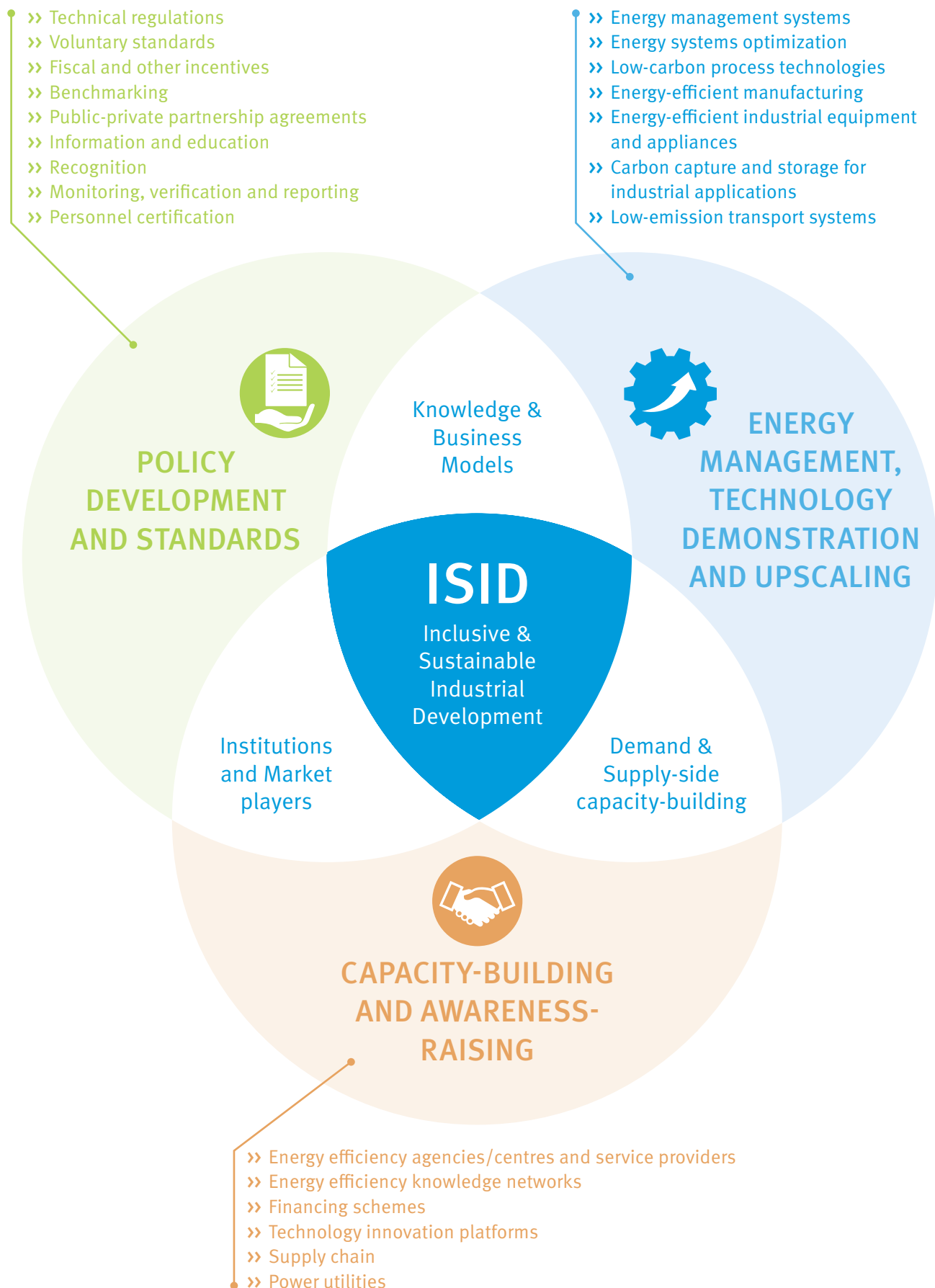
These include continuous improvement in industrial productivity and competitiveness, a reduction in the environmental impact of industry and the creation of new ‘green’ jobs in the manufacturing sector.

However, despite the very tangible and proven benefits brought about by pursuing industrial energy efficiency through strategic energy management, measures to integrate energy efficiency into the daily management and operations of industry are still not common practice in much of the world.

We at UNIDO aim to close this gap: we work to ensure that the imperative to promote and support energy efficiency in industry remains a priority for all governments and the international community.

Industrial Energy Efficiency Unit

Strategic areas of focus



Projects: What we do

Gains in energy efficiency will be critical in the coming years to ongoing efforts to put the world on a path to sustainable economic development. According to the International Energy Agency (IEA), global energy intensity, or the amount of energy required to produce one unit of GDP, fell by 2.4 per cent in 2014 (IEA WEO Special Report, 2015). At more than double the average rate recorded over the past decade this represents a significant improvement. Yet, despite this progress, much more needs to be done at national and international level to boost energy efficiency if the world is to limit global warming to the 2°C target agreed in Copenhagen in 2009.

Based on current national plans, around \$8 trillion will be invested globally in energy efficiency between 2015 and 2030, roughly \$3 trillion short of what is required to maintain a 2°C scenario (IEA WEO Special Report, 2015). However, the resulting lifetime savings in energy costs will offset the costs of these additional investments. The IEA median projections assume the savings in global energy demand will total 1,200 Mtoe (million tons oil equivalent) by 2040 because of ongoing efforts to improve energy efficiency (IEA WEO, 2014). But meeting these ambitious goals will only be possible through continuous efforts to reduce energy inefficiency in industrial facilities. Overall, industry accounts for nearly one-third of the world's total energy consumption (IEA WEO, 2014) and even higher share of the world's fossil fuel carbon emissions. These factors make the role of industrial energy efficiency crucial for the realization of global mitigation goals.

UNIDO's IEE programmes and projects are helping to do this by focusing specifically on small and medium-sized enterprises (SMEs), which account for about 60 per cent of private-sector employment globally (TERI, 2015), making them important drivers of the economy. Such assistance is especially important for SMEs in countries at early stages of industrialization to ensure that the structural transformation of their industries is sustainable.





As of August 2015, the IEE Unit's project portfolio totalled \$105 million in grant funding and more than \$700 million in co-financing spread across 20 countries.

The UNIDO approach to industrial energy efficiency combines the deployment of low-carbon process technologies with the principles of product quality, sustainability and cost-effectiveness, along with the use of managerial tools such as energy management systems (EnMS), based on the ISO 50001 Energy Management Standard and/or relevant national standards. It also emphasizes the use of best operational practices, such as an energy systems approach to identifying and implementing energy saving measures in industrial operations.

Energy management systems and standards provide a way to identify energy-saving measures and ensure that industrial companies reap the rewards of these savings over time. They do this through employing a performance measurement framework, which requires support at corporate management level to carry it forward. Through a process of benchmarking, monitoring, reporting and verification, companies are able to estimate and report the benefits of projects and investments in energy efficiency. These efforts are essential not only for fine-tuning the production processes, but also for securing the sustained support from top management and policy-makers for the implementation of further energy efficiency measures.

Among the other areas of work carried out by UNIDO's IEE Unit that contribute to the improvements of the efficiency of energy-intensive industrial equipment are projects on industrial boilers, furnaces, motors, compressors, and on energy-efficient and low-carbon vehicles, as well as the related transport infrastructure.



> Around \$8 trillion is expected to be invested globally in energy efficiency between 2015 and 2030, roughly \$3 trillion short of what is required to maintain a 2°C scenario (IEA WEO Special Report, 2015).

How we do it

UNIDO aims to integrate energy efficiency practices into enterprises' existing management structures, effecting long-term changes to daily operations that will support continuous improvements in energy efficiency. Encouraging management to adopt a vision that takes account of the most recent economic challenges and trends will also be necessary for efficient business development in a quickly changing contemporary economic environment.

UNIDO projects are designed to respond to stakeholders' needs through the optimal use of the opportunities offered by the national economy by taking into account the country's context, priorities, industrial structure and stage of development. UNIDO pursues a holistic approach to achieving continuous energy efficiency improvements and increasing the use of low-carbon technologies in developing and emerging economies, ensuring that the policy, economic, technical, environmental and social aspects of its projects are integrated.

Within its IEE activities UNIDO offers the following services:



Policy support

- » Expert advice to industry and policy-makers in the development and formulation of policies and programmes designed to support energy efficiency and increase energy productivity in industry.
- » Technical assistance to develop policy and regulatory frameworks promoting and supporting the adoption of energy management systems and standards by industry.
- » Facilitation of collaboration agreements between public authorities and industrial sectors in the field of energy-efficient technologies and best energy management practices.
- » Promotion of the measurement mechanisms for the transparent estimates of financial benefits inherent to IEE as well as of the dedicated financing schemes.



Capacity-building

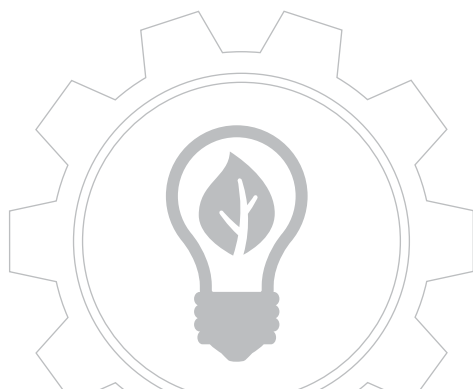
- » Institutional and workforce capacity-building for the development, implementation and monitoring of industrial energy efficiency policies and programmes, including energy management standards.
- » Technical training programmes on energy management systems and standards targeted to enterprises as well as consultants.
- » Tailor-made training programmes on industrial energy systems optimization (such as motor, pump, steam, fan, and compressed air systems) for enterprise personnel, energy auditors and IEE service providers.





Technology demonstration and transfer

- » Project-specific technical assistance to industrial enterprises for demonstration and transfer of state-of-the-art energy and low-carbon technologies, including fuel switching.
- » Industrial applications of renewable energy technologies.
- » Production process analysis focused on the development of recommendations for improvements in energy efficiency.
- » Support research, development and deployment of low-carbon industrial technologies.



Global forum activities

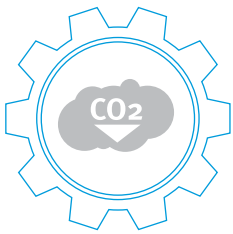
- » Organization of, and participation in, international and regional events for government and industry decision-makers and institutions to raise awareness and build understanding about industrial energy efficiency and to create partnerships.
- » Organization of expert group meetings in order to share and disseminate best practices, and support the ongoing international debate on industrial energy efficiency policies and technologies.

Information and dissemination

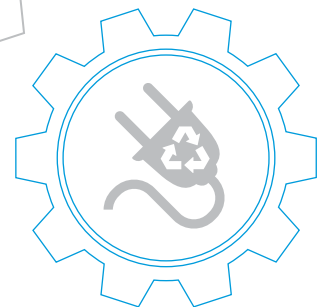
- » Dissemination of information on industrial energy efficiency policies, technologies and their applications for the interested market players around the globe.



» UNIDO projects are designed to respond to stakeholders' needs through the optimal use of the opportunities.



Project Portfolio



Chad

Promoting energy-efficient cook stoves in micro and small-scale food processing industries

UNIDO is implementing a project that aims at substantially reducing greenhouse gas (GHG) emissions through the installment of energy-efficient cook stoves in the traditional agro-food sectors of meat grilling and beer brewing.

The inefficient stoves traditionally used in both sectors mean longer cooking times, increasing the need for expensive and environmentally damaging firewood. By shifting to more efficient stoves the men and women involved in these businesses can improve their livelihoods by cutting fuel costs. A reduction in the use of firewood will also have knock-on effects in curbing deforestation and improving the health of those using the stoves.

UNIDO is taking a multi-level approach through engagement with participants all along the value chain. It is adopting the holistic UNIDO cluster methodology in order to reduce firewood consumption in the aforementioned sectors whilst enhancing the business performance of the micro enterprises in three selected locations organized in four clusters, namely; N'Djamena 1 & 2, Guelendeng and Mandelia.

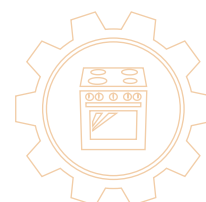
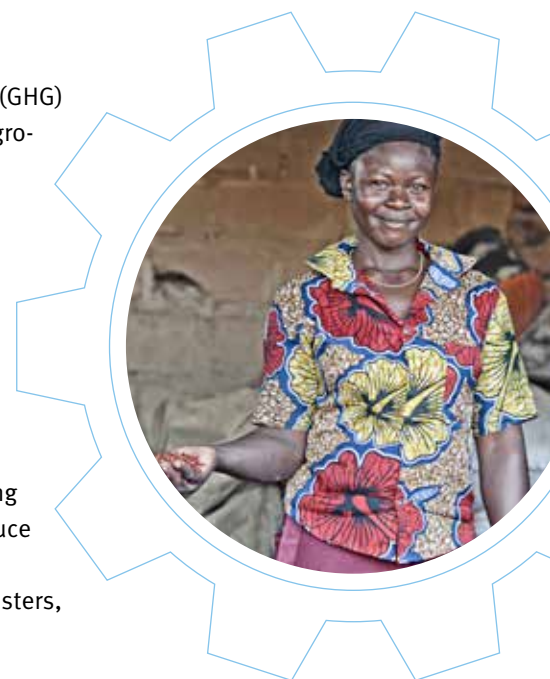
The project is working within the supply chain promoting joint actions, creating associations, enhancing the energy performance of the local cook stoves, opening the local market of energy-efficient cook stoves, increasing access to credit, building capacities and ultimately spreading the use of energy-efficient cook stoves.

Objective

The main objective of this project is to stimulate the market demand for energy-efficient cook stoves in traditional agro-food processing industries in Chad with a focus on two sub-sectors: traditional sorghum-based beer brewing (bili bili, kochat and argui) and meat grilling (tchélé).

Achieved and expected results

- » Empowerment of women beer brewers and men meat grillers.
- » Increased access to finance and credit by the beer brewers, meat grillers and manufacturers.
- » Improvement of the livelihoods of women and men entrepreneurs.
- » Improvements in health and wellbeing of women and men working in the beer brewing and meat grilling sectors.
- » Enhancement of the knowledge and the skills of energy-efficient cook stove manufacturers.
- » Development of clusters, fostering of the interaction between stakeholders and generation of collective gains.
- » Reduction of carbon emissions by 12,162 tons per year in addition to reduced concentrations of smoke and greenhouse gas emissions, reduced pressure on forests and related resources.
- » Scaling up the project and ensuring its sustainability through the provision of capacity-building on carbon finance to support mobilizing funds.



» Donors and partners

Donor » Global Environment Facility (GEF)

Partners » Agence pour l'Énergie Domestique et l'Environnement (AEDE), Fonds Spécial en faveur de l'Environnement (FSE), Shell Foundation, Envirofit.

Egypt

Industrial Energy Efficiency



Industry-related emissions account for around a third of total GHG emissions in Egypt and are set to rise further. The final energy consumption per unit of output in the most important industries in the country is typically 10 to 50 per cent higher than the international average. Therefore, increased energy efficiency (EE) in Egyptian industry has the potential to create significant energy savings and so help bridge Egypt's growing energy supply-demand gap.

In an effort to help address this challenge, UNIDO has launched an industrial energy efficiency project in cooperation with various government agencies. The five-year project, which was approved in February 2012, will provide technical assistance to develop and help establish market-oriented policy instruments needed to support sustainable progression of Egyptian industries toward international best energy performance and to stimulate the creation of a market for IEE products and services.

With an emphasis on energy systems optimization and energy management systems, such as the ISO 50001 Energy Management Standard, the project will build knowledge and in-depth technical capacity for IEE in industry, among energy professionals and in relevant institutions, such as the Egyptian Environmental Affairs Agency and other concerned institutions. It will also provide technical assistance to support a limited number of pilot IEE projects with high replication and/or energy savings potential in the key industrial sectors.

Objective

The objective of the IEE project is to “facilitate energy efficiency improvements in the industrial sector through supporting the development and implementation of a national energy management standard and energy efficiency services for Egyptian industry as well as the creation of demonstration projects”.

Achieved results

- » Recommendations for the introduction of suitable policy instruments to improve energy efficiency in the industrial sector have been developed.
- » Benchmarking reports for three industrial sectors (cement, iron and steel and fertilizers) that identify the potential for energy savings in these sectors have been published.
- » A national campaign recognizing efforts of companies implementing energy efficiency measures and spreading knowledge on energy efficiency in the industrial sector was launched.
- » Some 55 experts have been trained on energy management.
- » A total of 30 government representatives and 150 industry professionals have been trained on basic concepts of energy management.
- » In all, 31 energy-intensive companies are implementing energy management: 965 gigawatt-hours (GWh) have been saved and another 300 GWh are expected to be saved by the end of 2015.

Expected results

- » Supportive policy instruments (EnMS, benchmarks) for delivering EE in industry and contributing to international competitiveness.
- » Widespread awareness on EE and energy management.
- » A cadre of specialized/certified energy management and system optimization experts made available.
- » There will be increased access to financial assistance for implementing EE projects.
- » State-of-the-art energy management practices will be implemented and EE measures demonstrated.

» Donors and partners

Donor » GEF

Partners » Egyptian Environmental Affairs Agency, Egyptian Organization for Standardization, Industrial Modernization Center, Industrial Development Authority and Federation of Egyptian Industries, Ministry of Trade, Industry and SMEs.

South Africa

The Global Cleantech Innovation Programme for SMEs

In 2011, the Government of South Africa, with the support of the GEF and UNIDO, implemented the 'Greening the COP17' project. One of the four components of the project was the first South Africa Clean Technology Competition (2011 SA Cleantech) for green entrepreneurs and small and medium-sized enterprises (SMEs) with innovative ideas and concepts in the areas of energy efficiency, renewable energy and green building practices. Building on this success, UNIDO is implementing the GCIP for SMEs to promote clean technology innovation in SMEs in South Africa in cooperation with the Technology Innovation Agency (TIA). The GCIP for SMEs is a global flagship programme of UNIDO with funding from the GEF and executed in partnership with the Cleantech Open, USA.

Objective

The Global Cleantech Innovation Programme (GCIP) for SMEs in South Africa aims to enhance emerging clean technology startups and strengthen policy frameworks for innovation and startups. The programme takes a competition-based approach to identify a pool of promising entrepreneurs and support them through ongoing mentoring, webinars and networking events to grow their innovative concepts into full-fledged products ready for the national and global markets.

Achieved results

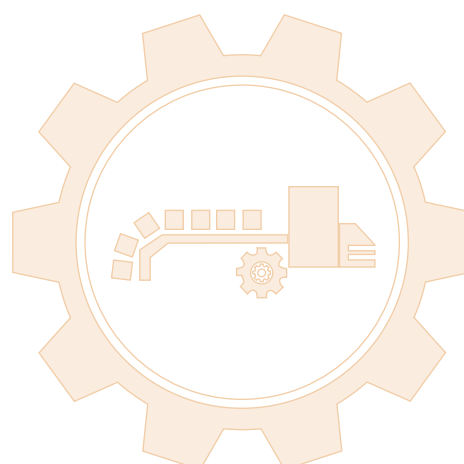
- » Under the 2014 Cleantech Competition and Accelerator Programme, 68 applications were received and 24 teams were selected as semi-finalists to progress through the Accelerator Programme.
- » Clear Sky Energy (Pty) Ltd was selected as the 2014 National Winner and given the opportunity to fly to Silicon Valley to pitch their technology to international investors and venture capitalists. Clear Sky offers a profitable solution for medical waste destruction using a patented combustion chamber technology.
- » In 2015, 120 applications were received; from which 18 were selected as semi-finalists to take part in the Accelerator Programme.
- » To date, 19 events have been organized to support the development of Cleantech mentors, judges and entrepreneurs; four mentors trainings, three judges trainings, two National Academies, and 10 webinar (mentoring) sessions.



» Donors and partners

Donor » GEF

Partners » Technical Innovation Agency (TIA).



South Africa

Energy-efficient, low-carbon transport

The transport sector accounts for 28 per cent of final energy consumption in South Africa (97 per cent of which is in liquid fuels) and demand is expected to double by 2050; therefore, the sector plays an increasingly important role in the overall economic and energy performance of South Africa. The country is also experiencing a higher level of motorization as a result of increased commuting needs, an automobile-dependent urban sprawl and personal wealth, in terms of both the number of wealthy people and disposable incomes. The ongoing use of transport fuel price subsidization only supports this growth, and is closely linked to the fact that automotive manufacturing is an important sector in South Africa, being labour intensive and considered a high-yield investment opportunity.

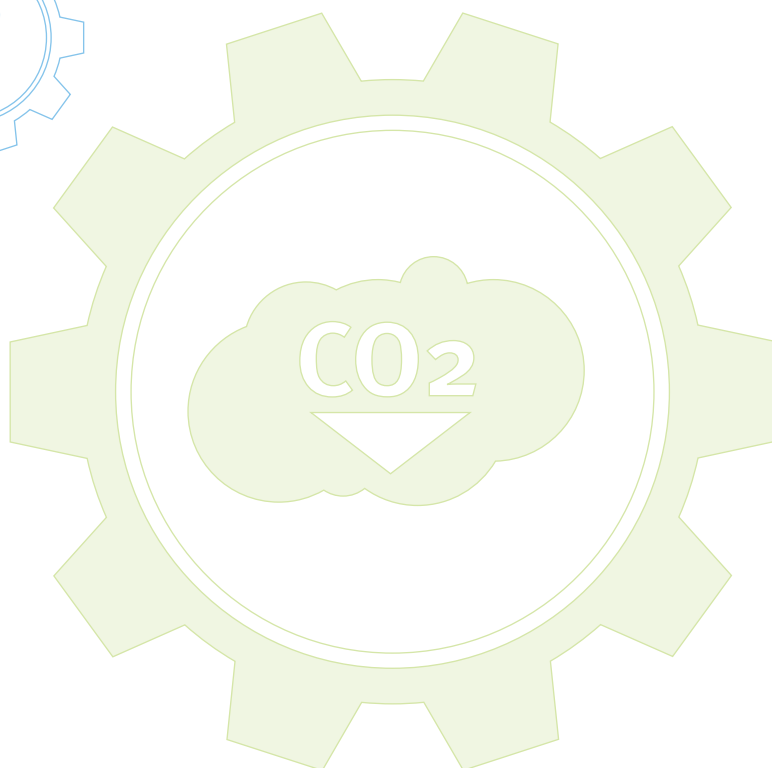
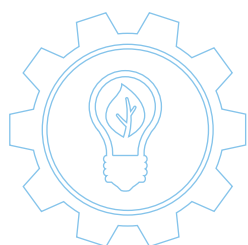
In light of this, UNIDO is implementing a project on the promotion of energy-efficient, low-carbon transport in South Africa in cooperation with the South African National Energy Development Institute (SANEDI).

Objective

Promotion of the widespread use of electric vehicles (EVs) and non-motorized transport (NMT), and the development of the necessary infrastructure, as part of the Green Transport and Green Cities initiatives of South Africa.

Expected results

- » Enabling policy and regulatory framework, together with strengthened institutional capacity and enhanced awareness; facilitating early and widespread use and local manufacturing of electric vehicles (EVs) and non-motorized transportation (NMT) in South Africa.
- » Improved non-motorized and public transport result in a reduction of GHG emissions in the transport sectors of the cities of Durban and Johannesburg; adequate infrastructure facilitates widespread utilization of EVs powered by renewable energy.



» Donors and partners

Donor » GEF

Partners » South African National Energy Development Institute (SANEDI)

South Africa

Industrial Energy Efficiency Improvement in South Africa

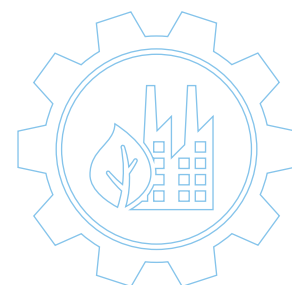
South Africa is a highly energy-intensive economy that, while rapidly diversifying, is still structured around energy-intensive, large-scale operations, such as large-scale manufacturing, mining and primary minerals beneficiary industries. Therefore, there is a strong need for the increased promotion and implementation of industrial energy efficiency through the application of relevant national policies and strategies that address sustainable economic and industrial development and climate change mitigation.

Objective

The idea behind the project is to increase industrial energy efficiency in South Africa in order to contribute to national efforts to improve energy security and electricity supply, while at the same time ensuring that GDP growth is not constrained by energy shortages and rising prices. The South Africa IEE Project seeks to achieve this overall objective through the development of industrial energy efficiency policy frameworks; the introduction and promotion of energy management systems (EnMS); industry capacity-building and expert development in the field of EnMS and energy systems optimization (ESO); as well as awareness creation with piloting and demonstration of EnMS and ESO within South African Industry.

Achieved results

- » National institutional capacity for the operationalization of the SANS/ISO 50001 standard was strengthened by training South Africa's first SANS/ISO 50001 Lead Auditors and Training Centre Providers (TCPs).
- » The project has strengthened knowledge of energy management systems and their optimization across a wide section of the South African industrial sector (both enterprise and consultancy), with some 2,300 course participants being trained in EnMS and different ESO topics by the end of 2013.
- » An ESO-based energy auditing programme of approximately 220 SMEs has been completed.
- » The project has worked with approximately 150 large companies assisting them to reduce their energy consumption by conducting various ESO assessment and EnMS implementation activities.
- » By the end of September 2015, the South Africa IEE project had supported ten South African companies to be fully SANS/ ISO 50001 certified, with additional companies in the pipeline for 2016.



» Donors and partners

Donors » Government of South Africa, through the Department of Trade and Industry (dti), the UK Department for International Development (DFID), and the Swiss State Secretariat for Economic Affairs (SECO).

Partners » African National Cleaner Production Centre (SA-NCPC), Department of Energy (DoE), South African Bureau of Standards (SABS), Business Unity South Africa (BUSA), National Business Initiative (NBI).

China

Promoting energy efficiency in industrial heat systems and high energy-consuming (HEC) equipment

The project focuses on improving energy conservation across industries by focusing on heat transfer equipment. This will achieve energy savings that have a positive effect on the profitability, competitiveness and energy resilience of Chinese industries, thus contributing to the national economy.

Objective

To promote energy efficiency in high energy consuming special equipment through the development of technical regulations; the establishment of national laboratories; the training of national experts; and the demonstration of new technologies at enterprise level.

Expected results

- » Enhanced regulatory framework; a knowledge management tool is available to users and facilitating the implementation of systems optimization and efficient equipment by improving testing capabilities and energy efficiency awareness raising for financing mechanisms.
- » The General Administration of Quality Supervision, Inspection and Quarantine (AQSIQ) has the capacities required to enforce technical regulations.
- » A cadre of highly specialized system optimization experts from the public and private sectors are available as a long-term technical resource to industry and the country.
- » Enterprises awareness on measures and new technologies has been increased.
- » New efficient technologies and efficiency measures are demonstrated.



» Donors and partners

Donor » GEF

Partners » Special Equipment Safety Supervision Bureau (SESA) of the General Administration of Quality Supervision, Inspection and Quarantine (AQSIQ), China Special Equipment Inspection and Research Institute (CSEI).



China

New vehicle technologies

In July 2012, the State Council of China released the Energy Saving and New Energy Vehicle Development Plan (2012-2020), which set an aggressive target of putting 500,000 new energy vehicles (NEVs) on the road by 2015, rising to 5 million in 2020. However, the market is still at the start-up stage with a number of technical, economical or institutional barriers to be overcome before China's low-carbon transportation goal can be reached. To help speed progress, MIIT, together with other government agencies, announced an incentive plan for NEVs from 2013 to 2015. This project will assist the Chinese government to meet the targets set in the Energy Saving and New Energy Vehicle Industry Development Plan.

Objective

The project aims to design low-carbon commercialization models for the entire supply chain of advanced-powertrain vehicles, investigate the feasibility of a low-carbon transport system, demonstrate the system in a selected district, and disseminate the results to encourage the transformation of the Chinese automotive industry by following a low-carbon development path.

This project shall provide the analytical basis for the "Integrated adoption of New Energy Vehicles" project, in which technologies and commercialization pathways will be demonstrated at city level scale.

Expected results

- » The commercialization pathways for NEVs and the policy framework are identified and provided to Chinese policy-makers to facilitate their deployment.
- » The awareness and acceptance on the low-carbon transport by NEV stakeholders is improved to promote cross-industry cooperation and joint development.
- » Facilitate and scale up the integrated development of NEVs and renewable energy in China through piloting of technologies and commercialization pathways in two pilot cities, Shanghai and Yancheng.

› Donors and partners

Donors › China International Centre for Economic and Technical Exchanges (CICETE)

Partners › Society of Automotive Engineers of China (SAE-China), China International Centre for Economic and Technical Exchanges (CICETE).



China

Integrated adoption of New Energy Vehicles

The main technical pathway to realize largescale energy-savings and emission reductions in the automotive industry is through the development of “New Energy Vehicle” (NEV) technologies. These advanced-powertrain vehicle technologies, which include electric battery and plug-in hybrid technologies have the advantages of high energy efficiency (EE) and zero tail pipe emissions. While the use of electric vehicles (EVs) reduces the demand on imported liquid fuels, improving energy security; it does not reduce environmental impacts if electricity is mainly sourced from coal fired power generation.

To achieve the targets set in the “Energy Saving and New Energy Vehicles Industry Development Plan (2012-2020)”, China has conducted a NEV demonstration at city level in two phases: phase 1 demonstrations (2009 to 2012) were conducted in 25 cities and phase 2 demonstrations (2013-2015) are underway for 88 cities. In both demonstration phases at city level, it was the central government who choose the cities based on their geographic, social and economic diversity and representativeness, existing foundation and/or preparation work in NEVs and demonstrated interest by the local regions to be a pilot location.

Objective

To facilitate and scale up the integrated development of New Energy Vehicles (NEVs) and renewable energy (RE) through the development of policies, technologies and standard systems to promote NEVs and RE by deploying smart grid and smart charging infrastructure and carry out a demonstration of the integrated policies and technology standards in Yancheng and Shanghai.

Achieved results

- » Drafting of technical standards and guidelines to provide regulatory elements, leading to higher adoption of NEV schemes by city Governments, vehicle manufacturers and consumers.
- » Increasing the institutional capacities and public awareness of policymakers at national stakeholder on the use of integrated EV-SG (Smart Grid)-RE systems.
- » Demonstrating the technology integration at two city scale projects (Yancheng) and innovative business models for the promotion of EV fleets (Shanghai).
- » Raising awareness of stakeholders, on NEVs research and development, manufacture, operation, and maintenance.

» Donors and partners

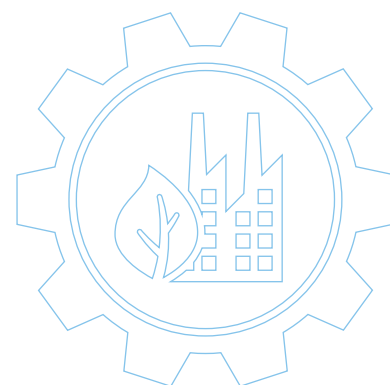
Donor » GEF

Partner » Ministry of Industries and Information Technology (MIIT), Society of Automotive Engineers of China (SAE-China).



India

Promoting energy efficiency and renewable energy in selected MSME clusters



Primary energy consumption in the fast growing Indian economy has risen sharply in recent years, leading to a subsequent spike in the country's CO₂ emissions. Industry, which plays a vital role in the economy, is the main driver of this demand, accounting for over 50 per cent of total energy consumption.

Within industry, the micro, small and medium enterprises (MSME) sector is an essential contributor to economic and social development, accounting for around 45 per cent of manufacturing output, 40 per cent of exports, and employing over 69 million people.

In order to encourage the adoption of sustainable industrial practices in this dynamic sector, UNIDO is implementing a project on the promotion of energy efficiency and renewable energy in MSMEs in cooperation with the Indian government.

Objective

The aim of the project is to develop and promote a market environment for introducing energy efficiencies and enhanced use of renewable energy technologies in process applications in 12 selected energy-intensive MSME clusters in India with expansion to more clusters in the future. The idea is to raise the productivity and competitiveness of units as well as to reduce overall carbon emissions and improve the local environment. The project will work at cluster level as well as policy level to achieve its aim.

› Donors and partners

Donor › GEF

Partners › Bureau of Energy Efficiency (BEE), Ministry of Micro, Small and Medium Enterprises (M/o MSME), Ministry of New and Renewable Sources of Energy (MNRE).

Achieved results

- ›› A total of nine clusters leaders from industrial associations of the various clusters have been appointed and have joined the project.
- ›› Sample energy audits in order to develop the best operating practices, as well as discussions with experts and technology suppliers, have been initiated in 10 clusters.
- ›› Two Indian Institutes of Technology and the Central Glass and Ceramic Research Institute (CGCRI) have submitted proposals for the project's assistance in the modification of existing technologies.
- ›› Two demonstration projects on energy information and analytics are under way and three technology demonstrations (for renewable energy & energy efficiency) have been initiated.



India

Promoting market transformation for energy efficiency in MSMEs

India's economy is diverse, encompassing modern and traditional agriculture, a wide range of industries, and a broad number of services. In 2014, GDP passed the \$2 trillion mark, with almost 30 per cent of the value generated through industry. Within this, as noted above, the MSME sector plays an important role in both output and job creation. However, despite its vibrancy, the sector often still deploys first era technologies and processes, resulting in higher energy intensity. Indian MSMEs are also reluctant to buy energy-efficient appliances, which are generally more expensive than less efficient options. Working together with the government, UNIDO is implementing a project that will support the transformation of the market for energy efficiency, thus supporting a move to more sustainable operating practices.

Objective

To promote the implementation of energy efficiency in the MSME sector; to create and sustain a revolving fund mechanism to ensure replication of energy efficiency measures in the sector; and to address the identified barriers for scaling-up energy efficiency measures and consequently promote a cleaner and more competitive MSME industry in India.

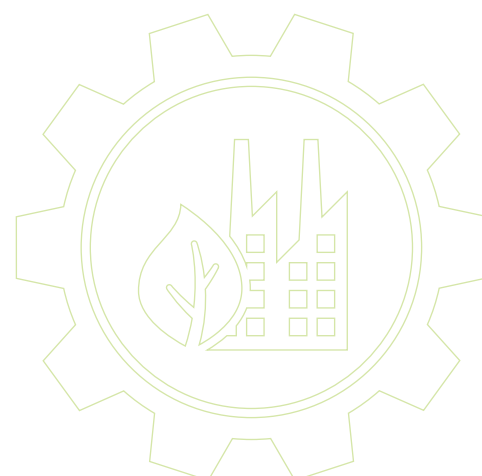
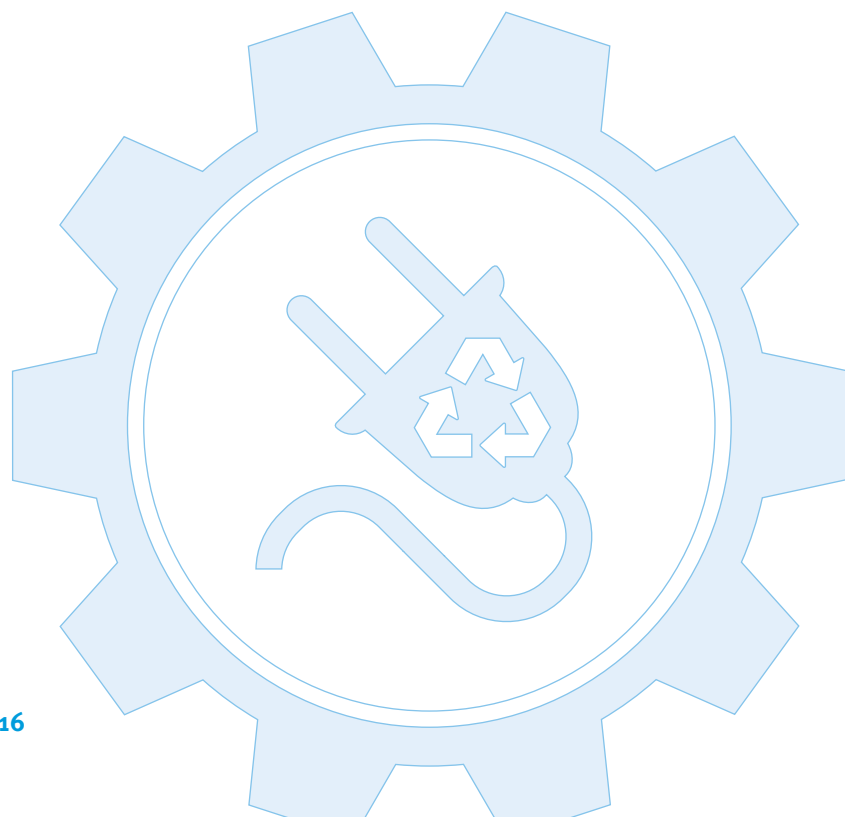
Expected outcomes

- » Ten energy intensive clusters identified based on objective criteria.
- » Identification of technologies that have the maximum impact on the cluster as a whole.
- » Capacity built and awareness raised as a result of the demonstration projects.
- » Demonstration of energy consumption reduction at the cluster level.
- » Scaling up of investment activities for energy efficiency in industry.
- » Establishment of sustainable and effective financial mechanisms.

» Donors and partners

Donor » GEF

Partner » Ministry of Micro, Small and Medium Enterprises (M/o MSME).



Indonesia

Promoting IEE through system optimization and energy management standards

There is a general concern at the Indonesian government level about the inefficiency of energy usage in industry. The government is also conscious of the need to improve the competitiveness of industry by reducing production costs and promoting sustainable and low-carbon development. To address this issue, it has initiated several actions, including awareness-raising activities, demand-side management, and an energy conservation partnership programme. UNIDO is implementing a project on the promotion of energy efficiency through system optimization and energy management standards in cooperation with the Indonesian government.

Objective

This project seeks to promote industrial energy efficiency by taking a system optimization approach and introducing ISO energy management standards.

Achieved results

- » In all, 39 national experts have successfully completed the EnMS expert module.
- » More than 400 participants have attended the combined ISO 50001 and system optimization awareness workshops, 227 of whom were factory managers.
- » A total of 387 factory personnel have been trained on the implementation of ISO 50001 Energy Management Standard.
- » Three peer-to-peer network meetings have been conducted and attended by around 150 representatives from pilot companies, national experts, government staff, financial institutions and vendors.
- » 78 national experts and candidate national experts have participated in system optimization expert modules.
- » 15 EnMS pilot companies have fully adopted the management cycle of ISO 50001; 15 companies have been assessed on system optimization.
- » Five factories have been certified with ISO 50001 with another five set to complete the process shortly.

» Donors and partners

Donor » GEF

Partners » Ministry of Energy and Mineral Resources (MEMR), the Ministry of Industry (Mol) and the National Standardization Body (BSN) of the Republic of Indonesia.



Islamic Republic of Iran

Energy efficiency in key industrial sectors

In partnership with Iranian Fuel Conservation Company (IFCO) and with funding from the GEF, UNIDO is promoting sustainable energy management in five energy-intensive industrial sectors; bricks, cement, iron and steel, oil refineries and petrochemicals.

Objective

The main objective of the project is to accelerate the uptake of energy efficiency (EE) by setting up voluntary energy agreements with industrial sectors, providing a framework for national energy management standards, assisting in capacity-building through training, developing targets, providing benchmarks and most importantly, by identifying technology improvement options to these high energy-intensive industrial sectors.



Achieved results

- » Development of an industrial energy efficiency policy and national emission trading scheme is in progress.
- » Communication strategy developed.
- » A total of 20 experts have been trained and 150 energy managers from industry have received user training.
- » Nine companies have been assisted on implementing EnMS.
- » Four pilots on iron and steel, cement, oil refineries and bricks are being implemented.



Expected results

- » Integrating energy efficiency priorities into national industrial policies and development programmes on energy-intensive SMEs in Iran.
- » Information dissemination and awareness-raising on EE good practices, selected case studies, sectoral benchmark reports, discussion forums and the establishment of a data bank on EE technologies and suppliers.
- » Building a national cadre of experts on energy management systems and system optimization, along with creating new energy auditors.
- » Introducing the concepts of energy management systems and system optimization to company management, and training enterprises on the preparation of bankable projects.
- » Implementing one demonstration project within each sector to act as a showcase for other industries and supporting those with energy audits, energy auditing equipment and energy metering equipment.
- » Facilitating financing by training banks on the financial appraisal of EE projects and establishing a revolving fund to support investments in EE.



» Donors and partners

Donor » GEF

Partner » the Iranian Fuel Conservation Company (IFCO)

Malaysia

IEE for Malaysian Manufacturing Sector

The rate of industrialization in Malaysia is reflected in rapid growth of the manufacturing sector and increased energy consumption. Real GDP growth rates have been strong since 2010, with manufacturing's share hovering at a significant 31 to 32 per cent of GDP. In terms of energy use, the industrial sector (comprising manufacturing, construction and mining) consumes most energy (42.6 per cent), followed closely by transport (36.5 per cent).

Energy efficiency has always been a low priority for industry due to low energy prices supported by subsidies and limited policy measures dedicated to encouraging energy savings. In an effort to overcome these barriers, UNIDO is implementing a project on the promotion of industrial energy efficiency in Malaysian industry in cooperation with the government.

Objective

To promote energy efficiency improvements in the Malaysian manufacturing sector through the development of a national energy management standard and the application of system optimization.

Achieved results

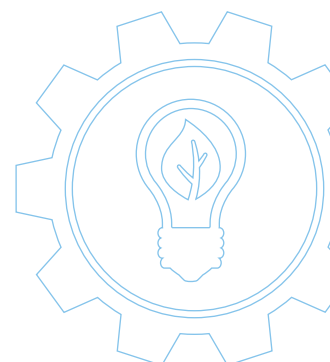
- » The project has contributed substantially to the National Energy Efficiency Action Plan (NEEAP), which was finalized and presented to the Cabinet in August 2015. Measures to improve energy efficiency in industries have been highlighted in the plan.
- » More than 900 industry personnel have attended EnMS and ESO awareness training sessions throughout Malaysia.
- » A total of 534 personnel have attended EnMS user training sessions.
- » Of the 58 EnMS expert trainees, 15 have completed all modules, on-the-job training and passed their exams to become national experts.
- » 100 factories are in various stages of implementing EnMS and the associated operational improvements.
- » In all, 154 expert trainees have been trained under systems optimization, with 55 having completed their certification as national experts.



» Donors and partners

Donor » GEF

Partners » Ministry of International Trade and Industry (MITI); Ministry of Energy, Green Technology and Water (KeTTHA), SME Corp.



Malaysia

Sustainable city development

Industrial growth in developing countries and emerging economies has been accompanied by rapid urban growth; in 2014, the urban population accounted for 54 per cent of the total global population, compared to only 34 per cent in 1960. As urban areas continue to grow, so too does their impact on the environment; currently, cities are already responsible for 60 to 80 per cent of the world's energy consumption, and this portion will continue to increase. In Malaysia, a country that has seen significant economic development in recent years, around three-quarters of the population now lives in urban areas. While this growth in urbanization brings challenges in terms of urban planning and development, it also holds promise for the improved living standards, with a close link between urbanization and improved income levels.

UNIDO is developing a project on the promotion of sustainable city initiatives in Melaka City, Malaysia under the GEF's Sustainable City Integrated Approach Pilot (IAP). This concept has been developed in close cooperation with Malaysia Industry-Government Group for High Technology (MiGHT) and Melaka City administration.

Objective

The project will directly contribute to the IAP goals of integrated sustainability planning, namely: integrating climate risks in urban planning and management. This will be achieved through support in the development of national urban policy frameworks, improved planning and management in Melaka City. It will also promote increased investment in Melaka City into urban management modalities; and Increased knowledge and partnerships on sustainable cities in Melaka City, and in Malaysia in general.

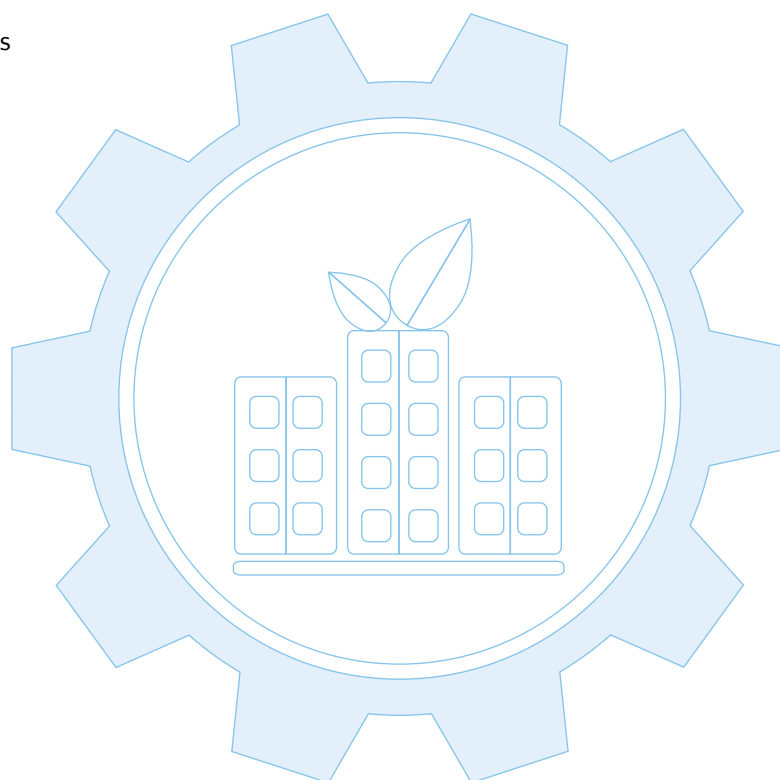
Expected results

- ›› National urban policy framework will be strengthened to promote sustainable cities model.
- ›› Improved planning and management capacities of pilot cities and central government for sustainable cities' principles.
- ›› Investments in pilot cities will generate local and global environmental benefits.
- ›› Increased knowledge and partnerships on sustainable cities and climate resilience at multiple levels.

› Donors and partners

Donor › GEF

Partners › Malaysia Industry-Government Group for High Technology (MiGHT) and Melaka City.



Malaysia

Applying EE and solar thermal systems to cut emissions

Final energy demand in Malaysia's growing industrial sector is expected to rise at an average rate of 3.4 per cent a year, reaching around 35.9 Mtoe (million tons of oil equivalent) by 2030. One area with huge potential to meet a growing share of this demand is solar, thanks to high levels of solar radiation throughout the year; the annual average daily solar irradiation ranges from 4.21 to 5.56 kilowatt-hours per square metre per day. With the establishment of the Solar Energy Research Institute in 2005, more than \$4.5 million has been invested in the establishment of facilities, research grants, and small demonstration projects. The focus, however, has mostly been limited to solar photovoltaic and residential solar water heaters, rather than on solar thermal applications in industry. Solar thermal energy is a convenient source of heating and a technology that does not rely on scarce, finite energy resources.



To address these challenges and opportunities, UNIDO is implementing a project on the promotion of energy efficiency and solar thermal systems application in Malaysian industry in cooperation with the Standards and Industrial Research Institute of Malaysia (SIRIM).

Objective

The goal of the project is to reduce GHG emissions by promoting and demonstrating sector-specific energy efficiency improvements and through introducing the use of solar thermal technology in industry.

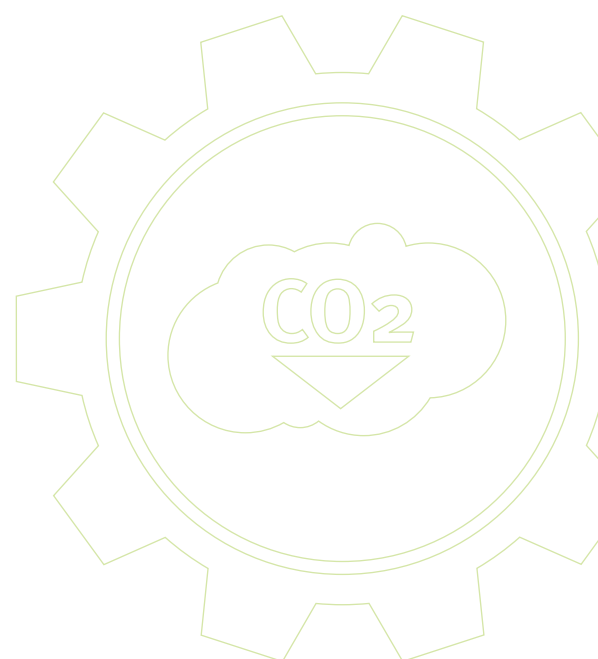
Expected results

- » Policy papers and financial incentive schemes will be established and endorsed by stakeholders.
- » Awareness and capacity of equipment vendors, service providers, industry management, plant engineers, and financial institutions in five targeted sub-sectors will be strengthened and utilized.
- » Thermal energy efficiency and solar thermal technology will be demonstrated and deployed in five targeted industrial sub-sectors.

› Donors and partners

Donor › GEF

Partners › Standards and Industrial Research Institute of Malaysia (SIRIM).



Malaysia

Energy-efficient, low-carbon transport

Demand for mobility is growing rapidly, especially in developing countries, with the number of vehicles on the road expected to triple by 2050 to over 2 billion. In 2000, energy production in Malaysia was responsible for around 35 per cent of total CO₂ emissions, with the transportation sector following with 21 per cent. Since 2009, the transport sector has become Malaysia's largest greenhouse gas emitter, and the second-biggest driver of energy demand in the economy. In light of these issues, electric vehicles (EVs) present significant potential to reduce GHG emissions, in particular if the EVs are powered by renewable energy sources, and improve energy efficiency. While there are many forms of clean vehicle technologies either currently under development or already in the market, EVs are one of the more promising alternatives for reducing oil consumption and emissions.

To address these challenges UNIDO is developing a project on the promotion of energy-efficient, low-carbon transport in Malaysia in cooperation with the Ministry of Energy, Green Technology and Water (KeTTHA) and Malaysia Green Technology Corporation (GreenTech Malaysia).



Objective

The project aims to encourage and accelerate widespread use of EVs as part of the energy-efficient, low-carbon transport and low-carbon cities initiatives set up by the Government of Malaysia.

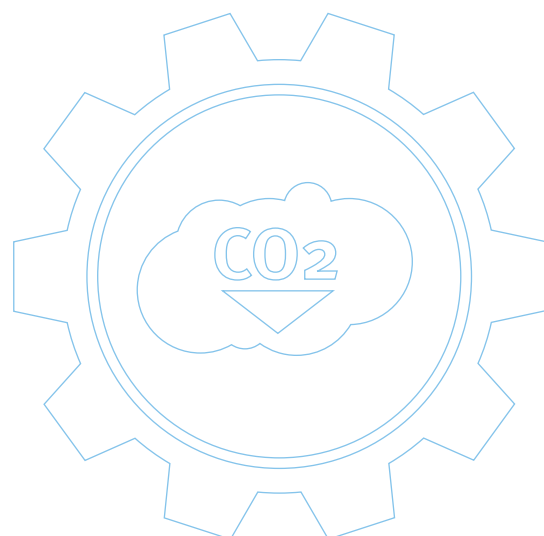
Expected results

- » The widespread use of EVs in Malaysia will move forward as a result of enabling policies, the establishment of a regulatory framework, strengthened institutional capacity, and enhanced awareness, resulting in GHG reductions, local manufacturing, job and income creation and environmental improvements.
- » Adequate infrastructure and skilled personnel will facilitate the local manufacture of EV parts and components and help encourage the widespread use of EVs.

› Donors and partners

Donor › GEF

Partners › the Ministry of Energy, Green Technology and Water (KeTTHA) and Malaysia Green Technology Corporation (Greentech Malaysia).



Myanmar

Improvement of industrial energy efficiency

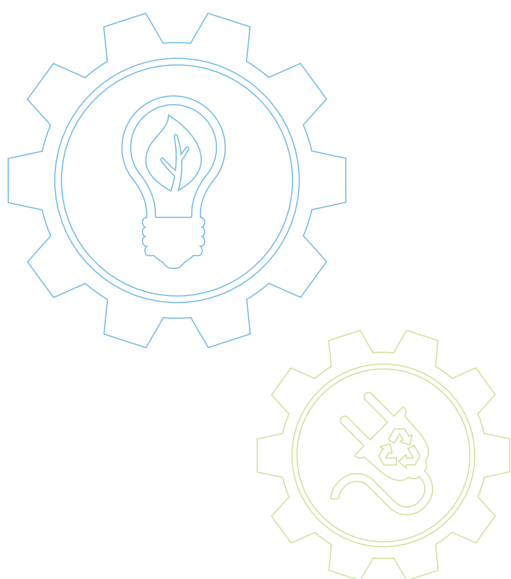
Myanmar is classified as a least developed country (LDC), with 25.6 per cent of its population of 61.65 million (2013) living below the poverty line. The economy, which in the past has been primarily agricultural (accounting for more than half of employment), has seen significant opening to foreign investment since the newly instated government embarked upon a reform policy. As a result, the economy has grown significantly in parallel with a surge in investment. In order to support and encourage sustainable industrial development in Myanmar, UNIDO is implementing a project on the improvement of industrial energy efficiency in cooperation with the Ministry of Industry (Mol).

Objective

The aim of the project is to promote a sustained reduction in GHG emissions in industry by improving policy and regulatory frameworks and institutional capacity-building for industrial energy efficiency through the implementation of energy management systems, based on ISO 50001, EnMS and optimization of energy systems.

Expected results

- » Improved policy and regulatory frameworks, incentive schemes, support programmes, energy data and awareness will facilitate the improvement of sustainable energy efficiency in industry.
- » Strengthened or built capacity of institutions, industries, consultants and equipment suppliers on energy management systems, energy system optimization, and EE project financing will assist industries in the implementation of EE improvements.
- » Demonstrated projects on energy management systems, and energy system optimization in selected plants and sub-sectors and widely used case studies will result in direct GHG emissions reductions and leverage the interest and belief in investment in IEE projects.



» Donors and partners

Donor » GEF

Partners » Ministry of Industry (Mol)

Philippines

Industrial energy efficiency

UNIDO is implementing a project on the promotion of industrial energy efficiency in cooperation with the Department of Energy (DoE) and the Department of Trade and Industry (DTI) in the Philippines.

The project, which started in 2011, is in line with the government's 2011-2016 Development Plan to improve energy security and environmental sustainability. It trains Filipino national experts in both the optimization of steam, compressed air and pumping systems and in energy management, while at the same time introducing these concepts to participating industrial enterprises that will directly benefit from project implementation.

It foresees a reduction in greenhouse gas emissions from savings in the use of fuel and electricity attributable to systems improvements undertaken by the participating industrial enterprises. The project will also build capacity for industries in order to introduce Energy Management Standard ISO 50001. Compliance with this ISO standard will provide an incentive for continuous attention to improved energy use efficiency.

Objective

The project aims to introduce ISO 50001 Energy Management Standard along with system optimization approach for improvement of industrial energy efficiency of the Philippines.

Achieved results

- » A total of 43 national experts on EnMS, consisting of consultants, experts from beneficiary industries, partner government agencies, equipment/service providers and academia, have successfully completed the EnMS expert module.
- » Nine EnMS two-day user training sessions have been conducted with 529 personnel attending.
- » 11 two-day industrial user training session on systems optimization have been conducted in various regions of the Philippines. In these sessions, 439 personnel from 309 factories were made familiar with the use of UNIDO tools in steam, pump and compressed air system optimization.
- » Three expert training sessions have been conducted on system optimization, with a total of 62 local experts participating.
- » Some 18 companies have implemented EnMS in their facilities, of which three are considering applying for full certification to ISO 50001.
- » 22 factories have served as host plants for system optimization assessments, of which 14 assessments have been completed to date.

› Donors and partners

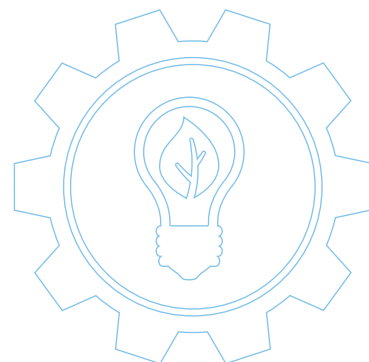
Donor › GEF

Partners › Department of Energy (DoE) and the Department of Trade and Industry (DTI).



Thailand

Industrial energy efficiency



In South-East Asia, Thailand has been a leader in the promotion of energy efficiency. The Thai government has been proactive in fostering an energy efficiency culture and industry has been a receptive and active participant. As in other countries in the region, however, Thai industries continue to focus more on individual system components, such as motors, pumps, or boilers than on the whole system, and energy management remains an ad-hoc practice. In an effort to address this, UNIDO has teamed up with the government in a project to improve levels of industrial energy efficiency.

Objective

The project aims to promote energy efficiency in industry through the introduction of Energy Management Standard ISO 50001 and by incorporating industrial energy systems optimization.

Achieved results

- » 73 national experts/candidate national experts have participated in EnMS expert modules.
- » 440 management staff from 341 factories attended awareness-raising workshops, while 438 representatives from 196 factories received EnMS user training.
- » 33 national experts have been qualified under system optimization expert training programmes and a further 27 are currently candidate national experts.
- » 645 factory personnel from 243 factories received system optimization user training.
- » 24 factories have implemented energy management plans and completed operational improvements.
- » 15 host facilities began the establishment of EnMS in line with ISO 50001 requirements, seven of which have already received certification to ISO 50001.
- » 26 systems assessments have been completed, with a further 18 assessments planned for the 2015 period.
- » 35 participants, representing nine banks in Thailand, have attended a one-day training session on assessment of energy efficiency projects, as well as site visits to the energy conservation demonstration centre.
- » 87 participants, representing 40 factories, have attended a two-day training session designed to enhance the capacity of factory personnel and management on the development of bankable proposals.

» Donors and partners

Donor » GEF

Partners » the Department of Industrial Promotion (DIP), the Thai Industrial Standards Institute (TISI), the Department of Alternative Energy Development and Efficiency (DEDE), and the Department of Industrial Works (DIW).



Viet Nam

Promoting IEE through improved systems and energy management standards

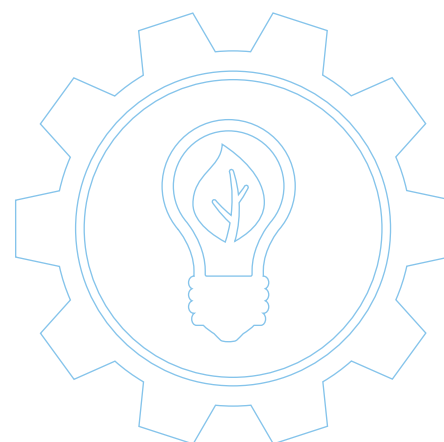
In respect to industrial practices, the Vietnamese government has expressed its concern with the current inefficient way in which industry uses fuel and power. There is limited implementation of energy efficiency programmes by industrial enterprises, with energy efficiency improvement measures more focused on the component levels such as motors, pumps or boilers, rather than on the system level. Addressing this will require policy and normative interventions, including the establishment of energy management standards, and the delivery of a training curriculum to both energy efficiency services “buyers” and “sellers.”

Objective

The aim of the project is to promote energy efficiency in industry through the introduction of the ISO 50001 Energy Management Standard incorporating industrial energy systems optimization.

Achieved results

- » 27 national experts and 14 staff members from 10 enterprises received training on EnMS modules, of whom 27 national experts and three factory staff were granted certificates.
- » A total of 241 management personnel from enterprises attended ESO introduction workshops organized by the IEE project.
- » The EnMS user training programme was attended by 250 energy managers and production operators from 126 different enterprises, along with 29 energy consultants.
- » 62 factories adopted energy management plans and completed operational improvement projects with assistance provided by trained national experts.
- » 15 factories have fully implemented ISO 50001 and received EnMS certificates in line with ISO 50001.
- » A total of 150 system assessments have been completed; 139 of which led to system optimization projects being implemented.
- » 27 national experts and staff of financial institutions participated in the financial analysis training.



› Donors and partners

Donor › GEF

Partners › Ministry of Industry and Trade (MOIT).



Viet Nam

Promotion of energy-efficient industrial boilers

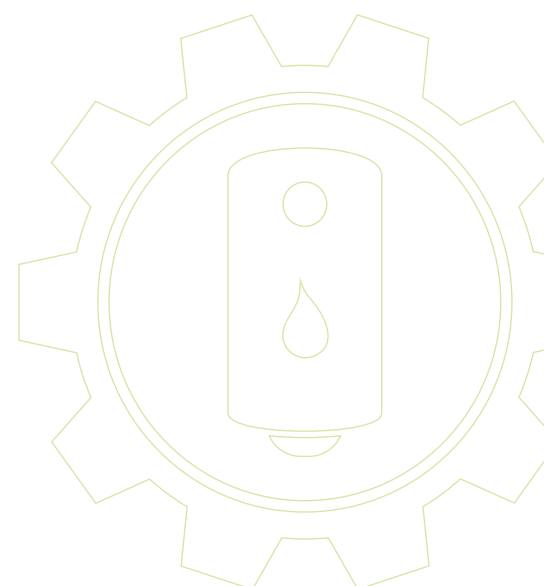
The project is designed with three substantive components that address the current market barriers to the promotion of energy-efficient boiler manufacturing, as well as their adoption by end-users. It is expected that these interventions will create an enabling environment for promoting the widespread adoption of energy-efficient boilers and best operating practices in the industrial sub-sectors of Viet Nam. The project's approach will facilitate the development of both end-use and supply sides of the energy efficiency industrial boiler market in Viet Nam; this will be achieved through policy and regulations on a boiler standardization system that can enforce the usage of energy-efficient boilers and promote capacity-building of local boiler manufacturers, boiler operators, end-users, energy consultants, energy service providers, ESCOs and boiler providers.

Objective

To cut energy consumption and reduce greenhouse gas emissions through promoting the widespread adoption of energy-efficient boilers and best operation practices in industry.

Expected results

- » The establishment of regulations and guidelines on an industrial boiler standardization system.
- » Increased awareness of and information on energy-efficient industrial boilers for end-users (industrial enterprises), energy consultants, energy service providers, energy service companies (ESCOs) and industrial boiler providers.
- » Improved technical capacity of government agencies, industrial boiler owners, operators and manufacturers, service providers, and financial/banking institutions.
- » Increased access to financial sources and incentives for investment projects on energy-efficient boiler adoption and manufacturing.



» Donors and partners

Donor » GEF

Partners » Ministry of Industry and Trade (MOIT).

The Former Yugoslav Republic of Macedonia

Catalyzing market transformation for industrial energy efficiency and accelerate investments in best available practices and technologies in the Former Yugoslav Republic of Macedonia

In recent years Macedonian industry has made considerable strides in improving energy efficiency, in particular in larger enterprises, thanks to greater support from policy-makers and help from a number of internationally funded projects. However, there is still much to be done to create an adequate policy and legal framework for industrial energy efficiency (IEE). The market for energy efficiency services and technologies is still underdeveloped, with potential technical and economic gains untapped.

Objective

To accelerate change in the market for industrial energy efficiency by creating stronger policy, regulatory and institutional frameworks and supporting increased diffusion of and investment in best available industrial energy efficiency practices and technologies.

Expected results

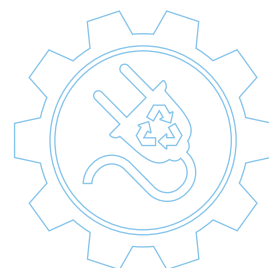
- » The establishment of a sustainable environment that supports IEE through strengthened policy and regulatory frameworks and market-based mechanisms.
- » The adoption of energy and environment management systems will lead to greater resource investments in energy efficiency measures and low-carbon technologies, and increased energy productivity and competitiveness of Macedonian industries.
- » Adoption of energy-efficient and low-carbon process/sector specific technologies



› Donors and partners

Donor › GEF

Partners › Ministry of Environment and Physical Planning, Ministry of Economy, Energy Agency of the Republic of Macedonia, Regional Environment Centre of Macedonia.



Republic of Moldova

Reducing GHG emissions through improved energy efficiency in the industrial sector in Moldova

Despite improvements in recent years, energy productivity and performance of Moldovan industry still remain significantly below those of EU countries as well as other countries in the region. This is the result of several barriers including: inadequacy of existing policies and institutional frameworks to effectively promote and support industrial energy efficiency (IEE); lack of, or limited knowledge and technical capacity for, energy efficiency among industry decision-makers and service providers; credit constraints faced by both public- and private-sector enterprises.

Objective

The ultimate objective of the project is to reduce greenhouse gas emissions from Moldovan industry by strengthening institutional capacity and establishing a policy and legal environment that enables and supports sustainable adoption of energy-efficient technologies and management as an integral part of industries' business practices. The project seeks to address many of the existing barriers to IEE, to deliver measurable results and to make an impact on how Moldovan industry manages energy through an integrated approach that combines capacity-building and technical assistance interventions at the institutional, policy, market and project/investment level.

Achieved results

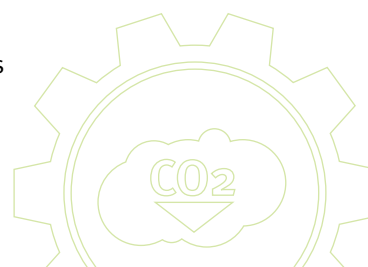
- » Enhanced institutional capacity of Moldova Energy Efficiency Agency (MEEA) for IEE and increased visibility of IEE within national frameworks and strategies through:
 - IEE indicators introduced in national monitoring, reporting and verification framework;
 - transfer of EE benchmarking methodology and piloting in Moldova industry (dairy sector);
 - energy management system enlisted as industrial sector measure in the 1st Moldovan National Energy Efficiency Action Plan (NEEAP) 2013-2015; and
 - substantial institutional skill development and direct expert support for implementation of the 1st NEEAP.
- » Catalyzed and accelerated development of the Moldovan market for energy management systems implementation and steam system optimization (SSO) through:
 - 16 national EE consultants qualified as UNIDO EnMS experts and 12 as UNIDO SSO experts;
 - more than 100 energy managers and engineers trained on EnMS and SSO;
 - more than 10 UNIDO qualified experts offering EnMS and SSO expert services to clients in manufacturing, power/ heat generation and in public sector two years after programmes completion; and
 - EnMS and/or SSO projects implemented in more than 15 public- and private-sector companies.
- » More than \$2 million worth of industrial energy efficiency investments catalyzed and supported for an estimated GHG emission reduction in excess of 25,000 tons CO₂eq.



» Donors and partners

Donor » GEF

Partners » Ministry of Environment of the Republic of Moldova, Ministry of Economy of the Republic of Moldova.



Russian Federation



Market transformation programme on energy efficiency in GHG-intensive industries in Russia

The project aims to reduce GHG emissions of Russian industries by transforming the market for industrial energy efficiency. It builds on and reinforces the work carried out by the Russian Federation Government over the last five years to accelerate the pace of Russian transition towards a more energy-efficient and productive economy. While remarkable progress has been made, substantial work is still needed and numerous barriers remain to be addressed in order to achieve widespread improvement of energy efficiency in industry as well as in other sectors of the economy.

Objective

The project is designed to make a tangible impact on how industry manages energy, leading to sustainable and continually improving energy performance, substantial cost savings and GHG emission reductions. It focuses, in particular, on enhancing industry and service providers' technical capacity for implementing EnMS in line with ISO 50001 along with other selected best-available technologies (BAT). Interventions at market level are complemented by close collaboration with the Russian Energy Agency (REA) and other federal and regional authorities to develop or support implementation of programmes contributing to the Russian Federation Energy Efficiency Programme till 2020.



Achieved results

- » Energy management system (EnMS) promotional and awareness-raising activities delivered to over 25,000 thousands practitioners and decision-makers.
- » More than 200 federal and regional government officials and 200 enterprise managers and engineers have been trained on EnMS and IEE technology and policies best practices.
- » Six training programmes for enterprises and energy efficiency consultants developed on specific IEE technologies, with work ongoing for the development of a web-based energy management and system optimization resource library.
- » More than 70 Russian consultants and 100 enterprises trained at different levels of knowledge on EnMS, steam system optimization and fans system optimization.
- » EnMS and energy system optimization implemented, with work ongoing in around 30 Russian factories from different sectors and regions.
- » More than 15 energy audits have been carried out.
- » Analysis of international approaches and best practices on monitoring and verification of industrial energy savings, performance and policies carried out and presented to REA.
- » Policy research and development study on Energy Saving Obligations and White Certificates for Russian industry prepared; provision of related technical assistance for policy development and capacity building.

» Donors and partners

Donor » GEF

Partners » Russian Energy Agency, Ministry of Energy, Ministry of Industry and Ministry of Environment, Russian industrial enterprises, higher education institutions.

Turkey

Improving industrial energy efficiency

Energy efficiency has been identified as an integrated component of national energy policy objectives in Turkey because of its important role in mitigating energy security risks, reducing import dependence, and helping meet the challenges of climate change. Supporting this objective, UNIDO is implementing a project on the improvement of industrial energy efficiency in Turkish industry in cooperation with the United Nations Development Programme (UNDP) and a number of Turkish government agencies. The project focuses on strengthening the policy and institutional framework; raising awareness and building the capacity of Turkish industry and private energy service providers; implementing energy audits and energy management systems (EnMS); and executing demonstration projects on energy efficiency and system optimization.

Objective

To improve the energy efficiency of Turkish industry by enabling and encouraging companies in the industrial sector to manage energy use efficiently through different energy conservation measures and energy-efficient technologies.

Results achieved

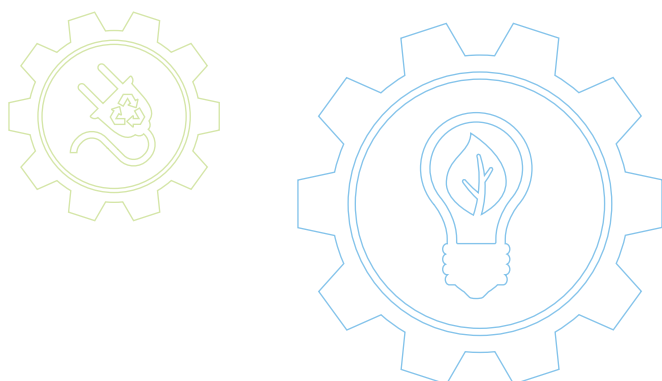
- » Potential financial mechanisms have been prepared and proposed for the Technology Department Foundation of Turkey (TTGV), which were subsequently incorporated into TTGV's financing methodology for funding energy efficiency investments.
- » Numerous user and expert level training sessions on energy management systems (EnMS) have been conducted throughout Turkey for industry managers, organized industrial zones (OIZs) personnel, engineers, university professors, energy consultants and certification company employees. In total, more than 400 people have been trained.
- » In 2015, six OIZs have joined the project to receive support in the establishment of energy management units in each OIZ.
- » The pilot phase of energy audit activities was initiated in early 2015, with walk-through energy audits already taking place.



» Donors and partners

Donor » GEF

Partners » United Nations Development Programme (UNDP), the General Directorate of Electrical Power Resources Survey and Development Administration (EIE), the Small and Medium Enterprises Development Organization (KOSGEB), the Technology Development Foundation of Turkey (TTGV), and the Turkish Standards Institution (TSE).



Ukraine

Introduction of Energy Management System Standard in Ukrainian Industry

The Ukrainian economy is highly energy intensive when compared with other economies. This is partly due to the economy being based on energy intensive industries, technology that lags the developed countries, and price subsidies in the internal energy markets. This results in poor energy independence and poor competitiveness in an increasingly global market. Ukrainian industries are typically 3-4 times more energy intensive than similar industries in the EU. This is partly due to fixed assets which are old and inherently inefficient, but also due to the fact that Energy Management and Energy Efficiency have traditionally been given low priority within Ukraine. The GEF5 Cycle UNIDO-GEF project 'Introduction of Energy Management System Standards in Ukrainian Industry (Ukraine IEE Project)', builds on UNIDO's unique expertise in the field of sustainable industrial development and the achievements of the GEF4 Cycle UNIDO-GEF project entitled 'Industrial Energy Efficiency and Renewable Energy in Ukraine'.

Objective

This project aims to achieve a sustainable transformation of industrial energy usage practices in Ukraine by advancing and promoting the concepts of energy management systems (EnMS) and energy system optimization (ESO), along with the application and promotion of the ISO 50001 Energy Management Standard.

Expected results

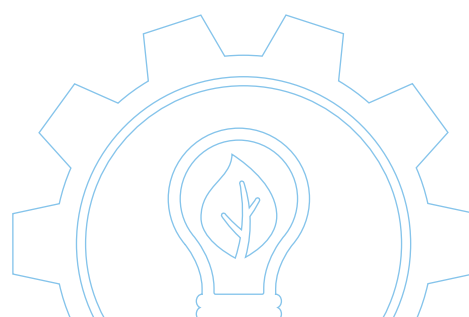
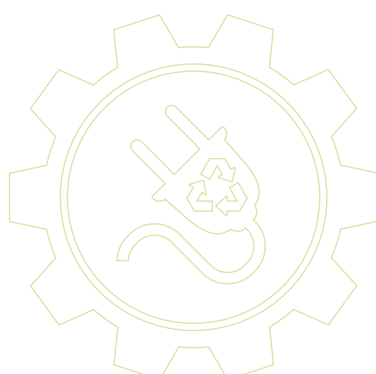
- » A policy and institutional framework supporting the national implementation of the ISO 50001 series of energy management system standards in industry will be established.
- » National capacity for implementation of EnMS and ESO in industry will be developed.
- » The sector-wide penetration of energy management systems will be accelerated and ESO and EE technologies promoted.
- » A financial mechanism to assist enterprises in the adoption of ESO measures.



» Donors and partners

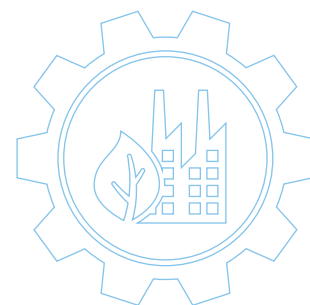
Donors » GEF with Co-financing from: Financial Institutions, Private Companies and UNIDO.

Partners » Ministry of Economic Development and Trade, Kyiv Polytechnical Institute ("NTUU" KPI), State Agency on Energy Efficiency and Energy Saving (SAEE).



Colombia

Promotion of industrial energy efficiency in Colombian industries



The industrial sector in Colombia represents about 25 per cent of national energy consumption. Significant opportunities to save energy have been identified and Government entities have focused their efforts on raising awareness and disseminating information about energy-efficiency measures. A national programme denominated the “Comprehensive Energy Management System” has been successfully implemented by a National University Network, sponsored by Administrative Department for Science, Technology and Innovation (Colciencias), establishing postgraduate training in Energy Management systems. However, highly industrialized intermediate cities and regions are not all covered by this training programme. The two main barriers remain to encourage enterprise to adopt energy efficiency measures: (a) higher dissemination amongst the private sector (b) a personnel certification scheme to ensure the quality of services offered by EnMs implementers.

Objective

The project objective is to strengthen the technical and financial capacities of relevant stakeholders to enable the scale-up of the energy efficiency (EE) measures that have been piloted by nationally driven programmes. It aims to improve Colombian industries’ energy performance by focusing on adopting energy management systems and a number of technical measures, such as motor, steam and pump systems optimization. The project seeks to produce energy savings and to help raise industry profitability and competitiveness, thus contributing to national welfare.

Expected results

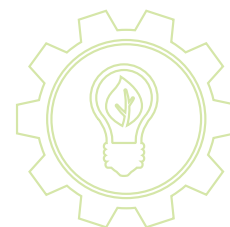
- » The national institutions will develop the mandatory regulations, voluntary standards and Monitoring and Evaluation schemes to support the adoption of EE measures in industries
- » The development of industry specific capacities will be promoted, establishing a cadre of highly specialized energy management experts from the public and private sectors, who are available as a long-term technical resource to industry and the country.
- » There will be strengthened technical capacities on audit and system optimization for energy end-use leading to measurable energy savings in industrial facilities.
- » A national financing scheme for the implementation of EE measures in the industrial sector will be assessed and financing institutions will be strengthened to assess IEE projects.

› Donors and partners

Donor › GEF

Partners › Mining and Energy Planning Unit (UPME), Administrative Department for Science, Technology and Innovation (Colciencias).



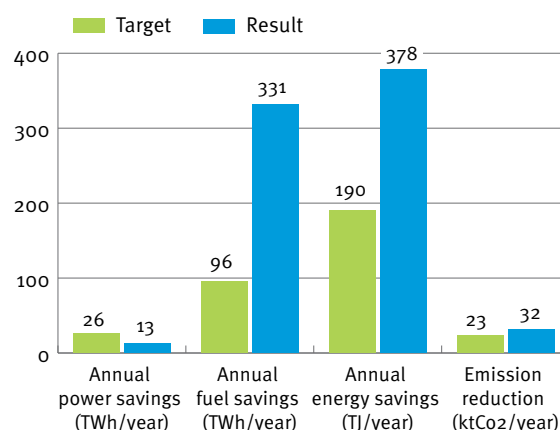


Ecuador

Industrial energy efficiency

The Government of Ecuador is committed to increase energy efficiency in the country. For Ecuador, energy efficiency is a priority; both from an economic and an environmental perspective. Its first National Plan for energy efficiency was developed in 2004. This Plan mentions a general objective of fostering “the efficient use of energy at the national level, contributing to sustainable development”. The promotion of efficient and rational use of energy is the government’s long-term objective and, in this context, UNIDO has partnered with MERE to support the adoption of energy efficiency measures in the industrial sector.

Global project targets



Objective

The objective of project has been to promote energy efficiency improvements in the industry sector of Ecuador through the development and implementation of national energy management standards and application of system optimization. The project implementation started in late 2011 and completed in September 2015.

Achieved results

- » In 2015, the Organic Law for the provision of electric services highlights the need to define policies to adopt energy efficiency measures, and establishes the need for a yearly action plans.
- » ISO 50001 was officially approved as a National Technical Standard in March 2012.
- » 464 industry representatives have raised their awareness on system optimization and 481 on energy management systems (EnMS).
- » Capacity-building in EnMS was conducted for 50 government officials and 137 enterprise managers, while 207 industry staff acquired an understanding of the basic principles of an EnMS and 25 technicians have received extensive training to implement the standard.
- » Capacity-building in energy systems optimization was conducted for 55 national trainees, and 379 industry staff acquired an understanding on systems assessments.
- » A total of 42 enterprises were involved in adopting EnMS, of which 34 developed energy management plans, 22 adopted an EnMS and were verified by third parties and are achieving energy savings; and two were certified under the ISO 50001 standard.
- » Energy systems assessments have been conducted for 20 enterprises; and pilot measures are being implemented in four of them.
- » The energy savings account to 378 TJ/year and direct emission reductions to 32,000 tons Co2/year.

» Donors and partners

Donor » GEF and Ministry of Electricity and Renewable Energy Ecuador

Partners » Ministry of Electricity and Renewable Energy, Ministry of Environment, Ministry of Industry and Competitiveness and the Ecuadorian Normalization Institute.



Global sustainable energy standards

Industrial energy efficiency is about achieving energy savings in industries. Energy management systems (EnMS) are a tool that enterprises can use to systematically integrate energy efficiency into their daily management practices. Standardization of EnMS has resulted in having a method that is globally recognized. However, to ensure that enterprises are able to improve their energy performance through the adoption of these standardized systems, and therefore contribute to achieving sectorial, national or global energy efficiency targets, requires comprehensive support systems that can monitor, verify and certify enterprise behaviour. This process entails the establishment of accreditation and certifications schemes, or “conformity assessment” that can support enterprises’ industrial sectors and aid governments in meeting energy conservation goals.

Objective

In order to define the technical needs and policy requirements that may give wider credibility to conformity assessment (accreditation and certification) of EnMS ISO 50001, UNIDO will conduct an Expert Group Meeting (EGM) to explore which government policies best encourage the adoption of EnMS by organizations worldwide, investigate the frameworks for conformity assessment schemes related to EnMS and assess the challenges of EnMS implementation and monitoring of energy performance at enterprise level. The aim of this exercise is to:

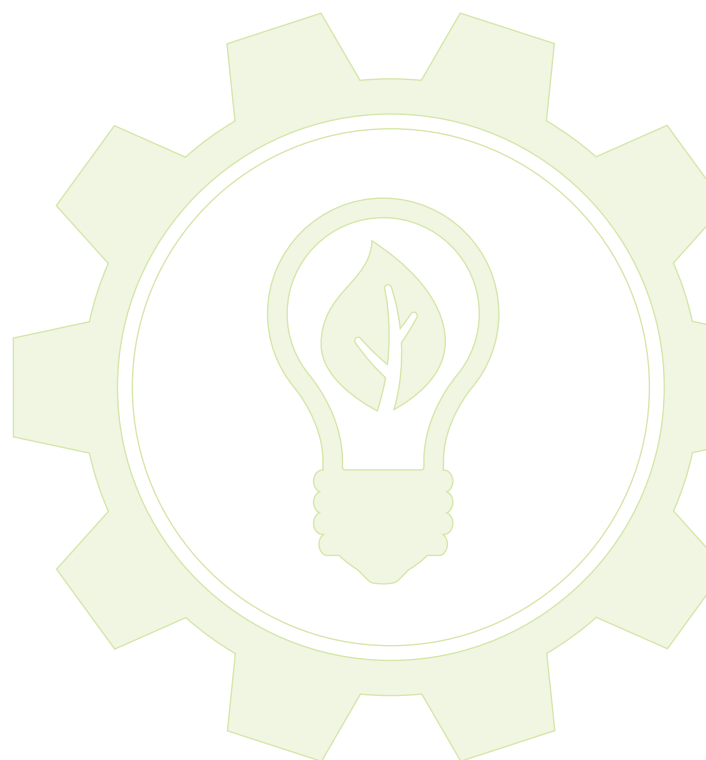
- » develop a shared understanding of what is meant by robust implementation of an EnMS;
- » discuss the elements considered to be essential to the successful adoption of EnMS and “continuous improvement of energy performance” on a global scale; and
- » define UNIDO’s strategic plan for new projects related to EnMS.

Expected results

The EGM is expected to propose a strategy and common action plan on EnMS conformity assessment schemes which includes the following elements:

- » government policies that may be adopted to support EnMS implementation,
- » well-defined requirements for an effective EnMS certification and accreditation,
- » a framework for the development of a global energy performance evaluation scheme,
- » standards, tools and methodologies to support EnMS adoption.

› Donors and partners
UNIDO Trade and Capacity
Building Branch.



List of projects

COUNTRY	PROJECT TITLE
AFRICA	
Burkina Faso	Promoting energy efficiency technologies in the beer brewery sector in Burkina Faso
Chad	Promoting energy-efficient cook stoves in micro and small-scale food processing industries
Egypt	Industrial Energy Efficiency (IEE)
South Africa	The Global Cleantech Innovation Programme for SMEs
South Africa	Energy-efficient, low-carbon transport
South Africa	Industrial energy efficiency improvement in South Africa
South Africa	Industrial energy efficiency through mainstreaming the introduction of energy management systems and energy system optimization
ASIA AND THE PACIFIC	
China	Promoting energy efficiency in industrial heat systems and high energy-consuming (HEC) equipment
China	Fuel efficiency strategies for the Chinese automotive industry
China	Vehicle Technologies
China	Integrated adoption of New Energy Vehicles
India	Promoting energy efficiency and renewable energy in selected MSME clusters
India	Promoting market transformation for energy efficiency in MSMEs
Indonesia	Promoting IEE through system optimization and energy management standards
Islamic Republic of Iran	Energy efficiency in key industrial sectors
Malaysia	IEE for Malaysian Manufacturing Sector
Malaysia	Sustainable city development
Malaysia	GHG emissions reductions in targeted industrial sub-sectors through EE and Application of Solar Thermal Systems
Malaysia	Energy-efficient, low-carbon transport
Myanmar	Improvement of industrial energy efficiency
Philippines	Industrial energy efficiency
Thailand	Industrial energy efficiency
Viet Nam	Promoting IEE through improved system optimizations and energy management standards
Viet Nam	Promotion of energy efficient industrial boiler adoption and operating practices
EUROPE	
Republic of Moldova	Reducing GHG emissions through improved energy efficiency in the industrial sector in Moldova
Russian Federation	Market transformation programme on energy efficiency in GHG-intensive industries in Russia
The former Yugoslav Republic of Macedonia	Catalyzing market transformation for industrial energy efficiency and accelerate investments in best available practices and technologies in the Former Yugoslav Republic of Macedonia.
Turkey	Improving energy efficiency
Ukraine	Introduction of energy management system standards in Ukrainian industry
LATIN AMERICA	
Colombia	Promotion of industrial energy efficiency in Colombian industries
Ecuador	Industrial energy efficiency
GLOBAL	Sustainable energy standards

Industrial Energy Efficiency Projects



POLICY DEVELOPMENT
AND STANDARDS



Unit

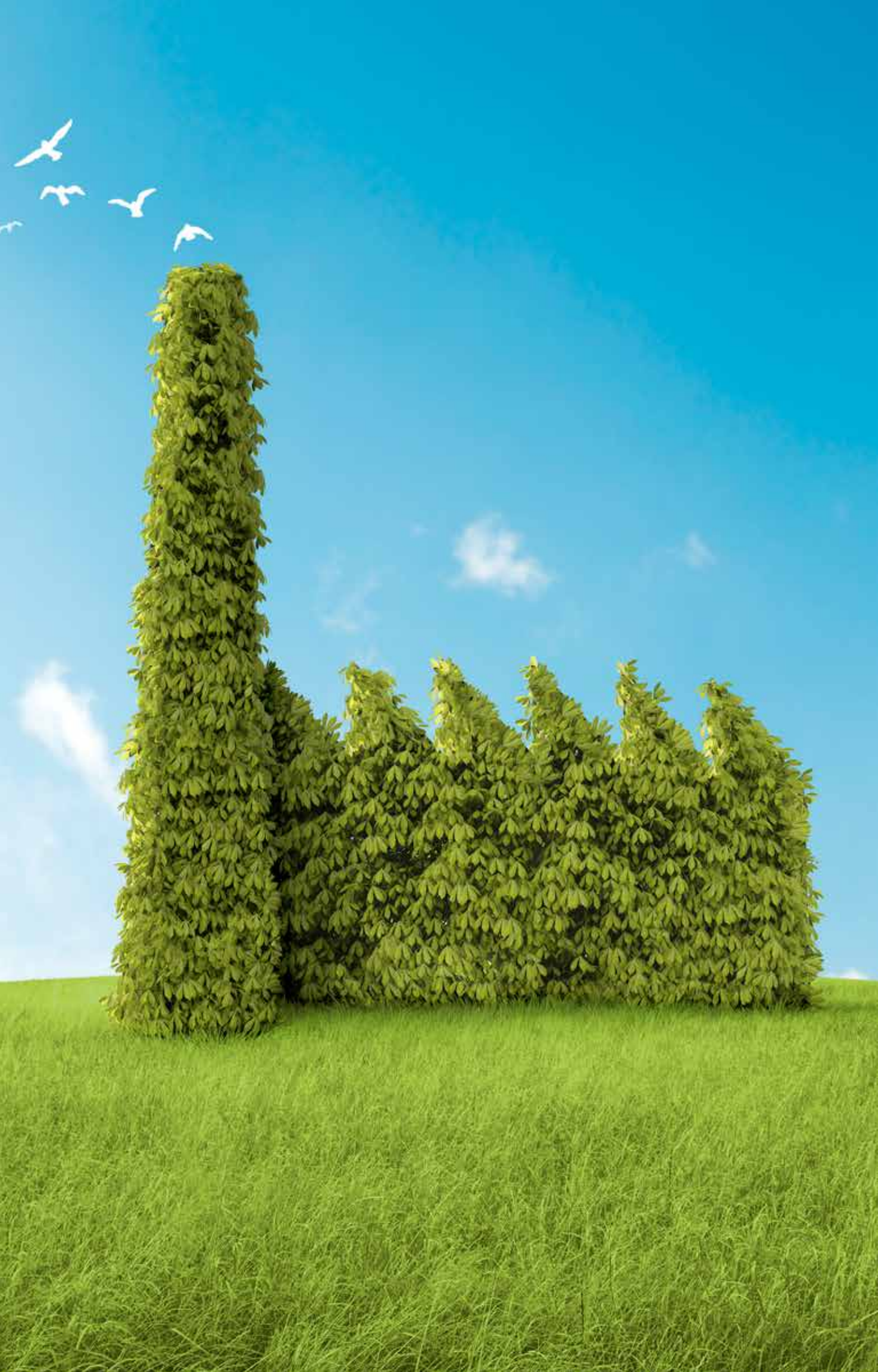


ENERGY MANAGEMENT,
TECHNOLOGY DEMONSTRATION
AND UPSCALING



CAPACITY-BUILDING
AND AWARENESS-RAISING





UNIDO ENERGY PROGRAMME

INDUSTRIAL ENERGY EFFICIENCY UNIT

energymanagement@unido.org



UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

Vienna International Centre · P.O. Box 300 · 1400 Vienna · Austria
Tel.: (+43-1) 26026-0 · E-mail: info@unido.org
www.unido.org