Spreading the energy management message in Turkey

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Abstract

As many other countries are doing, Turkey is actively encouraging businesses to adopt good energy management practices, primarily through the global standard, ISO 50001. Turkey is a major global manufacturer and exporter, with many active energy-intensive industrial sectors. It is important that they remain as competitive as possible so that they do not lose their competitive position. However, businesses are busy and management has a multitude of competing priorities. Increasingly, industry has come to realise the full range of benefits from improving their own energy performance. Yet, the messaging often gets lost in addressing the competing priorities. Two UN agencies, UNIDO and UNDP, with Global Environment Facility (GEF) funding are jointly supporting a project in Turkey to promote industrial energy efficiency. The overall objective of the IEEI Project is to "improve energy efficiency in Turkish industry" which gives it quite a wide scope – and challenge. The main strategy of the IEEI Project is to help remove key finance, capacity, technology and policy barriers that currently stand in the way of the widespread adoption of energy-efficient processes and technologies in industry in Turkey. While there are many aspects to the multi-year project, one is particularly exciting: working with Organised Industrial Zones (OIZs) to promote good energy management. This is a concept largely unknown outside Turkey and for that reason it is important for the international community to better understand how effectively these OIZs reach down and work with companies individually and collectively. OIZs were created under Turkish law to allow companies to operate within an investor-friendly environment with ready-to-use infrastructure and social facilities. The existing infrastructure provided in the OIZs includes roads, water, natural gas, electricity, communications, waste treatment, and other services. There are over 150 active OIZs in Turkey and they vary in size with some of the largest having hundreds of factories within their boundaries. The industrial energy efficiency project has helped create energy management units (EMUs) in selected OIZs. Those EMUs are the interface with industry, raising awareness, helping them find efficient solutions, helping to overcome many of the barriers that are faced. The paper will explain the approach taken by the project to engage the OIZs and will give important insight as to the effectiveness of companies working together within the OIZs to find the appropriate solutions to energy management practices.

Introduction

Energy efficiency (EE) is a stated priority for both its energy and climate change policies in Turkey. Turkey is a founding member of the International Energy Agency and has considered EE an important long-term policy area. The country has been active in EE particularly since the 1980s. In the 1980s, Turkey started some EE activities that continue until today – mandatory data reporting for large industry, awareness creation, and institutional co-ordination, to name but a few. The current strategy covers all end-use sectors as well as the transformation sector.

The key drivers for improving energy efficiency in Turkey are:

- Improving energy security.
- Reducing imports and the total energy bill.

- Improving competitiveness of industry that is heavily oriented towards export and that is heavily energy-intensive.
- Improving energy services to all consumers.
- Lowering carbon used throughout energy system.
- Reducing total environmental impact (including air quality).

These objectives are expressed primarily through the 2012 Energy Efficiency Strategy, the Climate Change Strategy and the 10th Development Plan.[1]

The current EE Strategy is most recently expressed in the 2012 EE strategy, replacing the earlier strategy from 2004. The EE Strategy set an overall target of reducing the amount of energy consumed per unit of GDP by at least 20 % by 2023 using 2011 as the base year. For industry, there is a sub-target to reduce energy intensities in each industry sub sector at least 10 % by 2023.

It is fundamentally important that Turkey improves its energy performance in all end-use sectors but it is probably most important for industry. It is a sector that is the driver for economic development. There are many energy-intensive industries and the sector is highly export-oriented, meaning that it has to work within a highly competitive environment. The focus of this paper is the industrial sector and particularly concerns one component of a multi-year project that specifically promotes good energy management practice through a subcomponent that will be described below. First it is important to understand more about the project.

There is an important internationally funded project for the industrial sector that is helping the country achieve its energy efficiency objectives through building capacity and undertaking measures to demonstrate the benefits of good energy management and to encourage companies to start investing more effectively in energy efficiency measures. Improving Energy Efficiency in Industry (IEEI) Project is being implemented by the General Directorate of Renewable Energy (YEGM) of the Ministry of Energy and Natural Resources with support from the Global Environment Facility (GEF) and in cooperation with United Nations Development Programme (UNDP), United Nations Industrial Development Organization (UNIDO), Small and Medium Sized Enterprise Development Organization (KOSGEB), Turkish Standards Institute (TSE) and Technology Development Foundation of Turkey (TTGV).

The overall objective of the IEEI Project is to "improve energy efficiency in Turkish industry" which gives it quite a wide scope – and challenge. The main strategy of the IEEI Project is to help remove key finance, capacity, technology and policy barriers that currently stand in the way of the widespread adoption of energy-efficient processes and technologies in industry in Turkey. The GEF funding has been provided to undertake capacity building and to develop and implement enhanced financial tools and technical mechanisms program that will help transform the Turkish industrial sector to a new more energy efficient way of operating. There is clearly significant potential to achieve energy savings and reduce greenhouse gas emissions in the industrial sector in Turkey.

The objective will be achieved by:

- Improving the institutional and legislative framework through different studies including the ones related to database management, benchmarking and financial mechanism, and promoting the implementation of the Energy Management System (EnMS) approach;
- Improving the capacity and enhancing the awareness of energy service providers and industrial enterprises;
- Strengthening energy audit skills of relevant actors, developing audit methodologies, implementing pilot energy audits, and facilitating ISO 50001 certification of industrial companies;
- Demonstrating through pilots the benefits of energy efficiency practices and promote financing models, fostering efficiency projects and investments; and
- Monitoring, evaluation and experience sharing.

The IEEI Project has an important subcomponent designed to improve the energy management units (EMUs) at organized industry zones (OIZs). This subcomponent was designed to provide equipment aid to build capacity at EMUs in order to support these units in 12 OIZs across Turkey making each a centre of excellence in a sense. These OIZs are being selected from among those where most tenants are small industrial enterprises with annual energy consumption less than 1,000 tonnes of oil equivalent (toe).

The OIZs are not well known outside Turkey and this paper will describe their role in the industrial sector and will describe how an on-going UNIDO/UNDP project is working with selected OIZs to create awareness of the importance of energy efficiency within their zones and use that awareness creation to help lead towards actions and investments in energy-efficient techniques and technologies. There are important lessons in using peer level experts to gain the confidence and acceptance of both management and technical staff of the companies within the OIZ spheres.

Importance of the Industrial Sector in Turkey's Economy

The manufacturing industry is one of the main drivers of Turkish economy, accounting for 24.2 % of total GDP. The Turkish manufacturing industry has been growing over the past decade and increasing at a compound annual growth rate of 12 % since 2003. In 2012 it exceeded gross domestic product growth levels and reached approximately 79 billion Euro.[2]

The industry recovered quickly after the 2009 global economic recession and exceeded pre-crisis levels with an annual average growth rate of 8 % between 2009 and 2012. During the first quarter of 2013, Turkey achieved a remarkable manufacturing output growth rate of 4 % while industrialized countries suffered significantly. But, this trend seems to reverse in the second quarter of 2014, showing the highest downturn since

1. There is a good discussion of these policies in *Mediterranean Energy Perspectives* – Turkey, Observatoire Méditerranéen de l'Energie, Paris, 2014.

2. This number is calculated by using the Turkish Central Bank's exchange ratios.

Table 1. Key Indicators for Turkey, 1960–2013.

	1960	1973	1980	1990	2000	2012	2013	2014p
Energy production (Mtoe)	9.4	5.5	17.1	25.8	25.9	30.6	302.4	30.6
Net imports (Mtoe)	1.1	8.9	14.4	28.1	50.9	89.0	86.7	91.0
Total primary energy supply (Mtoe)	10.7	24.4	31.5	52.7	76.0	116.9	116.5	119.4
Net oil imports (Mtoe)	1.2	8.8	13.7	21.2	29.3	31.9	31.3	31.0
Electricity consumption (TWh)	2.5	11.0	21.8	50.1	104.5	206.7	209.2	218.4
TPES/GDP (toe per thousand 2005 USD)	0.17	0.19	0.19	0.20	0.20	0.19	0.18	0.18
TPES/Population (toe per capita)	0.39	0.64	0.71	0.96	1.18	1.56	1.54	1.56

Source: Energy Balances of OECD Countries, OECD, Paris 2014 and 2015.

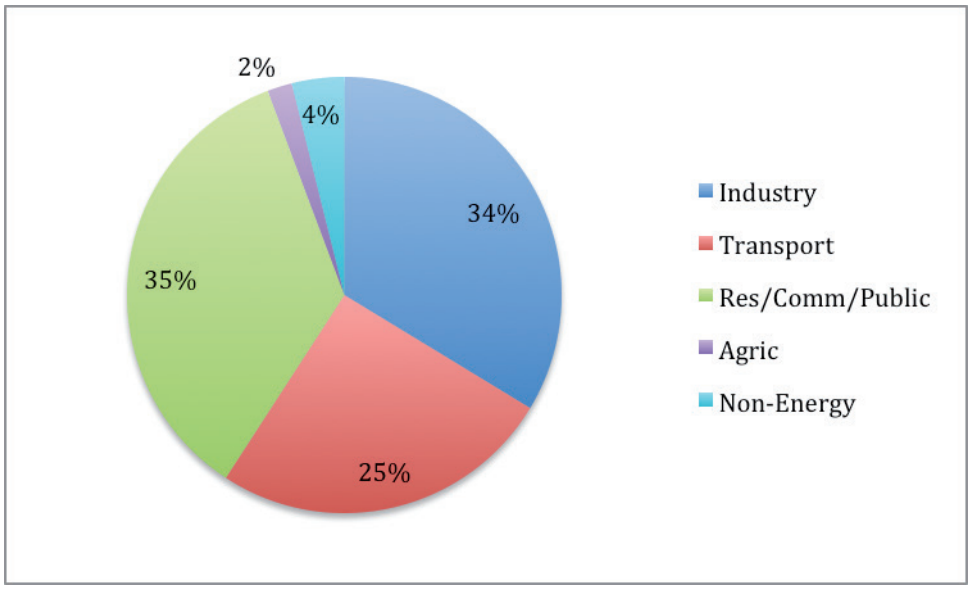

Figure 1. Shares in Final Energy Consumption (2013). Source: Ministry of Energy and Natural Resources.

March 2012. The stagnating market conditions and the geopolitical uncertainties in the Middle East Region are main factors affecting this recession.

It should be added that small and medium-sized enterprises also play an important role in Turkey and many of them are within the OIZs. SMEs play a very important role in the Turkish economy and the country has, according to KOSGEB, more than 3,470,000 SMEs not including those in the agriculture sector. These companies are essential for manufacturing products that are traded internationally, in creating employment and in providing vital services to the economy. For example, SMEs (micro, small and medium) have about 77 % of all employment in Turkey's enterprises. Table 1[3] provides key indicators for energy as a whole.

Now it is important to show how energy is consumed in the industrial sector in Turkey. The following chart shows the shares in final energy consumption in Turkey in 2013 and the importance of the industrial sector. The buildings sector comprising residential, commercial and public buildings, has the largest share of total final consumption with 35 %. This is followed closely by the industrial sector at 34 % and then transport at 25 %.

Figure 2 shows how energy is consumed in the industrial sector. The large energy-intensive sectors include iron and steel, cement, chemistry-petrochemistry and textiles.

Turkey's manufacturing industries are diverse and growing. Some of the key energy-intensive sectors are: textiles, chemicals, cement, iron and steel, agro-processing and machinery.

- Turkish machinery industry has the capacity to manufacture high technology products both for consumer and industrial markets, using computer controlled manufacturing systems. With regard to export growth rate, Turkish machinery industry ranked as the second fastest after China and she currently exports machinery products to over 200 countries.
- The Turkish electronics industry has begun to develop rapidly in the second half of the 1980s. Introduction of the colour TV broadcasting and the acceleration in telecommunication investments have supported that rapid development

3. TPES/GDP (toe per thousand 2005 USD): There is a difference in the energy intensity from the 10th Development Plan described in section 3.1 because the IEA/OECD uses a different base year now.

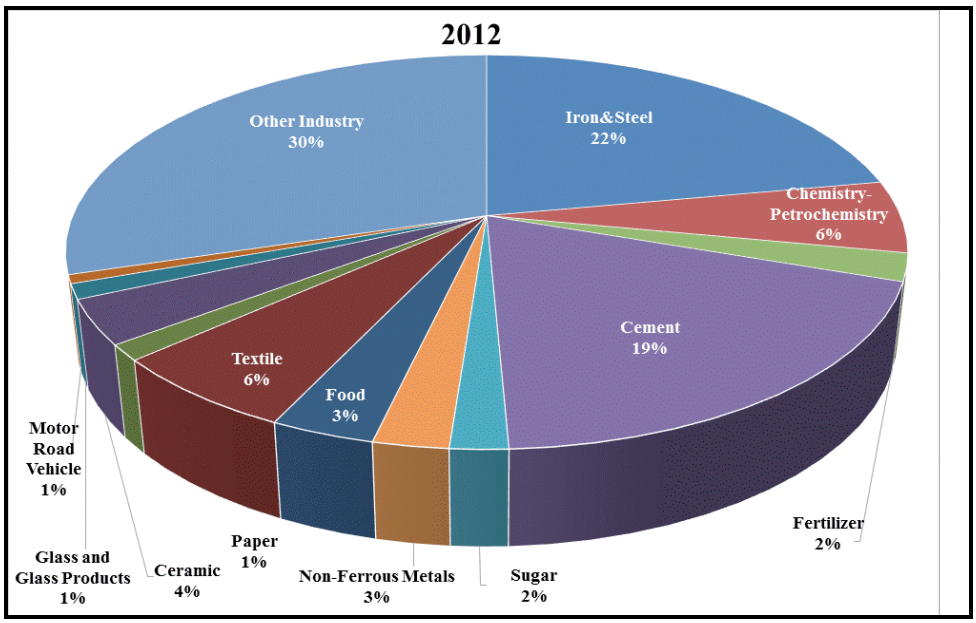

Figure 2. Breakdown of the Turkish Industry by Energy Consumed. Source: Güler 2015, p. 18.

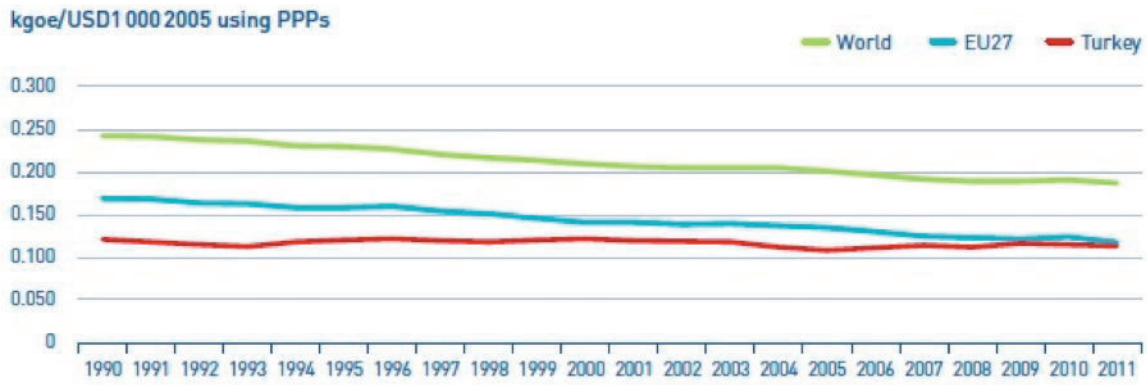

Figure 3. Energy Intensity Evolution, 1990–2011. Source: Mediterranean Energy Perspectives, Observatoire Méditerranéen de l'Energie 2014, p. 101.

and the revolution in telecommunication technologies, which has taken place in the recent years, have increased the growth rate of the sector. Today, the sector is a mature industry and has reached to a significant level in technical knowledge. In Turkey, electronics industry technically and structurally involves telecommunication equipment, consumer electronics, computers, defence industry, professional and industrial equipment and components sub-sectors.

- Agro-processing is one of the most dynamic branches of Turkish industry, supplying both domestic and export markets. Main product lines are sugar, flour, processed meat and milk, and fruits and vegetables.
- The iron and steel sector has become more competitive in adjacent Middle Eastern markets, where Turkey's location is an advantage.
- The chemical industry, one of the country's largest in terms of value, is concentrated in a few large enterprises, including the Petrochemical Corporation and Etibank, and some other private enterprises. Chemicals produced in Turkey include boron products, caustic soda, chlorine, industrial chemicals, and sodium phosphates. The high quality of the country's minerals gives it a comparative advantage in several products.[4]

Figure 3 shows that energy intensity (TPES/GDP) has not changed significantly over the years. This figure summarizes the evolution of energy intensity between 1990 and 2011 compared to the changes in the European Union and globally. Where there had been a big gap between the EU and Turkey 25 years ago that gap no longer exists, since the EU has made major improvements in its energy intensity. When the PPP is not used Turkey's energy intensity becomes higher; however, for a proper comparison this method seems more appropriate. Even though the lack of detailed analyses in different sectors does not allow the authors to speculate on the reasons of

4. Güler, 2015, p. 17.

the relative stability of energy efficiency, one can claim that the structural change of the economy in the last decade has played the biggest role concerning this situation. The share of services, which are less energy intensive, has dramatically increased within the GDP whereas the share of industry has declined. With no doubt, mostly immeasurable effects of energy efficiency have also played a role; yet, due to lack and/or inadequacy of the proper data, it is virtually impossible to quantify those effects.

Role of Organised Industrial Zones in Turkey and Energy Management Units

Organised Industrial Zones were created under Turkish law. Law No. 4562 on Organized Industry Zones defines OIZs as:

> […] zones for producing goods and services operated under the provisions of this Law which are created by equipping certain pieces of land having certified boundaries with necessary administrative, social and technical infrastructural facilities, small manufacturing, repair, trade, training and healthcare areas and technology development zones within such ratios as specified in land development plans, and allocating such pieces of land for industrial use in a planned manner and within defined systems in order to enable the industry to build up in the selected appropriate areas, prevent irregular industrialization and environmental problems, guide and direct urban development, use resources rationally, make use of information technologies, foster various types of industries within a certain plan.

The objectives of establishing OIZs in Turkey may be summarized as follows:

- Foster discipline in the industry;
- Contribute to planned urbanization;
- Improve productivity and profitability by enabling complementary and associated industries to produce in co-location and within a programme;
- Disseminate industries in underdeveloped regions;
- Impose discipline on the use of agricultural land for industry;
- Build sound, inexpensive, reliable infrastructure and shared social facilities;
- Prevent environmental pollution through the use of joint treatment facilities;
- Ensure that zones be self-governed by own bodies under government supervision.

With a more non-technical manner one can claim that OIZs are established to benefit from the principle of "economies of scale" within a specified territory. These benefits include i) to use the common infrastructure such as electricity grid, natural gas distribution network, treatment plant, etc. ii) to complement each other by exchanging by-products for minimizing transportation costs, iii) to cooperate in various other issues. Inevitably, all OIZs have their own managements elected by the facility owners, and the elections are repeated every two years. They are legally entitled to organize the zone and conduct activities such as land allocation, electricity and gas sale, etc.

Turkish legislation (*Regulation Regarding the Increase of Efficiency in the Use of Energy Resources and Energy*, which was issued in the Official Gazette numbered 28097 and dated on 27.10.2011, as a complementary document and regulatory directive of Energy Efficiency Law accepted in 2007) provides the mandate to establish energy management units (EMUs) in OIZs that consist of more than 50 companies. Those EMUs, according to the legislation, are expected to help the companies within the zone in promoting good energy management practices. The details of this expectation (defining energy goals and policies, conducting awareness raising activities, determining the energy saving potentials and EE measures, performing energy audits when needed, etc.) are also defined in the legislation. For all these activities, OIZs are also required to employ energy managers, who were previously trained and certified by YEGM.

Even though the legislation was good, actual implementation showed that there was little success. The basic reasons of the failures are i) the limited sanctions of non-conformity defined in the legislation, and ii) the lack of enforcement of the sanctions. During the course of time some of the OIZs established the EMUs (mostly on paper) and recruited energy managers. However, it was observed that none of the energy managers engaged in EE activities; instead, they dealt with daily energy operations (electricity and natural gas trade, billing, collection of the payments, maintenance of the zone-grids, ensuring the reliable operation of the electricity and gas systems, etc.) of the OIZs. Since they did not use their technical knowledge on EE that they gained through the energy management trainings, most of those energy managers also felt strong disappointment.

For effective implementation of the legislation and revitalization of the initial interest of the OIZs, which were expecting a more robust supervision at the time the legislation was issued, the IEEI Project was seen as an important opportunity. The following section describes how the activities were executed.

OIZs within the IEEI Project

Throughout the IEEI Project, the effective implementation of the legislation was aimed. In this regard, it was planned to support EMUs in 12 selected OIZs as models for "centers of excellence" with a purpose to support the energy management of those zones. These OIZs were decided to be selected from the zones where companies with annual energy consumption ≤1,000 tonnes of oil equivalent (toe) are of majority.

In the planning phase it was envisaged that the baseline costs (premises, staff etc.) of these EMUs would be covered by the OIZs. The GEF was considered to cover the costs of their capacity building and training as well as some complementary software, testing and measuring equipment and training for their use to allow the EMUs to approach industrial companies also with some concrete monitoring data and suggestions for simple measures to improve their EE (such as better insulation, tuning of boilers, etc.) as well as to raise awareness for EnMS.

As all OIZ managements have a strong network in their own zones, the IEEI Project Management Unit (PMU) cooperated with them to disseminate the EE materials as well as enhance the basic consciousness on EE. In this regard, the PMU, first

of all, established a good relationship with OSBUK (the High Commission of Organized Industrial Zones based in Ankara that essentially co-ordinates and oversees all the OIZs), officially mandated NGO in this field, from the very beginning. As OSBUK plays a significant role in the industrial relations with government, it can be considered as a supreme board. The cooperation with OSBUK was very critical and fruitful as it not only provided very valuable statistics that can hardly be acquired by open sources but also shared its institutional experience about the existing OIZs. It helped PMU to see the entire picture more clearly and prepared the selection criteria in this context.

By the assistance of OSBUK the PMU selected six OIZs out of 272 (approximately 150 of them are currently active, remaining are either in the planning or the developing phase) to develop EMUs. As the factors such as impartiality and fair competition were taken into account together with the aim of providing maximum benefit, the selection process lasted longer. Similar problems were also arisen during the designing of the program and procurement processes. Management changes in the partner agencies also negatively affected the process. However, despite those unexpected hurdles, the program was successfully initiated and appreciated by all stakeholders. In the below subsections, some major cornerstones are summarized. These are important to understand because it shows the many steps that are required to get such a concept off the ground and activated.

CHOOSING OIZS TO PARTICIPATE AND PREPARATION PROCESS

In July 2014 an invitation letter together with a questionnaire was prepared and sent to 103 OIZs. Even though 272 OIZ licenses were authorized, some of them were not active at that time. Moreover, three out of seven geographical regions were excluded in the project document, which ended up the reducing number of OIZs (103) to be contacted. Another restriction stemmed from the legislation. Some of the active OIZs did not have more than 50 companies operating within their boundary. Even though the legislation mandates to establish EMUs in OIZs whose total number of companies exceed 50, all eligible OIZs were invited to gather as much data as possible.

103 OIZs (out of 150 active) were officially invited to the program. Normally, it was previously known that just 57 of them were meeting the requirement of having more than 50 companies within the zone. Interestingly 36 OIZs applied to the program in August 2014. Since the number of applications was greater than expected, it was decided to elaborate on the forms particularly given that many OIZs had local political connections, which could create disputes and/or unfair demands.

In September 2014 the applications were classified and analysed. All the information gathered via the forms was tabulated, prioritized (with relevant coefficients introduced for different features, which can be seen below) and a matrix was formed (see Table 2).

For all criteria a numeric value was assigned and thereby all OIZs were graded with respect to methodology shown above. Then in October 2014, by the participation and contribution of the project partners, 9 OIZs were selected. However, as it was revealed in the meeting that some OIZs provided wrong information unintentionally (by the warning of project partners and performing a cross-check from the available databases), it was decided to visit all selected OIZs to assess their real potential and capacity to implement the program.

In November and December 2014 all nine OIZs were visited. They were informed about the IEEI Project and the data they submitted were checked, their physical facilities and human resources were examined. In the final evaluation undertaken in January 2015, three of the initially selected OIZs were eliminated mainly due to their insufficient capacity and lack of clear ambition towards the program.

In February 2015, an official letter was sent to the remaining six OIZs. In the letter, the OIZs were requested to sign the commitment form to undertake the joint program. They all committed to cooperate and dedicate necessary resources.

In April 2015, an international tender was announced by UNIDO for purchasing a set of measuring equipment for the OIZs. The measuring equipment would be used for their awareness creation and outreach activities. The bid collection ended in May 2015. The evaluation was finalized in July 2015 by the participation of project coordinator, YEGM experts and UNIDO officials.

Even though it was not stated in the tender document, the supplier company was requested in August 2015 to acquire calibration documents as to be sure that all those equipment will function properly. In October 2015 the necessary transactions were completed and the batch was sent by the supplier company. After several obstacles tackled in custom operations, the batch was delivered to the PMU at the end of November 2015.

By taking the management changes within the bureaucracy after election into account, a training program was planned for March 2016 and the invitation letter was sent to six OIZs in January 2016.

TRAINING EVENT AND UPCOMING STUDIES

After such a long preparation period, the PMU was in doubt whether the OIZs would still have the enthusiasm for the program. In total, six OIZs were requested to provide a maximum of two names for the training but it ended up that 20 names were submitted through official letters. This was seen as a good sign for the ongoing interest.

Finally, in the last week of March 2016, the theoretical and practical trainings were held. The training included understanding the purpose of the equipment, how they were to be used, calibration, storing and maintaining the devices. After the training together with certificates and calibration documents, a set of measuring equipment was delivered to each participating OIZ. The sets included 9 devices: infrared camera (together with software for reporting), infrared temperature meter, ultrasonic liquid meter, energy analyser (including data logger, cable, connector, clamps, and a suitable evaluation software), multifunction HVAC and indoor air quality meter (together with probes), flue gas analyser, ultrasonic leak detector, tachometer, and water conductivity meter.

Interviews were held to get the reaction of the participants. The interviews revealed that all OIZs were deeply excited to get the equipment and training. Most of the participants expressed that they had never a chance to use such devices before though they were identified as energy managers. They also articulated that they felt more secure to go to industrial companies, provide basic information about EE, and perform walk-through audits. However, some of the participants stated that they still did not know how the measured values would be evaluated. By relying on the feedback provided by the participants, the PMU made a

Table 2. Criteria for Selection of the OIZs.

Number of Firms in Operation			Energy Consumption (toe) (2011-2012-2013 Average)			
Small	Medium	Large	<50.000	50.000 <<100.000	100.000 <<300.000	300.000 <

Occupancy Rate	OIZ	EMU	EMU	EMU	ISO 50001	ISO 50001
(By number of parcels)	Manpower	Exists/None	Manpower	Equipment	Certification	Application

En.Eff.Investment	International	En.Eff.Audit	Co-financing
Budget Ratio (%)	Prj. Experience	Comm.Firms	(Yes/No)

Table 3. Some selected figures about the OIZs involved in the program.

Name of the OIZs	Number of Active Companies				Energy Consump. (toe)	Occupancy Rate	OIZ	ISO 50001
	Small	Medium	Large	Total	(Aver.of 2011-2012-2013)	(With Respect to Parcels)	Manpower	Certification
DENİZLİ	74	66	19	159	91,394	0.89	45	No
İZMİR KEMALPAŞA	384	94	9	487	251,650	0.46	27	No
GEBZE	35	52	27	114	64,343	0.59	63	No
BURSA	103	73	41	217	767,400	0.76	171	Yes
ANKARA SİNCAN	97	150	20	267	62,221	0.80	75	Yes
GAZİANTEP	260	820		1,080	486,534	0.87	247	Yes

quick decision to serve OIZs for organizing further trainings. The following training topics were decided in consultation with the EMU engineers: i) Measurement evaluation and technical analysis; ii) Project development; and iii) Financial analysis (for making the projects "bankable").

At the end of the training, the attendees were also informed that the PMU would regularly send several EE documents to the EMUs. It was also underlined that those materials would be used for EE studies and awareness creation within the zones. They were notified that the materials would consist of both technical and managerial documents for distribution amongst their member companies. Examples of technical documents are as following: Booklets and leaflets on EnMS, technical training materials on several cross-cutting technologies (pumps, fans, motors, compressed air systems, etc.), articles on different aspects of EE in selected sectors (textile, plastics, chemicals, etc.). The IEEI PMU is also planning to send simple EE tips and the EMU personnel are expected to disseminate those tips to all relevant actors in the plants.

Next Steps

The work with the OIZs is starting to accelerate. Six of the OIZs have now been trained and have the measuring equipment. They have also been given awareness materials to distribute. The idea is to have the companies within the OIZs rely more and more on the EMUs for information that is both technical and related to programs. On the program side, it is important that the EMUs know, for example, all the financial mechanisms available in the country. Right now there is a combination of national (government and commercial), multilateral and bilateral financial incentives available. The PMU wants the OIZs to be able to have available a comparison of the various offerings in order to make it clearer to the companies what incentive may be most suited for them.

What is very promising is the fact that all engineers trained are very keen on reviewing the companies in their zones. Moreover, some of them expressed their will to help neighbouring OIZs, which are settled close.

The IEEI PMU will continue working with these six EMUs and increase the number to 12 by the end of the project. The aim is to repeat all the processes taken place in the past. Yet, as the PMU acquired a great experience for the processes of official invitation, OIZ selection, equipment purchasing and training, it is highly expected that those step will take less time.

There is another project funded through the World Bank to help increase capacity in the country on energy efficiency and to help transpose the EU Energy Efficiency Directive. That project also plans to follow up working with the OIZs.

By the feedback given by the energy managers, it is estimated that there is a huge energy saving potential in OIZs. Unfortunately, as of now it is nearly impossible to estimate the magnitude of the potential due to lack of adequate data. For a proper estimation, energy audits in selected companies, which will represent the entire OIZ network, should be performed. Those audits do not have to be comprehensive audits; as a matter of fact, walk-through energy audits would be sufficient to see the entire picture. Even though very few individual studies undertaken by energy managers in a couple of companies showed that the potential untapped may reach 20 percent, a more systematic approach should be implemented in order to determine the existing potential.

The energy managers, who were trained for using measuring equipment, were told that they were expected to realize such studies. Just after the completion of the official asset transfer procedures, they will be informed that they are going to be involved in such a study. The methodology for sampling/selecting the industrial companies and the principles of the walk-through energy audit will be prepared and disseminated by the IEEI Project soon.

Lessons Learned

The IEEI PMU observed that there is a huge potential in the industrial plants located in OIZs. The team also has a strong sense that OIZ EMUs have better communication with the companies in their zones as they are already touching to them through several daily operations from natural gas bills to electricity quality. As it is seen a considerable asset, the PMU supposes that directly training the engineers who are in charge in the EMUs would be a short-cut method to trigger an institutional shift towards better EE in the manufacturing companies.

Another observation is that there is a "hidden" competition amongst the participating OIZs. Therefore, the PMU considers the share the success stories of one OIZ with the others so that a competition for EE activities can be triggered. In this sense, OSBÜK is seen a perfect agent as it has direct connection with all OIZs. OSBUK will also likely to disseminate the good examples with the OIZs who had not a chance to join the program.

What does all this mean in terms of promoting good energy management in industry? The example of using the OIZs in Turkey shows that, while the end results are expected to be very positive, the steps to achieving it are complicated and take time. Thus, a long-term approach is required. This is important to gain the confidence and respect of the potential recipients. It is also important that the participants see that this will be a long-term commitment and that the support will not end at any moment. The EMUs within the OIZs have an important role to play to promote energy efficiency. Companies are not going to give much credence to bureaucrats from the capital. Having well-trained and well-motivated engineers within their boundary is vitally important.

It should be added that many of these companies also know that the IEEI program is also sponsoring specific training on energy management throughout the country. Thus, all of these efforts are coming together to reinforce each other and truly embed a culture of good energy management in the country. It also shows the importance of the international community (both UNIDO and UNDP are supporting this project with GEF funding) in doing all it takes to overcome the many technical, management and political barriers that need to be addressed effectively. Many of these barriers are not even well understood at the design stage of the project and arise unexpectedly. This means there is a need for a certain amount of flexibility and patience that are often in short supply. But, as this activity with OIZs shows, there are important long-term dividends if one perseveres.

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