

## Summary

Evaluation conducted by: SUEYOSHI Yukiko

<b>1. Outline of the Project</b>	
<b>Country :</b> Turkey	<b>Project Title :</b> The Project on Energy Conservation
<b>Issue/Sector :</b> Energy Conservation	<b>Cooperation Scheme :</b> Technical Cooperation Project
<b>Division in Charge :</b> Natural Resources and Energy Conservation Division, Natural Resources and Energy Group	<b>Total Cost :</b> 760 million yen (Estimate at the Terminal Evaluation. No record available on the actual total cost at the end of the Project)
<b>Period of Cooperation</b>	1 <sup>st</sup> August 2000-31 <sup>st</sup> July 2005
	<b>Partner Country's Implementing Organization :</b> The National Energy Conservation Center(NECC) <b>Supporting Organization in Japan :</b> The Energy Conservation Center
<b>Related Cooperation</b>	Third Country Training Program on Energy Efficiency and Management in Industry
<p><b>1-1. Background of the Project</b> The government of the Republic of Turkey heavily depends upon imports for its energy. Hence, it has been eagerly promoting energy conservation since the oil crisis. However, the self-supply rate of energy was less than 50% in 1997. This rate has been declining year on year in line with the rapid increase in energy consumption. NECC has been promoting energy conservation primarily for more than 600 companies with large-scale plants by offering training courses in energy management. However, there were not enough training facilities available to achieve significant outcomes. The Turkish Government stipulated the 'Energy Efficiency Regulations for Industrial Establishments' in 1995. It legally mandates major plant enterprises join management courses for energy conservation. Thus, it is an urgent issue for EIE/NECC to train personnel as energy managers. Under these circumstances, the Turkish Government requested the Japanese Government provide project-type technical cooperation for the organization of a training course aimed at improving the current practical conditions of energy managers as quickly as possible. The Project on Energy Conservation (hereinafter 'the Project') was terminated in July 2005.</p> <p><b>1-2. Project Overview</b></p> <p><b>(1) Overall Goal</b> Energy intensity of the selected factory is reduced.</p> <p><b>(2) Project Purpose</b> EIE/NECC's overall capacities in training, audit, policy-making and promotion activities are strengthened.</p> <p><b>(3) Outputs</b> 0.Management and administration are established for implementing energy conservation activities. 1.CP's overall skills in operations and maintenance of the training facilities and measuring equipment are strengthened. 2.CPs acquire the knowledge and skills necessary for implementing energy manager training 3.CPs acquire knowledge and skills to implement energy audit and consultation in industrial factories. 4EIE/NECC's capacity in providing energy-saving information to industries, and building public awareness on energy saving, and preparing policy recommendations will be strengthened.</p> <p><b>(4) Inputs</b> (as of the final evaluation: no record is available on the inputs at the termination of the Project)</p>	

<b>Japanese side :</b>			
<b>Long-term Expert</b>	5	<b>Equipment</b>	20 million yen
<b>Short-term Expert</b>	25	<b>Local cost</b>	32 million yen
<b>Trainees received</b>	19	<b>Others</b>	
		<b>Total</b>	<u>760 million yen</u>
<b>Turkish side :</b>			
<b>Counterpart</b>	31	<b>Equipment</b>	-
<b>Land and Facilities</b>	Administration Office Training center	<b>Local Cost</b>	2.1 million USD
<b>Others</b>			
<b>2. Evaluation Team</b>			
<b>Members of Evaluation Team</b>	SUEYOSHI Yukiko, Junior Researcher, Global Link Management Inc.		
<b>Period of Evaluation</b>	4/1/2009-13/1/2009 (Field research in Turkey)	<b>Type of Evaluation :</b>	Ex-post
<b>3.PROJECT PERFORMANCE</b>			
<b>3-1. Performance of Project Purposes</b>			
<b>“EIE/NECC’s overall capacities in training, audit, policy-making and promotion activities are strengthened”</b>			
<b>Indicator 1: By July 2005, 80% of the 600 factories designated will have assigned certified Energy Mangers as required by the Energy Efficiency Regulation for Industrial Establishments.</b>			
As of July 2005, 78% of the factories that consume more than 2,000 TOE of energy had assigned certified Energy Managers. Therefore, the Ex-post Evaluation confirmed that the Project Purpose was almost achieved at the end of the Project.			
<b>Indicator2: Number of factories receiving energy audit including process equipment by EIE/NECC will have increased.</b>			
The number of energy audits had been increased as a result of the Project implementation. EIE/NECC has been conducting energy audit by the requests from factories. However, follow-up activities have not been conducted since termination of the Project.			
<b>3-2. Achievement related to Overall Goal</b>			
<b>“Energy intensity of the selected factory is reduced.”</b>			
<b>Indicator: Energy intensity in selected factories in the target industry sectors is reduced</b>			
At the final evaluation of the Project, it was found that some of the factories that received energy audits had succeeded in reducing their energy intensity. Beneficiary surveys indicate that the energy audits brought positive results such as energy cost reduction and increased awareness among workers. According to the follow-up survey on energy audit 1996-2005 undertaken by EIE/NECC, the realization rates of energy saving potential are 93% for the textile sector and 33% for the food sector.			
<b>3-3. Follow-up of the Recommendations Made by the Terminal Evaluation Study</b>			
1. Maintaining the Acquired Capacity of EIE/NECC	NECC has been trying to improve its training courses and energy audits based on the results of questionnaire surveys of trainees and factories.		
2. Maintaining the Training Units	Many of the training units are being utilized properly. However, EIE/NECC has requested JICA to replace some parts of equipment that could not be repaired in Turkey.		

3.Promotion of Energy Conservation Measures Through Investment and Renewal of Production Lines	EIE/NECC has successfully obtained enough knowledge on improving energy efficiency in utility areas, but still lacks the related skills with regards to production lines.
4.Provision of Incentives for Energy Conservation	Energy Efficiency Law (hereinafter ‘Energy Law’) came into effect on April 2007.
5.Energy Conservation Promotion to SMEs	Currently, regulation to promote energy conservation for SMEs is being prepared in collaboration with EIE and KOSGEB.
6.Diversification of Training Programs	EIE have been conducting new training courses for energy efficiency in the building sector since 2006.
7. International Training	International Training has been conducted continuously under JICA’s third country training program. A total of 72 international trainees had participated in training courses by the time the Project was terminated.
8. Energy Efficiency Modeling Study	‘Energy Efficiency Modeling Study’ was implemented with EC between July 2005.7-Nov 2007. <sup>1</sup>

#### 4. Results of Evaluation

##### 4-1. Summary of Evaluation Results

###### (1) Relevance

The Project’s relevance is very high vis-à-vis the national policies of Turkey, JICA’s Country Assistance Program, and needs of the target group. The current development strategy, ‘the Ninth Development Plan (2007-2013)’, identifies energy efficiency and its relation to increasing competitiveness as one of the critical development axes in Turkey. JICA’s Country Strategy, which was revised in September 2006, regards energy efficiency for the reduction of environmental burdens as one of the five pillars of assistance to Turkey. Under the framework of ‘the Energy Efficiency Regulations for Industrial Establishments’ issued in 1995, EIE/NECC have been responsible for certifying Energy Managers in factories which are consuming energy at levels over 2,000 TOE. Therefore, the Project’s objectives and its approach effectively addressed the needs of the target group (factories) and the needs of the main CPs (NECC/EIE).

###### (2) Effectiveness

The Ex-post Evaluation concluded that the Project Purpose “strengthening the EIE/NECC’s overall capacities in training, audit, policy-making and promotion activities are strengthened.” has been achieved at the point of Project termination. EIE/NECC indicates that the number of factories deploying the Energy Manager has increased to 410 factories by the end of the Project, which is worth 78% of factories consuming energy at rates exceeding 2,000 TOE. Factors promoting the success of the Project Purpose include the EIE’s basic capacity, and their experience working in the energy sector.

###### (3) Efficiency

In general, the inputs were appropriate in quality, quantity and timeliness with regard to the achievement of the planned outputs. Observed factors that facilitated the smooth progress of intended activities are the flexible manner of the technical transfer and low turnover ratio of EIE engineers. However, EIE mentioned that public awareness for factory managers under output 4 should have been strengthened to promote energy saving activities in the factories. With regards to equipment, certain sections of training units imported from Japan had broken down, and were not

<sup>1</sup>EIE and EU conducted project for ‘Improvement of Energy Efficiency in Turkey 2005.7-2007.11’.

Under the purpose of ‘Establishment and/or strengthening of the legislative and institutional framework based on the energy law’, both agencies conducted study with components of; institutional building, study for estimating energy efficiency, and establishment of implementation systems for energy conservation.

repairable in Turkey. (JICA conducted follow-up activities for training units in EIE.)

#### **(4) Impact**

Focus group discussions with factory managers and workers confirmed that the energy cost-reduction and awareness raising have enabled the results found in the energy audit by EIE. Furthermore, the beneficiary survey shows that 86% of the trainees who responded to the questionnaire survey stated the training was useful, and 69% answered they have practiced what they learned about energy saving through the EIE training. Interviewed trainees stated that their colleagues have realized the importance of energy efficiency after conducting effective activities towards energy saving without the need for major investment in their factories.

#### **(5) Sustainability**

Project sustainability is high in terms of policy, organizational, financial and technical aspects. Regarding the organizational aspect, EIE has faced the problem of a lack of human resources in the training and audit because of diversification of operations in the energy sector. However, EIE will promote outsourcing of training courses under the energy law. Therefore, this problem is expected to be resolved in the years to come. From the technical point of view, though the transferred technologies have been well adopted by EIE staff, EIE has needed foreign assistance in the new energy efficiency areas such as building, transportation, ESCO (Energy Service Company) and collaboration with SMEs.

### **4-2. Factors that have promoted project**

#### **(1) Impact**

One of the factors promoting the achievement of the Project Purpose was the EIE's basic capacity and working experience in the energy sector. Another contributing factor is the EU accession started in 2005, which brought a great deal of momentum to energy saving in Turkey.

#### **(2) Sustainability**

The Energy Efficiency Law was enacted in 2007 under the process of EU accession, which became an important factor in promoting the project's sustainability. Furthermore, it was mentioned that technical transfer combined with theory and practice are effective ways of applying introduced knowledge and skills. Another factor contributing to sustainability is the low turnover ratio of EIE staff.

### **4-3. Factors that have inhibited project**

#### **(1) Impact**

It is reported that the low attention to energy efficiency by factory managers has prevented trainees from conducting energy saving activities in their factories.

#### **(2) Sustainability**

No inhibiting factors have been reported so far.

### **4-4. Conclusions**

At the point of Ex-post Evaluation, it is confirmed that the Project impact and sustainability are high. Key contributing factors achieving project objectives are increasing socio-economic needs to save energy, and high political incentives to standardize in line with EU regulations. Positive reports have been received with regards to the impact of training courses and energy audits conducted by the EIE during the Project period, which reports in some cases showing a change in behavior towards taking action for saving energy in factories.

### **4-5. Recommendations**

- (1) Establishment of a trainee network:** In order to share information promoting energy saving in factories, the EIE should further strengthen its established network among energy managers by utilizing such tools as trainee mailing lists and the EIE homepage.

- (2) **Visualization of outputs brought by energy saving activities:** In order to raise awareness of energy conservation, it is recommended that good practices and data demonstrating the effects of energy saving be accumulated. Such information should then be disseminated to all energy management through a website.
- (3) **Response to new technical needs:** EIE needs technical assistance in new energy sectors such as building, transportation, ESCO and collaboration with SMEs. It is recommended that JICA respond to these new technical needs based on the outcomes of the Project.

#### **4-6. Lessons Learned**

- 1) **Flexible manner of technical transfer:** The flexible response to CP's technical needs promotes the smooth implementation of the project.
- 2) **Technical transfer combining both theory and practice:** Technical transfer that combines both theory and practice contributes to deeper understanding and application of the concepts by CPs in their daily operations.
- 3) **Establishment of indicators to measure project outcomes:** It is recommended that indicators and data sources used to measure the Project's achievements should be clearly identified at the planning stage.