

Summary of Terminal Evaluation

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| 1. Outline of the Project | |
| Country: Republic of Poland | |
| Project Title: Poland – Japan Energy Conservation Technology Centre Project | |
| Issue/Sector: Energy Conservation | |
| Cooperation Scheme: Technical Cooperation Project | |
| Division in charge: Economic Development Department | |
| Total Cost: JPY 542.680.000 | |
| Period of Cooperation: | 1 July, 2004 – 30 June, 2008 (Four Years) |
| | Implementing Organization in the Host Country: Polish Agency for Energy Conservation (KAPE S.A.) |
| | Supporting Organization in Japan: Energy Conservation Center, Japan (ECCJ) |
| Related Technical Cooperation: None | |
| <p>1-1 Background of the Project</p> <p>The Republic of Poland has become an energy-importing country since 1986 because of increasing oil and natural gas consumption. In order to facilitate such circumstances, it promotes policies aiming at enhancing energy security, industrial competitiveness and environmental protection by furnishing the Energy Law and the related legislations in 1997. Poland works very hard to realize various international treaties in energy conservation such as Kyoto Protocol as priority because Poland's accession to the European Union is in progress. From the viewpoint of international cooperation, Poland ratified Kyoto Protocol in 2002. It is Poland's priority to endeavor the implementation and realization of energy conservation and environmental regulations of EU.</p> <p>JICA carried out a technical assistance, "Study on master plan for energy conservation" in Poland between 1997 and 1999. The Government of Poland has pursued its recommendations including establishment of legislation and institutional arrangements of energy efficiency and conservation (EE&C). Poland-Japan Energy Conservation Technology Centre (ECTC) was established at Polish Agency for Energy Conservation (KAPE S.A.) to train engineers and to disseminate EE&C with a substantial support from Warsaw University of Technology. Acknowledging that Japan has EE&C technology and experience, Polish government requested the Government of Japan a technical cooperation project for ECTC to facilitate EE&C and to promote measures for Environmental protection in 2001. JICA has dispatched a series of study teams to discuss the terms of reference for the prospective technical cooperation. As a result, JICA started a four year long technical cooperation project beginning from July 2004. JICA dispatched a mid-term evaluation study team in November 2006 and an advisory study team in June 2007. A terminal evaluation team was dispatched this time prior to the termination of the Project scheduled in June 2008.</p> | |

1-2 Project Overview

(1) Overall Goal

The energy conservation of industrial sector is promoted

(2) Project Purpose

ECTC is established as the governmental structure for promotion of the energy conservation of Polish industrial sector

(3) Outputs

0. ECTC's administration and management structure are established

1. ECTC is able to implement the training course
2. ECTC is able to follow-up the trained trainees after the training courses
3. ECTC is able to support companies concerning energy efficiency.
4. ECTC is able to provide information on energy conservation for factories.

(4) Inputs (Actual, as of March 2008)

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| Japanese side: | | | |
| Long-term Experts | 4 (Total of 159M/M) | Equipment | Total amount of JPY136.623.000 |
| Short-term Experts | Total of 19 experts have been dispatched | Local Cost | Disbursed JPY34.380.000 to cover the local cost |
| Trainees received | 12 trainees have received (10 trainees to Japan and 2 trainees to Turkey) | Note: | |
| Lao Side: | | | |
| Counterparts | F/T C/P: 4 | P/T C/P: 23 | |
| Land and Facilities | Land, building, rooms and other facilities for the Project were provided by Polish side | | |

2. Terminal Evaluation Study Team

| Member of the Evaluation Study Team | Responsibility | Name | Affiliate/Title |
|-------------------------------------|----------------|-----------------------|---|
| | Team Leader | Hiroyuki KOBAYASHI | Team Leader, Natural Resources and Energy Conservation Team, Group II (Natural Resources and Energy), Economic Development Department, JICA |

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|--------------|--------------------------------|-----------------|--|
| | Energy Conservation Technology | Yoshitaka USHIO | General Manager, International Engineering Department, The Energy Conservation Center, Japan (ECCJ) |
| | Cooperation Planning | Atsunori KADOYA | Senior Program Officer, Natural Resources and Energy Conservation Team, Group II (Natural Resources and Energy), Economic Development Department, JICA |
| | Evaluation Analysis | Masato ONOZAWA | Director, Pionnier Research Inc. |
| Study Period | March 5 to 21, 2008 | | Type of Evaluation: Terminal Evaluation |

3. Result of Evaluation

3-1 Summary of Evaluation Results

(1) Relevance

The Project maintains its relevance at the time of the evaluation because of the following three reasons:

First and foremost, ECTC was established as the national center for promoting EE&C and providing the related information based on advanced Japanese technologies and experiences. ECTC gives practical training opportunities to managers and engineers of various industrial sectors in particular SMEs, by making best use of its unique training plant. The center plays important roles in Poland to promote importance of EE&C technology in industries. ECTC has become a meeting place of energy efficiency interested engineers and university specialists. Such roles of ECTC remain valid at the time of the evaluation;

Secondly, the importance of promoting EE&C has been increasing because of the current upsurge of energy prices and climate oriented issues. EE&C in the industrial sector of Poland should be much improved. Also, EE&C technologies, awareness in energy management and down to earth practice of EE&C activities have much to improve in the Polish industries. In addition, legislative framework for EE&C promotion is in progress. KAPE S.A./ECTC is expected to contribute to transforming Poland into more energy efficient society. The Project has helped KAPE S.A./ECTC act such role.

Finally, the EE&C technology and the experience in overcoming the energy crises of Japan is significant for strengthening KAPE S.A./ECTC's role. Such advantages of Japan provides KAPE S.A./ECTC with knowledge and educational tools to be further transferred to Polish industries.

(2) Effectiveness

The Team concludes that the Project has achieved its purpose as defined in the PDM (ANNEX-1), "ECTC is established as the governmental structure for promotion of the energy conservation of Polish industrial sector".

Step by step, ECTC came to the point when the trainings are carried out independently by Polish

instructors (C/P). The quality of the training has been judged as highly satisfactory by the participants. An Executive Manager Training Course has been carried out to provide general knowledge to managers of industries. It promoted ECTC's activities to wide range of clients and made managers aware of importance of EE&C in the industry. Other technical courses provide opportunities for engineer of industries to access the current EE&C technologies and to participate in the network of engineers to exchange their knowledge of EE&C. According to the monitoring result, majority of participants responded that their expectations for the training were met. They have applied the knowledge gained at the courses to their daily activities.

A series of so-called open door seminar presenting various EE&C topics has been organized regularly. Japanese short-term experts and Polish industrial experts have presented interesting topics regarding the most up to date EE&C technologies and the training plant potentials. Once a year since December 2004, KAPE S.A./ECTC with a support from Ministry of Economy has organized a large conference to promote EE&C technology to Polish industry. Because of steadily increasing participants to various training programs and seminars, reputation of ECTC has been increasing. Such reputation has encouraged some companies to request ECTC to provide tailor made training for their employees.

The Japanese experts conducted a series of factory-based audit trainings for C/P and fostered C/P's practical experiences and in-depth understanding of EE&C in factories. The field-based learning experiences have enhanced the skills and knowledge necessary to carry out effective training at the training plant. The audit training was effective because C/P had lacked field-based knowledge at the beginning of the Project and it was once a problem for C/P to interact with trainees from various industries. Concrete experiences through the audit training including preparation of audit reports have provided C/P with their confidence.

ECTC tried to pave the way to establish a proper positioning and relationship with factories, and has trained the C/P through walk-through type audit training. As a result, it was confirmed that the energy saving potential of Polish industry is still very high. The industry needs to improve its EE&C and the mission of ECTC to promote EE&C technologies and measures is crucial for Polish economy.

(3) Efficiency

The Project was carried out as scheduled and the planned outputs listed in the PDM were achieved by effectively utilizing the resources available. The local procurement of the training plant was the first experience in EE&C projects of JICA and proved to be a good solution. Installation of the plant, however, was a challenge for the project management because there were many difficulties in coordination, preparation of specification etc. Such endeavor by both the experts and C/P were rewarded by various advantages. As a result of the partnership with WUT, it was possible to add digital interfaces to four units of the training plant to make the training more efficient. The training plant was highly appreciated because the trainees are familiar with the machines locally available. Investment cost has been reduced, as well as future maintenance cost would be reduced.

Cost-benefit factor of the Project has been positive. The Project has been carried out initially by four, and after two years, as planned, by three long-term experts supported by frequent visits of diverse

short-term experts from Japan. The dispatches of short-term experts were flexible to meet the Project's on-going needs. Polish side contributed to the Project with the government financing as planned, dedicated staffs as C/P and the facility in the university with a convenient location in the state capital, which allowed the Project to save time and money.

(4) Impact

KAPE S.A. has been actively engaging in regional technical cooperation using ECTC. ECTC has received various missions from abroad including EU, Bulgaria, Ireland and China. Especially, KAPE S.A. hosted a visit of EU Energy Commissioner in December, 2005. ECTC has participated in various conferences and exhibitions to present and promote the activities. In the course of the Project, KAPE S.A. has introduced and promoted ECTC's activities to neighboring countries including Russia, Ukraine, Bulgaria, Serbia, etc. ECTC has trained engineers from Ukraine and Russia. ECTC's reputation is spreading because of its unique activities.

Through the technical cooperation, EE&C measures in Japan, such as the Energy Conservation Law including Energy Manager System and the various energy management know-how (measuring, analyzing, reporting etc.) in factories were presented to various levels of the industry sector in Poland. The Project provided a variety of EE&C related information to the society. Polish Ministry of Economy is drafting the energy efficiency law expected in January, 2009 and is considering the information and the material provided by ECTC.

(5) Sustainability

ECTC has EE&C technology and human resources that can be utilized effectively to promote EE&C in Poland.

The Team shares, at the time of evaluation, concerns on KAPE S.A./ECTC's unclear sustainability because its roles and responsibilities depend on the conclusions of the current intensive discussion within the Polish government on the draft of the energy efficiency law (to be completed in January, 2009).

When the Project was started, it was expected to be financially self-reliant by 2008. ECTC was expected to cover its operational cost by collecting fees from the participants of the training. At the current market situation, it is not easy even for the training activities. Energy auditing and promotion of EE&C at the moment are also subsidized by the Ministry of Economy and their future depends on the suitable provisions in the energy efficiency law in preparation.

3-2 Contributing Factors to Outcomes

(1) Linkage between the energy audit training at active factories and energy manager training program at ECTC

Main approach for technology transfer to the C/P was to carry out energy audit as a part of on the job training in active production lines in factory. The training has provided C/P opportunity to learn outlines of production process and facilities. Through the training programs C/P required to face with trainees from various industries of the training programs as trainers in a day to day basis. Practical experiences

and knowledge in actual production lines in factory were crucial for ECTC's training program because it was identified that C/P's lacked them prior to the Project. The OJT program for C/P was effective because energy audit training giving opportunity for basic knowledge of actual production process were carried out. Such experiences were effective for C/P to utilize when they work as trainers.

(2) Synergetic Effects From Combining Roles and Responsibilities of Long-Term and Short-term Experts

Three of the four long-term experts served in the project for entire duration of four years. This has been very effective because such assignment has reduced inevitable initial idling period each time newly assigned expert is arrived. The long-term commitment by the experts to the project has fostered mutual understanding among the Project members, and better communication. The long-term experts successfully bore the responsibility of overseeing project management along with respective areas of technical expertise in EE&C. For example, they have carried out needs assessment, preparation for training, arranging prospective factory to carry out energy audit trainings, receiving and assisting in-coming short-term experts and providing follow-up after the experts' departure. Such efforts facilitate full use of short-term experts' assignments to produce maximum use of the time by allowing them to concentrate to their tasks and responsibilities. Depending on the contents of the EE&C training to the C/P, short-term same experts were dispatched repeatedly to accommodate the needs of the Polish side as much as possible. In addition, the local procurements of materials and equipment for the Project have required high level of project management which was primarily performed by the long-term experts. As such, the Project has been implemented by utilizing full capacity and expertise of the available resources.

(3) Effectiveness of Focusing on Appropriate Technology

The main focus of the technology transfer carried out in the Project was EE&C measures requiring no or low level of investments (hereinafter referred to as "no cost & low cost options" or "EE&C measures focusing on utilities"). The Project hence has aimed at transferring such approach steadily. Based on our reviews on results from energy audit activities the project has implemented, energy reduction potential only by EE&C on utilities has been significant. The approach was considered appropriate because of high benefit compare to low cost necessary as well as ease of adoption. It was found effective for Poland to promote no or low cost approach rather than technologically-driven and high cost EE&C approach because Poland does not fully adopt the idea that EE&C is required.

3-3 Factors that Impeded Realization of Effects

(1) Factors Concerning Planning

As described above, the biggest challenge for implementing the project was that ECTC was established as a branch of KAPE, S.A. incorporated as a self-financing state enterprise while legal framework for promoting EE&C is not yet sufficient in Poland. The project has endeavored to maintain its mission between promotion of EE&C for public good and profit-making. Polish side initially expected that ETCT will be self-sustaining from EE&C activities when it was completed. It has been,

however, dependant to outside support financially and organizationally.

During the evaluation process, the team confirmed ECTC's future role in the proposed energy efficiency law. The detail of such a role, however, is still pending. Japanese side has expressed the strong interest for the future role of ECTC, and offered necessary support to the project.

(2) Factors Concerning the Implementation Process

Not applicable

3-4 Conclusion

The Team concludes that the Project has largely contributed to laying a solid foundation for promotion of EE&C technologies and measures for industries. The cooperation between Polish side and Japanese side has been fruitful and led to the substantial improvement of EE&C knowledge and practical skills in Poland.

The Project has received a full support from both governments.

The most significant outcome is that ECTC has been established as a unique energy conservation training center in Europe which provides practical energy management training based on Japanese technology aiming at various industrial sectors. C/P has acquired enough skills and knowledge to launch various training programs successfully and regularly. The center has trained 586 trainees since the commencement of the Project.

The Project has been conducted effectively and timely. With a rapid increase of energy prices, Polish society faces various challenges in defining sustainable energy policies. EU is enforcing actively its energy policy to all member states. The government of Poland is undertaking a series of reforms on energy policies and is preparing enactment of energy efficiency law scheduled in January, 2009. Moreover, Poland is expected to take initiatives and measures toward climate change, and will host the 14th Conference of the Parties to Climate Convention (COP14) held in Poznań, Poland December this year.

ECTC is now ready to fulfill its role as the leading national center and will play a vital role in promoting EE&C in Poland.

3-5 Recommendation

The Team recommended the following in order to achieve successful completion of the project:

(1) Continuous Improvement Based on the Results of the Survey

Training should be diversified to meet needs of wider group of clients. Introduction of Energy Manager Program may be an option to increase the number of participants in the training courses at ECTC. The training courses require continuous process of improvement based on the feedback given by participants. Therefore monitoring and questionnaire survey should be conducted regularly. Adaptation and redesign of ECTC according to specific market needs of the industries should also be continued. Possibilities of other activities, other than training may be explored e.g. the promotion of EE&C in industry. Further collaboration with universities is also highly recommended.

(2) Strengthening Finance

The ongoing changes in industry, including the energy sector should lead ECTC to play more intensive and diverse role. The future capacity and resources of the ECTC should meet such extended duties. The future financing of the ECTC should be as much as possible based on self financing however the Polish government shall cover the cost of public mission performed by ECTC and therefore necessary part of the operational expenses shall be covered from budgetary resources.

3-6 Lesson Learned

(1) Local Procurement of Machinery and Equipment for Training

Local procurement of the machinery and equipment for the training was the first case among the EE&C projects carried out by JICA. It was acknowledged because it has led a couple of benefits such as reduction of initial cost and maintenance cost, and also the counterparts' stronger sense of ownership. In the other hand, local procurement requires such difficulties as difference in building code, large burden for undertaking proper procurement procedures. More specifically, not only preparation of specifications and bidding documents, but also bidding procedures, evaluation and selection of tender processes, import and custom clearance, installation, and inspection, etc, are required in order for assuring performance specified.

When local procurement would be planned in the future projects, documentations and experiences from this project may be referenced. The decision for making local procurement would look into the unique circumstances of the project.

(2) Relevancy of National-level Energy Intensity as Indicator

The overall goal of the project was defined as "The energy conservation of industrial sector is promoted" and its indicator was reduction of energy intensity. As for the long-term policy goal, GDP and energy intensity may be appropriate for an indicator. It was, however, not fully feasible for defining as indicator. The reasons are explained as following:

Firstly, energy intensity comprised with a variety of parameters. A technical cooperation project such as this may not be able to contribute to improvement of energy intensity of national level in a relatively short period of time (i.e. 4 years for this project). Secondly, acquiring accurate statistical data in a timely manner is difficult because many developing and/or transitional economies do not furnish reliable energy statistics. Furthermore, estimating national-level EE&C potentials through auditing individual factories may be difficult.

Alternative indicator may be "reduction of sector specific energy intensity". It may be able to estimate through implementation of future EE&C policies such as audit activities and nomination of energy managers. Such positive measures for EE&C may be taken into consideration for projection of energy intensity reduction precisely. The other alternative indicator may be "progress of efforts to make EE&C policies by the government" if it would be a precondition that the project makes influences to the policy making process.

(3) Legal Framework as Prerequisite for Implementation of Technical Cooperation Project

According to JICA's past experiences of the similar projects overseas, promotion of EE&C requires combination of regulatory enforcement and provision of economic incentives. As described above, the project's main components of training were carried out while legal framework of training requirement, etc was not defined in the Polish law. While the government of Poland is preparing various regulatory arrangements such as establishment of energy efficiency law, introduction of certification program of energy manger, etc. These arrangements, however, have not fully completed in the course of the technical cooperation project. The training activities have been difficult for the project to promote to many companies because of lack of legal arrangements which was expected to complete initially.

In the light of capacity development in the technical cooperation project in EE&C sub-sector, there are three entry points of "individual-level", "organizational-level" and "institutional/societal-level". The project has confirmed effectiveness of simultaneous implementation of (a) individual capacity development through introduction of professional qualification; (b) organizational development through implementation of energy audit and promotion of EE&C technology through in-house energy mangers of industries; and (c) institutional building and strengthened awareness toward EE&C by public.

In the future technical cooperation projects in EE&C, therefore, are required to assess the current legal framework supporting EE&C. In addition, possibility of granting professional qualification certification for EE&C may be realized when the project is carried out. When such legal supports are found not available, a future possibility of establishing a legal framework for supporting EE&C should be carefully examined.