

Report / Fiscal Year of 2006

Project on Infrastructure Improvement for
Rationalization of International Energy Use

"Project on Improvement in Infrastructure for Energy
Management in ASEAN Countries"

(Promotion of Energy Efficiency and Conservation
For
Energy Management
Under
SOME-METI Program for 2006 – 2007)

March 2007

Ministry of Economy, Trade and Industry

The Energy Conservation Center, Japan

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Summary

The rapid economic development of the ASEAN (the Association of Southeast Asian Nations) member countries is continuing and it is expected that their energy consumption will also grow rapidly in the future. Therefore, efficient use of energy and measures for preventing global warming will become even more necessary than ever.

This program is one of the main projects under ASEAN Plan of Action for Energy Cooperation (APAEC) and is named PROMEEC (Promotion of Energy Efficiency and Conservation) in ASEAN, which was authorized by ASEAN Ministers of Energy Meeting (AMEM). This program consists of three projects, “major industries,” “buildings” and “improvement in infrastructure for energy management”, hereinafter referred to as PROMEEC (Major Industries), PROMEEC (Buildings) and PROMEEC (Energy Management) respectively.

The fiscal year of 2006 is the seventh year of implementation of PROMEEC (Major Industries) and PROMEEC (buildings) and the third year of PROMEEC (Energy Management). The efforts to implement the activities by the counterparts such as the focal points of the respective countries including ASEAN Center for Energy (ACE) are becoming more established and active. Awareness of the need for a reduction in energy consumption has further penetrated into these countries, due to rising energy prices and a tighter energy supply – demand caused by a recent high level of oil prices and remarkable economical development of the Asian countries.

To achieve this target more effectively, aiming at enhancing and establishing the infrastructure for energy management, the PROMEEC (Energy Management) was established and launched in 2004 in addition to PROMEEC (Major Industries) and PROMEEC (Buildings), based on the discussion with and agreement by the representatives from the ASEAN countries.

The ideal target of this project is to establish the “ASEAN Energy Management System” to be shared by all the ASEAN countries within about 5 years.

Moving forward the target, in this fiscal year as the third year of PROMEEC (Energy Management), the following have been prepared and some completed and started its operation.

- 1) Establishment and operation of the “ASEAN Award System of Best Practices in Energy Management for Industries and Buildings”
- 2) Preparation and operation of the system to disseminate tools for energy management such as the technical directory, the in-house database and handbooks
- 3) Preparation and operation of the system to utilize the existing implementing organizations possible to provide services for energy audit and training

The specific activities as follows have been smoothly implemented and successfully completed.

◆ Intensive Seminar-Workshop and visit to enterprises and organizations

In the ASEAN 7 countries, the Intensive Seminar-Workshops were held and the ECCJ / ASEAN experts visited some enterprises and organizations. The team members presented the specifics of the PROMEEC projects and the basic plan of the “ASEAN Energy Management System”, exchanged opinions with participants and requested them to participate in the project activities and to utilize the tools and programs prepared by the PROMEEC (Energy Management) project.

◆ Start implementation of the “ASEAN Award System of Best Practices in Energy

Management for Industries and Buildings”

The award system stated its operation, for the purpose of collecting and disseminating excellent cases of practicing energy management in the fields of industry and building among the ASEAN countries.

The members of the committee (Board of Judges (BOJ)) were selected by the respective ASEAN countries and the 1st BOJ meeting was held on September 20th and 21st in 2006, then the official announcement to the start the award system including the call for the 1st application was made by the ASEAN side in October 2006. Following this announcement, the “Research Forum in Japan” was held in December 2006 by inviting the BOJ members with the purpose of improving the evaluation guideline and the application form.

In the ASEAN countries, the application is continuing, under the plan to close application in early May 2007 and to select awardees until June 2007.

- ◆ Development of various energy management tools (technical directory, in-house database and handbooks) and the its dissemination system
The draft of the energy management handbook was prepared. Moreover, the ECCJ / ACE jointly developed the basic design of the system to disseminate the energy management tools including the technical directory and the in-house database.
- ◆ Revision of the basic plan of the “ASEAN Energy Management System”
Based on the actual results of the activities mentioned above, the plan of the “ASEAN Energy Management System” was revised and finalized through discussion with the representatives from the ASEAN 10 countries.

As a result of the above activities, it could be achieved to have prepared the basic functions of the “ASEAN Energy Management System” and started implementing the “ASEAN Award System of Best Practices in Energy Management for Industries and Buildings”.

The activities in ASEAN of this fiscal year started with the Inception Workshop (common for the three projects) in July 2006 and closed by the Summary and Post Workshops (common for the three projects) in February 2007. In the Summary and Post Workshops, gathering the focal points from the ASEAN countries, the actual results and achievement in the respective countries were reported and the future project plan including that of the next year was discussed.

The specifics of the PROMEEC (Energy Management) project are as follows.

“Inception Workshop of on Promotion of Energy Efficiency and Conservation (PROMEEC) (Major Industry, Building and Energy Management), SOME – METI Work Program 2006– 2007” (Common activities to PROMEEC (Major Industries and Buildings)

Date ; July 6th – July 7th, 2006 (Trip on July 4th through July 8th) /

Venue ; Kota Kinabaru, Malaysia

Although the focal points from Myanmar and Singapore, total 15 persons consisting of the focal points from ASEAN and representatives from ASEAN Center for Energy (ACE) and The Energy Conservation Center, Japan (ECCJ) participated in the workshop and discussed the following.

Opening Remarks by the host country etc.

(Session 1) Implementation plan of PROMEEC (Buildings) by representatives of ECCJ and ASEAN

(Session 2) Implementation plan of PROMEEC (Major Industries) by representatives of ECCJ and ASEAN

(Session 3) Implementation plan of PROMEEC (Energy Management) by representatives of ECCJ and ASEAN

(Session 4) Status of activities by ECCJ and ACE by representatives of ECCJ and ACE

- ◆ In-house Database

- ◆ Preparation of Technical Directories for Industries and Buildings

(Session 5) Finalization of implementation plan of 3 projects for 2006 – 2007 by the representative of ECCJ

1st Site Activities (September 11th – September 21st, 2006)

Visited Countries: Cambodia, Lao PDR and Vietnam (3 countries)

1. Intensive Seminar-Workshop

The basic plan of the “ASEAN Energy Management System” including functions and tools equipped with the system were presented. The team members consisted of ECCJ, ACE and the focal points exchanged opinions with the participants and requested them to participate in the project activities and to utilize the program and tools prepared in the project.

2. Visits to concerned enterprises and organizations

By visiting concerned companies and organizations, the team consisted of ECCJ, ACE and the focal points surveyed at factories and buildings, exchanged opinions and provided advice to improve energy management

3. 1st BOJ meeting for “ASEAN Award System of Best Practices in Energy Management for Industries and Buildings (on September 20th and 21st)

The 1st meeting was held in Hanoi and

In Hanoi, the 1st ASEAN BOJ meeting was held and the plan was approved. Furthermore, the evaluation guideline was discussed and the application form was finalized. After then, in October 2006, the official announcement to start the award system including the 1st call for announcement was made by ACE through the focal points of ASEAN.

Through the activities described above, we could expand the network with cooperative companies / organizations and start up the ASEAN Award System of Best Practices in Energy Management for Industries and Buildings.

2nd Site Activities (November 20th – December 1st, 2006)

Visited Countries: Malaysia, Philippines, Brunei Darussalam and Indonesia (4 countries)

1. Intensive Seminar-Workshop

The basic plan of the “ASEAN Energy Management System” including functions and tools equipped with the system were presented. The team members consisted of ECCJ, ACE and the focal points exchanged opinions with the participants and requested them to participate in the project activities and to utilize the program and tools prepared in the project.

2. Visits to concerned enterprises and organizations

By visiting concerned companies and organizations, the team consisted of ECCJ, ACE and the focal points surveyed at factories and buildings, exchanged opinions and provided advice to improve energy management

Through the activities described above, we could expand the network with cooperative companies / organizations.

Research Forum in Japan (December 12th – December 14th, 2006)

Inviting the members of BOJ (Energy Management) from the ASEAN countries, the evaluation guideline and the application form were improved through the activities of the Research Forum in Japan.

“Summary Workshop and Post Workshop on Promotion of Energy Efficiency and Conservation (PROMEEC) (Major Industry, Building and Energy management), SOME – METI Work Program 2006– 2007” (Common activities to PROMEEC (Major

Industries and Buildings)

Date : February 27th – February 28th, 2007

Venue : Seria, Brunei Darussalam

Total 22 persons from ASEAN countries, ACE and ECCJ participated in the workshop, summarized and discussed the results of the activities completed.

Opening Remarks by the Host Country etc.

Summary Workshop

Session 1 : The results and achievements of PROMEEC (Major Industries)

Session 2 : The results and achievements of PROMEEC (Buildings)

Session 3 : The results and achievements of PROMEEC (Energy Management)

- ◆ Report on the results of activities for this fiscal year
- ◆ Finalized plan of and progress in “ASEAN Award System of Best Practices in Energy Management for Industries and Buildings
- ◆ Explanation and discussion of the updated plan of “ASEAN Energy Management System”
- ◆ Basic direction and plan of the future activities including FY 2007

Post Workshop

(Session 1) Confirmation of important points for the respective projects discussed in the Summary Workshop

(Session 2) Basic Implementation Plan after the FY 2007

In order to assist ASEAN in establishing the sustainable infrastructure to promote energy efficiency and conservation in ASEAN, a higher level of the activity has been implemented with request for the enhanced self efforts by each country. That results in the following.

- (1) Actual preparation or development of important functions in accordance with the basic plan of the “ASEAN Energy Management System” to be shared by all the ASEAN countries
- (2) Start-up of the “ASEAN Award System of Best Practices in Energy Management for Industries and Building”

These are the largest achievements of the FY 2006.

In implementing the projects, many persons in charge from the ASEAN countries including ACE provided us with enhanced cooperation with enthusiasm.

Finally, in this report, we would like to express our sincere appreciation for the cooperation by all the ASEAN persons concerned.

I Objectives and Background of the Project

The objective of this project is to explore and propose measures for efficient use of energy in the countries and the regions which contribute to a stable energy supply for Japan, through the investigation and analyses on the energy policies and tendency of energy consumption, provision of advice on efficient use of energy by exchanging resource persons, targeting to build a stable and suitable infrastructure for energy supply and demand to meet the international and domestic economic and social environment.

By building the infrastructure and basis for energy management for the purpose of promoting energy conservation in the major industries and buildings, in order to achieve the above objective, the PROMEEC (Energy Management) aims at contributing to the promotion of energy conservation and environmental protection through the promotion in realizing energy conservation measures in the Southeast Asian nations by assisting the activities of ASEAN.

This project was established in 2004 and is called as “PROMEEC (Energy Management)” in the ASEAN side. PROMEEC is the abbreviation for the “Promotion of Energy Efficiency and Conservation.” It is a collaboration program between the Ministry of Economy, Trade and Industry (METI) and ASEAN, approved by the ASEAN Ministers on Energy Meeting (AMEM). METI-ECCJ is technically and operationally cooperating with ASEAN by supporting ASEAN both in the establishment of the infrastructure and basis for energy management essential for promoting energy conservation in the industry and building sectors of ASEAN countries and in the realization of improvement. We are also cooperating by supporting improvements of the system from a technical and operational point of view.

The goals of this project are to establish the following.

1. Sustainable infrastructure and system for energy management called as the “ASEAN Energy Management System” which can be shared by the ASEAN countries and contributing to the promotion of energy conservation in the industrial and building sectors.
2. Specific effective functions for the “ASEAN Energy Management System” to provide customers with facilities and services to assist the activities for implementing and disseminating various improvement for energy conservation, such as energy audit, training services and information provision, including rule to smoothly and properly work these functions in the “ASEAN Energy Management System”
3. Effective collaboration with the PROMEEC (Major Industries) and PROMEEC (Buildings) projects for the purpose of sharing information and utilization of accomplishments of the projects to disseminate the outcomes, and so on.

This project was established based on the experience and the achievements of PROMEEC (Major Industries) and PROMEEC (Buildings) being implemented since 2000. Namely, this project was established in the fiscal year of 2004, as a new project of PROMEEC, to promote improvements in energy management which is the common issue for both PROMEEC (major Industries) and PROMEEC (Buildings) and is the most effective measures for energy conservation.

To achieve the above-mentioned goals, the activities for a long term of approximately 5 years

will be required and the PROMEEC (Energy Management) has been implemented based on the stepwise approach as follows.

[The first stage]

Development of the plan of the “ASEAN Energy Management System”, based on the investigation on the actual situations of the infrastructure and basis for energy management in ASEAN countries and on the transfer of technologies and experience realized in Japan.

[The second stage]

Establishment of the “ASEAN Energy Management System” including measures and procedures to work the system

[The third stage]

Actual operation to work the “ASEAN Energy Management System” and improvement of the system

During the past two years, the activities of the first stage have been almost completed, and the actual activities have shifted to a level of the second stage. Through the activities in this fiscal year, the basic plan for the “ASEAN Energy Management System” was established and the activity level moved on to the second stage. The “ASEAN Award System of Best Practices in Energy Management for Industries and Buildings” has been developed and started its actual operation. This fact means that a part of the activities has already shifted to the third stage where some prepared functions are working.

This project was actually implemented by the Energy Conservation Center, Japan (ECCJ), and was conducted mainly by the following four members who were in charge of the project.

Mr. Kazuhiko Yoshida General Manager, International Engineering Department

Mr. Takashi Sato Technical Expert, International Engineering Department

Mr. Fumio Ogawa Technical Expert, International Engineering Department

Mr. Akira Kobayashi Technical Expert, International Engineering Department

II Plan of “ASEAN Energy Management System” and Implementation Plan for FY 2006 to aim Build “ASEAN Energy Management System”

II-1 Plan of “ASEAN Energy Management System”

The followings are the important direction required for the “ASEAN Energy Management System” of which basic plan was established through the activities until FY 2005.

- (1) System and its functions can be shared among all the ASEAN countries.
- (2) Activities related to individual policies and laws are not included.
- (3) The fundamental functions consist of the function needed for the actual implementation and the tools to assist activities of the governments and enterprises to promote activities and enhance infrastructures for energy conservation
- (4) In the future, the system will include the function to coordinate implementation of projects under the international cooperation with Japan and EU.

Accordingly, the functions equipped with will be provision of information, services for energy audit and training, consulting / advisory services for actual implementation and award systems / campaign for collection and dissemination of useful information. A system to provide these functions actually is required. From an operational point of view, for the purpose of realizing the requirement to share the system among the ASEAN countries, the followings are also required for the system.

- (1) Optimum design of the total system
- (2) Future organization of a coordination team aiming at further effective cooperation by the countries outside ASEAN

Based on the direction mentioned above, the specific concept of the “ASEAN Energy Management System” was established, as shown in Fig II-1-1

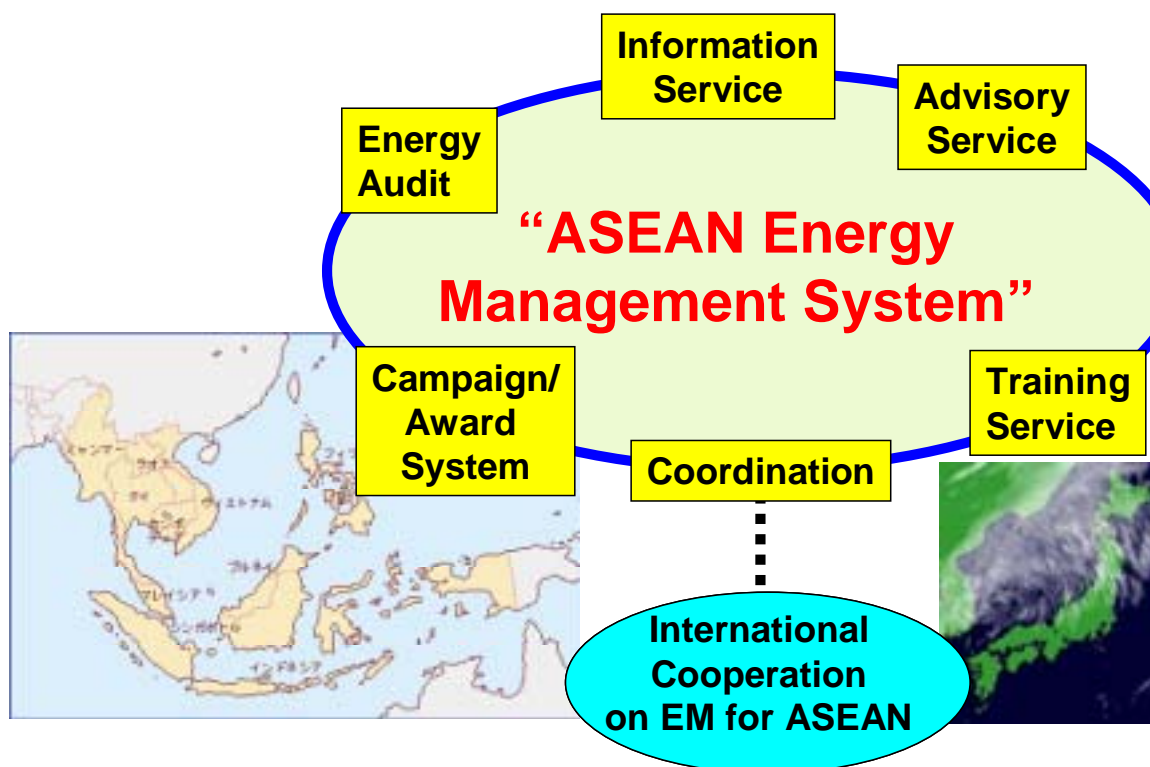


Fig II-1-1 : Concept of “ASEAN Energy Management System”

Moreover, it was confirmed that the functions to be equipped with the “ASEAN Energy Management System” should provide useful information and tools especially to assist enterprises in ASEAN in their voluntary activities for promotion of energy conservation. Namely, it is important that the enterprises establish the sustainable basis of energy management and the “ASEAN Energy Management System” will effectively work especially for a stage of initial introduction and process until they build their basis. Generally, the process to establish a sustainable energy management system starts with technology transfer from the outside for introduction of the energy management system, then, the standardization including preparation of database based on voluntary activities with self effort follows, next the up-gradation of the system including organization a team for management for enhanced activities through usual operation of the energy management system and finally ends up building the sustainable energy management system.

The scope of functions of the “ASEAN Energy Management System” includes assistance of activities of enterprises from the initial introduction of energy management and technologies for energy conservation until the stage of systematization and standardization for stabilization. This concept is shown in Fig II-1-2.

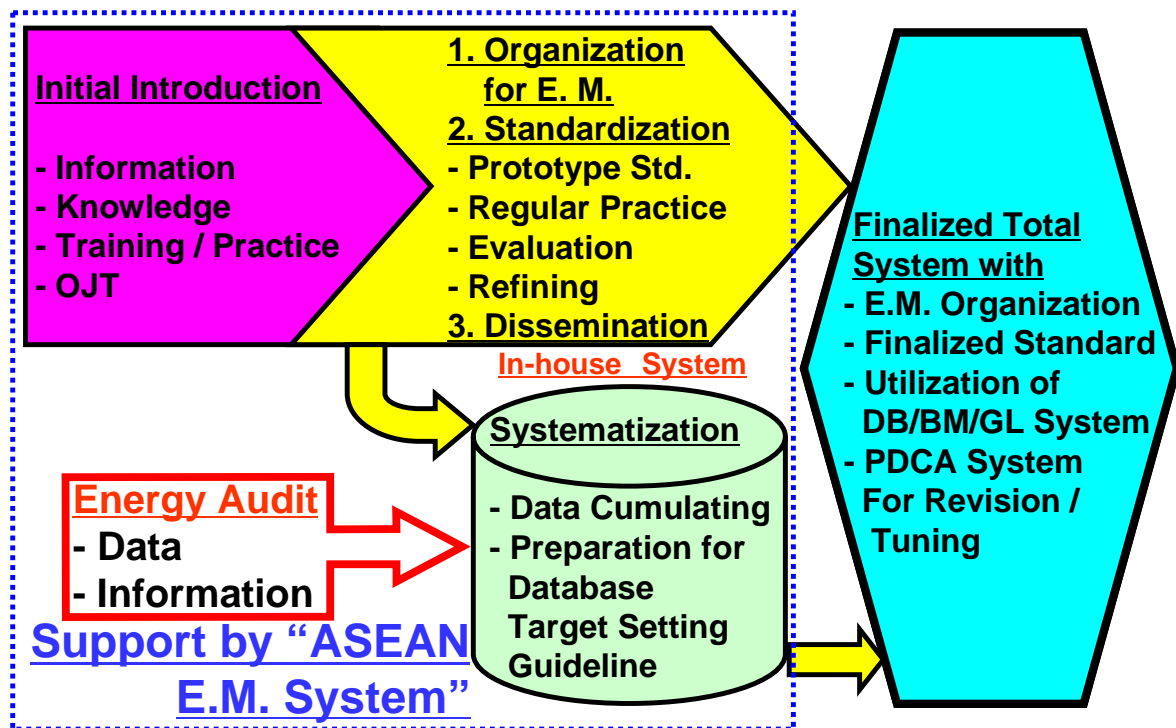


Fig II-1-2 : Process to Establish Sustainable Basis of Energy Management and Possible Scope of Functions of “ASEAN Energy Management System”

In accordance with the above, the representatives from the ASEAN countries and ECCJ agreed on the basic policy that the most important functions are developed, established, and the system starts working from functions possible to work. Based on this consensus, the long term plan to establish the “ASEAN Energy Management System” was developed. And the basic plan of the “ASEAN Energy Management System” including the time schedule was agreed by the focal points from the ASEAN countries, in the “Summary and Post Workshop held in January 2006. Fig II-1-3 shows the time schedule to develop and establish the “ASEAN Energy Management System”

| Phase | Main Activities | 2004 | 2005 | 2006 | 2007 | 2008 | After 2009 |
|--------------------------------------|---------------------------------|------|------|------|------|------|------------|
| Phase - 1 Prepare Basic Functions | Investigation / Study Concept | | | | | | |
| | Develop Specific Plan | | | | | | |
| | Prepare / Work Functions | | | | | | ...▶ |
| | Verification Result | | | | | | |
| Phase - 2 | Study / Prepare / Add Functions | | | | | ... | |

Fig II-1-3: Time Schedule for Establishment of “ASEAN Energy Management System”

II-2 Implementation Plan for FY 2006

The implementation plan for 2006-2007, which was developed in accordance with the plan to establish and work “ASEAN Energy Management” with consideration of the actual achievements in the previous year, was agreed by the focal points in the Inception Workshop held in July 2006. The following targets were setup at first.

♣ Establishment and start of working of the function to provide information

- (1) Collection and dissemination of ASEAN best practices in energy management for industries and buildings
 - a. Start operation of the “ASEAN Award System of Best Practices in Energy Management for Industries and Buildings”
 - b. Study to establish a system to share information of best practices in energy management awarded
- (2) Establishment of a system to utilize the Technical Directory and In-house database
- (3) Development of the energy management handbook to provide readers with guideline of energy management system

♣ Development of functions to provide services for energy audit and training

- (1) Development and startup of trial of procedures to utilize the existing implementing organizations (including utilization of information of ESCOs)

♣ Revision of the plan of the “ASEAN Energy Management System” based on activities explained above

In order to achieve the above targets, the following activities were implemented.

1. Holding “Intensive Seminar-Workshops” and visits to concerned organizations and enterprises in ASEAN countries

The purpose of the “Intensive Seminar-Workshop” is as follows.

- (1) Introduction of the PROMEEC projects including PROMEEC (Energy Management)

- (2) Introduction and discussion of the “ASEAN Energy Management System” including programs and functions
- (3) Introduction of activities and programs under PROMEEC (Energy Management) including requests for utilizing and participating in the programs
- (4) Request for cooperation by participants to the project activities

Moreover, after completing the “Intensive Seminar-Workshops”, the expert team visited concerned organizations and enterprises in each country. The purpose of the visits is to survey and identify the status of the basis or infrastructure of energy management and to provide them some possible advices and consultation to solve specific problems which they experienced, in addition to the purpose of the “Intensive Seminar-Workshop”.

Through these activities, the project aimed at expanding the networks with cooperating enterprises and organizations. It was decided to implement these activities in the 7 countries, or Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Philippines and Vietnam.

2. Activities to start working the “ASEAN Award System of Best Practices in Energy Management for Industries and Buildings”

In order to start the “ASEAN Award System of Best Practices in Energy Management for Industries and Buildings” (hereinafter abbreviated as the “Award System (Energy Management)”), the following are planned to be implemented.

- (1) Organization of evaluation committee
The evaluation committee is named “Board of Judges for Energy Management (hereinafter referred to as “BOJ (EM)”). The members of the BOJ (EM) shall consist of one member for each country hence 10 members in total.
- (2) Holding the BOJ (EM)
The BOJ (EM) will develop and approve the implementation plan, the evaluation guideline and the application form. After then, the first call for application will be announced.
- (3) Conduct “Research Forum in Japan”
The “Research Forum in Japan” will be held in Tokyo to revise the evaluation guideline, to improve the application form and to confirm the time schedule to complete the first round of awarding.

3. Development of tools and various studies

The activities include preparation for implementation by the ASEAN and Japan side, studies on plans etc. based on the implementation results and continuation of development of various tools such as the “Energy Management Handbook”

The implementation plan and time schedule of the above activities are shown in Table II-2-1.

Table II-2-1 : Implementation Plan for 2006 – 2007

| Project / Activities | 2006 | | | | | | | | | | 2007 | | | Remarks |
|---|--|-----|------|------|--------|-----------|---------|----------|----------|---------|----------|-------|--|---------|
| | April | May | June | July | August | September | October | November | December | January | February | March | | |
| (Overall) | | | | | | | | | | | | | | |
| A. Development of Detailed Project Plans / Preparatory Work | ■ | | | | | | | | | | | | | |
| B. Contract with ACE | ■ | | | | | | | | | | | | | |
| C. Inception Workshop | ■ | | | | | | | | | | | | | |
| D. Implantation of Projects | ■ | | | | | | | | | | | | | |
| E. Post Workshop | ■ | | | | | | | | | | | | | |
| F. Preparation of Report | ■ | | | | | | | | | | | | | |
| (3-Project Management) | | | | | | | | | | | | | | |
| (1) Planning / Preparation / Evaluation | ■ | | | | | | | | | | | | | |
| (2) Coordination Meeting in Indonesia or Japan | ■ | | | | | | | | | | | | | |
| (3) Inception Workshop | ■ | | | | | | | | | | | | | |
| (4) Post Workshop | ■ | | | | | | | | | | | | | |
| 3. PROMEEC (Energy Management) | | | | | | | | | | | | | | |
| (1) Preparation : Detailed Plan / Arrangement for 1st Site Activity | ■ | | | | | | | | | | | | | |
| (2) 1st Site Activity (Intensive Workshop, etc.) (1) | ■ | | | | | | | | | | | | | |
| (3) 2nd Site Activity (Intensive Workshop, etc.) (2) | ■ | | | | | | | | | | | | | |
| (4) 2nd Research Forum in Japan on Award System | ■ | | | | | | | | | | | | | |
| (5) Summary and Post Workshop | ■ | | | | | | | | | | | | | |
| (6) Preparation of Report | ■ | | | | | | | | | | | | | |
| | 9/11 Cambodia/Vietnam/Lao PDR 9/22 Philippines/Indonesia/Brunei/Malaysia 11/27 12/8 | | | | | | | | | | | | | |
| | Brunei Darussalam Cambodia Indonesia Lao PDR Malaysia Philippines Vietnam | | | | | | | | | | | | | |

III Intensive Seminar-Workshops and Visits to Companies and Organizations with Request for Participation in and Cooperation to Projects

III-1 Outline

In the visited 7 countries, the “Intensive Seminar-Workshop” was held on the first day and the ECCJ-ASEAN team visited concerned organizations and enterprises on the second day in each country. The ECCJ-ASEAN team visited Cambodia, Lao PDR and Vietnam in September 2006 and visited Malaysia, Philippines, Brunei Darussalam and Indonesia in November – December 2006.

Many participants from the governments, implementing organizations, industrial associations, enterprises and universities attended the Intensive Seminar-Workshops. The total number of participants was 267. Moreover, the ASEAN-ECCJ team visited 22 enterprises and organizations concerned.

As shown in Attachment III-1, the program of the Intensive Seminar Workshop consists of the main sessions as follows.

(Session 1) Outline and Achievements of PROMEEC Projects

(Session 2) Introduction of “ASEAN Energy Management System”

(Session 3) Plan and Functions of “ASEAN Energy Management System”

(Session 4) Activities to Develop and Work Functions of “ASEAN Energy Management System”

(Session 5) Panel Discussion (Request for Participation in Activities / Proposals and Requirements for Future Improvement)

(Special Session) Individual Advisory Service for Participants (if required)

After completing the above sessions, ECCJ experts replied to questions and provided advices concerning their activities for promotion of energy conservation and for practicing energy management.

Through visits to enterprises etc, the ASEAN-ECCJ team requested them to participate in the project activities, exchanged opinions with engineers and staffs at factories and buildings and provided them with advices and recommendations for improvement.

Thanks to efforts by concerned persons including the focal points in the respective countries, all the activities have smoothly completed in accordance with the plan. The achievement of activities resulted in the following outcomes.

- (1) Creation or enhancement of keen interest in and a good evaluation of the PROMEEC (Energy Management) project and programs of the “ASEAN Energy Management System” by participants and visited organizations with confirmation of their hope to actually participate in our activities
- (2) Confirmed coincidence of the specifications of the functions and tools of the “ASEAN Energy Management System” with needs of concerned persons in ASEAN based on the replies to the questionnaire of the participants
- (3) Acquisition of consensus by many participants and organizations of on the proposed specification of functions and tools with requests and proposals for improvement possible to be reflected to the current plan

The specific activities in each country are described in the following chapter.

III-2 Activities and Results of Implementation in Each Country

III-2-1 Cambodia

(ECCJ Expert)

Kazuhiko Yoshida (General Manager, International Engineering Department)

Takashi Sato (Technical Expert, International Engineering Department)

(Actual Schedule)

| Date | | Activity |
|--------------------|------|--|
| 10 September, 2006 | Sun. | Traveled to Cambodia after completing other project duties in Thailand Lv. Bangkok Ar. Phnom Penh (Cambodia) |
| 11 September, 2006 | Mon. | Implementation of Intensive Seminar-Workshop |
| 12 September, 2006 | Tue. | Visits to 2 governmental organizations (EAC & EDC) and 2 industrial associations or garment and hotel industries (Field survey / Information exchange and advice on energy management / Request for participation in PROMEEC) |
| 13 September, 2006 | Wed. | Traveled to Laos Lv. Phnom Penh (Cambodia) Ar. Vientiane (Laos) |

Mr. Ivan Ishmed (Project Officer), Ms. Maureen C. Balamiento from ASEAN Center for Energy (ACE) and staffs including the focal point from Cambodia participated in the above-mentioned activities.

1. Intensive Seminar-Workshop

28 people from the government and concerned enterprises, including newly appointed Mr. Victor Jona (Deputy Director General of Energy, Ministry of Industry, Mines and Energy) who was recently promoted from the Planning Division, attended this workshop and it was successfully completed with intensive and active discussions taking place. In spite of his busy schedule, Mr. Jona participated in the workshop over the entire day and made timely comments in answer to questions or comments from the other participants. Excellent opinions were also exchanged between the participants.

The program (common to every country) is given in Attachment-III-1. Two new methods were introduced at the Intensive Seminar-Workshop this time. In brief, at first, the companies to which participants belong and its business associates were requested to actively participate in the PROMEEC projects itself and each program in the PROMEEC (Energy Management) project at the end of the seminar session. Following that, secondly, the two sessions were setup, namely the sessions of panel discussions and individual advisory service for participants.

In Cambodia, the panel discussion session integrating the individual advisory session was conducted hence making individual consultations public. There were interesting conversations in the panel discussion including a sensitive discussion and questions from a participant working for a NGO. According to them, namely, the electrical power meters checked and installed by the government were totally unreliable in terms of accuracy even though they were related to electrical charge payments, and advice was requested on how to handle that kind of problem in terms of energy management. Our opinions were that should be dealt from a technical viewpoint. What we felt about this issue through discussions by the people concerned was that mutual trust among Cambodians including reliabilities of equipment was rather weak except what oneself is concerned about and controlling. We are quite

concerned about this point.

2 . Visits to concerned organizations including companies

(Request for participation in and cooperation to the activities of the PROMEEC Projects)

The ASEAN-ECCJ team visited the "Cambodia Hotel Association", "Electricity Authority of Cambodia (EAC)", "Garment Manufacturers Association of Cambodia (GMAC)" and "Electricite Du Cambodge (EDC)" for the sake of requesting their enthusiastic participation in PROMEEC projects and each of the programs under the PROMEEC (Energy Management) project.

The details of discussion made in each organization are described hereafter.

At the Cambodia Hotel Association, we talked with people from member hotels (including two hotels at Siem Reap), and they promised their participation in and cooperation to this project and programs as an association. They said that the association would meet within two weeks and they wished to raise the issue of participating in The ASEAN Award System for Best Practices in Energy Management for Industries and Buildings. For our part, we requested them to discuss with those concerned from the hotels which were energy-audited in the PROMEEC (Building) project and to encourage them to apply to the award system.

In addition, we enjoyed the high expectations at EAC that our project and what we were attempting to do was good, and furthermore they promised to promote their participation in and cooperation to this project.

Furthermore, in the Garment Manufacturing Association of Cambodia (GMAC), they understood the significance and achievements of the PROMEEC projects knowing that June Textile and M&V among nearly 400 member firms had participated in the PROMEEC (Major Industries) project. Based on the understanding, they pledged to prepare a letter written in Chinese to ask for cooperation to the PROMEEC projects together with the URL address of ACE. We hoped that this letter would be sent to their member companies. We also requested them to discuss with those concerned from the garment factories which were energy-audited in the PROMEEC (Major Industries) project and to encourage them to apply to the award system.

At EDC, they also recognized the necessity to strengthen the energy management at power-plants and the power distribution division, and pledged their participation in and cooperation to this project. There was a participant of the latest JICA group training course among the interviewees. According to him, he had reported his boss about his action plan prepared in Japan submitted to JICA after returning to his home country, and his boss has enthusiastically supported him in conducting the training for energy conservation for employees, so our visit this time was of good timing. In addition, as they expressed their intention to request support from Japan that would combine the provision of devices for energy audit and the dispatch of experts from Japan, we advised to submit a request letter from MIME to METI when they finalize the specific requirements through discussion with concerned persons in Cambodia.

VISIT to ORGANIZATIONS / COMPANIES CONCERNED (Cambodia) NO.1

Name of Organization : Cambodia Hotel Association (CHA)

| NO. | Items | Details |
|-----|---------------------------------|---|
| 1 | Date | 9:15-10:30, Tue., 12 September |
| 2 | Interviewee | Mr. Lina THAV (Board Member, in charge of Tax, Energy and Garbage Cambodia Hotel Association) Mr. Jameg Kheng Suk (Office Manager , Cambodia Hotel Association) |
| 3 | Visitors (Focal Point, etc.) | Mr. Lieng Vuthy (Deputy Chief of Energy, Efficiency and Standards Office, Department of Energy Technique, MINISTRY OF INDUSTRY MINES and ENERGY) |
| 4 | Visitors (ACE, ECCJ) | <u>ACE :</u> Mr. Ivan Ismed, ACE Ms. Maureen Balamiento (DB & IT Specialist, ACE) <u>ECCJ :</u> Mr. Kazuhiko Yoshida (General Manager, ECCJ) Mr. Takashi Sato (Technical Expert, ECCJ) |

Summary of Activities

First, ECCJ / ACE explained the purpose of the visit and outlined PROMEEC projects.

The Cambodia Hotel Association has 24 member hotels in Phnom Penh, 54 in Siem Reap and 3 in Sihanoukville. The association is functioning well, and carrying out an action to pressure the government to postpone enforcing the Accommodation Tax. The profitability of hotels is gradually declining due to the recent increases in electricity charges and other various costs.

At the Intensive Workshop held on September 11th, a participant from Cambodia Hotel Association had replied to the questionnaire that he could not understand the activities of PROMEEC project very well. Accordingly, in the meeting, we again explained the outline of PROMEEC activities as follows.

- (1) Purpose of PROMEEC project and the past activities implemented in Cambodia.
The team explained the specific experiences as follows.
 - Energy audits and workshops for buildings carried out at the Sofitel Hotel in Siem Reap
 - Energy audits and workshops for major industries conducted at the garment factories in Phnom Penh
- (2) Technical Directory and Database that are currently under development
- (3) The Award System that will soon start.
- (4) ASEAN Version of the Energy Management Handbook under planning to develop and upload on the website

Regarding the award system, we also explained the possibility that even small hotels will be able to apply for the award system for energy management and their local language would be accepted for preparing application. At the same time, we informed that the first Board of judges for the award system will be held to announce the start of the award system for energy management in the near future (within 2 weeks).

However, in fact, it appears that few hotels in Phnom Penh are promoting energy conservation.

VISIT to ORGANIZATIONS / COMPANIES CONCERNED (Cambodia) NO.2

Name of Organization : Electricity Authority of Cambodia (EAC)

| NO. | Items | Details |
|-----|---------------------------------|---|
| 1 | Date | 11:00-12:00, Mon., 12 September |
| 2 | Interviewee | Mr. Theng Marith (Electric Regulation Department, EAC) Mr. Ou Long (Manager, Generation Regulation Office, EAC) Mr. Yim Viseth (Manager, T&D GM Office, EAC) |
| 3 | Visitors (Focal Point, etc.) | Mr. Lieng Vuthy (Deputy Chief of Energy, Efficiency and Standards Office, Department of Energy Technique, MINISTRY OF INDUSTRY MINES and ENERGY) |
| 4 | Visitors (ACE, ECCJ) | <u>ACE</u> ; Mr. Ivan Ismed, ACE Ms. Maureen Balamiento (DB & IT Specialist, ACE) <u>ECCJ</u> ; Mr. Kazuhiko Yoshida (General Manager, ECCJ) Mr. Takashi Sato (Technical Expert, ECCJ) |

Summary of Activities

First, ECCJ / ACE explained the purpose of the visit and outlined PROMEEC projects. EAC is a domestic Cambodian institution that drafts laws and regulations in relation to electric power.

Although Mr. Marith participated in the Intensive Workshop held on September 11th, we again requested the three gentlemen the active participation of EAC in PROMEEC. Specifically, we asked cooperation to provision of information and data reflected to develop the Technical Directory and Database including proposals for improvement of these tools.

According to them, there are very few people in Cambodia who concretely understand the implementation of practical Energy Management (EM), and the EM conditions differ from those in Thailand or Malaysia. Hence in this situation they would like us to develop the Database or Technical Directory that will be made by PROMEEC to be simple and user-friendly. (ACE and ECCJ realized that these tools should be based on the minimum specifications.)

Their vision is that the consumption of oil used for in-house power generation at factories and companies will be reduced by knowing and practicing energy management.

VISIT to ORGANIZATIONS / COMPANIES CONCERNED (Cambodia) NO.3

Name of Organization : Garment Manufacturing Association of Cambodia (GMAC)

| NO. | Items | Details |
|-----|---------------------------------|---|
| 1 | Date | 14:00-15:00, Tue., 12 September |
| 2 | Interviewee | Dr. Ken Loo (Secretary General, Garment Manufacturing Association of Cambodia, GMCA) Mr. Buth Bonroath (GMAC) |
| 3 | Visitors (Focal Point, etc.) | Mr. Lieng Vuthy (Deputy Chief of Energy, Efficiency and Standards Office, Department of Energy Technique, MINISTRY OF INDUSTRY MINES and ENERGY) |
| 4 | Visitors (ACE, ECCJ) | <u>ACE</u> ; Mr. Ivan Ismed, ACE Ms. Maureen Balamiento (DB & IT Specialist, ACE) <u>ECCJ</u> ; Mr. Kazuhiko Yoshida (General Manager, ECCJ) Mr. Takashi Sato (Technical Expert, ECCJ) |

Summary of Activities

First, ECCJ / ACE explained GMA about the purpose of the visit and outlined PROMEEC projects and requested the broad members the participation of the Cambodian garment industry in PROMEEC activities.

The ASEAN-ECCJ team further explained the following points.

The garment industry in Cambodia will be able to access to information on specific cases of other ASEAN member countries through utilizing the Technical Directory or Database developed in the PROMEEC projects. In addition, we requested their cooperation by explaining the benefits of the award system for energy management. Namely, companies can receive enormous merit if they win the award system.

They say that GMAC is considering the utilization of solar power. We added more explanation that in this case, for example, they might be able to promptly find some actual examples by using the Technical Directory or Database. GMAC gradually realized these points of the PROMEEC projects and cleared up their thought that they would introduce the PROMEEC projects and activities under the project in the next Board Meeting.

VISIT to ORGANIZATIONS / COMPANIES CONCERNED (Cambodia) NO.4

Name of Organization : Electricite Du Cambodge (EDC)

| NO. | Items | Details |
|-----|---------------------------------|--|
| 1 | Date | 15:00-16:30, Tue., 12 September |
| 2 | Interviewee | Mr. Iv Visal (Deputy Director, Distribution & Transmission Department, EDC) Dr. Chlasa Praing (Deputy director Corporate Planning & Projects Department) Mr. Piseth Chun (Chief of Planning, MIS and tariff Office) |
| 3 | Visitors (Focal Point, etc.) | Mr. Lieng Vuthy (Deputy Chief of Energy, Efficiency and Standards Office, Department of Energy Technique, MINISTRY OF INDUSTRY MINES and ENERGY) |
| 4 | Visitors (ACE, ECCJ) | Mr. Ivan Ismed, ACE Ms. Maureen Balamiento (DB & IT Specialist, ACE) Mr. Kazuhiko Yoshida (General Manager, ECCJ) Mr. Takashi Sato (Technical Expert, ECCJ) |

Summary of Activities

Although EDC was initially established in 1957, its function was disrupted due to the war, and then newly re-established in 1997. Therefore, EDC has a relatively short history.

First, ECCJ / ACE explained EDC about the purpose of the visit and outlined PROMEEC projects including various activities and "ASEAN Energy Management System". Next, the ECCJ-ACE team requested them a broad range of cooperation in the future.

The main points of discussion were as follows.

- (1) In response to our request for their active participation in PROMEEC in future, they explained the following.
 - EDC is in the position where they are able to request their customers to participate in the projects
 - The appropriate organization to request participation in the project for industries is MINISTRY OF INDUSTRY MINES and ENERGY
- (2) As oil prices are rising, EDC wishes to improve as much transmission-loss as possible. If they reduce the current 15% of loss by just 1 percent, it could save US\$1.5 million. (In the previous meeting with EDC, we were informed that a considerable amount of electric power was stolen in addition to the transmission loss).
- (3) Power consumption by pumps and lubrication used as the auxiliaries of the diesel power generators is too high.
- (4) There is no night time discount system of the electricity charges due to the diesel power generation.
- (5) They expect PROMEEC to help building the capacity of human resources at EDC.
- (6) EDC considers expanding the EDC training center through assistance by ADB (so far the main purpose of the training is to improve the skill level of workers).
- (7) Unlike Japan and Thailand, energy-conservation has not spread throughout Cambodia yet. They wish to implement training with assistance from Japan. In addition, they lack the necessary measurement devices needed in implementing energy audits. They expect that Japan will offer a variety of cooperation.

In response to this request, ECCJ advised that EDC could request METI through MIME on a basis of the bilateral cooperation because PROMEEC is a multilateral cooperation..

III-2-2 Lao PDR

(ECCJ Expert)

Kazuhiko Yoshida (General Manager, International Engineering Department)

Takashi Sato (Technical Expert, International Engineering Department)

(Actual Schedule)

| Date | | Activity |
|--------------------|------|--|
| 13 September, 2006 | Wed | Travel to Laos from Cambodia Lv. Phnom Penh (Cambodia) Ar. Vientiane (Laos) |
| 14 September, 2006 | Thu. | Implementation of Intensive Seminar-Workshop |
| 15 September, 2006 | Fri. | Visits to 4 companies (Cement, beer, steel and lumber manufacturing (state-owned and private)) (Field survey / Information exchange and advice on energy management / Request for participation in PROMEEC) |
| 16 September, 2006 | Sat. | Day off |
| 17 September, 2006 | Sun. | Travel to Viet Nam Lv. Vientiane (Laos) Ar. Hanoi (Viet Nam) |

Mr. Ivan Ismed (Project Officer), Ms. Maureen C. Balamiento from ASEAN Center for Energy (ACE) and staffs including the focal point from Lao PDR in the above-mentioned activities.

1. Intensive Seminar-Workshop

38 people participated in this Intensive Seminar-Workshop and Mr. Chareune Inthavy, Deputy Permanent Secretary of the "Ministry of Energy and Mines", gave a welcome address. Attachment-III-1 shows the program of this seminar workshop.

As there was problem with a language for communication, Mr. Khamso of the focal point consecutively interpreted the points of the presentation and discussion. So we considered that the participants adequately understood the content though it took a little time. At the panel-discussion after the seminar, we were questioned on the specific ways of utilizing the tools such as the "Energy Management Handbook" and "In-house Database" that will be prepared in this project. And one participant in particular from a cement company requested comments and advice to solve concrete problems at a factory. In response, we provided them with more detailed explanations or some comments and advices, which would have resulted in the fruitful and successful discussion to transfer the essence of the energy management through explanation and discussion based on these specific cases.

At Laos, we also requested the participants that their companies, including related companies, would actively participate in the PROMEEC projects and utilize each program provided by the PROMEEC (Energy Management) project.

2. Visits to concerned organizations including companies

(Request for participation in and cooperation to the activities of the PROMEEC Projects)

We visited 4 companies, "Vientiane Steel Industry Co., Ltd.", Lao Brewery Co., Ltd.", "State Enterprise for Agriculture – Industry Development IMP-EXP & General Service" and "Khounta Timber Processing Co., Ltd.". (One out of the four is a state-owned company.)

We requested these companies for their active participation in the PROMEEC projects and utilization of each program provided by the PROMEEC (Energy Management) project.

At each company, the actual decision-makers and their deputies including participants of the Intensive Seminar-Workshop held on the 14th, met with us and promised their participation

and cooperation in the activities and programs of the PROMEEC (Energy Management) project.

The details of discussion made in each organization are described hereafter.

Vientiane Steel Industry Co., Ltd. is the largest steel manufacturer in Laos. (There are 3 steel companies in the country.) As for the production size, the company purchases billet and produces bar and shaped steel at around 50 thousand tons annually. While the annual manufacturing capacity is 150 thousand tons, they failed to accurately forecast the domestic demand due to the currency crisis that occurred in the Southeast Asia in 1997 when the company was first established.

When we requested for their participation in and cooperation to the PROMEEC projects, they showed a strong interest in the PROMEEC projects and promised their participation and cooperation. They are enthusiastically tackling energy conservation activities, in particular in making efforts and creating better ideas to reduce the heating time per batch so as to reduce consumption of heavy oil, 50 liter/t of which is used at re-heating furnace. We exchanged opinions and offered some simple advice.

Lao Brewery Co., Ltd. is expanding their business backed by a solid increase in demand due to the annual 6.5% of economic growth of Laos. When we visited the factory, the construction work to build more production lines was in progress based on the plan to increase the production by 30% and the interviewees were very busy. However, they did understand and showed strong interest in PROMEEC and expressed both their intentions of participating in and cooperating with us in the future and their expectations of future advices by Japanese experts through this project. This company is one of the excellent representative companies in Lao PDR. They are actually carrying out energy conservation activities through 3 projects and have developed and used an original database. We observed the actual factory conditions when we walked through the factory and ensured the measures taken to be quite good. Moreover, the company is proceeding with studying a project under the CDM scheme with Maekawa Manufacturing Co., Ltd of a Japanese company, which may prove a high level of capabilities of their engineers possible to lead not only Lao but also ASEAN enterprises.

State Enterprise for Agriculture – Industry Development IMP-EXP && General Service is a state-owned company producing cement at 3 factories, different from the business area imagined from the name of the company. The business of the company was very steady under a strong economic growth and they have constructed the third factory and started its operation since November 2004. They said that the company would offer the two factories energy audits in early October under the PROMEEC (Major Industries) project. This company also better understood the projects and showed their strong interest in this project, intension to actively participate in and cooperate with us in the future and expectation for advices for improvement to be provided by Japanese experts.

This company actually started practicing activities to reduce consumption of electricity and coal including practices based on TQM. Although they do understand the importance and effectiveness of training for employees, however, they are struggling because it is tough and not so easy to achieve much effect due to the current level of the ability of employees being not very high. Accordingly, we felt that both the need for and expectations from tools such as the Energy Management Handbook that will be made are both high.

Khounta Timber Processing Co., Ltd. was established in 1989 and produces and exports flooring timber, furniture, and so on as major products made of four different kinds of wood that includes teak.

Because this company supplies semi-finished wood products to a Japanese manufacturer in the Shikoku region, they have established their production technology possible to pass the quality inspection by the Japanese company. The quality of products was proven because they won an award provided by EU and they showed us the certificate.

Most of the equipment in the factory is simple, which mainly consists of electrical ovens for sterilization, many saw mills, and dust collectors.

Since they didn't understand how they could participate in and contribute to the PROMEEC projects, we well explained and discussed the PROMEEC projects to deepen their understanding, to make them recognize the values of the activities and various programs under the PROMEEC (Energy Management) project. Through the discussion, it was possible to confirm their intension to participate in the award system for energy management and to utilize some tool.

We consider that this company's participation in the PROMEEC projects in the future is very meaningful because the size of this company would be typical among small - medium sized enterprises sharing the majority in ASEAN.

VISIT to ORGANIZATIONS / COMPANIES CONCERNED (Lao PDR) NO.1

Name of Organization : Vientiane Steel Industry Co., Ltd.

| NO. | Items | Details |
|-----|---------------------------------|---|
| 1 | Date | 9:20- 10:30, Fri., 15 September |
| 2 | Interviewee | Mr. Chan Thone Soukdala (Technical Manager) and others |
| 3 | Visitors (Focal Point, etc.) | Mr. Khamso Kouphokhan (Deputy Chief of EMD, Ministry of Energy and MINEs) |
| 4 | Visitors (ACE, ECCJ) | <u>ACE ;</u> Mr. Ivan Ismed, ACE Ms. Maureen Balamiento (DB & IT Specialist, ACE) <u>ECCJ ;</u> Mr. Kazuhiko Yoshida (General Manager, ECCJ) Mr. Takashi Sato (Technical Expert, ECCJ) |

Summary of Activities

First ECCJ / ACE team expressed their appreciation to Mr. Chan for his participation in the Intensive Workshop held on September 14th. We explained the purpose of the visit and then conveyed our intention to have them participate in the ASEAN award system for energy management and trial use of the In-house Database, Technical Directory, Energy Management Handbook and so on. After that, the ECCJ-ASEAN team exchanged opinions on these matters. After the explanation and discussion, Mr. Chan showed his pleasure to participate in and cooperate to the PROMEEC projects.

- (1) This factory produces steel material for construction using billets. The current unit consumption of energy is 50 liters-oil per ton, they do want to reduce this to 40 liters-oil per ton. They also want to achieve energy saving by reducing treatment time in the furnaces.
- (2) Although the production capacity of this factory is 150,000 tons a year, the actual amount produced 50,000 tons a year of half the capacity due to the weak demand and hard competition with Thailand, China and domestic manufacturers in Lao PDR. This company targets the domestic market and cannot sell more unless there is a large scale of constructions such as construction of dams.
- (3) Mr. Yoshida advised them on the possible innovation of the production system in the future and Mr. Chan much appreciated for this advice.

VISIT to ORGANIZATIONS / COMPANIES CONCERNED (Lao PDR) NO.2

Name of Organization : Lao Brewery Co., Ltd.

| NO. | Items | Details |
|-----|---------------------------------|---|
| 1 | Date | 11:00-11:50, Fri., 15 September |
| 2 | Interviewee | Mr. Sounthala KEOMISY (Chief Engineer, Lao Brewery Co.) and others |
| 3 | Visitors (Focal Point, etc.) | Mr. Khamso Kouphokhan (Deputy Chief of EMD, Ministry of Energy and MINES) |
| 4 | Visitors (ACE, ECCJ) | <u>ACE</u> ; Mr. Ivan Ismed, ACE Ms. Maureen Balamiento (DB & IT Specialist, ACE) <u>ECCJ</u> ; Mr. Kazuhiko Yoshida (General Manager, ECCJ) Mr. Takashi Sato (Technical Expert, ECCJ) |

Summary of Activities

Although the engineering division of Lao Brewery Co., Ltd. is now in full operation due to the expansion of the existing facilities and energy conservation projects, it expressed their intention to enthusiastically participate in and cooperate with the PROMEEC projects in response to the explanation given by ECCJ / ACE on the PROMEEC project.

- (1) This company is enthusiastic to implement energy conservation projects. In brief, the projects include the following.
 - 1) Project on the biogas boiler utilizing waste from the fermentation waste which will generate biogas of 4,000m³/day
 - 2) Project on the pre-heater for heating boiler water
 - 3) Project on modification of sterilization systemThese projects are the CDM projects with the introduction of equipment from Maekawa Manufacturing Co., Ltd. in Japan under cooperation with a Japanese consultant.
- (2) The expansion of the facility for beer production has been implemented because of the increase in beer demand by 30%.

VISIT to ORGANIZATIONS / COMPANIES CONCERNED (Lao PDR) NO.3**Name of Organization : State Enterprise for Agriculture-Industry Development IMP – EXP & General Service (DAI)**

| NO. | Item | Details |
|-----|---------------------------------|---|
| 1 | Date | 13:30-14:30 Fri., 15 September |
| 2 | Interviewee | Mr. Khamkhith VIPHAKONE (Chief Cabinet, DAI) Mr. Daovone SOULAPHY (Directors Assistant, DAI) Mr. Viseth INTHALANGSY (Chief of Economic & Finance, DAI) Mr. Sengthong MANIVANH (Chief of Planning, DAI) |
| 3 | Visitors (Focal Point, etc.) | Mr. Khamso Kouphokhan (Deputy Chief of EMD, Ministry of Energy and MINES) |
| 4 | Visitors (ACE, ECCJ) | <u>ACE</u> ; Mr. Ivan Ismed, ACE Ms. Maureen Balamiento (DB & IT Specialist, ACE) <u>ECCJ</u> ; Mr. Kazuhiko Yoshida (General Manager, ECCJ) Mr. Takashi Sato (Technical Expert, ECCJ) |

Summary of Activities

First ECCJ / ACE team explained the purpose of the visit and outlined the PROMEEC projects. The team also expressed their appreciation to Mr. Khamkhith VIPHAKONE for his participation in the Intensive Seminar-Workshop held on September 14th.

This company is a state-owned enterprise of which major business is to produce cement though the name of the company provides us with a different imagination of the business area. Their factories were subjected to the energy audit for the cement industry in October 2006 under the PROMEEC (Major Industries) project in Lao PDR. A top manager replied that he was looking forward to seeing us again at that time. He expressed his intention to enthusiastically support and participate in the PROMEEC projects.

- (1) This company is a state-owned enterprise with 1,320 employees. Besides cement, it also produces and sells construction materials such as blocks and roofing, and wooden products. It has three cement producing factories, and the second factory was designed and constructed by the Tianjin cement technology company of China.
- (2) In the #2 factory, TQM has been practiced since the end of 2002. At present, they are implementing activities step by step approach.
- (3) In Lao PDR, TQM has been practiced in factories of Lao Cotton and Lao Brewery in addition to this company.

VISIT to ORGANIZATIONS / COMPANIES CONCERNED (Lao PDR) NO.4**Name of Organization : Khounta Timber Processing Co., Ltd.**

| NO. | Item | Details |
|-----|---------------------------------|--|
| 1 | Date | 15:00-16:40, Fri., 15 September |
| 2 | Interviewee | Mr. Bounthavy LUANG-AMATH (Director General, Khounta Timber Processing Co., Ltd.) Mr. Sounthone PHENGSY (Deputy Director, Khounta Timber Processing Co., Ltd.) Mr. Boun Pheng (Manager, Khounta Timber Processing Co., Ltd.) |
| 3 | Visitors (Focal Point, etc.) | Mr. Khamso Kouphokhan (Deputy Chief of EMD, Ministry of Energy and MINES) |
| 4 | Visitors (ACE, ECCJ) | <u>ACE</u> ; Mr. Ivan Ismed, ACE Ms. Maureen Balamiento (DB & IT Specialist, ACE) <u>ECCJ</u> ; Mr. Kazuhiko Yoshida (General Manager, ECCJ) Mr. Takashi Sato (Technical Expert, ECCJ) |

Summary of Activities

First the ECCJ / ACE team expressed appreciation to Mr. Phengsy for his participation in the Intensive Seminar-Workshop held on September 14th and explained the purpose of the visit and outlined the PROMEEC projects.

This company is categorized to the Small- and Mid-size Enterprise (SME) and owns 280 employees. In response to the question whether or not SMEs could participate in the PROMEEC projects and the programs such as the award system for energy management, the ECCJ-ACE team rather requested them for their active participation because the actual participation by some SMEs will encourage other similar size of companies and successful cases by these companies will also contribute to information sharing between SMEs in ASEAN. We further conveyed our intention to have them actively disseminate their successful example to other SMEs in ASEAN. After discussion, we then toured the plant.

- (1) The company was privatized in 1989. 60% of its capital is Thai. The products are wood flooring materials, door materials, and furniture made of Chinese quince or rose wood, and many of its products are exported to Japan. And because of that, they emphasized enhanced quality control. This year it won a Quality Commitment Award.
- (2) They explained their experience of energy conservation since 6 years ago. Then, they held a meeting where all the employees participated in and discussed how to implement EE&C. As a result of activities based on the results of discussion, they did succeed in reducing energy consumption.

III-2-3 Vietnam

(ECCJ Expert)

Kazuhiko Yoshida (General Manager, International Engineering Department)

Takashi Sato (Technical Expert, International Engineering Department)

(Actual Schedule)

| Date | | Activity |
|--------------------|------|--|
| 17 September, 2006 | Sun. | Travel to Viet Nam from Laos Lv. Vientiane (Laos) Ar. Hanoi (Viet Nam) |
| 18 September, 2006 | Mon. | Implementation of Intensive Seminar-Workshop |
| 19 September, 2006 | Tue. | Visits to 4 organizations (HUT, IE and 2 companies (textile and rubber manufacturing)) (Field survey / Information exchange and advice on energy management / Request for participation in PROMEEC) |
| 20 September, 2006 | Wed. | Meeting of the 1 st Board of Judges (BOJ(EM)) for the ASEAN Award System of Best Practices in Energy Management ; Part I |
| 21 September, 2006 | Thu | Meeting of the 1 st Board of Judges (BOJ(EM)) for the ASEAN Award System of Best Practices in Energy Management ; Part 2 Travel to Tokyo from Hanoi, Viet Nam |
| 22 September, 2006 | Fri. | Ar. Tokyo |

Mr. Christopher Zamora (Manager), Mr. Juanito M, Ms. Maureen C. Balamiento from ASEAN Center for Energy (ACE) and staffs including the focal point from Vietnam participated in the above mentioned activities.

1 . Intensive Seminar-Workshop

30 people participated in the Intensive Seminar-Workshop. Mr. Chu Duc Khai, Deputy General Director of the "Dept. of Science and Technology", gave the welcome address as a representative from Ministry of Industry on behalf of Mr. Hiep, the Director General.

Mr. Vu Van Thai, who is the leader of SOE in Vietnam and the Deputy General Director of the International Cooperation Dept., also attended the first half of the seminar-workshop.

We sincerely felt how Vietnam recognizes the importance of both the PROMEEC projects and the bilateral cooperation with Japan because these high level government officers did attend the activities of the PROMEEC while pressed for time because they also had to deal with a Russian governmental energy related mission of more than 50 people on the same day.

Attachment-III-1 shows the program of this seminar workshop.

We here again think that the participants could clearly understand the presentation and discussion because they arranged an interpreter taking into consideration the language problem for communication. In the panel-discussion held after the seminar, inquiries and comments were made about each of the tools that will be developed in the PROMEEC (Energy Management) project such as the Energy Management Handbook and the In-house Database, or the utilization of the existing implementation institutions. Accordingly, the Intensive Seminar-Workshop was very successful and fruitful.

MOI in particular actually outlined a policy of disseminating the Energy Management Handbook, Technical Directory and so on domestically through their political activities, which was delightful to us and we felt that Vietnam has become a strong promoter of the PROMEEC activities.

Other participants expressly came from such distant places as Ho Chi Minh City and evaluated that the activities and programs including the award system for energy management under the PROMEEC (Energy Management) project would be very useful. Based on these facts, we believe that we could obtain many future cooperators through this kind of activities.

2. Visits to concerned organizations including companies

(Request for participation in and cooperation to the activities of the PROMEEC Projects)

The ECCJ-ASEAN team visited 4 companies and institutions, namely the "Hanoi Textile Company", "Hanoi University of Technology", "Institute of Energy" and "Sao Vang Rubber Company", and requested their active participation in the activities of the PROMEEC projects and each program under the PROMEEC (Energy Management) project.

At each company, as well as in Lao PDR, we met the actual decision-makers and their assistants, and they promised their enthusiastic participation in and cooperation to the activities and program of the PROMEEC (Energy Management) project in the future.

The details of discussion made in each organization are described hereafter.

At the "Hanoi Textile Company", we met a Deputy Director and some people who had attended the Seminar-Workshop on the 18th. They say that this company is one of the top three among about 70 textile-related state-owned enterprises in Vietnam and is also an international company who imports cotton and chemical fibers from India and Thailand, dye from Indonesia, processes yarn, textiles and clothing and sewing, and then exports these products to Japan, the U.S and the EU. This company has already introduced their suggestion system by the all employees not limited to energy conservation but to the others. Energy conservation is an important theme to them so they have already implemented various activities. They consider energy conservation to be obligatory, and they expressed their intention to participate in the PROMEEC activities including the award system for energy management, and required concrete information to be offered.

At the "Hanoi University of Technology", Dr. Luong, the Vice Director at the Institute of Heat Engineering and Refrigeration (IHER), and several staffs including a professor, associate professors and graduate students met with us, and we held a very enthusiastic discussion. Through this discussion they realized that they would be able to utilize the activities and program of the PROMEEC (Energy Management) project in relation to R&D and education / training activities that they currently have implemented. Some of their activities are implemented for the projects funded by GEF (Global Environmental Facility). And they promised that they will recommend not only the IHER members but their trainees or students to utilize the tools and programs such as the Energy Management Handbook under development by PROMEEC (Energy Management) project. At the same time, they mentioned that they were strongly interested in ECCJ activities, and enthusiastically expressed their hope for future cooperation with ECCJ.

At the "Institute of Energy (IE)", Dr. Lien, a chief of International Cooperation and his staffs met with us. They are constantly checking the ACE website and have already seen the Technical Directory etc. In particular they were enthusiastic about utilizing tools such as the Energy Management Handbook, and simultaneously showed interest in participating in implementing training for concerned foreigners and dispatching lecturers as enforcers of it. As they showed their intention to participate as a service provider for training through a new search system for service providers and customers through the ACE website, we requested them to provide information of IE that can be uploaded to the ACE web. They readily accepted the proposal. IE has also already started various new projects such as projects funded by ADB and the master plan development assigned by JICA.

"Sao Vang Rubber Company" is a semi-state-owned company that produces rubber products such as tires for automobiles. Here, the vice Director and 3 managers met with us and we

were allowed to make a walk-through survey at the factory. This company, like many other companies, also considers energy conservation to be important, and they explained that they are operating an Energy Management System developed by them. And they displayed their intention to participate in the activities and program of PROMEEC (Energy Management) project. Although we experienced a problem with language for communication, this is also a part of reality in ASEAN to be considered in implementing the projects.

3. The 1st BOJ Meeting for the ASEAN Award System of Best Practices in Energy Management for Industries and Buildings

Consecutively, BOJ (Board of Judges) meeting of the captioned activities were held in Hanoi on September 20th and the 21st. The number of the BOJ members is limited to one per country in principle. The BOJ members gathered from eight countries except Singapore that has none nominated yet and Malaysia that suddenly changed its member. These BOJ members lead the actual activities of the “ASEAN Award System of Best Practices in Energy Management for Industries and buildings” (herein after referred to as “Award System for E.M.”), though the ECCJ experts are advisers to offer comments and advice.

Mr. Vu Van Thai from MOI, the SOE leader, gave the welcoming address and kicked off the meeting. Then, the BOJ members selected Mr. John A. W. Turangan, Chairman of the Indonesian Building Association, as the first chairperson and Ms. Amarporn Achavangkool from DEDE in Thailand as the first vice chairperson for a period of 2 years.

The major purpose of the BOJ meeting was to discuss and agree upon the plan of the “Award System for E.M.”, to announce the actual start of the “Award System for E.M.” and to call the first application. This time, these purposes were achieved and all the preparations were completed except the processes for approval to start the first application and various works by the coordinator (ACE).

The detailed agenda is shown hereunder.



1st BOJ (Energy Management) Meeting
ASEAN Award System of Best Practices in Energy Management
for Industries & Buildings
PROMEEC(ENERGY MANAGEMENT) UNDER THE SOME-METI WORK PROGRAMME
2006-2007

Day 1 (September 20th)

| | |
|----------------------|--|
| 08:00 – 08:30 | Registration |
| 08:30 – 08:40 | Welcome Remarks by the Host Country |
| 08:40 – 08:50 | Opening Statement by The Energy Conservation Center, Japan (ECCJ) |
| 08:50 – 09:00 | Opening Statement by ASEAN Centre for Energy (ACE) |
| 09:00 – 09:30 | Self Introduction of Members |
| 09:30 - 09:40 | COFFEE BREAK & GROUP PHOTO SESSION |
| 09:40 – 10:40 | Session 1 : Presentation Outline of PROMEEC / Award System of Best Practices in Energy Management |
| 09:40 – 10:10 | Presentation by ACE Status and Outline of PROMEEC Projects under ASEAN Plan of Action for Energy Cooperation |
| 10:10 – 10:30 | Presentation by ECCJ Actual Results and Plan of PROMEEC (Energy Management) Project |
| 10:30 – 10:50 | Presentation by ECCJ Outline of Award Systems in Japan |
| 10:50 – 11:20 | Presentation by ECCJ Plan of ASEAN Award System of Best Practices in Energy Management for Major Industries and Buildings |
| 11:20 – 11:50 | Presentation by BOJ Member / ACE Application Form Prepared in “Research Forum in Japan” |
| 11:50 – 13:00 | Lunch |
| 13:00 – 16:30 | Session 2 : Discussion ASEAN Award System of Best Practices in Energy Management System |
| 13:00 – 13:30 | Discussion : Basic Plan and Schedule |
| 13:30 – 14:30 | Discussion : Detail of Application Form |
| 14:30 – 14:50 | Explanation by ECCJ : Proposed Evaluation Items and Criteria |
| 14:50 – 15:10 | COFFEE BREAK |
| 15:10 – 16:10 | Discussion : Evaluation Items and Criteria |
| 16:10 – 16:30 | Discussion : Role of BOJ (EM) Members / Focal Points / ACE in Implementation |
| 16:30 – 17:00 | Discussion : Plan and Preparation for 2 nd “Research Forum in Japan” |
| 17:00 – 17:30 | Session 3 : Confirmation of Results of Discussion and Approval |
| | COMPLETION of Day 1 Sessions |

Day 2 (September 21st)

| | |
|----------------------|--|
| 08:30 – 09:00 | Registration |
| 09:00 – 12:00 | Workshop Preparation for Calling 1st Application |
| 09:00 – 09:30 | Finalization of Document : Basic Plan including Schedule |
| 09:30 – 10:30 | Finalization of Document : Application Form |
| 10:30 – 10:50 | COFFEE BREAK |
| 10:30 – 11:30 | Finalization of Document : Evaluation Items and Criteria |
| 11:30 – 12:00 | Preparation of Document : Letter of Announcement |
| 12:30 – 13:30 | Lunch |

(Name of ASEAN participants)

Mr. Vu Van Thai, Deputy General Director, International Cooperation Dept., MOI, Vietnam

Dr. Tan Kha Sheng, Associate Professor, Universiti Brunei Darussalam

Mr. Lien Vuthy, Head of Energy Efficiency and Standard Office, MINE, Cambodia

Dr. John A.W. Turangan, Chairman, The Indonesian Building Physics & Building Utility Experts Association

Mr. Khamso Khouphokham, Chief, Electricity Management Div., Ministry of Energy & Mines, Lao PDR

Mr. U Win Khaig, General Secretary, Myanmar Engineering Society

Mr. Artemio Habitan, Section Chief, Technology Promotion & Assessment, DOE, Philippines

Ms. Amarporn Achavangkool, Chief, Technical & Efficiency Promotion, DEDE, MOE, Thailand

Mr. Dang Hai Dung, Electrical Engineer, Science and Technology Dept, MOI, Vietnam

Mr. Christopher Zamora, Manager, ACE

Ms. Maureen C. Balamiento, Database and IT Specialist, ACE

Mr. Juanito M., IT Staff, ACE

(Details of discussion and results)

For some committee members this was the first experience as a BOJ member. Therefore, at first, the plan and activities of the PROMEEC (Energy Management) project and the proposed basic plan of the "Award System for E.M." were explained by ECCJ and ACE, and next the details of the plan was discussed and confirmed by the BOJ (EM) members. As a result, the revised plan based on the discussion was agreed upon by the BOJ (EM) members.

The point of the discussion was to provide ideas and comments from each BOJ member's point of view on the detail of the basic plan especially evaluation items, and to suggest the details of the application form which should be a guideline for applicants to prepare the application document. They enthusiastically discussed these points. In addition, the BOJ (EM) members confirmed the schedule to actually implement the 1st application.

The discussion was based on the basic plan proposed by ECCJ, and the BOJ (EM) members revised some points from their viewpoints. The major points of decisions are as follows and some modified points are based on an ASEAN way of doing.

(1) Evaluation items

The item of "Presentation" was added. This means "Ordering information", "visibility" and "understandability" of the submitted application document.

The following are the finalized items and score distribution for evaluation.

- ◆ Impact : 30% (energy conservation, economic practicality, environmental protection, etc.)
- ◆ Sustainability : 25% (degree of employee participation and involvement, management policy, voluntary level, organization, training, etc.)
- ◆ Replicability : 25% (cost, technology, practicability, applicability, etc.)
- ◆ Other Factors : 15% (innovation / freshness, creativity, impression forming, etc.)
- ◆ Presentation : 5%

Taking the above into consideration the number of pages of the application form is to be around 17 including some attachments.

(2) Schedule

Application period is to be from October 2006 to April 2007 after completing the approval by the focal points and SOE leaders by circulating the plan and the first winners will be selected in May 2007. (The BOJ (EM) members judged it to be tough to close the application in December 2006.)

By the end of the application period each country may hold a competition and submit the

selected cases to ACE. The award will be done by the ceremony at the AMEM that will be held in Singapore in July 2007. And therefore, the schedule is similar to the building award.

Moreover, the "Research Forum in Japan" which will be held in mid December 2006 aims at formulating a method and guideline of evaluation, and the BOJ (EM) members were requested to prepare documents made by ECCJ which is required for invitation to Japan such as visas.

(3) Number of awardees

Each country can send up to 4 cases (two for industrial sector, two for building sector) to the ASEAN competition. In the ASEAN competition, one case as the winner and two cases as runner-ups will be selected from each sector hence two winners and four runner-ups in total, and then these will be awarded at the AMEM conference in July 2007.

(4) Confirmation of the role of BOJ (EM) members, Focal Points and ACE

The meeting confirmed in particular that in each individual country the BOJ (EM) member and the Focal Point will mutually cooperate with each other and promote and encourage stakeholders to apply the "Award System for E.M."

VISIT to ORGANIZATIONS / COMPANIES CONCERNED (Vietnam) NO.1

Name of Organization : Hanoi Textile & Garment Co. (HANOSIMEX).

| NO. | Item | Details |
|-----|---------------------------------|--|
| 1 | Date | 8:30-9:30, Tue., 19 September |
| 2 | Interviewee | Mr. Ho Le Hung (Deputy General Director, HANOSIMEX) Mr. Vn Duc Thien (Technical Dept. HANOSIMEX) |
| 3 | Visitors (Focal Point, etc.) | Mr. Nguyen Anh Dung (MOI) |
| 4 | Visitors (ACE, ECCJ) | <u>ACE</u> ; Mr. Christopher Zamora (ASEAN Co-Director, ACE) Mr. Juanito M (Manager Computer Centre & IT, ACE) Ms. Maureen Balamiento (DB & IT Specialist, ACE) <u>ECCJ</u> ; Mr. Kazuhiko Yoshida (General Manager, ECCJ) Mr. Takashi Sato (Technical Expert, ECCJ) |

Summary of Activities

First the ECCJ / ACE team expressed appreciation to Mr. Ho Le Hung for his participation in the Intensive seminar-Workshop on September 14th, and then the team explained the purpose of the visit and expressed expectation that they will participate in the ASEAN EM Award and trial use the Database, Technical Directory and Energy Management Handbook. After that, all members exchanged opinions on these points. After discussion, Mr. Ho stated that he would be more than happy to participate in and cooperate to the PROMEEC projects.

- (1) They also recognize the importance of energy management amidst fierce competitions, and consider that it can make a direct contribution to improve their business.
- (2) This company is a state-owned enterprise of which 50% of stock is owned by the government. There are many other companies similar to them in Vietnam. Its main products are goods made of cotton and they import raw materials from India, Mexico and Africa. On the other hand, they export products to the U.S., Japan and Europe.
- (3) Regarding activities for energy conservation, they are implementing a project to utilize condensate from the steam system. Moreover, they have a system to collect opinions and suggestions from employees.

VISIT to ORGANIZATIONS / COMPANIES CONCERNED (Vietnam) NO.2

Name of Organization : Hanoi University of Technology (HUT)

| NO. | Item | Details |
|-----|---------------------------------|---|
| 1 | Date | 10:20-12:00, Tue., 19 September |
| 2 | Interviewee | Professor , Dr. Pham Hoang Luang (Vice Director, Institute of Heat Engineering and Refrigeration, HUT) Prof. Dr. Sc Nguyen Si Mao (Heat Thermal Energy Tech. Dept. HUT) Prof. Dr. Dinh Nguyen Binh (Head of Department, Thermal Energy Equipment Dept) Other Instructors and students: 6 |
| 3 | Visitors (Focal Point, etc.) | Mr. Nguyen Anh Dung (MOI) |
| 4 | Visitors (ACE, ECCJ) | <u>ACE</u> : Mr. Christopher Zamora (ASEAN Co-Director, ACE) Mr. Juanito M (Manager Computer Centre & IT, ACE) Ms. Maureen Balamiento (DB & IT Specialist, ACE) <u>ECCJ</u> : Mr. Kazuhiko Yoshida (General Manager, ECCJ) Mr. Takashi Sato (Technical Expert, ECCJ) |

Summary of Activities

First the ECCJ / ACE team explained the purpose of visit, the activities of the PROMEEC projects and expressed expectation that they will participate in the activities and programs of the PROMEEC (Energy Management) project. After that, mutual introductions of ECCJ / ACE and HUT were made to each other to deepen mutual understanding.

This institution adopted a self-supporting accounting system that operates with revenue of US\$1.8 million. It has 64 staff -- 4 professors, 9 assistant professors, 20 people who have doctor's degree, and other technicians etc.

Currently their educational / training courses include programs to teach methodology to conduct energy audits by utilizing new devices and procedures for capacity building.

IHER has a possibility to participate in the program to provide educational course and training course for ASEAN stakeholders as an implementing organization. The ECCJ-ACE team discussed this possibility with them.

ACE / ECCJ team proposed to establish a network of universities for education and training in ASEAN, and asked for their cooperation to the PROMEEC (Energy Management) project in the future. So that they agreed to keep in touch to study and develop this scheme.

VISIT to ORGANIZATIONS / COMPANIES CONCERNED (Vietnam) NO.3

Name of Organization : Institute of Energy(IE), Electricity of Vietnam

| NO. | Item | Details |
|-----|---------------------------------|--|
| 1 | Date | 13:45-14:40, Tue., 19 September |
| 2 | Interviewee | Mr. Tran Manh Hung (Head of Economic, Demand Forecast and Demand Side Management Dept, IE) Dr. Tran Thanh Lien (Chief of International Cooperation Dept, IE) |
| 3 | Visitors (Focal Point, etc.) | Mr. Nguyen Anh Dung (MOI) |
| 4 | Visitors (ACE, ECCJ) | <u>ACE</u> ; Mr. Christopher Zamora (ASEAN Co-Director, ACE) Mr. Juanito M (Manager Computer Centre & IT, ACE) Ms. Maureen Balamiento (DB & IT Specialist, ACE) <u>ECCJ</u> ; Mr. Kazuhiko Yoshida (General Manager, ECCJ) Mr. Takashi Sato (Technical Expert, ECCJ) |

Summary of Activities

As we had visited IE last fall and explained the activities of the PROMEEC projects, they already realized the purpose of our visit this time.

IE is now currently making progress in the following projects;

- PREGA (ADB)
- National Focal Point of GVEP (Global Village Energy Program)
- DSM (conveying the importance of Energy Audits to clients)

They are planning to conduct a National Energy Master Plan over 2 years from now, using consultants from Japan or assistance from JICA. They have already finished a Master plan of Electricity. According to this plan, they consider that the electric power supply will not be able to meet the expected demand hence they need to enhancing promotion of energy conservation and development of renewable energy.

We confirmed to keep in touch to cooperate in the future.

VISIT to ORGANIZATIONS / COMPANIES CONCERNED (Vietnam) NO.4

Name of Organization : Saovang Rubber Joint-Stock Co. (SRC)

| NO. | Item | Details |
|-----|---------------------------------|--|
| 1 | Date | 15:00-16:20, Tue., 19 September |
| 2 | Interviewee | Mr. Le Van Cuong (Vice Director, SRC) Mr. Tran Ky Vu (Manager of Mechanical Energy Technic, SRC) Mr. Dao Ngoctu An (Deputy Manager Mechanical Energy Technic, SRC) Mr. Trieu Vinh Thong (Manager Energy Workshop, SRC) |
| 3 | Visitors (Focal Point, etc.) | Mr. Nguyen Anh Dung (MOI) |
| 4 | Visitors (ACE, ECCJ) | <u>ACE</u> : Mr. Christopher Zamora (ASEAN Co-Director, ACE) Mr. Juanito M (Manager Computer Centre & IT, ACE) Ms. Maureen Balamiento (DB & IT Specialist, ACE) <u>ECCJ</u> : Mr. Kazuhiko Yoshida (General Manager, ECCJ) Mr. Takashi Sato (Technical Expert, ECCJ) |

Summary of Activities

At first, the ECCJ / ACE team explained the purpose of the visit and outlined the activities of the PROMEEC projects. This company is a semi-state-owned enterprise that produces rubber products such as tires for automobiles.

According to them, the recent surge in energy prices has had a great impact on this company's business. Accordingly, reducing energy costs is indispensable in further strengthening their competitive edge. After exchanging information, they took us to walk through the factory.

In the factory, they produce the rubber products using the processes from vulcanizing natural rubber to molding. The equipment was imported mainly from China because of expensive price of Japanese one.

Finally we requested their future cooperation. In response, they expressed intention to participate in the activities and program of the PROMEEC (Energy Management) project.

We experienced a difficulty in communicating each other because of language problem. However, we should recognize that this kind of difficulty is well observed in the ASEAN countries and should establish measures to solve in order to smoothly implement activities of the PROMEEC projects. This is one of important findings in Vietnam.

III-2-4 Malaysia

(ECCJ Expert)

Kazuhiko Yoshida (General Manager, International Engineering Department)

(Actual Schedule)

| Date | | Activity |
|-------------------|------|---|
| 19 November, 2006 | Sun. | Lv. Tokyo Ar. Kuala Lumpur (Malaysia) |
| 20 November, 2006 | Mon. | Implementation of Intensive Workshop |
| 21 November, 2006 | Tue. | Visits to 2 private companies (Building management and glass manufacturing) (Field survey / Information exchange and advice on energy management / Request for participation in PROMEEC) |
| 22 November, 2006 | Wed. | Travel to Philippines from Malaysia Lv. Kuala Lumpur (Malaysia) Ar. Manila (Philippines) |

Ms. Maureen C. Balamiento and Ms. Cindy Rianti from the ASEAN Center for Energy (ACE) and staffs including the focal point from Malaysia participated in the above mentioned activities.

1. Intensive Seminar-Workshop

There were 46 participants at this Seminar-Workshop, and the Chief Executive Officer of "PTM (Malaysia Energy Center)" Dr. Anuar Abd Rahman gave a welcoming address that included a keynote.

Attachment-III-1 shows the program of this seminar workshop.

The participants came from the government, the governmental institutions such as the Energy Commission, private companies and universities. In the Seminar-Workshop, a presentation on the policy and measures for energy conservation was made the Malaysian government, and the participants have actively discussed including many questions and answers concerning the activities of the PROMEEC projects and the Malaysian policies for energy conservation.

Regarding the "ASEAN Award System of Best Practices in Energy Management for Industries and Buildings", as the "ASEAN Award System for Buildings" had already started and was well known by those concerned, we received questions and comments concerning the relationship with the ASEAN Award System of Best Practices in Energy Management, so further explanations were made for the sake of even better clarity. As a result, the merits and features of the Award System of Best Practices in Energy Management were plainly well understood. Some participating companies have highly evaluated the Award System for Energy Management and questioned details such as how to concretely fill in the application form.

Based on discussions made, the ECCJ-ACE team felt the necessity to further discuss the detailed guideline in relation to filling in the application form with the BOJ (EM) members at the "Research Forum in Japan" that will be held in December. In addition, as for the various tools for energy management, it could also be judged that the Seminar-Workshop raised the interest of participants, based on the fact that they questioned the details as to when and how they would be able to actually get and use each tool such as the energy management handbook. It should be specially noted that the time spent for the Seminar-Workshop became overwhelmingly long because of questions and comments by almost all of the participants including discussion and consultation with some participants after closing the Seminar-Workshop.

At the end of the seminar session, we asked those concerned participating institutions and

companies to enthusiastically participate in the PROMEEC projects and the programs in the PROMEEC (Energy Management) project.

Ms. Norhasliza from Ptm, who was a Malaysian Focal Point, commented that in many companies the top managers didn't particularly place high priority on saving energy because energy prices are still cheap. However, many participants were concerned about the future conditions of energy and the environment and increasing risk damaging these. As there were occasions to exchange opinions and discuss for Malaysian participants, we thought that this event was particularly beneficial to the participants.

2. Visits to concerned organizations including companies

(Request for participation in and cooperation to the activities of the PROMEEC Projects)

The ECCJ-ACE team including Ms. Norhasliza and Mr. Phubalun from Ptm visited two companies, namely "Raikon Building Management Co." which is a building management company operating some large buildings in the central area of Kuala Lumpur and "JG Containers (Malaysia) Sdn. Bhd" which is a glass container maker. The team requested these companies their enthusiastic participation in the activities of the PROMEEC projects and the programs in the PROMEEC (Energy Management) project.

At each company, the actual decision makers and their assistants including participants at the Intensive Seminar-Workshop held on the 20th met with us and promised their enthusiastic participation in and cooperation to the activities and programs under the PROMEEC (Energy Management) project. Each company allowed us to visit the fields of the building managed by Raikon Building Management Co. or major factory line of JG Containers (Malaysia) and we confirmed some fine measures taken in for energy conservation, as described later.

They also expressed their intention especially to apply for the ASEAN Award System of Best Practices in Energy Management, and we again replied to concrete questions concerning the application form.

The details of discussion made in each organization are described hereafter.

"Raikon Building Management Co." is a building management company that manages buildings in the central area of Kuala Lumpur including the Hong Leong Bank, where the ECCJ-ACE team met seven people or executives, managers and engineers who were in charge of the operation and maintenance of each building.

The company itself is new and was established in 2005. The company has already introduced equipment, and implemented improvements for energy conservation. The president calls meetings on a regular basis with the person responsible for each building, and they exchange information and opinions on possible improvements. They are enthusiastic about practical actions that Japanese companies take. The most prioritized theme of the company is how to strengthen capacity of employees by enhancing training and education like Japanese companies.

They questioned Ptm whether it could conduct training on the fundamentals of energy conservation and management, and Mr. Yoshida did give him some advice on that. Then, ECCJ-ACE toured the Hong Leong Bank building and gave possible advice, and exchanged opinions on the power receiving / distribution system and data management of the BAS (Building Automation System). Moreover, they including executives questioned on how to apply to the Award System for Energy Management. In addition, they showed a strong interest and expectations in particular for the Energy Management Handbook.

At the same time, since we understood that there are some improvement case examples possible to apply to the award systems for building and for energy management, we recommended them to apply for these cases without hesitation. They promptly began to discuss it with Ptm staffs.

"JG Containers (Malaysia) Sdn. Bhd" is an Indian company that constructed the factory in

Malaysia and has been running it since 1972. They produce glass containers using 30 - 40% cullet. The technology manager and his two assistants met with us. Ptm selected this factory as a model factory for MIEEIP. They not only have made various improvements since introducing a new type of glass melting furnace supplied by Japanese Asahi Glass Co.,Ltd, in 2002, but also are developing some future plans for improvement programs. The introduced furnace in particular improved production by 50% (80t/d to 120t/d) with the same energy consumption hence doubled energy efficiency and is an excellent example of improvement. They said that they could conduct energy audits by themselves. The slogan of “5S” was written in both Japanese and Malay and is hanged in the meeting room, which may prove that the company has a basis of a Japanese-style activity including TPM. This company was also considering applying for the ASEAN Award System of Best Practices in Energy Management and we received detailed questions on preparing the application form.

We were permitted to make a short visit of the factory and found some room for improvement. We gave them some advice on possibilities for reducing energy consumption, based on the experience of Mr. Yoshida, namely an improvement in air-cooling to prevent refractory of the melting furnace from erosion and a design modification for reducing radiation losses from the bottom refractory. They said that they heard this kind of technological concept for the first time. Hence as an example that ideas from a fresh point of view can be created by knowing excellent cases in other sectors collected through the Award System for Energy Management, they all, including participants from Ptm, could specifically understand the possibility and benefits of this system.

VISIT to ORGANIZATIONS / COMPANIES CONCERNED (Malaysia) NO.1

Name of Organization : Raikon Building Management Co.

| Items | | Details |
|-------|--|--|
| 1 | Date | 10:00 -2:30, Tue., 21 November |
| 2 | Interviewee | Mr. Selvem Sivagnanam (Executive), Mr. Balaprakash E. Tharrumah (Manager, Aesthetics & Physical Maintenance) , Mr. Sankar Kuppusamy (Assistant Manager, Technical Maintenance) , Mr. Andrew Dass (Building Manager, YAP Burgess Rawson International), Three other Technicians |
| 3 | Visitors (ECCJ) | Mr. Kazuhiko Yoshida (General Manager) |
| 4 | Visitors (ACE, Focal Point) | <u>ACE</u> ; Ms. Maureen Balamiento (Database & IT Specialist) , Ms. Cindy Rianti (Senior Information Officer) , <u>Focal Point (Ptm)</u> ; Ms. Norhasliza Mohd. Mokhtar, Mr. K. Phubalan, Mr. M. N. Embong, One other person |
| 5 | Brief Profile of Company or Organization | Establishment : 2005 Business : Management of operation / maintenance of buildings Employees : 33 Address : Kuala Lumpur (both Headquarters and 6 branches) |

Mr. Balaprakash E. Tharrumah participated in the Intensive Seminar-Workshop on the 20th.

Summary of Activities

First the ECCJ / ACE team explained the purpose of the visit and outlined the activities of the PROMEEC projects including the programs of the PROMEEC (Energy Management). At the same time, we asked for their future participation in the activities of the PROMEEC projects, in particular their enthusiastic participation in the ASEAN Award System of Best Practices in Energy Management and to cooperate to PROMEEC (Energy Management) project through utilization of each of the tools under development and provision of comments on possible improvements.

Following that, Mr. Sivagnanam, the Executive (Technology), explained to us the company profile, its recent activities and further improvements including achievements that they had implemented in relation to energy conservation. They have already introduced equipment and implemented improvements for energy conservation. The president calls meetings on a regular basis with the person responsible for each building, and they exchange information and opinions on possible improvements. At the meeting, the policies of the president are also conveyed. They are enthusiastic to practice various actions in a similar way to that by Japanese companies.

A big theme for the top management was on how to develop the capacity of employees through training and education like Japanese companies. They questioned Ptm staffs on whether it could conduct basic training for the fundamentals of energy conservation and management methods, at the same time, Mr. Yoshida gave him some advices.

After discussion, the ECCJ-ACE team toured the Hong Leong Bank building and gave advice and exchanged opinions on the electric power receiving system and data management of the BAS (Building Automation System).

Finally, we were questioned on how to apply to the Award System for Energy Management) by those concerned including the executives. In addition, they showed a strong interest and expectations in particular with regard to the Energy Management Handbook.

At the same time, because we found that there are some improvement cases which could apply for the building award system as well that of energy management, we recommended them to apply for these cases without hesitation. They promptly began to discuss it with the Ptm staffs.

VISIT to ORGANIZATIONS / COMPANIES CONCERNED (Malaysia) NO.2

Name of Organization : JG Containers (Malaysia) Sdn. Bhd

| Item | | Details |
|------|--|---|
| 1 | Date | 14:30 - 17:00, Tue., 21 November |
| 2 | Interviewee | Mr. Ashok Rao M (Technical Head) Mr. M. S. Sivaneswaran (Deputy Technical Manager) |
| 3 | Visitors (ECCJ) | Kazuhiko Yoshida (General Manager) |
| 4 | Visitors (ACE, Focal Point) | <u>ACE :</u> Ms. Maureen Balamiento (Database & IT Specialist) Ms. Cindy Rianti (Senior Information Officer) <u>Focal Point (Ptm) :</u> Ms. Norhasliza Mohd. Mokhtar, Mr. K. Phubalan, Mr. M. N. Embong One other person |
| 5 | Brief Profile of Company or Organization | Establishment : 1972 (as a Malaysia-based affiliate of the Indian company) Business : Manufacturing glass container used for beverages and chemicals. (Product capacity is 4,800t/year.) Employees : 240 Address : Selangor Darul Ehsan. (The HQ is in New Delhi, India.) |

Mr. M. S. Sivaneswaran participated in the Intensive Seminar-Workshop on the 20th.

Summary of Activities

First the ECCJ / ACE team explained the purpose of the visit and outlined the PROMEEC projects. The team requested their future participation in the activities and program of the PROMEEC projects, in particular their enthusiastic participation in the ASEAN Award System of Best Practices in Energy Management, and to cooperate to PROMEEC (Energy Management) project through utilization of the tools under development and provision of comments on possible improvements.

The company is an Indian company that constructed this factory in Malaysia and has been running it since 1972 and produces glass containers using 30 - 40% cullet. Mr. Ashok, a Technical Head, and his two assistants met with us.

Ptm selected this factory as a model for MIEEIP. They not only have made various improvements since introducing a new type of glass melting furnace supplied by Japanese Asahi Glass Co.,Ltd, in 2002, but also are developing some future plans for improvement programs. The introduced furnace in particular improved production by 50% (80t/d to 120t/d) with the same energy consumption hence doubled energy efficiency and is an excellent example of improvement. As a result, according to them, they could increase exports and expand their business. They are still making improvements based on their analyses that production could be increased further by 10% by the current facilities. They said that they could conduct energy audits by themselves.

By the way, they displayed the slogan of "5S" written in both Japanese and Malay in the meeting room, which may prove that the company has a basis of a Japanese-style activity including TPM. This company was also considering applying for the ASEAN Award System of Best Practices in Energy Management and we received detailed questions on preparing the application form.

The ECCJ-ACE team was permitted to make a short visit of the factory and found some room for improvement. The factory line consists of simple processes as follows.

- (1) Blending of purchased cullet
- (2) Melting and forming
- (3) Cooling and annealing
- (4) Inspection and packing

We gave them some advice on possibilities for reducing energy consumption, based on the experience of Mr. Yoshida, namely an improvement in air-cooling to prevent refractory of the melting furnace from erosion and a design modification for reducing radiation losses from the bottom refractory. They said that they heard this kind of technological concept for the first time. Hence as an example that ideas from a fresh point of view can be created by knowing excellent cases in other sectors collected through the Award System for Energy Management, they all, including participants from Ptm, could specifically understand the possibility and benefits of this system.

III-2-5 Philippines

(ECCJ Expert)

Kazuhiko Yoshida (General Manager, International Engineering Department)

(Actual Schedule)

| Date | | Activity |
|-------------------|------|---|
| 22 November, 2006 | Wed | Travel to Philippines from Malaysia Lv. Kuala Lumpur (Malaysia) Ar. Manila (Philippines) |
| 23 November, 2006 | Thu | Implementation of Intensive Workshop |
| 24 November, 2006 | Fri. | Visits to 2 companies (Building management and hotel) (Field survey / Information exchange and advice on energy management / Request for participation in PROMEEC) |
| 25 November, 2006 | Sat. | Day off Travel to Brunei Lv. Manila (Philippines) |

Ms. Maureen C. Balamiento from the ASEAN Center for Energy (ACE) and staffs including the focal point from the Philippines participated in the above mentioned activities.

1. Intensive Seminar-Workshop

In the Intensive Seminar-Workshop, Mr. Mariano S. Salazar, Undersecretary of DOE, gave a welcoming address which included a keynote.

Attachment-III-1 shows the program of this seminar workshop.

26 participants from the government and governmental institutions such as the Department of Energy (DOE), and from private companies and universities attended. The specifics of activities and programs of the PROMEEC projects were presented including the presentation of the policy and measures by the Philippine government. The discussion was very active including opinion exchange and questions / answers.

This time we also received questions and comments on the relationship between the well-known ASEAN Award System for Buildings and the ASEAN Award System of Best Practices in Energy Management, and we made further explanations for the sake of further clarification. In addition, the Don Emilio Abello Energy Efficiency Award has been implemented for a long time in the Philippines and some of the people who had won that award in the past were participating. Accordingly, the team discussed the differences in evaluation criteria and the required conditions to apply for the ASEAN Award System of Best Practices in Energy Management. In case of the Philippines, although the activities for the ASEAN Award System for Energy Management could share the current activities under the Don Emilio Abello Energy Efficiency Award, it will be impossible to coincide everything with the ASEAN Award System for Energy Management. Therefore, in order to avoid some duplicated activities, the Philippines could revise a part of the activities of the Don Emilio Abello Energy Efficiency Award if required.

Furthermore, the question/answers and discussions became quite heated over the content of the Energy Management Handbook, relation to the Technical Directory and details of the In-house Database. These were discussed including the relationship with energy conservation activities that DOE is currently implementing, and the discussions and opinion exchange were actively made between DOE and participants from the companies.

Many participants mentioned that they understood the activities being done under the PROMEEC (Energy Management) project and its program quite well and were very beneficial. Actually, they wanted to study the program more and promptly utilize the results

in their business, which encouraged us for our future efforts. As many didn't know much about the PROMEEC projects until they attended this Intensive Seminar-Workshop, some participants expressed their intention to follow PROMEEC activities in more detail from now on and wished to participate in activities if they had the chance to do so.

At the end of the seminar session, we asked those concerned from each participating institution and company for their enthusiastic participation in the activities of the PROMEEC projects and each of the programs in the PROMEEC (Energy Management) project.

As we noted above, as the participants exchanged opinions and made in-depth discussions between the Filipinos after having heard our presentations, we felt that the Intensive Seminar-Workshop provided the participants with a very beneficial opportunity.

2. Visits to concerned organizations including companies

(Request for participation in and cooperation to the activities of the PROMEEC Projects)

As our appointment at the planned food & drug factory couldn't be confirmed, we instead visited two companies, or "Ayala Property Management Corp." (a building management company) along with three people, Mr. Domingo and Ms. Almonares from DOE and Ms. Maureen from ACE. In these companies, the team requested their enthusiastic participation in the PROMEEC projects and each of the programs in the PROMEEC (Energy Management) project.

At each company, participants of the Seminar-Workshop on the 23rd met with us and promised their enthusiastic participation in and cooperation to the activities and program of the PROMEEC (Energy Management) project. Each company is enthusiastically tackling energy conservation, in particular, and expressed their intention to apply for the ASEAN Award System of Best Practices in Energy Management and had some concrete question about the application form. As vital discussions were held at each company, we believe that we deepened their understanding of the activities of this project.

The details of discussion made in each organization are described hereafter.

"Ayala Property Management Corp." manages various buildings constructed and owned by Ayala Land mainly in Makati city. Indeed, this company manages 54 buildings including offices, shopping malls, parking lots and collective houses, and dispatches staffs including energy managers at each of those buildings. Three of the buildings among the buildings managed by this company have already been awarded in the ASEAN Award System of Best Practices Buildings. Namely, these are Tower One Building, MSE (Makati Stock Exchange) Building and the 6750 Tower Building, and MSE was energy audited in the PROMEEC (Building) project in the past.

This time, we met an energy manager who is responsible for the integrated management of these buildings and awarded in the personnel section of the Don Emilio Abello Energy Efficiency Award in the Philippines. He showed strong interest in the ASEAN Award System of Best Practices in Energy Management. They have organized a CQI (Cost Quality Initiative) Team, setup energy conservation / energy audit groups under that and are carrying out activities. Although they mentioned that they are understaffed, the organization is quite in order. Program and tools provided by the PROMEEC Energy Management Project were evaluated as being useful ones.

Their scope of their managing facilities includes the common facilities such as the power receiving and distribution system in each building. In the meeting, they made very detailed confirmation on the difference in conditions of application and evaluation between the Don Emilio Abello Energy Efficiency Award System and the ASEAN Award System for Best Practices in Energy Management of Buildings. And they also questioned us on actual practice of the energy management in Japanese companies and on concrete energy conservation technology, and we replied to those questions.

The Richmonde Hotel is a new hotel established seven years ago through being invested in by the Mandarin Hotel, and a technical executive who was also in charge of operations and maintenance of the Mandarin Hotel facilities met with us. He has been awarded in the personnel section of the Don Emilio Abello Energy Efficiency Award three times and is also one of the 35 Energy Managers recently certified for the first time by the AEMAS (ASEAN Energy Manager Accreditation System) and was very willing to apply for the ASEAN Award System of Best Practices in Energy Management.

This time we confirmed that the hotel industry organized an association (the Hotel Association) with many hotels members. We'd heard that the Hotel Association holds a meeting nearly every month and shares information with each other. Mr. Logelio D. Lampa, who met with us, also plays a role of a technical leader in this association. According to DOE, connections between members of this Hotel Association are very strong and that is a world different from the industrial sector such as the steel industry. Mr. Lampa advised Mr. Domingo from DOE to meet the chairman of this association and introduce the activities of the PROMEEC (Energy Management) project. At this hotel, they also made very detailed confirmation on the difference in conditions of application and evaluation between the Don Emilio Abello Energy Efficiency Award System and the ASEAN Award System for Best Practices in Energy Management of Buildings.

In addition, we were questioned on the energy management practices in Japanese companies, related to the discussion of the Energy conservation Act in the Philippines that is currently suspended in Congress. In particular there were many questions on building sector regulations, which we did reply to.

VISIT to ORGANIZATIONS / COMPANIES CONCERNED (Philippines) NO.1

Name of Organization : Ayala Property Management Corp.

| Item | | Details |
|------|--|---|
| 1 | Date | 9:00 - 11:30, Thu., 24 November |
| 2 | Interviewee | Mr. Francis Albert D. Dela Cruz (Head of R&D / ENERCON) |
| 3 | Visitors (ECCJ) | Kazuhiko Yoshida (General Manager) |
| 4 | Visitors (ACE, Focal Point) | <u>ACE</u> ; Ms. Maureen Balamiento (Database & IT Specialist) <u>Focal Point (DOE)</u> ; Mr. Rolumo Domingo, Ms. Genevieve L. Almonares |
| 5 | Brief Profile of Company or Organization | Establishment : 1976 Business : Building management (operation and maintenance) 54 buildings including office buildings, malls, parking, and complex housing, etc. owned by Ayala Land Employees : 187 Address : Manila (Makati City). HQ and 65 branches. |

Mr. Francis Albert D. Dela Cruz participated in the Intensive Seminar-Workshop on the 23rd.

Summary of Activities

First the ECCJ / ACE team explained the purpose of the visit and outlined the activities of the PROMEEC projects. The team requested their future participation in the activities and program of the PROMEEC projects in particular their enthusiastic participation in the ASEAN Award System of Best Practices in Energy Management and to cooperate to the PROMEEC (Energy Management) project through utilizing each of the tools under development and providing any comments on improvements.

Following that, they explained their operations and activities and made a concrete discussion and opinion exchange each other. Three of the buildings among the buildings managed by this company have already been awarded in the ASEAN Award System of Best Practices Buildings. Namely, these are Tower One Building, MSE (Makati Stock Exchange) Building and the 6750 Tower Building and MSE was energy audited in the PROMEEC (Building) project in the past together with their staffs. This time, we met an energy manager who is responsible for the integrated management of these buildings and is awarded in the personnel section of the Don Emilio Abello Energy Efficiency Award in the Philippines. He showed strong interest in the ASEAN Award System of Best Practices in Energy Management. They have organized a CQI (Cost Quality Initiative) Team, setup energy conservation / energy audit groups under that and are carrying out activities. Although they mentioned that they are understaffed, the organization is quite in order. Program and tools provided by the PROMEEC Energy Management Project were evaluated as being useful.

Their scope of their managing facilities includes the common facilities such as the power receiving and distribution system and water systems in each building.

In the meeting, they made very detailed confirmation on the difference in conditions of application and evaluation between the Don Emilio Abello Energy Efficiency Award System and the ASEAN Award System for Best Practices in Energy Management of Buildings.

On the other hand, they also questioned us on actual practice of the energy management in Japanese companies and on concrete energy conservation technology, and we replied to those questions. They said that they were studying to introduce the NAS battery and a de-scaling equipment for a chiller and water piping.

VISIT to ORGANIZATIONS / COMPANIES CONCERNED (Philippines) NO.2

Name of Organization : The Richmond Hotel

| Item | | Details |
|------|---|--|
| 1 | Date | 13:00 – 15:30, Thu., 24 November |
| 2 | Interviewee | Mr. Rogelio D. Lampa (Chief Engineer) |
| 3 | Visitors (ECCJ) | Kazuhiko Yoshida (General Manager) |
| 4 | Visitors (ACE, Focal Point) | <u>ACE</u> ; Ms. Maureen Balamiento (Database & IT Specialist) <u>Focal Point (DOE)</u> ; Mr. Rolumo Domingo, Ms. Genevieve L. Almonares |
| 5 | Brief Profile of Company or Organization | Establishment : 1999 (founded by Mandarin Hotel) Business : Hotel Employees : not confirmed Address : Manila (Pasig City) |

Mr. Rogelio D. Lampa participated in the Intensive Seminar-Workshop on the 23rd.

Summary of Activities

First the ECCJ / ACE team explained the purpose of the visit and outlined the activities of the PROMEEC projects. The team requested their future participation in the activities and program of the PROMEEC projects in particular their enthusiastic participation in the ASEAN Award System of Best Practices in Energy Management and to cooperate to the PROMEEC (Energy Management) project through utilizing each of the tools under development and providing any comments on improvements.

Mr. Lampa who met with us was the technical executive and also in charge of operations and maintenance of the Mandarin Hotel facilities. He has been awarded in the personnel section of the Don Emilio Abello Energy Efficiency Award three times and is also one of the 35 Energy Managers recently certified for the first time by the AEMAS (ASEAN Energy Manager Accreditation System) and was very willing to apply for the ASEAN Award System of Best Practices in Energy Management.

This time we confirmed that the hotel industry organized an association (the Hotel Association) with many hotels members. We'd heard that the Hotel Association holds a meeting nearly every month and shares information with each other. Mr. Logelio D. Lampa, who met with us, also plays a role of a technical leader in this association. According to DOE, connections between members of this Hotel Association are very strong and that is a world different from the industrial sector such as the steel industry. Mr. Lampa advised Mr. Domingo from DOE to meet the chairman of this association and introduce the activities of the PROMEEC (Energy Management) project.

At this hotel, they also made very detailed confirmation on the difference in conditions of application and evaluation between the Don Emilio Abello Energy Efficiency Award System and the ASEAN Award System for Best Practices in Energy Management of Buildings.

In addition, related to the discussion of the Energy conservation Act in the Philippines that is currently suspended in Congress, they asked Mr. Domingo about the definition of the "Energy Manager". And they asked us on the energy management practices in Japanese companies, especially in the field of buildings. The team replied to these questions.

According to their explanation, the Don Emilio Abello Energy Efficiency Award System is intended for large energy consuming factories and buildings who voluntarily provided data on energy consumption. The assessment of the data is made by DOE, including interviews to

concerned candidate factories and buildings. Finally, the energy data and results of investigations by DOE are evaluated and the awardees are determined in the committee meeting.

III-2-6 Brunei Darussalam

(ECCJ Expert)

Kazuhiko Yoshida (General Manager, International Engineering Department)

Fumio Ogawa (Technical Expert, International Engineering Department)

(Actual Schedule)

| Date | | Mission |
|-------------------|------|---|
| 25 November, 2006 | Sat. | <u>Yoshida</u> : Travels to Brunei from Manila. Lv. Manila (Philippines) |
| 26 November, 2006 | Sun. | <u>Ogawa</u> : Travel to Brunei from Yangon after completing other project activities. Lv. Yangon (Myanmar) Ar. Bandar Seri Begawan (Brunei Darussalam) |
| 27 November, 2006 | Mon. | Implementation of Intensive Workshop |
| 28 November, 2006 | Tue. | Visit to 3 companies (“Oil & Gas Discovery Center” of an oil mining company , cement manufacturing and hotel) (Field survey / Information exchange and advice on energy management / Request for participation in PROMEEC) |
| 29 November, 2006 | Wed. | Travel to Indonesia Lv. Brunei Ar. Jakarta (Indonesia) |

Mr. Christopher Zamora (Manager) from ASEAN Center for Energy (ACE) and staffs including the focal point from Brunei Darussalam participated in the above mentioned activities.

1 . Intensive Seminar-Workshop

At the Intensive Seminar-Workshop, as the Energy Minister could not attend, Mr. Hj Ismail Bin Putih, an executive engineer of DES, gave the welcome address including a keynote.

Attachment-III-1 shows the program of this seminar workshop.

42 participants from the government and governmental institutions such as the Department of Electrical Services (DES), private companies and universities attended. The Intensive Seminar-Workshop was successfully completed with very vital questions / answers and active discussions including in-depth / advisory discussion for some participants after closing the seminar. (Mr. Okouchi, Second Secretary and Chief of Economy Group from the Embassy of Japan, participated in the opening ceremony.)

As for Brunei Darussalam, it is said that the awareness of energy conservation is still weak because energy is even cheap. Hence, according to some concerned persons, even though they emphasize the importance of energy conservation, it is rather difficult for that to lead into practical activities.

However, the Energy Minister is displaying strong leadership in regard to the promotion of energy conservation and the participants at the Intensive Seminar-Workshop included persons who are enthusiastically tackling energy conservation in each sector. They provided questions and comments from various viewpoints in the Intensive Seminar-Workshop. The participants were from the sectors of the supply side, the transportation, architecture, education including the Ministry of Religion.

More specifically, the following were the questions and required advices in the Intensive Seminar-Workshop.

- (1) Programs in the fields of renewable energy and power grid under ASEAN Plan of Action for Energy Cooperation

- (2) Possibility to apply for the activities on the supply side
- (3) Specific activities to save energy at religious facilities such as the national mosque
- (4) Energy saving procedures for road lighting including request of information on Japanese cases (This is one of instructions made by the Energy Minister.)

Although some questions were not expected, we could well handle these questions since we could understand the background. Through discussion, the team could understand the conditions of Brunei Darussalam. We should consider that this is not only Brunei conditions but possible conditions for ASEAN and such understanding should be reflected to the activities and programs in the future.

2. Visits to concerned organizations including companies

(Request for participation in and cooperation to the activities of the PROMEEC Projects)

We visited 3 companies, namely the "Oil & Gas Discovery Center" of "Brunei Shell Petroleum Co. Sdn Bhd," which is a joint petroleum enterprise between a European company and Brunei, the "Butra Heidelberg Cement SDN BHD," a cement maker, and the "Orchid Garden Hotel". At each company, we requested their enthusiastic participation in the activities and program in the PROMEEC (Energy Management) project and all of the companies showed their wishes, wills and interests in participation in the specific programs of the project.

As both the cement maker and the hotel have cooperated in the OJT activities of the energy audits including the follow-up surveys, they have already understood the activities of the PROMEEC projects. Therefore, we could discuss details of the ASEAN Award System for Energy Management. As Mr. Hashimoto, Ambassador of Japan, mentioned in Orchid Garden Hotel, these companies should be evaluated because they made effort to improve energy efficiency even under environment economically difficult for energy conservation.

The details of discussion made in each organization are described hereafter.

The "Oil & Gas Discovery Center" of "Brunei Shell Petroleum Co. Sdn Bhd. (BSP company)" is an equally owned joint enterprise between the Brunei government and the Shell (Royal Dutch Shell). The Brunei government has been recently attempting to increase its stock ratio. This company is implementing education, displays on and events concerning science and technology which include energy, in particular, targeting youngsters from primary schools through teenagers in cooperation with Brunei University basically free of charge. We were very impressed with the policy of the company to contribute to the society by spending profits from its business for education of the younger generation that will support the future. Actually, their activities have brought fruitful achievements. We heard that the facility was established in 2002, and commenced operation in 2003 particularly targeting schools in the Seria Community where people working for the company live (40,000 residents including 3,500 employees).

It takes 1.5 hours to drive from the central of Bandar Seri Begawan to the OGDC facility situated in the place near the Malaysian border where crude oil was firstly discovered in 1921 in Brunei Darussalam. It is an excellent facility composed of a main building, pavilion and movie theater (commercial cinema programs are also available at night) in addition to a multi-purpose open space that has a traffic rule training field. We observed these facilities, listened to some explanations on how they tackle energy conservation and discussed and gave advice on possible improvements. In addition, we requested them to participate both in the program under the ASEAN Energy Management System to utilize the existing implementing organizations and in the activities of energy audit at the BSP buildings under the PROMEEC projects. They showed their intention to accept our request.

The production volume of Butra Heidelberg Cement SDN BHD is, as an industrial team surveyed and reported upon last year, currently below 50% of its capacity due to the increased

import of cheaper cement from China. When we visited there, the factory was shut-down for the maintenance. As availability of the facility was low, the operation has shifted from the continuous mode to the intermittent mode and they maintain the facility during shutdowns.

We heard that the president had recently changed, however, they have been continuing improvements recommended last year by the team of PROMEEC (Major Industries). They are preparing a proposal on improvement for power saving of the blowers to discuss with the top management. Furthermore, the company has introduced TPM with the cooperation from Onoda Cement Company and the activities and management are also in progress including preparation of check lists for maintenance as SOP (Standard Operation Procedure).

With this background, we hope that they could understand benefits and significance to utilize the programs included in the ASEAN Energy Management System including various tools for energy management and system to utilize the existing implementing organizations.

In addition, the information on the Award System for Energy Management System was already provided by Mr. Yaman of the Focal Point, and they said that they were considering participation in it but wished to confirm some details to Mr. Yaman later.

Although this company is in a tough situation because its business environment is very critical, we requested them their continued cooperation to the PROMEEC projects as a model case for other ASEAN member countries and their enthusiastic participation in workshops held in other ASEAN member countries.

As aforementioned, Mr. Hashimoto of Japanese Ambassador to Brunei and Mr. Okouchi of Second Secretary (Chief of Economy Group) from the Embassy of Japan participated in the meeting held at Orchid Garden Hotel. The Ambassador Hashimoto gave a welcome address upon opening the meeting, and then discussions commenced. The Ambassador's statements made in this meeting and our activities were released to the press by the Japanese Embassy. The Ambassador Hashimoto did attend the meeting until the end, and listened to the discussion and opinion exchanged, recognized the achievements of the PROMEEC projects including the value of Japan's contribution. He said that he was much satisfied with the result of not only the meeting but also the specific achievements of the PROMEEC projects. We believe that Brunei people felt the presence, substantial assistance and status of the Japanese government through the fact that VIPs from Japan participated in the activities.

In this hotel, a team of the PROMEEC (Buildings) conducted energy audit including the follow-up survey, and they have also been implementing the recommended improvements and achieved energy saving of 14%. Accordingly, they requested us advices on specific activities to improve operation of BAS (Building Automation System) and transformer system, including specific questions on the "ASEAN Award System for Energy Management"

Regarding the improvement in the BAS, the team provided advice on the viewpoint and methodology of practicing energy management taking a few examples. As for the improvement in the transformer system, the team advised them to discuss with Mr. Yaman. Concerning the application conditions of the Award System for Energy Management, Dr. Tan of a BOJ (EM) member and Mr. Zamora of ACE explained details together with time schedule. These discussions were very significant in having confirmed the points to be discussed with the BOJ (EM) members in the Research Forum in Japan held in December 2006 since the hotel staffs clearly stated that they would apply to the award system in the future. The methodology to discuss with concerned persons before the Research Forum in Japan seems very effective to efficiently develop the plan.

Finally, we requested them for their continuous participation in and cooperation to the PROMEEC (Buildings) project including the presentation of achievements in the seminar-workshops in other ASEAN member countries.

Concerning the articles press-released, the Borneo Bulletin published an article about the Intensive Seminar-Workshop in its morning paper on November the 28th and the other one

released by the Embassy of Japan on November the 29th. However, as for the television, we unfortunately could not watch the news because the local channel was not available at the hotel where we stayed. At the same time, the Embassy of Japan also uploaded our activities on the website. (URL Address : <http://www.geoship.jp/BRUNEI/>)

VISIT to ORGANIZATIONS / COMPANIES CONCERNED (Brunei Darussalam)

NO.1

Name of Organization : Brunei Shell Petroleum Co. Sdn. Bhd. Oil & Gas Discovery Centre (OGDC)

| Item | | Details |
|------|--|--|
| 1 | Date | 9:00 - 12:00, Tue., 28 November |
| 2 | Interviewee | Mr. Iskandar Bin HJ Alias (Head of OGDC) Mr. Hasni HJ Hafarudin (Electrical Maintenance Engineer) Three other people |
| 3 | Visitors (ECCJ) | Kazuhiko Yoshida (General Manager) Fumio Ogawa (Technical Expert) |
| 4 | Visitors (ACE, Focal Point) | <u>ACE :</u> Mr. Christopher Zamora (Manager) <u>Focal Point (PMO / DES) :</u> Mr. Haji Abd Shawal Yaman (Head of Division, Power & Energy Management, Prime Minister's Office) Mr. Ismail Bin Hj. Mohd. Daud (Head of Unit Safety & Enforcement, Department of Electrical services) Dr. Tan Kha Sheng (Associate Professor, University of Brunei Darussalam) Three other people |
| 5 | Brief Profile of Company or Organization | Establishment : September 2002 Business : Contribution to the community (part of CSR) through Science and Technology Promotion Employees : 7, besides some part-timers and volunteers Address : Seria region (about 1.5 hrs of driving from Bandar Seri Begawan) |

Mr. Iskandar Bin HJ Alias participated in the Intensive Seminar-Workshop held on the 27th.

Summary of Activities

At first, the ECCJ / ACE team explained the purpose of the visit and outlined the activities of the PROMEEC projects. We requested them to participate in the activities and program of the PROMEEC projects in the future, in particular, their enthusiastic participation in the ASEAN Award System of Best Practices in Energy Management under the PROMEEC (Energy Management) project and to cooperate in the PROMEEC (Energy Management) project through utilizing each of the tools under development and providing comments on improvement. (As Mr. Iskandar Bin HJ Alias participated in the Intensive Seminar-Workshop, he fully understood about that.)

The planning and construction of this facility were based on the similar facilities established in Japan and the Philippines such as "Mirai-kan" in Japan. The purpose of establishment of OGDC also includes the increase of visitors, by positioning itself as a featured facility for promotion of local business.

In OGDC, there are the Gallery (main building), Exhibition Hall (various pavilion), Exploratorium (educational place for children), Theater (3-D theater), Cafeteria, a go-cart field for teaching traffic rules. The targeted visitors vary widely from children (9 – 17 old years) through to adults and its annual number of visitors from 2003 - 2005 was around 25,000.

The displays in the Exhibition Hall are intended to be "Hands-on Learning" where they can be

touched and experienced, for example, they include astronauts training devices. In addition, the educational programs include various Workshops, Holiday Camps, Technical Challenges and Little Explorer etc. In March 2006, the Astronaut Mr. Mori visited OGDC for "Meet the Science" and made lectures. The students are requested to pay small amount of fare for participating in these activities and programs.

Although the plan and implementation of the programs are done by staff at the facility, they are supported and helped in development of details by UBD (University of Brunei Darussalam), the Brunei Museum and by volunteers on many occasions.

Although the power consumption at OGDC peaked 250 thousand kWh per month in 2004, it was lowered to 200 thousand kWh per month through their efforts such as reducing spot lights at night. The voltage for power receiving is 66kV and then reduced to 6kV and 33kV. There are three kinds of power tariff system for industrial / commercial / residential use and the commercial tariff is applied for this facility which is very cheap at 0.15 BD/kWh.

They said that they had changed policy to further enhance energy conservation in addition to the emphasis on "Safety First". The visiting team advised them to install individual power meter in the respective buildings and to identify the power consumption of each building.

VISIT to ORGANIZATIONS / COMPANIES CONCERNED (Brunei Darussalam)

NO.2

Name of Organization : Butra Heidelberg Cement SDN BHD

| Item | | Details |
|------|--|--|
| 1 | Date | 14:20 -15:20, Tue., 28 November |
| 2 | Interviewee | Mr. Achmad Hidayat (Maintenance Manager) |
| 3 | Visitors (ECCJ) | Kazuhiko Yoshida (General Manager) Fumio Ogawa (Technical Expert) |
| 4 | Visitors (ACE, Focal Point) | <u>ACE ;</u> Mr. Christopher Zamora (Manager) <u>Focal Point (PMO/DES) ;</u> Mr. Haji Abd Shawal Yaman (Head of Division, Power & Energy Management, Prime Minister's Office) Mr. Ismail Bin Hj. Mohd. Daud (Head of Unit Safety & Enforcement, Department of Electrical Services) Dr. Tan Kha Sheng (Associate Professor, University of Brunei Darussalam) Three other people |
| 5 | Brief Profile of Company or Organization | Establishment : 1993 Business : Production and sales of cement (imports clinker and gypsum) Employees : about 100 Address : Maura area (about 0.5 hrs of driving from Bandar Seri Begawan) |

Summary of Activities

At first, the ECCJ / ACE team explained the purpose of the visit and outlined the activities of the PROMEEC projects. We requested them to participate in the activities and program of the PROMEEC projects in the future, in particular, their enthusiastic participation in the ASEAN Award System of Best Practices in Energy Management under the PROMEEC (Energy Management) project and to cooperate in the PROMEEC (Energy Management) project through utilizing each of the tools under development and providing comments on improvement.

The team of the PROMEEC (Major Industries) conducted energy audits in February 2001 at this factory and made the follow up survey in December 2005. In spite of the annual production capacity of 500 thousand tons of cement, the actual production volume was 50% of that, hence around 250 thousand tons per year. However, due to importing cheap Chinese cement since July 2005, the production has further declined and they are losing their market share. Among those who met with the energy audit team of the PROMEEC (Major Industries) last time, the head of the factory Mr. Ardi Widjaya recently retired and a new head was appointed. But as he was absent due to his business trip, only Mr. Achmad Hidayat met us. The factory uses a large amount of electricity and the monthly charge for it is around 80 thousand BD and they want to lower power consumption. However, the unit consumption of electric power tends to increase because of frequent shutdowns of the factory.

The factory receives electric power at 11kV then drops it to 6.6kV. Low voltage power is setup at 380V. It has two large electricity consuming devices: a grinding mill motor (2800kW) and a mill fan motor (355kW). As it is difficult to improve the former, they are

planning measures to reduce power consumption of the latter. (They wish to implement the plan shortly.)

For the purpose of improving cost competitiveness, they have stated activities based on the "5S" and TPM etc. Although they feel that it is hard to change corporate culture, they decided to implement the activities for their survival in business. In addition, they have introduced SOP (Standard Operation Procedure) and prepared the check lists for maintenance of motors and transformers etc. and started using these lists.

Although nobody from this company could participate in the Intensive Seminar-Workshop held on 27th, they said that they would study the presentation materials given later by Mr. Yaman. We felt that they had so many issues to clear up and improvements to be implemented for them in order to survive while they were very eager to promote energy conservation (electricity saving).

VISIT to ORGANIZATIONS / COMPANIES CONCERNED (Brunei Darussalam)
NO.3

Company's name : Orchid Garden Hotel

| Item | | Details |
|------|--|--|
| 1 | Date | 15:50 - 17:20, Tue., 28 November |
| 2 | Interviewee | Mr. Shamsul Bahrin Pehin Dato Dr. Hj Ahmad (Assistant General Manager) Mr. Philip Ho Youn Von (Electrical Engineer) one other person |
| 3 | Visitors (ECCJ) | Kazuhiko Yoshida (General Manager) Fumio Ogawa (Technical Expert) |
| 4 | Visitors (ACE, Focal Point) | <u>The Embassy of Japan in Brunei :</u> Mr. Itsuo Hashimoto (Ambassador of Japan) Mr. Hiroshi Okouchi (Second Secretary, Chief of Economy Group) <u>ACE :</u> Mr. Christopher Zamora (Manager) <u>Focal Point (PMO/DES) :</u> Mr. Haji Abd Shawal Yaman (Head of Division, Power & Energy Management, Prime Minister's Office) Mr. Ismail Bin Hj. Mohd. Daud (Head of Unit Safety & Enforcement, Department of Electrical Services) Dr. Tan Kha Sheng (Associate Professor, University of Brunei Darussalam) Three other people |
| 5 | Brief Profile of Company or Organization | Establishment : 1999 Business : Hotel Employees : 120 Address : Bandar Seri Begawan |

Mr. Philip Ho Youn Von participated at the Intensive Seminar-Workshop on the 27th

Summary of Activities

It was a very meaningful meeting because the ambassador of Japan from Embassy of Japan in Brunei Darussalam attended.

At the opening, Ambassador Hashimoto gave a sophisticated keynote in which he stated the importance of energy conservation, achievements in Japan and a future direction and expectations of Brunei Darussalam for energy conservation. Since Ambassador Hashimoto fully attended the meeting until the end, we believed that he could understand the PROMEEC (Energy Management) project and feel a nice atmosphere of cooperation activities in field. Moreover, his presence brought a strong impression of cooperation by Japan to persons from ASEAN including Brunei Darussalam.

After that, the ECCJ / ACE team explained the purpose of the visit and outlined the activities of the PROMEEC projects. We requested them to participate in the activities and program of the PROMEEC projects in the future, in particular, their enthusiastic participation in the ASEAN Award System of Best Practices in Energy Management under the PROMEEC (Energy Management) project and to cooperate in the PROMEEC (Energy Management) project through utilizing each of the tools under development and providing comments on improvement.

They seemed already to have well understood these points, because the hotel has been implementing improvements since 2003 when the ECCJ team implemented energy audit and Mr. Philip attended the Intensive Seminar-Workshop held on November 27th. In that sense, this hotel is one of good cooperators.

Furthermore, Mr. Shamsul explained some achievements of this hotel in energy conservation activities. Since the 1st energy audit in 2003, the hotel has taken measures for improvement such as replacing the bulbs with more energy efficient lamps, raising room temperatures to 22 and rationalizing utilization of a Building Automation System (BAS) in the hotel. In addition, they are studying the plan to change the number of transformers from the current two sets to one set.

Based on these achievements, they are very positive to apply for the ASEAN Award System of Best Practices in Energy Management that will be implemented under the PROMEEC (Energy Management) project. Concerning this award system, Mr. Shamsul inquired enthusiastically about the schedule and conditions that should be written on the application form. The ECCJ-ACE team replied to these questions. As Dr. Tan of a BOJ (EM) member attended, we could deeply make appropriate and pinpointed discussion. Finally, we requested them for their continued cooperation in the PROMEEC projects through utilizing the various tools under development in the PROMEEC (Energy Management) project and providing their comments for improvements.

III-2-7 Indonesia

(ECCJ Expert)

Kazuhiko Yoshida (General Manager, International Engineering Department)

Fumio Ogawa (Technical Expert, International Engineering Department)

(Actual Schedule)

| Date | | Mission |
|--------------------|------|---|
| 29 November, 2006 | Wed. | Travel to Indonesia from Brunei Lv. Brunei Ar. Jakarta (Indonesia) |
| 30 November, 2006 | Thu. | Implementation of Intensive Workshop |
| 1st December, 2006 | Fri. | Visits to 3 companies (Glass manufacturing and hotels) (Field survey / Information exchange and advice on energy management / Request for participation in PROMEEC) Trip to Japan Lv. Jakarta |
| 2nd December, 2006 | Sat. | Ar. Tokyo |

Mr. Christopher Zamora (Manager), Mr. Juanito M and Ms. Maureen C. Balamiento from the ASEAN Center for Energy (ACE) and staffs including the focal points from Indonesia participated in the above mentioned activities.

1 . Intensive Seminar-Workshop

At this seminar Ms. Ratna Ariati, who is the Director in charge of new energy and energy conservation in Directorate General of Electricity and Energy Utilization, Ministry of Energy and Mineral Resources (MEMR), gave a welcome address which included a keynote.

Attachment-III-1 shows the program of this seminar workshop.

57 participants from the government and governmental institutions such as those concerned from MEMR, ACE, private companies, industrial associations and colleges attended, and very vital question/answers and discussions were made. The Intensive Seminar-Workshop was successfully finished. It is believed that the participants could deepen their understanding of the activities of the PROMEEC projects and the programs of the PRMEEC (Energy Management) project.

In Indonesia, as well as the other countries, Ms. Indarti, a section head of the Energy Conservation Section of MEMR and a Focal Point of EE&C-SSN, also presented the current policy and measures, the national program and international cooperation with foreign countries in the field of energy conservation, then detailed questions / answers and discussions were made with participants on these issues including the relationship with the activities under the PROMEEC projects. Therefore, the Intensive Seminar-Workshop provided the participants with an opportunity to better know the national policy and program for energy conservation by the Indonesian government.

Regarding the activities of the PROMEEC (Energy Management) project and the programs under the "ASEAN Energy Management System" that we are trying to establish, we made many question/answers, discussions and comments with those concerned from the government, the implementing organizations and companies that are actually implementing energy management. In that sense, this was a very good Intensive Seminar-Workshop.

Finally, introducing the result of the analyzed answers to the questionnaires that we got from participants at the Intensive Seminar-Workshops held in the six countries to date, we showed that these programs and tools to be prepared and operated in the "ASEAN Energy

Management System" in the PROMEEC (Energy Management) project would be very effective and realistic measures for ASEAN stakeholders to realize improvement under the current infrastructures for energy management lowering barriers.

On that basis, we requested participants to participate in the activities and programs of the PROMEEC (Energy Management) project, to give valuable comments on further improvements of the program and activities, and further to request for their cooperation in expanding the network of enterprises and persons concerned in ASEAN, which closed the Intensive Seminar-Workshop successfully in Indonesia as the last country we had visited.

2. Visits to concerned organizations including companies

(Request for participation in and cooperation to the activities of the PROMEEC Projects)

The ECCJ/ACE team visited "PT Pasir Sari Raya Industri," of a glass manufacturer, "Hotel Mulia" and "Kartika Chandra Hotel". All the three companies showed strong hopes and willingness or interest in participating in the activities implemented and specific programs developing under the PROMEEC (Energy Management) project.

"PT Pasir Sari Raya Industri" and "Kartika Chandra Hotel" are members of the "Partnership Program" established by MEMR that implements free energy audits and recommends improvements to be implemented by the member companies and then evaluates unit energy consumptions. The chief engineer of the Hotel Mulia is the vice chairman of the "Indonesian Hotel Engineers Association" and actively working for information sharing among the members. Therefore, these companies have a good understanding of information sharing through participation in the activities of the PROMEEC projects.

The details of discussion made in each organization are described hereafter.

PT Pasir Sari Raya Industri is a company that annually produces 73,000 tons of glass cups and tableware and owns 1,300 employees and a relatively large factory site of 14ha. However, with only 20 top managers (including section managers) and 5 engineers, they seemed very busy and it would be difficult to conduct trainings for employees. The ECCJ/ACE walked through the factory and found that they were too busy to realize so called "5S" even though they were good engineers. Even with regard to safety, many problems were observed in their work area such as employees working with no shirts on, and broken glass scattered in the vicinity of the passageway.

Concerning their issues on and interests in energy conservation, they did not have any good ideas on specific measures including energy audit measure to utilize combustion waste gas of 200 from the glass melting furnace for drying silica sand that shared 60% of the raw material. Moreover, they wanted to improve the imbalance between the phase voltages of alternate-current power source.

Regarding the above issues, the ECCJ/ACE team gave them some advices by citing some examples from the program and tools prepared by the PROMEEC projects and we think they understood well enough the point that the program and tools could be beneficial to them. In addition, they participated in the seminar of the PROMEEC (Major Industries) project; they have the material presented by "JG Container" from Malaysia and were very interested in this company's improvement. Notifying them that we had visited that company one week ago and that they have also expressed their intention to participate in and cooperate to the PROMEEC projects, we emphasized the possibilities and benefits of collectively exchanging information among companies in certain same business area via the PROMEEC network, which resulted in our belief that they could understand the positive effect of participating in the PROMEEC (Energy Management) project.

Furthermore, they reported that PLN (a state-owned electric power company) were collecting abnormal electricity charges in the form of fines. According to them, the fines are charged for

all days of one month even if 50% or more electricity is utilized even for only an hour in one month exceeding some basis which was unclear. We couldn't understand whether the basis for that was the capacity of the electricity receiving transformer of the factory or some other standards, and the reason why the fine is imposed for other time than extraordinary utilization. Those who met with us didn't understand the mechanism neither. It is a serious problem for the companies that a government related institution collects fines without any explanation. We questioned Mr. Wafa from MEMR about it. He replied that he had received similar reports from other companies as well but not from PLN but he could not understand it. Mr. Wafa immediately made a telephone call to a person of PLN to confirm. According to Mr. Wafa, it was decided to hold a meeting with those concerned from PLN for confirmation of the fact including discussion for improvement. It was very meaningful that this kind of problem was discovered when we visited the factory of this company and that Mr. Wafa from MEMR took such prompt action.

At Hotel Mulia, the Chief Engineer Mr. Deddy who had participated in the Intensive Seminar-Workshop of the previous day couldn't meet us due to his busy schedule so his subordinates met with us. As Mr. Christianto, who had once worked as an engineer at the Mid-Plaza Hotel when we had conducted an energy audit in 2004, was one of them, we met persons who recognized rather well the benefit and significance of the PROMEEC projects. He moved to the current position around four months ago. Although possibly experience and information is spread around in this country where it is usual for engineers to move around companies, as he mentioned, there are realistic situations that the succeeding engineer would not continue improvements after an engineer left. This becomes a kind of risk of sustainability. Taking this into consideration, the solution of this kind of problem too could be partly covered when tools prepared by the PROMEEC projects becomes available.

The hotel is a still new and large hotel excellently designed with 996 guest rooms which equipped with the high efficiency lighting system with a luminous control system, high efficiency boilers, operation control system based on the timer control and waste water recycling. The energy consumption of air conditioning shares about 50% compared with 60% of a typical number for hotels in this country. Observing that a temperature was setup at 21 in the lobby area, the team advised the importance to monitor and assess not only the percentage of but amount of energy. In addition to the excellent facilities, they are also making further progress in improvements and current issue is to improve energy consumption of the boiler and chiller, but they had some points not clear. So, we advised them on how to identify the actual conditions and possible improvements including viewpoints.

Through the discussion, we had them understand that the tools being developed under the PROMEEC projects can be utilized effectively including provision of information on technologies that would be considered to introduce in the future.

Although they were interested not only in the ASEAN Award System of Best Practices in Energy Management but also in the Award System of Energy Efficient Best Practice Buildings, they did complain that the latter's application form very complicated was very tough to prepare. However, they felt that the application for the ASEAN Award System of Best Practices in Energy Management would be relatively easy and they expected little problem with application. This kind of comments should be forwarded to the members of BOJ (EM) and should be discussed for future improvement.

At the Kartika Chandra Hotel, the chief who had participated in the Intensive Seminar-Workshop met with us so the activities of the PROMEEC (Energy Management) project and effectiveness of each program were already well recognized. This hotel is a relatively old hotel constructed in 1971, some equipment seemed outdated and required for further improvement. The hotel's occupancy rate was varying 50% to 60%, which is considerably lower than the Hotel Mulia.

From the viewpoint of energy utilization, with regard to air conditioning, the energy must be saved based on the facts that the temperature in the lobby and passage was high and the meeting room was hot.

Furthermore, they hold the management level meeting everyday and the participants report energy consumption and discuss measures to reduce energy consumption. Beside, the engineering group holds a meeting once per month to discuss the improvement to reduce consumption of electric power, fuel and water. In addition, another meeting with employees from other departments is held once every three months to share information and ensure the thorough implementation of improvements.

As mentioned above, their organizational practices are very good, it seems that there are some best practice cases of energy management. They also participate in the MEMR's Partnership Program and understand the PROMEEC projects. Their attitude was very cooperative.

VISIT to ORGANIZATIONS / COMPANIES CONCERNED (Indonesia) NO.1

Name of Organization : P.T. Pasir Sari Raya Industri

| Item | | Details |
|------|--|---|
| 1 | Date | 10:00 -12:00, Fri., 1 st December |
| 2 | Interviewee | Mr. Dani Widjaya (Director) Mr. Albertus Agung (Assistant Manager, Operational Dept. Engineering) Mr. Aliang (Electrical Engineer) |
| 3 | Visitors (ECCJ) | Kazuhiko Yoshida (General Manager, International Engineering Department, ECCJ) Fumio Ogawa (Technical Expert, International Engineering Department, ECCJ) |
| 4 | Visitors (ACE, Focal Point) | <u>ACE</u> : Mr. Ivan Ismed (Project Officer) Ms. Maureen Balamiento (Database & IT Specialist) Ms. Cindy Rianti (Senior Information Officer) <u>Focal Point (MEMR)</u> : Mr. Ainul Wafa (DGEEU, Ministry of Energy and Mineral Resources) |
| 5 | Brief Profile of Company or Organization | Establishment : 1978 (expanded in 1990) Business : Glass tableware manufacturer (production volume: 73,000t/year) Employees : 1300 (20 managers and staffs) Address : Cengkareng (about 45 min from the center of Jakarta by car) |

Summary of Activities

At first, the ECCJ / ACE team explained the purpose of the visit and outlined the activities of the PROMEEC projects. We requested them to participate in the activities and program of the PROMEEC projects in the future, in particular, to participate enthusiastically in the ASEAN Award System of Best Practices in Energy Management under the PROMEEC (Energy Management) project and to cooperate in the PROMEEC (Energy Management) project through utilizing each of the tools under development and providing comments on improvement.

Mr. Albertus from this company participated in the Seminar-Workshop on the previous day, so he understood the purpose and activities of the PROMEEC (Energy Management) project and had materials presented. This time, we held a fruitful meeting as we could meet and talk to Mr. Dani who is a Director and a son of the founder in the company. In addition, this company is one of members (21 companies for this year in the industrial sector) that participated in the Partnership Program of the government (MEMR). KONEBA had already come and completed investigation on the utilization of electrical energy and will conduct investigation on the utilization of thermal energy in the near future.

With regard to thermal energy, while the total amount of natural gas consumption is being measured and there were orifice type of flow meters for fuel gas at the glass melting furnace, no fuel gas consumption was measured at other facilities and equipment.

They wished to utilize combustion waste gas (over 200) from the glass melting furnace to dry silica sand that shared 60% of the raw material.

With regard to electrical energy, they have a theme on countermeasures against an imbalance

of the phase voltages for the alternate-current electric power source. We gave them some advices on this issue, in particular, we discussed the "RST Balancer" and finally requested ACE to check information in the Technical Directory because it is the commercialized technology.

While we were talking about electricity, they reported a problem with a penalty charge for electricity. Namely, as for the monthly power charge, even if they make effort to reduce electric power consumption, a big amount of penalty fare is charged when the peak demand exceeds a level of 50% higher than a certain setup level. The problem is that the penalty fare is applied to all days in one month and there is no detailed explanation on the pricing system including the reasons. Mr. Wafa from MEMR who accompanied us also didn't understand it very well and he decided to have a meeting with PLN (a state-owned electric power company) promptly in the coming week. It can be said that our investigation brought this company an good opportunity for this company to solve the problem.

When we toured the field, we found some safety problems and felt the necessity for this company to start with the "5S" and safety training. In addition, depending on the facility, the ratio of defect to product was high, hence improvement in this situation would realize the most immediate effect. They said that that this company had accepted technical assistance from Japanese Asahi Glass Co., Ltd from 1978 to 1982. The effect would be very big if they improve the yield through receiving technical assistance again.

VISIT to ORGANIZATIONS / COMPANIES CONCERNED (Indonesia) NO.2

Name of Organization : Hotel Mulia

| Item | | Details |
|------|--|--|
| 1 | Date | 14:20 - 15:30, Fri., 1 st December |
| 2 | Interviewee | Mr. Deddy El Rashid (Chief Engineer) Mr. Christianto Suroso (Senior Assistant Chief Engineer) Mr. P. Adi Nugroho (Senior Assistant Chief Engineer, responsible for EC) |
| 3 | Visitors (ECCJ) | Kazuhiko Yoshida (General Manager) Fumio Ogawa (Technical Expert) |
| 4 | Visitors (ACE, Focal Point) | <u>ACE</u> ; Mr. Ivan Ismed (Project Officer) Ms. Maureen Balamiento (Database & IT Specialist) Ms. Cindy Rianti (Senior Information Officer) <u>Focal Point (MEMR)</u> ; Mr. Ainul Wafa (DGEEU, Ministry of Energy and Mineral Resources) |
| 5 | Brief Profile of Company or Organization | Establishment : Newly opened Business outline : Hotel (996 guest rooms) Employees : Not confirmed Address : Senayan (Center of Jakarta) |

Summary of Activities

At first, the ECCJ / ACE team explained the purpose of the visit and outlined the activities of the PROMEEC projects. We requested them to participate in the activities and program of the PROMEEC projects in the future, in particular, to participate enthusiastically in the ASEAN Award System of Best Practices in Energy Management under the PROMEEC (Energy Management) project and to cooperate in the PROMEEC (Energy Management) project through utilizing each of the tools under development and providing comments on improvement.

Although Mr. Deddy, who was once a ship engineer and now the vice chairman of the Indonesian Hotel Engineers Association, participated in the Intensive Seminar-Workshop on the previous day, he only made greeting when we left the hotel due to his busy schedule. And Mr. Christianto transferred 4 months ago from the Mid-Plaza Hotel where the ECCJ experts conducted energy audit in 2004 was acquainted with Mr. Yoshida.

This hotel is not only new but also the largest class in Indonesia; in addition, a large scale of condominium has been being built in its backyard. The location is also first grade being near the Congress House and its business performance is good as the occupancy rate on that day was 95%.

The term of construction of the hotel was as short as around nine months, and it has advanced equipment such as energy efficient lighting facilities, high efficiency boilers and a water recycling facility. A current theme is to improve energy used at the boiler and chiller, but the basic procedures to start are to investigate the present energy consumption, to identify problems and to study possible improvement based on the analyses of the investigation results. From this point, the team explained again that it would be very effective to utilize the various tools under development in the PROMEEC (Energy Management) project. According to their data, the energy consumption of air conditioning shares is about 50% compared with 60% of a typical number for hotels in this country. They explained that the setup temperature

was 21 in the lobby by the standard of the hotel owner. The team advised the importance to monitor and assess not only the percentage of but amount of energy, observing the actual temperatures. In other words, they have not yet established standards for operation on a basis of firm technical and practical background.

However, regarding electricity, we heard that there was a plan to replace the ballast at that time and they were negotiating the price with makers. Their standard for investment was that the payback should be in 10 months or shorter.

They had a strong interest in the ASEAN Award System of Best Practices in Energy Management. However, they did complain about the application form for the Award System of Energy Efficient Best Practice Buildings because there were number of pages to be filled and preparation of data and information is very tough.

In this field, it can be considered that the energy audits conducted under the PROMEEC (Buildings) project and each tool now under development in the PROMEEC (Energy Management) would be very effective for their activities.

VISIT to ORGANIZATIONS / COMPANIES CONCERNED (Indonesia) NO.3

Name of Organization : Kartika Chandra Hotel

| Item | | Details |
|------|---|---|
| 1 | Date | 15:50 - 16:50, Fri., 1 st December |
| 2 | Interviewee | Mr. H. Aang Suhata (Chief Engineer) Mr. Haryanto (Assistant Chief Engineer) Mr. H. M. A. Kosasih (Assistant Chief Engineer) |
| 3 | Visitors (ECCJ) | Kazuhiko Yoshida (General Manager) Fumio Ogawa (Technical Expert) |
| 4 | Visitors (ACE, Focal Point) | <u>ACE</u> ; Mr. Ivan Ismed (Project Officer) Ms. Maureen Balamiento (Database & IT Specialist) Ms. Cindy Rianti (Senior Information Officer) <u>Focal Point (MEMR)</u> ; Mr. Ainul Wafa (DGEEU, Ministry of Energy and Mineral Resources) |
| 5 | Brief Profile of Company or Organization | Establishment : 1971 Business outline : Hotel Employees : 320 Address : Center of Jakarta |

Summary of Activities

At first, the ECCJ / ACE team explained the purpose of the visit and outlined the activities of the PROMEEC projects. We requested them to participate in the activities and program of the PROMEEC projects in the future, in particular, to participate enthusiastically in the ASEAN Award System of Best Practices in Energy Management under the PROMEEC (Energy Management) project. Although Mr. Aang from this hotel participated in the Intensive Seminar-Workshop on the previous day and considerably understood the activities and effectiveness of the PROMEEC (Energy Management) project, we explained again these points because there were other persons in the meeting. This hotel is one of members (11 companies for this year in the building sector) participating in the MEMR's Partnership Program and they said that an investigation had already been done.

This hotel is a relatively old hotel constructed in 1971, some equipment seemed outdated and required for further improvement. The hotel's occupancy rate was varying 50% to 60%, which is considerably lower. It was hot in the lobby and passage and hotter in the meeting room. The room temperature of the air conditioning was setup at 25 and the share of energy consumption by the air conditioning system was 60%.

In response to our questions on the organization for energy conservation, they explained that operation meetings at the managerial level were held everyday and meetings of the Engineering Department were held every month. In the latter meeting, the participants discussed about reducing consumption of fuel (gas and oil), electricity, and water. Moreover, they hold additional meetings with employees from the other departments every 3 months for the purpose of sharing information and discussing improvement. For example, they have installed the capacitor banks to improve the power factor of electrical equipment. In addition, this hotel is a member of the Indonesian Hotel Engineers Association.

They were interested in the ASEAN Award System of Best Practices in Energy Management. In addition, Mr. Aang knows Mr. John Turangan who is a member (chairman) of the BOJ (EM), so that it seems easy for them to get advice etc.

Attachment-III-1 : Program of Intensive Seminar-Workshop



**INTENSIVE Seminar – WORKSHOP AGENDA
PROMOTION OF ENERGY EFFICIENCY AND CONSERVATION (PROMEEC)
(ENERGY MANAGEMENT) UNDER THE SOME-METI WORK PROGRAMME 2006-2007**

| | |
|----------------------|---|
| 08:30 – 09:00 | Registration |
| 09:00 – 09:10 | Welcome Remarks by the Host Country |
| 09:10 – 09:20 | Opening Statement by ECCJ Mr. Kazuhiko Yoshida : The Energy Conservation Center, Japan (ECCJ) |
| 09:20 – 09:30 | Opening Statement by ACE ASEAN Centre for Energy (ACE) |
| 09:30 - 09:40 | COFFEE BREAK & GROUP PHOTO SESSION |
| 09:40 – 10:40 | Session 1 : Seminar Outline of PROMEEC Projects and Achievements |
| 09:40 – 10:00 | Presentation by ACE Status of PROMEEC Projects under ASEAN Plan of Action for Energy Cooperation |
| 10:00 – 10:20 | Presentation by Mr. Kazuhiko Yoshida (ECCJ) Outline and Achievements of PROMEEC Project Recent Progress in PROMEEC (Energy Management) Project |
| 10:20 – 10:40 | Presentation by Focal Point Realized Activities and Outstanding Improvement in (Host Country) |
| 10:40 – 12:00 | Seminar Session 2 : Seminar “ASEAN Energy Management System” under PROMEEC (E.M.) |
| 10:40 – 11:10 | Presentation by Mr. Kazuhiko Yoshida (ECCJ) Basic Concept and Plan of “ASEAN Energy Management System” |
| 11:10 – 11:20 | Presentation by Mr. Kazuhiko Yoshida (ECCJ) Implementation Plan of PROMEEC (Energy Management) Project for 2006 – 2007 |
| 11:20 – 11:45 | Presentation by ACE : Dissemination Tools Developed Technical Directory for Major Industries and Buildings Developed In-house Database for Major Industries and Buildings |
| 11:45 – 12:00 | Presentation by Mr. Kazuhiko Yoshida or Mr. Fumio Ogawa (ECCJ) : Dissemination Tools under Developing Energy Management Handbook |
| 12:00 – 13:30 | Lunch |
| 13:30 – 14:40 | Session 3 : Seminar Activity to Work Functions of “ASEAN Energy Management System” |
| 13:30 – 14:00 | Presentation by Mr. Kazuhiko Yoshida or Mr. Fumio Ogawa (ECCJ) ASEAN Award System of Best Practices in Energy Management for Major Industries and Buildings |
| 14:00 – 14:20 | Presentation by Mr. Kazuhiko Yoshida (ECCJ) Proposed Plan to Utilize Existing Implementing Organizations |
| 14:20 – 14:40 | Explanation by Mr. Kazuhiko Yoshida (ECCJ) Request for Participation in PROMEEC (Energy Management) Program |
| 14:40 – 15:00 | COFFEE BREAK |
| 15:00 – 16:00 | Session 4 : Panel Discussion with Participants Request / Opinion to Participate in Activities of “ASEAN E.M. System” |
| | PRELIMINARY END OF INTENSIVE SEMINAR - WORKSHOP |
| 16:00 – 17:00 | Extra Session : Consultation for Participants on Energy Conservation (Specific Procedure to Participate in Program, General Issues on EE&C) |
| | COMPLETION of INTENSIVE SEMINAR - WORKSHOP |

III-3 Results and Achievements of Intensive Seminar-Workshops and Visits to Companies and Organizations

III-3-1 Summary of Results of Intensive Seminar-Workshops and Visits to Companies and Organizations

As a results of the aforementioned activities, it was possible to get great achievements as follows.

- (1) As shown in Table III-3-1-1, by the participation of 267 persons concerned, it was possible for the participants to better understand the activities of the PROMEEC projects and the functions / programs of “ASEAN Energy Management System” under the PROMEEC (Energy Management) project through active discussions.

| Visited Countries | Number of Participants |
|-------------------|------------------------|
| Brunei Darussalam | 42 |
| Cambodia | 28 |
| Indonesia | 57 |
| Lao PDR | 38 |
| Malaysia | 46 |
| Philippines | 26 |
| Vietnam | 30 |
| <u>TOTAL</u> | 267 |

Table III-3-1-1 : Intensive Seminar-Workshop / Number of Participants by Countries

- (2) As explained in Section III-3-2, based on the results of replies to the questionnaire for participants, it was proven that the functions and programs including tools of the “ASEAN Energy Management System” to be established in the PROMEEC (Energy Management) project matched with the needs of stakeholders in ASEAN. Moreover, the effectiveness of the activities under the project is also expected.
- (3) In addition to the Intensive Seminar-Workshops, the activities included the visits to 22 various organizations including the industrial associations and factories / buildings of enterprises. Almost all the visited organizations and participants of the Intensive Seminar-Workshop expressed their intention and wishes to participate in the activities of the PROMEEC (Energy Management) project and to utilize programs / functions of the “ASEAN Energy Management System” with intensions to cooperate to the PROMEEC projects.
- (4) The activities mentioned above resulted in expanding the network of enterprises, organizations and persons in the ASEAN countries. Especially, as shown in Table III-3-1-2, it is stressed that the project team visited 69 governmental organizations, implementing organizations and enterprises in ASEAN who became or would be important cooperators to the PROMEEC projects.

| | Brunei D. | Cambodia | Indonesia | Lao PDR | Malaysia | Myanmar | Philippines | Singapore | Thailand | Vietnam | TOTAL |
|--|-----------|----------|-----------|----------|----------|----------|-------------|-----------|-----------|-----------|--------------------|
| Government (Ministry / Department) | 1 | 1 | 2 | 1 | 2 | 1 | 3 | 1 | 2 | 3 | 17 |
| Governmental Organization | 0 | 3 | 2 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 8 |
| Implementing Organization | 0 | 0 | 3 | 0 | 2 | 0 | 2 | 0 | 2 | 3 | 12 |
| Associations Academy (University) | 0 | 2 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 5 |
| NGO / NPO | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Enterprises (Factory / Building) & ESCOs | 3 | 0 | 4 | 4 | 2 | 1 | 3 | 0 | 6 | 3 | 26 |
| TOTAL | 4 | 6 | 12 | 6 | 6 | 2 | 10 | 2 | 10 | 11 | |
| | | | | | | | | | | | GRAND TOTAL |
| | | | | | | | | | | | 69 |

Table III-3-1-2 : Number of Enterprises and Organizations by Countries

III-3-2 Summary of Replies from Participants to Questionnaire

The investigations were made based on the questionnaire to the participants of the Intensive Seminar-Workshop. The main investigation items are as follows.

The details of the questionnaire are shown in Attachment III-3-2-1.

- (1) Outline of organizations / companies where the participants are working
- (2) Barriers for the participants to promote energy conservation
- (3) Actual status of energy management and measures to breakthrough measures implemented or under studying
- (4) Expectation for the “ASEAN Energy Management System” to be established by the PROMEEC (Energy Management) project

The purpose of the investigation is to prove the following.

- (1) Appropriateness of the basic direction of activities of the PROMEEC (Energy Management) project
- (2) Effectiveness of program and functions to be equipped with the “ASEAN Energy Management System”

125 participants out of 267 participants submitted the replies to the questionnaire. According to the results of the investigation, it is proven that the direction of the PROMEEC (Energy Management) project is appropriate and the programs and functions of the “ASEAN Energy Management System” are effective. As a result, the PROMEEC (Energy Management) project continues activities to establish “ASEAN Energy Management System” in accordance with the present implementation plan.

Based on the replies received, the analyzed results are summarized below.

1. Barriers to promote energy conservation

At first, the barriers to promote energy conservation when participants implement improvements are summarized in Fig. III-3-2-1.

According to the figure, a lack of information, a lack of capabilities of engineers and

managers including a lack of person power are the main barriers. However, it would not be difficult to lower or weaken these barriers. The activities implemented and the “ASEAN Energy Management System” establishing under the PROMEEC (Energy Management) project aim at assisting in lowering these barriers.

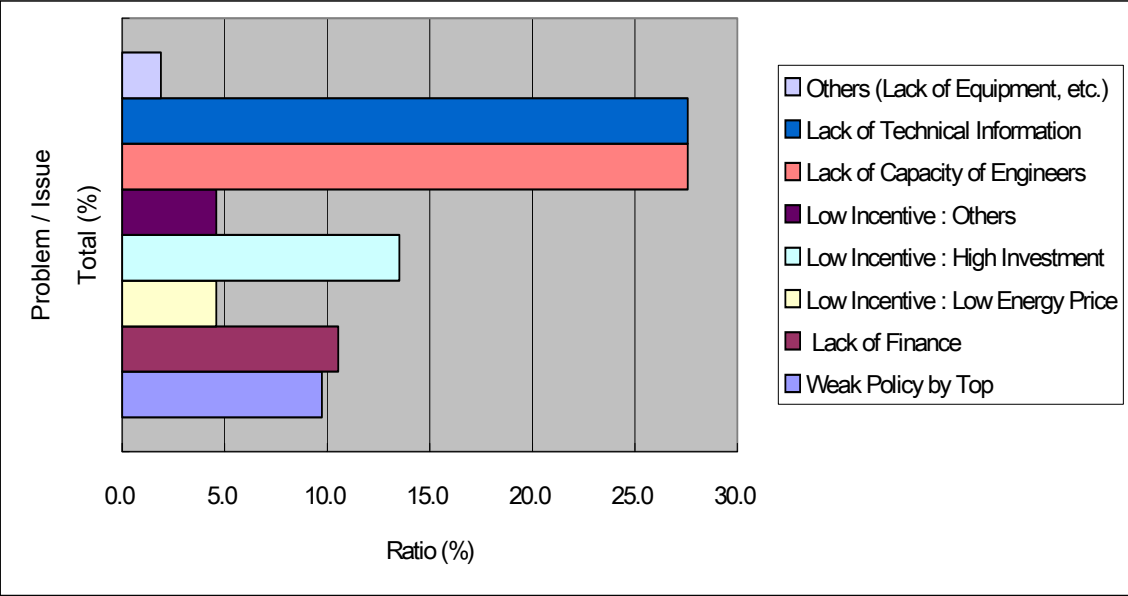
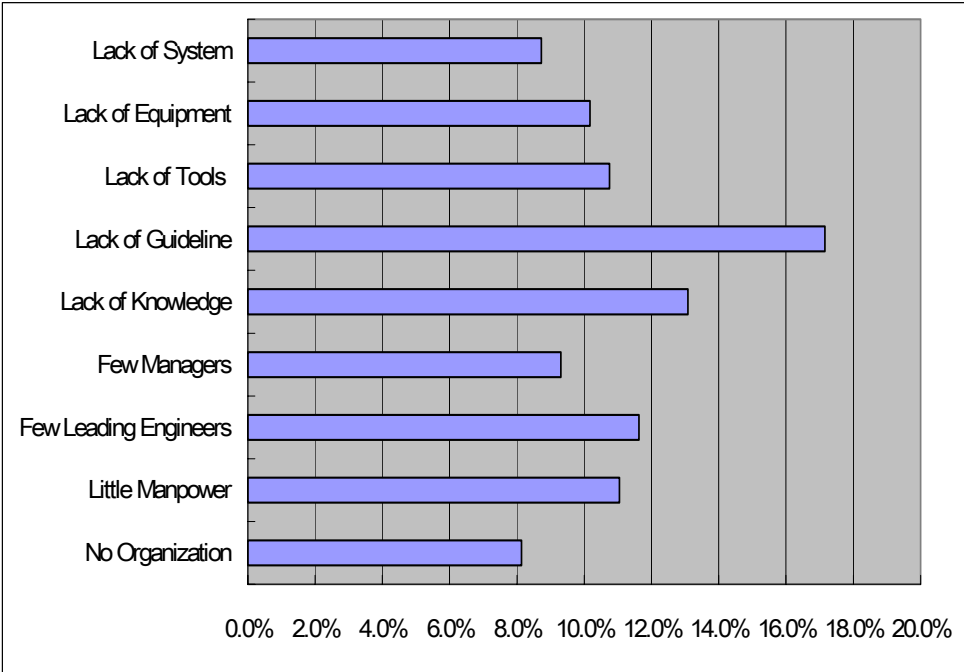


Fig. III-3-2-1 : Barriers to Promote Energy Conservation

2. Actual status and problems

Regarding the actual status of and problems with energy management practiced in factories and buildings where the participants are working, the results of replies to the questionnaire are shown in Fig. III-3-2-2.



III-3-2-2 : Actual Status of and Problems with Energy Management

Although the replied items include some inter-related factors, the following are the featured problems recognized by the participants.

- (1) Lack of guideline to practice energy management
- (2) Lack of knowledge on energy management and lack of staffs possible to understand and practice energy management
- (3) Insufficient tools and system to practice energy management

Actually, the “ASEAN Energy Management System” aims at providing ASEAN stakeholders with tools and functions to effectively utilize for the purpose of solving problems mentioned above.

3. Expectations and requests for PROMEEC (Energy Management) projects and “ASEAN Energy Management System”

Based on the above recognition clarified above, the questionnaire asked expectations and requests for the “ASEAN Energy Management System” which has been developed and started its operation under the PROMEEC (Energy Management) project. The summarized replies of the participants are shown in Fig. III-3-2-3.

The following would be the important expectations and requests for the “ASEAN Energy Management System”.

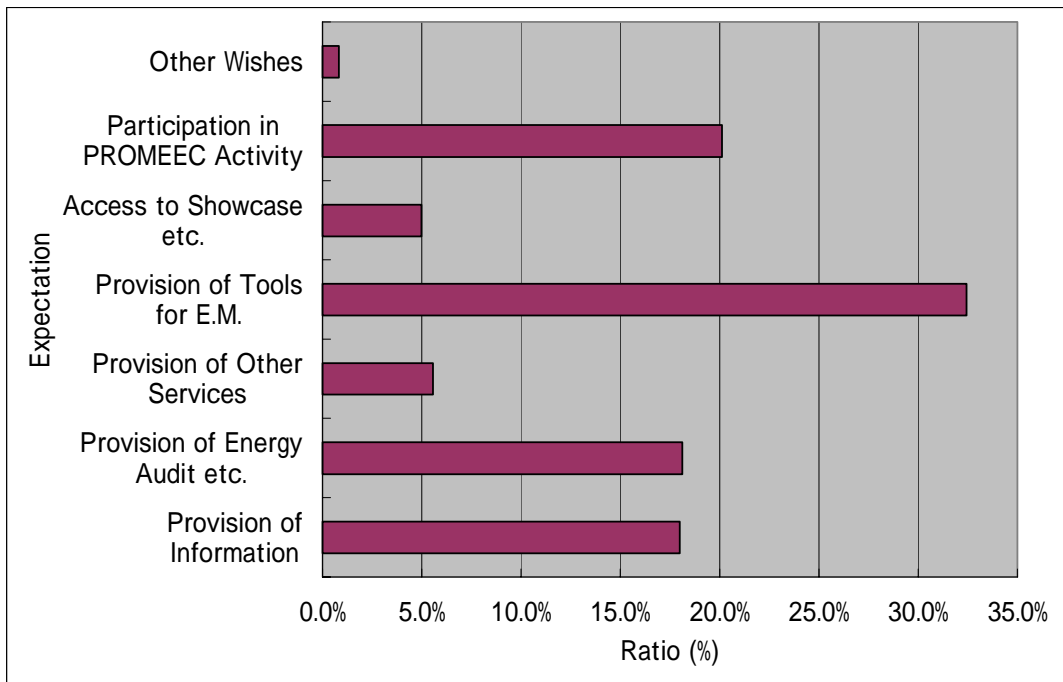
- (1) Provision of useful tools for energy management
- (2) Provision of useful information and services for energy management
- (3) Participation in activities of the PROMEEC projects

Since the programs and tools of the “ASEAN Energy Management System” and activities of the PROMEEC (Energy Management) project aim at meeting requests and expectations mentioned above and being utilized by ASEAN stakeholders, it is confirmed that the basic direction and specific activities of the PROMEEC (Energy Management) project are appropriate.

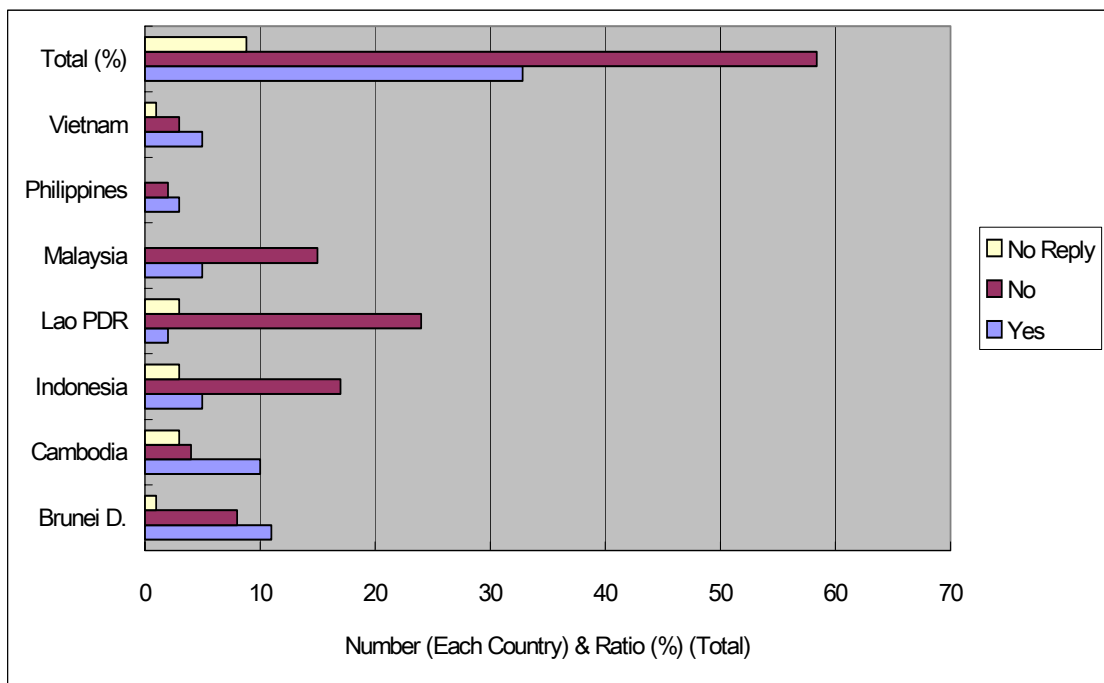
4. Points to be considered in implementing the project in the future

As aforementioned, the replies to the questionnaire by the participants proved that the activities and the “ASEAN Energy Management System” to be established by the PROMEEC (Energy Management) project would be very useful and effective to promote energy conservation through the establishing basis and infrastructure of energy management.

However, according to the replies from the participants, as shown in Fig. III-3-2-4, approximately 60% of the participants had not known the PROMEEC projects until the Intensive Seminar-Workshops were held. This fact shall be recognized and considered for future improvement. Namely, it will be required that the ASEAN-ECCJ team including the focal points should enhance activities to let more ASEAN persons to know the activities and achievements of the PROMEEC projects.



III-3-2-3 : Requests and Expectation for “ASEAN Energy Management System” and PROMEEC (Energy Management) Project



III-3-2-4 : Did you know the PROMEEC projects ?

Attachment-III-3-2-1 :

PROMEEC (Energy Management) Project for 2006 - 2007
Intensive Workshop : Profile of / Request from Participants

ECCJ / ACE

Please fulfill the following.

Have you known the "PROMEEC Projects" ? YES NO

1. Name of Participant and Company / Organization

(Participant) _____

(Company) _____

2. Outline of Your Company

(1) Business Field (Check) : Industry / Building / Others _____

(2) Specific Business(Please describe.)

(3) Details of Company

| | |
|-------------------------------|---|
| Year of Establishment | |
| Number of Employees | |
| City of Head Office / Country | |
| Number of Business Units | (Factories : _____ Branch Offices : _____) |
| Yearly Business Size | USD / Year (Production) tons/Year |

3. Problems / Issues to Promote Energy Conservation in Your Company

3-1. Weak Policy of Top Management : No Policy Statement
 No Commitment

(Please describe if any.)

3-2. Small Economy and Finance : Little Incentive / Lack of Finance
Why little incentive ? Low Energy Price High Investment
 Others (_____)

3-3. Technology

(1) Capability of Engineers (Technicians) to Understand and Use Technology
 Small Number Lower Individual Quality Lack of Experience

(2) Lack of Information on Details of Technology and/or Suppliers, etc.

Lack of Available Database Lack of Sharing System
 Little Access to Available Supplier of Technology and or Equipment

(3) Others(_____)
(Please describe if any.)

3-4. Energy Management

(Energy Audit / Data Monitoring / Improvement / Evaluation, etc.)

(1) No Organization Little Manpower

(2) Few Leading Engineers

Few Managers (For Implementation & Training)

(3) Lack of Knowledge Lack of Guideline

(4) Lack of Tools Lack of Equipment Lack of System

(5) Others (_____)

- 3-5. What is the most interested issue on energy conservation ?
 ()
- 3-6. Other Factors ()

4. Expectation for PROMEEC Project

- 4-1. Provision of Information Website Seminar-Workshop
 What kind of information ? ()
- 4-2. Provision of Services Energy Audit Training Consultation
- 4-3. Provision of Tools Manual / Handbook
 Database for In-house Use
 Other Tools Directory of Technology
 Directory of Suppliers
- 4-4. Access to Showcase or Best Practice Factories or Buildings: Yes / No
- 4-5. Actual Participation Industries
 Buildings
 Energy Management
- 4-5. Others including Wishes
 ()

Thank you very much for your kind cooperation !

III-3-3 Evaluation of the “ASEAN Energy Management System” Plan and Future Direction of Activities Based on the Results of Analyses

Based on the results of the replies to the questionnaire for the participants, it was possible to confirm that the target and specific functions of the “ASEAN Energy Management System” would coincide with the needs of ASEAN stakeholders including enterprises and concerned organizations for energy efficiency and conservation in the ASEAN countries.

Namely, it was proven that the present policy and plan of the “ASEAN Energy Management System” were appropriate in improving and/or supplementing capacities of ASEAN stakeholders with a focus on providing concerned persons with information and services for implementation.

In the Intensive Seminar-Workshops, furthermore, by knowing specific information and tools provided by the “ASEAN Energy Management System”, the participants showed their expectations that these information and tools would be very effective and their participation in the activities in the PROMEEC (Energy Management) project would bring them large benefits. This is an important achievement.

However, concerning the PROMEEC projects as a basis to establish and disseminate the “ASEAN Energy Management System”, it should be noted that many participants knew and understood the specifics of the projects for the first time in the Intensive Seminar-Workshops. In the future, therefore, further efforts and ideas by ECCJ-ASEAN team including the focal points will be required for ASEAN stakeholders to better know and understand the projects’ achievements and the merits in participation in the projects’ activities.

IV Preparation and Operation of Functions to Be Equipped with the “ASEAN Energy Management System”

IV-1 Outline

As described in Chapter II, the “ASEAN Energy Management System” is planned to provide the following main functions.

- (1) Provision of information, the award system and campaign to collect and disseminate useful information
- (2) Energy audit
- (3) Training
- (4) Advice and coordination to smoothly work the above functions

In this fiscal year, the “ASEAN Award System of Best Practices in Energy Management for Industries and Buildings” was started for the purpose of collecting and providing information useful for energy management. Moreover, the following activities have been in process.

- a. Drafting “Energy Management Handbook”
- b. Establishing the system to disseminate and assist the development of “Technical Directory” and a database for in-house use or “In-house Database” being developed under the PROMEEC (Major Industries and Buildings)

On the other hand, as for the function to provide services for energy audit and training, based on the results of investigations and study made to date, it has been studied to develop a system and procedures for utilization of the implementing organizations which are existing and actually working in the respective ASEAN countries. According to the study results, it would be realistic and optimum to establish the system for ASEAN customers to search and find some suitable implementing organizations for business negotiation by inputting required specific information of the implementing organizations and customers. In accordance with the above results, this system is in process of development.

The details are described hereunder.

IV-2 ASEAN Award System of Best Practices in Energy Management for Industries and Buildings : Plan and Implementation

The plan of “ASEAN Award System of Best Practices in Energy Management for Industries and Buildings” (hereinafter referred to as the “Award System for Energy Management”) was established, and started the 1st application in October 2006.

IV-2-1 Results of Discussion of The 1st Board of Judges (BOJ)

As mentioned in Chapter III, the discussion and approval on the implementation plan including the evaluation guideline were made and the application form was prepared by 9 members of the Board of Judges (BOJ (EM)) at Hanoi in Vietnam on September 20th and 21st, 2006.

As a result, the implementation plan and the application form were approved and the start of the “Award System for Energy Management” including the 1st application officially announced in October 2006 by ASEAN Centre for Energy (ACE) through the focal points. The details of the 1st BOJ (EM) are explained in Section III-2-3 of Chapter III.

IV-2-2 Results of The 2nd Research Forum in Japan

After having started the 1st application of the “Award System for Energy Management” in accordance with the results of the 1st BOJ (EM), the 2nd Research Forum in Japan was held in

Tokyo on December 12th through 14th in 2006 by inviting 10 BOJ (EM) members etc. from ASEAN for the purpose of improving the evaluation guideline and the application form.

Although the 1st application had started in the ASEAN countries since October 2006, in the Research Forum in Japan, the evaluation guideline was refined and the application form was improved by reflecting the refined evaluation guideline. Accordingly, since the Research Forum included the programs to introduce various related award systems in Japan and to provide the participants with opportunities of intercourses with concerned persons in some Japanese company by visiting a factory and of opinion exchange with several members of the BOJ for the Japanese Award System of Excellent Cases for Energy Conservation, the BOJ (EM) members could make deep and more specific discussion based on the programs.

Concerning the 1st application and evaluation of the “Award System for Energy Management”, the 2nd Research Forum in Japan resulted in big achievements in establishing the basis to implement the “Award System for Energy Management”. Therefore, based on the activities including the Intensive Seminar-Workshops and visits to factories and buildings in the 7 countries in September and November 2006, it was possible to complete preparation for operation the “Award System for Energy Management”. Regarding the basic schedule, the following were determined in the 2nd Research Forum in Japan. (Finally these were revised later.)

- (1) Close the 1st Application Late April 2007
- (2) Determination of ASEAN Winners) Early June 2007 (Tentatively on June 5th – 6th)
- (3) Official Announcement and ceremony) July 2007 (in the AMEM-METI Meeting)

The details are explained as follows

(Purpose of the 2nd Research Forum in Japan)

- (1) Introduction of the award systems for energy conservation in Japan such as the award system of excellent cases for energy conservation etc. including visit to an awarded factory
- (2) Exchange of opinions on procedures and evaluation guidelines with concerned persons in Japan
- (3) Refining the evaluation guideline and improvement of the application form of the “ASEAN Award System of Best Practices in Energy Management for Industries and Buildings”

(Participants)

10 members from the ASEAN countries (9 BOJ (EM) members and 1 from the coordinating organization (ASEAN Centre for Energy)) and 6 Japanese including one interpreter (Refer to Attachment IV-2-2-1 for detailed names of participants.)

(Program)

Refer to Attachment IV-2-2-2 in detail.

(Specific Activities and Results)

1. Situations of the 2nd Research Forum in Japan

The 2nd Research Forum is the activity related to the “ASEAN Award System of Best Practices in Energy Management for Industries and Buildings” and was held in accordance with the implementation plan agreed with the ASEAN in the inception workshop.

This award system aims at widely collecting cases of best practices in energy management from factories and buildings in the ASEAN 10 countries and at sharing and disseminating the collected cases in the ASEAN countries. On the hand, the award system is expected to bring tangible and intangible incentives and benefits to companies applied to the “Award System for

Energy Management”, the plan of the award system also targets to realize these incentives and benefits for applicants. In this fiscal year, 9 BOJ (EM) members (1 member in each country) were selected from the ASEAN countries. (One member from Singapore has not yet been selected.) These BOJ (EM) members gathered in Hanoi, Vietnam and the 1st BOJ (EM) was held in September 2006 and approved the basic plan of the “Award System for Energy Management”. In October 2006, the award system was commenced. Based on the progress mentioned above, the 2nd Research Forum in Japan was situated as a meeting equivalent to BOJ targeting to further specify and clarify the evaluation guideline and to improve the application form. In order to achieve these targets, the 2nd Research Forum in Japan was planned and implemented the following programs.

- (1) Lecture of the award systems for energy conservation realized in Japan
- (2) Case study to experience evaluation using the excellent cases actually awarded in Japan
- (3) Exchange of opinions and deepening understanding on energy management practice through visit to factory including discussion with engineers in the factory
- (4) Exchange of opinions with the committee members of BOJ of the award system in Japan
- (5) Preparation of output in the workshop based on the activities in the programs (1) through (4) mentioned above

2. Specific Program of the 2nd Research Forum in Japan

The program of the 2nd Research Forum is shown in Attachment IV-2-2-2. The program was implemented as follows.

- ♣1 Introduction and Keynote Lecture
- ♣2 Presentation
“Award Systems Implemented in Japan”, especially, “Award System of Excellent Cases for Energy Conservation”
- ♣3 Case study
Simulated evaluation in accordance with the previous evaluation guideline for ASEAN using 2 excellent cases awarded in Japan in FY 2005
- ♣4 Opinion Exchange (1)
Visit to Keiyo Factory of Kubota and opinion exchange on energy management practice with engineers in the factory
- ♣5 Opinion Exchange (2)
Opinion exchange on the award system with Japanese committee members of the BOJ for the “Award System of Excellent Cases for Energy Conservation” including Japanese advisors for the ASEAN “Award System for Energy Management”
- ♣6 Workshop (by the ASEAN BOJ (EM) members) on the Following
 - (1) Refining the evaluation guideline
 - (2) Improvement in the application form
 - (3) Confirmation of the future schedule

3. Outcomes of the 2nd Research Forum in Japan

The evaluation guideline of the “Award System for Energy Management” was assessed and refined, hence the application form was improved reflecting the refined evaluation guideline. In addition, the future schedule was confirmed. Therefore, the target of the 2nd Research Forum in Japan was achieved.

These improvements were made based both on the better understanding on the Japanese way and the difference in situations between the Japanese and the ASEAN’s through the lecture, case study and opinion exchange with the concerned persons including the BOJ members for the Japanese award system and on the advices made by the concerned Japanese persons. This

time it was very fruitful and effective for the ASEAN participants to get right and appropriate answers including advices to their questions and comments by the following Japanese committee members of the “Award System of Excellent Cases for Energy Conservation” based on the 31-year of experiences of operating the award system and evaluating many excellent cases.

- Dr. Kadoguchi (Chairperson, BOJ of the “Award System of Excellent Cases for E.C.)
- Mr. Akira Ishihara (Member, BOJ of the “Award System of Excellent Cases for E.C.)
- Mr. Akira Kobayashi (Member, BOJ of the “Award System of Excellent Cases for E.C.)

Moreover, according to the ASEAN participants, it was also very beneficial for them to obtain specific advices through the experience as follows.

- (1) Observation of the actual and very specific energy management practices at Kubota Keiyo Factory awarded as an excellent energy management practicing factory
- (2) Joint experience with Japanese advisors in evaluating excellent cases awarded in the “Award System of Excellent Cases for Energy Conservation” using the ASEAN evaluation guideline

Finally, the forum is actually equivalent to a BOJ (EM) meeting because this forum was concluded by the workshop where the ASEAN participants actively discussed from various viewpoints among them, under their management. As a result, the evaluation guideline and the application form were improved, as shown in Attachment IV-2-2-3 and Attachment IV-2-2-4. The discussion was made in the manner that the participants confirmed / shared the definition of each item and deepened their understanding item by item, which resulted in revising some evaluation items in terms of wording and score distribution with maintaining basic framework agreed in the 1st BOJ (EM) in Hanoi in September 2006.

Regarding the evaluation guideline, the following are the revised point.

- (1) Evaluation items simplified but more specifically defined
- (2) Score distribution weighed more on the “Impact” and “sustainability” of improvements (30% each)
- (3) Score distribution weighed less on the “Replicability” or a potential of dissemination

While the above revisions are very rational, in our opinion, some should be further tuned for better improvement in the future.

Based on the above revision of the evaluation guideline, the application form was improved with minor revisions in final though there were various discussions.

The above results shall be respected because of the decision by the ASEAN BOJ (EM) members. Accordingly, some proposal by some BOJ (EM) members if they need any revisions in the future in the future and the Japanese advisors (Mr. Yoshida and Mr. Ogawa etc.) should properly advise them so that they can recognize points for improvement specifically.

As for the schedule, the ASEAN members decided to coordinate to hold the BOJ (EM) to determine the winners on 5th and 6th June, 2007.

The results of the 2nd Research Forum in Japan concluded and confirmed that the present forum included excellent programs and the participants especially of the ASEAN BOJ (EM) could obtain very fruitful and effective output through implementing activities in accordance with the programs.

Pictures : 2nd Research Forum in Japan



Participants



Lecture



Opinion Exchange with Japanese Participants (Japanese Committee Members)

Attachment IV – 2 – 2 – 1 : List of Names ParticipantsASEAN Participants : BOJ (EM) Members

| No. | Name | Country | Organization / Title |
|-----|---|-------------------|---|
| 1 | Mr. Kha Sheng Tan | Brunei Darussalam | <u>Universiti Brunei Darussalam</u> Associate Professor and Head of Department of Engineering Science |
| 2 | Mr. Lieng Vuthy | Cambodia | <u>Ministry of Industry, Mines and Energy</u> Deputy Director, Department of Energy Technique |
| 3 | Mr. John A. W. Turangan | Indonesia | <u>The Indonesian Building Utility & Physics Engineers Association</u> Mechanical/Electrical Consultant |
| 4 | Mr. Khamso Kouphokham | Lao PDR | <u>Ministry of Energy and Mines</u> Deputy Chief of Electricity Management Division |
| 5 | Mr. Zainuddin Abdul Manan | Malaysia | <u>Universiti Teknologi Malaysia</u> Associate Professor of Chemical Engineering |
| 6 | Mr. U Win Khaing | Myanmar | <u>Myanmar Engineering Society</u> General Secretary |
| 7 | Mr. Artemio P. Habitan | Philippines | <u>Department of Energy</u> Section Chief of the Technology Promotion and Assessment Section |
| 8 | Ms. Amarporn Achavangkool | Thailand | <u>Department of Energy Alternative Development and Efficiency (DEDE)</u> Senior Scientist, Chief of Technical and Efficiency Promotion Division |
| 9 | Mr. Dang Hai Dung | Vietnam | <u>Ministry of Industry</u> Electrical Engineer, Science and Technology Department |
| 10 | Mr. Christopher G. Zamora (Coordinator) | Indonesia | <u>ASEAN Centre for Energy</u> Manager |

Japanese ParticipantsAIST *

| | | |
|----|-------------------------|---|
| 11 | Dr. Katsuhiko Kadoguchi | Senior Principal Planning Officer, Planning Headquarter ECCJ |
| 12 | Mr. Akira Ishihara | Managing Director |
| 13 | Mr. Hisakazu Tsujimoto | General Manager, Dissemination Dept. |
| 14 | Mr. Kazuhiko Yoshida | General Manager, International Engineering Dept. |
| 15 | Mr. Yoshitaka Ushio | General Manager, International Engineering Dept. |
| 16 | Mr. Fumio Ogawa | Technical Expert, International Engineering Dept. |
| 17 | Mr. Akira Kobayashi | Technical Expert, International Engineering Dept. |
| 18 | Ms. Katsuko Tamura | International Engineering Dept. |

Interpreter

| | | |
|----|-------------|--|
| 19 | Mikiko Wada | |
|----|-------------|--|

Mr. Zainuddin Abdul Manan returned on December 14th due to an urgent matter.

AIST *: Advanced Industrial Science and Technology

Attachment IV – 2 – 2 – 2 : Program of The 2nd Research Forum in Japan

| Date | | Activities |
|-------------|--------|---|
| December 11 | (Mon) | Arrival in Tokyo |
| December 12 | (Tue.) | 9:30 – 12:30 Opening Remarks by Mr. Akira Ishihara (ECCJ) Keynote Lecture by Mr. Kazuhiko Yoshida (ECCJ) Lecture by Mr. Hisakazu Tsujimoto “Award System in Japan for - Excellent cases for energy conservation - Factories and Buildings Excellent for Energy Management, etc.” |
| | | 14:00 – 17:00 Case Studies & Opinion Exchange Trial Evaluation of Actual Awarded Japanese Cases (ECCJ : Mr. Kazuhiko Yoshida, Mr. Fumio Ogawa, Mr. Akira Kobayashi and Mr. Hisakazu Tsujimoto) |
| December 13 | (Wed.) | 9:30 – 11:00 (Venue : ECCJ) Preparation for Workshop : Discussion & Opinion Exchange (ECCJ : Mr. K. Yoshida and F. Ogawa) |
| | | 13:30 – 15:30 Factory Visit : Kubota Keiyo Factory (ECCJ : Mr. K. Yoshida, Mr. Yoshitaka Ushio, Mr. F. Ogawa) |
| December 14 | (Thu.) | 9:30 – 11:00 Opinion Exchange on System and Evaluation with Japanese Committee Members and Experts <u>Japanese Committee Members</u> Dr. Katsuhiko Kadoguchi (Chairman from AIST*), Mr. A. Ishihara (ECCJ) and A. Kobayashi (ECCJ) <u>Advisers for ASEAN</u> Mr. K. Yoshida and Mr. F. Ogawa |
| | | 11:00 – 17:00 (Including Lunch time (12:30 – 14:00)) Workshop : “Development of Evaluation Guideline & Confirmation of Future Plan by All Participants Chair P. - Mr. Turangan / Vice C.P. - Ms. Amraporn ECCJ Adviser : Mr. K. Yoshida, Mr. F. Ogawa and A. Kobayashi |
| December 15 | (Fri.) | Departure from Tokyo |

* : AIST (National Institute of Advanced Industrial Science and Technology)

Attachment IV – 2 – 2 – 3 : Refined Evaluation Guideline

Evaluation Criteria for ASEAN Award System of Best Practices in Energy Management
As of December 14th, 2006

Red Letters : Revised points

| Evaluation Items | | Distribution of Score |
|--|---|-----------------------|
| 1. Impact | Energy Saving | 30% |
| | Environment (Positive / Negative) | |
| | Economic (Production , ROI, Investment) | |
| | Efficiency | |
| 2. Sustainability | Participation / Involvement | 25% |
| | Top Level Management Commitment | 30% |
| | Enforcement (Voluntary / Mandatory) | |
| | Applicability Short & Long Term Plan | |
| | Organization (ex. SGA, EC Team, etc.) | |
| | Capacity Building (Education, Training) | |
| 3. Replicability | Cost | 25% |
| | Technology | 20% |
| | Practicality Practice and Measures | |
| | Adaptability | |
| 4. Other Factors Originality | Innovation | 15% |
| | Creativity | |
| | Image Building | |
| 5. Overall Presentation | | 5% |

Attachment IV – 2 – 2 – 4 : Improved Application Form

**“ASEAN Award System of Best Practices in Energy Management
for Industries and Buildings”
- Application Form -**

As of December 14th, 2006

Category: Buildings
 Industries

Title of Activity / Project / Theme:

| |
|--|
| |
|--|

Applicant General Information

| | | |
|---------------------------|---|--|
| Name of Company | : | |
| Business Address | : | |
| Number of Employees | : | |
| Type of Building/Industry | : | |
| Age of Building/Industry | : | |
| Nature of Business | : | |
| Contact Person | | |
| Name | : | |
| Position | : | |
| Telephone | : | |
| Mobile phone | : | |
| Fax | : | |
| E-mail | : | |

Project Abstract:

| |
|-------------------------|
| Not more than 200 words |
|-------------------------|

CERTIFICATION AND ENDORSEMENT

The (insert name of building/industry) hereby agreed to allow the ACE Board of Judges and other experts that may be designated by ACE to visit the building/factory and verify the authenticity of the data. However, two weeks advance notice is required to allow for necessary arrangements.

We also hereby agreed that ACE can publish the whole submission in ACE publications and website, without any prior consent of the owner of the buildings and industries (factories). If the submission will be published in other publications, the consent of the concerned building and industry (factory) would be required.

We, the undersigned certified that the information given is true and accurate and prepared with the consent of the party/ies involved.

Name of the Applicant

Office, Position

Tel, fax, e-mail

Name of Top Manager /

Owner

Office

Position

Tel,

Fax,

E-mail

Endorsed by Focal Point

Name, Office (*country*) &

Position

Tel, Fax, e-mail

For further inquiries, please contact:

The Executive Director

ASEAN Centre for Energy

6th Floor, Jl. HR Rasuna Said, Blok X-2

Kav. 07-08 Kuningan, Jakarta 12950, Indonesia

Tel.: (6221 – 527-9332) Fax: (6221 – 527-9350)

E-mail: Christopher@aseanenergy.org

1. PROJECT / ACTIVITY OVERVIEW

Discussion items:

- 1.1 Description
- 1.2 Rationale
- 1.3 Target

2. POLICY ON ENERGY MANAGEMENT

Cite specific policy and how the policy is achieved. What management activities have been implemented to achieve the policy?

3. DETAILS OF ENERGY CONSERVATION ACTIVITIES (DURING THE LAST 2 YEARS)

Discussion items:

- 3.1 Specific measures and activities implemented
- 3.2 Yearly energy consumption / unit energy consumption (electricity – kWh; fuel – liters; etc.)
- 3.3 Problems and Countermeasures
- 3.4 Plans and targets
- 3.5 Energy Management Structure

4. DISCUSSION OF ACTIVITY / PROJECT RESULTS

Discussion items:

- 4.1 Effect of reduction in energy consumption
- 4.2 Economical effect
- 4.3 Environmental impact
- 4.4 Energy Efficiency Index (kWh/m²/year, GJ/ton, etc.) (to be defined by the applicant)

5. ADDITIONAL BENEFITS

Discussion items:

- 5.1 Replicability of technology used and practices and measures implemented
- 5.2 Sustainable activities and implementing organization (improved organization chart, new standardization, new operation mode, etc.)
- 5.3 Other tangible and intangible effects (increasing business efficiency, quality productivity, safety, morale, better communication, and pleasant workplace)
- 5.4 Creativity / innovation or new ideas

6. FUTURE ENERGY CONSERVATION / IMPROVEMENT ACTIVITIES

7. SUPPORTING DOCUMENTS/ATTACHMENTS

“ASEAN Award System of Best Practices in Energy Management for Industries and Buildings” - Guideline for Application -

1.0 INTRODUCTION

The ASEAN Centre for Energy (ACE) and the ASEAN Energy Efficiency and Conservation Sub-Sector Network (EE&C-SSN) established the Board of Judges for the ASEAN Energy Management for Buildings and Industry Competition under the ASEAN Energy Awards 2007. The Board had its first meeting in Hanoi, Vietnam on 20-21 September 2006 and drafted the Rules and Guidelines of the Competition. The Energy Conservation Center, Japan plays the role of an adviser to the Board. ACE serves as the Coordinator and Administrator of the Competition.

The rules and guidelines of the Competition are discussed below.

2.0 OBJECTIVES OF THE COMPETITION

- a). To promote and disseminate best practices in energy management demonstrated or applied in buildings and industries in the ASEAN Member Countries.
- b). To encourage private sector participation in adopting and implementing innovative and creative energy management approaches towards energy conservation to enhance business growth.
- c). To promote energy management as a tool to save energy and to improve environmental quality in the ASEAN region.

3.0. COMPETITION CATEGORIES AND DEFINITIONS

- 1). Buildings
- 2). Industries

3.1. Definition of Categories

3.1.a. Building

- 1). Open category – any type of buildings
- 2). Must have been operational for at least 2 years

3.1.b. Industry

- (1) Open category – any type of industries
- (2) Must have been operational for at least 2 years

4.0. NUMBER OF APPLICATION PER COUNTRY AND THE NUMBER OF WINNERS PER CATEGORY

Reference Table 01

| Name of Category | Max Number of Application/Member Country | No. of Winners per Category |
|------------------|--|---|
| 1. Building | 2 | 1 Winner; 2 Runner-ups (applicants with the same scores will be declared as group of winners/runners-up) |
| 2. Industry | 2 | 1 Winner; 2 Runner-ups (applicants with the same scores will be declared as group of winners/runners-up) |

5.0. CRITERIA AND DISTRIBUTION OF SCORES

Reference Table 2

| Criteria and Mark Structures | | |
|------------------------------|--|--------------------------|
| No. | Criteria Group | Maximum Marks Allocation |
| | | |
| 1 | Impact | 30% |
| | 1.1 Energy Saving (kWh/year) | |
| | 1.2 Environmental Effect | |
| | 1.3 Economic Effect | |
| | 1.3.1 Investment | |
| | 1.3.2 Payback period | |
| | 1.4 Energy efficiency index (kWh/m ² /year, GJ/ton, etc.) | |
| 2 | Sustainability | 30% |
| | 2.1 Level of participation and involvement | |
| | 2.2 Top Level Management Commitment | |
| | 2.3 Short and Long-term Plan | |
| | 2.4 Organization | |
| | 2.4.1 Established or Improved Organization for E.M. | |
| | 2.4.2 Capacity building | |
| | 2.4.3 Educational training | |
| 3 | Replicability | 20% |
| | 3.1 Practices and Measures | |
| | 3.2 Technology | |
| 4 | Originality | 15% |
| | 4.1 Creativity | |
| | 4.2 Innovation | |
| 5 | Presentation and Impression | 5% |
| 6 | Total | 100% |

6.0. RULES, FORMAT AND REQUIREMENTS FOR APPLICATION

6.1. PRE-QUALIFICATION REQUIREMENT

Buildings and industries are operational for at least 2 years.

6.2. SUBMISSION PROCEDURE AND REQUIREMENTS

6.2.1 The Application Form must be channeled through the designated Focal Points of the ASEAN EE&C-SSN. The Focal Points shall ensure that the applications are in full compliance with the rules and requirements of the competition. The Focal Points shall forward the Application Form, both hard and soft copy, to ACE, two (2) weeks prior to the final judging session of the Board.

6.2.2 The soft copy of the Application Form must be saved in one (1) CD in a Microsoft Word and/or Microsoft Excel format. In addition, twelve (12) original hard copies will

be submitted to ACE, ready for distribution to the Board of Judges during the evaluation meeting.

- 6.2.3 The Application Form, submitted to ACE, must be written only in the English Language.
- 6.2.4 ACE should put a mark on late submission of filled out Application Forms.

6.3. SUBMISSION FORMAT

Reference Table 3

| Item No. | Submission Heading/Discussion Items | Maximum Number of Page Allocation* | |
|----------|--|------------------------------------|-----------|
| | | Building | Industry |
| 1 | Application Cover | 1 | 1 |
| 2 | Certification and endorsement | 1 | 1 |
| 3 | Project/Activity Overview | | |
| | 3.1 Description | | |
| | 3.2 Rationale | | |
| | 3.3 Target | | |
| 4 | Policy on Energy Management | | |
| 5 | Details of Energy Conservation Activities (during the last 2 years) | | |
| | 5.1 Specific measures and activities implemented | | |
| | 5.2 Yearly energy consumption / unit energy consumption (electricity – kWh; fuel – liters; etc.) | | |
| | 5.3 Problems and Countermeasures | | |
| | 5.4 Plans and targets | | |
| | 5.5 Energy Management Structure (team / group, etc.) | | |
| 6 | Discussion of Activity/Project Results | | |
| | 6.1 Effect of reduction in energy consumption | | |
| | 6.2 Economical effect | | |
| | 6.3 Environmental impact | | |
| | 6.4 Energy Efficiency Index | | |
| 7 | Additional Benefits | | |
| | 7.1 Replicability of technology used and practices and measures implemented | | |
| | 7.2 Sustainable activities and implementing organization (improved organization chart, new standardization, new operation mode, etc.) | | |
| | 7.3 Other tangible and intangible effects (increasing business efficiency, quality productivity, safety, morale, better communication, and pleasant workplace) | | |
| | 7.4 Creativity / innovation or new ideas | | |
| 8 | Future Energy Improvement Activities | | |
| 9 | Supporting Document | | |
| | Total No. of Pages | 17 | 17 |

* There is no definite number of pages allocated for each submission heading or discussion items. However, the total number of pages must not exceed 17 pages.

* Penalty will be applied to applications that exceeded the maximum number of pages. Score that will be deducted from the total garnered score will depend on the judgment of the BOJ member.

6.4 EVALUATION OF APPLICATIONS

- 6.4.1 One vote for one country.
- 6.4.2 A BOJ member is not allowed to evaluate application/s that come from his/her country of origin.
- 6.4.3 Each application form will be evaluated for 30 minutes.
- 6.4.4 The Board will not allow or entertain any question, comment and suggestions during the evaluation process. Scores must be provided on the score sheets on the merit of the applications.
- 6.4.5 The individual member of the Board shall be given 30 minutes to compare and finalize the scores given to each application.
- 6.4.6 All score sheets must be submitted to ACE after all applications in one category have been completed.
- 6.4.7 If any member of the BOJ failed to submit the score sheets on the time set, his or her score sheets will not be included in the overall tabulation.

6.5 TABULATION OF SCORES AND SELECTION OF WINNERS

- 6.5.1 The ACE representative and the 2 appointed witnesses shall comprise the Secretariat whose function is to tabulate, validate and certify the scores given by all the members of the Board.
- 6.5.2 The Secretariat shall complete, verify, and certify the Overall Tally Sheet, with their signatures affixed. The OTS summarizes the scores given to each of the application by all the judges.
- 6.5.3 The first three submissions which garnered the highest average scores will be selected/declared winner, first and second runner-up. In the event of “tie scores”, all of them will be considered as “group winners”.
- 6.5.4 The judges will not be given the detailed mark scores to take home. This is a way of ensuring that the judges’ integrity is protected. Once winners are identified, the BOJ would respect the majority’s decision and draw the judging to the conclusion at the Meeting, subsequent personal investigation and scrutiny should not be encouraged under the ASEAN spirit of friendship and solidarity. Specific details of the competition will be kept in the custody of ACE.

7.0 ANNOUNCEMENT OF WINNERS

- 7.1. The Secretariat, led by the ACE representative, will brief the Chair and Vice-Chair of the tabulation results.
- 7.2. The Chairman will hold “discussion session” to consider and agree on the results of the tabulations and announce the winner and runners-up of the competition.
- 7.3. Any complaints, inconsistencies or observations must be discussed during the said “discussion session”.

7.4. ACE will submit a summary of the proceedings of the BOJ Evaluation Meeting to all the Focal Points of the EE&C-SSN and SOE Leaders.

7.5. ACE will notify the applicants on the results of the competition.

8.0. PRIZES

8.1. Winners and runners-up will be awarded with Trophies.

8.2. ACE will provide plaques of “*Achievement Award in Energy Management*” to all nominees.

9.0 AWARDING CEREMONIES

9.1. The Awarding Ceremonies will be held in conjunction with the gala dinner of the ASEAN Energy Ministers and ASEAN Energy Business Forum in July 2006, Singapore.

10.0 PUBLICATION AND PROMOTION

10.1 ACE will publish the applications in the ACE website.

10.2 ACE will feature the winners in the ASEAN Energy Bulletin.

FOR REFERENCE

Points to Be Included (For Reference)

- (1) Overview of Activity / Project
 - Description,
 - Reasons,
 - Purpose
 - Target
 - (2) Top policy on Energy Conservation / Energy Management
(Including specific support for the activity / project)
 - (3) Specifics of Energy Saving Activities (during the last 2 years)
 - Specific Measures and Activities implemented for Improvement
Plan and Implementation including process, steps and time schedule for realization
 - Yearly Energy Consumption / Unit Energy Consumption (base load)
Energy unit in (Electricity: kWh / Fuel kg, kl, m3 etc. (with MJ / (kg or kl, etc.))
Preferably Production Volume / Mass, Width, Numbers etc. to Derive Unit Consumption
 - Identification of Problems and Countermeasures
 - Setting Target
 - Special efforts to Study Measures and the implementation for Improvement
 - Responsible Organization or Team to implement the Activity / Project
(Including “Small Group” etc. to develop / implement activities)
 - (4) Actual Results
 - Effect of Reduction in Energy Consumption
In Comparison of Yearly Energy Consumption / Unit Energy Consumption for one year
or longer after Improvement with Base Load
 - Economical Effect
Reduction in Cost / ROI
Payout time
 - Featured Efforts of Activities
 - Impact on Environment
 - (5) Additional Benefits
 - Potentiality of Applicability for Dissemination and Estimated Effect
(Number of Potential Factories / Buildings, Utilization of Technology in A Similar
Factory / Building, etc.)
 - Creativity / innovation or new ideas
 - Sustainable Activities and Implementing Organization (Organization Chart, New
Standardization, New Operation Mode, etc.)
 - Other Tangible and Intangible Effects (Increasing business efficiency, quality,
productivity, safety, morale, better communication and pleasant workplace, etc.)
 - (6) Future Energy Improvement Activities
 - (7) Supporting Document
-
-

IV-2-3 Updated Plan and Status of Implementation

As of the end of March 2006, the “Award System for Energy Management” has been smoothly implemented as per the updated plan.

In each ASEAN country, through the focal point, each country will choose 4 cases at a maximum of 2 cases from the industry area and 2 cases from the building area and submit the selected cases to the ASEAN competition. In ASEAN, ASEAN centre for Energy will collect the cases including various coordination.

Among 40 cases at a maximum applied to the ASEAN competition, the BOJ (EM) will basically choose the awardees as follows.

(Industry Area) 1 winner and 2 runner-ups

(Building Area) 1 winner and 2 runner-ups

Concerning the plan of the 1st award, the time schedule was partially revised as follows after the 2nd Research Forum in Japan by ASEAN.

Close of application : April 2007

BOJ (EM) to decide winners : May 2007

Official announcement and ceremony : August 2007 (During AMEM (ASEAN Ministers on Energy Meeting)

Publishing awarded cases on website : September 2007

IV-3 Preparation of the System to Utilize the Existing Implementing Organizations

IV-3-1 Proposed Basic Plan

The purpose of the system is to provide the function for enterprises in the ASEAN to utilize the existing implementing organizations in ASEAN and to get services of energy audit and training. Namely, the function will work so that ASEAN customers can get specific services if they wish from their preferable implementing organizations existing in the ASEAN region. More specifically, the so called “Cyber Search System” is planned for the system to utilize the existing implementing organizations. In the system, the implementing organizations and customers register the respective information and this system searches the implementing organizations and customers of which requests and conditions for services meet each other.

Namely, the implementing organizations open the items of services with conditions wishing to provide. On the other hand, customers wishing to get services also register the specifications and conditions to purchase wished services. The “ASEAN Energy Management System” will include the cyber search system to utilize the existing implementing organizations as the place for the implementing organizations and customers to register the respective information.

Actually, this place will be prepared on the ACE website so that the implementing organizations can register services the wish to provide and customers can also register specifications and purchase conditions of their wished services for appropriate implementing organizations. This system to utilize the existing implementing organizations compares the specifications and conditions required by the both stakeholders and find the implementing organizations and customers whose requests and conditions meet each other within certain ranges.

The role and scope of this system is to finally provide these stakeholders with information on suitable partners for services of energy audit and training. After receiving information from the system, customers will directly discuss and negotiate with the implementing organization(s) recommended by the system.

The basic concept of the cyber search system to utilize the existing implementing organizations is shown in Fig. IV-3-1-1.

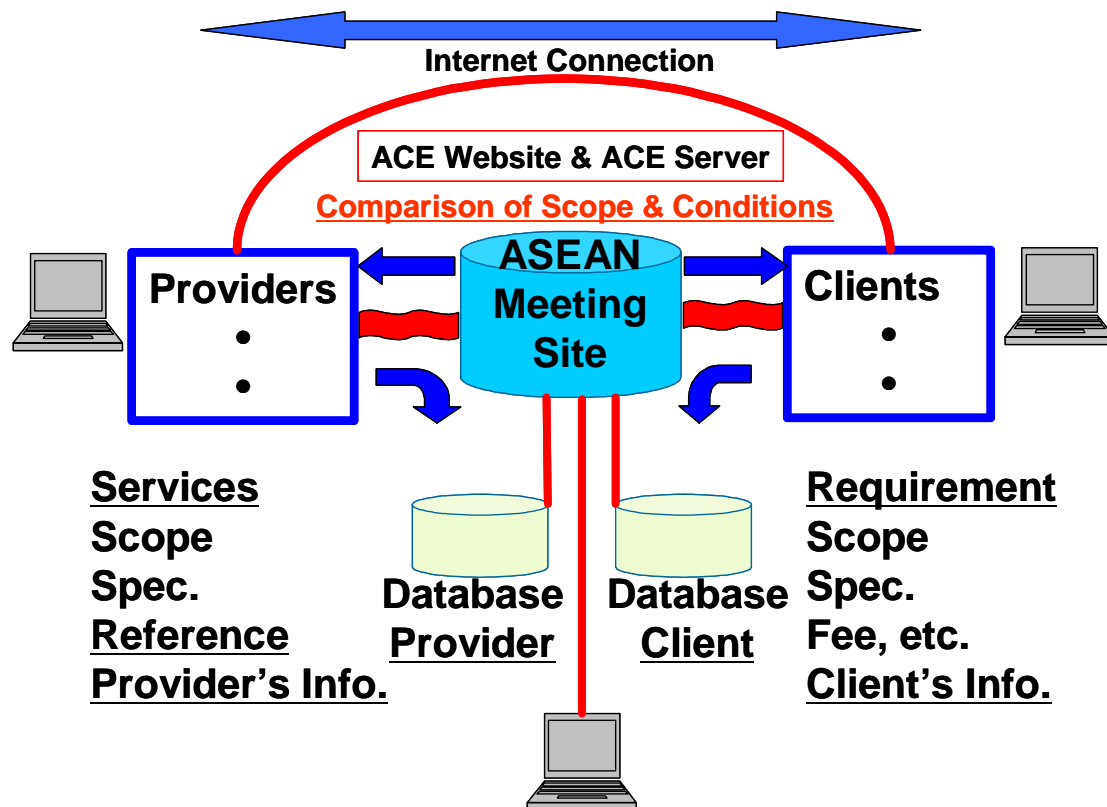


Fig. IV-3-1-1 : Concept of “Cyber Search System to Utilize the Existing Implementing Organizations

The information required for the existing implementing organizations and customers to register is shown in Table IV 3-1-1 and Table IV 3-1-2.

IV-3-2 Status of Preparation of the System

In the Intensive Seminar-Workshop held in 7 countries, the ECCJ team introduced the basic concept of the cyber search system to utilize the existing implementing organizations, and asked for opinion and comments of the participants. As a result, the proposed concept of this system was accepted by almost all the participants, and they requested to prepare and start working this system as early as possible. This point was also reported and confirmed by the focal points from the ASEAN 10 countries in the Summary and Post.

As of the end of March 2007, ECCJ experts have already prepared the basic form in which all the required information should be fulfilled by the implementing organizations and customers. Based on the form prepared by ECCJ, ACE has been developing the design of the cyber search system to utilize the implementing organizations to be uploaded on the ACE website. It would be possible to start its trial operation in the early stage of the next fiscal year.

Basic Data for Utilization of The Existing Implementing Organizations

Customer

Name of Organization or Company

| |
|--|
| |
|--|

1. General Information

Address

| |
|--|
| |
|--|

Operation (Governmental / Private, etc.)

| |
|--|
| |
|--|

Capital

| |
|--|
| |
|--|

Number of Employees

| |
|--|
| |
|--|

Branch / Liaison (Country and City)

| |
|--|
| |
|--|

Business Specifics

| |
|--|
| |
|--|

2. Services Required

2-1. Energy Audit

(1) Buildings

Typical Scope (Categories, etc.)

| |
|--|
| |
|--|

Typical Specifications

| |
|--|
| |
|--|

(2) Factories

Typical Scope (Categories, etc.)

| |
|--|
| |
|--|

Typical Specifications

| |
|--|
| |
|--|

(3) Conditions for Services

| |
|--|
| |
|--|

2-2. Training

(1) Energy Management Course

Typical Scope (Categories, etc.)

| |
|--|
| |
|--|

Typical Curriculum / Specifications

| |
|--|
| |
|--|

(2) Specific Technological Course

Typical Scope (Categories, etc.)

| |
|--|
| |
|--|

Typical Curriculum / Specifications

| |
|--|
| |
|--|

(3) Specific Practical Course

Typical Scope (Categories, etc.)

| |
|--|
| |
|--|

Typical Curriculum / Specifications

| |
|--|
| |
|--|

(4) Conditions for Services

| |
|--|
| |
|--|

2-3. Educational Course

Typical Scope (Categories, etc.)

| |
|--|
| |
|--|

Typical Curriculum / Specifications

| |
|--|
| |
|--|

Conditions for Services

| |
|--|
| |
|--|

2-4. Consultation / Engineering

Typical Scope (Categories, etc.)

| |
|--|
| |
|--|

Typical Curriculum / Specifications

| |
|--|
| |
|--|

Conditions for Services

| |
|--|
| |
|--|

2-5. Others

Typical Scope (Categories, etc.)

| |
|--|
| |
|--|

Typical Curriculum / Specifications

| |
|--|
| |
|--|

Conditions for Services

| |
|--|
| |
|--|

Table IV 3-1-1 : Basic Information Required (For Customers)

Basic Data for Utilization of The Existing Implementing Organizations

Service Provider

Name of Organozation or Company

| |
|--|
| |
|--|

1. General Information

Address

| |
|--|
| |
|--|

Operation (Governmental / Private, etc.)

| |
|--|
| |
|--|

Capital

| |
|--|
| |
|--|

Number of Employees

| |
|--|
| |
|--|

Branch / Liaison (Country and City)

| |
|--|
| |
|--|

Business Specifics

| |
|--|
| |
|--|

2. Services Possible to Provide

2-1. Energy Audit

(1) Buildings

Typical Scope (Categories, etc.)

| |
|--|
| |
|--|

Typical Specifications

| |
|--|
| |
|--|

(2) Factories

Typical Scope (Categories, etc.)

| |
|--|
| |
|--|

Typical Specifications

| |
|--|
| |
|--|

(3) Conditions for Services

| |
|--|
| |
|--|

2-2. Training

(1) Energy Management Course

Typical Scope (Categories, etc.)

| |
|--|
| |
|--|

Typical Curriculum / Specifications

| |
|--|
| |
|--|

(2) Specific Technological Course

Typical Scope (Categories, etc.)

| |
|--|
| |
|--|

Typical Curriculum / Specifications

| |
|--|
| |
|--|

(3) Specific Practical Course

Typical Scope (Categories, etc.)

| |
|--|
| |
|--|

Typical Curriculum / Specifications

| |
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| |
|--|

(4) Conditions for Services

| |
|--|
| |
|--|

2-3. Educational Course

Typical Scope (Categories, etc.)

| |
|--|
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|--|

Typical Curriculum / Specifications

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Conditions for Services

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2-4. Consultation / Engineering

Typical Scope (Categories, etc.)

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| |
|--|

Typical Curriculum / Specifications

| |
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|--|

Conditions for Services

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2-5. Others

Typical Scope (Categories, etc.)

| |
|--|
| |
|--|

Typical Curriculum / Specifications

| |
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Conditions for Services

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|--|

Reference (Lists of Actual Services in 5 Years)

2-1. Energy Audit

2-2. Training

2-3. Educational Course

2-4. Consultation / Engineering

2-5. Others

**Table IV 3-1-2 : Basic Information Required
(For The Existing Implementing Organizations)**

IV-4 Development of Tools for Energy Management

IV-4-1 Proposed Basic Plan

Another important function of the “ASEAN Energy Management System” is to provide some effective tools for energy management. Relating to the activities under the PROMEEC (Major Industries and Buildings), the database for in-house use (“In-house Database”) and Technical Directories are being prepared, in addition, the “Energy Management Handbook” is also under development, as the activities to develop the tools for energy management.

IV-4-2 Development of Basic Design of and the System for Dissemination of In-house Database for Major Industries and Buildings

For the purpose of effectively utilizing for energy management in factories and buildings, some standardized data files are prepared and uploaded on the website so that concerned staffs in factories and buildings can download the data files to utilize in their factories.

The standardized data files have been developed under the PROMEEC (Major Industries and Buildings). Basically, these standard data files will be prepared based on the questionnaire prepared by ECCJ and used for energy audits in factories and buildings in the past. Fig. IV-4-2-1 shows the basic concept of the system to utilize the standardized data files for the customers’ In-house Database.

The standardized data files will consider the required factors as follows.

- (1) Data required for energy management
- (2) Standard form for data compiling and standard indices for energy management.
- (3) Standardized and typical data processing and diagrams for monitoring and management
- (4) Effective analyses to find out improvement measure such as statistical and process analyses

Moreover, the standardized database will require a good design to find out effective improvement. In order to conduct a deep analyses, therefore, in case of databases for buildings the data should be arranged equipment by equipment, and in case of databases for major industries the data should be arranged process by process so that the relation of energy use between the equipment or process can be also identified. The concept of the basic design and management of database is shown in Fig. IV-4-2-2.

Based on the consideration mentioned above, the databases for major industries and buildings have been in process of development and preparation under the PROMEEC (Major Industries and Buildings).

The database for buildings is completed and currently under improvement for the actual usage. On the other hand, the databases for major industries will be prepared under the basic plan to develop databases for the respective sub-industries and to be completed within 2 years.

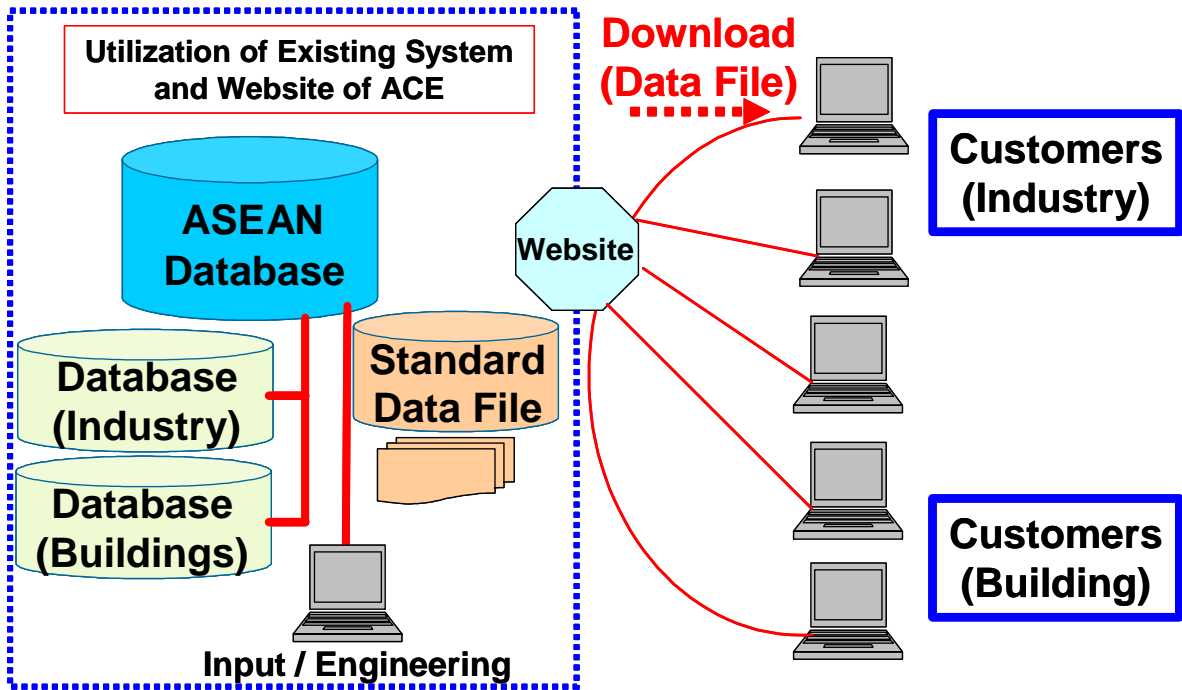


Fig. IV-4-2-1 : System to Provide “In-house Database”

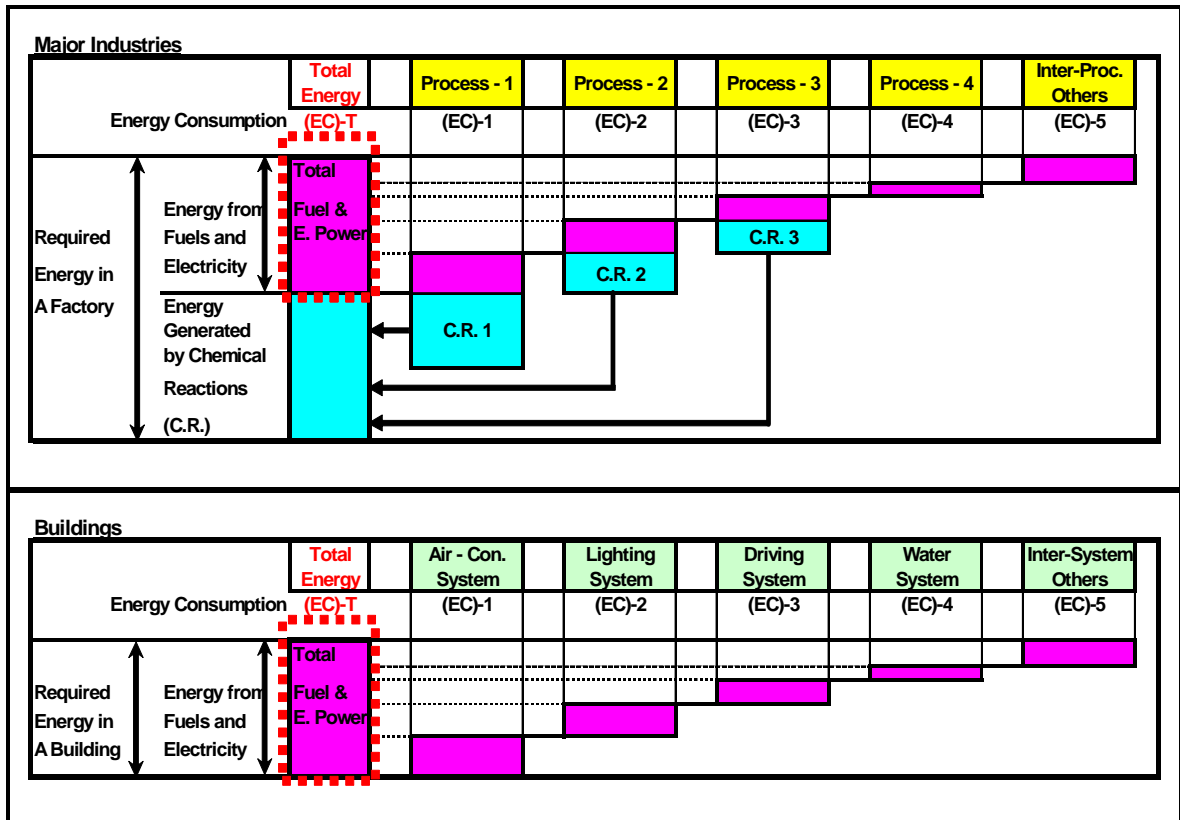


Fig. IV-4-2-2 : Concept of Basic Structure for “In-House Database”

IV-4-3 Preparation of System for Dissemination of Technical Directories for Major Industries and Buildings

The “Technical Directory” aims at collecting effective technologies for energy conservation including specific cases to apply these technologies, and at being disseminated in the ASEAN region. The system to realize the above purposes will be established. The effective technologies for energy conservation will be actually collected in the PROMEEC (Major Industries) and PROMEEC (Buildings) projects and the system to disseminate the “Technical Directory” will be established and worked in the PROMEEC (Energy Management) project. The details of the “Technical Directory” are described in the reports of the PROMEEC (Major Industries and Building) projects, this report does not describe the details. The basic structure of the “Technical Directory” is considered to be user-friendly and easy to update and expand the contents. The following are the basic contents of the “Technical Directory”.

▶ Part – 1 : Overview of Technologies

This part consists of summary of effective technologies and effects for buildings and industrial sub-sectors for industries. This summary eases searching by readers.

▶ Part – 2 : Details of Technologies

This part describes the details of features of mechanism to achieve energy conservation and typical effects of the individual technologies. The descriptions are based upon the information and data possible to publish. For some items, this part setup accesses such as names of makers including information including information on industrial properties to contact suppliers for more information.

▶ Part – 3 : Excellent Cases for Each Technology

By choosing some successful cases, specific excellent cases for each technology applied are prepared for reader to easily understand how to apply each technology in a factory or a building. Specifically, it would be realistic to apply cases actually realized in the PROMEEC (Major Industries and Buildings) projects based on the results of energy audits in factories and buildings.

The Technical Directory could be disseminated through accessing to the ACE or ECCJ website and/or introducing it in the seminars conducted under the 3 PROMEEC projects.

IV-4-4 Development of Energy Management Handbook

The Energy Management Handbook has been developed and prepared as a tool to provide guidelines for voluntary activities for energy conservation in factories and buildings. The draft was prepared in FY 2006. The development of this handbook is based on the basic policy to utilize the Total Energy Management (TEM) Handbook developed in Thailand under the cooperation between Thai and Japanese government through METI. In Thailand, the effects of the TEM Handbook have been already proven in Thailand. The essence of the Energy Management Handbook is to provide users with guidelines to apply the principles of the small group activities, the Total Quality Management (TQM) and the Total Productivity Maintenance (TPM) for the activities to promote energy conservation.

In case of Thailand, the cultures of Japanese enterprises and business custom are well known because many Japanese enterprises established business, and business activities with Japanese are very active. Therefore, the environment to utilize the TEM Handbook was established. However, the situations in ASEAN are not necessarily similar to the Thai and there would be many countries where business is based on those by European or American enterprises or on the local business without knowing the culture and environment of the Japanese enterprises.

When the Energy Management Hand book is developed, these points should be considered.

The main contents of the Energy Management Handbook consist of the following.

- ▶ Part – 1 : Purposes and Usage of Energy Management Handbook
- ▶ Part – 2 : Total Energy Management "by Participation" with Key Step Approach
- ▶ Part – 3 : Implementation of Energy Conservation Projects

Appendix – 1

Successful Examples of Energy Conservation by Small Group Activities in ASEAN countries
(Samples of Winners for “ASEAN Award System of Best Practices in Energy Management for Industries and Buildings”)

Appendix – 2

Related Information

The important parts of this handbook are Part-2 and Part-3 where the guidelines of activities based on the experience of having practiced the small group activities and TPM/TQM are given. Accordingly, the important points to develop this handbook are as follows.

- (1) To be user-friendly
- (2) To be flexible for updating and expanding
- (3) More practical than technical

In addition, in order to maximize the achievements of the PROMEEC projects, the cases awarded by the “ASEAN Award System of Best Practices in Energy Management for Industries and Buildings” will be selected for the cases in ANNEX-1. Furthermore, this handbook will also provide guidelines to effectively utilize the “In-house Database” and “Technical Directory” in Part-2.

It will be necessary to aim at realizing improvement possible to utilize in the ASEAN countries with different situations between the countries. So it is required to include activities to revise the specific draft and complete it as the handbook in the plan. Basically, it will be realistic and rational to finalize the handbook reflecting opinions and comments from users through the introductory use of the Energy Management Handbook in factories and buildings.

V Results of Discussion in the Summary and Post Workshops

Inviting the focal points from the ASEAN countries, the “Summary and Post Workshop” was held on 27th and 28th February, 2007 in Brunei Darussalam for the purpose of sharing information by the ASEAN 10 countries through confirming and evaluating the results of activities for the PROMEEC 3 projects and discussing the future plan. In the “Summary Workshop”, the participants discussed the PROMEEC (Energy Management) project. The program of the “Summary Workshop” is shown in Attachment V-1.

V-1 Summarized Actual Results and Achievements of Implementation of Projects for 2006 - 2007

As targeted in the plan of the PROMEEC (Energy Management) project, some important functions of the “ASEAN Energy Management System” started working. The actual results to date shows that the activities have been implemented on the schedule established in 2004 when the PROMEEC (Energy Management) project was established. Based on the actual results, the direction of improvement to establish the “ASEAN Energy Management System” has become clearer and the project has been in progress in spite of experiencing some difficulties.

The followings are the specific achievement in this one year.

- (1) Regarding “ASEAN Award System of Best Practices in Energy Management for Industries and Buildings”, BOJ (EM) was established and ASEAN officially announced the start of the award system including the 1st application in October 2006 with the target to collect and disseminate excellent cases for energy management.
- (2) The draft of the “Energy Management Handbook” as a tool available for energy management was prepared.
- (3) It was possible to proceed with work to establish the system to disseminate information and tools including “In-house Database” and “Technical Directory” under preparation in the PROMEEC (Major Industries and Buildings) projects.
- (4) Including the issues above, concerning the functions and programs of the “ASEAN Energy Management System” for ASEAN stakeholders to utilize, it was possible to identify and clarify the points possible to further improve and to study.
- (5) The Intensive Seminar-Workshop was held and the ECCJ-ASEAN team visited to companies / organizations in the 7 countries to introduce the activities of the PROMEEC (Energy Management) project and plan / functions of the “ASEAN Energy Management System” and to collect opinions and requests. These activities resulted in having made the above presentations to many ASEAN persons from enterprises and various organizations including the 265 seminar-workshop participants and in having exchanged and obtained opinions and requests from them.

As a conclusion, it was confirmed that the functions and programs of the “ASEAN Energy Management System” including those under planning would meet the actual needs of concerned persons in factories and buildings in the ASEAN countries.

- (6) Through the activities in each country, it was possible to expand the networks among enterprises, various organizations and concerned persons. These networks will be the basis to activate participation in the activities and disseminate achievements of the PROMEEC projects in the future.
- (7) In the activities of Item (4), we found the fact that the PROMEEC projects were not well known by the ASEAN persons. Accordingly, more enhanced efforts including efforts by the focal points will be required to let ASEAN persons know the PROMEEC projects and the activities under the projects.

Attachment V-1 : Program of “Summary and Post Workshop”



**SUMMARY AND POST WORKSHOPS
PROMOTION OF ENERGY EFFICIENCY AND CONSERVATION (PROMEEC)
(MAJOR INDUSTRY, BUILDING AND ENERGY MANAGEMENT)
SOME-METI WORK PROGRAMME 2006-2007
27-28 February, 2007
Oil & Gas Discovery Centre, Seria, Brunei Darussalam**

Day 1: 27 February

| | | | |
|------------------|---|---------------------------------|---|
| 08:00 | - | 08:30 | REGISTRATION |
| 08:30 | - | 09:30 | Opening Session |
| 08:30 | - | 08:35 | Welcome Remark from Mr. Hj ZainalAbidin bi Hj Mohd Ali, Deputy Managing Director Brunei Shell Petroleum |
| 08:35 | - | 08:40 | - Opening Statement from Dr. Prasert Sinskprasert, EE&C-SSN Chairman |
| 08:40 | - | 08:45 | - Opening Statement from Dr. Weerawat Chantanakome, Executive Director, ACE |
| 08:45 | - | 08:50 | - Opening Remarks by Mr. Tsuzuru Nuibe, Senior General Manager, ECCJ “Expected Status of PROMEEC Project in Asia and Cooperation by Japan” |
| 08:50 | - | 09:00 | - Welcome Address by Mr. Hj Aziz bin Abd Hamid, Director of Electrical Services, Prime Minister’s Office |
| 09:00 | - | 09:30 | Adoption of the Agenda and Election of Rapporteur, Photo Session & Coffee Break |
| | | | SUMMARY WORKSHOP |
| SESSION 1 | | PROMEEC - MAJOR INDUSTRY | |
| 09:30 | - | 10:00 | 1. Summary of Local Activities-by Mr. Taichiro Kawase (ECCJ) Results of Follow-up Surveys / Energy Audit and Workshops in Lao PDR, Myanmar and Thailand - Status of Implementation and Dissemination of Improvement - Discussion Results : Barriers and Possible Recommended Measures |
| 10:00 | - | 11:10 | 2. Highlights of Local Activities: Improvement in OJT Practice for Energy Audit and Seminar. 3. Country Initiatives towards the Preparation of Technical Directory & Status/Plan to Prepare Database for In-house Use |
| 10:40 | - | 10:50 | Presentation by Lao PDR |
| 10:50 | - | 11:00 | Presentation by Myanmar |
| 11:00 | - | 11:10 | Presentation by Thailand |
| 11:10 | - | 11:40 | 4. Status of Preparation of Technical Directory for Major Industries and Database for In-house Use by Industrial Sub-sectors in ASEAN by ACE |
| 11:40 | - | 12:00 | 5. Proposed Plan for 2007– 2008: Explanation & Discussion by Mr. Taichiro Kawase / Mr. Kazuhiko Yoshida |
| 12:00 | - | 12:10 | Discussion / Q & A |
| 12:10 | - | 14:00 | Lunch |
| SESSION 2 | | PROMEEC – BUILDING | |
| 14:00 | - | 14:30 | 1. Summary of Local Activities by Mr. Yoshitaka Ushio (ECCJ) Results of Follow-up Surveys / Energy Audit and Workshops in Brunei Darussalam, Philippines and Vietnam - Status of Implementation and Dissemination of Improvement - Discussion Results : Barriers and Possible Recommended Measures |
| 14:30 | - | 15:45 | 2. Highlights of Local Activities : Improvement in OJT Practice for Energy Audit and Seminar 3. Country Initiatives towards the Preparation of Technical Directory & Status/Plan Plan to Prepare Database for In-house Use |

| | | | |
|-------|---|-------|---|
| 15:00 | - | 15:10 | Presentation by Brunei Darussalam |
| 15:10 | - | 15:20 | Presentation by Philippines |
| 15:20 | - | 15:35 | Coffee Break |
| 15:35 | - | 15:45 | Presentation by Vietnam |
| 15:45 | | 16:15 | 4. Status of Preparation of Technical Directory and Database for In-house Use for Buildings in ASEAN by ACE |
| 16:15 | | 16:45 | 5. Proposed Plan for 2007 – 2008 : Explanation & Discussion by Mr. Yoshitaka Ushio (ECCJ) |
| 16:45 | - | 17:00 | Q & A |
| | | | END of Session for Day 1 |

Day 2 : 27 February 2007

| SESSION 3 | | | PROMEEC – Energy Management |
|----------------------|---|-------|---|
| 8:30 | - | 9:00 | 1. Summary of Local Activities in 7 ASEAN Countries by Mr. Kazuhiko Yoshida (ECCJ) - Results of Intensive Seminar-Workshops and Visits to Factories etc. - Progress in Implementing Award System of Best Practices in Energy Management for Industries and Buildings including Results of “Research Forum in Japan” |
| 9:00 | - | 09:30 | 2. Finalized Plan of and Current Progress in “Award System of Best Practices in Energy Management for Industries and Buildings” by Mr. Kazuhiko Yoshida (ECCJ) |
| 09:30 | - | 09:45 | Q&A |
| 09:45 | - | 10:00 | Coffee Break |
| 10:00 | - | 10:40 | 3. Updated Plan for “ASEAN Management System” : Presentation & Discussion by Mr. Kazuhiko Yoshida (ECCJ) |
| 10:40 | - | 11:10 | 4. Proposed Plan for 2007 – 2008 : Explanation & Discussion by Mr. Kazuhiko Yoshida (ECCJ) |
| 11:10 | - | 11:25 | Q&A and Discussion– |
| 11:25 | - | 13:00 | Lunch |
| POST-WORKSHOP | | | |
| 13:00 | - | 14:15 | Confirmation of Results of Summary Workshop by Mr. Kazuhiko Yoshida (ECCJ) - Important Achievements and Basic Plans for 2007 – 2008 |
| 13:00 | - | 13:15 | PROMEEC-Major Industry |
| 13:15 | - | 13:30 | PROMEEC-Building |
| 13:30 | - | 13:45 | PROMEEC-Energy Management |
| 13:45 | - | 14:15 | Q&A and Discussion of Details |
| 14:15 | - | 14:30 | Closing Statements by Chairperson (EE&C-SSN), Mr. Tsuzuru Nuibe (ECCJ), Dr. Weerawat Chantanakome (ACE) and Representative of Host Country. |
| 14:30 | - | 15:00 | Coffee Break |
| | | | End of POST-WORKSHOP |
| 15:00 | - | 16:00 | Site Visit |
| | | | End of Session for Day 2 |

V-2 Proposed Latest Plan of the “ASEAN Energy Management System” Based on the Actual Implementation Results

Reflecting the actual results of activities and discussions in each country, the plan of the “ASEAN Energy Management System” was revised. Basically, while the plan is based on that established in 2005, further improvement in functions was proposed and agreed by the focal points. The important revisions mainly consist of two parts, namely the improvement of programs and functions already under work or under development and the additional new programs and functions proposed to develop and establish in the future.

1. Improvement of programs and functions already under work or under development

The following are the points of revision. As the detailed specifics of the respective plans are explained in Chapter IV, the detailed are not described here.

(1) System to collect and disseminate excellent cases for energy management

It is a great progress that the “ASEAN Award System of Best Practices in Energy Management for Industries and Buildings” including the 1st application has started. Further improvements will be required to make the program and function of this system more effective in the future, working the system. Especially, the evaluation guideline should be improved further so that the award system for energy management can collect cases with a higher possibility to disseminate and implement effectively. Specifically, the preferred cases should satisfy the following conditions.

1) Improvement applicable for both factories and buildings

2) Improvement with little cost and investment (STEP-1 improvement with no / low cost)

3) Improvement to activate and sustain the activities of Item 2)

In the 2nd Research Forum in Japan, BOJ (EM) members exchanged opinions regarding the above points. However, it will be necessary to check the above points assessing the cases actually awarded in the award system.

(2) Establishment of basic tools for energy management

As it is very effective to use the Energy Management Handbook drafted together with the preparing “In-house Database” and “Technical Directory”, these are situated as the “basic 3 tools for energy management”. Therefore, in order to complete and effectively disseminate these tools, the introductory use in factories and buildings is planned. The introductory use would be for about 6 months to propose further improvements and assess the actual effects of the tools by the factories and buildings. The proposals and comments based on their experience can be reflected to finalization of these tools and the more effective plan for dissemination.

(3) Cyber search system to utilize the existing implementing organizations for ASEAN customers to obtain services of energy audit and training

Since the concept and basic design of the system completed in early 2007, the trial operation will be started, further improved through the trial operation and the system. The activities aim at completing the system so that the completed system can start the actual operation until March 2008.

2. Additional new programs and functions proposed to develop and establish in the future

In addition, the new functions and programs were proposed as follows. After FY 2007, the following will be studied and developed.

(1) Development and introduction of new tools

It will be beneficial to introduce the “Thermal Energy Efficiency Improvement (TEEI) Handbook” developed and “Electrical Energy Efficiency Improvement (EEEI) Handbook” developing in Thailand through the cooperation under Green Partnership

Program (GPP) policy dialogue between Thailand and Japan, for the purpose of utilizing these handbooks in the ASEAN region.

(2) Preparation of directory of companies related to energy conservation business

It was to prepare a directory introducing companies and contact persons who supply technologies and equipment for energy conservation.

The directory will be the “e-Directory” utilized by accessing the ACE website. In the PROMEEC (Energy Management) project, after completing basic design, the information firstly collected with cooperation by the focal points will be uploaded and the “e-Directory” will be available for the actual use. The system will be of the self-updating type by registering and uploading by enterprises which wish their business for energy conservation in ASEAN on a voluntary basis.

(3) Improvement

The functions of “One Stop Service” and advisory service will be added to establish the user-friendly “ASEAN Energy Management System”.

(3)-1 Function of “One Stop Service”

In case that users do not find wishing accesses, the system will be more user-friendly by setting up the “One Stop Service” which will automatically guide users to find appropriate accesses. This improvement will be easy and able to be soon realized.

(3)-2 Function of advisory service

This function targets to provide users with advices by experts in case that the “One Stop Service” cannot handle the requests from users. In this case, the issue is that the system will need experts. In order to solve this problem, it is proposed to ask some experts for their cooperation and to prepare the following accesses so that users and the experts can contact.

- ◆ Procedure for users to directly access to the registered experts by indicating an area or a category for consultation
- ◆ Procedure for users to contact a receptionist who provide users with advices given by the registered experts

We would like to further continue studying to find better procedures by collecting ideas and opinions from ASEAN stakeholders through the activities in the future.

The updated concept of the “ASEAN Energy Management System” is shown in Fig. V-2-1, based on the improved plan mentioned above.

V-3 Plan of the ASEAN Award System of Best Practices in Energy Management for Industries and Buildings

As explained in Section IV-2, it was possible to smoothly startup the 1st application in October 2006. The details are not described here. At present, the activities are continued in accordance with the following time schedule.

| | |
|-------------------------------------|---|
| Close of application | : April 2007 |
| BOJ (EM) to decide winners | : May 2007 |
| Official announcement and ceremony | : August 2007 (During AMEM (ASEAN Ministers on Energy Meeting)) |
| Publishing awarded cases on website | : September 2007 |

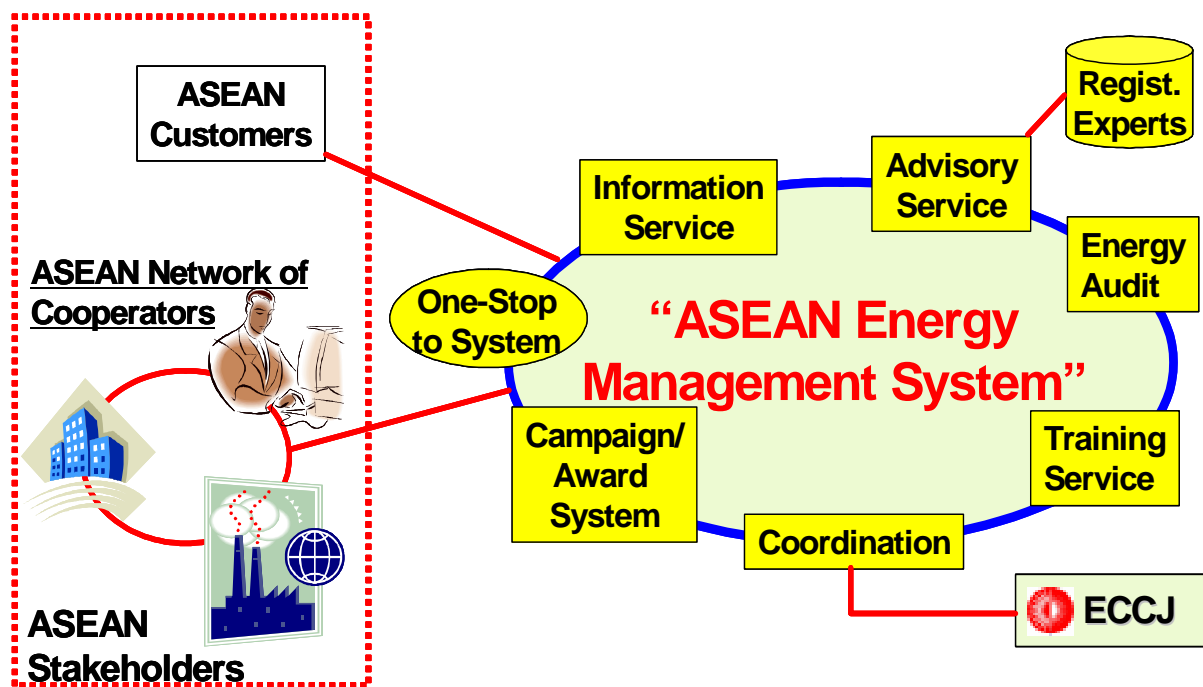


Fig. V-2-1 : Updated Concept of “ASEAN Energy Management System”

V-4 Basic Policy on the Future Activities and Proposed Basic Implementation Plan for 2007 - 2008

4 years have passed since the PROMEEC (Energy Management) project started. According to the plan to establish the “ASEAN Energy Management System”, the fiscal year of 2007 is the important year when almost of all the functions will be prepared and start working.

Actually, the following specific activities will be continued or newly implemented in accordance with plan explained in Section V-2

1. Smooth operation of the “ASEAN Award System of Best Practices in Energy Management for Industries and Buildings”
 - (1) Related activities between the focal points and the BOJ (EM) members
 - (2) Improvement in the evaluation guideline etc.
 - (3) Establishment of the system to disseminate the excellent cases
2. Preparation of “Energy Management Handbook” and verification of effect through the introductory use combined with the “Technical Directory” and “In-house Database” at cooperative factories and buildings
3. Refining and development of “Technical Directory” and “In-house Database”
4. Establishment and start of trial operation of the cyber search system to utilize the existing implementing organizations
5. Dissemination of programs mentioned above through the Intensive Seminar-Workshop and visits to enterprises / organizations and expansion of networks with cooperative enterprises / organizations
 - (1) Intensive Seminar-Workshop and visits to factories and buildings at 6 countries
The ASEAN countries are requested to submit proposals and requests. Based on the submitted proposals, the countries to visit will be selected.
 - (2) 3rd Research Forum in Japan
The theme of the forum would be the following.

- Optimized functions and smooth operation of the “ASEAN Energy Management System” including improvement in programs
- Improvement in the evaluation guideline for the “ASEAN Award System of Best Practices in Energy Management for Industries and Buildings”

Table V-4-1 shows the basic schedule proposed by ECCJ and agreed by the focal points.

Table V-4-1: Plan of PROMEEC (Energy Management Project for 2007 - 2008)

| Project / Activities | 2007 | | | | | | | | | | 2008 | | | Remarks |
|--|-------|-----|------|------|--------|-----------|---------|----------|----------|---------|----------|-------|--|---------|
| | April | May | June | July | August | September | October | November | December | January | February | March | | |
| (Overall) | | | | | | | | | | | | | | |
| A. Development of Detailed Project Plans / Preparatory Work | ■ | | | | | | | | | | | | | |
| B. Contract with ACE | ■ | | | | | | | | | | | | | |
| C. Preparation to Start Projects | ■ | | | | | | | | | | | | | |
| D. Inception Workshop | ■ | | | | | | | | | | | | | |
| E. Implantation of Projects | ■ | | | | | | | | | | | ■ | | |
| F. Post Workshop | ■ | | | | | | | | | | | ■ | | |
| G. Preparation of Report | ■ | | | | | | | | | | | ■ | | |
| (3-Project Management) | | | | | | | | | | | | | | |
| (1) Planning / Preparation / Evaluation | ■ | | | | | | | | | | | | | |
| (2) Coordination Meeting in Indonesia or Japan | | | | | | | | | | | ■ | | | |
| (3) Inception Workshop | | | | | | | | | | | ■ | | | |
| (4) Summary and Post Workshop | | | | | | | | | | | ■ | | | |
| 3. PROMEEC (Energy Management) | | | | | | | | | | | | | | |
| (1) Develop Detailed Plan / Arrange for Site Activity / Develop | ■ | | | | | | | | | | | ■ | | |
| (2) BOJ for Award System (Energy Management) | ■ | | | | | | | | | | | ■ | | |
| (3) 1st Site Activities (Intensive Seminar-Workshop / Visits to Companies) | ■ | | | | | | | | | | | ■ | | |
| (4) 2nd Site Activities (Intensive Seminar-Workshop / Visits to Companies) | ■ | | | | | | | | | | | ■ | | |
| (5) Research Forum in JP (Improvement in Award System / ASEAN EM System) | ■ | | | | | | | | | | | ■ | | |
| (6) 3rd Site Activity (Summary&Post Workshop) | ■ | | | | | | | | | | | ■ | | |
| (7) Preparation of Report (Japanese Version) | ■ | | | | | | | | | | | ■ | | |
| * AMEM Activities in Max. 6 Countries | | | | | | | | | | | | | | |

VI Reference Materials

VI – 1

**Documents Used in Intensive Seminar-Workshop
(Common for 7 Countries)**

VI – 2

**Summary of Replies to Questionnaire from the
Participants of Intensive Seminar-Workshop**

VI – 3

Documents Used in Summary and Post Workshop

VI – 4


Energy Management Handbook for ASEAN (Draft)

VI – 1

**Documents Used in Intensive Seminar-Workshop
(Common for 7 Countries)**


**Title : Recent Progress in PROMEEC (Energy Management) Project
In 2004 through 2006**

J01 **Intensive Workshop**
PROMEEC (Energy Management) for 2006 - 2007
- Recent Progress in PROMEEC
(Energy Management) Project
(in 2004 through 2006) -



November, 2006

Kazuhiko Yoshida
General Manager, International Engineering Dept.
The Energy Conservation Center, Japan

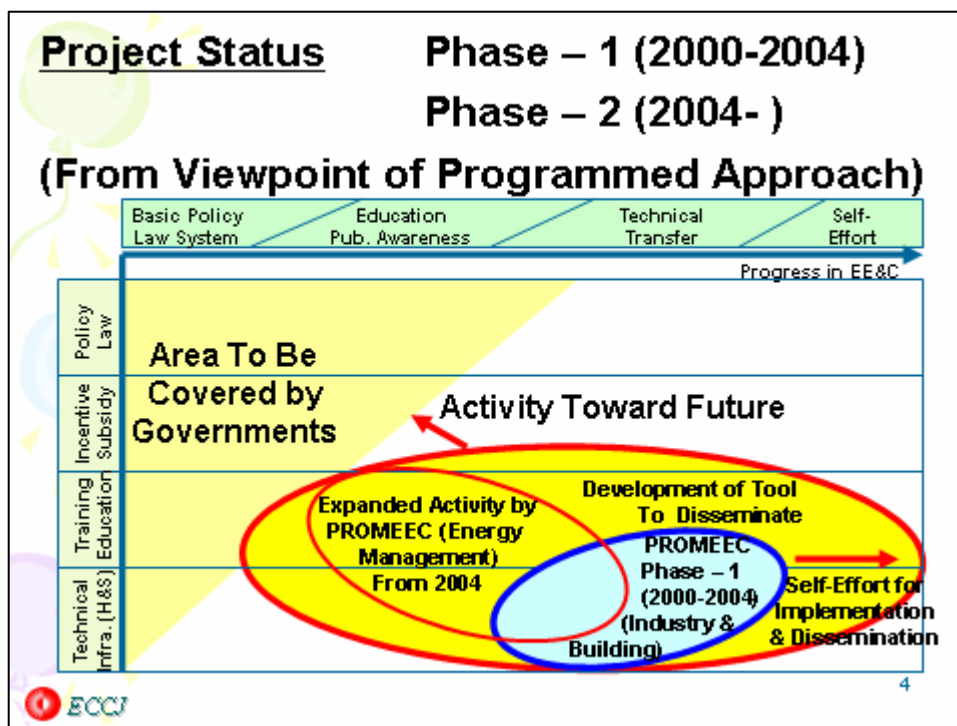
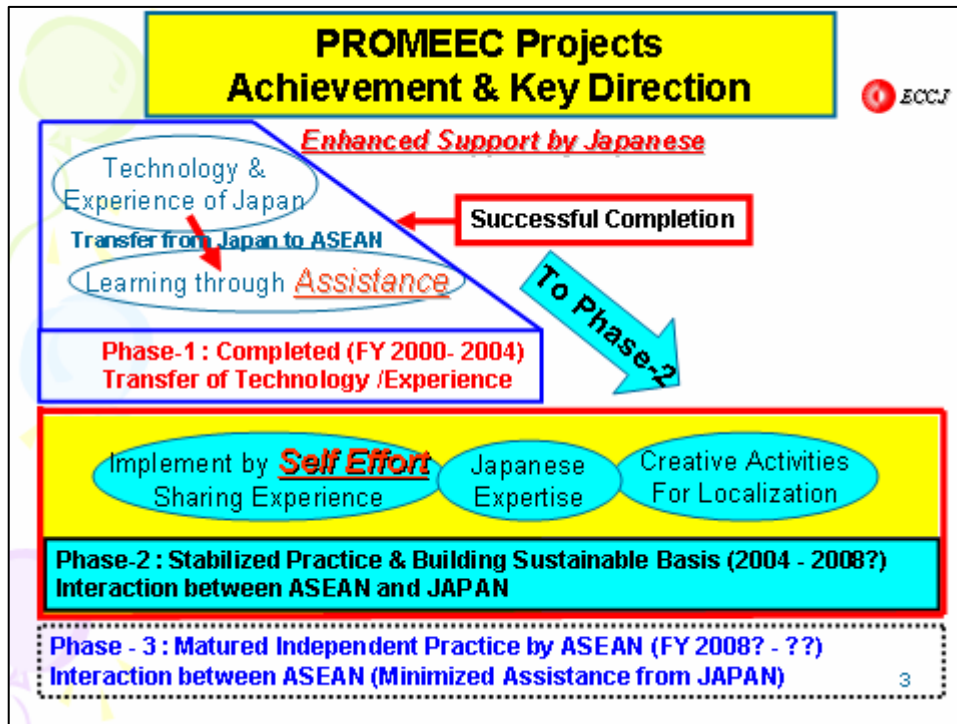


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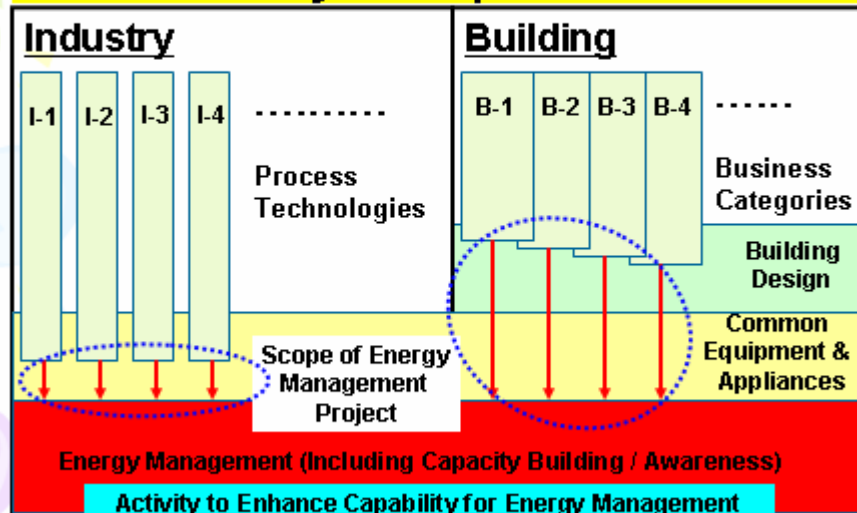
1. Background of Launching
PROMEEC (Energy Management)



2



PROMEEC (Energy Management) Newly Set-up in 2004



2. Activities & Results 2004 – 2005 (1st Year of E.M. Project)

Implementation of Survey (2004)

1. Date

| | | | |
|-----------------|------------------------|--------------------|-----------------------|
| <i>Myanmar</i> | <i>Oct.6 & 7</i> | <i>Indonesia</i> | <i>Nov.29-Dec.1</i> |
| <i>Cambodia</i> | <i>Oct.8</i> | <i>Singapore</i> | <i>Dec.2 & 3</i> |
| <i>Lao PDR</i> | <i>Oct.11 & 12</i> | <i>Brunei</i> | <i>Dec.4 & 6</i> |
| <i>Viet Nam</i> | <i>Oct.13 & 14</i> | <i>Malaysia</i> | <i>Dec.7 & 8</i> |
| | | <i>Philippines</i> | <i>Dec.9 & 10</i> |
| | | <i>Thailand</i> | <i>Dec.13&14</i> |

2. Surveyors

Mr. Christopher Zamora (ACE)
Mr.Kazuhiko Yoshida(ECCJ)
Mr.Takashi Sato (ECCJ)



Survey : Procedure and Items

1. Procedure

- *Questionnaire*
- *Interview to Concerned Persons*
(Ministries, Institutions, Consultants, NGOs, ESCOs.etc.)

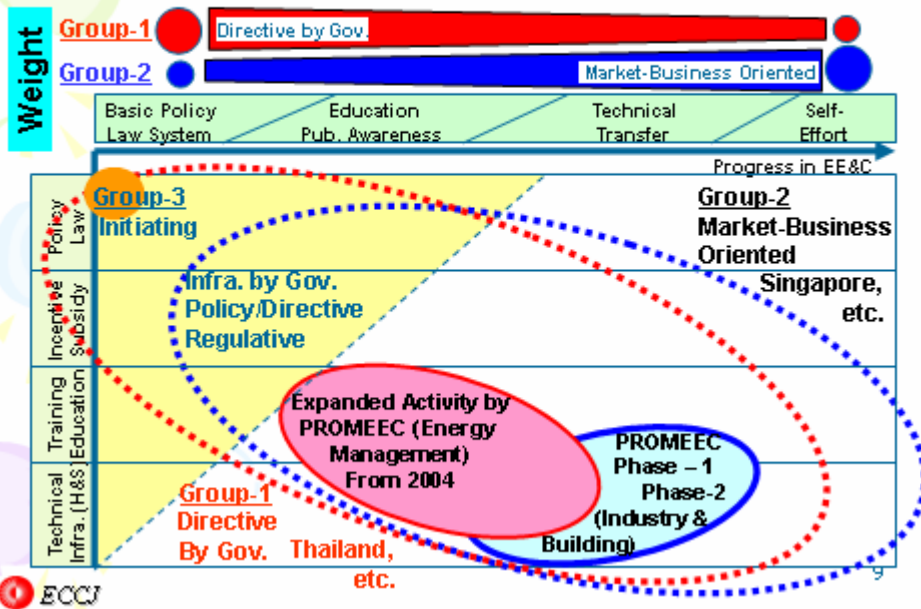
2. Items for Survey

Current Situations and Conditions of Establishing Basis of Energy Management

- (1) Policy and Law*
- (2) Organization for Implementation and Promotion*
- (3) Activities for Energy Conservation of Private Companies*



Overview of Actual Status of Infrastructure for EM



ASEAN Energy Management System (1)

Purpose and Required Functions Analyzed

1. Purpose

1-1. Building Policy / Directive Framework

- ASEAN Policy and Direct or Rule (if necessary)

1-2. Establishing Implementation Organization for ASEAN

- Organizing / Building Capacity

1-3. Building Environment to Promote EE&C in Private Sector

- Information / Guideline for Voluntary Activities

ASEAN Energy Management System (2)

2. Required Function

2-1. Sharing Information

2-2. Provision of Facilities and Services

2-3. Scheme and Rule to Work The Functions of Items

2-1 and 2-2

Concept of ASEAN Energy Management System

ASEAN Energy Management System

Each Country System

ASEAN Policy / System
Information
Energy Audit / Training
Guidance / Advice

Policy / Law


Implementation
Organization

Private
Activity

Global
Business /
Energy
Market

Cooperation
with Japan,
EU, etc.

..... C B A



3. Activities & Results for 2005 – 2006
(2nd Year of E.M. Project)

Targets for 2005 – 2006 (1-2)

(Target 1)

Identification of Components Possible to Share among ASEAN or To Be Added for "ASEAN Energy Management System"

(Target 2)

Development of The Award System for The Best Practices in "Energy Management for Major Industries and Buildings"

Targets for 2005 – 2006 (2-2)

(Target 3)

Assessment of Possibility & Procedures / Rules to Utilize & Function Services and Facilities Owned by The Existing Implementing Organizations in ASEAN

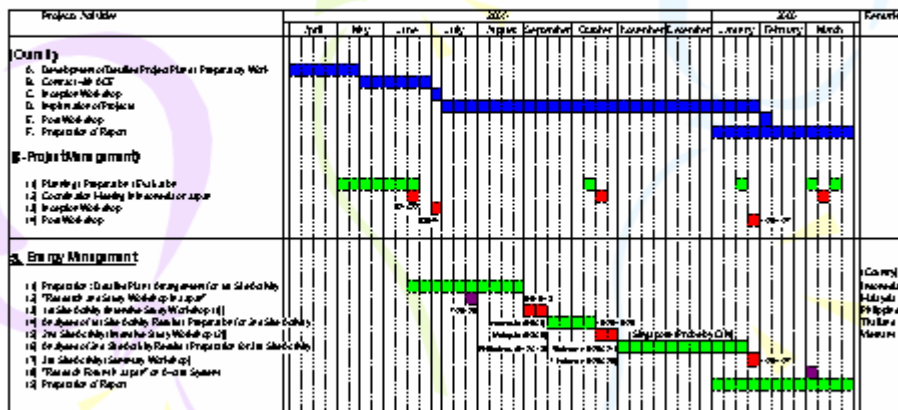
(Target 4)

Assessment of Prioritized Components and Establishment of The Specific Plan of "ASEAN Energy Management System"

Activities to Achieve Target

| Target / Activity | Target 1 Identify Key Function ASEAN EM System | Target 2 Develop ASEAN EM Award System | Target 3 Utilize The Existing Impl. Organization | Target 4 Develop specific Plan of ASEAN EM System |
|---------------------------|---|---|---|--|
| Local Intensive Survey | | ● | ● | |
| Workshops | ● <u>New</u> Research & Study (JP) | ● <u>New</u> Research Forum (JP) | | ● Summary & Post |
| Internal Analyses & Study | ● | ● | ● | ● |

Actual Activities of PROMEEC (Energy Management) 2005-2006



ECCJ Team : Mr. Kazuhiko YOSHIDA (PM)
Mr. Takashi SATO



Activity for Target 1 Research & Study Workshop in Japan Brainstormed Ideas & Proposals

- 1. Learning and Observation of Actual Situations of Various Activities for Energy Conservation Including Energy Management Realized in Japan**
- 2. Information Exchange between Participants including Japanese**
- 3. Discussion and Brainstorming To Create Ideas on The Plan for The "ASEAN Energy Management System"**



Activity for Target 1 Research & Study Workshop in Japan Participants

1. Total Number : 20

1 or 2 from Ten (10) Country and ACE

2. Categories

1) Focal Points of EE&C-SSN for PROMEEC

2) Persons from

- Governmental Organizations Related to EE&C
- Non-governmental and Non-profit Implementation Organizations for EE&C

Activity for Target 1 Research & Study Workshop in Japan Program and Schedule

| Date | Morning Session 9:30—12:30 | Afternoon Session 14:00—17:00 |
|-------------|---|---|
| 26 July Mon | Orientation / Program Guidance / Opening Ceremony KEYNOTE LECTURE: Energy Conservation Policy and Measures by METI | LECTURE: Promotion of Energy Conservation in Japan by ECCJ |
| 26 July Tue | LECTURE: Energy Conservation Law - System for Qualified persons for Energy Management in Japan | LECTURE: Energy Conservation Law - Top Runner System VISIT: Excellent Consumer Products Shop of Energy Conservation (Eco Camera) |
| 27 July Wed | LECTURE: Energy Conservation Audit & EBCO | VISIT: Excellent Building of Energy Conservation (Itabashi Ward Office) |
| 28 July Thu | VISIT: Excellent Company of Energy Management (Mitsubishi Electric Co., Ltd.) | VISIT: Excellent Case of Energy Conservation (ORAM-MELCO) |
| 29 July Fri | PRESENTATION: Country Report | PANEL DISCUSSION: Final report Program Evaluation / Introduction of Next Training Course / Conclusion Closing Ceremony |

**Activity for Target 1
Research & Study Workshop in Japan
Evaluation of Current Status
- Summary of Country Report -**

| | | | | | | | | | | | | | |
|-------------------------|--------------------------------------|-------------|-----------------------|------------------------------|---------------------------|--------------------|------------------------------------|---------------------|--------------------------|-------------------------------------|---------------|-------------|--|
| 10 | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | | |
| 3 | | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | | |
| 1 | | | | | | | | | | | | | |
| No. of Countries | Exist | Good | To Be Improved | Not Established | Partly Established | Established | Established | Establishing | To Be Established | Very Active | Active | Weak | |
| | Policy / Regulation Framework | | | Energy Pricing System | | | Implementation Organization | | | Activities by Private Sector | | | |

**Activity for Target 1
Research & Study Workshop in Japan
Brainstormed Idea and Proposal
Including Desire / Wish**

**1. Provision by Country Report
Proposal and Desire / Wish**



**Lecture and Visits to Business
Units Best-Practiced in Japan**

**2. Brainstorming
Additional Ideas and Proposals**

Activity for Target 1
Research & Study Workshop in Japan
Results : Ideas / Proposals for
“ASEAN Energy Management System”

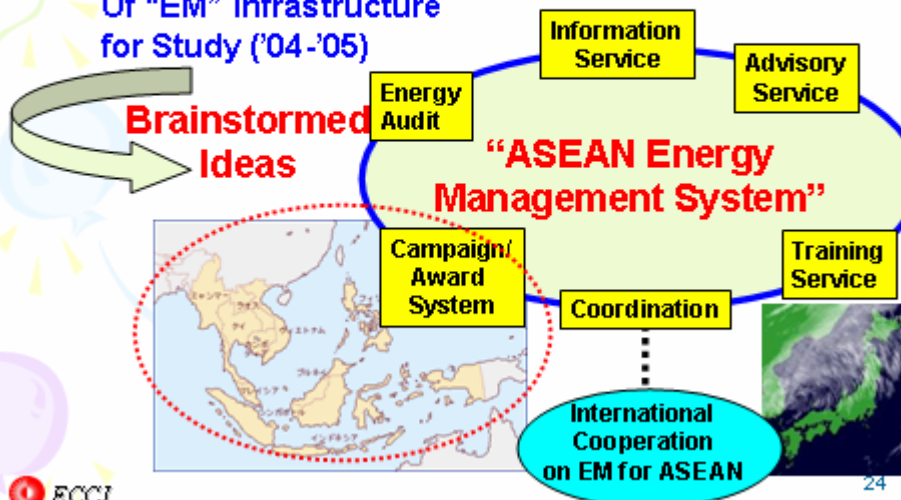
1. Provision of Information / Database
Useful Best Practices / Technology
/ Data / Other Project Information

2. Facilities / Services / Organization
to Implement EE&C Activities
Energy Audit / Training / Education

3. Building Capacity of Persons

Approach to Develop “ASEAN
Energy Management System”

Investigation on Actual Status
Of “EM” Infrastructure
for Study ('04-'05)



Activity for Target 2
Local Intensive Survey
Development of Basic Plan for
ASEAN Award System of Best Practices
in Energy Management for
Industries & Buildings

- 1. Draft Proposal by ECCJ**
- 2. Intensive Survey in 5 Countries**
Discussion with Focal Points
- 3. Preliminary Proposal by ECCJ**
- 4. Collection of Comments from ASEAN**

Activity for Target 2
Local Intensive Survey at 5 Countries
Discussing Draft Plan with Focal Points

- 1. Visited Countries to Discuss Draft**
Indonesia / Malaysia / Philippines
Thailand / Vietnam
- 2. Request of Comments by Sending Draft**
Singapore



Internal Study by ECCJ

- 3. Preparation of Preliminary Plan by ECCJ**
- 4. Comments of Preliminary Plan by E-Mail**

Activity for Target 2
Outline of Preliminary Plan (1) :
Award System for Best Practices in E.M.

**(Purpose) Collect & Share Information
on Best Practices in E. M.**

- 1. Category : Industries and Buildings**
- 2. 2 Winners & 4 Runner-Ups Each Year**
1 Winner & 2 Runner-Up Each Category
among 4 Candidates from Each Country
(2 for Industries + 2 Buildings)
- 3. Publishing Awarded Cases on Website**

Activity for Target 2
Outline of Preliminary Plan (2) :
Award System for Best Practices in E.M.

- 4. Judging Committee (BOJ)**
 - 1) Number of Members : 10**
More Members from Industries
 - Recommendation by Focal Points and
ACE / Advice by ECCJ for Finalization
 - Assignment for 1 Year or 2 Years (Max.)
 - 2) Research Forum in Japan (March 2006)**
 - Participants : BOJ Members & Advisers
 - Development of Application Form

Activity for Target 2
Outline of Preliminary Plan (3) :
Award System for Best Practices in E.M.

5. Schedule for The 1st Award (Reference)

April 06 : Preparation of Application Form

May 06 : Call for Application

December 06 : Decision of Local Winners

**February 07 : Presentation by Focal Points
(Same Timing as Post Workshop)**

March 07 : Determination of ASEAN Winners

May 07 : Publishing Winners on Website

Activity for Target 3
Local Intensive Survey
Possibility to Utilize The Existing
Implementing Organizations / ESCOs

1. Preparation of Questionnaire by ECCJ

**2. Sending Questionnaire to Implementing
Organizations through Focal Points**

3. Intensive Survey in 5 Countries

- Visit to Implementing Organizations

**- Interview / Discussion Based on Reply
to Questionnaire**

- Observation of Owned Facilities

**Activity for Target 3
Local Intensive Survey
(No. of Implementing Organizations)**

| | Total | Government | Private |
|-------------|-------|------------|---------------|
| Indonesia | 3 | 3 | 0 |
| Malaysia | 2 | 2 | 0 |
| Philippines | 4 | 2 | 2 |
| Thailand | 7 | 1 | 6 |
| Vietnam | 3 | 2 | 1 |
| (Singapore) | (1) | (0) | (1) By e-mail |

**Activity for Target 3
Local Intensive Survey : Procedure**

Questionnaire

Part 1. Outline of Organization & Business

**Part 2. Possibility / Intension to Provide
Services and Facilities for Other
ASEAN Countries**

(Including Conditions for Provision)

Part 3. Services and Facilities Owned



Reply to Questionnaire

Visit : Interview / Discussion / Observation

Activity for Target 3

Local Intensive Survey : Results - 1

Almost All Organizations Showed Strong Intension to Provide Other Countries with Their Services and Facilities as Business !

1. Services Possible to Provide

- (1) Energy Audit**
For Industries and Buildings
- (2) Training / Education (Inc. for Students)**
Energy Management / Energy Audit, etc.
- (3) Others (Engineering, Information, etc.)**

Activity for Target 3

Local Intensive Survey : Results - 2

2. Conditions for Providing Services

- (1) All Organizations**
 - 1) Fee for Services**
- (2) Some Organizations**
 - 2) Approval by Owners etc. (Some)**
 - 3) Expansion of Facilities and Manpower**
 - 4) Language is English.**
- (3) A Few**
 - 4) Agreement on Copy Right etc.**
 - 5) Interpreter for Local Language-English**

Activity for Target 3
Local Intensive Survey : Results – 3
(Scope of Services by The Implementing Org.)

| Energy Audit | Training / Education | Other Services | Number of Organizations |
|-----------------------------|----------------------|----------------|-------------------------|
| | | | 2 |
| | | | 12 |
| | | | 2 |
| | | | 4 |
| Important Findings → | | | <u>TOTAL</u> |
| | | | 20 |

Activity for Target 4
Development of Specific Plan of
"ASEAN Energy Management System"

1. Assessment of Prioritized Functions

(1) Provision of Useful Information

Award System (Preparation In Process)

Dissemination of Other Information

(2) Provision of Energy Audit and Training Measures Under Study

(3) Provision of Other Services

2. Development of Specific Plan of "ASEAN Energy Management System"



4. Conclusion

37

Conclusions

- 1. Targets Were Achieved or Will Be Achieved until March 2006 Under Cooperation by Focal Points and ACE.**
- 2. The Achievements Will Be Basis of and Accelerate The Activities for 2006 - 2007**
 - (1) Launching Award System for E. M.**
 - (2) Utilization of Existing Services for Energy Audit and Training**
 - (3) Study to Work Other Functions**

Thank You

Very Much





The Energy Conservation Center, Japan

Title :
Basic Concept and Plan of “ASEAN Energy Management System”


J02

Intensive Workshop
PROMEEC (Energy Management) for 2006 - 2007
- Basic Concept and Plan of “ASEAN
Energy Management System” -



November, 2006


Kazuhiko Yoshida
General Manager, International Engineering Dept.
The Energy Conservation Center, Japan



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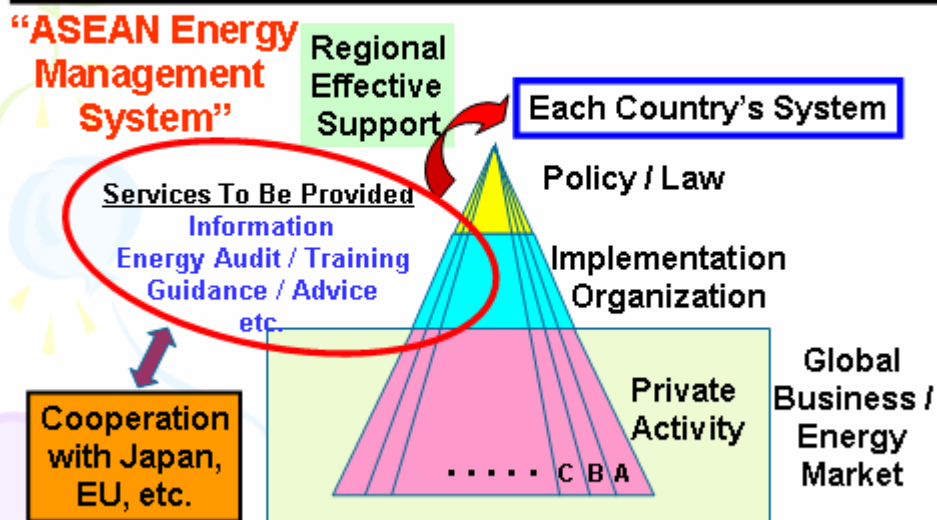
Contents

- 1. Philosophy and Basic Concept of The System***
- 2. Required Infrastructure and Functions for Energy Management***
- 3. Conceptual Plan on Specific Activities***
- 4. General Schedule***



1. Philosophy and Basic Concept of The System

“ASEAN Energy Management System” and Countries’ Respective Systems



Support Activities by Private Sector Evaluation of Current EE&C Status in ASEAN (Country Reports Submitted in Research & Study Workshop in Japan)

| 10 | | | | | | | | | | | | | | |
|------------------|-------------------------------|------|----------------|-----------------------|-----------------------|-----------------|-----------------------------|--------------|-------------------|------------------------------|--------|------|--|--|
| 9 | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | | | |
| 3 | | | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | | | |
| 1 | | | | | | | | | | | | | | |
| No. of Countries | Existence | Good | To Be Improved | Not Established | Partially Established | Not Established | Established | Establishing | To Be Established | Very Active | Active | Weak | | |
| | Policy / Regulation Framework | | | Energy Pricing System | | | Implementation Organization | | | Activities by Private Sector | | | | |

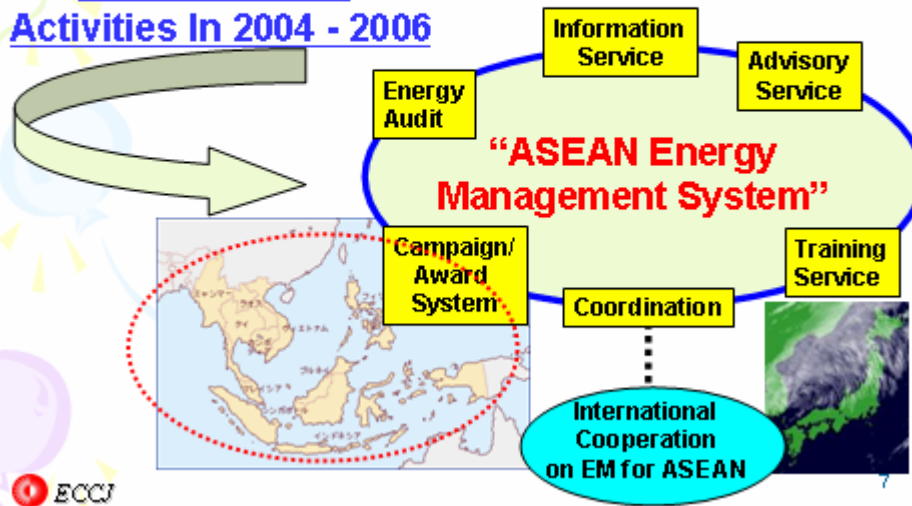
Utilize Existing Facility → Enhance Private Activities

Utilization of Existing Services / Facilities Results of Local Intensive Survey (Scope of Services by The Implementing Org.)

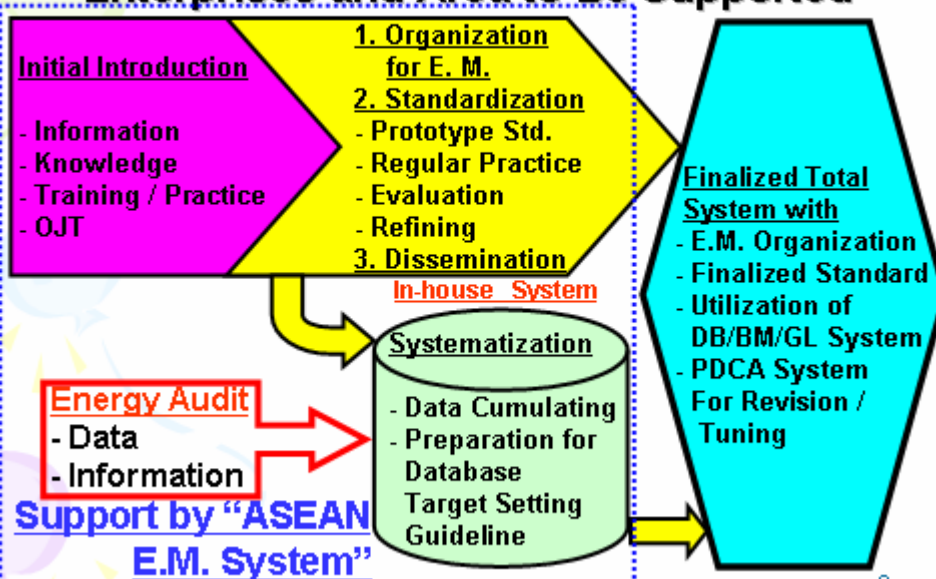
| Energy Audit | Training / Education | Other Services | Number of Organizations |
|---|----------------------|----------------|-------------------------|
| | | | 2 |
| | | | 12 |
| | | | 2 |
| | | | 4 |
| Potentiality to Utilize The Existing Services By Implementation Org. | | | TOTAL 20 |

Approach to Develop "ASEAN Energy Management System"

Results of Past Activities In 2004 - 2006



Steps to Build Sustainability of E. M. by Enterprises and Area to Be Supported





2. Required Infrastructure and Functions for Energy Management

ASEAN Energy Management System (Requirement-1)

1. Required Infrastructure for Energy Management

- 1-1. Building Policy / Directive Framework***
 - Information and Data to Study***
- 1-2. Establishing Implementation Organization for ASEAN***
 - Organizing / Building Capacity***
- 1-3. Building Environment to Promote EE&C in Private Sector***
 - Information / Guideline for Voluntary Activities***

ASEAN Energy Management System **(Requirement-2)**

2. Required Function

2-1. Sharing Information

2-2. Provision of Facilities and Services

*2-3. Scheme and Rule to Work The Functions of Items
2-1 and 2-2*

ASEAN Energy Management System **Basic Scope : Required Infrastructure & Function**

| Required Infrastructure | Required Function | | |
|--|---------------------------|---------------------------------------|-----------------------------------|
| | A. Sharing Information | B. Provision of Facility / Service | C. Scheme / Rule to Work A & B |
| 1. Policy and Directive Framework | AREA - 1A | <u>Out of Scope</u> | <u>Out of Scope</u> |
| 2. Implementation Organization (Organization / Capacity) | AREA - 2A | AREA - 2B | AREA - 2C |
| 3. Environment to Promote EE&C in Private Sector | AREA - 3A | AREA - 3B | AREA - 3C |

ASEAN Energy Management System - Required Function Matrix : Activity Status -

| Required Infrastructure | Required Function | | |
|--|--|--|--|
| | A. Sharing Information | B. Provision of Facility / Service | C. Scheme / Rule to Work A & B |
| 1. Policy and Directive Framework | AREA - 1A Under Study | <u>Out of Scope</u> | <u>Out of Scope</u> |
| 2. Implementation Organization (Organization / Capacity) | AREA - 2A Outline and Reference of Organizations | AREA - 2B Utilization of Services of Existing Org. | AREA - 2C Under study |
| 3. Environment to Promote EE&C in Private Sector | AREA - 3A Best Practices Technologies ... | AREA - 3B Information Sys. Tech. Directory .. | AREA - 3C Award System Web., Seminar . |

Required Function : AREA - A (Information)

| Required Infrastructure | Required Function |
|--|--|
| | A. Sharing Information |
| 1. Policy and Directive Framework | AREA - 1A (1A1) Policy and Law in Each Country |
| 2. Implementation Organization (Organization / Capacity) | AREA - 2A (2A1) Implementation Organization in Each Country (Capacity / Reference / Scope of Activities) |
| 3. Environment to Promote EE&C in Private Sector | AREA - 3A (3A1) Technologies for Industry & Building (3A2) Data and Information to Study (3A3) Information on Activities & Projects by Companies (3A4) Procedure for Energy Management in Enterprises (3A5) Technology Suppliers / ESCOs / Consultants |

Required Function : AREA – B (Service Provision)

| Required Infrastructure | Required Function |
|--|--|
| | B. Provision of Facility / Service |
| 1. Policy and Directive Framework | <u>Out of Scope</u> |
| 2. Implementation Organization (Organization / Capacity) | <u>AREA – 2B</u> (2B1) Energy Audit (2B2) Training / Education including Enlightenment (2B3) Others (Consulting / Engineering, etc.) |
| 3. Environment to Promote EE&C in Private Sector | <u>AREA – 3B</u> (3B1) Directory of Technologies for EE&C (3B2) Database / Benchmark / Guideline Systems (3B3) Information of Successful Cases for E. M. (3B4) Guideline for Voluntary Activity (3B5) Directory of Suppliers |

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Required Function : AREA – 2C (Scheme & Rule) - Activities to Establish Scheme / Rule -

| Required Infrastructure | Required Function |
|--|--|
| | C. Scheme / Rule to Work A & B |
| 2. Implementation Organization (Organization / Capacity) | <u>AREA – 2C</u> <u>(STEP – 1)</u> (2B1&2C1) Develop System / Rule to Utilize Existing Facilities including to Give Related Information (2B3C2) Organize ASEAN-Japan (A-J) Expert Team (For Coordination including Advice) <u>(STEP – 2)</u> (2B1&2C3) Expansion of Existing Facilities (or) Establishment of New Facility for ASEAN (2B1&2C4) Training of Auditors and/or Trainers for ASEAN by A-J Team |

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**Required Function : AREA – 3C (Scheme & Rule)
- Activities for Establish Scheme / Rule -**

| Required Infrastructure | Required Function |
|--|--|
| | C. Scheme / Rule to Work A & B |
| 3. Environment to Promote EE&C in Private Sector | <p>AREA – 3C (STEP – 1)</p> <p>(3B1-3/C1) Develop of System to Collect & Disseminate Information (Award System for Best Practices in E.M. and Information of Suppliers including ESCOs for EC Technologies, etc.)</p> <p>(3B2/C2) Utilize Technical Directory and Database etc. Developed by Projects (Industries & Buildings)</p> <p>(3B4/C3) Develop Effective Handbook(s) (Ex. Handbook Based on SGA / TPM / TOM)</p> <p>(3B1-5/C4) Develop Network with ASEAN Stakeholders</p> <p>(3B1-5/C5) Organize A-J Taskforce for Advice / Assistance</p> |

**Required Function : AREA – 3C (Scheme & Rule)
- Activities to Establish Scheme / Rule -**

| Required Infrastructure | Required Function |
|--|---|
| | C. Scheme / Rule to Work A & B |
| 3. Environment to Promote EE&C in Private Sector | <p>AREA – 3C (Continued)</p> <p>(STEP – 2)</p> <p>(3B1-5/C6) 1) Implement Award System for E.M. / Build System to Disseminate Collected Information</p> <p>2) Increase Companies for Cooperation (Through Activities for PROMEEC Projects)</p> <p>(3B1-5/C7) Advisory Service by A-J Expert Team (Including Training of ASEAN Advisors)</p> |



3. Plan of Specific Key Functions and Activities to Work Functions

1. Award System of Best Practices in Energy Management for Industries and Buildings

Purpose

Collect and Disseminate Successful Cases of Energy Management in Factories and Buildings

Outline of Procedures

- 1. Organize Judging Committee & Preparation**
- 2. Call for Application in Each Country**
- 3. Select 2 Local Winners (For Each Category)**
- 4. Determine ASEAN 2 Winners and 4 Runner-Ups**
- 5. Publish through Media Such as Website**

Schedule for 2006 - 2007

- 1. Call for Application : October 2006**
- 2. Determine ASEAN Winners : May 2007**

2. Utilization of The Existing Implementing Organizations for Energy Audit and Training (1)

Purpose

Utilize Services Owned by Existing Implementing Organization for Energy Audit in Factories and Buildings and for Training

Benefits for Customers

- 1. Most Cost Effective and Realistic Solution to Requirement**
- 2. Possible to Choose An Organization Suitable**

Benefits for Service Providers

- 1. Expand Business**
- 2. Increase Availability of Facilities and Manpower**
- 3. Possibility to Enhance Facilities / Capacity**

2. Utilization of The Existing Implementing Organizations for Energy Audit and Training (2)

Basic Procedures

(Development of Detailed System will Be Studied Further)

- 1. Open Meeting Site through Website**
- 2. Direct Contact and Negotiation between Customers - Service Providers**
- 3. Consideration on Intermediate Coordination / Advice (Option)**

Outstanding Issue for Consideration

Measures to Assure Quality of Service Providers

3. Dissemination System of Technical Directories for Major Industries and Buildings

(Status)

Under Development through Projects for Major Industries & Buildings and Edition by ACE

- (1) Available for ALL Users
- (2) Wider Coverage of Technology and Application including Practice for EE&C
- (3) Flexibility to Update and Expand
- (4) Various Possible Access to Directory

User Friendly!

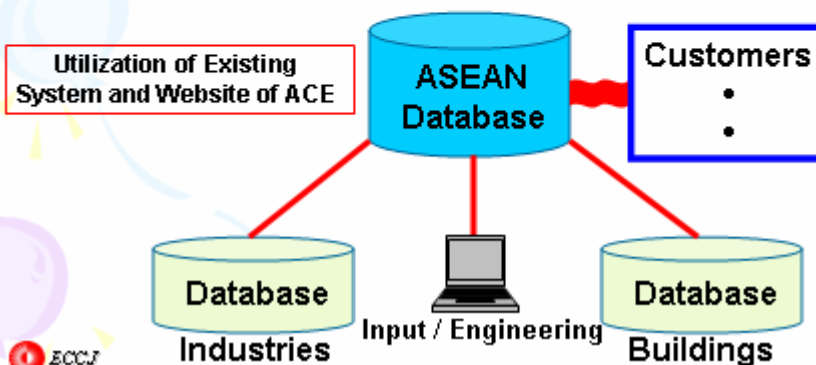


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4. Dissemination System of In-house Database

(Status)

Under Development through Projects for Major Industries & Buildings with Design by ACE/ECCJ



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5. Energy Management Handbook (1) (Enhancing “Energy Conservation by All Participation”)

(Area / Purpose)

- (1) Industry Sector : Inter-Industry to Individual Industries
- (2) Promote Companies’ EC Activities by All Participation
Management (Owner / Managers)
Staff, Engineers, Foremen, Workers (Operators)

Concept : Handbook for Total Energy Management

(Features)

- (1) Main users (readers) : Staff/Engineers
- (2) Practice&Business - Oriented (than Technical)
- (3) User Friendly Guidance
- (4) Expandable Contents / Easy to Update



(Expected EC Potential) 10 – 15% (By No/low Cost)

5. Energy Management Handbook (2) - Basic Contents -

I. Purposes and Usage of TEM Handbook Introduction / Purpose / Usage

II. Total Energy Management “by Participation” with Key Step Approach

**CORE
PARTS**

III. Implementation of EC Project

Basic Tools: Small Group Activities (SGA) such as TQM / TPM

Appendix-1 Successful Examples of EC by S.G.A. in ASEAN

Appendix-2 Related Information

(Access to the Existing Various References)

Energy Statistics and EC Target in ASEAN countries

List of References (Websites / Directory /Training Courses /
Technical Manuals, etc.)

6. Other Information Services to Study Development in The Future

1. Directory of ESCOs

- 1) Company Name or Association**
- 2) Reference of Business**
- 3) Contact**

2. Information on Suppliers of Technology / Equipment for EE&C

- 1) Company Name**
- 2) Business Category & Reference of Business**
- 3) Contact**

4. General Schedule

4. General Schedule

| Phase | Main Activities | 2004 | 2005 | 2006 | 2007 | 2008 | After 2009 |
|-------------------------|---------------------------------|------|------|------|------|------|------------|
| Phase - 1 | Investigation / Study Concept | | | | | | |
| Prepare Basic Functions | Develop Specific Plan | | | | | | |
| | Prepare / Work Functions | | | | | | ...▶ |
| | Verification Result | | | | | | |
| Phase - 2 | Study / Prepare / Add Functions | | | | | ...▶ | |

Thank You



Very Much




The Energy Conservation Center, Japan

**Title : Implementation Plan of PROMEEC (Energy Management)
Project for 2006 – 2007**

**J03 Intensive Workshop
PROMEEC (Energy Management) for 2006 - 2007
- Implementation Plan of PROMEEC
(Energy Management) Project for
2006 - 2007 -**



November, 2006
Kazuhiko Yoshida
General Manager, International Engineering Dept.
The Energy Conservation Center, Japan




1

1. Project Status of 2006-2007
3rd Year (Newly Established in 2004)

Results of Activities in 2005 – 2006

- (1) Development of Plan of “ASEAN Energy Management System”**
 - Research & Study Workshop in Japan, etc
- (2) Preparation of Award System of Best Practices in Energy Management for Major Industries and Buildings**
 - Intensive Survey at 5 countries
 - Research Forum in Japan
- (3) Confirmed Possibility to Utilize The Existing 20 Implementing Organizations in ASEAN**
 - Intensive Survey at 5 Countries



2

2. Basic Direction for 2006-2007

- (1) Start Working Functions of “ASEAN Energy Management System”**
 - 1) Award System of Best Practice in Energy Management (Industries & Buildings)**
- (2) Development of Specific Detailed Plan**
 - 1) Procedure to Utilize The Existing Implementing Organizations**
 - 2) Info. System to Share and Disseminate Best Practices, Technical Directories, etc.**
 - 3) Development of New Tools for Energy Management**

Items (1)&(2) : Cooperative Implementation with Projects for Major Industries & Buildings

General Time Schedule

| Phase | Main Activities | 2004 | 2005 | 2006 | 2007 | 2008 | After 2009 |
|-------------------------|---------------------------------|------|------|------|------|------|------------|
| Step - 1 | Investigation / Study Concept | | | | | | |
| Prepare Basic Functions | Develop Specific Plan | | | | | | |
| | Prepare / Work Functions | | | | | | ...▶ |
| | Verification Result | | | | | | |
| Step - 2 | Study / Prepare / Add Functions | | | | | ...▶ | |

Updated Plan for 2006 - 2009

| Project | Phase | Activities | 2006-07 | 2007-08 | 2008-09 | | |
|----------------|----------------------------------|--|---------------------------|-------------------------|----------|--|--|
| Energy Manage. | Step 1 Prepare Basic Function | Develop Further Specific Plans | Continue | | | | |
| | | Verification / Feedback | | | | | |
| | | Functioning Award System for Best Practice | start | | | | |
| | | Dissemination of Info. | | | | | |
| | | - Develop Procedure to Utilize Exist. Org. | Plan | Database to Disseminate | | | |
| | | - Functioning Procedure | | Trial | Finalize | | |
| | Step 2 | Study Prepare / Add Functions | Development of Info. Sys. | start | | | |
| | | | Development of New HB. | | | | |
| | | Operation of System | start-up | Ramp-up | Tune-up | | |

3. Activities for 2006-2007 (1)

1. Start "Award System for Best Practice in E.M. for Industries / Buildings"

(1) Intensive Workshop

For Advice & Explanation & Application (in Max. 7 Countries Such as Cambodia and Lao PDR, etc.)

(2) 1st BOJ (EM) Meeting : Sept. 20th in Hanoi

(3) Research Forum in Japan (Evaluation & Development Dissemination Procedure)

1st : March 2006 (Plan / Application Form)

2nd : Dec. 2006 (Evaluation Guideline)

3. Activities for 2006-2007 (2)

- 2. Development of Procedure to Utilize The Existing Implementing Organizations (Introductory Trial, if Possible)**
 - (1) Intensive Workshop (Same as 1 (1))
Explanation & Discussion of Proposed Procedure**
 - (2) Trial Operation to Probe Points to Improve**
- 3. Development of Information System to Share and Disseminate The Following**
 - (1) Best Practices from Award System**
 - (2) Technical Directory / In-House Database**

3. Activities for 2006-2007 (3)

- 4. Development of New Tools for Energy Management**
 - (1) Energy Management Handbook for ASEAN (Guidance for Voluntary Activities Based on Small Group Activities and TQM/TPM)**
 - (2) Directories of ESCOs and Suppliers (Technology and Equipment for EE&C)**
- 5. Development of Information Sources**
 - (1) Intensive Workshop (Same as 1 (1))
Encouraging Companies to Participate in The Project Activities**

3. Activities for 2006-2007 (4)

Main Activities (in ASEAN)

(1) Intensive Local Workshops (Continued)

1) Proposed Country : 7 Countries

**Brunei Darussalam, Cambodia, Lao PDR,
Malaysia, Philippines and Vietnam**

2) Expected Participants

Companies / Implementing Organizations, etc.

3) Subject

**PR/Encouraging Application of Award System
Discussion (Development of New Functions)**

3. Activities for 2006-2007 (5)

Main Activities (in ASEAN)

(1) Intensive Local Workshops (Continued)

4) Basic Agenda

Presentation

Outline / Program / Activity of PROMEEC

ASEAN Award System of Best Practices

Presentation and Discussion on Development

Database for In-house Usage for E.M.

Technical Directory

Energy Management Handbook for ASEAN

Proposed Plan to Utilize Existing

Implementing Organizations

Consultation including Advice

3. Activities for 2006-2007 (6)

Main Activities (in Japan)

(2) 2nd Research Forum in Japan (Dec. 12th – 14th, 2006)

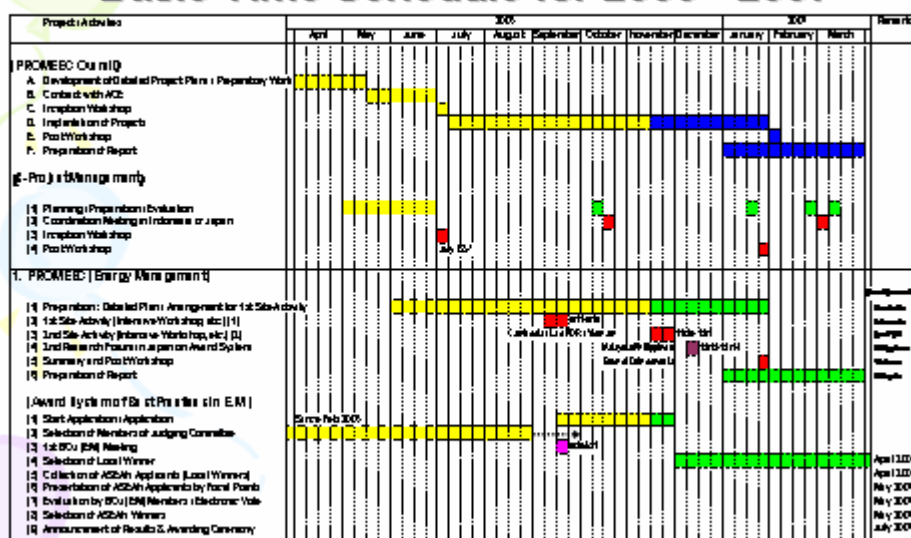
1) Subject

Development of Evaluation Guideline
Research & Study on Japanese Way /
Opinion Exchange with Japanese Experts,
and Committee Members)

2) Participants

9 Members of Judging Committee (BOJ (EM))
3 Advisors (ECCJ)
ASEAN Coordinator (ACE)

Basic Time Schedule for 2006 - 2007



Thank You

Very Much



The Energy Conservation Center, Japan

Title : Development of Energy Management Handbook for ASEAN

J04

Intensive Workshop PROMEEC (Energy Management) for 2006 - 2007 - Development of Energy Management Handbook for ASEAN -



November, 2006

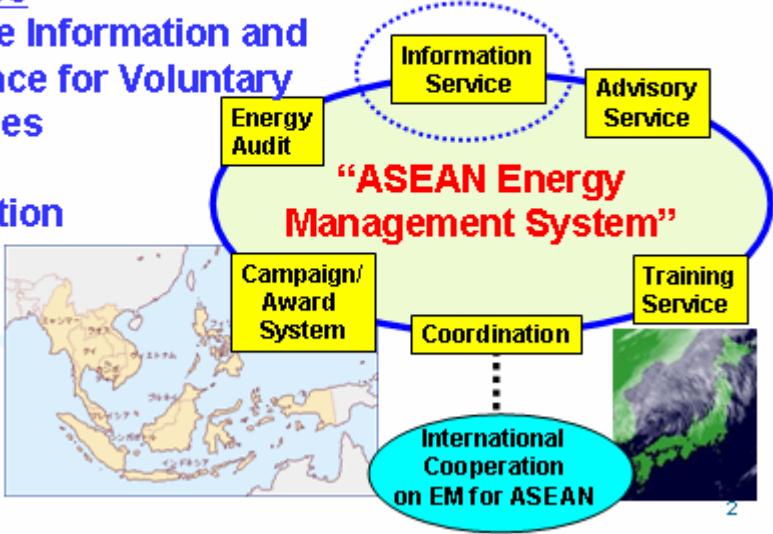
Kazuhiko Yoshida / Fumio Ogawa
International Engineering Dept.
The Energy Conservation Center, Japan



1

Concept and Purpose : Energy Management Handbook

Purpose
Provide Information and
Guidance for Voluntary
Activities
Merit
Promotion



**“ASEAN Energy
Management System”**

Energy Audit

Information Service


Advisory Service

Campaign/
Award
System

Coordination

Training Service

International
Cooperation
on EM for ASEAN



2

Philosophy of Energy Management Handbook (Enhancing “Energy Conservation by All Participation”)

(Area / Purpose)

- (1) Industry Sector : Inter-Industry to Individual Industries
- (2) Promote Companies’ EC Activities by All Participation
Management (Owner / Managers)
Staff, Engineers, Foremen, Workers (Operators)

Concept : Handbook for Total Energy Management

(Features)

- (1) Main users (readers) : Staff/Engineers
- (2) Practice&Business - Oriented (than Technical)
- (3) User Friendly Guidance
- (4) Expandable Contents / Easy to Update



(Expected EC Potential) 10 – 15% (By No/low Cost)

Basic Contents of EM Handbook

I. Purposes and Usage of TEM Handbook
Introduction / Purpose / Usage

**II. Total Energy Management “by Participation”
with Key Step Approach**

**CORE
PARTS**

III. Implementation of EC Project

Basic Tools: Small Group Activities (SGA) such as TQM / TPM

Appendix-1 Successful Examples of EC by S.G.A. in ASEAN

Appendix-2 Related Information

- (Access to the Existing Various References)
- Energy Statistics and EC Target in ASEAN countries
- List of References (Websites / Directory /Training Courses /
Technical Manuals, etc.)

Contents of EM Handbook – 1

Part I. Purpose and Usage of TEM Handbook

- Ch-1 Introduction
- Ch-2 Purpose of TEM Handbook
- Ch-3 Usage of TEM Handbook

Part II. Total Energy Management “by Participation” with Key Step Approach

- Ch-1 Key Step Approach for Energy Management
- Ch-2 Policy & Planning for Energy Conservation
- Ch-3 Organization & Structure for E.C. Promotion
- Ch-4 Principles and methods of S.G.A. (Small Group Activities) for Energy Management

Contents of EM Handbook – 2

- Ch-5 Building Awareness, Motivation and Training
- Ch-6 Evaluation of Total Energy Management

Part III. Implementation of E. C. Projects

- Ch-1 Procedures of Energy Audit
- Ch-2 Data Collection and Analysis
- Ch-3 Planning, Targeting & Benchmarking for E.C. Projects
- Ch-4 Implementation of E.C. Projects
- Ch-5 Evaluation of E.C. Projects

Contents of EM Handbook – 3

Appendix – 1

Successful Examples of E.C. by Small Group Activities
(Samples of Winners for ASAEN E.M. Award System)

Appendix – 2 Related Information

Access to the Existing Manuals / Data / Information
Available for E. C. Activities

- Statistics Data on Energy, etc.
- Websites of Related Energy / Industrial Organizations
- Directory related to E.C. Activities
- Available Training Courses
- Available Technical Manuals, etc.

Expected Function of E.M. Handbook

Utilization of Energy Management Handbook
Provision of Guidance for Activities by Companies
Effective Utilization with In-house Database

Steps of Activities for Improvement Management of Data and Activities

Sustainable Energy Management System
with Enhanced Voluntary Activities

Organization / Motivation & Incentive / Management
Participation / Technical & Practical OJT / Standardization



Process and Activities

1. Develop and Draft “Energy Management Handbook for ASEAN”
(ECCJ / ACE)
2. Review and Discuss “Energy Management Handbook for ASEAN” in Intensive Workshops with Participants in Each Country
3. Finalize Handbook (ECCJ / ACE)

TEM Handbook & Activities : Thailand



คู่มือการจัดการพลังงานโดยใช้เทคนิค

นิต TEM

(Total Energy Management, TEM Handbook)



**TEM Handbook : Actual Results of
Introductory Use at 10 Pioneer Factories
in Thailand**

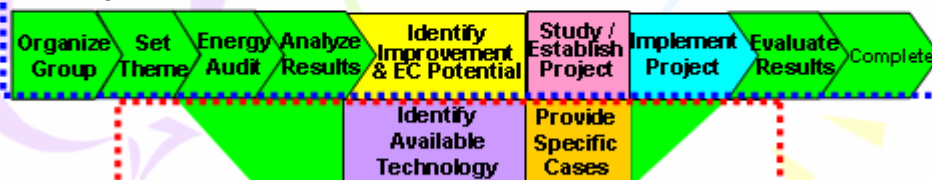
| Company | Number of Projects Implemented | Economical Effect (Baht) |
|--------------------------|--------------------------------|--------------------------|
| A : Building Management | 26 | 825,000 |
| B : Food Processing | 25 | 68,193 |
| C : Electrical Appliance | 12 | 318,954 |
| D : Plastic | 4 | 1,900,000 |
| E : Ink Fabrication | 5 | 18,217 |
| F : Ceramics | 18 | 2,590,548 |
| G : Cement | 2 | 79,530 |
| H : Pulp and Paper | 11 | 35,339,600 |
| I : Vehicle Engine | 10 | 314,266 |
| J : Textile | 9 | 4,147,652 |
| Total | 122 | 45,601,960 |

**Total Energy Management Handbook
- Overview of Thai Case -**

Energy Management Handbook

**Sustainable Energy Management System
with Enhanced Voluntary Activities**

Organization / Motivation & Incentive / Management
Participation / Technical & Practical OJT / Standardization



Enhanced Technical Capacity

**Supplemental Technical Handbooks
(In the process of Developing)**

*Thank You Very Much for Your
Further Cooperation !*





The Energy Conservation Center, Japan

Title : Award System of Best Practices in Energy Management for Industries and Buildings


J05

Intensive Workshop PROMEEC (Energy Management) for 2006 - 2007 - Award System of Best Practices in Energy Management for Major Industries & Building -



November, 2006

Kazuhiko Yoshida / Fumio Ogawa
General Manager, International Engineering Dept.
The Energy Conservation Center, Japan

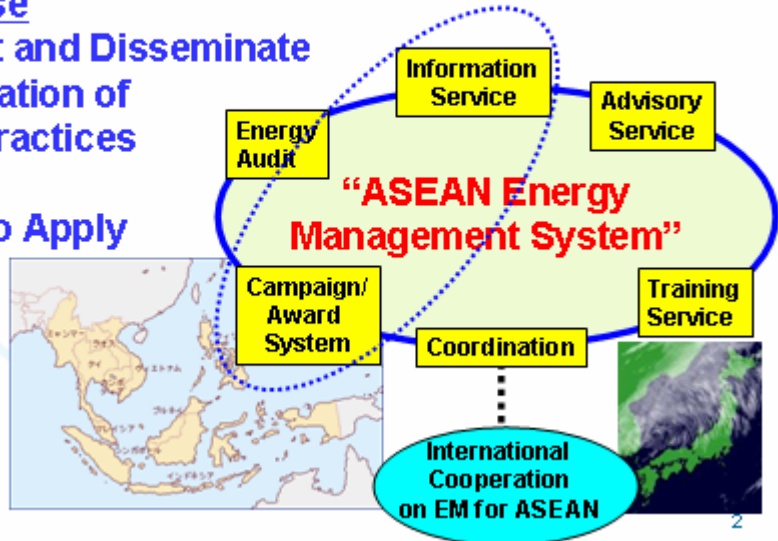


1

Concept and Purpose of E. M. Award System

Purpose
Collect and Disseminate
Information of
Best Practices

Merit
Easy to Apply



**“ASEAN Energy
Management System”**

Energy Audit

Information Service


Advisory Service

Training Service

Coordination

Campaign/
Award System

International
Cooperation
on EM for ASEAN

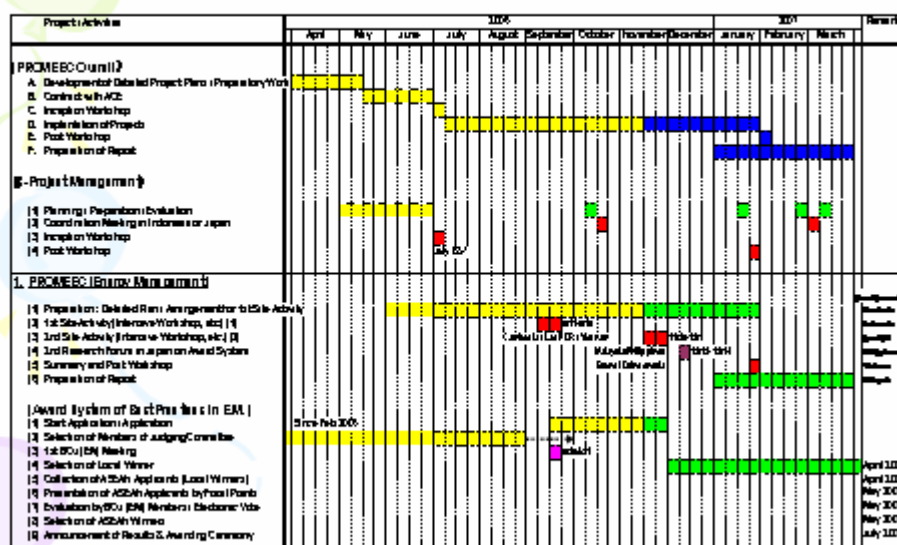


2

Activities and Progress

1. Draft and Discuss Basic Plan (2005-2006)
2. Authorize Basic Plan (2006)
Summary & Post / Inception Workshops
3. Develop Application Form (2006)
1st Research Forum in Japan (March)
4. Apply BOJ (E. M.) Members (2006)
5. 1st BOJ (E. M.) Meeting (Sept. 20, 2006)
Authorize Plan for 2006 - 2007
Call 1st Application (Oct. 2007)

Revised Schedule (Preliminary)



Recent Progress

- 1. Prepare The Following by BOJ (E.M.)**
 - (1) Authorization of Plan and Document for Application by BOJ (E.M.)**
 - (2) Guideline for Evaluation by BOJ (E.M.)**
- 2. Announce Application**
- 3. Inform / Encourage Companies to Apply by Focal Points**
Including Activity by Intensive Seminar-Workshop in 7 ASEAN Countries

Qualifications Preferred for Members of BOJ (E.M.)

- 1. Working Experience for E.M. in Factories and Buildings for 5 Years or Longer**
- 2. Educational Background with Bachelor or Higher Degree in Science / Engineering**
- 3. In Neutral Position**
(Government / NGO or NPO / Free after Retirement)

Persons Recommended by Focal Points Shall be Finally Respected.

Members of Judging Committee-1

1. Member of Judging Committee

One Member for Each Country (Total 10)

1) Selected (9 Members)

- Mr. (Dr.) Kha Sheng Tan (Brunei Darussalam)
- Mr. Lieng Vuthy (Cambodia)
- Mr. (Dr.) John A.W. Turangan (Indonesia)
- Mr. Khamso Khoupokham (Lao PDR)
- Mr. (Dr.) Zainuddin Abdul Manan** (Malaysia)
- Mr. U Win Khaing (Myanmar)
- Mr. Artemio P. Habitan (Philippines)
- Ms. Amarporn Achavangkool (Thailand)
- Mr. Mr. Dang Hai Dung (Vietnam)

2) Remaining (1 Member from Singapore)

Members of Judging Committee-2

2. Adviser

No Right to Vote / Referential Evaluation

1) ASEAN Adviser

Mr. (Dr.) S. Kannan Al V Krishna (Malaysia)

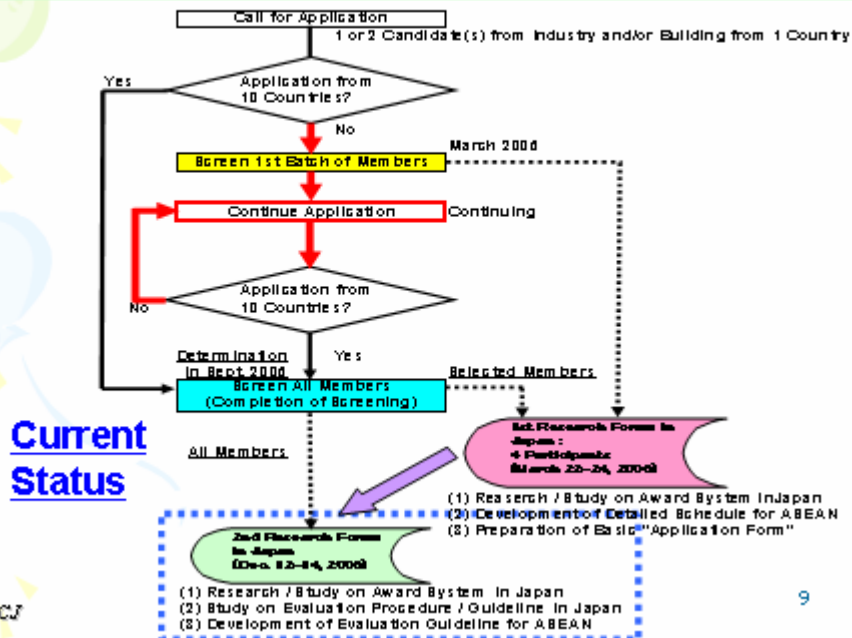
2) Japanese Adviser

Mr. Kazuhiko YOSHIDA
Mr. Takashi SATO
Mr. Fumio OGAWA

3. ASEAN Coordinator

ASEAN Centre for Energy (ACE)

Screening BOJ Members & Preparatory Activities



Evaluation of Items Determined in 1st BOJ Meeting

| Evaluation Items | | Distribution of Score |
|-------------------|---------------------------------------|-----------------------|
| 1. Impact | Energy Saving | 30% |
| | Environment (Positive / Negative) | |
| | Economic (Production, ROI, etc.) | |
| | Efficiency | |
| 2. Sustainability | Participation / Involvement | 25% |
| | Top Level Management Commitment | |
| | Enforcement (Voluntary / Mandatory) | |
| | Applicability | |
| | Organization (ex. SGA, EC Team, etc.) | |
| 3. Replicable | Cost | 25% |
| | Technology | |
| | Practicality | |
| | Adaptability | |
| 4. Other Factors | Innovation | 15% |
| | Creativity | |
| | Image Building | |
| 5. Presentation | | 5% |

ECCJ

10

Requirement for Participants

Encouraged Application
of Your Successful /
Excellent Cases !!

*Thank You Very Much for Your
Further Cooperation !*



The Energy Conservation Center, Japan



Title : Proposed Procedure to Utilize The Existing Implementing Organizations

J07

Intensive Workshop


PROMEEC (Energy Management) for 2006 - 2007

- Proposed Procedure to Utilize The Existing Implementing Organizations -



November, 2006

Kazuhiko Yoshida
General Manager, International Engineering Dept.
The Energy Conservation Center, Japan

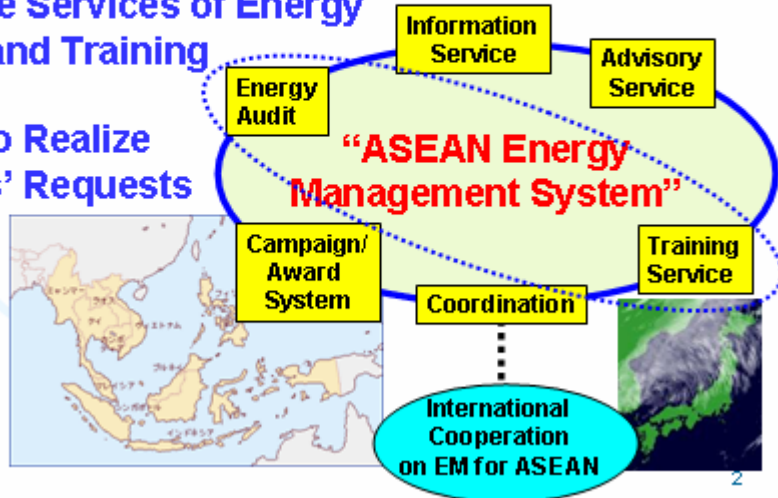


1

Concept and Purpose to Utilize The Existing Organizations

Purpose
Provide Services of Energy Audit and Training

Merit
Easy to Realize Clients' Requests



“ASEAN Energy Management System”

Energy Audit

Information Service

Advisory Service

Training Service

Coordination

Campaign/Award System

International Cooperation on EM for ASEAN



2

**Results of Local Intensive Surveys in 2005
(Scope of Services Possible to Provide by The Existing Implementing Organizations)**

| Energy Audit | Training / Education | Other Services | Number of Organizations |
|--------------|----------------------|----------------|-------------------------|
| | | | 2 |
| | | | 12 |
| | | | 2 |
| | | | 4 |
| TOTAL | | | 20 |

Potentiality to Utilize
Owned Capability of
The Existing Org.

Requirements for “ASEAN Energy Management System” to Realize (1)

1. Preparation of Site to Meet Service Providers and Clients

Meeting Site on Website

Possible Services by Providers

↑↓ (Scope / Spec. / Fee / Conditions)

Services Required by Clients

Finding Partners for Negotiation

Requirements for “ASEAN Energy Management System” to Realize (2)

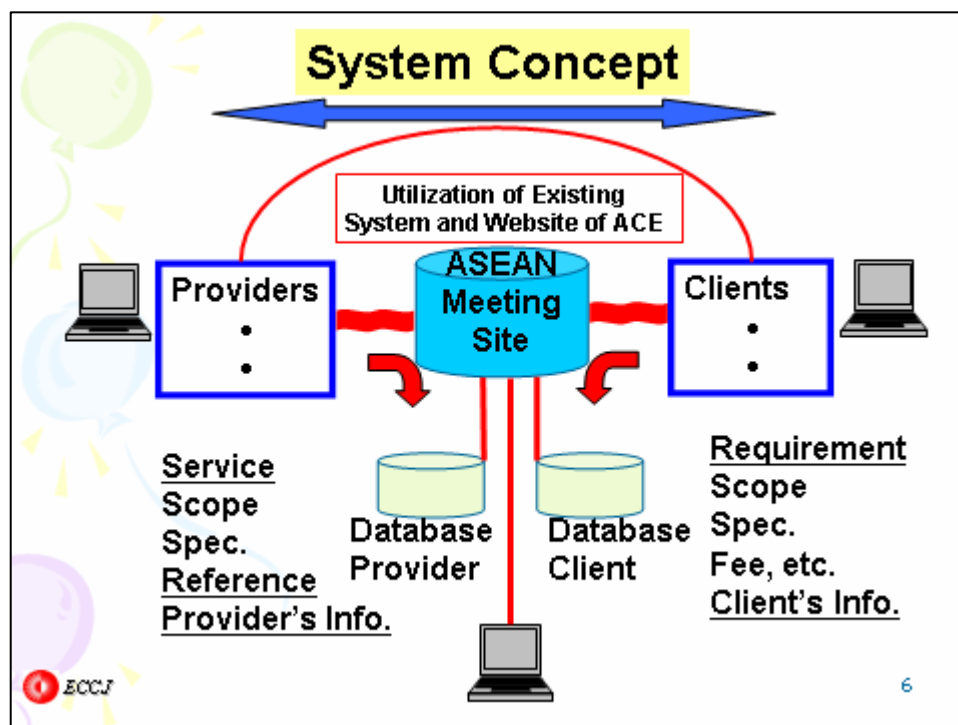
2. Provision of Required Information for Service Providers and Client

(1) Service Providers

- 1) General Information on Providers
- 2) Reference of Actual Results of Services
- 3) Typical Scope / Spec. etc. of Services

(2) Clients

- 1) Specific Requirement
Scope / Spec. / Fee / Other Conditions
- 2) General Information on Client



Proposed Process and Activities

1. Develop Detailed Draft Basic Plan (ECCJ / ACE)
2. Discuss Basic Plan in Intensive Workshops with Stakeholders in Each Country (7 Countries)
3. Establish A Protocol System for Trial (ECCJ / ACE)
4. Start Trial Operation

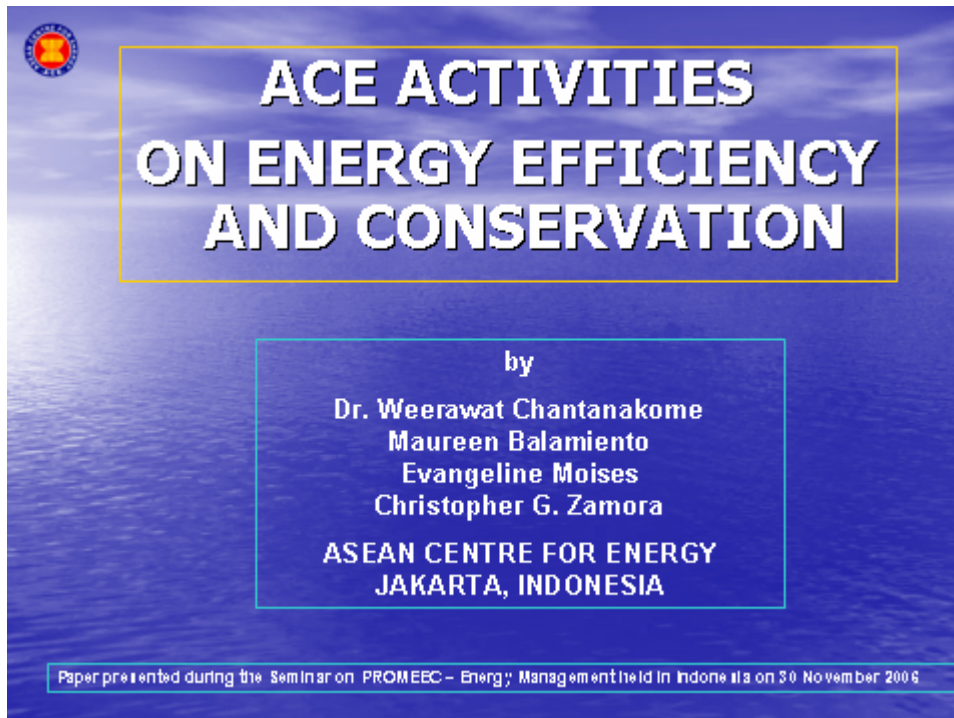
Thank You

Very Much



The Energy Conservation Center, Japan

Title : ACE Activities on Energy Efficiency and Conservation

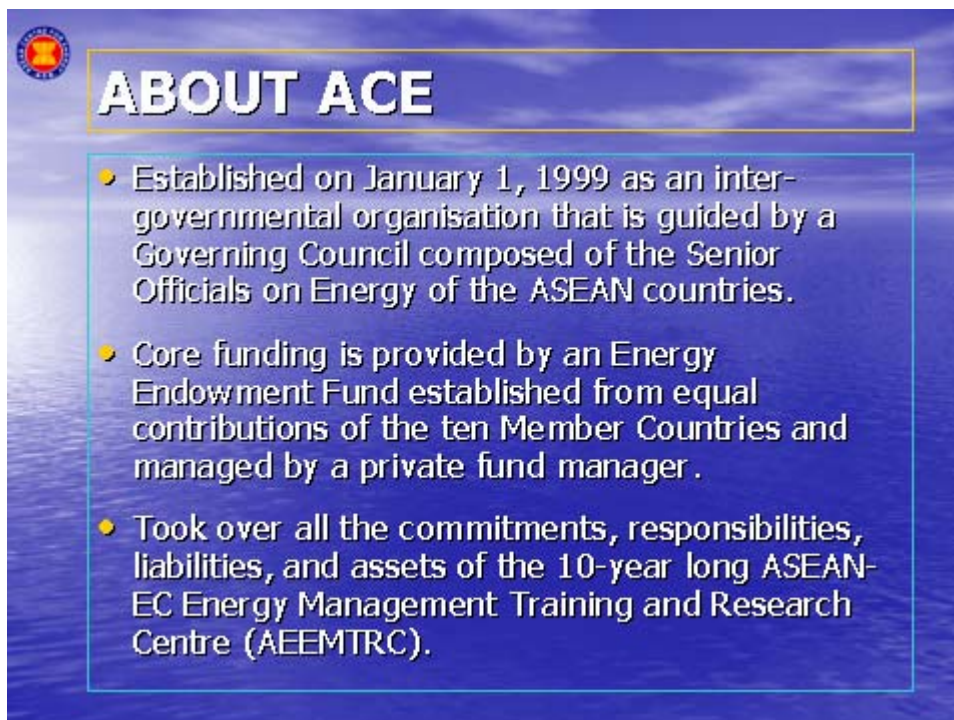


**ACE ACTIVITIES
ON ENERGY EFFICIENCY
AND CONSERVATION**

by
Dr. Weerawat Chantanakome
Maureen Balamiento
Evangeline Moises
Christopher G. Zamora

ASEAN CENTRE FOR ENERGY
JAKARTA, INDONESIA

Paper presented during the Seminar on PROMEEC - Energy Management held in Indonesia on 30 November 2006



ABOUT ACE

- Established on January 1, 1999 as an inter-governmental organisation that is guided by a Governing Council composed of the Senior Officials on Energy of the ASEAN countries.
- Core funding is provided by an Energy Endowment Fund established from equal contributions of the ten Member Countries and managed by a private fund manager.
- Took over all the commitments, responsibilities, liabilities, and assets of the 10-year long ASEAN-EC Energy Management Training and Research Centre (AEEMTRC).

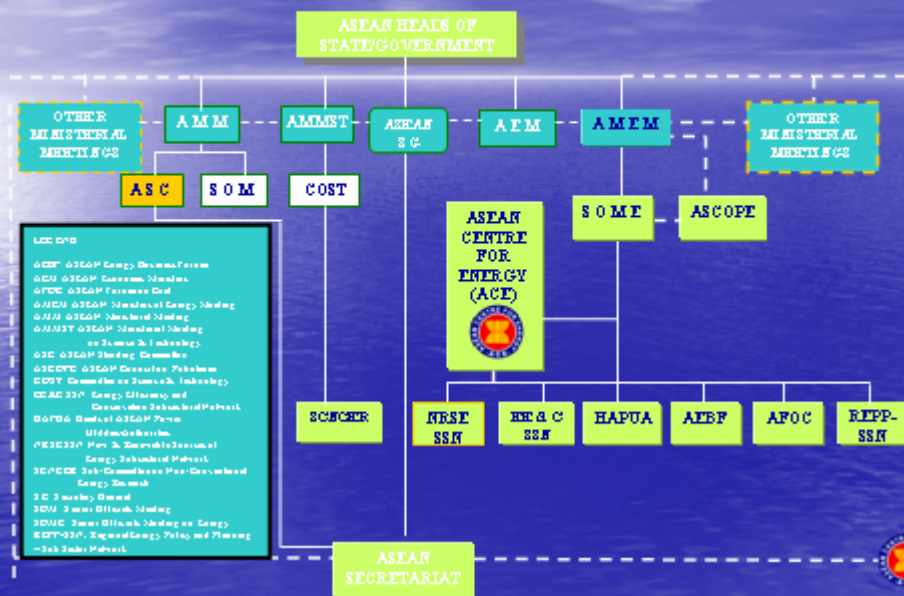



ABOUT ACE Charter of ACE

- ACE is envisioned to be a catalyst for the economic growth and development of the ASEAN region by initiating, coordinating and facilitating regional as well as joint and collective activities on energy.
- To realise this vision, the Centre will accelerate the integration of energy strategies within ASEAN by providing relevant information, state-of-the-art technology, and expertise to ensure that over the long-term, necessary energy development policies and programmes are in harmony with the economic growth and the environmental sustainability of the region.





ACE in the ASEAN Energy Sector






ASEAN PRIMARY ENERGY MIX (In Thousands Tons of Oil Equivalent)

| Fuel Type | 1990 | 1995 | 2000 | 2005 | 2010 |
|--------------|----------------|----------------|----------------|----------------|----------------|
| Natural Gas | 25,523 | 41,876 | 62,949 | 108,111 | 166,162 |
| Coal | 12,499 | 18,526 | 26,524 | 43,255 | 75,404 |
| Oil | 89,105 | 113,648 | 128,460 | 170,798 | 230,098 |
| Hydro | 7,596 | 11,448 | 16,620 | 23,953 | 42,837 |
| Others | 1,361 | 1,982 | 2,901 | 3,324 | 4,099 |
| Total | 136,084 | 187,481 | 237,454 | 349,440 | 518,599 |

ASEAN ENERGY MIX 1990-2010 (in percent %)

| Fuel Type | 1990 | 1995 | 2000 | 2005 | 2010 |
|--------------|--------------|--------------|--------------|--------------|--------------|
| Natural Gas | 18.8 | 22.3 | 26.5 | 30.9 | 32.0 |
| Coal | 9.2 | 9.9 | 11.2 | 12.4 | 14.5 |
| Oil | 65.5 | 60.6 | 54.1 | 48.9 | 44.4 |
| Hydro | 5.6 | 6.1 | 7.0 | 6.9 | 8.3 |
| Others | 1.0 | 1.1 | 1.2 | 1.0 | 0.8 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |





ASEAN PLAN OF ACTION FOR ENERGY COOPERATION (APAEC) 2004-2009

Six Program Areas

- Trans-ASEAN Gas Pipeline
- ASEAN Power Grid
- Coal
- **Energy Efficiency and Conservation**
- **New & Renewable Sources of Energy**
- **Regional Energy Policy and Planning**



APPROACHES TO APAEC 2004-2009

- Strengthen coordination/participation in all program areas to narrow development gap among ASEAN member countries;
- Encourage a conducive environment for greater private sector involvement and participation, including securing foreign direct investment;
- Enhance human resources and capacity building skills;
- Develop and expand the energy mix and supply source through utilisation of full energy potential of the region to include frontier exploration and development and extensive research on oil, natural gas, coal, hydropower, geothermal, EE&C and NRSE;
- Develop transparent legal, regulatory and technical frameworks in various energy projects, in particular on the cross border interconnection projects




Multilateral Cooperation for APAEC 2004-2009

- ASEAN - Japan Cooperation
- ASEAN and European Union (EU) Cooperation
- ASEAN + 3 Cooperation
- ASEAN - Australia Cooperation
- Cooperation with the Energy Charter Secretariat
- Initiative for ASEAN Integration (IAI)



Energy Efficiency and Conservation

| STRATEGIES | PROGRAMS/PROJECTS |
|--|---|
| 1. Continuation of Information Sharing and Networking | Develop a compendium of the following for circulation to member countries and general public: <ul style="list-style-type: none">❖ EE&C Policies / Strategies / Programs❖ EE&C Products and Technologies❖ EE&C Pool of Experts and Institutions❖ EE&C Best Practices / Researches |



Energy Efficiency and Conservation

| STRATEGIES | PROGRAMS/PROJECTS |
|--|--|
| <p>2. Continuation of ASEAN Energy Standards and Labeling</p> | <ul style="list-style-type: none"> ❖ Review country S&L programs and testing capacity ❖ Study international experiences through study tour and joint workshops ❖ Formulation of common Technical Bases ❖ Development of Control Mechanisms and Implementation process ❖ Dialogues with stakeholders and promotion |



Energy Efficiency and Conservation

| STRATEGIES | PROGRAMS/PROJECTS |
|--|--|
| <p>3. Expansion of Private Sector Involvement</p> | <ul style="list-style-type: none"> ❖ Enhance dialogues with private sector, other countries and organizations outside ASEAN ❖ Conduct Seminars and Workshops jointly with EE&C industry and Businesses ❖ Include EE&C Discussion and Exhibitions in AEBF ❖ Expand Energy Awards / Competitions for Industry Sector and Individual Achievements |



Energy Efficiency & Conservation

| STRATEGIES | PROGRAMS/PROJECTS |
|----------------------|--|
| 4. Capacity Building | <ul style="list-style-type: none">❖ Establish energy audit procedures❖ Implement energy audit training❖ Implement / Disseminate recommended improvements❖ Develop system for energy database, benchmarking and guideline❖ Develop ASEAN Energy Management System/Network❖ Develop certification system for ASEAN energy manager including energy auditor❖ Develop ASEAN energy management training for trainers❖ Develop energy management guidelines❖ Technology Transfer and Demonstration |



Energy Efficiency & Conservation

| STRATEGIES | PROGRAMS/PROJECTS |
|---|---|
| 5. Promotion of ESCO business | <ul style="list-style-type: none">❖ Development of Measurement & Verification (M&V) Protocol for ASEAN❖ Development of Energy Performance Contracting Legal Framework and Standard Form of Contract❖ Development of Project Management and Institutional Guideline❖ Development of Energy Saving Potential Indexes (Benchmarking)❖ E-commerce development for energy services |
| 6. Promotion of Energy Efficiency in the Transport Sector | <ul style="list-style-type: none">❖ Information Sharing on EE Policy and Measures for Transportation❖ Explore possible cooperation activities with ASEAN Transport sector (STOM) |



ON-GOING PROGRAMS ON EE&C

- **EC – ASEAN ENERGY FACILITY**
- **SOME – METI WORK PROGRAM**
- **METI MULTI-COUNTRY TRAINING PROGRAM**
- **ASEAN AWARDS PROGRAM**
- **PROMOTIONS PROGRAM**



1. EAEF Program

- A program of cooperation between EU and ASEAN launched in March 2002 and will be completed in March 2007.
- ACE implements the EAEF program.
- It facilitates partnerships between ASEAN and EU organizations in developing specific joint projects in the energy sector
- It also targets institutional development (cap. Building)
- Catalysing interaction of industry and energy sector operators
- Supports the implementation of the APAEC 1999-2004; 2004-2009
- In brief, a co-financing instrument for energy projects— supporting the APAEC projects
- Co-funded 77 projects; total project cost is about Euro 38.5 million
- 17 projects on EE&C were co-funded.



The 17 EAEF Projects on EE&C

1. Launching of a EC-ASEAN energy network, Sharing energy policy and implementation experiences among selected countries
2. ASEAN-European study tour and regional ASEAN workshops addressing best practices in energy labeling
3. Feasibility study for the establishment of an Energy Manager Accreditation Scheme for the ASEAN region
4. Setting up of National Associations for Cogeneration and Decentralized Energy Systems in ASEAN Countries
5. Development of a Business Model for Building Energy performance Services in the ASEAN region (being developed by National University of Singapore)
6. Capacity building in formulating harmonized policy instruments for the promotion of renewable energy and energy efficiency in the ASEAN Member Countries
7. Development of a Comprehensive database for Building Energy Performance Benchmarking in the ASEAN region



The 17 EAEF Projects on EE&C

8. Feasibility study for the sustainable development of Samui Island
9. The PTM Zero Energy Office Building (ZEO Building)
10. Study of the Energy Charter Treaty for Possible Adoption by ASEAN
11. Regional Energy Policy and Planning in ASEAN for Sustainable Development (REPP-ASD)
12. Establishment of the Energy Efficiency and Conservation Office of Vietnam; Dissemination of the Experience to ASEAN
13. Development of the Energy Management Simulation Test for the Practical Training of Energy Managers in ASEAN
14. Implementation and Demonstration of a 1.5 MWe Cogeneration Plant in Cambodia
15. Increasing the market awareness of the benefits of energy efficiency improvements at Sugar Mills in Indonesia and the Philippines
16. Development of the Theoretical Training Curricula for Energy Managers and Training Providers in ASEAN
17. Increasing market awareness of energy efficiency improvement potential in paper mills in Vietnam



2. SOME – METI PROGRAM

- PROMEEEC was started in 2000 with technical and funding support from METI
 - Jointly implemented by ACE, EE&C-SSN and ECCJ
 - Consists of 3 Major projects
 - PROMEEEC – BUILDINGS
 - PROMEEEC – MAJOR INDUSTRIES
 - PROMEEEC – ENERGY MANAGEMENT
- Major Activities of PROMEEEC Building & Industry are:
- a. energy audit
 - b. development of database, technical directory and benchmarking system
 - c. On-the-job training on energy auditing
 - d. Seminar-Workshop on EE&C Best Practices



SOME-METI WORK PROGRAM: 2. PROMEEEC Work Program 2005-2006

PROMEEEC - BUILDINGS

PROMEEEC – INDUSTRIES

PROMEEEC-ENERGY MGT

INCEPTION WORKSHOP 2005-2006
Manila, Philippines, 30 June – 01 July
2005 – Hosted by DOE



PROMEEEC POST – WORKSHOPS 2005-2006
26 – 27 January 2006, Bandung, Indonesia
- Hosted by DJLPE

SOME-METI WORK PROGRAM
PROMECC – Building 2005-2006

Countries and Schedule


- Lao PDR : 07 - 11 November 2005
- Malaysia : 14 - 18 August 2005
- Myanmar: 08 - 12 August 2005
- Vietnam : 14 - 18 November 2005

8 building energy audits & OJT

4 Seminar workshops on EC

Benchmarking system, database development and guidelines for EE&C

Development of Technical Directory



SOME-METI WORK PROGRAM:
PROMECC – MAJOR INDUSTRIES 2005-2006

Countries and Schedules

- Brunei D. : 3 - 17 Dec 2005
- Cambodia : 22 - 26 Aug 2005
- Indonesia : 05 - 12 Dec 2005
- Philippines : 29 Aug-02 Sept '05

Four Seminar-Workshops on EE&C Best Practices : Total participants : 270

9 energy audits of industries & OJT

- Cement (Brunei D.)
- Food (Brunei D.)
- 3 Garment factories (Cambodia)
- Pulp & paper (Indonesia)
- Textile (Indonesia)
- 2 Steel Rolling Mills (Philippines)

Capacity Building

1. Development of Database and Guidelines
2. Development of Technical Directory

PROMECC – Major Industries Workshop held in Jakarta, hosted by DJLPE, Indonesia in December 2005





SOME-METI WORK PROGRAM: PROMEEC – ENERGY MANAGEMENT 2005-2006

5 Countries and Schedules

- Indonesia : 05 – 06 Sept 2005
- Malaysia : 08 – 09 Sept 2005
- Philippines : 12 – 13 Sept 2005
- Vietnam : 20 – 21 Oct 2005
- Thailand : 25 – 26 Oct 2005

Research and study workshop on energy management in Tokyo, Japan on 25 – 29 July 2005 with a total of **20 participants** from 10 ASEAN Countries and ACE

Surveys and workshops in 5ASEAN countries on: status of EE&C policy and law, activities of implementing organizations, and the private sector activities in the promotion of EE&C, EE&C infrastructures (lab, training facilities, etc.)

Proposed **ASEAN Energy Mgt Awards for Buildings and Industries** in 2006-2007 Work Program



SOME-METI WORK PROGRAM PROMEEC 2006-2007

INCEPTION WORKSHOP FOR 2006-2007
6-7 July 2006, Kota Kinabalu, Malaysia
hosted by PTM

PROMEEC - BUILDINGS

| | |
|-------------|-----------------|
| Brunei D. | 4-9 Sept 2006 |
| Philippines | 9-13 Oct. 2006 |
| Singapore | 16-20 Oct. 2006 |
| Vietnam | 6-10 Nov. 2006 |

PROMEEC - INDUSTRIES

| | |
|----------|-----------------|
| Myanmar | 25-29 Sept 2006 |
| Lao PDR | 2-6 Oct 2006 |
| Thailand | 13-17 Nov 2006 |

PROMEEC – ENERGY MGT

Lao PDR, Vietnam, Cambodia
(11-22 Sept. 2006)
Philippines, Indonesia
Brunei, Malaysia
(27 Nov – 8 Dec 2006)





A. PROMEEC - INDUSTRY

| Country | Brunei | Cambodia | Indonesia | Laos PDR | Malaysia | Myanmar | Philippine | Singapore | Thailand | Vietnam |
|---|--------------------|----------------------------------|----------------------------------|--------------------|--------------------|-----------|----------------------------------|--------------------|--------------------|-----------|
| 1. Country Condition | | | | | | | | | | |
| - Area (km ²) | 6,786 | 181,000 | 1,890,000 | 240,000 | 330,000 | 820,000 | 298,404 | 699 | 614,000 | 328,241 |
| - Population (x10 ⁵) | 360/03 | 13,600/02 | 216,000/01 | 6,800/06 | 26,620/04 | 62,170/02 | 81,600/03 | 4,240/04 | 61,870/04 | 82,080/04 |
| - GDP/capita/per year | 13,413/03 | 281/02 | 964/03 | 402/03-04 | 4,372/04 | 180/03 | 1,060/03 | 26,181/04 | 2,238/03 | 433/04 |
| 2. Industry & Time of Energy Audit | | | | | | | | | | |
| (1) Cement | 2000 (Dec.2006) | | | | | | | | | |
| (2) Textile | | | | | 2000 F.11-16,04 | | | | | |
| (3) Pulp / Paper | | | 2001 F.11-16,04 (Dec.2006) | | | | | | | |
| (4) Oil Refinery | | | | | 2001 F.11-16,04 | | | | | |
| (6) Ceramics / Porcelain | | | | | | | | | 2001 F.11-16,04 | |
| (8) Hydro power | | | | 2001 F.11-16,04 | | | | | | |
| (7) Cement | | 2002 F.11-16,04 (Aug.2006) | | | | | | | | |
| (3) Iron & Steel | | | | | | | 2002 F.11-16,04 (Sep.2006) | | | |
| (9) Food | | | | | | | | 2002 F.11-16,04 | | |
| (10) Chemical (Caustic Soda) | | | | | | | | | 2002 F.11-16,04 | |



B. PROMEEC - Building

| | Br | Ca | Ina | Laos | Mas | Mya | Phil | Sing | Thai | Vn |
|--------|------|------|------|------|------|----------|------|------|------|------|
| 2000 | | | | | | | | 2000 | 2000 | |
| 2001 | | 2001 | 2001 | | | | 2001 | | | |
| 2002 | | | | | | 2002 | | | | 2002 |
| 2003 | 2003 | | | 2003 | 2003 | | | | | |
| Hotel | H1 | H1 | | H1 | | H1 | | | | H2 |
| Office | | | O1 | | O1 | O1 | O1 | O1 | O1 | |
| 2004 | | 2004 | 2004 | | | | 2004 | | 2004 | |
| Follow | | H1 | | | | | O1 | | O1 | |
| New | | H1 | H2 | | | | O1 | | | |
| 2005 | | | | 2005 | 2005 | 2005 | | | | 2005 |
| Follow | | | | | | O1 H1 | | | | H2 |
| New | | | | H2 | O1 | | | | | H1 |

***C. PROMEEC – Energy Management
With 5 Specific Activities***

1. Award System for Best Practices in Energy Management for Major Industries and Buildings

Purpose

Collect and Disseminate Successful Cases of Energy Management in Factories and Buildings

Outline of Procedures

- 1. Organize Judging Committee & Preparation**
- 2. Call for Application in Each Country**
- 3. Select 2 Local Winners (Industries & Buildings)**
- 4. Determine ASEAN 2 Winners and 2 Runner-Ups**
- 5. Publish through Media Such as Website**

Schedule for 2006 - 2007

- | | |
|----------------------------------|---------------------|
| 1. Call for Application | : April 2006 |
| 2. Determine ASEAN Winner | : March 2007 |

2. Utilization of the Existing Implementing Organizations for Energy Audit and Training (1)

Purpose

Utilize Services of Existing Implementing Organization in ASEAN countries for Energy Audit in Factories and Buildings and for Training

Benefits for Customers

1. Most Cost Effective and Realistic Solution to Requirement
2. Possible to Choose An Suitable Organization

Benefits for Service Providers

1. Expand Business
2. Increase Availability of Facilities and Manpower
3. Possibility to Enhance Facilities / Capacity

3. Dissemination System of Technical Directories for Major Industries and Buildings

(Status)

Under Development through Projects for Major Industries & Buildings and Edition by ACE

- (1) Available for ALL Users
- (2) Wider Coverage of Technology and Application including Practice for EE&C
- (3) Flexibility to Update and Expand
- (4) Various Possible Access to Directory



User Friendly !

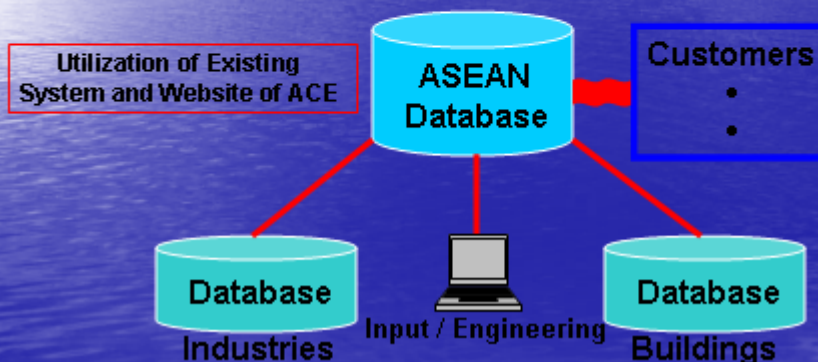


30

4. Development of System for Database

(Status)

Under Development through Projects for Major Industries & Buildings with Design by ACE/ECCJ



5. Development of TEM* Handbook for ASEAN Philosophy and Concept

(Area / Purpose)

- (1) Industry Sector : Inter-Industry to Individual Industries
- (2) Promote Companies' EC Activities by All Participation
Management (Owner / Managers)
Engineers and Workers

Total Energy Management (TEM*) Handbook

(Features)

- (1) Practice&Business - Oriented (than Technical)
- (2) User Friendly Guidance
- (3) Expandable Contents / Easy to Update

(Expected EC Potential) 10 – 15% (By No/low Cost)





3. Multi-Country Training Program on Energy Conservation in Japan

- Funded by METI, Japan
- Jointly implemented by ECCJ and ACE
- In year 1 (2005-2006), 100 ASEAN personnel were trained in Japan; consisting of 4 batches
- In year 2 (2006-2007), about 40 ASEAN participants will be trained; consisting of 2 batches
- More batches of training courses may be expected in the coming years



ACE-ECCJ/METI - Multi-Country Training Program on Energy Conservation

100 ASEAN participants trained in Japan for 2005-2006 period

4 Training Courses Japan
a. 25 – 29 July 2005
b. 24 Nov. – 02 Dec. 2005
c. 12 – 20 January 2006
d. 06 – 17 February 2006



Promotes awareness on energy conservation law and activities in Japan and ASEAN countries and on-site visits to energy efficient industries and buildings

The MTPEC program continues in Japanese FY 2006-2007 with 2 batches; 40 participants



4. Awards System in EE&C

- ASEAN EE&C Best Practices Competition for Energy Efficient Buildings
- Started in 2000 by ACE and EE&C-SSN
- Categories include:
 - New and Existing Building
 - Retrofitted Building
 - Tropical Building
 - Special Submission

New Category will be launched in 2006-2007: Energy Management for Building and Industry Competition; First Meeting of BOJ is being organized this September in Hanoi by ACE and ECCJ to formulate and agree on rules and guidelines of competition



ASEAN Energy Awards 2006

Organized the Evaluation Meetings of Board of Judges for **ENERGY EFFICIENT BUILDINGS (EEB)** and **RENEWABLE**



Energy Efficient Buildings Competition, hosted by MEM, Lao PDR, June 2006

AWARDEES FOR EEB

1. NEW AND EXISTING

Winner : Low Energy Office (LEO) **Malaysia**
 1st RU : One George Street **Singapore**
 2nd RU : Grha Wonokoyo, **Indonesia**

2. RETROFITTED

Winner : Tan Tock Seng Hospital **Singapore**
 1st RU : Krung Thai Bank PCL **Thailand**
 2nd RU: Makati Stock Exchange, **Philippines**

4. SPECIAL SUBMISSION

Winner : Water Jet Nozzle for AC Unit, **Atma Jaya Catholic University, Indonesia**

3. TROPICAL

Winner : Clarke Quay Development, **Singapore**



ASEAN Energy Awards 2006



Renewable Energy Project Competition
hosted by DES, Brunei Darussalam

AWARDEES FOR RE Project

1. OFF GRID

Winner : Wastewater Treatment and Biogas Generation Project, **Thailand**

1st RU : Community- Based Micro Hydropower, **Malaysia**

2nd RU: Rural Electrification with Rice Husk Gasifier, **Myanmar**

2. ON GRID

Winner : BMP Power Plant, **Thailand**

1st RU : 33 MW Northwind Bangui Bay Wind Power Project
Philippines

2nd RU : PV Grid Power Plant
Indonesia

3. COGENERATION

Winner : Biomass Cogeneration Power Plant (Development of Environment and Energy Foundation), **Thailand**



ASEAN Energy Awards 2006



Awardees for Excellence in Energy Management

Dr. Yogo Pratomo
Former SOE Leader for INDONESIA

Khun Cherdpong Siriwit
SOE Leader for THAILAND

Prof. Dr. S. Kannan Krishna
Chairman BOJ for EEB Competition, MALAYSIA

Prof. Dr. Lee Siew Eang
Chairman BOJ for EEB Competition, SINGAPORE

Prof. Dr. Horayangkura Vimolsiddhi
Chairman BOJ for EEB Competition, THAILAND

Khun Siriporn Sailasuta
Coordinator for ASEAN EE&C-SSN, THAILAND







5. Promotions Program

- Highlight recent policies, key technologies and development on EE&C in the annual ASEAN Energy Business Forum International Conference and Exhibition back to back with AMEM and its associated meetings
- Development of EE&C Infonet in the ACE website
- Publication of specific themes such as EE&C in the quarterly publication of ASEAN Energy Bulletin of ACE.
- Participation in EE&C events at regional and global level.

**THANK YOU
FOR YOUR KIND ATTENTION**



Title : Development of the Technical Directory and In-house Database



Development of the Technical Directory and Database

Seminar on the Promotion on Energy Efficiency and Conservation (PROMEEC) for Energy Management in Southeast Asia

The Background

Phase 2 of PROMEEC Activities

- Implementation of Energy Audits and Recommended Improvements in Each Country
 - Follow Up Survey to Find Actual Status
 - Study on Barrier and Measures
 - Consulting for Implementation
- Dissemination of Technologies and Practices
 - Preparation of Technical Directory
 - Establishment of Database
 - Workshop for Dissemination
- Development of an “ASEAN Energy Management System”

Why Develop a Technical Directory?

- Introduce and promote technologies and best practices on
- EE&C available in the world and in ASEAN
- Encourage further investments in technologies and best practices
- Help create the market
- Promote a culture of increased efficiency
 - Savings
 - Employment
 - Environmental Protection

The Technical Directory

- Designed to be user friendly
- Available for all users as it is web based
- Displays a wide coverage of technologies and best practices
- Updated regularly
- Open for expansion

Contents of the Technical Directory

■ Overview of Technology or Practice

- Name of Technology
- Energy Source/Practical Use
- Outline and Effects

■ Technical Description

- Principle
- Features
- Mechanism

■ Successful Cases

- Energy Saving and Cost
- Companies/Organizations

Status of Compilation

■ 50 Technologies for Industries

- Operation
- Heat exchange
- Machinery and equipment
- Energy saving equipment
- Welding

■ 33 Technologies for Buildings

- Operation
- Regulator
- Airconditioning
- Electricity
- Steam drain
- Lighting improvement

Technologies for Industries

- Application of Heat Pumps to a Fractionator
- Boiler Re-circulation scrubber pump
- Capacitor
- Caustic soda production process, Brine electrolysis heat recovery line preheater
- Caustic soda production process, Energy-saving ion-exchange membrane electrolyzer
- Caustic soda production process, Improvement of active cathode for ion-exchange membrane method electrolyzer
- Caustic soda production process Reduction of electrolytic electricity of brine electrolyzer
- Circulating Fluidized Bed (CFB) Boiler Technology
- Clean Boiler Waterside Heat Transfer Surface
- De-inking Module Pumps
- Development of Energy Conservation Technology for Manufacturing Plastic Products through Process Omission
- Development of Energy Saving Distillation, Technology through Internal Heat Exch.
- Development of Fundamental Technologies for Next-Generation Satellites
- Development of Welding Technology of Steel Conservation Structures for Energy
- Energy saving improvement of blowers and pumps
- Energy saving of vacuum pump for paper-making machine
- Fan Pump Impeller

Technologies for Industries

- Heating Furnace Using Regenerative Burner
- The integrated gasification combined cycle (IGCC) produces electricity from a solid or liquid fuel
- High efficiency dehydrator for dryer of paper-making machine
- High efficiency inverter driven screw compressor
- Improvement of vacuum condenser
- Improve Your Boiler's Combustion Efficiency
- Installing power recovery turbines for heavy fraction oil hydro cracking plant
- Install Removable Insulation on Valves and Fittings
- Introduction of clinker pre-grinding roll crusher (Cement Production Finishing Section)
- Ladle heating apparatus with regenerative burners
- Overhead Vapor Chiller System
- Power and Steam Balance System
- Power receiving/transforming equipment
- Primary Fan Pump Motors
- Recover Heat from Boiler Blow down
- Reducing excess air through modification to furnace dampers
- Semiconductor Application Chip Project
- Sensors for Smart Controller and Transfer Pump Motor Controller
- Use Low-Grade Waste Steam to Power Absorption Chillers

Technologies for Buildings

- Absorption Chiller
- AC equipped with heat pipe
- Use of water chilled in cooling tower during winter to cool telecommunications equipment rooms
- Adjustment of air ratio in Boiler
- Automatic Operation Control for Escalator
- AVR with load management system
- Building Automation System (BAS)
- Cogeneration System
- Control of outlet temperature of cold water from chiller depending on the season
- Control of the number of Elevators operating during nighttime
- Daylight sensors' on-and-off control of lights near the windows
- Diversion of emergency power generator to co-generation equipment
- Drain water heat recovery
- Energy Saving Module (Abbotly)
- Environmental Energy Utilization System
- Light Save (LSA2000B)

Technologies for Buildings

- Outdoor Air Cooling
- High-efficiency Gas Fired Air Conditioning System
- Installation of inverters to cold water pumping system
- Installation of automatic controllers to ducts of individual rooms
- Insulate Steam Distribution and Condensate Return Lines
- Placing of water saving type valve disc
- Process Heating System
- Repair and maintenance of cooling tower
- Reflector Light
- Segmentation of lighting circuit
- Solar Photovoltaic power generation
- Technological Development for a Small, Highly Efficient Natural Gas Co-Generator
- Test for Pumping System Efficiency
- Variable speed drive on Air Conditioning System chilled water pump and condenser
- Water Cooled Evaporative Air Conditioning
- Water saving

Examples in the Technical Directory

Buildings

| TECHNICAL DIRECTORY | | |
|---|--|---|
| Building 2.2 | AC equipped with heat pipe | Energy Source Electricity Practical Use 100% |
| Industry classification - Buildings / AC | | |
| Technology Classification - Domestic AC | | |
| Outline | <p>Air Conditioning unit equipped with heat pipe specially designed for Tropical Climate (Tougher than Sub-Tropic)</p> <p>The Climate Difference</p> <ul style="list-style-type: none"> • Sub-Tropic <ul style="list-style-type: none"> - Hot and Dry - Low wet B. •Tropic <ul style="list-style-type: none"> Hot and humid | |
| Principle & Mechanism | <p>Conventional Type (AC + Heater)</p> <ul style="list-style-type: none"> - Consume electricity for heater - Rise AC Capacity <p>A.C equipped with Heat Pipe</p> <ul style="list-style-type: none"> - No electricity for heater - Smaller AC Capacity <p>CONVENTIONAL AIR CONDITIONING WITH HEATER</p> <p>AIR CONDITIONING WITH HEAT PIPE</p> | |
| Structure, explanation, shapes, and/or System diagram | <p>Principle of Heat Pipe In one end part coolant absorbs heat and evaporates, in the other end coolant dissipates the heat and condenses</p> <p>The Use of Heat pipe in AC Hot and humid outdoor air is pre-cooled by heat pipe. Dehumidified and undercooled</p> | |

Examples in the Technical Directory

| | |
|---|---|
| Effectiveness of the improving measure | <p>AC Equipped with Heat Pipe used in Tropic Climate</p> <ul style="list-style-type: none"> - Comfort Zone SHI can be maintained. - AC Capacity can be reduce by 15-20%. - Operation cost can be reduce by 20-30%. - Room RH can be controlled <60%, to prevent the grow of Fungi and Microorganism. |
| Energy saving | AC Capacity can be reduce by 15-20% |
| Green House Gas reduction (except CO2) | Possible reduction correspondent to the reduction in electric power at power plants |
| Cost | 0 (About the same as conventional AC) |
| Economical effectiveness (benefit and cost) | <p>Operation cost of AC (In case of 1HP (1kW))</p> <p>(Preconditions)</p> <p>Operation time : 15 hours/day, 300 days/year,</p> <p>Electric Power Cost : Rp.500/kWh (US\$0.055/kWh)</p> <p>(Operation cost)</p> <p>1kW x 15h/d x 300d/y x Rp. 500/kWh (US\$0.055/kWh)</p> <p>Rp. 2,250,000 -/year (US\$22)</p> |
| Note | <ul style="list-style-type: none"> - Contacts for further information - Ir. John Budi Harjanto Lisjono M. Eng.Sc - Universitas Katolik Indonesia ATM A JAYA, Fakultas Teknik Jurusan Teknik Mesin - PT Metroplan Bayu Industri |

Examples in the Technical Directory

Major Industries Cement

| TECHNICAL DIRECTORY | | |
|--|---|------------------------------|
| Industry - 1.26 | Cement Production Finishing Section Introduction of Clinker Pre-Grinding Roll Crusher | Energy Source Electricity |
| Industry classification Ceramic: Cement | | Practical Use 1987 |
| Technology Classification Production Equipment | | |
| Outline | The present case installs a vertical roll crusher of high grinding efficiency as a pre-grinding crusher in the step previous to the ball mill, the finishing grinder of cement production. By preliminarily crushing clinkers before they are fed into the ball mill of high power consumption, the efficiency of the ball mill was increased because its load was greatly reduced and the specific electric power consumption was significantly saved. | |
| Principle & Mechanism | Structure of the pre-grinding crusher (vertical roller mill). A mixture of clinkers and gypsum was crushed by the compression and shear force between the table and three rollers, the latter being hydraulically pressed onto the former. | |
| Description | Outline of the pre-grinding crusher (Refer to fig. 1.) Limestone and others burned in the kiln are called clinkers. Clinkers are cooled and transported to the hopper. A weight counting feeder withdraws clinkers from the hopper and sends them to the pre-grinding crusher, a vertical roll mill, where the clinkers are preliminarily crushed. The preliminarily ground clinkers were lifted by a bucket elevator to a vibrating sieve which separates the ground clinkers into finer powders and coarser powders. The coarser powders in the sieve are sent back to the pre-grinding crusher. The finer powders are fed into the ball mill with gypsum for further grinding to produce finished cement product. | |
| Structure explanation, shapes, and/or System diagram | <p>Fig. 1 Flow scheme of pre-grinding system with pre-grinding crusher for clinkers</p> | |

Examples in the Technical Directory

| Table 1 Effect of the pre-grinding crusher on energy saving and productivity | | | | |
|--|--|-----------------------------------|-------------------|-------------------------|
| Energy Saving effect | | Before improvement | After improvement | Improvement effect |
| | Production capacity | 107 t/hr | 160 t/hr | 1.5 times (increase) |
| | Specific electric power consumption | 36 kWh/t | 29 kWh/t | 7 kWh/t (33% reduction) |
| | Electric power consumption* | 32,400 MWh/y | 26,100 MWh/y | 6,300 MWh/y (reduction) |
| | Crude oil equivalent | | | 1,531 kL/y (reduction) |
| Note: * Production: 3,000 tons/day at 300 days/year operation | | | | |
| Economics | Investment amount about 600 million yen for a 100 ton/hour grinder | | | |
| Equipment Cost | | | | |
| Remark | This facility was used for a demonstration plant for energy saving technology at a cement plant in Indonesia as a model project of the new energy and industrial technology development organization of Japan during the period from 1993 to 1995 and prove to effectively reduce specific electric power consumption. | | | |
| Example Sites | References | Inquiry | | |
| At Panda Cement Plant in Jawa Barat, INDONESIA | 44th Cement production Technology Symposium (1987), p56 NEDO report | Japan Cement Assoda / ECCJ (JIEC) | | |

Sources of Information

- Reports of Energy Audits in Major Industries
 - Cement
 - Food
 - Pulp and Paper
 - Textile
 - Steel and Iron
 - Petroleum Refinery
 - Caustic Soda
 - Garment
 - Hydro Power Generation
 - Ceramics / Porcelain

- Reports of Energy Audits in Buildings
- Researches (i.e. ECCJ, NEDO, ASEAN organizations)

We welcome information/inputs from you!!!

Database

PROMECC-BUILDING DATABASE

- Serves as a tool to:
 - ❖ determine the ideal energy consumption in buildings
 - ❖ find the best state of energy consumption in buildings
 - ❖ monitor energy conservation progress based on numerical data

BUILDING ENERGY MANAGEMENT DATABASE

- Purpose
 - Provide standardized database for Energy Management
- Objective
 - In-house database for individual buildings to monitor energy consumption

BUILDING ENERGY MANAGEMENT DATABASE cont..

■ Functionality

- Saving/storing data
- Editing/Modifying
- Deletion
- Searching of data
- Computation of the Building Energy Efficiency Index (BEEI)

■ Future Functionality

- Provide analysis through line graphs and pie chart

BASIC DATA AND STRUCTURE

A. General Information (Building & Operation etc.)

B. Data (Daily, Monthly, Yearly)

1. Data on Building Design (incl. AC System, etc.)

2. Data of Energy / Utility Consumption

a) Total / by Equipment

b) Major Equipment

BASIC DATA AND STRUCTURE cont..

C. Drawings : Layout / Flow / Main Equipment etc.

D. Information on Energy Management
(Organization / Project & Activity for EC)

****Data Types by Category (Hotel, Office, etc.)**

BASIC DATA AND STRUCTURE cont..

■ Sources

- Energy Audit Questionnaire of ECCJ
- Comments/suggestions of building owners, stakeholders and Focal Points
- Available sample data given by the buildings during energy audit

BUILDING ENERGY MANAGEMENT DATABASE – INDIVIDUAL BUILDINGS

■ Contents

- General Information
- Energy Consumption (monthly/yearly)
- Energy Consumption (hourly)
- Retrofitting and Operation
- Energy Efficiency and Conservation Measures
- Energy Management



BUILDING ENERGY MANAGEMENT DATABASE – INDIVIDUAL BUILDINGS cont..

■ General Information

| | |
|--|--|
| Building Name : <input type="text"/> <input type="button" value="Search"/> (or leave blank and fill out the boxes below) | |
| Building Name : <input type="text"/> | |
| Building: General Information | |
| Country: <input type="text"/> Please Select <input type="button" value="v"/> | |
| Owner: <input type="text"/> | Completion Date (dd/mm/yyyy): <input type="text"/> <input type="button" value="dd"/> |
| City: <input type="text"/> | Location/Address: <input type="text"/> |
| Building Usage: | % of each function (for complex building): |
| <input checked="" type="radio"/> Office | <input type="text"/> |
| <input type="radio"/> Hotel | <input type="text"/> |
| <input type="radio"/> Hospital | <input type="text"/> |
| <input type="radio"/> School | <input type="text"/> |
| <input type="radio"/> Retail and Shopping Center | <input type="text"/> |
| <input type="radio"/> Others (please specify): <input type="text"/> | <input type="text"/> |
| Parking Area (to be included in TGA): <input type="text"/> | Total Gross Area (TGA): <input type="text"/> |
| Total Air conditioned Area: <input type="text"/> | |
| Total Number of Storeys: | |
| Above ground: <input type="text"/> Storeys | Basement: <input type="text"/> Storeys |



BUILDING ENERGY MANAGEMENT DATABASE – INDIVIDUAL BUILDINGS cont..

■ Energy Consumption (monthly/yearly)

Building: Energy Consumption

Year:

| Month | Electric Power Consumption (kWh/month) | Oil (Gallons) | Gas (cubic feet) | Water (gallons) | Others |
|--|--|---------------|------------------|-----------------|--------|
| January | | | | | |
| February | | | | | |
| March | | | | | |
| April | | | | | |
| May | | | | | |
| June | | | | | |
| July | | | | | |
| August | | | | | |
| September | | | | | |
| October | | | | | |
| November | | | | | |
| December | | | | | |
| Total | | | | | |
| Heat content of fuel Btu/MWh ³ Btu/gal | | | | | |

Equipment Heat Source Capacity

| Order Plant Capacity | kW | USRT | GDP | Boiling (Baker) Plant Capacity | kW | USRT | GDP |
|----------------------|----------------------|----------------------|----------------------|--------------------------------|----------------------|----------------------|----------------------|
| Turbo Order | <input type="text"/> | <input type="text"/> | <input type="text"/> | Hot Water Boiler | <input type="text"/> | <input type="text"/> | <input type="text"/> |
| Order Unit | <input type="text"/> | <input type="text"/> | <input type="text"/> | Steam Boiler | <input type="text"/> | <input type="text"/> | <input type="text"/> |
| Package Unit | <input type="text"/> | <input type="text"/> | <input type="text"/> | Others | <input type="text"/> | <input type="text"/> | <input type="text"/> |
| Others | <input type="text"/> | <input type="text"/> | <input type="text"/> | | | | |

BUILDING ENERGY MANAGEMENT DATABASE – INDIVIDUAL BUILDINGS cont..

■ Retrofitting and Operation

Building: Retrofitting and Operation

Major Retrofitting

Year of Retrofitting: Room Temperature (°C):

Room Sealing Humidity: % Operation hours per week: %

Occupancy Ratio (Operation Ratio): %

Details of Retrofitting: (You may enter up to 500 characters) 500 characters left

Office Tenant Area: sq ft
Office Operation Rate (%/year): % hours/year

Hotel Number of Guest rooms: rooms

Hospital No. of beds: beds

School Number of Classrooms: rooms

Retail and Shopping Center Tenant Area: sq ft

Plant and Equipment Electricity

Voltage of the receiving power: V Total capacity of transformers: kVA

Plant and Equipment Air conditioning

Air conditioning System: Please choose

Single duct System:

Pan-coil System:

VAV System:

Package System:

Others, please specify:

Total fan capacity of AC System: kW Total chilled water pump capacity for AC: kW

Efficiency of the order: W/ton BAS, BMS etc.: Yes No

BUILDING ENERGY MANAGEMENT DATABASE – INDIVIDUAL BUILDINGS cont..

■ Energy Consumption (hourly)

Building: Energy Consumption (Hourly Power Consumption)

Date (dd/mm/yyyy):

| Time | kWh | Time | kWh |
|------|----------------------|------|----------------------|
| 0 | <input type="text"/> | 12 | <input type="text"/> |
| 1 | <input type="text"/> | 13 | <input type="text"/> |
| 2 | <input type="text"/> | 14 | <input type="text"/> |
| 3 | <input type="text"/> | 15 | <input type="text"/> |
| 4 | <input type="text"/> | 16 | <input type="text"/> |
| 5 | <input type="text"/> | 17 | <input type="text"/> |
| 6 | <input type="text"/> | 18 | <input type="text"/> |
| 7 | <input type="text"/> | 19 | <input type="text"/> |
| 8 | <input type="text"/> | 20 | <input type="text"/> |
| 9 | <input type="text"/> | 21 | <input type="text"/> |
| 10 | <input type="text"/> | 22 | <input type="text"/> |
| 11 | <input type="text"/> | 23 | <input type="text"/> |

BUILDING ENERGY MANAGEMENT DATABASE – INDIVIDUAL BUILDINGS cont..

■ Energy Efficiency and Conservation Measures

Building: Implemented Energy Efficiency and Conservation Measures

| | Measures | Saved Energy | Investment Category (A,B,C,D only)* |
|---|--|----------------------|-------------------------------------|
| 1 | <input type="text"/> 200 characters left | <input type="text"/> | <input type="text"/> |
| 2 | <input type="text"/> 200 characters left | <input type="text"/> | <input type="text"/> |
| 3 | <input type="text"/> 200 characters left | <input type="text"/> | <input type="text"/> |
| 4 | <input type="text"/> 200 characters left | <input type="text"/> | <input type="text"/> |
| 5 | <input type="text"/> 200 characters left | <input type="text"/> | <input type="text"/> |

* Investment Category: A: Small investment (less than US\$500); B: Medium investment (US\$500-US\$1000); C: Large investment (US\$1000-US\$10000); D: Major retrofit (over US\$10000)

BUILDING ENERGY MANAGEMENT DATABASE – INDIVIDUAL BUILDINGS cont..

■ Energy Management

Building: Energy Management

| | | | | |
|--|---|------------------|--------------------------|--------------------------|
| Number of the Energy Management staffs (incl. maintenance): <input type="checkbox"/> | Number of activities for EEM in a year: | Meeting | <input type="checkbox"/> | <input type="checkbox"/> |
| | | Training | <input type="checkbox"/> | <input type="checkbox"/> |
| | | Others, specify: | <input type="checkbox"/> | <input type="checkbox"/> |

STEPS FOR DATABASE COMPLETION

- Collect comments and suggestions from building owners, stakeholders and key players
- Circulate the updated copy of the database for comments of the Focal Points
- Finalise the main contents, structure and layout of the database

FUTURE PLAN

- To have a regional database for ASEAN that will provide benchmarking among various buildings

**Thank you for your kind
attention.**

www.aseanenergy.org/projects/promeeec

VI – 2

**Summary of Results of Replies to Questionnaire
from Participants of Intensive Seminar-Workshop**

Questionnaire **PROMEEC (Energy Management) Project for 2006 - 2007**

Intensive Workshop: Profile of / Request from Participants

October, 2006 ECCJ / ACE

Please fulfill the following.

Have you known the "PROMEEC Projects" ? YES NO

1. Name of Participant and Company / Organization

(Participant) _____
(Company) _____

2. Outline of Your Company

(1) Business Field (Check): Industry / Building / Others _____

(2) Specific Business (Please describe.) _____

(3) Details of Company

| | |
|-------------------------------|---|
| Year of Establishment | |
| Number of Employees | |
| City of Head Office / Country | |
| Number of Business Units | (Factories : _____ Branch Offices : _____) |
| Yearly Business Size | _____ USD / Year (Production tons/Year) |

3. Problems / Issues to Promote Energy Conservation in Your Company

3-1. Weak Policy of Top Management : No Policy Statement / No Commitment
(Please describe if any.)

3-2. Small Economy and Finance: Little Incentive / Lack of Finance
Why little incentive ? Low Energy Price High Investment Others ()

3-3. Technology

(1) Capability of Engineers (Technicians) to Understand and Use Technology

Small Number Lower Individual Quality Lack of Experience

(2) Lack of Information on Details of Technology and/or Suppliers, etc.

Lack of Available Database Lack of Sharing System

Little Access to Available Supplier of Technology and or Equipment

(3) Others ()
(Please describe if any.)

3-4. Energy Management

(Energy Audit / Data Monitoring / Improvement / Evaluation, etc.)

(1) No Organization Little Manpower

(2) Few Leading Engineers Few Managers (For Implementation and Training)

(3) Lack of Knowledge Lack of Guideline

(4) Lack of Tools Lack of Equipment Lack of System

(5) Others ()

3-5. What is the most interested issue on energy conservation ?

()

3-6. Other Factors ()

4. Expectation for PROMEEC Project

4-1. Provision of Information Website Seminar-Workshop

What kind of information ? ()

4-2. Provision of Services Energy Audit Training Consultation

4-3. Provision of Tools Manual / Handbook Database for In-house Use

Other Tools Directory of Technology Directory of Suppliers

4-4. Access to Showcase or Best Practice Factories or Buildings : Yes / No

4-5. Actual Participation Industries Buildings Energy Management

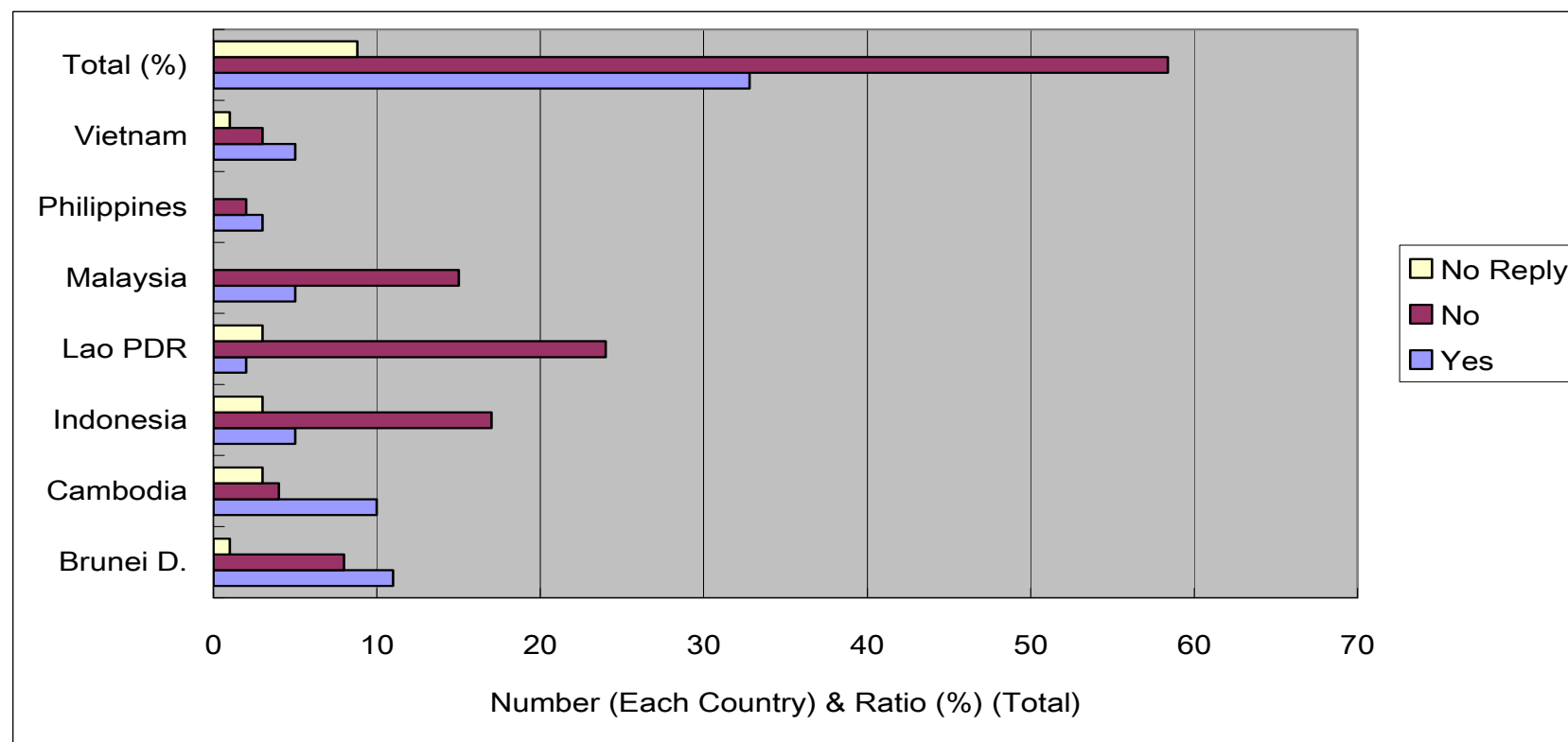
4-5. Others including Wishes ()

Thank you very much for your kind cooperation !

Summary of Replies to Questionnaire

1. Known About PROMEEC ?

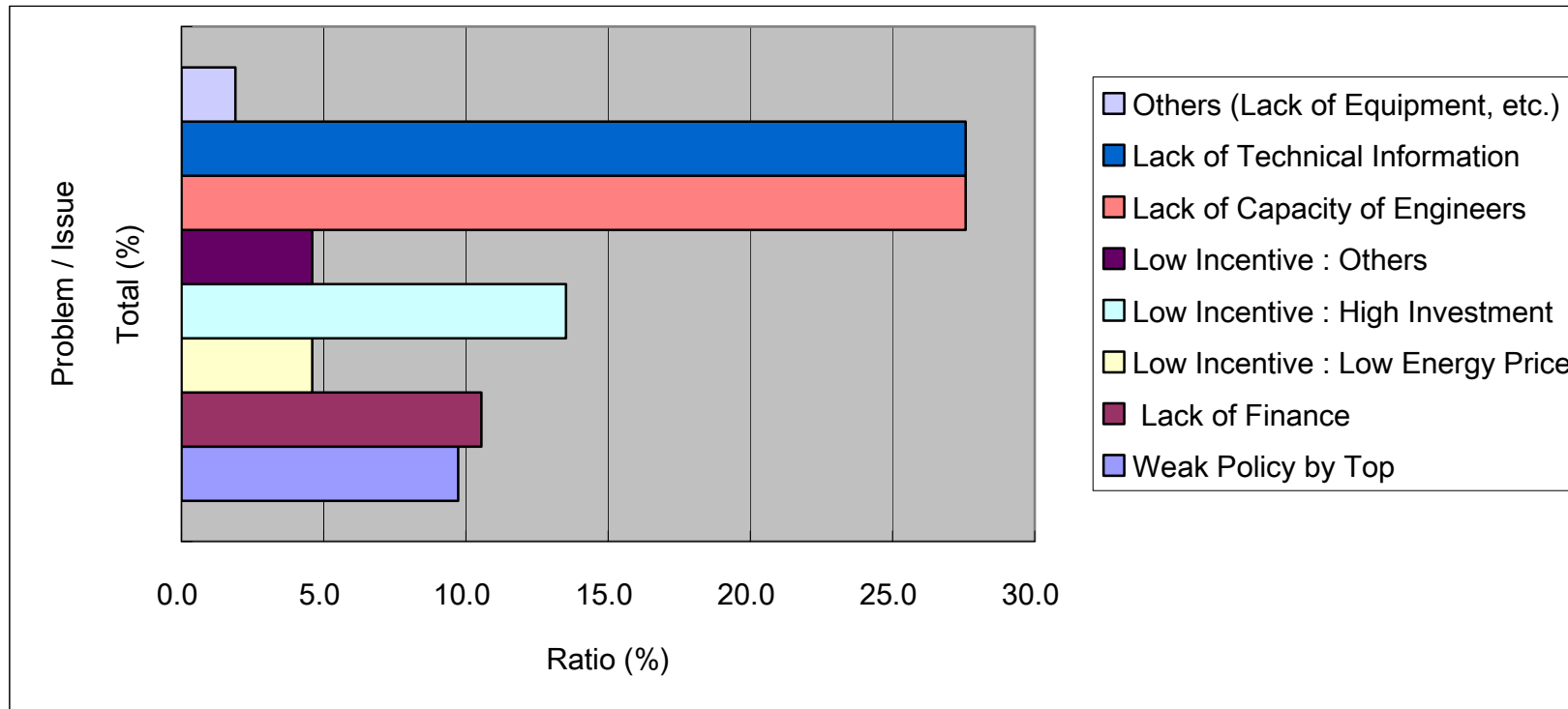
| | Brunei D. | Cambodia | Indonesia | Lao PDR | Malaysia | Philippine | Vietnam | Sum | Total (%) |
|---------------------|-----------|-----------|-----------|-----------|-----------|------------|-----------|------------|-----------|
| 1 Yes | 11 | 10 | 5 | 2 | 5 | 3 | 5 | 41 | 32.8 |
| 2 No | 8 | 4 | 17 | 24 | 15 | 2 | 3 | 73 | 58.4 |
| 3 No Reply | 1 | 3 | 3 | 3 | 0 | 0 | 1 | 11 | 8.8 |
| Total | 20 | 17 | 25 | 29 | 20 | 5 | 9 | 125 | |
| Participants | 42 | 28 | 57 | 38 | 46 | 26 | 30 | 267 | |



Problems / Issues on EE&C

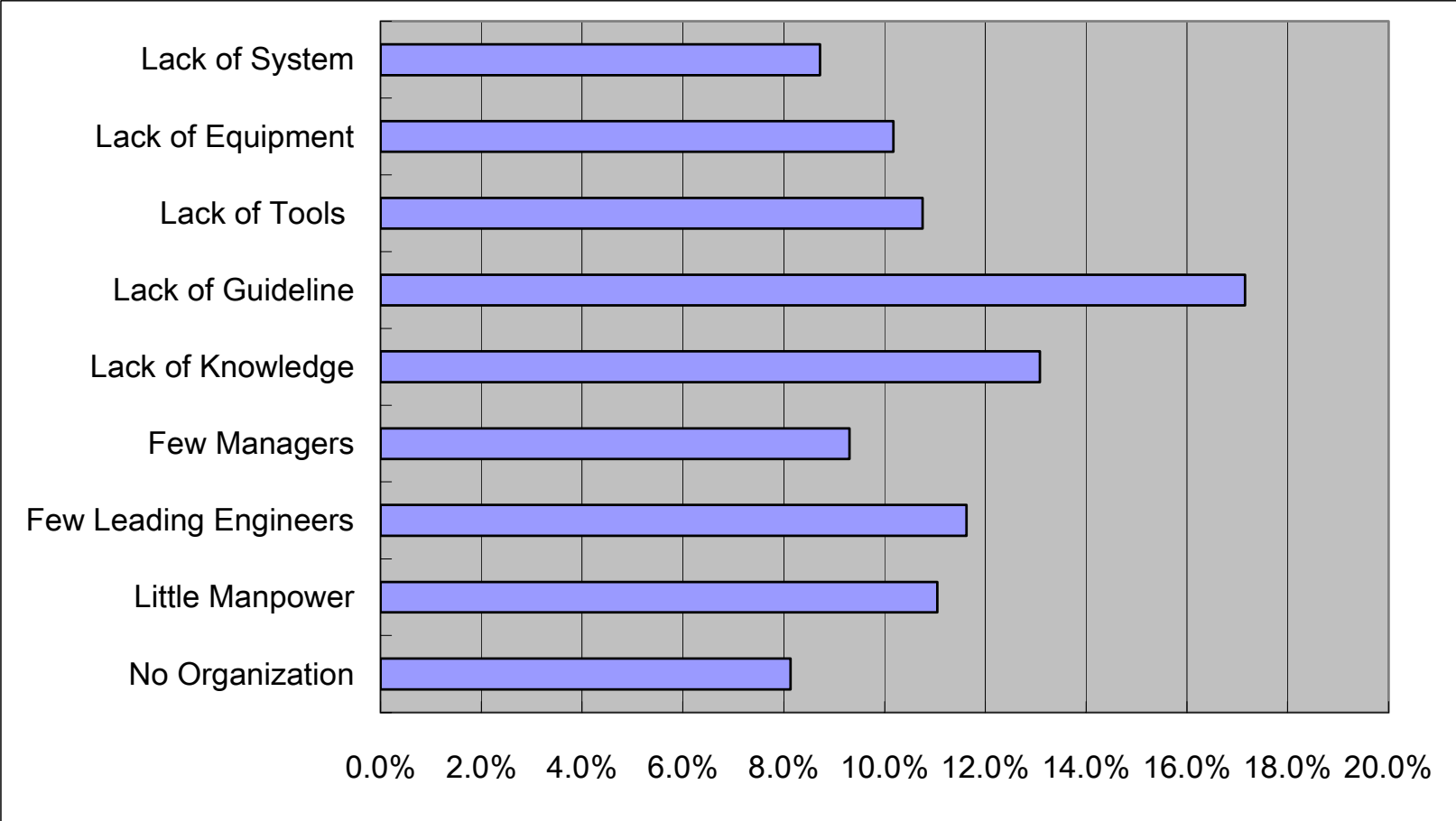
| | Brunei D. | Cambodia | Indonesia | Lao PDR | Malaysia | Philippine | Vietnam | Sum | Total (%) |
|------------------------------------|-----------|----------|-----------|---------|----------|------------|---------|-----|-----------|
| 1 Weak Policy by Top | 2 | | 17 | | 14 | 2 | 1 | 36 | 9.7 |
| 2 Lack of Finance | 6 | 7 | 8 | 7 | 8 | 1 | 2 | 39 | 10.5 |
| 3 Low Incentive : Low Energy Price | 9 | 1 | 2 | 1 | 3 | 0 | 1 | 17 | 4.6 |
| 4 Low Incentive : High Investment | 5 | 5 | 13 | 11 | 10 | 2 | 4 | 50 | 13.5 |
| 5 Low Incentive : Others | 3 | 2 | 0 | 3 | 5 | 1 | 3 | 17 | 4.6 |
| 6 Lack of Capacity of Engineers | 17 | 14 | 22 | 21 | 17 | 4 | 7 | 102 | 27.6 |
| 7 Lack of Technical Information | 17 | 12 | 21 | 22 | 17 | 4 | 9 | 102 | 27.6 |
| 8 Others (Lack of Equipment, etc.) | 0 | 2 | 1 | 0 | 3 | 1 | 0 | 7 | 1.9 |

Grand Total 370



Status / Issues on Energy Management

| | Brunei D. | Cambodia | Indonesia | Lao PDR | Malaysia | Philippine | Vietnam | Sum | (%) |
|---|-----------|----------|-----------|---------|----------|------------|---------|--------------------|-------|
| 1 No Organization | 7 | 3 | 7 | 4 | 6 | 0 | 1 | 28 | 8.1% |
| 2 Little Manpower | 8 | 2 | 9 | 10 | 6 | 1 | 2 | 38 | 11.0% |
| 3 Few Leading Engineers | 8 | 4 | 5 | 9 | 7 | 3 | 4 | 40 | 11.6% |
| 4 Few Managers | 4 | 3 | 5 | 10 | 5 | 2 | 3 | 32 | 9.3% |
| 5 Lack of Knowledge | 8 | 5 | 10 | 12 | 6 | 2 | 2 | 45 | 13.1% |
| 6 Lack of Guideline | 10 | 5 | 8 | 20 | 10 | 1 | 5 | 59 | 17.2% |
| 7 Lack of Tools | 6 | 3 | 7 | 10 | 5 | 0 | 6 | 37 | 10.8% |
| 8 Lack of Equipment | 3 | 5 | 7 | 10 | 4 | 2 | 4 | 35 | 10.2% |
| 9 Lack of System | 9 | 3 | 4 | 5 | 4 | 2 | 3 | 30 | 8.7% |
| | | | | | | | | Grand Total | |
| | | | | | | | | 344 | |
| 10 Interested Issues | | | | | | | | | |
| Energy Audit | | 1 | | | | | | | |
| Economy | | 3 | | | | | 1 | | |
| Demonstration Project | | 1 | | | | | | | |
| Equipment | | | 2 | 1 | | | | | |
| Saving Electricity, Diesel oil, Utilities | | | 1 | | | | | | |
| Technology, Knowledge, Databas | 3 | | | | 2 | | 1 | | |
| Cost Saving / Best Practice Techn | 1 | | | | 4 | | | | |
| Methodology & Systemfor EM | 1 | | | | 2 | | | | |
| Environment Issue | | | | | 1 | | | | |
| Training to Enhance Awareness | | | | | 1 | | | | |
| Establish Energy Index | | | | | | 2 | | | |
| Support by Top for EM Program | | | | | | 1 | | | |
| Measures to Improve Awareness | 2 | | 1 | | | | | | |
| Activitiy Related to New-Renewab | 2 | | | | | | | | |
| Committement for Preservation | 2 | | | | | | | | |
| Inter-connected Network | 1 | | | | | | | | |
| New & Renewable Energy | | | 1 | | | | | | |

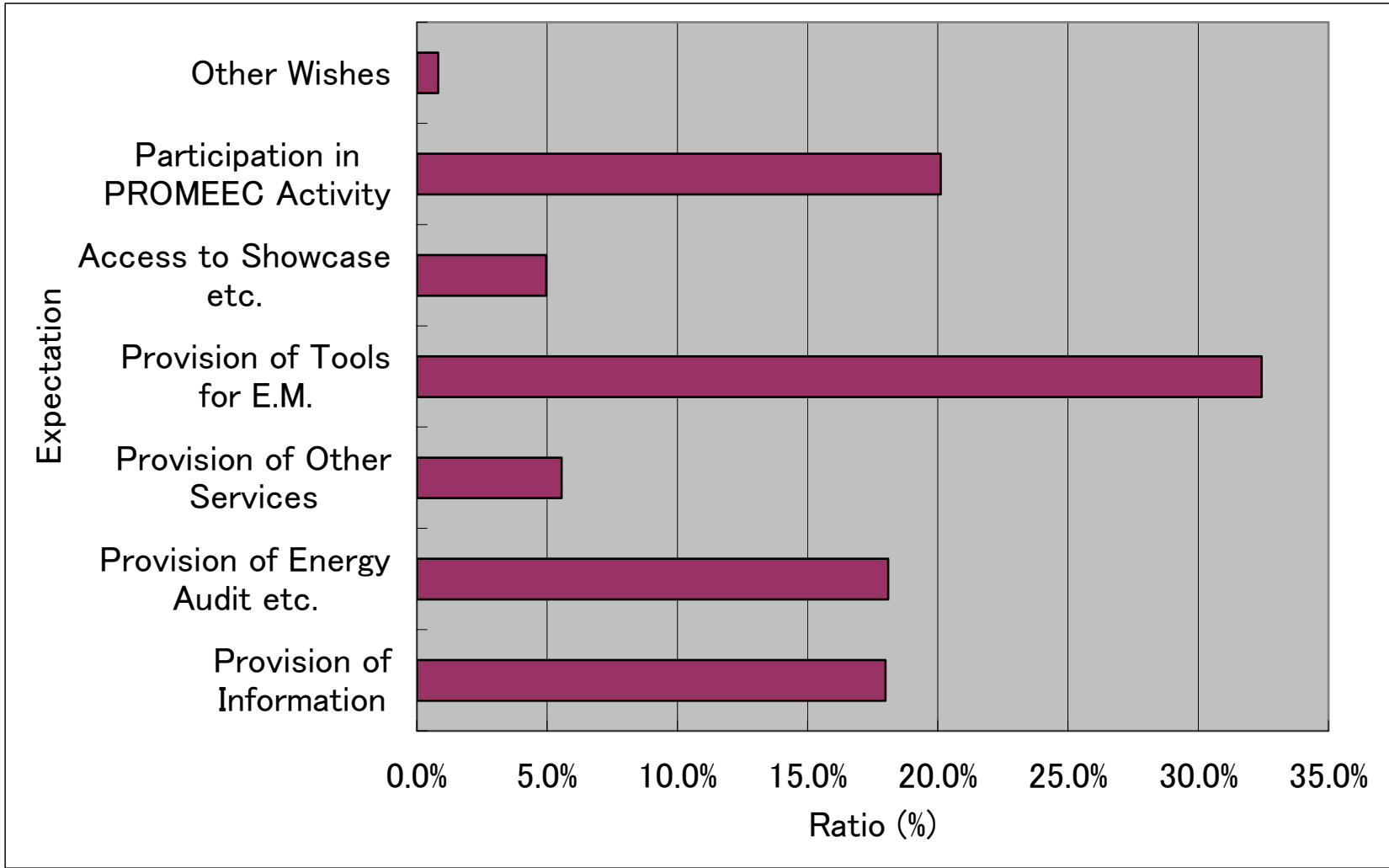


Expectation for PROMEEC Project

| | Brunei D. | Cambodia | Indonesia | Lao PDR | Malaysia | Philippine | Vietnam | Sum | (%) |
|--|-----------|----------|-----------|---------|----------|------------|---------|-----|-------|
| 1 Provision of Info. (Website) | 12 | 3 | 6 | 17 | 13 | 3 | 6 | 60 | 7.1% |
| 2 Provision of Info. (Seminar-WS) | 17 | 12 | 22 | 17 | 12 | 5 | 7 | 92 | 10.9% |
| 3 Provision of Energy Audit | 14 | 4 | 11 | 14 | 12 | 3 | 1 | 59 | 7.0% |
| 4 Provision of Training | 15 | 10 | 20 | 19 | 18 | 5 | 7 | 94 | 11.1% |
| 5 Provision of Consulting | 9 | 3 | 8 | 11 | 7 | 3 | 6 | 47 | 5.6% |
| 6 Provision of Other Services | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0% |
| 7 Tool : Handbook/Manual | 17 | 7 | 18 | 21 | 16 | 5 | 8 | 92 | 10.9% |
| 8 Tool : In-house Database | 10 | 6 | 14 | 15 | 10 | 2 | 2 | 59 | 7.0% |
| 9 Tool : Directory of Technology | 14 | 6 | 15 | 17 | 11 | 5 | 6 | 74 | 8.8% |
| 10 Tool : Directory of Suppliers | 7 | 2 | 8 | 15 | 11 | 2 | 4 | 49 | 5.8% |
| 11 Tool : Others | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0% |
| 12 Access to Showcase or Best Practice | 1 | 0 | 19 | 0 | 17 | 5 | 0 | 42 | 5.0% |
| 13 Participation : Industry | 11 | 4 | 7 | 11 | 11 | 1 | 3 | 48 | 5.7% |
| 14 Participation : Building | 14 | 4 | 9 | 15 | 8 | 2 | 5 | 57 | 6.7% |
| 15 Participation : Energy Management | 13 | 9 | 17 | 8 | 9 | 3 | 6 | 65 | 7.7% |
| 16 Other Wishes | 2 | 1 | 4 | 0 | 0 | 0 | 0 | 7 | 0.8% |

Grand Total 845

| | |
|-----------------------------------|-------|
| Provision of Information | 18.0% |
| Provision of Energy Audit etc. | 18.1% |
| Provision of Other Services | 5.6% |
| Provision of Tools for E.M. | 32.4% |
| Access to Showcase etc. | 5.0% |
| Participation in PROMEEC Activity | 20.1% |
| Other Wishes | 0.8% |



VI – 3

Documents Used in Summary and Post Workshop

J06

**PROMEEC for 2006-2007
Energy Management Project
Summary and Post Workshop
- Results of Activities -
(Intensive Seminar-Workshops / Visits, etc.)**



February 27th-28th, 2007

Kazuhiko YOSHIDA

General Manager, International Engineering Dept.
The Energy Conservation Center, Japan
(On Behalf of METI)

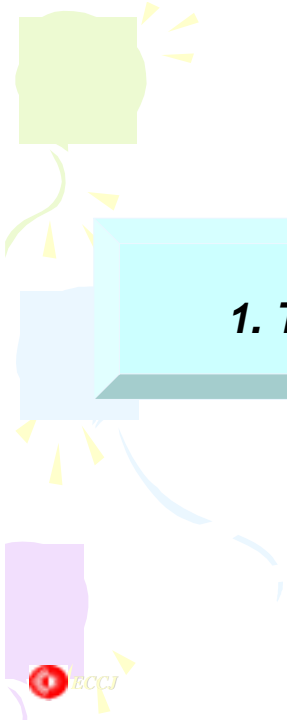


1

Contents

- 1. Targets for 2006 - 2007***
- 2. Activities to Achieve Targets and Results***
- 3. Conclusion***





1. Targets for 2006 – 2007

Target : Build & Start Functions of “ASEAN Energy Management System”

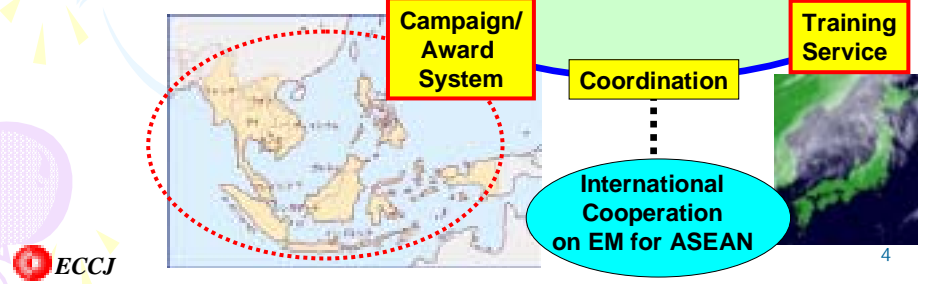
Developed as Follows

In 2004-2005

▶ Basic Concept

In 2005-2006

▶ Basic Plan and Specific Functions



Targets for 2006 – 2007 (1-2)

(Target 1)

Start “Award System for Best Practices in Energy Management for Industries and Buildings

(Target 2)

Develop Information System to Share and Disseminate The Following

- 1. Best Practices from The Award System**
- 2. Technical Directory / In-House Database**



5

Targets for 2006 – 2007 (2-2)

(Target 3)

Develop Procedures to Utilize The Existing Implementing Organizations

(Target 4)

Develop Effective and Comprehensive Tools for Energy Management

Continue Refining Plan of “ASEAN Energy Management System” Based on The Actual Results



6

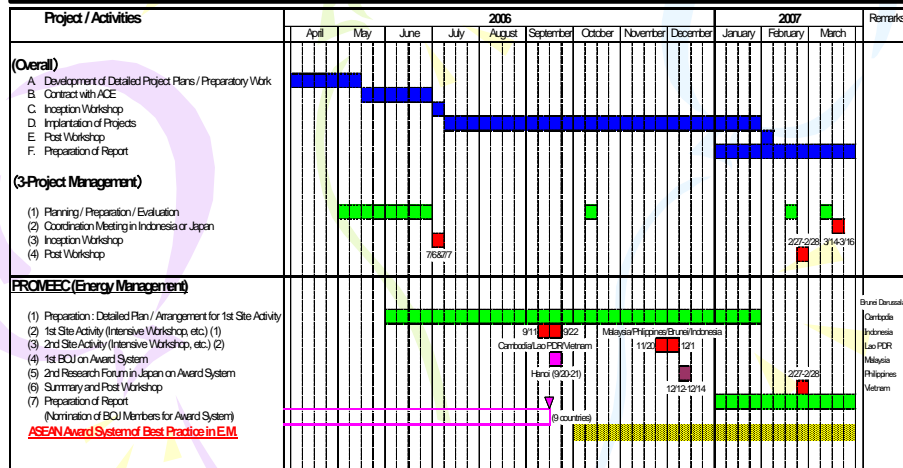
2. Activities to Achieve Targets and Results

7

Activities to Achieve Targets

| | Target 1 | Target 2 | Target 3 | Target 4 |
|---|--------------------------------|--------------------------------|--------------------------------|--------------------------------|
| Intensive Seminar-Workshop & Visits to Factories etc. | PR & Discussion ● Advice | PR & Discussion ● Advice | PR & Discussion ● Advice | PR & Discussion ● Advice |
| Research Forum in Japan | ● | ● | | |
| Internal Analyses & Study | ● | ● | ● | ● |

Actual Activities / Schedule of PROMEEC (Energy Management) 2006-2007



**ECCJ Team : Mr. Kazuhiko YOSHIDA (PM)
Mr. Takashi SATO & Mr. Fumio OGAWA**

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Activity for Target Nos. 1 though 4 1. Intensive Seminar – Workshop (1)

1. Purpose

- (1) Presentation and Discussion of
 - PROMEEC (Energy Management) Project
 - “ASEAN Energy Management System” Plan
 - Specific Functions and Tools
- (2) Request to Participate in and Cooperate to Activities & Programs of PROMEEC
- (3) Expand Network of Cooperators



10

Activity for Target Nos. 1 though 4
1. Intensive Seminar – Workshop (2)

2. One day Seminar-Workshop at 7 Countries

Cambodia / September 11th, 2006
 Lao PDR / September 14th, 2006
 Vietnam / September 18th, 2006
 Malaysia / November 20th, 2006
 Philippines / November 23rd, 2006
 Brunei Darussalam / November 27th, 2006
 Indonesia / November 30th, 2006

Activity for Target Nos. 1 though 4
1. Intensive Seminar – Workshop (3)

3. Number of Participants : Total 267

From Governments / Implementing Organizations / Private Companies / Industrial Associations / Universities, etc.

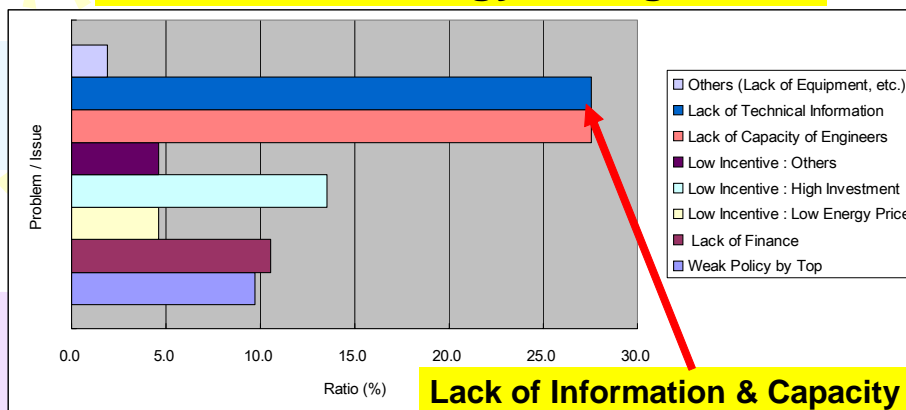
| | | | |
|---------------------|----|-------------|-------------------|
| Brunei Darussalam | 42 | Malaysia | 46 |
| Cambodia | 28 | Philippines | 26 |
| Indonesia | 57 | Vietnam | 30 |
| Lao PDR | 38 | | |
| <u>TOTAL</u> | | | <u>267</u> |

Activity for Target Nos. 1 though 4
1. Intensive Seminar – Workshop (4)

- 4. Program of Seminar-Workshop**
Session-1 : Introduction of The Project
Session-2 : Introduction of “ASEAN E.M. System (Plan and Programs)”
Session-3 : Intro. Activities to Function “ASEAN E.M. System”
Session-4 : Panel Discussion & Request for Participation / Cooperation
Session-5 : Advice on EM for Participants

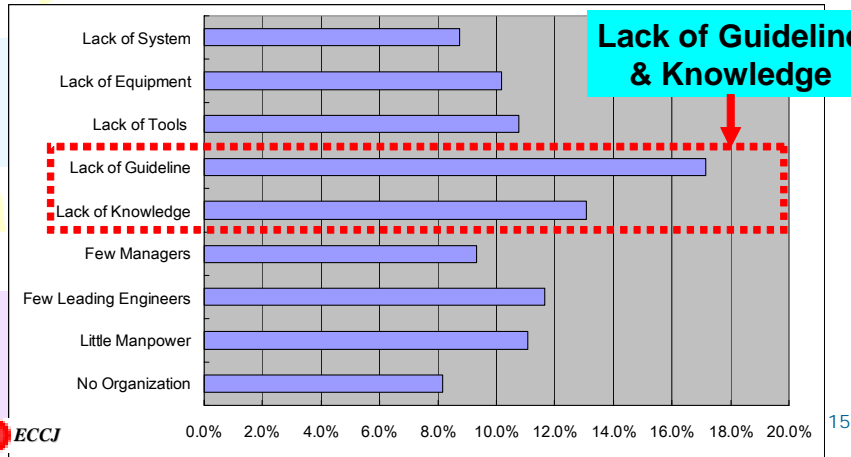
Situation of Energy Management in ASEAN
Results of Reply to QN from 125 Participants of E.M. Intensive Seminar-Workshop (1)

- Barriers for Energy Management -



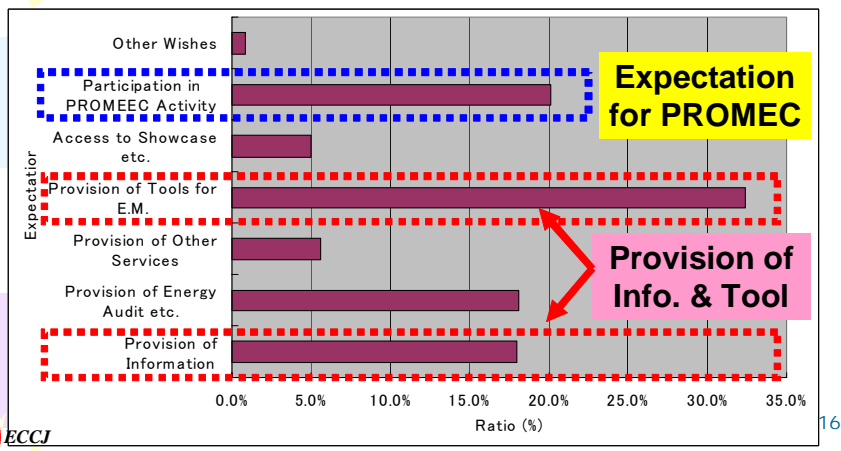
**Situation of Energy Management in ASEAN
Results of Reply to QN from 125 Participants
of E. M. Intensive Seminar-Workshop (2)**

- Status of Energy Management -



**Situation of Energy Management in ASEAN
Results of Reply to QN from 125 Participants
of E. M. Intensive Seminar-Workshop (3)**

- Expectation for ASEAN E.M. System -



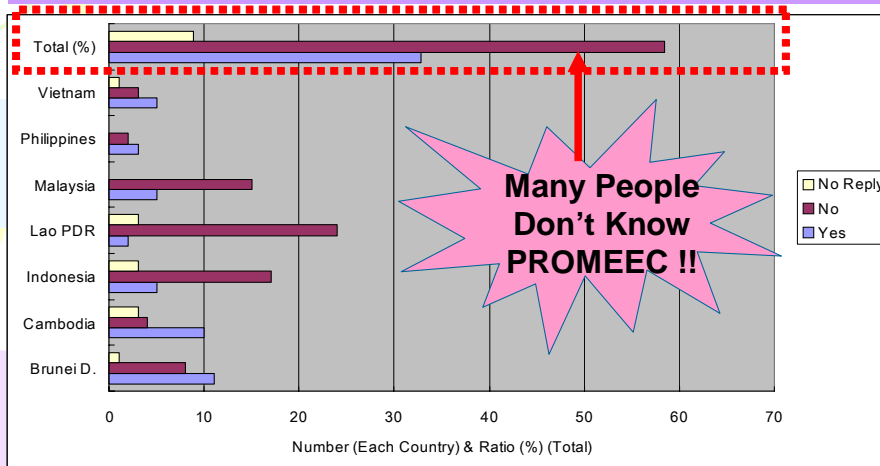
Important Confirmation

The results prove that activities and programs of PROMEEC (E.M.) Project to establish “ASEAN Energy Management System” meets the needs and expectations in ASEAN by providing

1. Information / Tools Useful to Improve Energy Management
2. Opportunities to Share Activities & Info.
3. Network among ASEAN Stakeholders

Results of Reply to QN from 125 Participants of E. M. Intensive Seminar-Workshop (4)

- Required Further Effort to PR PROMEEC -



Activity for Target Nos. 1 through 4
2. Visits to Factories & Buildings etc. (1)

1. Purpose

(1) Introduction and Discussion of

- PROMEEC (Energy Management) Project
- “ASEAN Energy Management System” Plan
- Useful Tools

(2) Request to Participate in and Cooperate to Activities & Programs of PROMEEC

(3) Expand Network of Cooperators

(4) Advise for Companies’ Improvements

Activity for Target Nos. 1 through 4
2. Visits to Factories & Buildings etc. (2)

2. One day Seminar-Workshop at 7 Countries

Cambodia / September 12th, 2006

Lao PDR / September 15th, 2006

Vietnam / September 19th, 2006

Malaysia / November 21st, 2006

Philippines / November 24th, 2006

Brunei Darussalam / November 28th, 2006

Indonesia / December 1st, 2006

**Activity for Target Nos. 1 though 4
2. Visits to Factories & Buildings etc. (3)**

**3. Visits : 22 Factories and Buildings, etc.
Factories, Buildings, Associations and
Implementing Organizations, etc.**

| | | | |
|-------------------|---|--------------|-----------|
| Brunei Darussalam | 3 | Malaysia | 2 |
| Cambodia | 4 | Philippines | 2 |
| Indonesia | 3 | Vietnam | 4 |
| Lao PDR | 4 | | |
| | | TOTAL | 22 |

**Activity for Target Nos. 1 though 4
2. Visits to Factories & Buildings etc. (4)**

All The Companies / Organizations Showed :
- Strong Interests in Programs & Tools
**- Expectation of Participation in PROMEEC
and Cooperation to E.M. Programs**

| Category | Number |
|---------------------------|-----------|
| Factory | 9 |
| Building | 6 |
| Association | 2 |
| Gov. Organization, Others | 5 |
| TOTAL | 22 |

**Expanded
Network of
ASEAN
Cooperative
Stakeholders**

Activity for Target Nos. 1 and 2 **1st BOJ Meeting for ASEAN Award (1)**

1. Purpose

- (1) Finalization and Approval of Plan of The Award System / Schedule of The 1st Round**
- (2) Preparation of Official Announcement (Including Preparation for Application)**

2. Date & Venue

Date : September 20th and 21st, 2006

Venue : Hanoi, Vietnam



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Activity for Target Nos. 1 and 2 **1st BOJ Meeting for ASEAN Award (2)**

3. Participants (BOJ Members / ACE/ ECCJ)

Member of BOJ (Energy Management)

Mr. (Dr.) Kha Sheng Tan (Brunei Darussalam)

Mr. Lieng Vuthy (Cambodia)

CP Mr. (Dr.) John A.W. Turangan (Indonesia)

Mr. Khamso Khouphokham (Lao PDR)

Mr. (Dr.) Zainuddin Abdul Manan (Malaysia)

Mr. U Win Khaing (Myanmar)

Mr. Artemio P. Habitan (Philippines)

VCP Ms. Amaraporn Achavangkool (Thailand)

Mr. Mr. Dang Hai Dung (Vietnam)



(CP : Chairperson / VCP : Vice Chairperson)

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Activity for Target Nos. 1 and 2
1st BOJ Meeting for ASEAN Award (3)

3. Results

3-1. Finalization and Approval of

- (1) The Implementation Plan**
- (2) Evaluation Guideline**
- (3) Application Form**

3-2. Confirmation of Role of BOJ Members

**3-3. Preparation for Official Announcement
to Start “ASEAN Award System of Best
Practices in Energy Management for
Industries and Buildings**

Activity for Target Nos. 1 and 2
Research Forum in Japan (1)

**Subject : Award System of Best Practices in E.M.
for Industries and Buildings**

Input

**Knowledge & Information on Japanese Award
System & E.M. Practice in Factory / Opinion &
Advice by Japanese Committee Members/Experts**

Output

- (1) Evaluation Guideline**
- (2) Refined Application Form**
- (3) Confirmation of Implementation Plan**

Activity for Target Nos. 1 and 2 Research Forum in Japan (2)

Participants

1. Member of BOJ (Energy Management)

Mr. (Dr.) Kha Sheng Tan (Brunei Darussalam)
 Mr. Lieng Vuthy (Cambodia)
 Mr. (Dr.) John A.W. Turangan (Indonesia)
 Mr. Khamso Khoupkhokham (Lao PDR)
 Mr. (Dr.) Zainuddin Abdul Manan (Malaysia)
 Mr. U Win Khaing (Myanmar)
 Mr. Artemio P. Habitan (Philippines)
 Ms. Amarporn Achavangkool (Thailand)
 Mr. Mr. Dang Hai Dung (Vietnam)

2. ASEAN Coordinator

Mr. Christopher Zamora (ACE)



Activity for Target Nos. 1 and 2 Research Forum in Japan (3) : Program

| Date | Activities |
|---|---|
| December 12 (Venue : Tekkou- kaikan #803) (Tue.) | AM 1. Opening Remarks Mr. Akira Ishihara (Managing Director, ECCJ) 2. Photo Session 3. Presentation 3-1. Keynote Lecture Mr. Kazuhiko Yoshida (General Manager, ECCJ) 3-2. Lecture Mr. Hisakazu Tsujimoto (General Manager, ECCJ) "Award System in Japan for - Excellent cases for energy conservation - Factories and Buildings Excellent for Energy Management, etc." |
| | PM 4. Case Studies & Opinion Exchange Trial Evaluation of Actual Awarded Japanese Cases (Advisers from ECCJ) Mr. Kazuhiko Yoshida, Mr. Hisakazu Tsujimoto Mr. Fumio Ogawa, Mr. Akira Kobayashi (Technical Experts) |
| December 13 (Wed.) | AM 1. Preparation for Workshop : Discussion & Opinion Exchange (Adviser from ECCJ) Mr. K. Yoshida and F. Ogawa |
| | PM 2. Factory Visit : Kubota Keiyo Factory (ECCJ : Mr. K. Yoshida, Mr. Yoshitaka Ushio, Mr. F. Ogawa) |
| December 14 (Venue : Tekkou- kaikan #805) (Thu.) | AM 1. Opinion Exchange on System and Evaluation with Japanese Committee Members and Experts <u>Japanese Committee Members</u> Dr. Katsuhiko Kadoguchi (Chairman from AIST*), Mr. A. Ishihara (ECCJ) and A. Kobayashi (ECCJ) <u>Advisers for ASEAN</u> Mr. K. Yoshida and Mr. F. Ogawa |
| | PM 2. Workshop : "Development of Evaluation Guideline & Confirmation of Future Plan by All Participants" Chairperson - Mr. Turangan / Vice Chairperson - Ms. Amarporn ECCJ Advisers : Mr. K. Yoshida, Mr. F. Ogawa and A. Kobayashi |



Activity for Target Nos. 1 and 2 **Research Forum in Japan (4) : Results**

1. Revised “Evaluation Guideline”

2. Refined Application Form Friendly to Applicants (Based on Item 1)

3. Confirmed Implementation Schedule

**April 2007 / Selection of Max. 4 Cases* by Each Nat.
Submission to ASEAN (ACE)**

(* : 2 cases for Each Sector)

June 2007 / BOJ (Determination of Winners)

July 2007 / Official Announcement & Ceremony

1 Winner & 2 Runner-ups for Each Sector

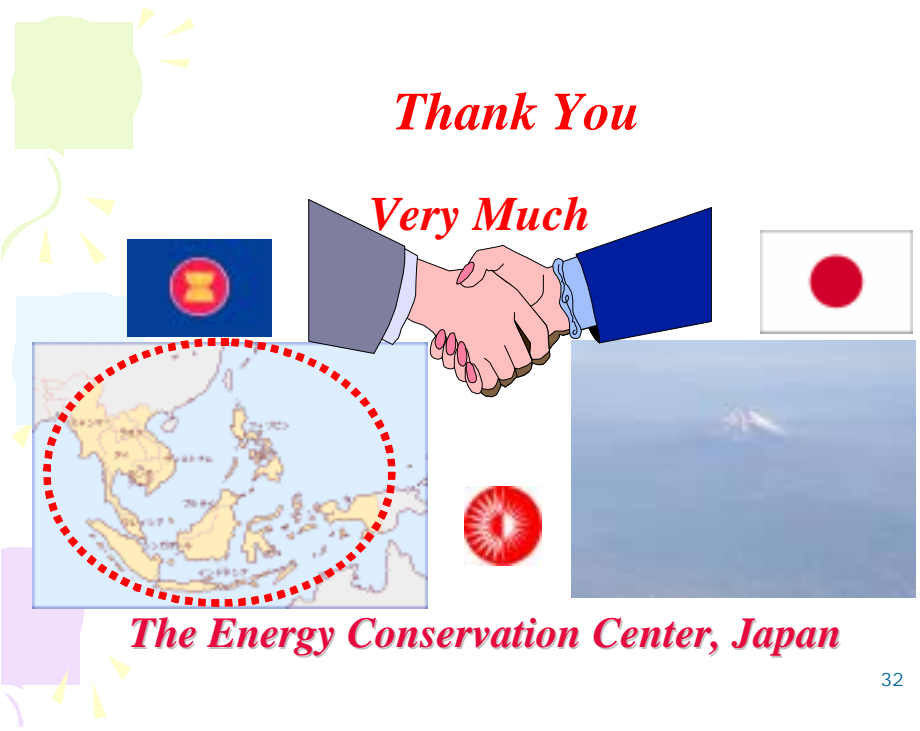
Summary **Achievements in 2006 - 2007**

**Development of Tools / Functions and
Start-up of Important Functions “ASEAN
Energy Management System”**

- (1) Start-up of “ASEAN Award Best Practices in Energy Management**
- (2) Preparation of Information Systems and Tools for Energy Management**
- (3) Expansion of Network of Cooperators among ASEAN Stakeholders**

Summary
Cumulative Frequency of Visits to
Organizations / Companies in 2004 - 2007

| | Burundi | Cambodia | Indonesia | Lao PDR | Malaysia | Myanmar | Philippines | Singapore | Thailand | Vietnam | TOTAL |
|--|----------|----------|-----------|----------|----------|----------|-------------|-----------|-----------|-----------|-----------------------|
| Government (Ministry/Department) | 1 | 1 | 2 | 1 | 2 | 1 | 3 | 1 | 2 | 3 | 17 |
| Governmental Organization | 0 | 3 | 2 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 8 |
| Implementing Organization | 0 | 0 | 3 | 0 | 2 | 0 | 2 | 0 | 2 | 3 | 12 |
| Associations Academy/University | 0 | 2 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 5 |
| NGO/NPO | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Enterprises (Factory/Building) & ESCOs | 3 | 0 | 4 | 4 | 2 | 1 | 3 | 0 | 6 | 3 | 26 |
| TOTAL | 4 | 6 | 12 | 6 | 6 | 2 | 10 | 2 | 10 | 11 | |
| | | | | | | | | | | | GRAND TOTAL 69 |



J07

PROMEEC for 2006 - 2007 Energy Management Project Summary Workshop



ASEAN Energy Management System - Updated Plan -

February 27th-28th, 2007

Kazuhiko YOSHIDA

General Manager, International Engineering Dept.
The Energy Conservation Center, Japan



Contents

- 1. Current Status of Developing
The "ASEAN Energy Management
System"*
- 2. Future Plan to Develop and Function
"ASEAN Energy Management System"*
- 3. Updated General Schedule*

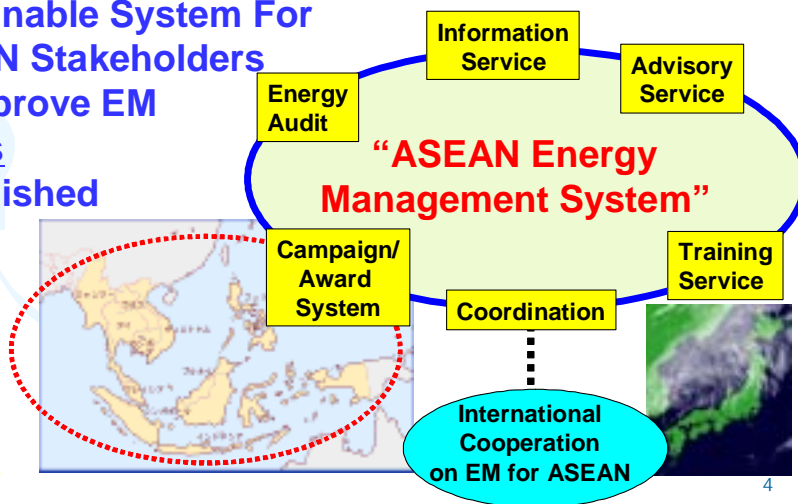


1. Current Status of Developing The "ASEAN Energy Management System"

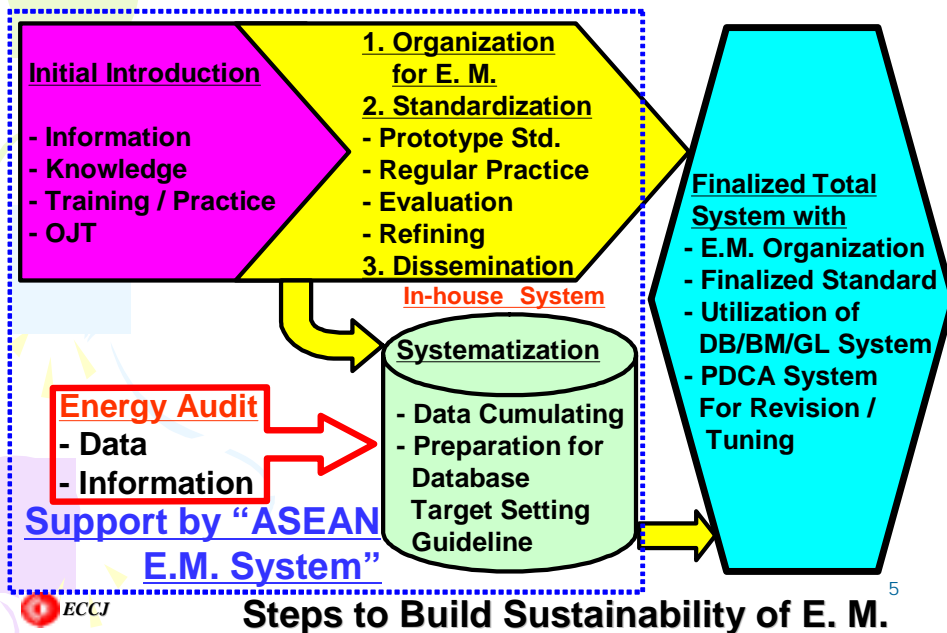


Established Plan of "ASEAN Energy Management System"

Purpose
Sustainable System For
ASEAN Stakeholders
To Improve EM
Status
Established



Scope of "ASEAN E.M. System"

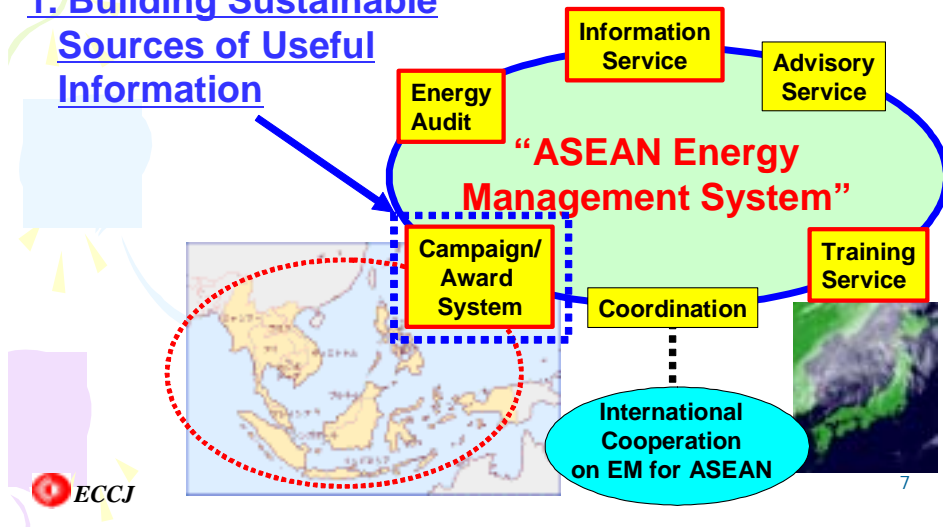


Actual Progress and Activities

1. Investigation of Actual Situations and Infrastructures for Energy Management in The 10 ASEAN Countries (2004)
2. Develop Concept of "ASEAN Energy Management (EM) System" (2004-2005)
3. Develop Plan of "ASEAN EM System" Study Workshop in JP (July 2005)
Intensive Surveys in ASEAN (2005-2006)
4. Establish Basic Plan of "ASEAN EM System" (Jan. 2006)

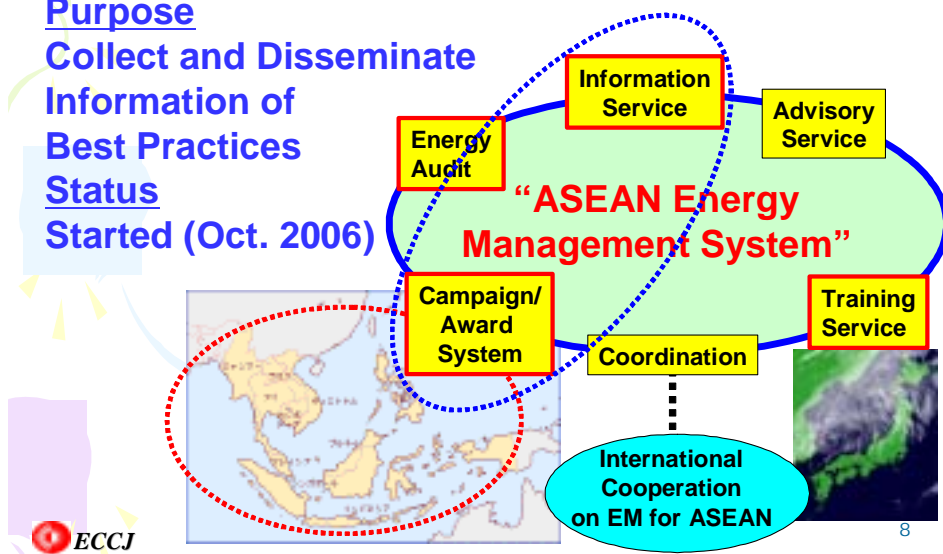
Building & Started Functions of “ASEAN Energy Management System”

1. Building Sustainable Sources of Useful Information



ASEAN Award System of Best Practices in E.M. for Industries & Buildings

Purpose
Collect and Disseminate
Information of
Best Practices
Status
Started (Oct. 2006)

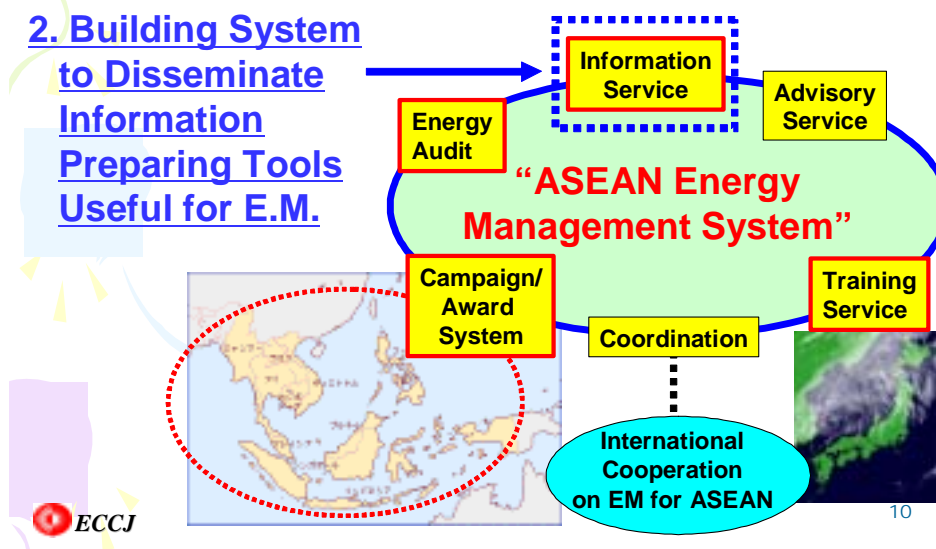


Actual Progress and Activities - 1

1. Develop Basic Plan (2005-2006)
2. Authorize Basic Plan (Jan. 2006)
Summary & Post Workshops
3. Develop Application Form (March 2006)
1st Research Forum in Japan (R.F. in JP)
4. Apply BOJ (E. M.) Members (Sept. 2006)
Finalize & Approve Plan for 2006 - 2007
in 1st BOJ Meeting
5. Call 1st Application (Oct. 2006)
Refine Evaluation Criteria in 2nd RF in JP

Building & Started Functions of “ASEAN Energy Management System”

2. Building System
to Disseminate
Information
Preparing Tools
Useful for E.M.



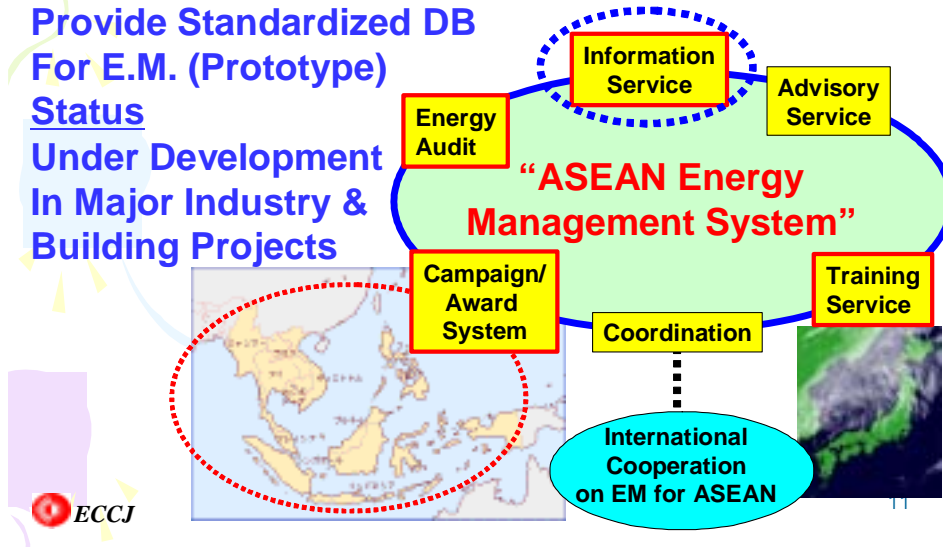
System to Disseminate In-house Database for Industries & Buildings

Purpose

Provide Standardized DB For E.M. (Prototype)

Status

Under Development In Major Industry & Building Projects



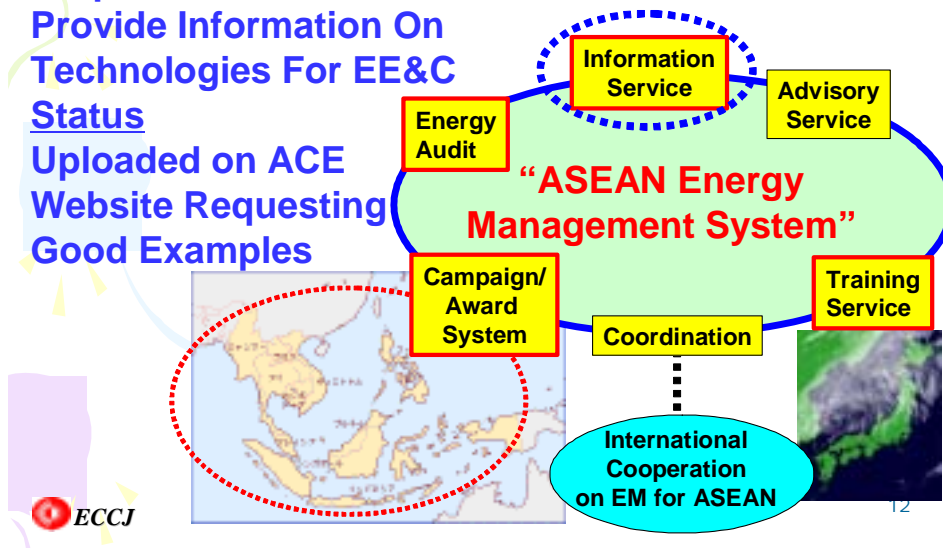
System to Disseminate Technical Directory for Industries & Buildings

Purpose

Provide Information On Technologies For EE&C

Status

Uploaded on ACE Website Requesting Good Examples



Actual Progress and Activities – 2A

1. Discuss Draft Concept (2004-2005)
Local Workshops in Projects for Buildings and Major Industries
2. Develop Technical Directory and Database Including Discussion in Local Workshops for Buildings and Major Industries Projects (2005-2006)
3. Establish Plan in 2006
4. Edit Tech. Directory & In-house DB by ACE-ECCJ (2006-)

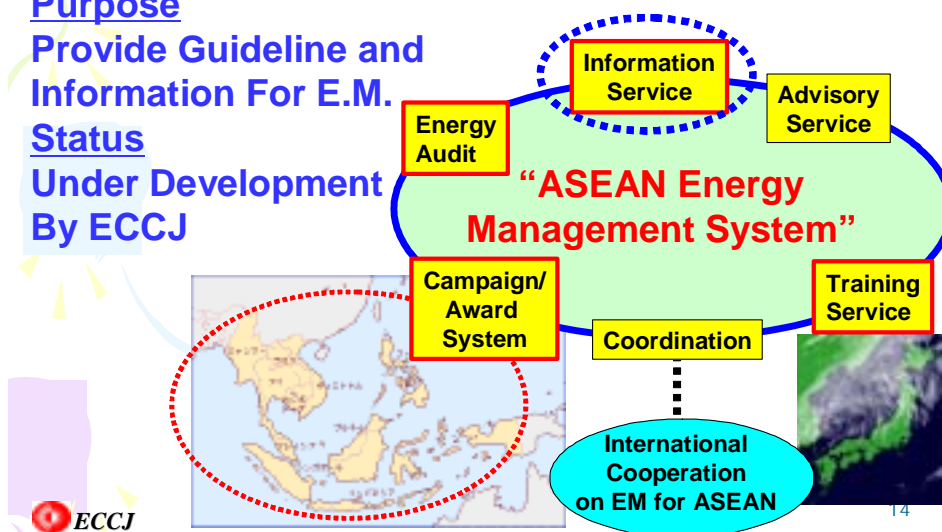
Preparation of Tools for Energy Management

Purpose

Provide Guideline and Information For E.M.

Status

Under Development By ECCJ

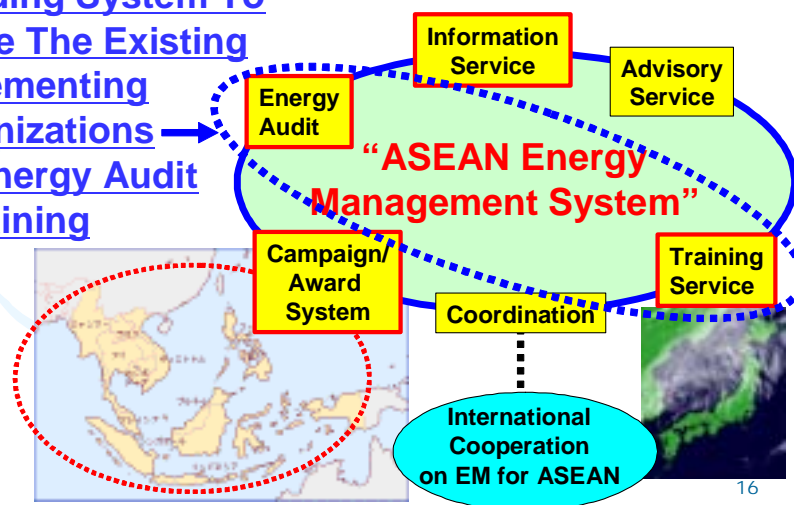


Actual Progress and Activities – 2B

1. Introduce & Discuss Concept (2006)
Intensive Seminar-Workshops
2. Prepare “Energy Management Handbook for ASEAN” (Draft) by ECCJ (2006-2007)
(Based on Total Energy Management (TEM) Handbook Developed in Thailand)
3. Upload Useful Handbooks & Reports on ECCJ Website (2007-)
4. Study Other Directories & Handbooks by ECCJ (2006-)

Building & Started Functions of “ASEAN Energy Management System”

3. Building System To Utilize The Existing Implementing Organizations for Energy Audit & Training



Actual Progress and Activities - 3

- 1. Develop Basic Concept by ECCJ (2005)**
- 2. Investigate Possibility (2005)
Intensive Surveys of 20 Implementing
Organizations in The 6 ASEAN Countries**
- 3. Develop Basic Plan (2006)
PR & Discussion in Intensive Seminar-
Workshop in the 7 ASEAN Countries**
- 4. Prepare Preliminary System Plan by
ECCJ and System for Trial by ACE**

***2. Future Plan to Develop and
Function “ASEAN Energy
Management System”***



***2-1. Continuation & Completion of
Development of / Working
Functions and Programs***



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System to Collect and Disseminate Best Practices in Energy Management

1. “ASEAN Award System of Best Practices in EM for Industries / Buildings”

- 1) Smooth Completion of The 1st Award**
- 2) Improvement of System Plan / Operation**

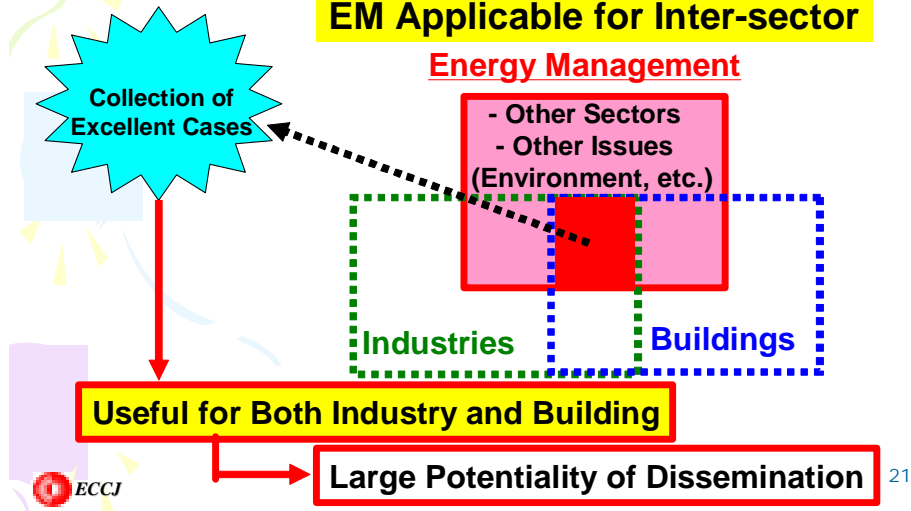
2. Establish Information System to Publish / Disseminate Awarded Best Practices

- 1) Consideration of Comprehensive Guideline to Ease Dissemination**
- 2) Compilation of Excellent Cases in E.M Handbook / Technical Directory**

20

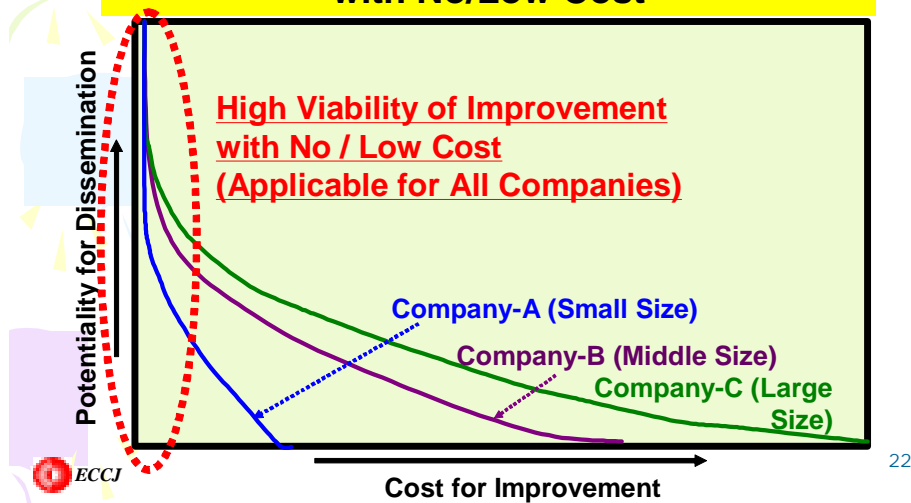
Points of Comprehensive Guideline to Ease Dissemination - (1)

Grouping "Best Practices" in EM Applicable for Inter-sector



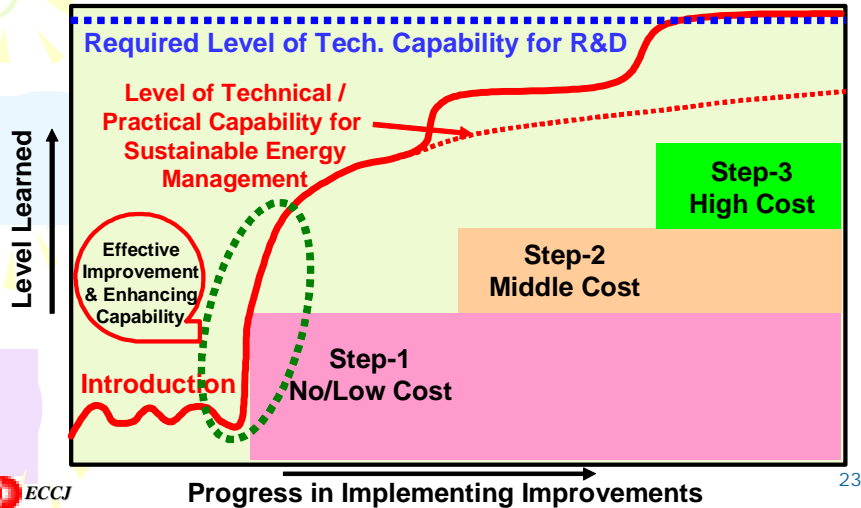
Points of Comprehensive Guideline to Ease Dissemination - (2)

Grouping "Best Practices in EM" Realized with No/Low Cost



Points of Comprehensive Guideline to Ease Dissemination - (3)

Important Learning Process Started with Step - 1



Tools for Energy Management - Preparation & Activity to Disseminate -

1. Basic 3 Tools for Energy Management

- 1) Energy Management Handbook
- 2) In-house Database
- 3) Technical Directory

2. Proposed Trial Use These Basic Tools in Factories and Buildings in ASEAN (Especially at Companies Awarded (EM))

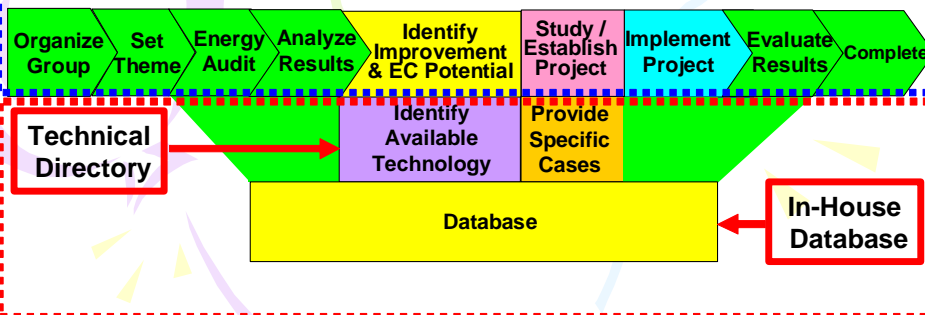
- 1) Trial Use for 6 Months
- 2) Regular Visit by ECCJ-ASEAN Experts
- 3) Reflecting Results for Improvement

Effective Use of Developed Tools for Energy Management

Energy Management Handbook

Sustainable Energy Management System
with Enhanced Voluntary Activities

Organization / Motivation & Incentive / Management
Participation / Technical & Practical OJT / Standardization



Draft Contents of EM Handbook – 1

Part I. Purpose and Usage of TEM Handbook

- Ch-1 Introduction
- Ch-2 Purpose of TEM Handbook
- Ch-3 Usage of TEM Handbook

Part II. Total Energy Management “by Participation” with Key Step Approach

- Ch-1 Key Step Approach for Energy Management
- Ch-2 Policy & Planning for Energy Conservation
- Ch-3 Organization & Structure for E.C. Promotion
- Ch-4 Principles and Methods of S.G.A. (Small Group Activities) for Energy Management

Draft Contents of EM Handbook – 2

Ch-5 Building Awareness, Motivation and Training
Ch-6 Evaluation of Total Energy Management

Part III. Implementation of E. C. Projects

Ch-1 Procedures of Energy Audit
Ch-2 Data Collection and Analysis
Ch-3 Planning, Targeting & Benchmarking for E.C. Projects
Ch-4 Implementation of E.C. Projects
Ch-5 Evaluation of E.C. Projects

(Including Guideline to Effectively Utilize In-House Database and Technical Directory)

Draft Contents of EM Handbook – 3

Appendix – 1

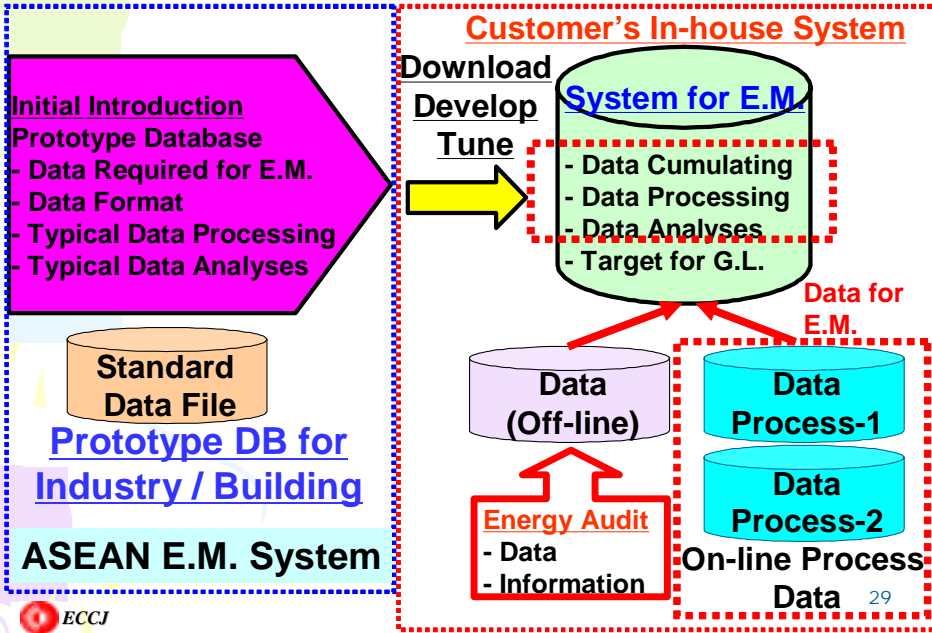
Successful Examples of E.C. by Small Group Activities
(Samples of Winners for ASAEN E.M. Award System)

Appendix – 2 Related Information

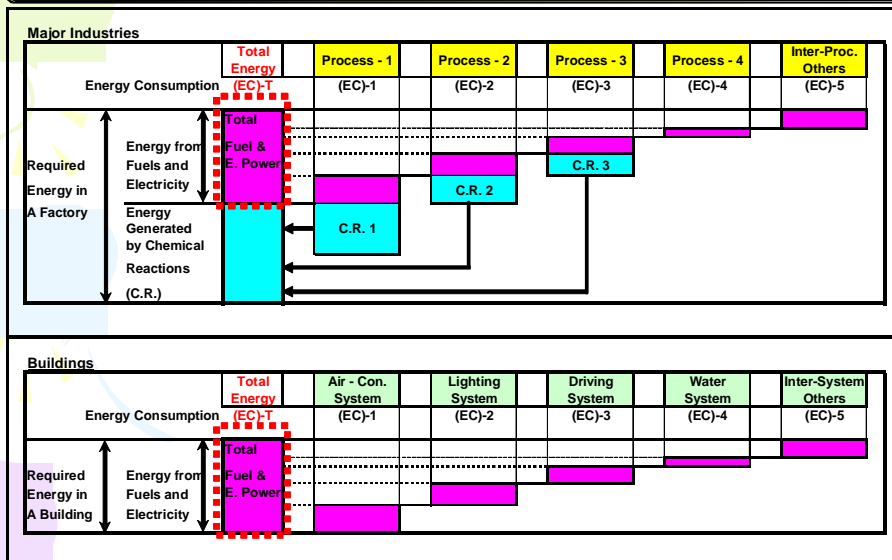
Access to the Existing Manuals / Data / Information
Available for E. C. Activities

- **In-House Database / Technical Directory**
- Statistics Data on Energy, etc.
- Websites of Related Energy / Industrial Organizations
- Available Training Courses
- Available Technical Manuals etc.
- Manual of Tools for TQM and TPM

Prototype Database for In-house Use



Database for E.M. : Comprehensive Design



System to Utilize The Existing Implementing Organizations

1. Plan Based on Surveys / Discussion

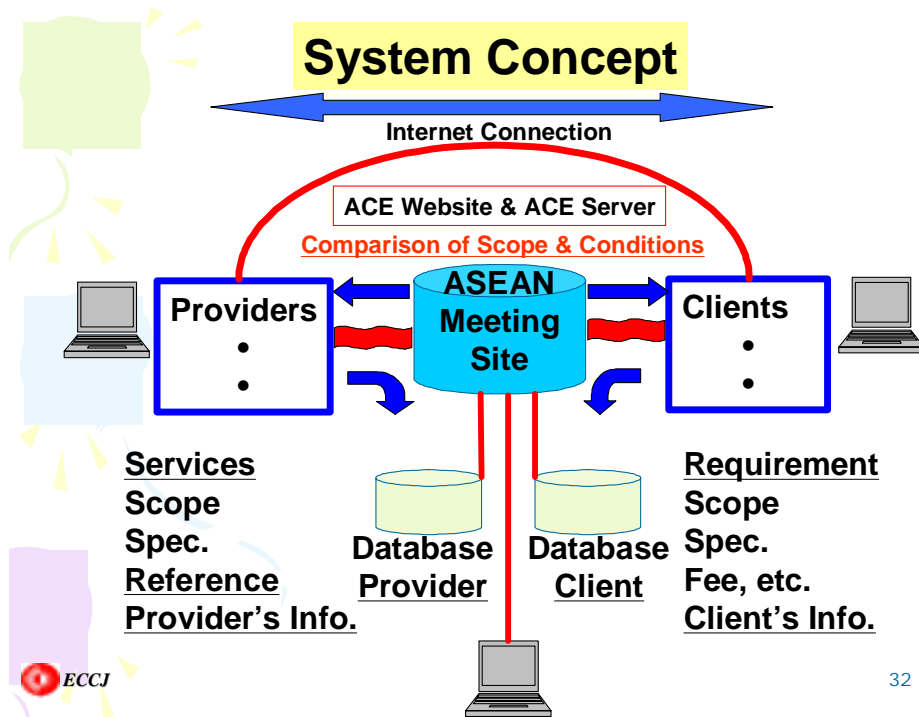
System Concept : Type & Procedure

- 1) Cyber Search for Stakeholders to Meet
- 2) Comparison of Scope & Key Conditions of Service Providers and Customers

2. Prepare and Start Trial Operation

- 1) Prepare The System in ACE Website (With Guidance & Conditions to Use)
- 2) Open Registration of Stakeholders (Service Providers and Customers)

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Proposal to Prepare Additional Tools for Energy Management (1)

- 1. Technical Handbooks for Industries**
 - 1) Thermal Energy Efficiency Improvement (TEEI) Handbook (Tentative Name)**
 - 2) Electrical Energy Efficiency Improvement (EEEI) Handbook (Tentative Name)**
- Application of Handbooks Developing by
METI / ECCJ – Thai MOI Cooperation**

**Handbooks to Supplement Energy
Management Handbooks for ASEAN**

Proposal to Prepare Additional Tools for Energy Management (2)

- 2. Directories to Provide Information of
Business**
 - 1) Directory of ESCOs**
 - 2) Directory of Technology / Equipment
Suppliers for EE&C**

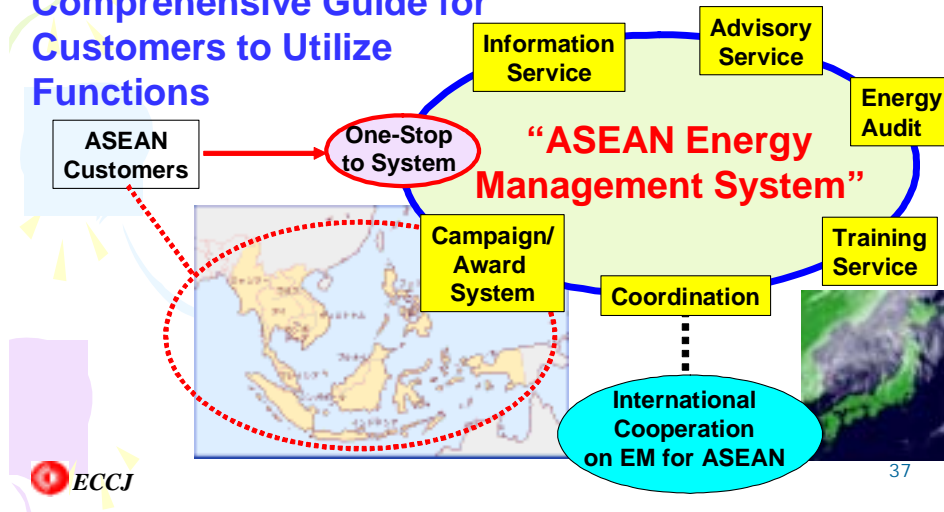
Development of e-Directory

- (1) Self Registration & Maintenance Type**
- (2) Future Access to Directory by ECCJ
(Currently Only Japanese Version)**

Comprehensive One-Stop Guidance of “ASEAN Energy Management System”

Purpose

Comprehensive Guide for Customers to Utilize Functions

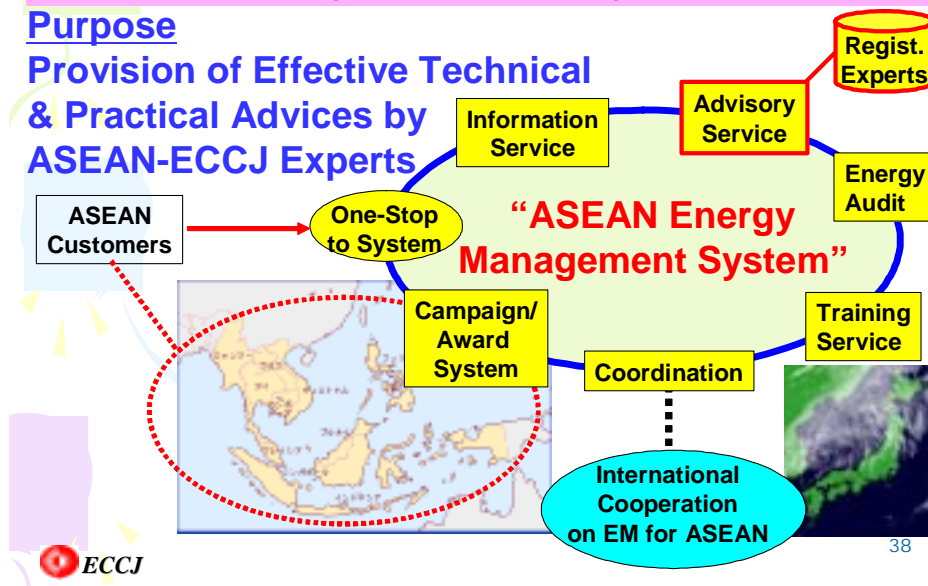


37

“ASEAN Energy Management System” - Advisory Services by Experts -

Purpose

Provision of Effective Technical & Practical Advices by ASEAN-ECCJ Experts



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Preparation of Further Functions of “ASEAN Energy Management System”

1. One-Stop Guidance to Access Functions

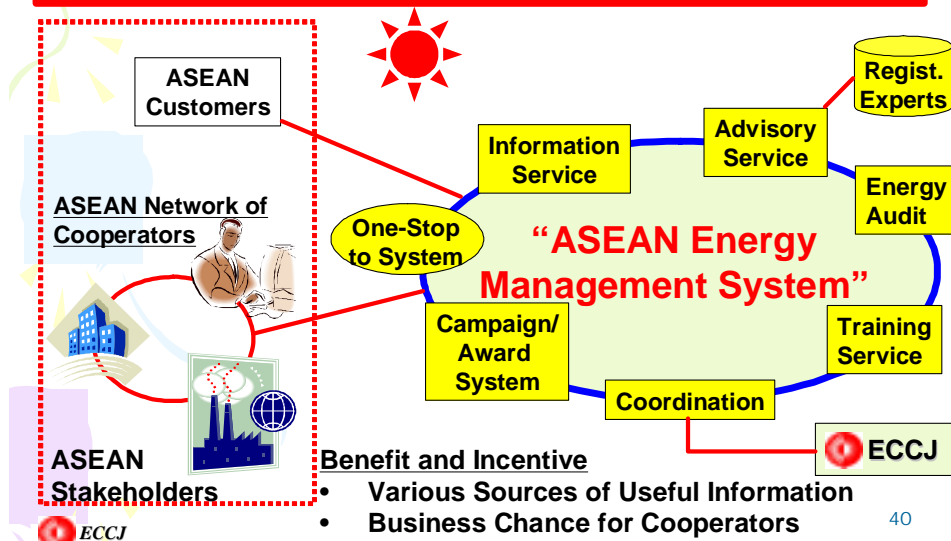
- 1) Specific of Requirements from Customer
- 2) Interactive e-Guidance Logic to Access Appropriate Functions In Accordance with Item 1)

2. Advisory Service

- 1) Scope Related to ASEAN E.M. System
- 2) Contacting Registered Experts by e-mail
- 3) Voluntary Reply by Some Experts
- 4) Open System for Experts to Register

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Continued Activities to Expand Network of Cooperating Companies and Persons



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3. Updated General Schedule

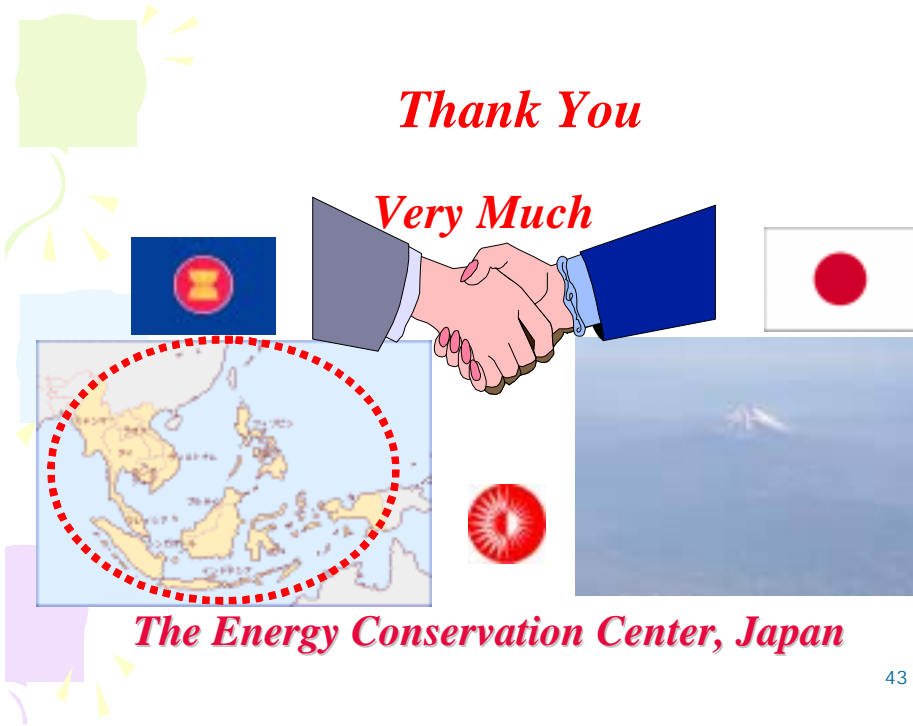
Updated General Schedule (As of February 2007)

| Phase | Main Activities | 2004 | 2005 | 2006 | 2007 | 2008 | After 2009 |
|-------------------------|---------------------------------|------|------|------|------|------|------------|
| Phase - 1 | Investigation / Study Concept | | | | | | |
| Prepare Basic Functions | Develop Specific Plan | | | | | | |
| | Prepare / Work Functions | | | | | | ...> |
| | Verification of Result | | | | | | |
| Phase - 2 | Study / Prepare / Add Functions | | | | | ... | |

**On Schedule !!
As of Feb. 2007**

Thank You

Very Much



The Energy Conservation Center, Japan

J07A

PROMEEC for 2006-2007 Energy Management Project Summary and Post Workshop - Plan of Award System of Best Practices in Energy Management for Industries & Building -



February 28th, 2007

Kazuhiko YOSHIDA

General Manager, International Engineering Dept.
The Energy Conservation Center, Japan



1

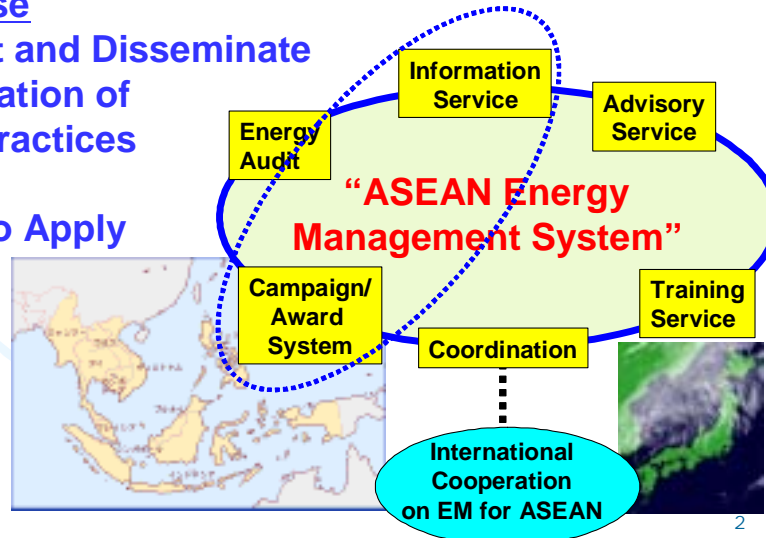
Concept and Purpose of E. M. Award System

Purpose

Collect and Disseminate
Information of
Best Practices

Merit

Easy to Apply



2

Actual Progress and Activities - 1

1. Develop Basic Plan (2005-2006)
2. Authorize Basic Plan (Jan. 2006)
Summary & Post Workshops
3. Develop Application Form (March 2006)
1st Research Forum in Japan (R.F. in JP)
4. Apply BOJ (E. M.) Members (Sept. 2006)
Finalize & Approve Plan for 2006 - 2007
in 1st BOJ Meeting
5. Call 1st Application (Oct. 2006)
Refine Evaluation Criteria in 2nd RF in JP

Members of Judging Committee

1. Member of Judging Committee

One Member from Each Country (Total 10)

- Mr. (Dr.) Kha Sheng Tan (Brunei Darussalam)
- Mr. Lieng Vuthy (Cambodia)
- Mr. (Dr.) John A.W. Turangan (Indonesia)
- Mr. Khamso Khouphokham (Lao PDR)
- Mr. (Dr.) Zainuddin Abdul Manan (Malaysia)
- Mr. U Win Khaing (Myanmar)
- Mr. Artemio P. Habitan (Philippines)
- Ms. Amaraporn Achavangkool (Thailand)
- Mr. Mr. Dang Hai Dung (Vietnam)
- (Expected Nomination from Singapore)

Judging Committee : Advisers, etc.

2. Adviser

No Right to Vote / Referential Evaluation

1) ASEAN Adviser

Mr. (Dr.) S. Kannan Al V Krishna (Malaysia)

2) Japanese Adviser (ECCJ)

Mr. Kazuhiko Yoshida

Mr. Takashi Sato

Mr. Fumio Ogawa

3. ASEAN Coordinator

Staffs of ASEAN Centre for Energy (ACE)

Mr. Christopher Zamora and His Staffs



5

Basic Rule to Select Winners

1. National Competition (10 Countries)

The System of Each Country Should Be Respected.

Max. 2 Winners from Industry and

Max. 2 Winners from Building

will be applied to ASEAN competition

2. ASEAN Competition

**1 Winner and 2 Runner-ups for Industry
and**

**1 Winner and 2 Runner-ups for Building
will be finally selected by BOJ.**



6

Latest Evaluation Guideline (As of December 14th, 2006)

| Evaluation Items | | Distribution of Score |
|-------------------------|--|-----------------------|
| 1. Impact | Energy Saving Environment (Positive / Negative) Economic (ROI, Investment) Efficiency | 30% |
| 2. Sustainability | Participation / Involvement Top Level Management Commitment Short and Long Term Plan Organization (ex. SGA, EC Team, etc.) Capacity Building (Education, Training) | 30% |
| 3. Replicability | Technology Practice and Measures | 20% |
| 4. Originality | Innovation Creativity | 15% |
| 5. Overall Presentation | | 5% |

7

Latest Application Form (1 / 2) (As of December 14th, 2006)

1. Guideline

To Be Comprehensive within 17 Pages
Consisting of

- 1) General Information & Endorsement
- 2) Project Specifics including
 - Overview of Project / Activity
 - Descriptions Covering Evaluation G/L Plan including Top Policy
 - Actual Results (Efforts / Effects)

8

Latest Application Form (2 / 2) (As of December 14th, 2006)

- 3) Future Plan Both to Disseminate and to Strengthen Sustainability of Activities
- 4) Applicants can download the form.

2. Application Form Uploaded on ACE Website

Applicants can download the application form.



9



**BOJ Members and
Participants of "Research Forum in Japan"**



10

Schedule of The 1st Competition

October 2006

Official Announcement & Call Application

April 2007

Close Application

May 21-23, 2007

BOJ (EM) : Determination of 1st Winners

August 22, 2007

Announcement & Awarding Ceremony

in AMEM + 3 on August 21-23, 2007

September 2007

Publishing ASEAN Winners / Applied Cases



11

Target to Extract Cases Easily Applicable
with Larger Potentiality of Dissemination



Many Small Powers (Improvements) will be
Able to Lift "Sleeping Gulliver" with No Pain !!



12

Requirement for Focal Points

**Please Encourage as Many
Factories & Buildings as
Possible to Apply Their
Excellent Cases !!**
**(Cooperating with BOJ
Members)**

*Thank You Very Much for Your
Further Cooperation !*



The Energy Conservation Center, Japan

J08

PROMEEC for 2006-2007 Energy Management Project Summary Workshop - Proposed Future Plan -



February 27th-28th, 2007

Kazuhiko YOSHIDA

General Manager, International Engineering Dept.
The Energy Conservation Center, Japan



1. Project Status of 2007-2008

4th Year

(Newly Established in 2004)

Results of Activities in 2006 – 2007

**(1) Intensive Seminar-Workshop and Visits to
Companies etc. at 7 Countries**

- PR and discussion of “ASEAN Energy Management System”
- Request to Cooperate to and Participate in Programs / Activities of “ASEAN Energy Management System” and PROMEEC Projects





Results of Activities in 2006 – 2007

(2) 1st BOJ Meeting and “Research Forum in Japan”

The Following for “ASEAN Award System of Best Practices in Energy Management for Industries and Buildings”

- Finalization and Approval of Implementation Plan
- Establishment of Evaluation Guideline
- Finalization of Application Form
- Preparation for Announcement of 1st Application



Major Achievements in 2006 – 2007

Started Some Key Functions of “ASEAN Energy Management System” as Follows :

- (1) Started The 1st Application of “ASEAN Award System of Best Practices in Energy Management for Industries and Buildings”**
- (2) Developed Information System for “Technical Directory” and “In-House Database” Prepared in Industry/Building Pro.**
- (3) Prepared “Energy Management Handbook” (Draft)**
- (4) Developed Plan of System to Utilize the Existing Organizations**
- (5) Expanded Network of Cooperators**

2. Basic Direction for 2007-2008

Activities Based on The Plan of “ASEAN Energy Management System”

- (1) Smooth Operation of “ASEAN Award System of Best Practices in Energy Management for Industries and Buildings
- (2) Start-up The System to Utilize The Existing Implementing Organizations
- (3) Preparation / Development of Handbooks and Directories as Follows
 - 1) “Energy Management Handbook” (Completion)
 - 2) Preparation for Trial Use of The E.M. Handbook with In-House Database and Technical Directory at Cooperation Factories and Buildings
 - 3) Development of e-Directory and Other Handbooks
 - 4) Preparation of One-Stop Guidance, etc.

Updated General Schedule

| Phase | Main Activities | 2004 | 2005 | 2006 | 2007 | 2008 | After 2009 |
|-------------------------|---------------------------------|------|------|------|------|------|------------|
| Phase - 1 | Investigation / Study Concept | | | | | | |
| Prepare Basic Functions | Develop Specific Plan | | | | | | |
| | Prepare / Work Functions | | | | | | |
| | Verification of Result | | | | | | |
| Phase - 2 | Study / Prepare / Add Functions | | | | | | |

Important Year !

Updated Plan for 2007 - 2010

| Project | Phase | Activities | 2007-08 | 2008-09 | 2009-10 | | |
|----------------|----------------------------------|--|---------------------------------|----------|---------|--|--|
| Energy Manage. | Step 1 Prepare Basic Function | Develop Further Specific Plans | Continue | | | | |
| | | Verification / Feedback | | | | | |
| | | - Operating Award System for Best Practice in E.M. | Continue | | | | |
| | | - System for Dissemination | Start System | | | | |
| | | - Develop System to Utilize Exist. Org. | Start Trial System | Finalize | | | |
| | | - Functioning System | | | | | |
| | | Development of Info. Sys. | Start Trial | Finalize | | | |
| | | Preparation of E.M. HB. | | | | | |
| | | Step 2 | Study / Prepare / Add Functions | | | | |
| | | | Develop Additional Functions | | | | |
| | Operation of ASEAN EM System | Ramp-up | Tune-up | | | | |

 ECCJ

3. Proposed Activities for 2006-2007

1. "Award System for Best Practice in E.M. for Industries / Buildings"

(1) Completion of 1st Competition

June 2007 : BOJ

July 2007 : Announcement of Winners (AMEM)

(2) Start 2nd Competition

(3) Establish Information System to Publish Awarded Cases (ACE Website)

(4) Follow-up in ASEAN by Visiting Companies

 ECCJ

3. Activities for 2006-2007 (Continued)

2. Start-Up System to Utilize The Existing Implementing Organizations

(1) Preparation of System by ACE / ECCJ in ACE Website

(2) Trial Operation and Improvement of System

3. Complete Energy Management Handbook

(1) Completion of Handbook

(2) Trial Use with In-house Database and Technical Directory in Cooperating Companies and Follow-up by ECCJ Experts to Reflect Results

4. Preparation of e-Directory of Technology Suppliers for EE&C including ESCOs



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3. Activities for 2006-2007 (Continued)

5. Development of Total System

(1) Information System to Disseminate Tools for Energy Management

(2) Preparation of “One-Stop Guidance”

6. Expansion of of Cooperative Companies and Organizations as Not only Users of “ASEAN E.M. System” But Also Information Sources

“PROMEEC Family Network”!!



10

4. Proposed Activities in ASEAN

Activities as Follows at 6 Countries (Max.)

1. Intensive Seminar-Workshop

- (1) Introduce and Discuss Functions / Programs of “ASEAN E.M. System”**
- (2) Encourage Participants to Join Programs / Activities of PROMEEC and “PROMEEC Family Network”**

2. Visit to Factories and Buildings

- (1) Same Purpose as Item 1**
- (2) Advice on Trial Use of E.M. Handbook or Follow-up at Awarded Companies**

4. Proposed Activities in Japan

3. Research Forum in Japan

- (1) Improvement in Operation and Evaluation Guideline of The Award System by Analyses of Results of The 1st Competition**
- (2) Improvement in Functions, Programs and System of “ASEAN E.M. System” Considering User-friendliness**

Proposed Basic Time Schedule for 2007 - 2008

| Project / Activities | 2007 | | | | | | | | | | | | 2008 | | | Remarks |
|---|--|-----|------|------|--------|-----------|---------|----------|----------|---------|----------|-------|------|--|--|---------|
| | April | May | June | July | August | September | October | November | December | January | February | March | | | | |
| (Overall) | | | | | | | | | | | | | | | | |
| A. Development of Detailed Project Plans/ Preparatory Work | [Blue bar from April to July] | | | | | | | | | | | | | | | |
| B. Contract with ACE | [Blue bar from May to August] | | | | | | | | | | | | | | | |
| C. Preparation to Start Projects | [Blue bar from June to September] | | | | | | | | | | | | | | | |
| D. Inception Workshop | [Blue bar from July to December] | | | | | | | | | | | | | | | |
| E. Implantation of Projects | [Blue bar from August to January] | | | | | | | | | | | | | | | |
| F. Post Workshop | [Blue bar from September to February] | | | | | | | | | | | | | | | |
| G. Preparation of Report | [Blue bar from October to March] | | | | | | | | | | | | | | | |
| (3-Project Management) | | | | | | | | | | | | | | | | |
| (1) Planning/ Preparation/ Evaluation | [Green bar from May to July] | | | | | | | | | | | | | | | |
| (2) Coordination Meeting in Indonesia or Japan | [Green bar from June to August] | | | | | | | | | | | | | | | |
| (3) Inception Workshop | [Green bar from July to September] | | | | | | | | | | | | | | | |
| (4) Post Workshop | [Green bar from August to October] | | | | | | | | | | | | | | | |
| 3. PROMEEC (Energy/Management) | | | | | | | | | | | | | | | | |
| (1) Develop Detailed Plan / Arrange for Site Activity / Develop | [Green bar from May to August] | | | | | | | | | | | | | | | |
| (2) BQI for Award System (Energy/Management) | [Green bar from June to September] | | | | | | | | | | | | | | | |
| (3) 1st Site Activities (Intensive Seminar-Workshop/ Visits to Companies) | [Green bar from July to October] | | | | | | | | | | | | | | | |
| (4) 2nd Site Activities (Intensive Seminar-Workshop/ Visits to Companies) | [Green bar from August to November] | | | | | | | | | | | | | | | |
| (5) Research Forum in JP (Improvement in Award System/ ASEANEM System) | [Green bar from September to December] | | | | | | | | | | | | | | | |
| (6) 3rd Site Activity (Summary&Post-Workshop) | [Green bar from October to January] | | | | | | | | | | | | | | | |
| (7) Preparation of Report (Japanese Version) | [Green bar from November to February] | | | | | | | | | | | | | | | |
| | * AMEM Activities in Mex. 6 Countries | | | | | | | | | | | | | | | |



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Thank You

Very Much



The Energy Conservation Center, Japan

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VI – 4

**Energy Management Handbook for ASEAN
(Draft)**

DRAFT FOR REFERENCE

Summary & Post Workshop, PROMEEC for 2006-2007

ENERGY MANAGEMENT HANDBOOK for ASEAN

New Approach to Energy Conservation in ASEAN countries

February 27th and 28th, 2007

XXXXXXXXXXXXXXXXXXXXXXXXXXXX

ASEAN Centre for Energy (ACE)

and

The Energy Conservation Center, Japan

Preface

This handbook was developed based on the TEM (Total Energy Management) Handbook which was successfully prepared first in Thailand through by the policy dialog between Thai government and Japanese government to support and supplement Energy Conservation projects carried out by Thai government.

The TEM Handbook, after the completion, was actually subjected to introductory use in 10 factories in Thailand in 2005, and proved its usefulness by the excellent results of energy saving corresponding to about 45.6 million Thai Bahts (about US\$ XXX) only in about 7 months. The results are summarized in the Table at the end of this section.

This TEM Handbook was then applied to the need of other ASEAN countries. In other words, the ASEAN TEM Handbook was developed by modifying the said Thai Handbook to meet the requirements of Energy Conservation in those countries.

This Handbook has been provided to be utilized by all people concerned with energy conservation in all the industries in ASEAN countries “from Top to Bottom”. In addition, the concept of Total Productivity Management (TPM), Total Quality Management (TQM) and Small Group Activities are incorporated into the TEM Handbook to facilitate to enhance energy efficiency.

Acknowledgement

All the ASEAN Countries acknowledges with thanks the valuable supports technical and financial by Ministry of Economy, Trade and Industry of Japan through The Energy Conservation Center, Japan to develop and complete “Energy Management Handbook for ASEAN”.

List of Authors

Authors in ASEAN countries

-
-
-
-
-

Japanese Authors

- Mr. Kazuhiko Yoshida, The Energy Conservation Centre, Japan
- Mr. Fumio Ogawa, The Energy Conservation Centre, Japan
- Mr. Takashi Sato, The Energy Conservation Centre, Japan

Contents

- Part I Purposes and Usage of Energy Management Handbook
- Chapter 1 Introduction
 - Chapter 2 Purposes of Energy Management Handbook
 - Chapter 3 Usage of Energy Management Handbook
- Part II Total Energy Management "by Participation" with Key Step Approach
- Chapter 1 Key Step Approach for Energy Management*
 - Chapter 2 Policy and Planning
 - Chapter 3 Organization and Structure
 - Chapter 4 Principles and Methods of Small Group Activities (SGA) for Energy Management
 - Chapter 5 Building Employee Awareness and Motivation
 - Chapter 6 Evaluation of Total Energy Management
- Part III Implementation of Energy Conservation Projects
- Chapter 1 Procedures of Energy Audit
 - Chapter 2 Measurement Procedure
 - Chapter 3 Data Collection and Analysis (Data Collection Standard Form)
 - Chapter 4 Planning, Targeting and Benchmarking for Energy Conservation Projects
 - Chapter 5 Project Implementing Steps
 - Chapter 6 Evaluation of Energy Conservation Projects
- Appendix - 1 Successful Examples of Energy Conservation by Small Group Activities in ASEAN countries (Samples of Winners for ASEAN Energy Management Award System)
- Appendix -2 Related Information***
1. In-house Database/Technical Directory
 2. Statistics Data on Energy, etc.
 3. Web sites of related energy and industrial organizations
 4. List of Available Training Courses
 5. List of Available Technical Manuals
 6. Manuals and Tools for TQM and TPM

ABBREVIATION

| | |
|---------|--|
| ACE | ASEAN Centre for Energy |
| CP | Counterpart |
| EC | Energy Conservation |
| ECCJ | The Energy Conservation Center, Japan |
| JICA | Japan International Cooperation Agency |
| METI | Ministry of Economy, Trade and Industry |
| PEMTC | Practical Energy Management Training Center |
| PR | Public Relations |
| PRE | Person Responsible for Energy |
| PROMEEC | Promotion Energy Efficiency and Conservation |
| TEM | Total Energy Management |
| TPM | Total Productivity Maintenance |
| TQC | Total Quality Control |
| TQM | Total Quality Management |
| W/G | Working Group |

FOR REFERENCE**Experience in Thailand by Using Total Energy Management (TEM) Handbook****Summary of Results of Introductory Use of TEM Handbook in Pioneer Factories in Thailand****(Effects of Activities for Approximately 7 Months, in 2005)**

| Company | No. of Small Groups Established | No. of Suggestions | No. of EC Projects Implemented | Energy Saving | | Total Savings (Baht) |
|--|---------------------------------|--------------------|--------------------------------|-------------------|-----------------------|----------------------|
| | | | | Electricity (kWh) | Heat | |
| A – Company Building Management | 13 | 196 | 26 | 300,000 | - | 825,000 |
| B – Company Food Processing | 29 | 25 | 25 | 25,350 | - | 68,193 |
| C – Company Electrical Appliance | 5 | 30 | 12 | 117,696 | - | 318,954 |
| D – Company Plastic | 60 (TPM) | 5 (TEM) | 4 | TOD-TOU + 76,000 | - | 1,900,000 |
| E – Company Ink Fabrication | 5 | 5 | 5 | 7,287 | - | 18,217 |
| F – Company Ceramic | 182 (QCC/TPM) 1 (TEM) | 19 (TEM) | 18 | 543,562 | 1,224,264* (Baht) | 2,590,548 |
| G – Company Cement | 1 | 5 | 2 | 35,880 | - | 79,530 |
| H - Company Pulp & Paper | 63 (TPM) 7 (TEM) | 28 (TEM) | 11 | 9,203,000 | 28,050 ton (Steam) | 35,339,600 |
| I - Company Manufacturing Vehicle Engine | 7 | 11 | 10 | 114,278 | - | 314,266 |
| J – Company Textile | 76 | 32 | 9 | 27,061 | 19,676 GJ (HFO, Coal) | 4,147,652 |
| Total | | | | 10,450,114 | | 45,601,960 |

* Demand charge savings for natural gas purchased

TOD : Time of Day

TOU : Time of Use

TPM : Total Productivity Maintenance

QCC : QC (Quality Control) Circle

Part I

Purposes and Background of Energy Management Handbook

Chapter 1 Introduction

Energy is one of the most important resources to sustain our lives. At present we still depend a lot on fossil fuels and other kinds of non-renewable energy. The extensive use of renewable energy including solar energy needs more time for technology development. In this situation Energy Conservation (EC) is the critical needs in any countries in the world.

Of special importance of Energy Conservation are the following two aspects:

- (1) Economic factors
- (2) Environmental impacts

1.1 Economic factors of Energy Conservation

Energy saving is important and effective at all levels of human organizations – in the whole world, as a nation, as companies or individuals. Energy Conservation reduces the energy costs and improves the profitability.

In ASEAN countries, though the situation is a little different from nation to nation, the efforts of Energy Conservation have been continued for decades. Some countries already have legal enforcement like the Energy Conservation Promotion Act. Some others are planning that or preparing for that. For both the oil-exporting countries and the oil-importing countries, the nation-wide Energy Conservation efforts will contribute to lessening dependence on scarce resources such as crude oils and establishing the more favorable budget balance of the country.

Private companies are also sensitive to energy costs, which directly affects their profitability and even their viability in many cases. Especially factories in the industrial sectors are of much concern, because reduced costs by Energy Conservation mean the more competitive product prices in the world markets.

1.2 Environmental impacts of Energy Conservation

Energy Conservation is closely related also to the environmental issues. The problem of global warming or climate change is caused by emission of carbon dioxide and other Green House Gases (GHG). Energy Conservation, especially saving use of fossil fuels, shall be the first among the various countermeasures of the problem, with due considerations of the aforementioned economic factors.

To cope with the said problem, there have been many global or international cooperation activities. One of those is IPCC (Intergovernmental Panel on Climate Change), started in November 1988.

There have been also the efforts in the shape of UNFCCC Kyoto Protocol, where a lot of countries in the world are working together in the same direction of reducing GHG

emission. Moreover, encouraged by introduction of “flexible mechanism” many international cooperation projects are developed between private sector entities of Annex 1 countries (Japan) and non-Annex countries (developing countries or those in transition) in the Asia-Pacific region. (Related articles in the Kyoto Protocol refer to “Activities Implemented Jointly”, “Emissions Trading among Annex 1 Parties” and “Clean Development Mechanism”.)

Chapter 2 Purposes of Energy Management Handbook

The current Energy Management Handbook was originally a product of a project initiated by the GAP (Green Aid Plan) policy dialog between Thai government and Japanese government, and now that is expanded to application to all ASEAN countries. The project was meant to support and supplement many projects for EC promotion carried out by the governments of ASEAN countries. More specifically, the Handbook is characterized by the following purposes:

(1) Main Users

The main users of the Handbook would be the energy managers or the key persons in similar positions who plan to promote EC inside the factories. Additionally all the people within factories from top management to workers/operators could be proper users to realize Energy Conservation by all members' contribution.

(2) EC by PARTICIPATION

The Handbook will be a very effective tool to be utilized in industrial factories based on the spirit of the teamwork, or "EC by Participation".

(3) Special and Unique Features

The Handbook was planned and designed in such a special way as is described later, and so it has very special and unique features. Those features are explained in the two categories – Comprehensive and Specific. The latter means utilization of SGA (Small Group Activities) in a broad sense – ESGA (Effective Small Group Activities).

2.1 Comprehensive Features

To achieve the above-said purposes, there was close cooperation among ACE, the representatives of ASEAN countries and Japanese experts from ECCJ. As a result, the Handbook has the following features:

(1) First book in the world

This kind of "Handbook for Energy Conservation" does not exist yet either in Japan or in any other countries in the world. It was first prepared in Thailand and followed by ASEAN countries under the cooperation by Japan through ECCJ.

(2) Management issues – not technical issues

The Handbook is different from the existing or planned manuals in ASEAN countries. The manuals in most cases deal with technical issues related to machinery and facilities, while the Handbook deals with management issues related to people. In other words, the Handbook shows how to use manuals and motivate people to work together for Energy Conservation.

(3) How to motivate people

Accordingly the Handbook puts stress on such items as Motivation Techniques, EC Attitudes and SGA (Small Group Activities) including TQM/TPM, all contributing to “EC by PARTICIPATION (of all the people working together)”.

Of these elements, utilization of SGA (including TQM/TPM) forms the very special features of the Handbook, and it is explained in more details in 1.2.2.

(4) User-friendly

The Handbook is so designed that the users read it and learn how to work on Energy Conservation program for industrial factories. Namely the book shows the way to carry on Energy Conservation activities. The book is very unique in that it is made in the “user-friendly” way. It was planned and designed, originally in Thailand, by the users, including not only engineers in industrial factories but also management level people, involved in the project from the very beginning stage. Thus the contents of the book were carefully arranged to assure convenience of the users.

(5) Comprehensive

At the same time, the Handbook is a very comprehensive one, with a lot of related useful information put into the Appendix part, so that the users would easily find what they want somewhere in the book.

(6) Expandable

The Handbook is made in an “expandable” manner for refinement and addition in the future. After actual use of the book in many factories in ASEAN countries from now, the feedback would be utilized to revise, update and expand the book. Especially putting successful examples of using the book into some part of the Handbook with a category by industry would make the book much more useful in the future.

(7) Provides the self-sustainable way

Accordingly the Handbook will be utilized within industrial factories in a self-sustainable way so that private sector people probably would be able to continue EC activities even without the help of outside consultants.

2.2 Specific Features – ESGA (Effective Small Group Activities)

As mentioned previously, utilization of Small Group Activities (SGA) is one of the special features of the Handbook. Japanese industrial sector has developed and improved a lot of techniques and methodology in the field of SGA, including TQM and TPM, in the past few decades with successful results. In the original project of

preparing the TEM Handbook in Thailand, two Japanese TQM/TPM experts took part and had long discussion with other committee members on how to utilize the essence of those SGA in Energy Conservation promotion.

The conclusion is, as explained below, introduction of the new concept of ESGA (Effective Small Group Activities). Now the special feature of the TEM Handbook is “utilization of ESGA for Energy Conservation”.

(1) SGA in a broad sense and in a narrow sense

There are many tools, methods and techniques in the field of SGA in a broad sense. TQM and TPM would be the two famous examples. SGA in a narrow sense might include such methods as Employee Suggestion System, ZD (Zero Defects) movement, 5S (Seiri: Order, Seiton: Arrangement, Seisou: Cleaning, Seiketsu: Cleanliness and Shitsuke: Discipline) activities, KAIZEN (Improvement) activities, and so on. All the good points of the SGA in a broad sense (i.e. TQM, TPM and the SGA in a narrow sense) were intended to be utilized in the TEM Handbook for the purpose of Energy Conservation promotion.

(2) Essence of SGA

It would not be useful to put all these methods and techniques, as they are, into the Handbook, because it requires a voluminous part of the book and also it confuses the users who would ask themselves which method to adopt for Energy Conservation promotion activities. It was therefore desired for the Japanese experts to digest all the good points of the said SGA in a broad sense and put only the essence (core nutrition) into the Handbook for the ready use in Energy Conservation activities.

(3) TQM and TPM

TQM and TPM have a separate long history each, starting from the different field, respectively the quality and maintenance. However the both methods continued development to cover wider fields and now deal with the extensive fields of organizational activities, with a lot of overlapping each other. At present both TQM and TPM aim at solving management issues, and can be used and applied in the various fields of company activities – manufacturing, maintenance, sales, administration, etc.

(4) New concept of ESGA

The essence of TQM, TPM and SGA (in a narrow sense) is expressed by a new concept called ESGA (Effective Small Group Activities). ESGA contains the excellent and substantial points extracted from all these methods/techniques and can be applied effectively to Energy Conservation activities as well as many other fields of business activities. ESGA is based on integration of the power of all the members of organizations through their PARTICIPATION for a project or the common goal (such as Energy Conservation).

Chapter 3 Usage of Energy Management Handbook

3.1 Users of Energy Management Handbook

The Handbook is meant for use in factories in the industrial sector in ASEAN countries. The following class (category) of people may be considered as users of the Handbook:

- (1) Factory Manager (Senior Management)
- (2) Middle managers
- (3) PREs, equivalent engineers or Energy Managers to promote EC
- (4) Other staff/engineers
- (5) Workers/operators

Of these, the Handbook is primarily supposed to be used by PRE (Person Responsible for Energy)s or Energy Managers. New types of PREs appeared in Thailand after completion of the new training center in the suburbs of Bangkok through PEMTC (Practical Energy Management Training Center) project jointly implemented by Japanese and Thai governments, with the new qualification system and the training with the mini-plants and new textbooks. Then they found the TEM Handbook a very useful tool to actually promote EC activities within the factories.

The Handbook is also useful for other class of people. They get deeper understanding of the issue of EC and how to promote it within factories so that all the people from the senior management down to workers/operators, including PREs, can work together in the same direction – EC promotion. The same thing goes in other ASEAN countries, too.

3.2 Contents of Energy Management Handbook

The contents of the Handbook are designed for convenient use. After Part I, Purposes and background of Total Energy Management Handbook, comes Part II, which shows Total Energy Management “by Participation” with Key Step Approach. Then Part III contains the way of Implementation of Energy Conservation Project. Appendix-1 and -2, respectively, show Successful Examples and useful related information.

3.3 Future shape after Expansion

Since the Handbook is designed to be expandable, addition of many successful examples, to be gathered from all over ASEAN countries, will accumulate in the book in future. Those examples will be arranged by category of industry, such as iron & foundry, chemical, food, textile, etc. Then future users would first look for reference examples in the industry to which they belong, and have good chances to find ones.

Part II

Total Energy Management "by Participation" with Key Step Approach

As said in the previous Part, strategic planning of the Energy Management is very important for

the management of factories/companies, and Energy Conservation is one of its major topics. In the Handbook, stress is put on introduction of the way of promoting Energy Conservation by participation of all the members within factories, i.e. “Energy Conservation by Participation”. That is explained in more details in Part II, with the “Key Step Approach, which is meant for easy and convenient access by the users.

Chapter 1 Key Step Approach for Energy Management

1.1 Energy Management Principles

Energy Conservation is an important issue for the corporate management, and is considered to form a part of Energy Management.

(1) Definition of Energy Management

Energy is one of the management resources of a company, and shall be managed and controlled by a systematic method in harmony with the management of other resources. Energy Management is managing all kinds of energy used in the company by making out an optimum program of purchasing, generating and consuming various types of energy based on the company's overall short-term and long-term management program, with due consideration of costs, availability, economic factors, and so on.

(2) Necessity of Energy Management

Energy Management is necessarily required because it influences a number of aspects of company operation and activities including the following:

- energy costs which affect the company profitability
- energy costs which affect the competitiveness in the world market
- national energy supply/demand balance
- national trade and financial balance
- local and global environments
- occupational safety and health
- loss prevention and waste disposal reduction
- productivity
- quality

1.2 Strategic Approach for Energy Management (Key Step Approach)

Nowadays all the corporate decision making and action taking shall be carried out on the basis of Strategic Approach. Otherwise the decision or action may not be effective enough from the overall viewpoints or under the rapidly changing circumstances, and soon the company would find itself in an uncertain situation of its viability. Energy Management is no exception.

In this section, Strategic Energy Management is explained in the form of “the Key Step Approach” to serve as a quick reference for the users to grasp its essence and take actions without delay. More detailed explanation of the Key Step Approach is given in Part III. It consists of the following key steps:

- (1) Top management commitment

- (2) Assignment of PRE (or Energy Manager)
- (3) Understanding the issues including
 - Grasp current energy use
 - Identify management strength and weakness
 - Analyze stakeholder needs
 - Anticipate barriers to implement
 - Estimate the future trend
- (4) Plan and organization including
 - Develop a policy statement
 - Set targets
 - Make out a plan/program
 - Establish organization (utilization of ESGA)
- (5) Implementation
- (6) Controlling and monitoring the performance
- (7) Management review
- (8) Standardization and Dissemination

Each step will be explained in this order as below:

(1) Top Management Commitment

It is the most important for the success of Energy Conservation activities within companies or factories to have clear and official commitment of top management – either the corporate top (senior) management or factory managers. The top (senior) management shall announce explicit commitment to the Energy Management (or Energy Conservation) and behave along this line – for example, participate in EC (Energy Conservation) events and encourage the people there for EC promotion. This Handbook is primarily meant for Energy Managers for the use of EC promotion within factories, on the assumption that top management has already committed to that. However, there may be cases where top management would learn about Energy Management (or Energy Conservation) by this Handbook, or Energy Managers would make efforts to persuade top management to support or commit to Energy Management (or Energy Conservation) with the help of this Handbook.

(2) Assignment of Energy Manager

In some countries, where the EC Promotion Act is in force, the designated factories have obligation of assigning PREs. In case of Thailand, a new training center was constructed to support the new system of assigning and training Energy Managers under the law.

In relation to Energy Management, however, the word “Energy Managers” is here used as a Manager or a Coordinator, separate from the above-said legal obligation, who works exclusively for Energy Management (or Energy Conservation) purposes, ranging from gathering energy-related information to drafting EC plans/programs and promoting or coordinating during implementation. To the proper Energy

Management, this type of PRE is indispensable. How to position this PRE within the company organization is also an important issue and needs careful decision. In some cases, Energy Committee, with members from the major departments, may be formed to assure the company-wide or factory-wide cooperation. This issue will be explained in Part II, Chapter 3, Organization and Structure.

(3) Understanding the issues

Before trying to make out any future programs or action plans, it is essential for the company or factory management to understand the current situation in a proper and accurate manner. This includes not only the status of their own operation but also other relevant information such as competitors' operation, circumstances around the company and their trend in future, positioning the company itself in the local and global markets, and so on.

The key steps for this purpose are shown below:

① Grasp Current Energy Use

The current data of energy consumption shall be obtained by measurement, calculation or estimation for the individual operation units (energy cost centers) with classification of kinds of energy (fuels types, utility types, etc.). The data shall be gathered regularly and arranged/summarized daily, weekly, monthly, by seasons or annually. Then the data shall be checked for the past historical trend and interpreted with relation to operational modes and production scales. That shall also be utilized for the forecast of future trends. More details of the data gathering are explained in Part III, Implementation Steps of Energy Conservation.

② Identify Management Strength and Weakness

Then the data shall be compared with the best practice data or benchmarks in the industry. If such reference data are hardly available, the historical data of their own operation and estimated data for the competitors would be utilized for this purpose. At the same time, the strength and the weakness of the company shall be evaluated considering the competitors' situations in the local and global markets. This would serve the purpose of making out a realistic Energy Management plan later.

③ Analyze stakeholder needs

Stakeholders are top (and senior) management, middle managers, staff/engineers and workers/operators. Other stakeholders in the normal sense, such as the shareholders and lenders, need not be included here. The needs and intention of those stakeholders shall be summarized and taken into consideration.

④ Anticipate barriers to implement

Making out a realistic and practical program also needs consideration of

anticipated barriers for the implementation of Energy Management program or action plan. Some possible examples of such barriers are:

- Insufficient understanding and support by top management
- Insufficient understanding and cooperation of managers within factories
- Insufficient awareness of people to get successful results
- Insufficient capability of people due to lack of training
- Insufficient available technology due to lack of information
- Insufficient availability of manpower for EC activities within factories
- Insufficient budget for EC activities due to the company's financial status

⑤ Estimate the future trend

The future trend of energy supply-demand balance is estimated based on checking and analysis of the historical data. That data of future trend would also be a basis of the program of good Energy Management.

(4) Plan and Organization

Based on the aforesaid understanding of the current status and position of the company, with the strength/weakness analysis and other relevant information, the following steps are taken to get a good Energy Management (or Energy Conservation) plan/program.

① Develop a policy statement

It is desired that the top (senior) management announces the "Energy Policy Statement". This is very effective to let people inside and outside the company clearly know the management's commitment to Energy Management (or Energy Conservation). The format of the energy policy statement is various, but it usually includes the goal or objective of the company and the more concrete targets in the field of Energy Management (or Energy Conservation). It often shows the major measures and timetables. The statement shall match the company's mission statement or overall management strategy plan.

② Set targets

The targets shall be concrete and specific so that everyone can understand it.

③ Make out a plan/program

The plan/program shall be realistic, practical and attainable with due consideration of many related elements and management resources of the company or factory. It also shall be expressed in terms of the measurable or quantifiable parameters. It usually include a lot of managerial measures of Energy Management (or Energy Conservation) promotion activities such as motivation techniques, means to improve awareness, training, and so on.

④ Establish organization

The organization shall be modified in an appropriate manner to attain the objective by using a PRE, a committee, or other organizational means. (The issue of organization would be explained in more details in Part II, Chapter 3.)

(5) Implementation

The organizational force established in the said planning step shall be utilized fully to ensure smooth implementation of the program. PRE and/or the committee shall continue working to promote the activities and report to top management on the status quo. This issue is explained in more details in Part III, Implementation of Energy Conservation Project.

(6) Controlling and Monitoring the Performance

The actual records of implementation shall be closely watched and monitored. If some problems arise, or some variance between the planned figure and the actual record is observed, then necessary actions shall be taken immediately.

(7) Management Review

After the program is completed, the report shall be submitted to the top (senior) management. The results shall be assessed and analyzed for any good and bad points. The lesson shall be utilized as a feedback in the subsequent plan/program. Thus the activities are repeated to form a cyclic movement.

(8) Standardization and Dissemination

The successful results and the lessons learned are to be arranged into the standard form which can be easily utilized by anyone in the factory. The standardized documents or information are to be disseminated all over the company.

As mentioned earlier, more details of how to implement each step are explained in the following chapters.

Chapter 2 Policy and Planning

2.1 Planning

Good Planning is a basis and starting point of the “Energy Conservation by Participation”. The essential elements for the purpose are as follows:

- Strategic goals only achieved if driven by day-to-day actions.
- Focusing on action plans starts with developing an energy policy.
- Setting objectives and targets.

- Preparing detailed action plans.
- Allocating management resources.
- Utilizing ESGA (Effective Small Group Activities)

2.2 Energy Policy

There are five attributes of a successful energy policy as shown below:

- (1) Commitment;
Personal message from top management with a commitment with a regular policy review.
- (2) Thrust;
A new and challenging dimension to energy and environment.
- (3) Applicability;
Directive on which parts of the organization are covered by the policy.
- (4) Implementation;
Guidance on how the policy objectives are to be met.
- (5) Review;
How an organization knows goals have been achieved.

To make out a good energy policy, the top (or senior) management shall convey his/her commitment clearly to others and the expected performance standards shall be set out.

2.3 Objectives and Targets

The important factors of the objectives and targets are as follows:

- (1) Setting objectives and targets
 - Objectives can be almost the same as the policy or may have to be set locally
 - they express desired outcomes of specific policy commitment.
 - Targets detail performance required to meet objectives, often quantitative
 - must be realistic, meaningful and achievable.
 - Benchmarking may be considered at this stage. This issue is explained in Part III, Chapter 5.
- (2) For each part of the organization.
- (3) Information from the “Understanding” stage.
 - Assess waste reduction targets, costs and returns.
 - Build on management strengths, Identify gaps.
 - Provide incentives for people at all levels.

2.4 Action Plans

Based on the energy policy and the objectives/targets, actions plans shall be made out, consisting of the following:

- (1) Keep the program on track.
- (2) Operate at different levels, but all should
 - Be agreed at appropriate level and “roll up” to the senior manager with overall responsibility for energy.
 - Relate actions to individual objectives and targets.
 - Assign actions to specific individuals, with clear deadlines for reporting & completion.
 - Indicate who is responsible for signing off.
 - Describe the resources available.
 - Facilitate budget negotiations and confirm adequate budget provisions have been made.

2.5 Major Points

The major points explained in the above are summarized as below:

- (1) Draft a policy statement about the 5 key attributes mentioned in 1.2 and have it signed by the head of the organization.

- (2) Draft objectives and targets and have these accepted and approved by senior management.
- (3) Develop action plans and complete a roles and responsibilities matrix.
- (4) Have key people develop individual action plans to guide their day-to-day activities.
- (5) Utilize ESGA (Effective Small Group Activities) as much as possible.
- (6) Establish monitoring procedures.

2.6 Developing an Effective Energy Policy

An effective Energy Policy is developed using the following documents:

- (1) Published policy document
 - Statement policy document
 - Corporate policy, endorsed by board, specifying goals and objectives.
- (2) In- house management documents
 - Strategic plan outlining what has to be done.
 - Management system specifying.
 - / Who is responsible for managing energy.
 - / Reporting and reviewing mechanism.
 - / Who is responsible for implementation.
 - / Milestones and targets.

2.7 Formulating Policy

The policy can be formulated in the following manner:

- (1) Can be a long and detailed process.
- (2) Remember the five key attributes explained in 1.2.
- (3) Syndicate session 1.
 - Draft a policy document containing a CEO statement and company goals and objectives.
 - Use the handouts to pick some long-term goals and medium-term objectives to put into your policy document.
 - Be prepared to present your results to the group and explain why you picked the message, goals and objectives that you did.

2.8 Example: Long-Term Goals

- (1) Commit to responsible energy management.
- (2) Give priority to energy efficiency in investments.
- (3) Promote energy efficiency throughout operations.
- (4) Do every thing economically feasible to reduce consumption.

- (5) Minimize CO₂ emissions.
- (6) Minimize environmental impact.
- (7) Promote the use of sustainable energy resources.
- (8) Use renewable energy wherever possible.

2.9 Example: Medium-Term Objectives

- (1) Create & maintain high profile for energy management.
- (2) Publish corporate energy policy.
- (3) Reduce cost of energy consumption by X% over Y years.
- (4) Monitor and evaluate performance levels.
- (5) Set and publish improvement targets.
- (6) Report performance (improvements) annually.
- (7) Increase staff awareness.
- (8) Motivate staff to save energy.
- (9) Use maximum payback period of 3 – 8 years.
- (10) Nominate employees as departmental energy officers.
- (11) Provide practical advice on energy saving to staff.
- (12) Adopt effective energy procurement policy.
- (13) Establish energy management structure.
- (14) Establish a monitoring & target setting system.
- (15) Provide regular reports on costs and consumption.
- (16) Establish an energy saving budget.
- (17) Invest 1 – 10% of energy spend on efficiency measures.

2.10 Roles & Responsibilities Matrix

The rolls and responsibilities of each member in the organization could be expressed in the form of matrix as shown bellow:

| Function | Director | Mgr A | Mgr B | Asst C | Asst D |
|---|----------|-------|-------|--------|--------|
| Responsible Person | | | | | |
| Measure consumption | (3) | (2) | (1) | | |
| Identify energy cost centers | | (3) | (4) | | |
| Track Performance | | | | | |
| Set target for energy use | | | | | |
| Develop saving programmer | (3) | (2) | (1) | | |
| Inspect equipment | | | | | |
| Select improvement projects | | | | | |
| Allocate budget/resources | | | | | |
| Prepare documentation | | | | | |
| Provide training | | | | | |
| Review new project for EE | | | | | |
| Carry out EE audits | | | | | |
| Key: (1): Perform work | | | | | |
| (2): Responsible for week | | | | | |
| (3): Approval authority | | | | | |
| (4): Provide advice (technical support) | | | | | |

2.11 Detailed Action Plans/Major Points

- (1) Break down the policy statement into specific objectives. Identify realistic targets for measuring progress.
- (2) Draw a roles and responsibilities matrix for the organization, including key functions and names of individuals.
- (3) Ensure all key players create their own action plants to guide day-to-day activities.
- (4) Have all action plans agreed and approved through line management.
- (5) In the plans ESGA (Effective Small Group Activities) can be utilized to a full extent. This topic is explained in more detail in Part II, Chapter 3, Principles of small Group Activities for Energy Conservation.

Chapter 3 Organization and Structure for Energy Conservation Promotion

To effectively promote Energy Conservation by utilizing ESGA (Effective Small Group Activities), it is very important to design and make out the organization carefully to meet the purpose. In practical sense to do that, there may be the following five ways of establishing the organization.

- (1) Use TPM Organization for ENERGY MANAGEMENT purpose
- (2) Use TQM Organization for ENERGY MANAGEMENT purpose
- (3) Use both TQM and Employee Suggestion System for Energy Conservation purpose
- (4) Make special organization supported by Employee Suggestion System
- (5) Utilize another organization for the Energy Conservation purpose

Each way listed above is explained briefly below, with some examples actually adopted in some Thai companies

3.1 TPM Organization for TEM purpose

Forming SGA in the framework of TPM is more closely related with the line (or formal) factory organization than the case of TQM. There are opinions that the TPM organization might be the best form of utilizing SGA for the Energy Conservation purpose, because the issue of Energy Conservation could be handled as one of the several “pillars” in the TPM system. However, adopting TPM into a factory means actually putting appreciable amount of manhours into the various work items, and there may be some factories where they find it difficult to introduce TPM method due to lack of manpower. Such factories may be better to look for another way.

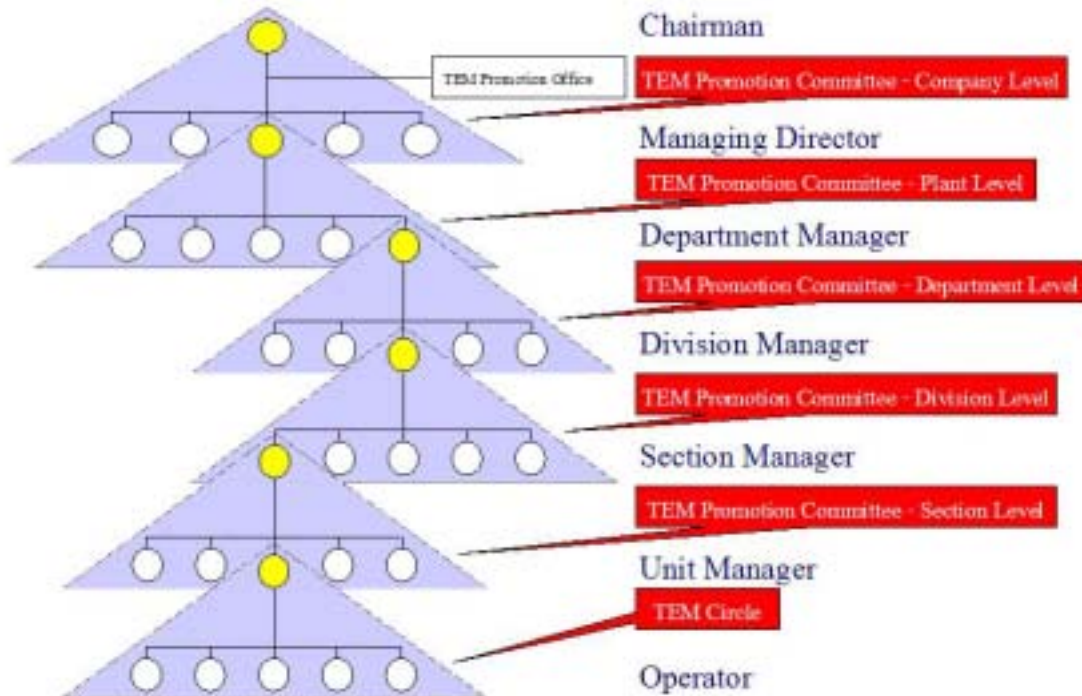
An example of such a “TPM Organization for ENERGY MANAGEMENT purpose” is shown in the following figure and explanation. In this case, “TPM Organization for ENERGY MANAGEMENT purpose” is expressed as “ENERGY MANAGEMENT Organization”, and actually “TPM Organization” is adopted and utilized to solve the Energy Conservation problems as one pillar of several ones.

Example – ENERGY MANAGEMENT Organization (with overlapping small group)

(1) Organization Structure

The Organization Structure of ENERGY MANAGEMENT activities should have overlapping small groups. And ENERGY MANAGEMENT promotion committees should be established in all organization levels company wide, that is in the level of company, plant, department, division and section level, including promotion offices of each committee called ENERGY MANAGEMENT promotion office or ENERGY MANAGEMENT office. In each ENERGY MANAGEMENT office will have permanent responsible persons.

The organization structure with overlapping small group (ENERGY MANAGEMENT Circle) will provide efficiency and effectiveness for internal communication and administration of activities.



Example of Overlapping Small Group Organization Structure (ENERGY MANAGEMENT Circle)

- (2) Role and responsibility of small group in each organization level
 - ① Role and responsibility of ENERGY MANAGEMENT promotion office
 - a. Ensure the overall ENERGY MANAGEMENT activities of each level are in the same right directions and not delayed.
 - b. Promote ENERGY MANAGEMENT activities and make them run smoother.
 - c. Provide appropriate guidance and methods to continually promote ENERGY MANAGEMENT activities with non-stop.
 - d. Listen for ideas and suggestions from small groups, consider for improvement of ENERGY MANAGEMENT promotion.
 - e. Provide appropriate advises in running ENERGY MANAGEMENT activities for small groups.
 - f. Maintain good human relation, friendly reaction and service mind.
 - ② Role and responsibility of top management
 - a. Establish company policy and target for ENERGY MANAGEMENT

- activities.
 - b. Follow up and ensure ENERGY MANAGEMENT activities are in line with policy.
 - c. Consider ideas and suggestions from ENERGY MANAGEMENT promotion offices.
 - d. Consider reports from ENERGY MANAGEMENT promotion committees.
- ③ Role and responsibility of middle management
- a. Establish ENERGY MANAGEMENT policy and target for responsible department, division or section in line with the company policy.
 - b. Establish numerical targets for each ENERGY MANAGEMENT circle by breaking down from company target.
 - c. Establish topics to be improved and set appropriate members responsible for each topic.
 - d. Follow up, advice, recommend and provide help for ENERGY MANAGEMENT circle activities.
 - e. Periodically report to upper committee the progress, comments and suggestions of ENERGY MANAGEMENT circle activities.
- ④ Role and responsibility of ENERGY MANAGEMENT circle
- Run ENERGY MANAGEMENT circle activities in the assigned topic successfully.
- Periodically report to upper committee the progress and problems occurred.
- Ask upper committee for help and provide suggestions and ideas in promotion of ENERGY MANAGEMENT activities.
- ⑤ Role and responsibility of small group leader/ ENERGY MANAGEMENT circle leader
- a. Provide each member opportunity to fully express their unlimited potentials.
 - b. Create system that promotes cooperation among members.
 - c. Provide each member necessary appropriate training.
 - d. Promote “want to work” feeling of each member.
 - e. Provide appropriate atmosphere, environment and work place suitable for working.
 - f. Continually check and promote working ability, “want to work” feeling and appropriate working environment.
 - g. Discuss with managers/ group leaders or other units for making success small group activities.

Group Success

= Potential X Human Relation X Enthusiasm

= Working Ability X “Want to Work” Feeling X Appropriate Working Atmosphere

3.2 TQM Organization for Energy Conservation purpose

This may also be a popular way of utilizing SGA for the Energy Conservation purpose, for there are a growing number of factories who carry out TQM (or QCC activities). TQM utilizes SG called “QC circles” (QCC), and the system can tackle problems in various fields and Energy Conservation can be one of them. Furthermore, TQM may be easier to introduce than TPM. The basic method can be covered by the subsequent section which deals with the third way of using the both TQC and Suggestion System, so please refer to the Section 2.3 for further details.

3.3 Both TQM and Suggestion System for Energy Conservation purpose

A good example of a Thai company factory utilizes both TQM method and Employee Suggestion System at the same time to solve the Energy Conservation problems. The both systems have the management policy, the committee, rules for operation/management, and so on. For details, please refer to the attachment put at the end of this Part II.

3.4 Energy Conservation Organization and Suggestion System for Energy Conservation purpose

There have been many factories in Japan where the both (special) Energy Conservation Organization and Employee Suggestion System are used in parallel. The Energy Conservation Organization has the following features:

- (1) Factory Manager clearly announces the Energy Management Policy and commit himself to Energy Conservation activities.
- (2) An Energy Conservation Committee is formed. Chairman of the committee is Factory Manager. Other members are department managers, and some section managers such as utility section manager, operation control manager, etc.
- (3) secretary of the committee is assigned. In many cases this person is a Energy Manager (Energy Manager in the Japanese system, a bit different from other countries).
- (4) Under the direction of chairman, the secretary (called EM hereinafter) makes out a draft of a one-year program including routine and special events.
- (5) In February every year, METI (Ministry of Economics, Trade and Industry of Japan) encourages many factories to hold an event including seminars, commendation ceremonies, etc. The committee plays an important role on that occasion.

Employee Suggestion System is carried out at the same time.

3.5 Utilize other organization for the Energy Conservation purpose

There may be another way, which utilizes an already existing organization for promoting the Energy Conservation, instead of forming a new organization. An example of such an organization is Safety Committee, which is obligated by law to form in factories.

Chapter 4 Principles and Methods of Small Group Activities for Energy Management

4.1 Principles of Small Group Activities (SGA) for Energy Management

One of the features of this Handbook is utilization of SGA (Small Group Activities) for the purpose of Energy Conservation. This chapter deals with the topic of “Energy Conservation by Participation of all the members”, or how to utilize SGA (or ESGA as already explained previously) for the purpose of Energy Conservation.

There have been many management tools proposed and carried out on how to utilize the capability of all the members within organizations, because the fruits of all the members working together toward one and the same objective are much bigger than the sum of the individual fruits of members working separately.

The typical successful methods or techniques in that category of management tools are TQM and TPM. Other methods or techniques in the category include Employee Suggestion System, ZD (Zero Defect) movement, KAIZEN, and so on.

As explained in Chapter 2 (Organization Structure for Energy Conservation Promotion), there are many ways of using these tools, separately or in combination, to promote Energy Conservation.

In this chapter, principles of forming and utilizing SG (Small Group) are explained mainly based on the TQM techniques. The purpose of SG activities is expressed in a general terms, because the technique can be used for various management purposes including Energy Conservation.

4.1.1 Principles of Energy Conservation promotion by participation by everyone

(1) Management cycle

As shown in below, the management cycle consists of four steps.

- Plan
- Do
- Check
- Act

Until the process achieves its objectives, the cycle is repeatedly rotated while each step is observed attentively. Commonly, people say “rotate the management cycle” or “the PDCA cycle” using its acronym.

The following explains the management cycle in more detail:

- Establish the objectives and targets for improvement.
- Determine the process and methods for achieving the objectives.

| | |
|-------|--|
| Plan | (Standardization: technical standards, operational standards, Procedures, guidelines, manuals, etc.) - Predict and prevent troubles beforehand. |
| Do | - Educate and train employees. - Implement the plans. |
| Check | - Compare the results against the targets. - When the results fall short, examine the causes. - Take immediate measures. - Analyze the process and identify the root causes and develop |
| Act | - Permanent measures (prevention of recurrence, prevention by prediction) - Revise the standards. |

“Process control” is the name used for the quality control activity that is carried out by rotating the management cycle. Process control strives for controlling and improving work processes and procedures so as to obtain desirable results.



“Prevention of recurrence” refers to activities that prevent problems from recurring by analyzing the probable causes of the problems, identifying the root causes, and removing them. “Prevention by prediction” are activities that predict and prevent problems before they occur.

A key to both prevention of recurrence and prevention by prediction is to nail down the root causes of the problems so as to improve the work processes and procedures.

(2) Management by Fact

Small Group activity encourage their members to discuss, think, and judge necessary matters based on the facts and data. Data refers to the results obtained by measuring or observing a fact and comes in various forms such as numerical values, language data, drawings, and pictures.

Without confirming the facts and collecting data, people often make judgments based solely on their experience, intuition, and gut feeling. On the other hand, the scientific way of thinking relies on the facts and data. Main points include the following:

- Observe actual items and symptoms on the spot.
- Show the observed results in data.
- Think about causes and effects while separating the two.
- Prioritize.
- Pay attention to variability when assessing the situation.
- Stratify and analyze data completely.

4.1.2 Planning and implementation of SGA (Small Group Activities)

- (1) Administration of Small Groups and solving Energy Conservation problems
- (2) Formation of Small Groups (belonging to the same section, having the same functional skill, depending on the individual problems, acting by fixed members, and so on)
- (3) Definition of functions of each group member
- (4) Setting the target and the annual program
- (5) Preparation for Small Group meetings
- (6) Administration of Small Group meetings
- (7) Follow-up of Small Group meetings
- (8) Summarizing lessons from problems tackled by Small Groups
- (9) Reporting and presentation of the problems solved

4.1.3 Activation of SGA (Attractive Small Group Activity)

Recognition of “Attractive” depends on where he/she stands.

For Leader/member, where they extend their ability is attractive.

On the other hand, Management expect to develop human recourses.

Manager must improve their workplace and make results.

Effective Small Group Activity means the activity that is attractive for all interested party.

- (1) SGA attractive for leaders and members

For Small Group leader/member, attractive Small Group Activity start from sense of accomplishment in what way it is. For instance, Some improvement “kaizen” that prove themselves and get recognition of superior, they will have incentive to challenge next.

For this, they start to master new Energy Conservation technology and skill.

Attractive Small Group Activity brings out their newly acquired skill, and it brings glad.



Key word

- 1, exertion of ability
- 2, achieve recognition
- 3, skill up



(2) SGA attractive for managers

Mission of Manager is achieving Energy Conservation Objectives and Targets that is deployed from Organization Policy.

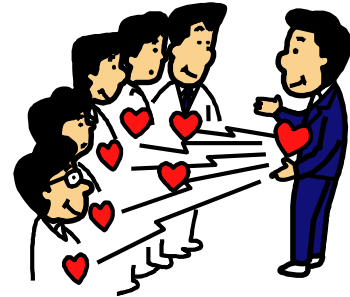
For this, they need to continue improvement and management of their site.

In former years, Managing is the manager's job, and that employees are expected to follow the manager's instructions.

To achieve Energy Conservation mission, the participation of all people concerned -not only managers but also first-line workers- required.

The managers do not have a monopoly on managing; it is, rather, the job of all employees

Then What happens to the manager's roles?



Key word

- 1, mutual understanding of all members
- 2, enjoy accomplishments
- 3, Improvement and Management on an autonomous basis

(3) Small Group's sense of achievements

- ① Challenge
- ② Efforts
- ③ Reflection
- ④ sense of achievements

(4) Function of managers to assure sense of achievements

- ① Motivation
- ② guidance and support
- ③ evaluation
- ④ praising

(5) Importance of setting the target and the program

- (6) Some problems observed in administration of SGA - Japanese top management
 Function of management and managers

Difference between succeeding company and troubled company expressed widely in Japan.

On the other hand, We know a company has made steady efforts and achieved V-shaped recovery.

What is the crisis between succeeded case and troubled case?

Top Managements from Some of Japanese Excellent Companies (eg: TOYOTA, HONDA, NISSAN, NEC, DENSO and so on) gathered in HAKONE to discuss the topics about TQM last December (Dec 2003)

After 2-days Discussion one of Group had presentation about the solution to Mannerism in QCC (Small Group Activity) in Japan.

Here are some of answers from experience in Japanese Companies.

– Key factor for Effective Small Group Activity –

- (1) Top Management's leadership

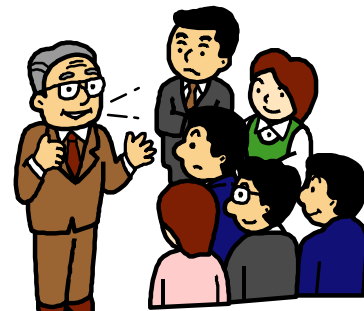
*The more earnest to develop human resource, the more significant result Small Group Activity achieve.

*Top Management should ensure that Small Group Activity is introduced all division.

*Top Management should make clear target of Small Group Activity eg, human resource development, vitalization in workplace, contribution to an Organization's health.

*For Top Management, Participation to Presentation meeting is indispensable.

*Communication should carry out to communicate in workplace.



- (2) Connection between Organization's Policy and Small Group Activity

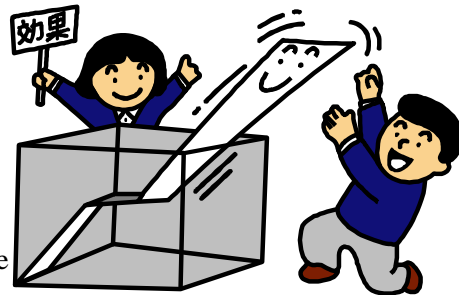
*Theme deployment to have sense of urgency in Organization

*Positioning Small Group Activities in an Organization

*Results of Small Group Activities should be reflected to employee evaluation or career path program.



- (3) Manager's positive measure
- *Manager should regard seriously to develop Human resource.
 - *Not only "Presentation Meeting" but also "Counseling and Training Meeting" should be implemented.
 - *Manager should trust Small Group. Delegation of authority
- (4) Continual and steady Education, Training
- *Performance-based wage system without education and support needless pressure. It makes workplace dissatisfied
 - *Education of Problem solving procedure and Task achieving procedure is indispensable for all employees.
 - *Manager should make clear the competence of Small Group leader
 - *Education to Small Group leaders to manage Small Groups (It includes bringing up next generation leaders)
 - *Framework of ISO9001 Quality Management system should be made use of evaluation for employees
- (5) Sharing system of technical know-how
- *Presentation is not Goal of activity. After presentation, Exchanging comments between Small Group and superior should be held.
 - *Small group's Improvement cases should be deployed to other workplace by Staffs and superior.
- (6) Evaluation to Results
- *Manager should feature the Evaluation that meets purpose of Small Group Activity
 - *Recognition should be decided with not only presentation but daily activity in workplace.



4.2 Method of Implementing Small Group Activities

In order to develop the Small Group Activities (SGA), the following basic method should be established in a company based on the philosophy of “Participation of All Employees” from top management through worker level.

1. Establishment of Infrastructure / Environment for SGA by management
The employer or top management should provide the following with employees.
 - (1) Announcement of policy to support SGA
 - (2) Organization of a task force or a team to motivate and assist SGA
 - (3) Establishment of management system of SGA in a company
 - (4) Establishment of annual plan of action to proceed SGA in the company
 - (5) Establishment of places and opportunities for guidance, presentation of activity results
 - (6) Establishment of the award system for employees' contribution
 - (7) Establishment of a reporting system from registration of a theme through results of activities
 - (8) Establishment of a fair evaluation system
 - (9) Establishment of technical supporting system including educational system for workers

2. Establishment of groups
Consulting with a manager, workers should form groups for SGA. The size of a group depends upon the size of section or group and subject etc. It is very important that each group member shall have rolls to proceed activities under a group leader.

3. Setup of subject for activities
Based on findings of problems / barrier to be improved, under consulting with a manager, each group will setup a subject for their activities. Basically, subjects as follows are not suitable for SGA.
 - Subject technically too difficult
 - Subject expected a long term for activities or manpower beyond a group sizeFor more information how to setup of subject for activities one can consult with the paper entitled “Discover Themes Method” written by Mr. Akira Kobayashi of Buil-Brain Co., Ltd.

4. Setup of basic duration of group activities for SGA
Managers shall set up a basic period for SGA from setting up a subject through completing the report, in accordance with a basic business plan.
Usually, one year or 6 months would be appropriate.

5. Setup of plan of action for each subject by an individual group
Each group should setup a plan of action for activities.

Fig II-4-1 : Circle Activities

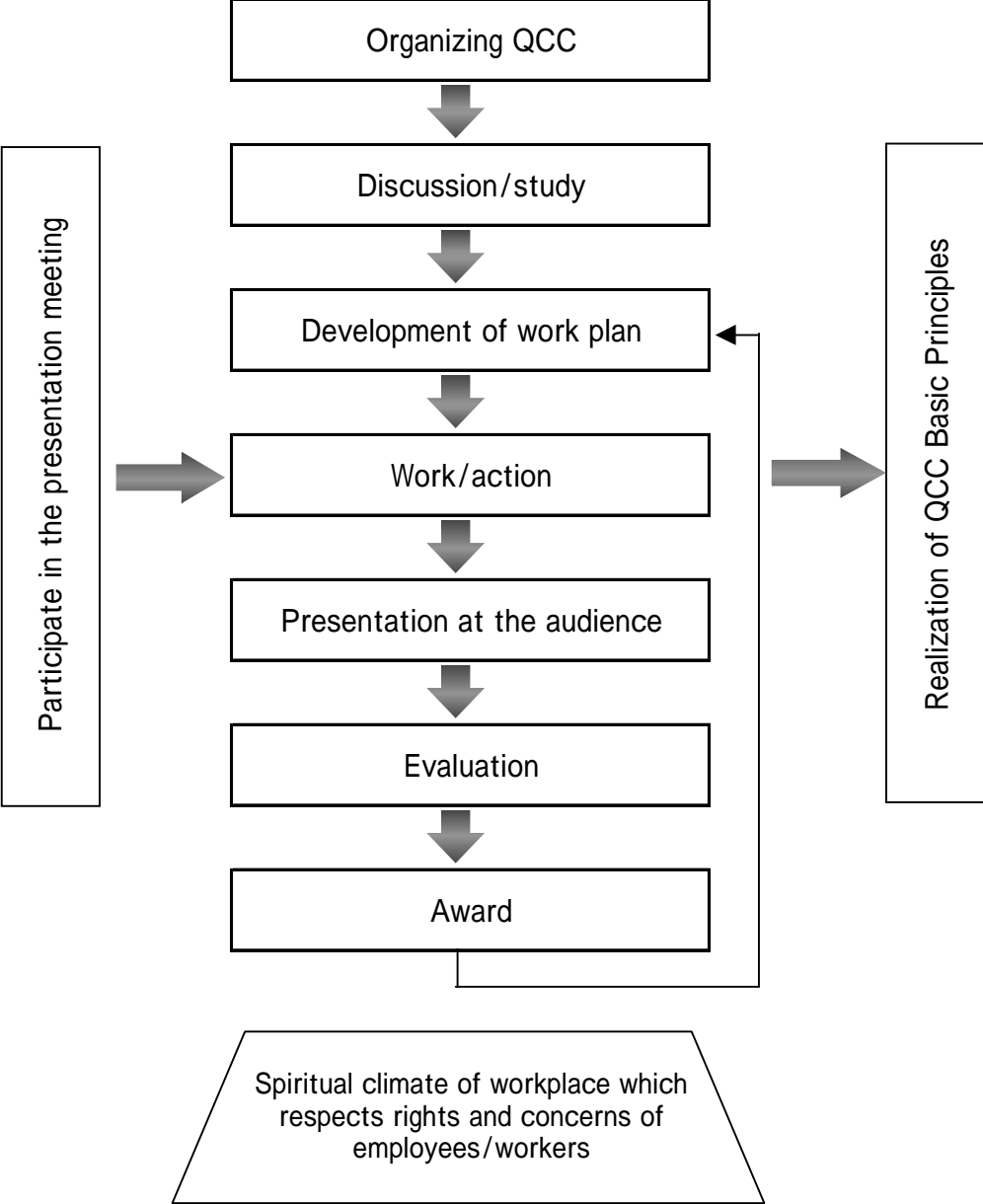
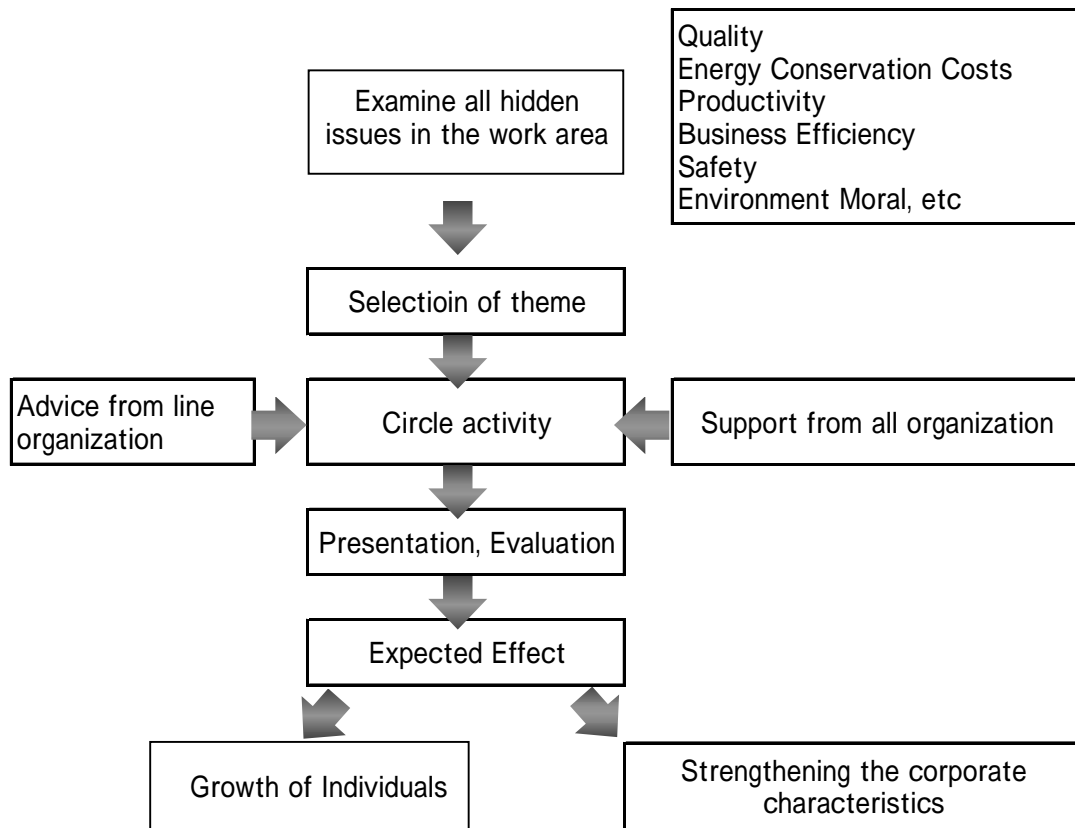


Fig II-4-2 : Outline of QCC (Quality Control Circle) Activities



6. Actual implementation of activities in accordance to the action plan

The actual activities by each group will be implemented in accordance with the basic sequence shown the following figures.

Fig.II-4-3 Basic procedure to Promote Energy Conservation Activities

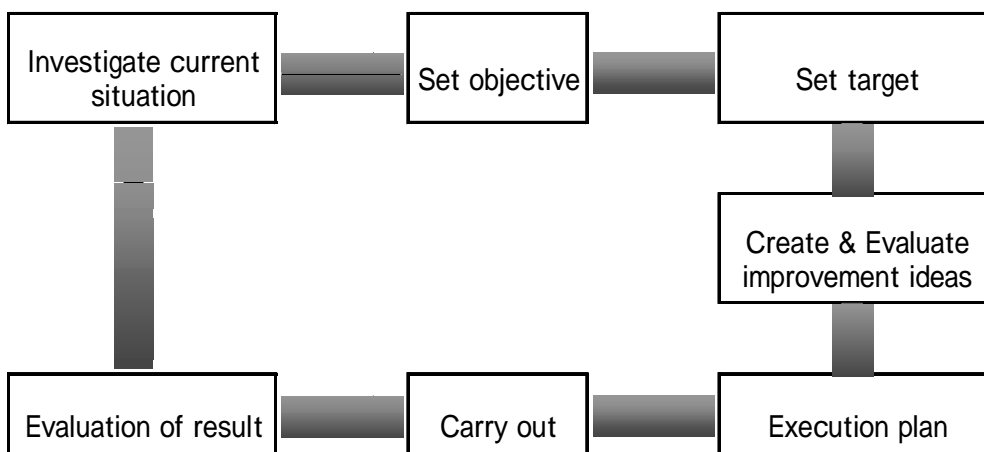
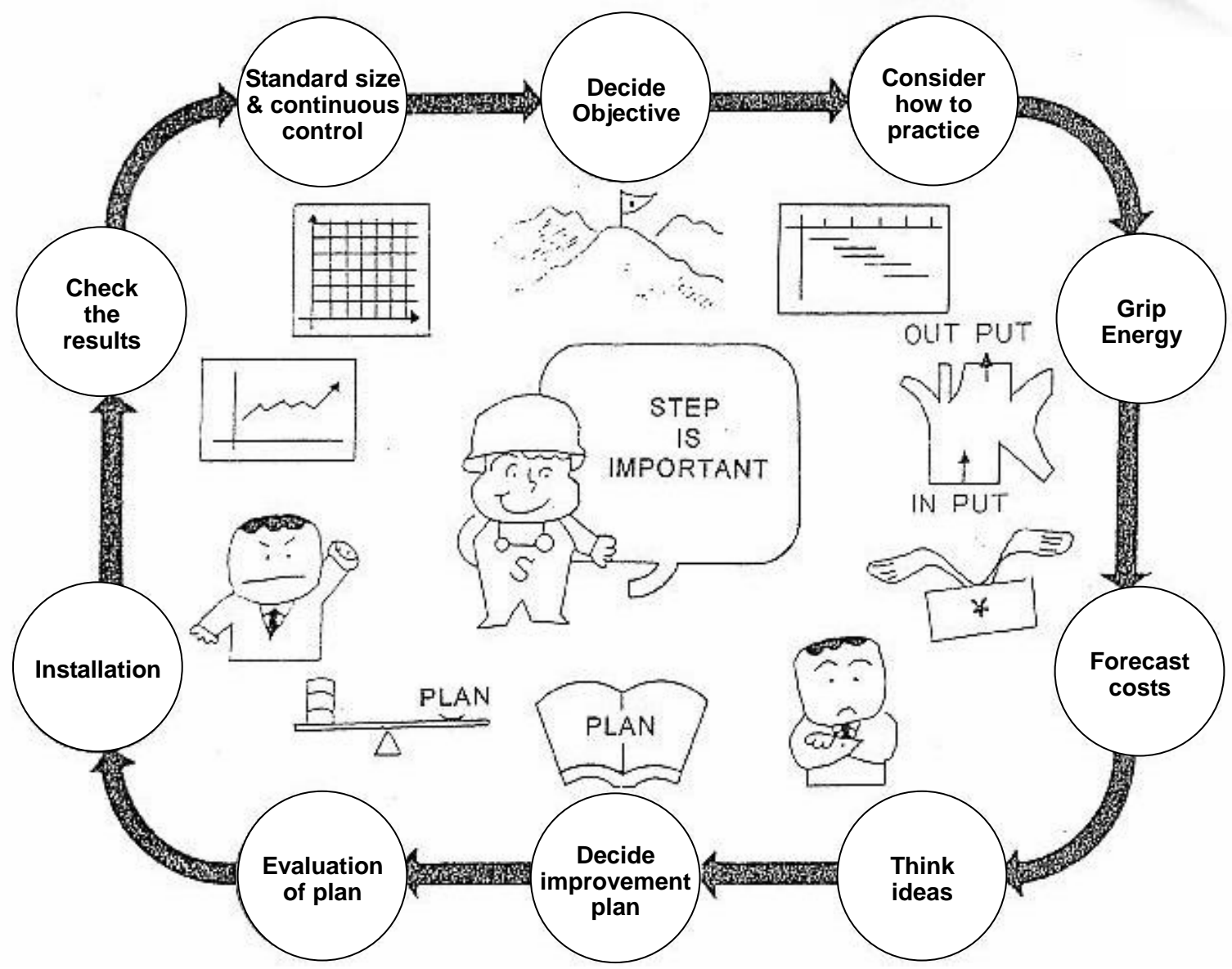


Fig II-4-4. Basic Procedure of Energy Conservation Activities



4.3 Examples of management tools

In this section some techniques or tools that might be useful to the Total Energy Management are summarized as follows :

1) **5s** is a five basic activities required for increasing productivities i.e. **SEIRI**, **SEITON**, **SEISO**, **SEIKETSU**, and **SHITSUKE**

| | | |
|----------|---|--|
| SEIRI | - | Separate utilizing items from unused items |
| | - | Eliminate the unused items and keep the utilizing ones |
| SEITON | - | Keeping the utilizing item orderly at a place where it is convenient for use when needed |
| SEISO | - | Cleaning work places |
| SEIKETSU | - | Maintaining work places to be sanitary |
| SHITSUKE | - | Building habits of employee to sustain 5s |

2) **7 Wastes of Lean** is a waste analysis process to minimize 7 wastes that would not make a profit to the company.

| | | |
|----------------|---|---|
| Deflects | - | Losses due to deflects of products |
| Overproduction | - | Losses due to over production |
| Transportation | - | Losses due to transportation system |
| Waiting | - | Losses due to waste of time in waiting |
| Inventory | - | Losses due to stocks of unnecessary materials |
| Motion | - | Losses due to movement |
| Processing | - | Losses due to inefficient processing |

3) **Activity – Based Costing (ABC)** is a technique to determine actual costs by activity focusing on competitive and profit making ability. The cost estimate would take into account all the costs incurred in the process including waiting cost, delivery waiting cost, reproducing cost, value engineering cost, quality management cost, etc.

4) Checklist is a tool for inspection to ensure major steps or activities have been implemented and not forget.

5) Control chart is one of the 7 QC tools used to control the items to be inspected to be under the area of acceptable range.

6) **5 W' & and 1 H** is a guideline for workers to follow the working procedure.

| | | |
|-------|---|--------------------------|
| Who | - | Who is responsible |
| What | - | What is needed to do |
| Where | - | Where is the place to do |

When - When is needed to do
Why - Why is needed to do
How - How to do

7) Kaizen Suggestion System

This is a Japanese suggestion system that encourage the employee to participate in giving suggestion and getting rewards in return. The rewards are focused on quantity not valuable so that the chances to get rewards are high, resulting in getting many more people to participate.

8) Lean Production System (LPS)

This system is to eliminate all kinds of wastes in the process but to focuses on value added to the process. This is a normal practice in the U.S. automobile industry which is comparable to the Toyota Production System in Japan.

9) Pareto Chart

This is one of the 7 QC tools where main causes and miner causes of a problem are sequentially identified in graph from called Pareto Chart. This technique was developed by J.M. Juran in 1950 using a principle of Vilfredo Pareto, on economist in nineteen century.

10) Plan – Do – Check – Act Cycle

This is a quality improvement cycle consisting of the following steps

- (1) Develop a good Plan
- (2) Do according to the plan
- (3) Check what have done so far is corresponded with the plan
- (4) Act due to the evaluation of results

11) Seven QC Tools

This a 7 basic QC tools used for analyzing work problems based on the data collected and to determine causes or roots of problems that would lead to the solutions for improvement. The tools include.

- (1) Pareto chart
- (2) Cause and effect diagram
- (3) Check sheet
- (4) Histogram
- (5) Control chart
- (6) Scatter diagram
- (7) Graph

12) Preventive Maintenance (PM)

This is a maintenance system to prevent a sudden interruption or shutdown of the

machine during the operation, including installation of machines in right places and maintaining them in good conditions.

13) Productive Maintenance

This is a set of maintenance systems used to prevent a sudden interruption or shutdown of machines during their operation taking into account efficiency and economic factors. The systems include.

- Breakdown maintenance
- Preventive maintenance
- Corrective maintenance
- Maintenance prevention

14) Six big losses

Six most important losses resulting from inefficiency of machines and process are investigated. These include

- Breakdown loss
- Setup and adjustment loss
- Minor stoppage loss
- Speed loss
- Quality defect and rework loss
- Yield loss

15) Total Productive Maintenance (TPM)

This is a small group activities (SGA) based maintenance system that encourage teams set up in all level of the organization working together to find out problems and solutions for work improvement.

16) Total Quality Management (TQM)

This is a total quality management conducted by a group of QC experts in an organization.

17) Toyota Production System (TPS)

This is a production system developed by Toyota Motors Company in Japan. The system would focus on eliminating losses that affect to the production cost and quality of products would be guaranteed for each processing step.

18) Why – Why analysis

This is a problem analysis based on why question until ending with no why question.

4.4 Staff Training

4.4.1 Introduction

Training is the key to staying on track for energy conservation. It is management responsibility to ensure that technical and operating personnel are trained to operate the equipment safely and in a proper manner. Effective training is not accomplished in a single whirlwind session that once completed, may be quickly forgotten. Training must be thorough and continuous to help not only to inform but also to change attitudes. Top management must give proper support to its Energy Committee, and to the Energy Manager in the form of training. Training allows the staff to explore new ideas, interchange them with experts and with other trainee participants, and feel more comfortable with the role they must fulfill. In turn, trained technical and management staff should be encouraged to provide in-house training to operating and lower level technical staff.

Staff training is the primary tool by which awareness is generated and knowledge is transmitted. As part of the Total Energy Management program, management needs to address two major areas for employee training:

- (1) Training to develop new skills in technologies
 - In-house Training
 - Outside Training and study Tour
 - Overseas Training

- (2) Training to adopt new attitudes towards energy wastage and reduction of waste.

The introduction of new technologies, process equipment, operating and maintenance procedures and energy documentation methods requires training at many levels. There is a need to train new as well as experienced personnel in energy efficient operation of company facilities. The need for training in each should be reviewed periodically to assure that all new personnel are properly trained and to refresh the skills of existing personnel. The Staff training is typically at three levels:

- Management
- Engineering/Technical/Supervisory
- Operators.

And following topics are some guidelines to train all energy conservation staffs;

- Awareness on Energy conservation
- TPM and TQM concept

- Electric System
- Thermal System
- Production Process
- Reduction of Loss
- Maintenance
- Data Recording & Summary
- Report
- Evaluation
- etc.

Finally, the ultimate target of the energy conservation training are;

- We can never stop learning or training unless we stop working
- Creativity is not just a natural talent, it is also a skill that everyone can develop and learn more.

4.4.2 Developing steps of the training program, there are 6 steps as the following;

- (1) Analysis for the training needs
- (2) Develop the objective of the training
- (3) Specify the matrix of the training
- (4) Select the suitable training method
- (5) Implementing the training
- (6) Evaluate the training

(1) Analysis for the Training Needs

- Concept
- Objective
- Target group
- Contents
- Trainer
- Plan
- Venue and equipment

(2) Develop the objective of the training

- The right and concise objective of the training is an important for the training on energy conservation.
- The good objective will be a good guideline for the trainers on developing the matrix and a training method.
- The objective of the training will guide to the trainees what they should learn and acknowledge after the training.

- (3) Specify the matrix of the training
 - Matrix of the training must cover and reflect everything that the trainees have to know.
 - A clear matrix will help specifying duration for the training.
- (4) Select the suitable training method
 - Presentation
 - Case Studies
 - Practice Cases
 - Workshop
 - Discussion
 - Demonstration
 - Coaching
 - On the job training
- (5) Implementing the training
 - Prepare venue (classroom, theater, U – shape, I – shape, etc.)
 - Prepare training documents (copies, bags, files, etc.)
 - Prepare coffee breaks and meals
 - Confirm participants, (Top management, trainers, trainees, etc.)
 - Prepare evaluation forms
 - Prepare training equipments (computers, LCD, notebooks, calculators, whiteboard, flipchart, pen, etc.)
 - Prepare certificates
- (6) Evaluate the training
 - For the content and matrix (relevant or none)
 - For the method of the training
 - For the objective (support to the requirement or not)
 - For the trainers
 - For the acknowledge or benefit (progress or none)
 - For the venue and facilities of the training
 - For the Outcome (After Training in some duration to follow up)

4.4.3 Management Training

Sufficient awareness should exist in management to treat energy as a resource that needs to be managed. All too often, managers looking to increase company profits concentrate on increasing production and not on reducing costs. Through training and information management can not only acquire the insight into efficient energy utilization but also

provide guidance, motivation and encouragement to the company staff. In this manual an outline for a comprehensive energy management strategy has been presented. A number of courses are now being offered by public and private sector companies to train people in energy management.

4.4.4 Engineers and Supervisors Training

In most industries and building facilities, engineers, higher-level technicians and supervisors are the on-line decision-makers, accountable to the senior level managers. They are usually the most interested and willing, as well as the most capable of understanding the technical (as well as the managerial) concepts of energy conservation.

It is important to consider broader training for technical personnel, even across disciplines. For example, a mechanical engineer could well be sent to participate in an electrical energy seminar, since much of the mechanical equipment he operates and maintains uses electricity. Similarly, a boiler operator may be sent to a course in steam systems efficiency: boiler room steam may be used for fuel preheating, condensate returns to the boiler, steam may be used for feed water preheating, and so on.

Technical staffs have the major role to play in operator training, and therefore need to be trained first.

Training technical-level staff will not only help ensure training of the operators and workers, but also encourage this staff to prepare and present interesting and cost-effective energy conservation proposals to the senior management.

It is important to note that from a personnel development policy, training is an extremely significant activity. Most companies know that the best future managers are those with the widest experience and broadest perspectives. At the same time, the technical staffs themselves know that training is important, they desire to learn more, and also see training as a strong motivational factor in their work.

4.4.5 Operator Training

The operator generally decides how he will operate the facility to accomplish the ends set by or for him. His decisions or ability have a most direct influence on savings or costs. Depending on the operators' skill, an investment in education and training can produce the greatest benefit rate of all. Poorly skilled, careless, or incompetent operators will degrade benefits. Competency is needed and must be produced by training and retraining.

They have learnt their skills by on-the-job training over several years. Short seminars or

workshops in operating specific equipment more efficiently need to be reinforced by supervisors to ensure that training given during the short courses or workshops is fully absorbed by the operating personnel.

The operator must also be made aware of the reasons for operating the equipment in a particular (energy efficient) manner. They must know the importance and use of the data they are required to collect. Energy conservation programs may not be successful if operators are not educated, kept informed, motivated and properly trained. They more than anyone, may determine success or failure.

4.4.6 Internal Training

For in-house courses or training programs, the same comments made in the preceding section apply. In these courses, company management has additional control that should be exercised. The course instructors are usually from within the company.

Management should be careful in selecting these persons, for not everyone is good at training or teaching. In this case, evaluation of the courses, even if informal, is very important. While some persons may be better at classroom training and teaching, others may be much more effective at on-the-job or hands-on training programs. Management should be aware of the different capabilities of their staff, and assign them tasks accordingly. Following Table can be used for training record for each trainee.

| No. | Training Topics | Trainee | Year 2007 | | | | | | | | | | | |
|-----|-----------------|---------|-----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| | | | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| 1 | Awareness | | Δ | | | | | | | | | | | |
| 2 | | | | Δ | | | | | | | | | | |
| 3 | | | | | Δ | | | | | | | | | |

Chapter 5 Building Employee Awareness and Motivation

Why do people waste energy in their organization without cares? Listed below are some reasons.

- No concerns in energy cost
- No problems in energy supply and consumption
- Not their duties to save energy
- Daily work load make no time to think about energy savings
- No energy saving policy from top management

Top management or energy manager have to find out how to motivate their people to and owner give cooperation in energy savings, taking into consideration environmental and ecological impact, decreasing in energy reserves, and rising in energy price.

Motivation of people to save energy is a challenge job of an energy manager. And, it is his opportunity to be accepted by the top management if successful.

Principle of motivation

- Allow participation in decisions making
- Let there know problems and reasons
- Admire their work results
- Believe in their responsibilities
- Rewarding when success

Characteristics of energy manager to support motivation of people

- Affable
- Admirable
- Amusing
- Ambitions
- Alert
- Active
- Accessible
- Articulate
- Appreciative
- Accepted

Strategies of motivation

- Understanding in objective and requirement of employee
- To be a good example on energy savings
- Set up a challenge and possible target in energy savings

- Opened mind to listen to anyone's opinion and ready to give them an advice
- Give simple, clear and interesting explanation
- Admire people in any chances

How to get cooperation from the 1st meeting

- Show strong self and team's confidence in success on energy savings
- Make relax meeting atmosphere and allow every one to participate
- Give comprehensive information and gook plan
- Find out what key factors that influence their decision in giving cooperation and try to response to their requirements
- If raising a question and nobody respond, wait until getting an answer, do not self answer

Two ways Communication

- Two ways Communication make understanding and cooperation
- Two ways communications is made for not only motivation but also request
- Two ways communication leads to common understanding and target
- Two ways communication is made for not only data monitoring but also return comments and suggestion

To be successful energy manager should demand not only for data but also for comments of participations. His task is not only to set up a target and plan, announce and request others to follow. Instead, he should persuade all the people concerned to participate in making action plan, make comments and implement according to the plan.

Building morale and encouragement

- Ask what they think or know about energy losses and how to improve
- Agree on objective, target and results of energy audit
- Give incentives, rewards to any responses

Good practices for building awareness and motivation

- Top management paid strong attention to energy conservation, set up and announce energy conservation policy
- Top management support energy conservation team and activities
- Top management gives incentives, rewards or admire to individual or team who succeed in energy conservation projects
- Continuation of energy conservation activities
- Follow up the projects and announce results of energy conservation to all employee
- Make good understanding and coordination among the people concerned

- Try to get participation from all the people concerned in every steps i.e. suggestion, making decision, implementation, follow up and evaluation
- Inform all the key staff of the organization about energy losses and convince them the benefit of energy saving policy. This would draw attention of the remaining staff to participate
- Working group consisting of representatives from each division should encourage and support their staff to implement energy saving measures
- At the end of every month there would be an evaluation energy consumption and energy saved in comparison with that of the past
- Maintain common understandings and prevent from watching mistakes to each other. Instead, follow up of results of implementation should be conducted
- The former employee should be a good example of energy saver for the new comer
- In order to get strong support working group should collect energy saving results and report to the management
- Organize in house training by utilizing inside and outside qualified speakers
- Campaign or connect use of electrical equipment
- PR of energy consumption data and energy savings by posting on a board or through local boast casting
- Organize an energy conservation week with various activities e-g, seminars, exhibitions, contest etc.

Chapter 6 Evaluation of Total Energy Management

6.1 General

Although SGA and TPM are applied in the Total Energy Management (IEM) evaluation of TEM implementation is, however, essential and needed. In the evaluation the following aspects should be taken into consideration:

- 1) Policy of TEM
- 2) Results of implementation
- 3) Comparison of the results with KPI

6.2 Preparation of evaluation form

In order to achieve the objectives given in the policy it is essential to evaluate the results of TEM implementation. An evaluation tool capable of monitoring the results is thus designed as given in Table 5.1. There should be three levels of evaluation as follows:

- 1) Self evaluation – This is an internal evaluation conducted by staff within a section or work unit in every month.
- 2) Section Manager Evaluation – This is an evaluation conducted by a section manager or a division manager who takes care of that section in every three months in order to intensify the evaluation.
- 3) Top Management Evaluation – This is an evaluation conducted by a top management. The evaluation results obtained will be used for personnel evaluation i.e. for annual increment of staff salary or giving bonus.

Table 5.1 Example of evaluation form

| | | | | | | | | | |
|---|--|------|---------|-------------------|--|---------------------|------|-------------|----------------|
| <h1 style="font-size: 2em; margin: 0;">TEM Evaluation Form</h1> | | | | Section : | | Name of Evaluator : | | | |
| | | | | Unit : | | Total rating: | | Pass | Fail |
| | | | | Due Date : | | Passing Criteria | | | |
| Level of Evaluation | | Self | Section | Top management | | | Self | Section mgr | Top Management |
| | | | | Evaluation Date : | | 80% | 65% | 60% | |

| Topics | Place | Items to be evaluated | Rating | | | | Suggestion |
|----------------------|-----------|--|---------------------------------------|---|---|---|------------|
| | | | 4 | 3 | 2 | 1 | |
| 1. Policy and Plan | Objective | 1.1 Is there any PR activities? - Posting policy on PR boards and explain to all employees | | | | | |
| | | 1.2 Is there any action plan according to the policy? - Action plan is made according to the policy | | | | | |
| | | 1.3 Is there any inspections and reviews of improvement measures? - Follow up of the measures implemented | | | | | |
| | | 2. Implementation | 2.1 Record of gasoline filled in cars | | | | |
| | | 2.2 Record of destination and milages | | | | | |
| | | 2.3 Record of A/C operation in working area | | | | | |
| | | 2.4 Setup room temperature between 25 - 28 °C | | | | | |
| | | 2.5 Reduce number of heat sources in the room | | | | | |
| | | 2.6 Prevent outside air flowing into the room | | | | | |
| | | 2.7 Turn off A/C in the unoccupied rooms | | | | | |
| | | 2.8 Prevent direct sun light penetrating the rooms | | | | | |
| | | 2.9 Install individual switches for lighting in specific areas | | | | | |
| | | 2.10 Cleaning light bulbs every month | | | | | |
| 3. Report of results | | 3.1 Display of energy consumption data | | | | | |
| Target & KPI | | 3.2 Reduce electricity consumption by 10 % | | | | | |
| | | 3.3 Reduce oil consumption by 10 % | | | | | |
| Definition of Rating | 4 = | Able to reduce energy consumption by 10 % or more | | | | | |
| | 3 = | Able to reduce energy consumption by 7.5 % but < 10 % | | | | | |
| | 2 = | Able to reduce energy consumption by 5 % but < 7.5 % | | | | | |
| | 1 = | Able to reduce energy consumption by 2.5 % but < 5 % | | | | | |
| Total rating | | | | | | | |
| Other suggestions : | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

6.3 Key Performance Index for Personnel Evaluation

In order to get cooperation and participations in TEM or other activities of the company Key Performance Index (KPI) relate to each activity must be given for personnel evaluation for annual increment of salary or giving bonus in all staff level e.g., factory manager, department manager, section manager, supervisor and operating staff.

Weighting for each KPI would depend on agreement in each organization.

Part III

Implementation of Energy Conservation Projects

Chapter 1 Procedures of Energy Audit

1.1 Introduction

In order to effectively promote energy conservation activities key steps approach is needed to apply. This is presented in more details in this Chapter.

In implementation of any energy conservation projects energy audit should be firstly conducted in order to determine the present energy situation and problems which would lead to the identification of improvement measures. And the data collected can be used as a reference throughout the project duration.

Energy audit could be conducted by using outside consultant or internal technical staff. One of the main objectives of this handbook is to guide the user how to conduct self energy audit without relying on outside consultants.

1.2 Purposes of Energy Audit

Energy audit is implemented for following purposes;

- Find realistic energy savings
- Create important information, new ideas
- Define cost effective project
- Prepare action plans
- Gather ammunition to help get approval
- Develop staff training programs

1.3 Main Stages of Energy Audit

Energy audit includes seven important stages which are seen below;

- Data collection and analysis
- Site investigations
- Conduct cost/benefit analysis
- Prepare a concise report
- Present the result to management
- Action plan for project implementation
- Follow up monitoring to prove results

(1) Data collection and Analysis

Following data below are collected and analyzed;

- Historical information on utilities unit consumption. (Energy intensity) (toe/ton-product)
- Comparison with standard/Industrial best, average.
- Production data for industrial plants to find out operation improvement opportunities.
- Cost (tariff) analysis.

The data can be collected in an efficient way with the comprehensive form of questionnaire or information format. This kind of form can be used both in the case of internal energy audit and outside consultants' audit.

Actual energy consumption in terms of fuel, electricity and water, etc. can be obtained either through:

- Measurement
- Calculation; or
- Heat and material balances.

The best way is through measurement. This may not always be possible due to poor metering or the measuring point may not be inaccessible.

Detailed explanation is made in latter part.

(2) Site Investigations

Procedures of Site Investigation normally includes following stages;

- Find major energy users.
- Conduct site tests.
(Conducting measurement and test works in the factory in order to collect all data on energy consumption and energy efficiency.)
- Install energy monitoring where required to assess opportunities and to identify energy waste.
- Discuss operations with site personnel, often they will know the energy use problems.

In order to conduct site investigations and site tests, the measuring instruments as shown below are necessary.

- Portable data logger to monitor energy use with analog and digital signals input capability.
- Digital thermometer, Infrared thermometer, Thermo-Hygrometer.
- Clip-on power meter, current meter, power factor meter, Demand profile meter.
- Combustion analyzer, O₂ analyzer.
- Ultrasonic flow meter, Ultrasonic leak checker etc.

In order to facilitate determining energy saving potentials, two major opportunities,

Fuel saving and Electricity saving are considered;

Fuel Saving;

- Enhancement of heat insulation
- Combustion improvement.
- Waste heat recovery.
- Reduction of waste heat.
- Efficiency increase in energy use.

Electricity Saving;

- Electricity demand control to reduce electricity costs.
- Power factor correction to reduce electrical demand and improve electrical distribution capacity.
- Reduce compressed air waste by minimizing air leaks, and isolation valves.
- Variable speed drives for fans and pumps to reduce energy loss due to valve throttling.
- Pump impeller trimming.
- Lighting replacement for more efficient lamps.
- Lighting control.

By well consideration of the operation and schedule management, energy saving becomes possible.

- **Good Housekeeping (As first priority).**
- Re-scheduling operations to occur during low cost energy period.
- Reducing rework or production wastes.
- Maintaining equipment correctly and promptly.
- Reducing delay times between processes particularly those involving heating/cooling.
- Improving control systems to ensure production quality targets are maintained.
- Improving the process; and
- Installing new technology.

The management would consider the simple low cost improvements first and only think about new equipment after all other improvements have been undertaken. Cheapest and easiest measures to implement should be first implemented.

- (3) Cost and Benefits Analysis when conducting Feasibility study on energy saving projects, cost and benefits analysis are essential;
- Assess both technical and economical feasibility.
 - Obtain supplier information and budget pricing as required.

- Process monitoring to assess saving potential.
- Use company financial evaluation criteria.
- Calculate return on investment, payback.

As next step, it is necessary to prepare the Strategy for implementation. In general, **no-cost or low-cost measures should be, of course, implemented first.**

To consider Priority of the energy conservation projects, one can grade the potential projects under the following headings:

| Title | Cost | Expected annual saving | Payback (years) | Effort required (man days) | Proposed start date | Outside help needed (Y/N) |
|-------|------|------------------------|-----------------|----------------------------|---------------------|---------------------------|
|-------|------|------------------------|-----------------|----------------------------|---------------------|---------------------------|

Detailed Analysis of Energy Conservation Potentialities or Measures:

A typical energy study report has to include all energy conservation opportunities, potential energy saving measures which could be obtained from opportunities, and an efficient summary table which shows an analysis of investment costs of these opportunities. A good report also has to include an analysis and detailed description of every measures in order to make the best possible information available for the management and thus to allow the management of the company to make appropriate decisions on the implementation. In addition to the possible risks analysis which is importance in the project implementation, the equipment expenditures has to be estimated with high accuracy as well.

(4) Preparation of concise report

After following works,

- Collection of basic energy consumption and production data, and determination of specific energy consumption where available,
- Conducting measurement and test works in the factory in order to collect all data on energy consumption and energy efficiency
- Calculation of energy balance and energy efficiency for the important equipment and processes in the factory;

a concise feasibility report must be prepared to express outline of project and feasibility and to convince their management.

Report must generally include following item;

- List of areas in need of improvement with priority Background information on the Plant

- Energy usage, details of energy consumption in machinery and equipment (including Evaluation of problems in gathering data and Necessity of installation of meters and proper maintenance)
- Concrete measures to address the improvement plan (Assessment of energy saving potentials of various measures)
- Proposal with expected benefit and investment and Evaluation of past energy conservation investments.
- Action plan for implementation.
- Evaluation of staff involved in energy production and use, and Staff training plan.
- Developing implementation plan, providing necessary guidance on project implementation.
- Conclusions and recommendations

Appendices shall include

- Details of the energy analysis.
- List of members.

As shown on the above, a good report also should present recommendations on energy conservation and, besides it should also specify the implementation order of these recommendations at the same time. In addition, the report should include some information about how the implementation will be conducted, who will be responsible for implementation and how long will the implementation take.

(5) Staff Training.

Staff training in Energy audit is important object. Through Energy audit, staffs are educated and trained. Training of staffs is conducted in various stages:

- On-going training while doing the audit.
- Energy awareness training through presentations and meetings
- Energy conservation training for staff.
- Technology updates for engineers.

Detailed explanation on staff training is stated in the latter parts.

(6) Presentation of the results to management

To persuade a company management, several considerations may be taken as follows;

- Persuasive Information to management.
- Pilot or demonstration projects to prove concept.
- Outside assistance
- Examples of energy savings achieved by similar industries.

As the management and managers who are the decision-makers, you must convince

them that the projects are viable.

(7) Action Plan for Project Implementation

Determination of the energy conservation potentialities that require capital investment specification of the equipment which are subject to replacement, quality improvement and the additional equipment to be provided; and recommendation regarding those equipment. In addition, calculation of the cash equivalent of the energy to be saved and the cost of investment. New equipment to be provided should be taken into account in following points:

- Equipment specifications.
- Specific instructions.
- Financial assistance available.
- Budget requirement.
- Seek examples of similar projects as a reference.

(8) Follow up monitoring to prove results

Implemented projects are evaluated in following viewpoints;

- Typical annual savings from projects with paybacks between 0 to 3 years.
- Staff energy awareness is improved.
- Improved knowledge of process operations leads to reduce energy wastes.
- Specific actions are defined to improve energy use.
- Increased awareness of energy costs leads to more management focus on energy use and improved energy conservation.

Chapter 2 Measurement Procedures

2.1 Introduction

Usually, the most important part of an energy audit study is the achieving of the accurate mass and energy balances for the whole factory (or plant) and / or for the equipments which are operated in different sections of the plant. Without these data, it is almost impossible to conduct the quantitative analysis which determines the value and the volume of the energy conservation potential.

Based on the experiences, in most cases, the necessary instrumentation which are to be used in order to calculate mass and energy balance is not sufficient sometimes in the plants. In addition to this situation, even if some instruments are existing, the accuracy levels of them are often not clear. In this situation, usage of the portable instruments is the most useful in the energy audit study. Thus, the basic data can be obtained and the accuracy of the fixed instruments can be controlled.

The measurements which should be made the most frequently in the plant are as follows:

- Temperatures (ambient, different flows, surfaces, etc.)
- Volume or flow speed of the gas, liquid and solid substances.
- Pressures (including the vacuum and draft in the furnaces)
- Temperature and component in the flue gases (oxygen, carbon-monoxide, etc.)
- Relative humidity (in order to determine the quantity of water steam which is contained in the air that enters and exit the dryers)
- Electrical energy (Voltage, Current, Power factor)
- Luminous intensity
- Linear speed and revolution speed on the motors and connected rotating equipments.
- Conductivity of different waters (boiler feed water, blow-down, condensate, fresh water, etc.)

The portable instruments should not be considered as a replacement for the fixed instruments which are periodically checked and calibrated and used in order for the plant to be operated under control and at optimum capacity. However, when the fixed instruments are not available, the majority of the data which is mentioned above can be collected by using portable instruments.

The physical data that is related to the steam, thermal fluids and fuels and material which is processed or produced, are also necessary in order to achieve energy and material balances. The data which is frequently used in the audit calculations are; the specific heat, enthalpies, calorific value of fuel, densities and the heat transfer coefficients. In most cases, the data can be obtained from the reference books (for example from steam tables) and usually it is

not necessary to obtain the data by trial method.

2.2 Energy metering

Energy metering can lead to improved equipment management & greater industrial competition.

- (1) Measurement of different parameters and control of process flow for:
 - determining breakdown of energy use,
 - calculating equipment efficiencies, and
 - tracking the evolution of production ratios.

- (2) Energy management for:
 - identifying the cause of increased energy use,
 - optimizing the control of production process,
 - choosing the energy with least cost at all times,
 - assuring quality of production.

- (3) Continuous follow-up leading to:
 - greater reliability and safety of equipment,
 - increased life of equipment
 - improved working conditions,
 - reduction in pollution emission

- (4) Better knowledge of the above data helps:
 - to justify investments related to energy management and calculate the benefits,
 - to motivate the personnel by introducing means for measuring the efficiency of his/her activities.

Win Through Energy Monitoring

| | |
|--|--|
| <p>Know</p> <ul style="list-style-type: none"> → Breakdown of energy use → Efficiencies of equipment → Production ratios | <p>Manage</p> <ul style="list-style-type: none"> → Share of energy cost in production → Equipment performance evolution → Choice of appropriate energy → Improvement in product quality |
| <p>Train</p> <ul style="list-style-type: none"> → Personnel involvement → Optimize all options for equipment → Contribute to equipment reliability and safety → Improvement of maintenance and fine tuning of equipment/process | <p>Win</p> <ul style="list-style-type: none"> → Reduce energy consumption → Improve productivity & quality → Greater competition |

2.3 Energy Management Implications

Energy monitoring and follow-up help to measure the performance of production activities and introduce analytical elements for enterprise management, through:

- Reduction of energy and raw materials.
- Important role of energy in the management of enterprise.
- Provision of reliable and useful data for decision making.
- Improvement in the product quality.
- Sensitization of personnel to the energy problem.
- Preparation towards automatic facility in factories.

2.4 Approach to Energy Monitoring

Steps prior to the establishment of energy monitoring and management system:

- Assess status of existing measuring instrumentation.
- Specify the need for new measuring devices and define the points of their installation.
- Select well adapted data collection and processing equipment.
- Consult competent enterprises to assure satisfactory installation, maintenance and after-sale support.
- Propose a well designed training program for operators.

Chapter 3 Data Collection and Analysis (Data Collection Standard Form)

After the information in the questionnaire form (A sample form is attached here) which has been sent by the factory after being completed, is evaluated and after that, if necessary, a member of the team which is to conduct energy conservation survey, pays a visit to the factory in order to determine the size of the factory to have a visual understanding of the departments of the factory and to determine the necessary portable test devices which are to be used in survey areas. In addition, the locations in which the test devices are to be installed during the energy conservation survey, and the factory staff is asked to establish connection parts (Flue gas measuring hole, suitable connection parts for electrical connection). Furthermore, more detailed information regarding the parts which are not clear in the questionnaire form is demanded and preparation of information about the process is required.

The most convenient date is decided by examining the work schedule of the factory in cooperation with the factory staff. Duration of the factory survey, which is to be conducted, are determined by such factors as results of diagnosis, the need for devices and the departments of the factory to be examined.

ATTACHMENT 1

Form 1/13

| ENERGY AUDIT PRELIMINARY INFORMATION FORM | |
|---|--------------------|
| A. INFORMATION REGARDING FACILITY: | |
| Date: | |
| Name of the factory: | Industrial sector: |
| Address: | Telephone: |
| | Telex: |
| | Fax: |
| Person who completes the form: | Title: |
| Address of The General Directorate: | |
| Person to be interviewed: | |
| Operation starting date of the factory: | |
| No. of employees: | No. of Shifts: |
| B. AREA OF ACTIVITY: | |
| Please list main production activities and equipments which consume big amount of energy and the important auxiliary systems. | |
| Please specify the energy production and consumption amounts on the basis of units. (Refer to page 13 for examples) | |

C. ENERGY USAGE

Please complete the following table with the previous year's values.
Please attach photocopies of all electric and fuel bills.

Year:

| Energy Type | Amount of consumption | Unit | Unit cost | Annual cost |
|----------------|-----------------------|------|-----------|-------------|
| Electric | | | | |
| Natural gas | | | | |
| LPG | | | | |
| Gas oil | | | | |
| Light Fuel oil | | | | |
| Heavy Fuel oil | | | | |
| Petrol coke | | | | |
| Hard coal | | | | |
| Lignite | | | | |
| Other | | | | |
| Other | | | | |

The monthly consumption values and monthly average unit prices of the fuels of which the types and annual consumption values are given in this table are to be printed in the tables in the following pages based on the same year.
Please print the fuel types and their consumption units (Ton / month, Kg / month, kWh / month, etc.) in the given blanks.

A. PRODUCTION DATA

Complete the following table with the previous year's values.

Year:

| Type of product | Amount of production | Unit |
|-----------------|----------------------|------|
| | | |
| | | |
| | | |
| | | |

The monthly production values of the products of which the types and annual production values are given in this table are to be printed in the tables in the following pages based on the same year.

| C-1 | YEAR CONSUMPTION VALUES | | | |
|---|-----------------------------------|------------------------|-----------------------------------|-------------------------|
| | CONSUMPTIONS | | | |
| | ELECTRICITY | | | |
| MONTHS | Consumption unit / month | Unit price \$/..... | Consumption unit / month | Unit price \$/ |
| JANUARY | | | | |
| FEBRUARY | | | | |
| MARCH | | | | |
| APRIL | | | | |
| MAY | | | | |
| JUNE | | | | |
| JULY | | | | |
| AUGUST | | | | |
| SEPTEMBER | | | | |
| OCTOBER | | | | |
| NOVEMBER | | | | |
| DECEMBER | | | | |
| TOTAL | | | | |
| Calorific value | | Kcal/kWh | Calorific value | |
| | | | | |
| <p>Note : Please print the type, consumption unit (Ton / month, Kg / month, kWh / month etc.), monthly average unit price (\$ / ton, \$ / kg) of fuel which is consumed and then fill out the related columns according to this data.</p> <p>: Please print the calorific value of the consumed fuel including its unit (Kcal/kg, Kcal / NM³, Kcal / ton etc.) if known.</p> | | | | |

| C-2 | YEAR CONSUMPTION VALUES | | | |
|---|-----------------------------------|------------------------|-----------------------------------|-------------------------|
| | CONSUMPTIONS | | | |
| | ..FUEL..... | | | |
| MONTHS | Consumption unit / month | Unit price \$/..... | Consumption unit / month | Unit price \$/ |
| JANUARY | | | | |
| FEBRUARY | | | | |
| MARCH | | | | |
| APRIL | | | | |
| MAY | | | | |
| JUNE | | | | |
| JULY | | | | |
| AUGUST | | | | |
| SEPTEMBER | | | | |
| OCTOBER | | | | |
| NOVEMBER | | | | |
| DECEMBER | | | | |
| TOTAL | | | | |
| | | | | |
| Calorific value | | | Calorific value | |
| | | | | |
| <p>Note : Please print the type, consumption unit (Ton / month, Kg / month, kWh / month etc.), monthly average unit price (\$ / ton, \$ / kg) of fuel which is consumed and then fill out the related columns according to this data.</p> <p>: Please print the calorific value of the consumed fuel including its unit (Kcal / kg, Kcal / NM³, Kcal / ton etc.) if known.</p> <p>: In case this table is not sufficient please copy it.</p> | | | | |

| D-1 | YEAR CONSUMPTION VALUES | | |
|---|-------------------------------|--------------------------|--------------------------|
| | PRODUCTIONS | | |
| | Name of product | Name of product | Name of product |
| MONTHS | Production unit | Production unit | Production unit |
| JANUARY | | | |
| FEBRUARY | | | |
| MARCH | | | |
| APRIL | | | |
| MAY | | | |
| JUNE | | | |
| JULY | | | |
| AUGUST | | | |
| SEPTEMBER | | | |
| OCTOBER | | | |
| NOVEMBER | | | |
| DECEMBER | | | |
| TOTAL | | | |
| Design Capacity | | | |
| <p>Note : Please print the type of product, and then print the related production value and production unit in the corresponding column.</p> <p>: If it is possible to use different production units for the same type of product, please specify the correlation between these units (For example, it is possible to use m² and ton as units in square flagstone production. In that case, specify the correlation as; m² flagstone = Ton flagstone</p> <p>: In case this table is not sufficient please copy it.</p> <p>: Print the annual or monthly planned production capacity in the related column by specifying the unit (Ton / month, ton / year)</p> | | | |

E. MISCELLANEOUS SUBJECTS

Please express your comments on the following subjects.

Problems related to the control of environmental pollution:

Possible process changes:

Maximum grace periods which can be accepted for the investments:

F. ENERGY MANAGEMENT

Is there an energy management program in your factory ?:

If yes, since when ?:

Is an energy manager assigned ?:

If yes, how long has he been working ?:

Is there any effort in order to Increase the Energy Efficiency, and to Decrease the Energy Consumption ?:

Are energy consumption and production values examined in terms of energy efficiency ?:

Are specific energy values etc., calculated ?:

Are these results checked in terms of problems and causes ?:

What are your other comments ?:

| G. BOILERS | | | | | |
|---|----------|-------------------|-------------------------|----------|-------------|
| No. of boilers in the facility | | | | | |
| Boiler No. | Capacity | Unit ¹ | Production ² | Pressure | Temperature |
| 1 | | | | | |
| 2 | | | | | |
| 3 | | | | | |
| 4 | | | | | |
| 5 | | | | | |
| 6 | | | | | |
| ¹ Ton / h, Kcal / h, m ² , please specify the type of heating surface ² Specify as steam, hot oil etc. Is flue gas analysis made in the boilers? : If yes, how often? : Are the necessary regulations made in the boilers? : Is the analyzer fixed type or portable? : Type of the flue gas analyzer (Electronic etc.) : Results of the flue gas analysis | | | | | |
| | Date | Date | Date | Date | |
| Unit | | | | | |
| T _{gas} | | | | | |
| T _{atmosphere} | | | | | |
| O ₂ | | | | | |
| CO | | | | | |
| (*) | | | | | |
| Fuel characteristics | | | | | |
| Type | | | | | |
| H _{top} | | | | | |
| H _{bottom} | | | | | |
| C | | | | | |
| H ₂ | | | | | |
| H ₂ O | | | | | |
| O ₂ | | | | | |
| N ₂ | | | | | |
| S | | | | | |
| Ash | | | | | |
| Results of Slag Analysis (**), if necessary. | | | | | |
| Grate discharge temperature °C | | | | | |
| Un-burnt carbon % | | | | | |
| (*) : The other parameters (SO ₂ , NOX, ETC.) that the device is capable of measuring may be written. (**): Please fill out only in case solid fuel is used Note : Please attach the unit prices of the fuels which have been purchased lately and send the form. | | | | | |

| H. ELECTRIC ENERGY USAGE | | |
|---|-----------------------|---|
| Of the existing power transformers: | | |
| Operation voltage (KV) | Installed power (KVA) | Power usage rate (Derived power / installed power) |
| / | | |
| / | | |
| / | | |
| / | | |
| Please print the amount of electric energy consumption according to the area of consumption. | | |
| Manufacturing | | |
| Lighting | | |
| Heating and Ventilation | | |
| Other (specify) | | |
| Purchased electric energy | | |
| <input type="checkbox"/> Electric tariff | | |
| What is the contracted electric power? : | | |
| The peak power range of electric energy: Kw (min. power) -Kw (max. power) | | |
| Is charge management implemented in your factory? : <input type="checkbox"/> Yes <input type="checkbox"/> No | | |
| Is there a charge management system in your factory? : <input type="checkbox"/> Yes <input type="checkbox"/> No | | |
| Power factor value (Cos ϕ) : | | |
| Type of compensation : | | |
| <input type="checkbox"/> Single compensation unit <input type="checkbox"/> Independent compensation unit | | |
| Are the static patching circuits applied to electric motors? | | |
| <input type="checkbox"/> Yes <input type="checkbox"/> No | | |
| Are variable speed control units applied to the pumps and fans? | | |
| <input type="checkbox"/> Yes <input type="checkbox"/> No | | |

| Please specify the usage percentages of the lighting armatures in the factory | | |
|---|------------------|----------------|
| Type of armature | Usage percentage | Place of usage |
| Glow filament armatures | | |
| Fluorescent armatures | | |
| Compact fluorescent armatures | | |
| Low pressure- High pressure Sodium vapor armatures | | |
| Mercury vapor armatures | | |
| Other (specify) | | |
| Other (specify) | | |

How is the lighting control done in the factory?
% Armature manual control
% Armature automatic control

Is electric energy produced in the factory? Yes No

Please specify the type of facility that you use for electricity production

Steam turbine Piston
 Gas turbine Other (specify)
 Combination of gas turbine and steam turbine

What is the total amount / installed power of the electric energy that is produced?
KVA / KWh / year

I. FIXED MEASUREMENT DEVICES IN THE FACTORY

Water Meters:
 Places of usage
 a) Factory pieces
 b) other building (specify)..... pieces

Electricity Meters
 Places of usage
 a) Factory pieces
 b) other (specify)..... pieces

Steam Meters
 Places of usage
 a) Boiler house pieces b) other (specify)..... Pieces

J. PORTABLE MEASUREMENT DEVICES IN THE FACTORY

- Flue gas analyzer
- Thermometer and its props (including infrared demometer)
- Conduct meter
- Energy analyzer (for electricity measurements)
- Pliers ammeter
- Lux meter (Light)
- Hygrometer (Humidity)
- Tachometer (Rotating speed)
- Recorder
- Thermographic camera (Temperature Indicator)
- Ultrasonic liquid flow meter
- Manometer (Pressure drop)
- Steam trap test device
- Dissolved oxygen meter
- Sound analyzer
- Other (specify)

K. Compressor Types and Compressed Air Systems

Type of Compressor:

Brand of Compressor:

Capacity of Compressor: (m³/minute)

Annual operation period of the compressor: (hour / year)

Compressor outlet pressure: (bar)

Air pressure needed in at the final usage point: (bar)

Pressure loss along the line: (bar)

No. of similar compressors:

How is the cooling done: With air With water With oil

Cooling (water, air, oil) inlet temperature: °C

Cooling (water, air, oil) outlet temperature: °C

Power which is used by the compressor at full load:kW, hour / month

Power which is used by the compressor at No - load:kW, hour / month

Is there any compressed air dryer:

Type of the dryer: Cooling Adsorption

Compressor control system: Modulating On /off load Start / stop

Is the compressor working connected to a successive (sequential) system? :

From which direction does the compressor get inlet air (suction air) ?:

Where does the compressor get inlet air? :

What is the type of compressed air line? : Single line Ring line Other

Is there any test for air leakage? : Yes No

If yes, how often? : Weekly Monthly Other

Is there any waste heat recovery system? :

Where is the energy recovered from waste heat, used? :

Boiler feed water pre - heating Field heating Bathroom, kitchen

Other (specify).....

Note: Please copy this form and fill the copies out for each of the existing compressors.

M. AREA OF WORK

Please specify the units of the factory to be worked in

How long should the working period be? :

Convenient dates for work :

B. EXAMPLE OF THE AREA OF ACTIVITY

| | | |
|--------------------------|------------------------|--------------------------------|
| Raw material preparation | 4500 kg / hour steam | 10 hour / day |
| | 325 kW electricity | 10 hour / day |
| Chemical reactors | 3200 kg / hour steam | 16 hour / day |
| Product separation | 2500 kg / hour steam | 24 hour / day |
| Boilers with 3 - 8 bars | 10800 kg / hour steam | 24 hour / day |
| | 815 kg / hour Fuel oil | 24 hour / day |
| Air compressors | 225 kW | 24 hour / day |
| Office heating | 4500 kg / hour steam | 10 hour / day during winter |

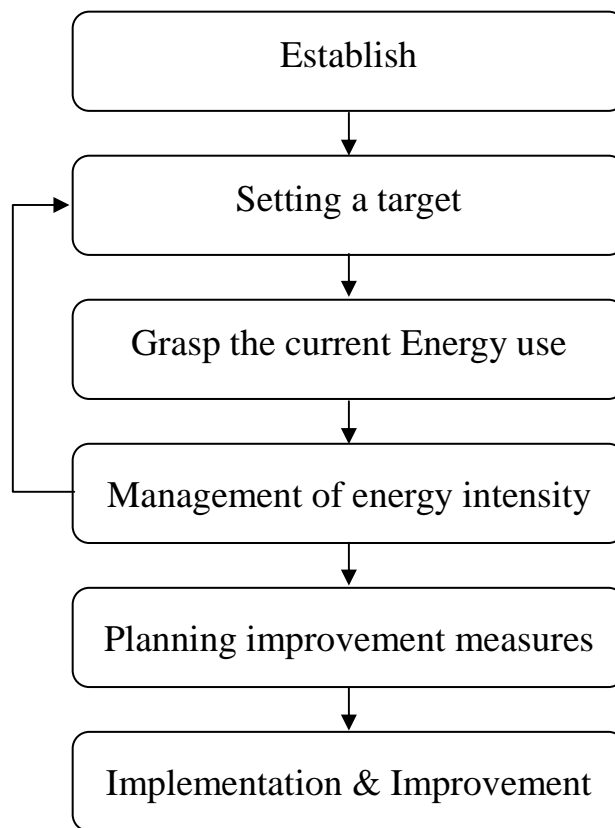
(In case the first page is not sufficient for the information regarding the area of activity, please use this page)

Chapter 4 Planning, Targeting and Benchmarking for Energy Conservation Projects

4.1 Promotion Procedures for Energy Saving Projects

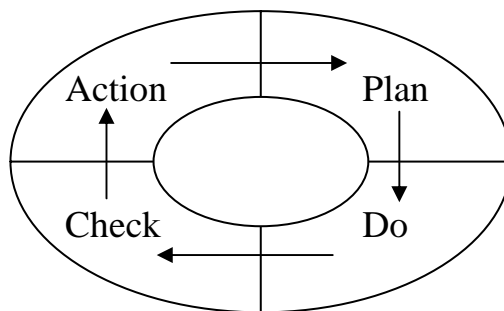
Through Energy Audit, the identification and evaluation of energy saving projects are implemented. Chapter 5 and 6, devoted to explanation of project planning and implementation, deal with key issues common to all kinds of projects. Accordingly, the contents of these chapters can be utilized not only in Energy Conservation projects but also in projects in other fields.

Following steps are taken for the promotion of energy conservation projects;



Grasp of the current Energy use and Management of energy intensity is a very important action. This action is followed by the goal setting/targeting.

In order to promote energy conservation in factories, “Plan - Do - Check - Action” cycle usually adopted which is in detail described in the previous part.



4.2 Setting Energy Conservation Goals and Targets

(1) Purposes of Setting Energy Saving Goals and Targets

Goals and targets are an important part of an energy conservation activity in factories. For an energy management program, this is of crucial importance. Performance improvement or energy savings targets are also a logical outcome of the energy accounting, monitoring, and analysis.

Targets are set for implementing changes and achieving the predicted energy cost savings. The targets can relate to the whole firm, to one site, to a production process, or even to a particular machine. A company may set a range of targets for different departments, taking into account the scope for improvement.

A goals program has a number of obvious and significant benefits:

- people are forced to plan ahead, and think concretely, because goals can only be achieved by implementation of specific projects.
- goals assign specific accountability to everyone, from the individual Energy Manager, right up to the top management, all of whose credibilities depend on achieving the goals
- goals serve as a standard against which progress can be measured.
- setting and evaluating goals elevates the energy issue to a higher level of awareness within the company.

Setting goals will not automatically produce results. A continuous process of monitoring, reviewing and evaluation is necessary to keep the goals visible and reachable.

In addition, some baseline data must be available in order to properly set reasonable goals. This must be data on energy consumption and production; it should be available for at least one, but preferably two or three years. Based on the variations in this data, energy consumption can be evaluated, and reasonable targets for reducing consumption can be set.

For the purpose of setting the targets, the most excellent and systematic way is to establish so-called "In-house database". In ASEAN PROMEEC projects, it has been recommended for years to develop that database. By downloading and utilizing a prototype of standardized database, a factory can internally accumulate and analyze the

energy data, as explained in the above, for some years until they can establish their own “In-house database”, which can be utilized to set the targets for the future. After the In-house database is established and utilized, then that can be shown to outside people, in a way of exchanging standardized data and information.

(2) Approach to Setting Goals or Targets

There are two principal methods of goal or target setting. First is the so-called ‘top down’ approach, a broadly based generalized technique that does not usually draw on a detailed analysis of the company’s circumstances. Second is the ‘bottom up’ method, which is based on a close knowledge of the energy requirements of different parts of the firm’s activities. Both systems have their merits and the method to be selected depends on circumstances and cost-effectiveness. The most firms are likely to prefer the ‘bottom up’ approach since it is, by its very nature, more closely tailored to company needs and hence more effective in providing motivation.

Even if the ‘bottom up’ approach is adopted, there can still be advantages for senior management to gather information on competitors’ performance as reference for goal setting/targeting. This issue is related to the topic of “4.3 Benchmarking” discussed later.

(3) How to Set Targets in Factories

The questions for the Energy Committee and for the Energy Manager are how to set up goals and targets, and what is a logical numerical goal or target for a given Company? Goals should be attainable, yet still challenging. A number of possibilities or examples of the form targets can take are given below.

Absolute energy savings basis: Some companies may set the goal of providing an absolute reduction in the energy consumption. Common energy units, such as kWh, GJ, or Btu can be used for all the energy consumption; the goal is a percent reduction of the total energy consumption.

Monetary savings basis: In other companies, the goal may be simply the reduction of energy costs. For example, the goal would be to save a certain percentage of last year’s energy bill. If the total energy cost the previous year were US\$ 50,000 the company (the Energy Manager) would be expected, for example, to come up with projects that saved US\$ 5,000:

Unit energy efficiency basis: A more common basis for setting an energy-saving goal is improvement in unit energy efficiency, or specific energy consumption. In this case, the company sets a goal of a certain percent reduction in the energy required to manufacture a particular product; or in the amount of energy consumed at each

processing or production unit within the factory. For example, if the unit consumption of a paper mill were 20.7 GJ/ton paper produced, a 5% improvement would set a goal of 19.7 GJ/ton. This presupposes that a good baseline measure of specific energy consumption is already available.

A good rule for setting goals is: start small. First year goals of 3 to 6% of energy consumption or specific energy consumption are quite adequate for most companies. In facilities where no attention has been paid to energy, or to maintenance, these savings will be extremely easy to achieve. In other cases, it may be more difficult. Another way may be to develop a target over several years; for example, set up a goal of 15% energy savings over 3 years. The yearly goals are usually better, however, as the reward can be seen sooner, success celebrated more often, and adjustments and corrections to goals can be made more frequently (especially if plant production changes).

4.3 Benchmarking

“Benchmarking” is a general term in the field of business administration or corporate management, meaning “gathering information on performance of others and compare” or “learn from others”. By benchmarking themselves against others who are best in the field, companies can learn more efficient ways of operating. You can learn from the international players as well as the competitors in Thailand or in the Southeast Asia. This concept was already referred to in “Part II, 1.3 Objectives and Targets”. If you could get good Benchmarking figures, they might be utilized as reference for goal setting or targeting.

Though Benchmarking is an effective tool for performance comparison and improvement, it should be used in a very careful manner, because it requires all the detailed data and information on not only energy type and consumption but also on manufacturing or production processes. The latter includes information on raw materials, products (types and grades), processes and other related conditions. Inaccurate comparison not standing on the same basis would give the misleading results.

Accordingly, if you want to do the Benchmarking, that means you should get very detailed information from others, and you have to think about the issue of confidentiality.

There would be cases of gathering detailed information from others as shown below:

- Industrial Association who gathers data from members by questionnaires
- Close relationship of top executives of companies in the same industry
- Seminars and/or conferences (not so detailed generally)
- Consultants who gather and disclose information based on multi-client contracts
(Process licensors could sometimes be in this kind of position)

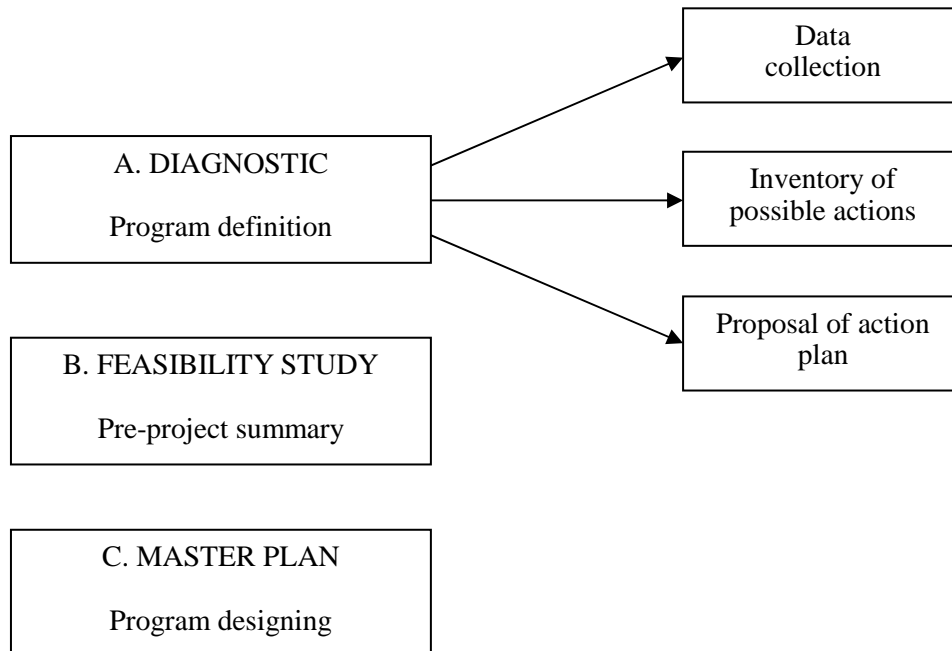
In any case, you will not disclose information unless you see the bigger merits in getting others' information. So it is important that the information is kept confidential only to be shared by the specific group members. In this relation, "Establishing Database" may be an excellent approach to serve the purpose. As stated in the previous item 4.2, the first step would be "In-house database". Then the database could be expanded and improved by information exchange with other companies, possibly including competitors depending upon the purpose, to establish the "Industry database" at a level of industrial association.

This Energy Management Handbook does not contain concrete Benchmarking figures for various kinds of industry for the above-mentioned reasons. As said in "Part I, 3.3 Future Shape after Expansion", it is expected that actual successful examples of applying the Handbook are put into the book in the future. Then the concrete figures will be accumulated in the Handbook covering various fields of industry, which will ultimately form the Benchmarking figures. Anyway that shall be also linked with the Database issue mentioned here.

Chapter 5 Project Implementation of Energy Conservation

5.1 Project Implementing Steps

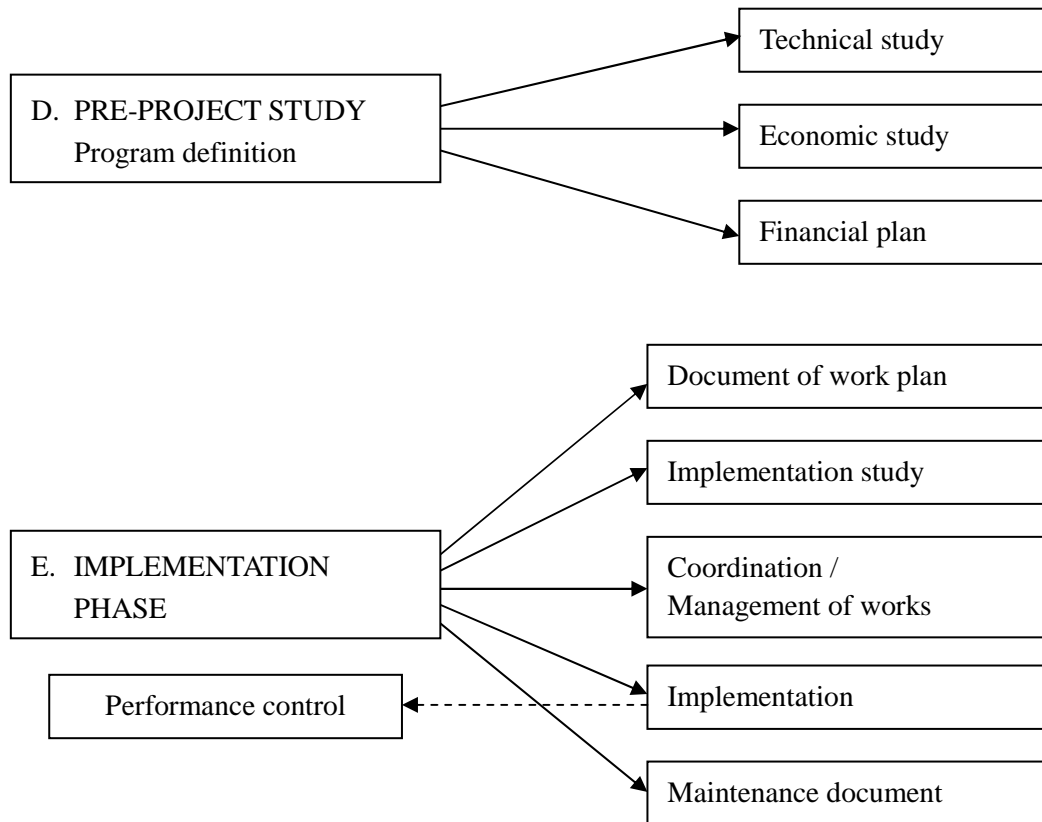
(1) Energy Study



- Improved operation and greater competition are the main objectives of energy efficiency action.
- Industry should invest not only in efficient equipment and processes, but also on monitoring & management, maintenance, information & training as well.
- Investments should be defined and made according to a global energy policy, accounting for all parameters, existing and future, which influence decision making.

(2) Implementing Steps

Implementation of the energy survey recommendations is normally the responsibility of the energy manager, who, ideally, has participated in the energy survey and helped draw up the action plan. The low-cost maintenance and housekeeping measures should be implemented first, to begin capturing energy cost savings and improving efficiency. Higher capital cost measures may require more detailed feasibility studies to determine exact equipment specification and to detail the financial attractiveness. “Technical Directory”, now under development in the PROMEEC Projects, will greatly serve for the purpose of Technical Study. The energy manager’s role is to coordinate these projects, working with outside consultants, evaluating the projects, and communicating to top management to ensure their continued commitment.

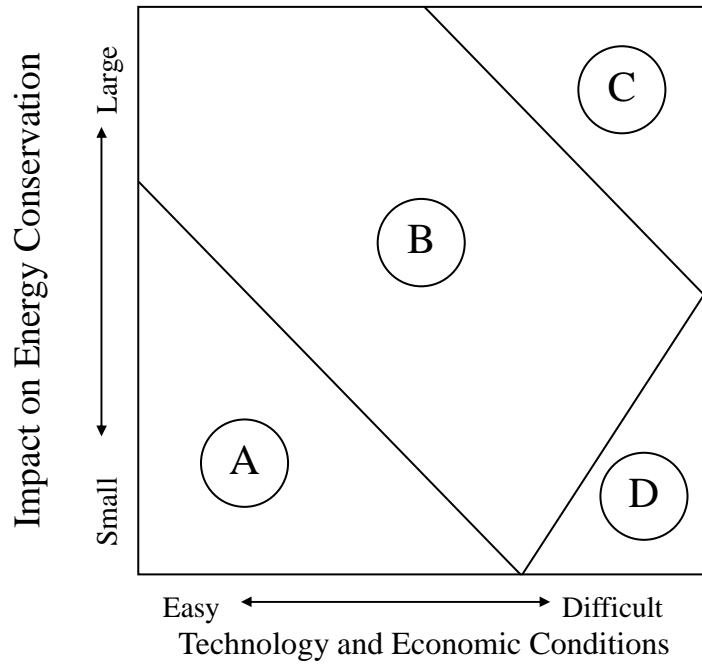


5.2 Project Implementation Scheduling

A realistic schedule should be drawn up for the various stages of the project implementation. This is an essential part of the feasibility study as the implementation of every project must be related to a time-scale. Such a schedule should initially define the various implementation stages, such as negotiation and contracting, project formulation, and actual construction and running-in, in terms of time required for each stage. The schedule should then lay down a time-programme that combines the various stages into a consistent pattern of activities that connect to one another. This comprehensive schedule should cover the entire phase, including the period between the investment decision and the end of the start-up stage of which the actual construction period is only one, although the most important, part.

5.3 Project Implementation Management

(1)Category of Candidate Projects



- A: Little Investment, Technically Easy, and Small Return
- B: Small Investment, Fair Return
- C: Large Investment, Technically Difficult, and Large Return
- D: Technically Difficult, but Small Return

(2)Priority by Small Groups, Managers and Project Teams

| | Small-group Circle | Manager Group | Director Project Team |
|---|--------------------|---------------|-----------------------|
| A | ++ | + | |
| B | + | ++ | + |
| C | | + | ++ |
| D | x | | |

- ++ : First Priority
- + : Second Priority
- x : Not Consider

When implementing a project, the company should first set up his own project implementation management team depending on its project largeness, technological difficulty, etc. shown previously. The efficient implementation of a project may depend considerably on the support services the counterpart team is able to furnish. This team should not only remain active during the implementation period, but should ideally form the nucleus of the managerial, technical and operational staff that is to be put in charge of operating the plant.

5.4 Detailed Engineering (equipment and civil works), tendering, evaluation of bids, awards of contracts

An adequate period should be provided for various activities before the actual site work begins, including detailed planning, preparation of tender documents, calls for tenders, evaluation of tenders, contract negotiations and preparatory work for site installation.

There is normally a considerable lapse of time between the invitation for machinery quotations and the placing of final orders, but nevertheless this period can generally be projected without too much difficulty. The time elapsing before equipment is delivered may, however, be very long, ranging from three to six months for relatively simple equipment to two years and more for complex process machinery, machine tools and heavy electrical equipment.

In ordering the machinery, the erection time and the requirements for various processing stages need to be considered, to ensure that the equipment arrives in a sequence that is optimal from both these viewpoints.

5.5 Construction supervision, co-ordination, testing and take-over of equipment and civil works

First of all the company has to decide which of these activities should be performed by his own staff and which, if any, by consultants.

The construction of plant buildings and facilities cannot commence before a final plant layout plan has been prepared, land has been purchased at the selected site, and the site has been prepared and developed. Site preparation can generally be planned without any major problem; the process should not take long except where site development presents difficulties. The sequence of civil works and construction activities, in terms of construction time and building requirements, needs to be carefully defined in relation to infrastructure requirements, availability, and the arrival and erection schedule of different types of equipment.

While the construction of civil works and infrastructure facilities is proceeding at the site, machinery and equipment may need to be inspected at various locations and to be dispatched.

The main critical stages during the implementation phase are the testing of equipment, trial production and commissioning of the plant. The trial production period is particularly crucial since it can only be initiated once the entire plant has been erected (if one disregards partial tests and trial runs performed during the stages of construction). There are several project implementation techniques and schedules available to facilitate this task.

Chapter 6 Evaluation of Energy conservation Projects

6.1 Measurement and Verification of Results

(1) General

From a financial viewpoint, energy conservation can be achieved by two different approaches:

- ① Implementation of housekeeping and maintenance measures that improve efficiency of existing plant and equipment. Most can be done at low cost out of operating expenses.
- ② Investment in new plant and equipment.

All investment, whether for energy conservation or not, should be subject to a systematic process of capital appraisal with two goals in mind:

- ① to provide a basis for selection or rejection of projects by ranking them in order of profitability
- ② to ensure that investments are not made in projects that earn less than the cost of capital, which is frequently expressed as a minimum rate of return.

After implementation of the energy saving project, following item should be checked;

- Typical annual savings from projects with paybacks between 0 to 3 years.
- Staff energy awareness is improved.
- Improved knowledge of process operations leads to reduce energy wastes.
- Specific actions are defined to improve energy use.
- Increased awareness of energy costs leads to more management focus on energy use and improved energy conservation.

(2) Preparation of Project Evaluation Report

When carrying out the evaluation of capital investment in energy efficiency projects, the Energy Manager or consultant should keep the audience in mind. The evaluation report, or feasibility study should be addressed to the decision makers, who are general top managers in the facility. Investment appraisal by management should focus on discerning, from the many claims that will be made on scarce resources, those projects that will best meet the company's goals.

The Energy Manager should recognize three important considerations:

- ① The decision maker should be identified so that his needs can be satisfied.

- ② The form of the project evaluation report should also satisfy the decision maker. Company policy may dictate the use of a particular format, or the decision maker may prefer a one-page summary.
- ③ The report should state clearly and explicitly the following:
 - why the project is being considered
 - what the project is intended to achieve
 - what the financial and other benefits should be.

6.2 Post Implementation Monitoring

It is vital to ensure the savings predicted are confirmed through adequate monitoring. Monitoring can be provided through a number of ways:

- (1) Using in-built metering equipment supplied with any new technology.
- (2) Purchasing additional meters and installing these during the project.
- (3) Using portable meters to monitor the performance of the new system.
- (4) Salvaging existing meters from the equipment to be replaced.

Evaluation of performance is done by regularly comparing actual levels of energy consumption with the expected energy use, as defined by a set of internally based standards that draw on past performance and reflect the particular and varying circumstances of individual energy-accountable centers. Differences between actual consumption and the standards will reveal either improvements in energy efficiency or a fall-off in performance levels.

In this way, the information produced by monitoring forms a basis for continuing performance evaluation and control. First, it will provide quantified evidence of exactly how successful measures to improve performance have been. Second, it will indicate if and where failures have occurred and trigger the necessary remedial action.

Allowance has to be made for the influence on energy consumption of “independent variables” such as output levels, product mix, raw material variations, rejection rates and weather conditions. Approximations both for standards and the corrections due to the relevant “independent variables” can be derived from a company’s own past records. The information can be refined as better records are collected.

Analysis should be a continuing process so that action can be taken speedily if energy efficiency deteriorates. To ensure effective performance evaluation and control, each line manager or plant operator must receive the energy, throughput, and other figures regularly (monthly in most plants, but on a weekly or a daily basis in large plants) and promptly, so that departures from the standards can be quickly diagnosed and corrected. In turn, line

managers themselves must ensure a rapid response to the information they receive. In this respect, well-designed reporting forms, expressed in readily understood energy cost terms, will be of great assistance.

6.3 Technology Assessment

After completion of energy saving projects, outcomes of projects should be reflected into manuals, standards or guidelines, for engineering, Operation and maintenance.

(1) Engineering Design Standards

When designing new systems or retrofitting old systems, standard engineering design practices should be followed. Certainly, boilers are designed and installed according to the National Boiler Code; pressure vessels are built to certain code specifications. However, where codes do not apply, design standards are lax, and often cause energy waste. A few examples of poor design practices commonly evident in Pakistan are noted below:

- ① Steam and condensate Piping is a common example where engineering standards are not followed. Steam piping should be supported at regular intervals depending on its size; piping should be inclined to allow condensed steam to drain toward drip legs; drip legs and traps should be installed at regular intervals; piping should be properly sized for the steam flow. If these standards are not followed, steam will still be supplied to the process; however, piping will sag, causing steam leaks at flanges and connections, accumulations of condensate will cause water hammer, slowly destroying valves and even equipment.
- ② Condensate piping should be laid in trenches, not on the ground. It is simply not worth insulating piping that is laid on the ground. If laid in trenches, however, wastewater should not be allowed to flow in the same trenches.
- ③ Additional electrical connections to existing panels should be limited; heavy loads on existing wires cause both energy losses and deterioration of cable, as well as increased voltage drops to end use equipment.
- ④ Electric motors should be protected from dust, moisture, and dirt. If a motor burns out, and must be rewound, the consequent drop in efficiency is an additional energy cost to the company, not to mention lost production time due to motor burn-out.

A number of engineering standard practices which can also result in energy savings, directly or indirectly, are available to companies through their Energy Manager or engineering department. Some of the more common practices with application in

Pakistan are discussed below

(2) Operation and Maintenance Guidelines

Deterioration of equipment due to lack of maintenance, improper spares, or harsh environmental conditions are common sources of energy inefficiency in Pakistan. Proper maintenance of equipment will extend equipment life and save energy. The energy manager, especially if he is from the maintenance department should help implement a proper preventive maintenance program throughout the plant. Equipment manufacturers' guidelines should be consulted, and used as the basis for the checking and maintenance of each piece of equipment.

(3) Energy Efficiency Standards

The highest level of engineering standards that a company can adopt relate to energy efficiency. Implementing these standards will also reap benefits such as extended equipment life and reduced maintenance costs. The Energy Manager can help organize and implement these standards. Examples of such standards are the following:

- ① **Operation and maintenance standards:** consistent procedures are developed to ensure rapid maintenance when energy waste is involved; one example is to physically tag steam leaks, compressed air leaks, failed steam traps, or even un-insulated pipes until they are repaired.
- ② **Standard for monitoring:** a company can institute regular measurements and logging of these measurements for all parameters related to equipment energy consumption, or which can be signs of increased equipment energy use; examples include motor currents (amps) at given load, boiler or furnace stack temperatures, chilled water supply and return temperatures.
- ③ **Purchasing of similar equipment:** equipment is bought consistently from the same manufacturer, especially once that equipment has proven itself in plant operation; this allows better familiarity of operators and maintenance staff with the equipment, and results in better maintenance; also the stocking of spares is reduced; this applies especially to small and numerous equipment such as steam traps, steam valves and other steam accessories, electric motors, electric accessories, but can also be used to for larger equipment such as burners, boilers, compressors. Always, when buying new equipment, efficiencies and operating costs should be checked to ensure that the best equipment is purchased.

- ④ **Energy efficient design standards:** minimum level efficiency standards can be incorporated for light levels, insulation type and thickness.
- ⑤ **Equipment efficiency standards:** the company will purchase only equipment that meets certain minimum standards of efficiency; this can apply especially to electric motors, lamps and bulbs, burners, and even large equipment such as boilers.

While implementing all of these standards simultaneously is almost impossible in Pakistan, some or others may be easier for different companies, depending on their business or their energy consumption. As time goes on, and energy costs rise, all of these will become more important. Certainly, each company should be aware of the many tools and approaches at their disposition to improve energy efficiency throughout their operations.

6.4 Financial Evaluation

Smaller projects will normally be funded from internal sources. Larger projects may need external funding which may require consideration of several criteria such as:

- Amount of investment.
- Amount and period of loan.
- Current and expected future inflation rates.
- Asset of borrower.
- Lender's judgment of the risk involved, etc.

Criteria used for evaluating project feasibility:

- Simple payback period for low cost projects.
- Rate of return considers the benefits after the project has paid back.
- Net present value gives the real cost benefits of a project.
- Internal rate of return offers the most comprehensive comparator.
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These methodologies are shown in many published books which are available in Thailand.

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The contacts are as follows.

TEL 81 - 3 - 5543 - 3018
FAX 81 - 3 - 5543 - 3022