Chapter 8 High Energy-Efficient Equipment and Labeling Program

8.1 Current Situation

In planning for energy conservation in the residential, commercial and transportation sectors, energy efficiency improvements to appliances, equipment, cars, etc. would be a highly effective measure. The governments of both developed and developing countries establish energy efficiency standards for appliances, equipment, etc., and require manufacturers and importers (hereafter "manufacturers") to achieve designated standards. In addition, the provision of necessary information to general consumers is very vital to the dissemination of high efficient appliances and equipment that meet energy efficiency standards. Hence, the Labeling Program has been developed as a vehicle to provide information.

In the Philippines, since the DOE does not have the authority to make it compulsory without EE&C Law, DTI-BPS (Department of Trade and Industry - Bureau of Product Standards) it has cooperated with the Filipino EES&L (Energy Efficiency Standards & Labeling), which has been mandatory per the PNS (Philippines National Standard) which is enforceable by the law. The relevant standards oblige manufactures: (1) to comply with Minimum Energy Efficiency Standards (MEPS); and (2) to attach labels on every designated product. EES&L in the Philippines has come into force in 1993 and the scope of designated products is gradually expanding.

DTI is the competent authority of EES&L as mentioned above, however LATL (Lighting & Appliance Testing Laboratory) under DOE-ERTLS (Energy Research and Testing Laboratory Services) in cooperation with DTI has carried out the actual operation of EES&L such as an energy efficiency test for products and consideration/development of MEPS.

The EES&L objectives prepared by DOE-LATL are shown below.

1. *Eliminate the least efficient household appliances and lighting system in the local market*
2. *Reduce the monthly electricity bill of end-users or consumers*
3. *Encourage manufacturers to improve product efficiency to make their products competitive in the local and world market*
4. *Reduce greenhouse gas emissions to mitigate global warming and other pollutants from power generation*

Regarding EES&L, the PNS has designated the items that manufacturers should comply with; and other basic items such as compliance with MEPS, obligation of label indication, definition of energy efficiency standards, values of MEPS, items to be shown in the label, sample of the label, etc.

Meanwhile, documents named the Implementation Guideline (IG) stipulate the operation of EES&L, role allocation among stakeholders and highly technical matters.

(1) Method for Determining Energy Efficiency Standards

The Philippines has adopted the most popular standard value system in the world known as the Minimum Energy Performance Standard (MEPS). Under the MEPS, a minimum value that all designated appliances and equipment products must exceed is established, and in the event that a product does not exceed the standard value, actions such as the suspension of product shipments may result.

(2) Designated Products

The following Table 8-1 shows EES&L designated products (as of June 2011)[1]. Out of the designated products, the part of appliances such as refrigerators, and ballasts, does not have MEPS. According to DOE-LATL, with regards to the addition of a new designated product, the labeling program is solely commenced prior to MEPS enforcement. They collect energy efficiency data on the market through the operation of the labeling program, and then they start to consider and develop MEPS based on the gathered data.

As for room air conditioners, only window-type ACs and split-type ACs without inverters are included. However, high energy-efficient split-type ACs with inverters are not covered under EES&L at this moment.

Table 8-1 Designated Products in EES&L (as of June 2011)

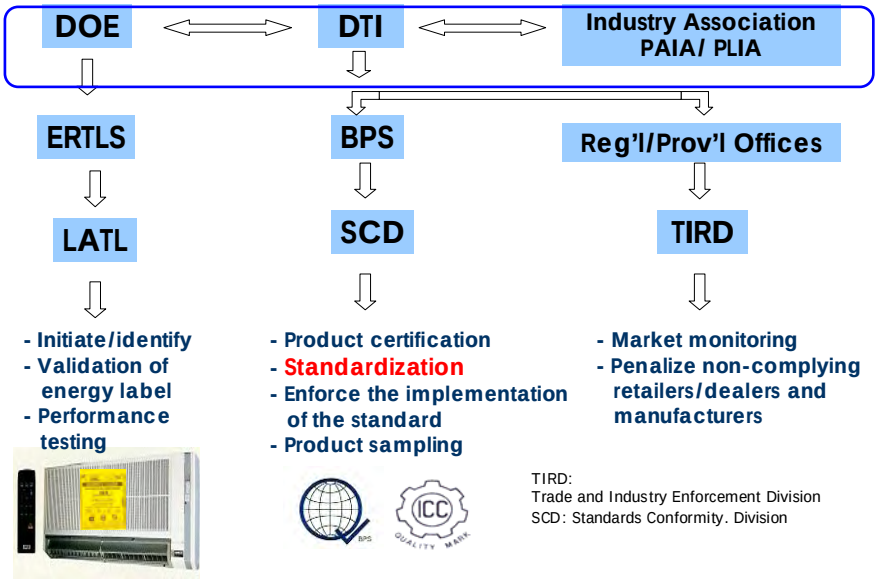
Product	MEPS	Labeling
Room Air Conditioner (Non-ducted)	○	○
Household Refrigerator	N/A	○
Compact Fluorescent Lamp (CFL)	○	○
Fluorescent Lamp Ballast	N/A	○
Linear Fluorescent Lamp	○	○
Circular Fluorescent lamps	N/A	○

DOE-LATL is planning to add large-size refrigerators for commercial use as a component of PEEP supported by ADB presently under implementation. In addition, the future plan of DOE-LATL includes color TVs and washing machines.

(3) Workflow

PNS and IG drafts are prepared via technical committee discussions consisting of DTI-BPS, DOE-LATL, industry associations and manufacturers. The detailed design such as the MEPS revision and the addition of designated products are also discussed at the technical committee. DTI and DOE hold internal discussions concerning committee decisions that will be reflected to PNS and thereby be compulsory.

[1] Though stated in 8.2(1), MEPS and the Labeling Program for lighting appliances were voluntarily institutionalized in July 2011. Following this, EES&L designated products since then are only room air conditioners and household refrigerators.



(Source: DOE-LATL)

Figure 8-1 Overall Framework of EES&L

The figure below shows the EES&L-related workflow regarding room air conditioners and refrigerators. Because there are two differences in each workflow of the two appliances: (1) refrigerators do not have MEPS; (2) only DOE-LATL can conduct performance tests of room air conditioners, the workflow below is explained focusing on room air conditioners.

1) Manufacturers apply a product certification to DTI because a new product needs to be approved by DTI in accordance with PNS prior to market distribution.
2) DTI requests DOE-LATL to implement an energy efficiency test.
   (Private testing laboratories (SLCTV, TUV) in addition to DOE-LATL can carry out a performance test for refrigerators.)
3) The test result is sent to DTI from DOE-LATL.
   (The test result of refrigerators prepared by private laboratories is to be sent to DOE-LATL. After checking out the results, DOE-LATL sends it to DTI. (Refer to procedure 2' of the workflow below.))
4) If the result satisfies PNS and passes DTI verification, DTI issues the product certification to manufacturers.
5) Manufacturers create a sample of the energy performance label reflecting the test result and send it to DOE. DOE accredits the label and assigns an accreditation number after confirmation.
6) Manufacturers attach the accredited labels on the body of every product, and then ship them to the market. As such, the product with a label is on display at retail shops.

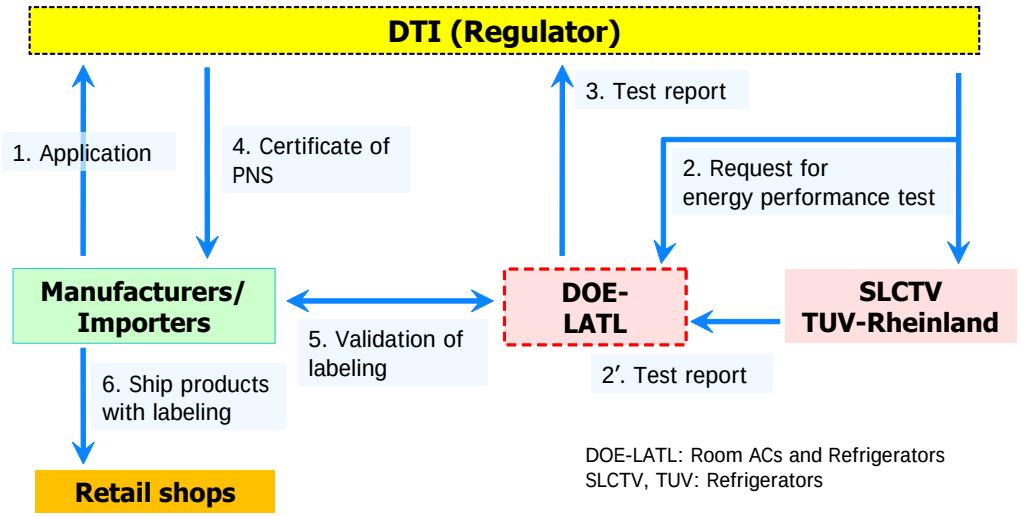


Figure 8-2 Workflow of EES&L (Room Air Conditioner and Refrigerator)

Lighting appliances designated in EES&L, such as CFL have a framework similar to the above figure, however there is one difference between them. The performance test of lighting appliances can be carried out by private testing laboratories (IIEE and SEAL) as well as DOE-LATL. On the other hand, the private laboratories send the test result to DTI, not DOE-LATL. (Refer to the figure below.)

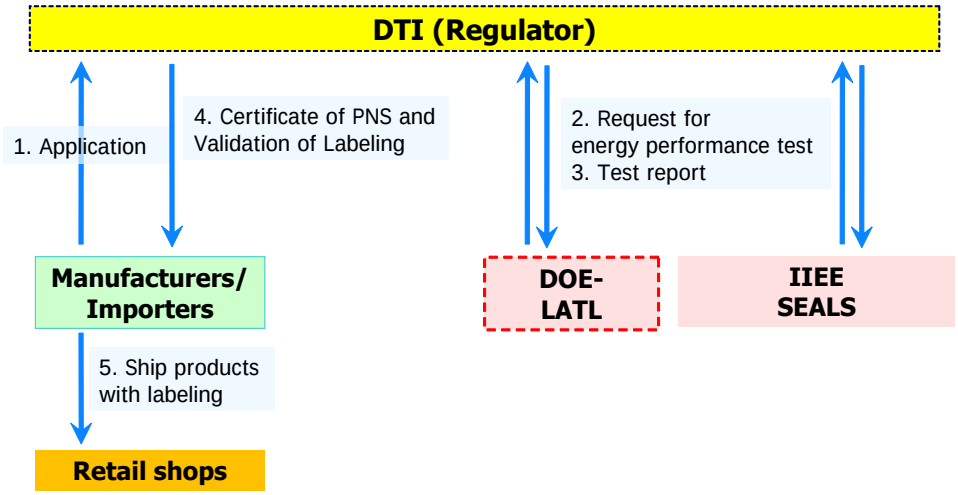


Figure 8-3 Workflow of EES&L (Lighting Appliance)

DTI regional offices handle post-marketing monitoring for product performance. The DTI regional offices are responsible to reassess product performance if a defective product, which may not satisfy PNS, is found in the market. Moreover, there is a reassessment system such that if a manufacturer finds a defective product of another manufacturer, which does not achieve the designated energy efficiency performance shown on the label and reports this to DTI, DTI will carry out a reassessment test based on the notification. However, in the hearings with parties concerned, it seems that such monitoring has not been carried out appropriately due to the insufficient manpower of government agencies.

While it is mandatory for manufacturers to display labels on all products as mentioned above, because it

manufacturer compliance is not regularly monitored the actual situation is unclear. When the JICA Study Team visited some retailers and confirmed display of labels, most of the products had been labeled but some products were without labels.

Figure 8-4 Examples of Labels Attached on Bodies of Products (photo at retail shops)

(4) MEPS

As shown in (2), MEPS is put in place for room air conditioners, CFLs and linear fluorescent lamps (as of June 2011).[2] The table below shows the values of MEPS developed for room air conditioners.

MEPS for only until 2002 is shown in the table below. This is because MEPS has not been revised since its last revision in 1998, and currently EES&L is operated in accordance with the 2002 standard. Though DOE-LATL began revising MEPS in 2004, coordination among DTI-BPS, industry associations and manufacturers and the internal coordination of each organization took a long time.

Currently MEPS is stipulated in PNS, hence it is necessary for DOE to revise PNS if they change MEPS. The revision of PNS takes much time and work. In order to avoid this situation, DOE has an idea to implement some policy changes that would have PNS stipulate mainly fundamental items while numerical matters in MEPS, etc. would be defined in IG.

Manufacturers of electric appliances are also criticized that MEPS has not reviewed and fixed at low-level values for a long period. It is seen that they are to repeatedly ask DOE to review MEPS soon. Manufacturers think that the current MEPS, which has been set at a low level, leads to the wide spread of low-quality products on the market. As such, manufacturers have positive attitudes toward EES&L because EES&L will contribute to the increase of sales of high value-added and high efficient appliances.

[2] Though stated in 8.2(1), MEPS and the Labeling Program for lighting appliances, including CFL and linear fluorescent lamps, were voluntarily institutionalized in July 2011. Since then, MEPS has been applied only to room air conditioners.

Table 8-2 MEPS for Room Air Conditioners

Classification of air conditioners	1995	1996	1997	1998	1999	2000	2001	2002
With cooling capacity below 12,000kJ/h (approx. 3.6kW)	8.3	8.3	8.3	8.7	8.7	8.7	9.1	9.1
With cooling capacity above 12,000kJ/h	7.4	7.8	7.8	7.8	8.2	8.2	8.2	8.6

(5) Awareness Level of Labeling

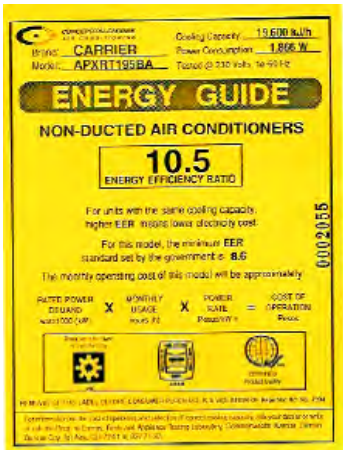
As shown in 3.5.6 of Chapter 3, the general awareness level of citizens of the Labeling Program was low as of HECS carried out in 2004, and 89.7 percent of the total households responded that they had no knowledge of the Labeling Program. On the other hand, more than 80 percent of the other 10.3 percent who were aware of Labeling Program positively considered the labeling as a factor in purchasing their appliances.

(6) Items Contained in the Label

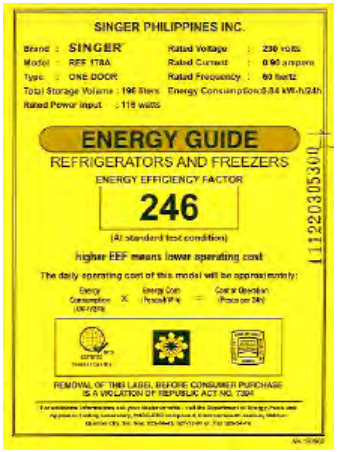
The label shall contain items shown in the table below:

Table 8-3 Items contained in the Label

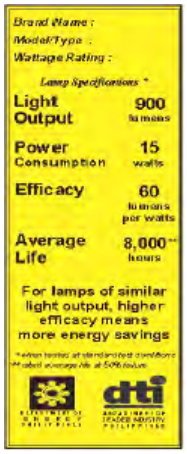
Product	Items to be displayed
Room Air Conditioner (Non-ducted)	- Name of manufacturer, brand, model - Energy efficiency ratio (EER) [(kJ/h) / W] - Cooling capacity [kJ/h] - Power consumption [W] - Calculating formula for monthly utility cost, etc.
Household Refrigerator	- Name of manufacturer, brand, model - Energy efficiency factor (EEF) [litters/(kWh/day)] - Total storage volume [litters] - Energy consumption [kWh/day] - Rated power input [W] - Calculating formula for monthly utility cost, etc.
Compact Fluorescent Lamp (CFL)	- Name of manufacturer, brand, model - Efficacy [lumens per watt] - Average life [hours] - Light output [lumens] - Power consumption [watts], etc.
Fluorescent Lamp Ballast	- Ballast efficacy factor, etc.
Linear Fluorescent Lamp	- Name of manufacturer, brand, model - Efficacy [lumens per watt] - Light output [lumens] - Wattage rating [watt], etc.
Circular Fluorescent lamps	- Name of manufacturer, brand, model - Efficacy [lumens per watt] - Light output [lumens] - Wattage rating [watt], etc.



Room Air Conditioner



Refrigerator



CFL

Figure 8-5 Sample of Labels

DOE-LATL has made great efforts to update the labels such as introducing a star marking rating scheme, and is planning to begin the enforcement of a new PNS for room air conditioners. However, as the government requires time to take procedures, when to enforce the new PNS has yet to be determined at present. The following shows a new label sample:

Figure 8-6 Sample of the new Label (tentative)

(7) Test Laboratories

Currently, the energy performance test for products designated in EES&L is carried out at the following test laboratories.

Table 8-4 Test Laboratories

Name of laboratory	Scope of product testing
DOE-LATL	- Room air conditioner (Non-ducted) - Household refrigerator - Lighting appliance
SLCTV (Solid Laguna Corporation Testing Laboratory)	- Household refrigerator
TUV-Rheinland	- Household refrigerator
IIEE (Institute of Integrated Electrical Engineers of the Philippines, Inc.)	- Lighting appliance
SEALS (Scientific Environmental and Analytical Laboratory and Services)	- Lighting appliance

Fifteen (15) employees work for DOE-LATL. Annual budget of DOE-LATL is shown below.

- ✓ Labor cost: 2,186,683 peso
- ✓ Operation and maintenance cost: 6,953,567 peso (including supplemental budget)
- ✓ Capital investment: 372,000 peso (including supplemental budget)
- ✓ Total: 9,512,250 peso (including supplemental budget)

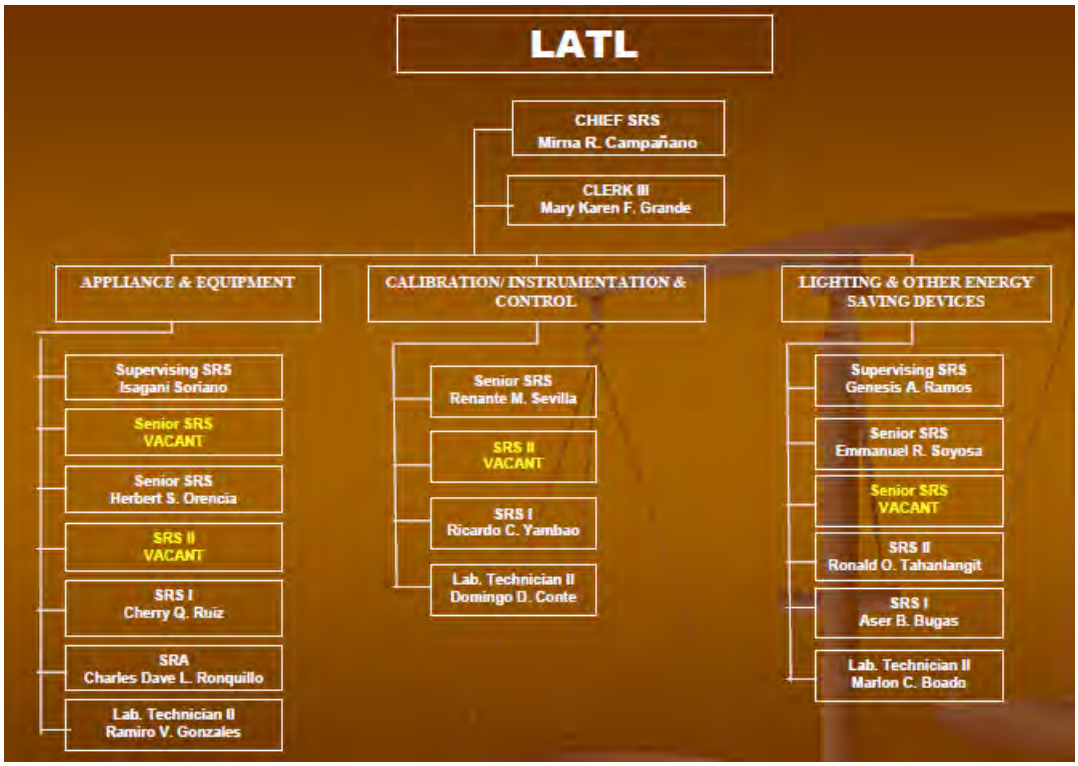


Figure 8-7 Organization Chart of DOE-LATL

(8) Database

DOE-LATL keeps data on product specifications such as energy efficiency, ratings, which are gathered when they conduct product performance tests. However, since the DOE-LATL cannot gather the shipping volumes of each product on the market under current operations, they cannot grasp to what extent high efficient appliances have penetrated the market.

8.2 Issues

The issues with regard to EES&L in the Philippines are shown below.

(1) Smooth Operation of the Program

MEPS for room air conditioners has not been revised for many years, and for the operations of EES&L, coordination among the stakeholders and the internal coordination of each stakeholder are taking a long time.

There are people at DTI who claim that EES&L should become voluntary and released from legal restrictions because the EES&L sometimes causes delays in the certification procedures of PNS. In July 2011, MEPS and the Labeling Program for lighting appliances were voluntarily institutionalized. Meanwhile, some DOE staff is of the opinion that the DOE should be empowered to administer EES&L by the power of EE&C Law; and should operate EES&L autonomously and flexibly.
In consideration of historical factors, stakeholder resources such as know-how, human resources, budget, the future framework and the content to be included in EE&C Bill should be discussed.

(2) Enhancement of Contents in the Label

The current energy efficiency label contains numerical energy efficiency; nevertheless it is still not easy to see the display of the labels compared to Japan and other countries, there is no indication of relative evaluations such as the star rating, which becomes an obstacle to bringing about a better understanding of energy energy-saving effects. Improvements are required in order that the labels may help consumers to purchase products as the criteria for their decision-making. Using examples from other countries, the labeling is to be improved so that it enables consumers to compare their expected electricity bill with the financial benefits of each product.

(3) Implementing Periodical Policy Assessment

Market and awareness surveys to achieve awareness; recognitions of the Labeling Program, household energy usages, monitoring of the labeling indications at retail shops and the shipping volume of products on the market should be carried out periodically. Moreover, the output from the surveys should be utilized for policy assessment such as the items listed in the label, an adequate evaluation of MEPS, the increase of designated products at EES&L, etc.

(4) Improve Awareness of the Labeling Program

Per the HECS carried out in 2004, the awareness of the Labeling Program was low and 89.7 percent of

the total households responded that they had no knowledge of the Labeling Program. Though it is necessary to grasp the current situation as a first step, IEC activities for its dissemination and enlightenment would be important.

(5) Introduction of Incentive Schemes toward a Wider Use of More Energy Efficiency Equipment

In general, more energy-efficient equipment costs more than others. Therefore, the introduction of such financial incentive schemes such as the VAT exemption, no-interest loans, subsidies, etc. should be considered.

8.3 Proposal

(1) Framework for Further Promotion of EES&L

As stated above, in July 2011, MEPS and the Labeling Program for lighting appliances were shifted to a voluntary system, and so it cannot be denied that this move is in a direction opposite to the path of duty in view of promoting energy conservation.

To incorporate EES&L in EE&C Law is one of the important success factors for the program to function as a more effective system. However, considering the current situation where, for example, the promotion of energy conservation has been impeded as stated above and the periodical update of labeling indications as well as MEPS have not been implemented smoothly, it is considered difficult to ensure effectiveness unless the current operational system is also improved.

DOE, in the phase of drawing up IRR, intends to consult stakeholders, including DTI, about the framework after the enactment of EE&C Law because EES&L has already been institutionalized and operated in cooperation with DTI regardless of whether or not EE&C Law has been enacted. Therefore, we will here propose a future framework while keeping in mind the framework will be used as one of the options at the time of such a consultation

When discussing the future framework after the enactment of the EE&C Law, we proceeded to consult with DOE considering 1) flexible realization of the periodical update of MEPS, etc. and system changes, such as the increase of designated products, 2) facilitation / simplification of EES&L-related procedures, such as those for accreditation of energy conservation labels and observation of MEPS, 3) reduction of budget / manpower required in the system operation as much as possible, and 4) avoidance of excessive burdens on manufacturers.

We will propose a future framework as follows:

1) Accreditation procedure flow based on DOE orders

Department orders in the Philippines refer to orders issued to the private sector from government ministries and this framework obligates the private sector to observe EES&L based on the effectiveness of DOE orders.

MEPS and IG drafts are prepared via technical committee (TC) discussions consisting of DOE, DTI-BPS, DOE-LATL, industry associations and manufacturers. The detailed design such as the MEPS revision and the addition of designated products are also discussed at TC. DOE holds internal discussions concerning committee decisions that will be reflected into DOE orders and thereby be made compulsory. Differences

with existing systems are that TC is managed under the responsibility of DOE rather than DTI and is operated more under the initiative of DOE.

Manufacturers, etc. are obligated to achieve MEPS and attach energy conservation labels under DOE orders when releasing new products subject to EES&L. DOE is required to check whether such new products have conformed to regulations prior to shipment thereof. The certification procedure flow for EES&L- designated products is as follows:

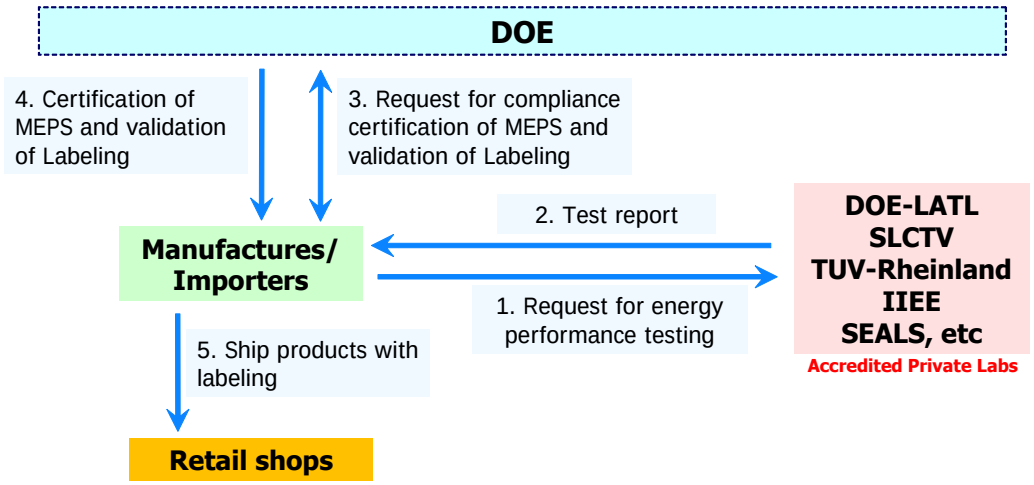


Figure 8-8 Certification Procedure Flow under DOE Orders

The procedure flow in Figure 8-8 is as follows:

1) Manufacturers request DOE-LATL or private testing laboratories to implement performance tests. Test commissions are paid directly to testing laboratories from manufacturers.
2) Test results are sent to manufacturers from DOE-LATL or private testing laboratories.
3) If MEPS is achieved, manufacturers will prepare a sample of an energy conservation label that reflects the performance results, and requests accreditation for the label sample and observance of MEPS.
4) DOE checks the performance results and label sample, and if there are no problems, accredits the achievement of MEPS and the energy conservation label. Then, DOE notifies the manufacturers of the accreditation No. and the results.
5) Manufacturers attach the accredited labels on the body of every product, and then ship them to the market. As such, the product with a label is on display at retail shops.

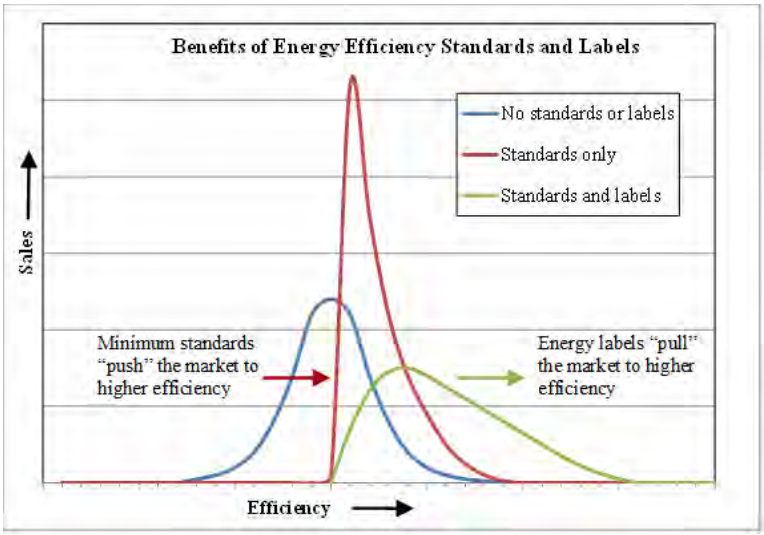
2) Other Measures

a. Duties to report product sales quantity to manufacturers

When conducting EES&L-related policy evaluation, such as the evaluation of the diffusion of high energy- efficient equipment, the DOE should periodically collect data on the sales quantity of each product in addition to the product specification / performance test results submitted from manufacturers. Although the DOE should obtain cooperation from manufacturers and related industry associations, such data are indispensable for policy assessment, so it is desirable to incorporate duties to report the sales quantity of each product in the EE&C Law Bill.

In addition, if the DOE periodically obtains such data, an update of MEPS more fitting the actual status can be expected. Therefore, this will also benefit manufacturers wishing to increase sales of high energy-efficient and high-value added products.

The following Figure conceptually shows the impact of the EES&L introduction on a certain product market. The blue line shows the energy efficiency and sales quantity of products sold in the market prior to the introduction of MEPS and the Labeling Program. In line with MEPS introduction, products that do not satisfy standards will be eliminated from the market. The red line at that time shows the relationship between energy efficiency and sales quantity. Moreover, if the Labeling Program is introduced, this will allow consumers to further understand the advantages of high energy-efficient products. As a result, the curved green line will be formed. If DOE receives reports on product sales quantity from manufacturers, the DOE will be able to analyze policy effects by actually constructing the following Figure:



(Source: CLASP)

Figure 8-9 EES&L Concept

In this regard, the top runner standards introduced in Japan require business operators who manufacture or import designated appliances to ensure that the weighted average value by category of the machinery and apparatus should achieve the base value by the target year. Therefore, a judgment concerning whether or not the top runner standards have been achieved is made based on the results obtained after the competent authority (Agency for National Resources and Energy) distributes a survey slip to manufacturers of appliances for which the target year was reached, and receives reports / holds hearings on the number of shipped units, energy consumption, etc. during the target year. In submitting the report, manufacturers should prepare a sheet by category on which energy consumption efficiency and the number of shipped units by product is input.

b. Duties of Efforts by Retailers to Provide Information

To attain a wider use of high energy-efficient appliances, the roles of retailers linking manufacturers with general consumers are important. Therefore, measures to encourage retailers to diffuse such appliances

should be introduced. Thus, we will propose that duties of efforts by retailers to provide information on energy conservation, which is also advocated in the energy conservation act of Japan, be stipulated in the EE&C Law Bill. (Chapter 9 Section 21 EE&C Law Bill)

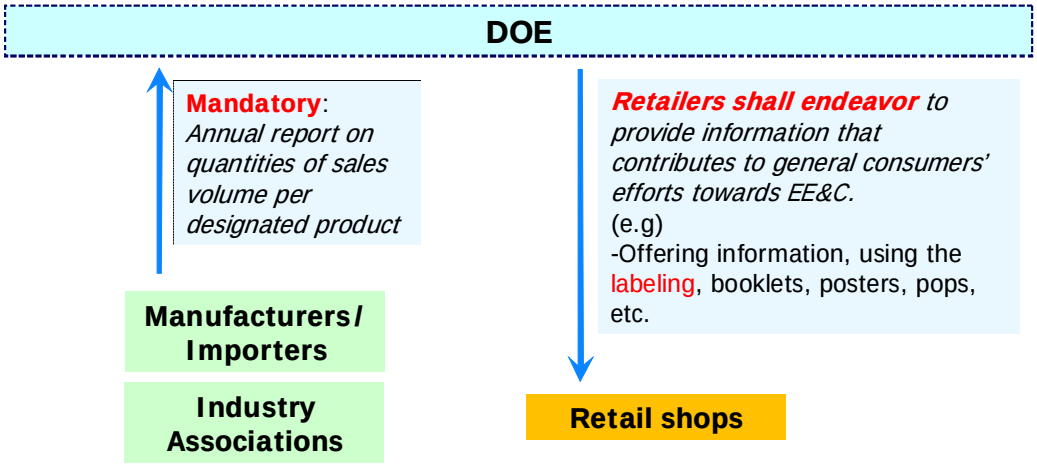


Figure 8-10 Other Measures

3) Implementation Structure etc.

Based on the matters stated in 1) and 2), a future framework is shown in the Table below along with a comparison with the current framework:

Table 8-5 Comparison of EES&L Implementation Framework

		Proposed framework	Current framework
Responsible organization	EES&L approved (stipulated) by	DOE (EE&C Law and Department Order by DOE)	DTI (PNS)
	Details of MEPS and Labeling approved (stipulated) by	DOE (IRR (DOE) or Department Order (DOE))	DTI
Deliberations of MEPS and Labeling • Draft/Revision of MEPS/Labeling • Expansion of coverage of designated products • Test procedures for product energy efficiency, etc.		DOE Technical Committee (DOE, DTI, Industry associations, etc.)	DTI Technical Committee (DTI, DOE, Industry associations, etc.)
Energy Performance Test Procedures		PNS (DTI-BPS)	
Database of product efficiency and sales (shipping) volume		DOE	DOE (except for sales volume data)
Test Laboratories		DOE-LATL and private laboratories	

a. Responsible organization, and laws and regulations

In the future framework, the DOE implements EES&L. The fundamental provisions for EES&L programs are incorporated in EE&C Law, and items requiring technical or periodical reviews, including the

MEPS base value, energy conservation label samples and test methods, are set forth in department orders or the IRR to ensure that they can be updated periodically.

b. Consultation with stakeholders

In the future framework, consultations with stakeholders for matters necessary for policy management, including the increase of designated products, review of MEPS / labeling, and test methods, are conducted at TC supervised by the DOE. In the future as well, long years of DTI experience and a channel to industry associations are indispensable. Therefore, the continuous cooperation of DTI should be sought.

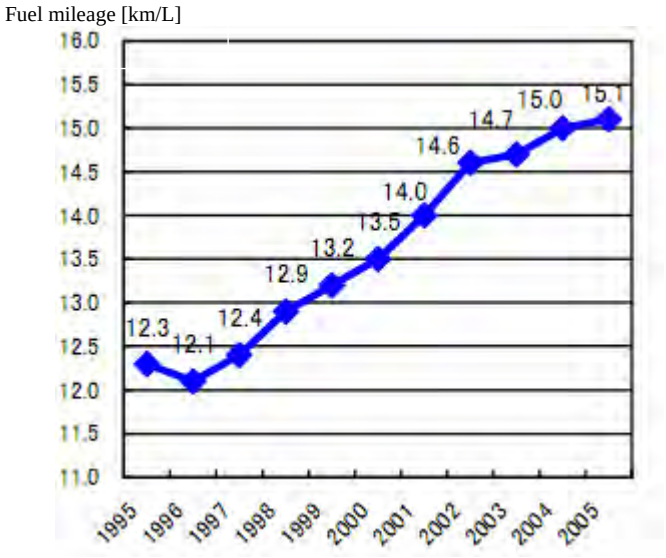
c. Performance test method

To allow for a comparison of the performances of a multiple number of products in operating EES&L, a unified test method should be stipulated. In general, a test method is standardized and standards thereof established. Then, the test is implemented in accordance with the standards. In the Philippines, the PNS established by the DTI is treated as regular standards and in the current EES&L as well, the performance test has been implemented using the test method stipulated in accordance with PNS standards.

From now on, the DOE will have difficulty establishing and operating regular standards like the PNS. In addition, there is a PNS relating to the performance test method established by DTI so it is desirable that the performance test method depends on PNS.

d. Database

In the future framework, the data on the sales quantity per product is obtainable in addition to data on product performance, such as the energy efficiency of EES&L-designated products. Based on this data, the DOE understands market trends, estimates the energy conservation potential, and conducts a periodical policy assessment.



（Source: http://www.mlit.go.jp）

Figure 8-11 Trend of Average Fuel Efficiency of Japanese Gasoline Vehicle

e. Testing laboratory

In the future framework as well, a performance test is implemented via certified testing laboratories (DOE-LATL and private testing laboratories) certified by DTI as with the current framework.

(2) Enhancement of Label Contents

Though DOE seeks to introduce a star marking a new label, when to enforce the new label has yet to be determined as there is a delay in procedures therefor by the government. If EE&C Law is enacted and a framework whereby DOE can operate this program more independently is created, it is expected that this program will be smoothly operated by DOE.

The energy conservation label is designed so that consumers easily understand the differences in the energy conservation performance of household appliances, and the advantages / effects thereof. However, to further enhance contents in the label, it is desirable that, in the future, the estimated annual electricity bills are contained in the label in addition to the relative evaluation via a star marking. Through this measure, consumers can easily understand the advantages of each product. For the calculation of estimated electricity bills, however, standard used hours, standard unit price of electricity, and hourly power consumption by product should be determined or measured in advance.

In the Philippines, middle-class people are expected to further increase in the future, so the use of consumer durable goods, such as air conditioners and refrigerators, could expand. It follows that an appropriate provision of information to consumers via energy conservation labels will become more important.

(3) Improvement of Standard Values of MEPS and Expanding Designated Appliances

The Figure below shows the distribution of EER of window-type room ACs and split-type room ACs without an inverter accredited by DOE-LATL introduced also in the survey results of the on-site re-entrustment in Chapter 3, as well as the EER of split-type ACs with the inverter collected in the on-site re-entrustment survey. The red line and purple line show MEPS in the Philippines and Thailand, respectively. The current MEPS for room air conditioners in the Philippines was stipulated in 1998 and has not been revised for many years, It has been found that the MEPS of the Philippines remains at a lower level compared with Thailand.

The manufacturers in the Philippines are willing to make a revision of MEPS that contributes to the sales expansion of high-value added and high-energy efficient appliances and their expectations for EES&L are great. Accordingly, the DOE should create a structure that can enact EE&C Law and further promote EES&L to strengthen MEPS in stages. MEPS prohibits the sales of products which are below the standard values of MEPS. Thus, if the standard values are revised in a short period, such as every year, it will affect greatly the business of manufactures. It also brings difficulty in coordinating the stakeholders at TC where the DOE, industry associations and manufactures discuss the issues. Thus, it is preferable to revise MEPS in a step-by-step manner for every 3 to 5 year, based on the progress status of technological development. This means that MEPS is set for a period of several years in advance and the revision of MEPS for the following period is discussed at TC during the period.

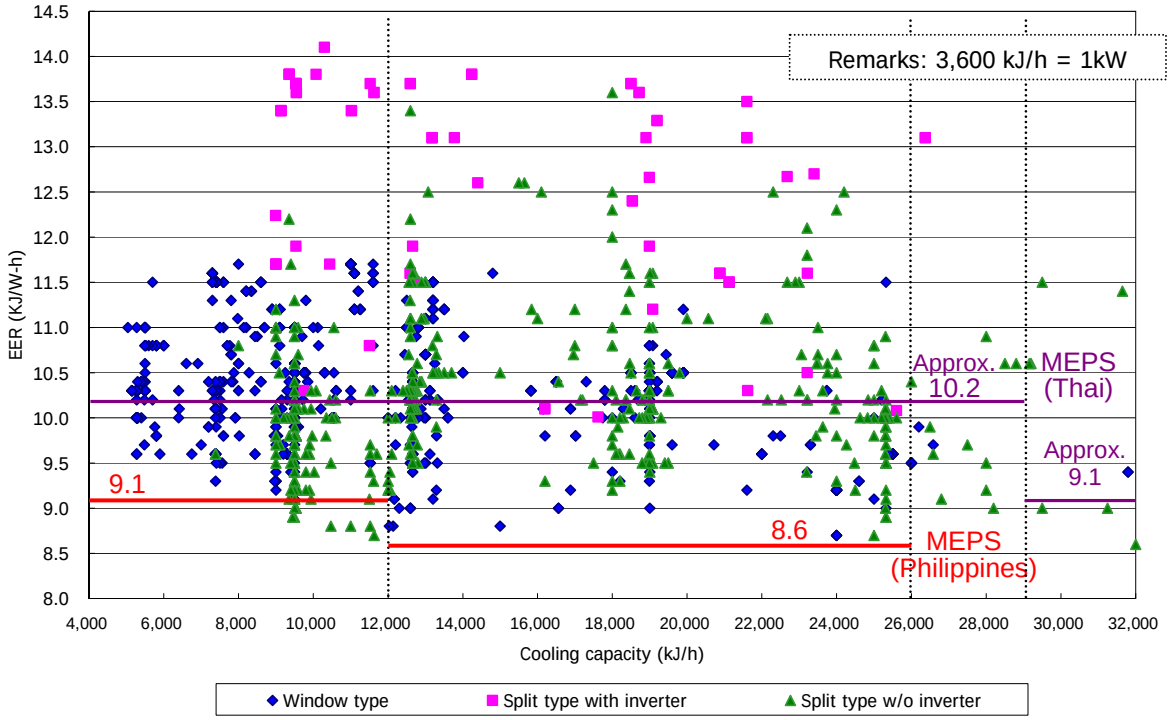
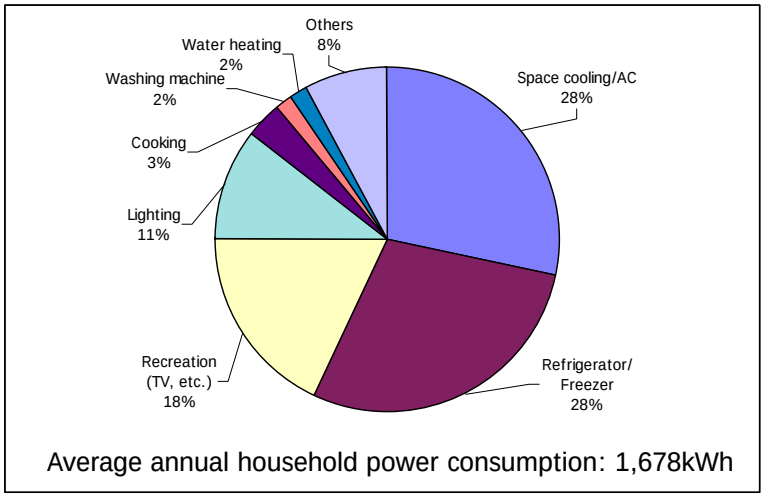


Figure 8-12 Relations between Cooling Capacity and Energy Efficiency (Data form market survey and DOE-LATL)

Regarding EES&L-designated products, beginning with room air conditioners in 1993, DOE has been increasing such products in cooperation with manufacturers, and household refrigerators and lighting appliances became the designated products. DOE is now making efforts to include large refrigerators for commercial use, TVs and washers in the designated products.

According to the results of a 2004 HECS survey, the annual power consumption per household in the Philippines was 1,678kWh. The breakdown of consumption by application is as follows. This data shows that DOE seeks to exhaustively add main household electric products to EES&L-designated products. Under this policy, such efforts should be continued steadily. In addition, room air conditioners and refrigerators already treated as designated products are only those without inverters. In addition, to diffuse high-efficient, inverter-mounted products, these products should desirably be included in the designated products.



(Source: 2004 HECS)

Figure 8-13 Percentage of Power Consumption by Application per Household

(4) Award Program for Retailers Contributing to Energy Conservation

In 8.3 (1), to promote wider use of high energy-efficient appliances, we proposed to retailers linking manufacturers with general consumers that the duties of efforts to provide information on energy conservation be stipulated in the EE&C Law Bill. In addition to the establishment of such regulations, on the other hand we will also propose further promotion of energy conservation while providing incentives to retailers through efforts by the nation to grant an award to retailers who are actively selling high energy-efficient products, using the energy conservation label, etc. and providing appropriate information to consumers. These measures for retailers will enable the diffusion and enlightenment of energy consumption for general consumers.

In view of CSR (Corporate Social Responsibility), major retailers in particular could actively tackle energy conservation and the award program will be expected to function effectively also in the Philippines. The DOE has accumulated the knowhow of operating an award program through the operations of the "Don Emilio Award" that is granted to enterprises with outstanding merits in energy conservation activities in the industrial / commercial sector. Thus, the nation's award program for retailers will probably be realized. In the initial stage of introducing the program, the award is granted to retailers located in the metropolitan area of Manila and then expanded throughout Philippines gradually.

The following Figure shows the workflow. First, retailers submit an application to DOE on its recommendation. Then the application is screened at an evaluation committee and an on-site evaluation is conducted when necessary to confirm the operational status of the shop. After that, the shop satisfying a certain standard is awarded as a good shop. The awarded store can display a symbol mark as certification of the award at the shop and for advertisement for a certain period.

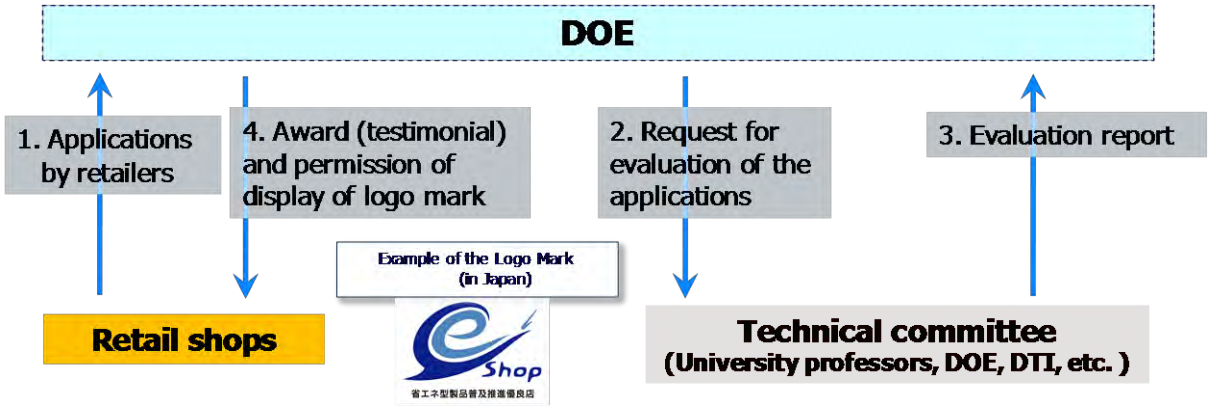


Figure 8-14 Workflow

In designing the award program, the following items should mainly be considered:

- ✓ Definitions of target retailers
- ✓ Definitions of products to be evaluated and high energy-efficient products
- ✓ Formats of application documents
- ✓ Award standards

  Sales status of high efficient-products, initiatives to provide information to consumers as well as improve knowledge of employees, and others
- ✓ Composition of evaluating committee members
- ✓ Contents of the award
- ✓ Design of the logo mark
- ✓ Usable period of the logo mark

(4) Measures for Transport Sector

Initially, the proposal of measures to the transportation sector was not included in the scope of this survey but as stated in 3.2.3, the transport sector is the largest energy consumption sector in the Philippines accounting for 37.4% of domestic final energy consumption, and the DOE has the intention to strengthen measures for the sector in the future. Therefore, we discussed the following as reference for the measures:

1) Background

The DOE has been providing energy conservation training programs (refer to Chapter 9), etc. as measures for the transportation sector, and also considering the introduction of a labeling program for automobiles for the purpose of promoting the purchase of high fuel-efficient vehicles in the future. The DOE has a certain amount of experience in manpower and budget restrictions as well as in the field of household appliances, but in contrast it does not have sufficient knowhow in the field of automobiles. Because of this, DOE wishes to operate the program through an all-out cooperation from manufacturers, including industry associations.

Consequently, we will examine the measures to operate the program under the cooperation with industry

associations, etc. to ensure the use of knowhow and the resources of the private sector while reducing the burdens of government agencies, including DOE.

2) Concept

The program should be a voluntary label accreditation program allowing the use of a logo mark with an indication of a high fuel-efficient performance only for automobiles that have achieved fuel efficiency standards determined in advance.

3) Framework

To reduce government agency burdens as much as possible and introduce the program earlier, manufacturers measure energy efficiency on their own or using the testing equipment of a third party. When the fuel efficiency standards are satisfied, the manufacturers apply for permission to use the logo mark with the DOE. In case DOE agrees on the appropriateness of the details in the application, the DOE notifies the manufacturers of the permission to use the logo mark for automobiles.

When joining this program, manufacturers should conclude an implementation agreement with government agencies, including DOE.

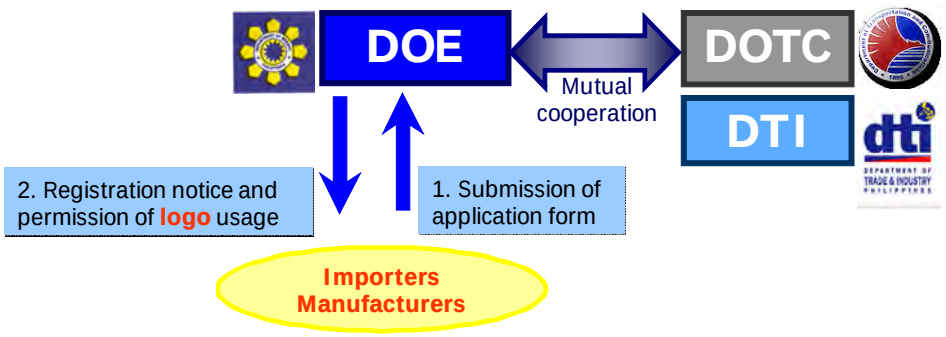


Figure 8-15 Workflow

Fuel efficiency standards, test methods, etc. are deliberated and determined at a committee consisting of DOE, DOTC, DTI and industry associations. According to the DOE, the industrial standards for measuring the fuel efficiency of automobiles have yet to be established in the Philippines, so such standards should be consulted at the committee when the program is introduced.

The implementation agreement stated above should include a provision that when necessary, DOE, etc. is able to request participant business operators to submit a report on the use of the logo mark as well as manufacturing and the sale of products in connection with the implementation of the Labeling Program. In addition, a penalty clause (cancellation of registration, etc.) for illegal behaviors should also be set forth in the agreement.

It is desirable that the DOE, etc. establish a monitoring system for general consumers by launching a window to receive information from consumers

Table 8-6 Framework

	Contents	Remarks
Responsible agency	DOE	
Stakeholders	DOTC DTI Importers and Manufacturers Industry Association	**Technical Committee;** consists of DOE and the members on the left column.
Target products	Passenger vehicles (Initial stage)	
Energy Efficiency Standard Indicator	Fuel mileage (km/litter)	
Test procedure for Energy Efficiency Standard	To be formulated	
Testing body	Importers/Manufacturers themselves, or third-party laboratories	
Penalty	In case a importer violates rules, DOE can call off the registration.	
Monitoring	•**Monitoring: By DOE, DOTC** •**Notification System from Consumers**	•DOE and DOTC are empowered to carry out necessary inspections and to call on registrant to submit reports on testing, sales and manufacturing. •DOE and DOTC are empowered to carry out on-site inspection

If the DOE wishes to further use cooperation from the private sector, there could be a way to entrust completely the operation to industry associations. An implementation agreement has been concluded between the DOE and industry associations, and under the agreement, authority and responsibility for the issuance of permission to register high fuel-efficient automobiles and use the logo mark are given to industry associations. Manufacturers submit an application for permission to use the logo mark to industry associations rather than the DOE. Government agencies, such as the DOE, manage and supervise only industry associations.

8.4 Summary

In this chapter, current situation of EES&L was surveyed and the future direction was discussed with the DOE based on the issues identified. This program has been operated, but it has not been implemented effectively. Thus, recommendations were mainly made in the viewpoint of implementation framework (implementation structure, work-flow etc.) and discussed intensively.

(1) Current Situation and Issues

- Smooth operation of the program
  EES&L program targeting air-conditioner, lighting equipment, refrigerators had been operated as a mandatory program together with safety standards under cooperation of DTI. However, permission process takes such long time that a program for lighting became a voluntary scheme last year (2011). It is not deniable that this program has receded in overall. It is necessary to reconstruct framework for smooth operation of the program.
- Lack of periodical policy assessment
  The effect of the program is limited, because the DOE has not monitored and appliances below the MEPS can be in the market. In addition, operation takes time and the MEPS values are at low level compared to other countries, since last revision of them values were made in 2002.
- Visibility of EE&C labels and low awareness of labeling program
- Lack of financial incentives to promote high efficient equipment (a trial calculation of financial incentives for air-conditioners is made in 11.4)

(2) Recommendations

Based on the abovementioned issues, the followings are the recommendations.

Table 8-7 Summary of Proposed Items

Framework to promote EES&L		
	Accreditation procedure flow based on DOE orders	Procedural flow will be changed to managed primarily by DOE not DTI.
	Duties to report product sales quantity to manufacturers	Putting duties on manufacturers to report sales quantity data to DOE to revise and improve standards of MEPS.
	Duties of efforts by retailers to provide information	Putting duties on retailers, a key influencer to consumers, to provide information on EE&C.
Implementation structure etc.		
	Responsible organization and laws/regulations	The primary agency is DOE and laws/regulations will be the EE&C bill or DOE orders.
	Consultation with stakeholders	Asking DTI for cooperation, coordination or discussion will be made in TC.
	Energy performance test procedures	It should be stipulated in PNS (DTI-BPS).
	Database	DOE will make and manage a database with quantified data etc.
Improvement of standard values of MEPS and expanding designated appliances		
	Periodical improvement of standard values	The current standard values stay low compared to other countries. Thus, it is necessary to collect data and improve the standard values. In addition, they should be evaluated periodically (3 to 5 year interval) and revised.
	Expansion of designated appliances	It is necessary to take back lighting equipment to the mandatory program. In addition, the designated appliances are limited. They should be expanded step by step.
Enhancement of label contents		
	Improvement by introducing a ranking system (star rating system)	This is under consideration by the DOE.
	Estimated annual electricity cost introduction	This is very comprehensible information for the consumers. However, it requires some conditions such as the standard use of appliances, the unit price of electricity, which needs further research/ study.
Award program for retailers		
	Providing awards for retailers who display labeling appropriately and provide EE&C information (accreditation of logo use)	Retailers who communicated to consumers directly apply for the excellent EE&C retailers and can use logos when accredited.

(3) Others

It seems that the DOE has been interested in EES&L in transport sector. However, it is difficult to introduce a mandatory program without preparation. Thus, an incentive scheme, like an energy star logo in the US, is also considered and proposed in brief.

Chapter 9 Information, Education and Communication (IEC)

EE&C awareness in the Philippines is class-dependent, divided into rich and poor. For instance, the poor-class people, who account for 30% of the whole population of the Philippines, expend all of their energy and resources in their day-to-day living. They cannot pay attention and use money for environmental issues or EE&C. The middle-class people have increased their awareness of EE&C since the oil price rises of 2007. (JETRO, Citizen Awareness and Environmental Policy, 2011)

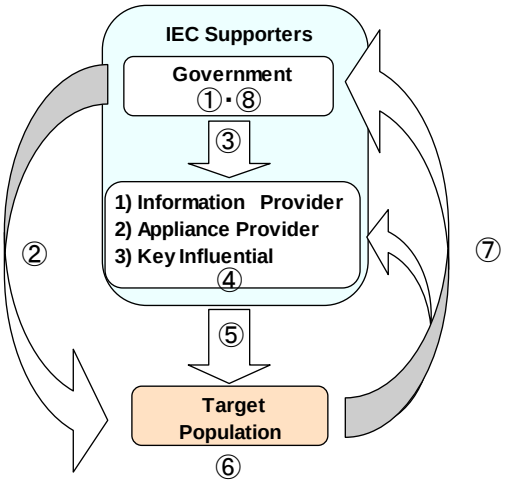
EE&C educational concepts have yet to be established. The IEC campaign relating to EE&C has been implemented based on the Environmental Education Act (2007) under DENR and private agencies and non-governmental organizations (NGO). The NEECP has one component of the current IEC campaign under the DOE. The IEC campaign includes Don Emilio Abello Energy Efficiency Awards, training-workshop on energy management and the distribution of brochures. The issue is that DOE cannot divide annual budget effectively based on the priority of the components. It is necessary that the target sector and population should be chosen and the cost and effect should be considered in drawing up IEC plans.

To analyze each IEC program, the IEC campaign can be analyzed into essential features; IEC actors and the IEC implementation process. The definitions are as follows.

(1) IEC Actor

First, the "IEC for EE&C" is defined to change the awareness of target energy consumers and urge them to act on behalf of EE&C. IEC actor is divided into two types. One is the "Energy Consumer" who consumes energy and acts on behalf of EE&C. The other is the "IEC Supporter" who supports IEC for EE&C. The next figure shows correlation between the IEC Actors. There are explanations about the correlation inside the box of Figure 9-1.

- IEC Actor: "Energy Consumer" and "IEC Supporter"
  - "Energy Consumer": Target of IEC or EE&C
  - "IEC Supporter":
    1) Government
       DOE and stakeholders
    2) Information Provider
       Private entity, local agency, NGO
    3) Appliance Provider
       Appliance manufactures, retail shops
    4) Key Influential
       Congressman, celebrity, etc



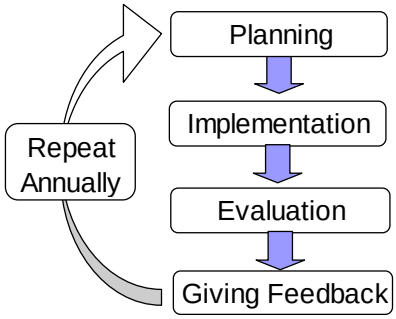
① Government makes plans of IEC programs.
② Government implements IEC programs to Target Population directry.
③ Government implements IEC programs to other IEC supporters*.
＊"other IEC supporters"are 1) Information Provider, 2) Appliance Provider, 3) Key Influential.
④ Other IEC supporters makes plans of IEC programs.
⑤ Other IEC supporters implements IEC programs to Target Population.
⑥ If the IEC programs succeed, awareness on EE&C increase and Target Population's behavior change.
⑦ Target Population give Government and other IEC supporters feedback about how the change Taget Population's awareness/behavior.
⑧ Government and other IEC supporters improve IEC programs based on the feedback.

Figure 9-1 Correlation of IEC Actors

(2) IEC Implementation Process

Besides the IEC actor, it is also important to have the "IEC Implementation Process" analyze IEC. In this chapter, the plan-do-check-act cycle for IEC is called the "IEC Implementation Process", and classified into four stages as "Planning", "Implementation", "Evaluation" and "Feedback". The next figure shows the IEC implementation process and notes of each stage.

- IEC Implementation Process is classified into four stages as "Planning", "Implementation", "Evaluation" and "Feedback". The definition is as follows.
  - "Planning": Identify target and the goal for IEC, compose strategic plan and allocate budget
  - "Implementation": Implement IEC based on the plan
  - "Evaluation": Investigate the effect of IEC and evaluate the good practice
  - "Feedback": Publicize the information on the evaluation. and use the evaluation result for the next plan



Planning/ Implementation
-*Who?* Government and other IEC supporters
-*What?* National/Local IEC program
-*When?* After role allocation of each IEC supporter is stated.
-*How?* Collaboration among the IEC supporters based on the research Target Population.

Evaluation
-*Who?* Government or other IEC supporters
-*What?* Effect of IEC program on Target Population
-*When?* Periodically
-*How?* National/Local survey
Using the website, quesationnaires by mail or interviews

Giving Feedback
-*To Whom?* Government or other IEC supporters
-*From Whom?* Target Population
-*What?* the change of Awareness/behavior on EE&C
-*When?* Periodically
-*How?* Publicity on the website

Figure 9-2 IEC Implementation Process

In this chapter, the IEC campaign in the Philippines is compared with the IEC of Japan and other countries in consideration of issues on the IEC Actor and on the IEC Implementation Process. A proposal and recommendation for the EE&C bill are given in the final part. The energy consumers are analyzed in each sector. There are seven sectors: Transformation, Industrial, Commercial, Academic, Residential, Governmental and Transport. Different from other EE&C measures, IEC uses the "Academic sector" independent from the Residential sector since the people from the Academic sector are one of the main targets of EE&C education for the next generation.

"IEC", IEC which stands for Information, Education and Communication is used often in the Philippines. Although *Don Emilio Abello Energy Efficiency Awards* is the other component of NEECP, not included in the IEC component, the awards scheme such as the Don Emilio Energy Efficiency Awards is handled as a part of IEC in this chapter.

9.1 Current Situation

Current situation of IEC for EE&C in the Philippines is stated in the three categories as follows.

- ✓ Awareness and behavior on the EE&C of energy consumers (based on the results of the re-commissioning survey)
- ✓ IEC campaign in public sector

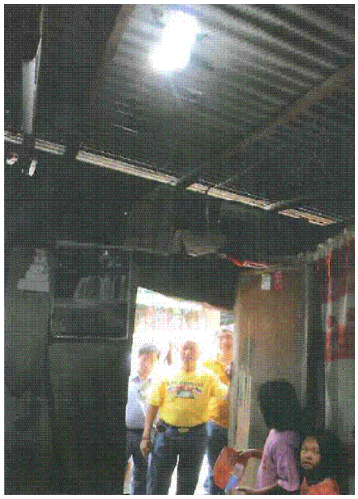
- ✓ IEC campaign in private sector

9.1.1 Energy Consumer's EE&C Awareness and Behavior

Residential sector

Almost all people in the residential sector understand that EE&C is important is and that they have to contribute to EE&C to help the environment. However, they remain passive due to a lack of information and experience in this area. Especially, per the results of a local consultant survey, IEC measures of DOE have not been disseminated among the Philippines. More than half of interviewees are not aware of DOE activities.

Some comments from the interviewees indicated that one of EE&C measures among the poor-class people is the "Solar bottle bulb campaign", which is the method of directing sunlight through a bottle installed in makeshift hole in the ceiling.



Source: MERALCO

Figure 9-3 Solar Bottle Bulb Campaign

In the residential sector, the most effective dissemination tool is the TV. There were many comments such as that the "DOE should be more active in campaigning via TV and radio etc.". In addition, utility providers' IEC campaign such media tools as pamphlets, leaflets and monthly bills are also effective. It is clear that utility providers are close to the target population as the Information Provider. MERALCO' s advertisement for EE&C and the handbook for the customers are shown below.

(Source: MERALCO)

Figure 9-4 Advertisement in MERALCO Bill and Handbook for Residential Customers

Amongst the many IEC campaigns implemented in the Philippines, the "Earth Hour" is well-known in the public as an easy measure. This is a world-wide EE&C project that has participants turn off the lights during a certain hour once a year at the same time in each country and is sponsored by World Wide Fund for Future (hereinafter WWF), an international environmental NGO. In 2011, the DOE joined the project as an official sponsor. The number of participants in the Earth Hour 2011 in the Philippines was 1,661 municipalities, 15 million people.

The national holidays in the Philippines related to environmental issues are shown below. On each day, many events are held in various cities.

Table 9-1 National Holiday in the Philippines relating Environmental Issues

Environmental Event	Date/Month
World Water Day	22-Mar
Earth Month	April
International Earth Day	22-Apr
Philippine Environment Month	June
World Environment Day	5-Jun
National Clean-Up month	September
Ozone Month	September
International Coastal Clean-Up Weekend	15-Sep
International Ozone Day	16-Sep
Philippine Clean Air Month	November

(Source: DOE Portal)

Industrial and Commercial sectors

The main reasons that entities in the industrial and commercial sectors promote EE&C are saving energy expenses, global warming reductions and corporate social responsibility (hereinafter CSR). The most effective place to get information on EE&C is from the Industry Association. The current issue is that many entities do not have any problem obtaining information. It is the implementation of EE&C measures that pose a challenge. The reasons that they cannot implement are 1) they cannot afford the initial costs estimated by the energy audit, 2) it takes a long time to recover the initial investment costs.

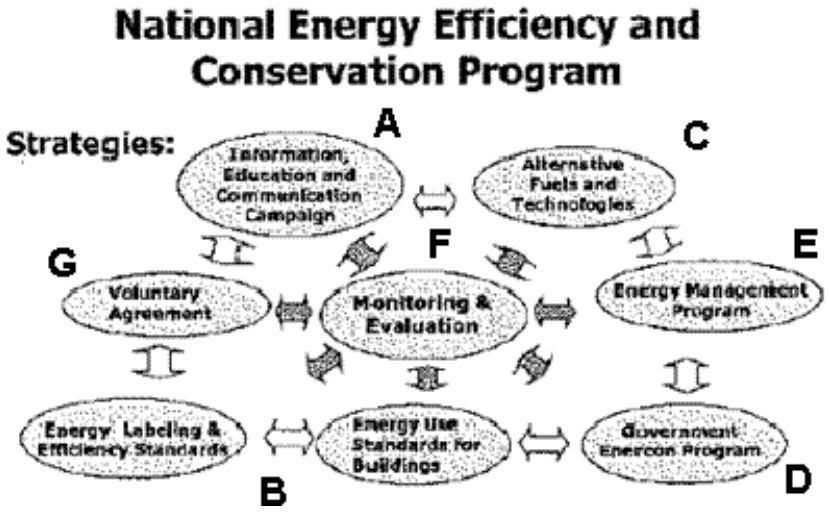
Some entities have joined the National EE&C Training-workshop by DOE, others have no idea that such workshops even existed. There are many opinions that DOE should inform more entities to join the workshop.

9.1.2 IEC for EE&C by IEC Supporters

(1) IEC Campaign in the Public Sector

a. DOE

NEECP, which stands for National Energy Efficiency and Conservation Program, is a national program to promote EE&C in the Philippines. Figure 9-5 shows the concept image of IEC strategies to implement NEECP by DOE. The names of the program components which DOE plans and implements are written in each circle (A, B, C, D, E and G in Figure 9-3), and Monitoring & Evaluation, which is one of the IEC implementation processes, is written in the middle circle (F in Figure 9-3). However, the specific targets or organizational structure of IEC supporters is not described in this concept image.



(Source: DOE)

Figure 9-5 NEECP Concept Image by DOE

<Budget for IEC campaign>

The budget for the IEC campaign of DOE-EUMB is 11million PhP in 2011, which means that the whole budget of DOE-EUMB is eaten up by IEC. Although the Industrial, Commercial, Residential and Transport sectors are essential

targets for IEC for EE&C, there is no priority for each IEC program in each sector.

Table 9-1 shows what content is included in each component of NEECP. On Table 9-1, Component A(Information, Education and Communication Campaign) includes a promotion campaign on EE&C using mass media and seminar-workshops to teach the target population how significant EE&C measures are and to introduce good practices, and distribution of IEC materials on EE&C. The details of these contents are described in the latter part of this chapter. Component B (Energy Labeling & Efficiency Standards and Energy Use Standards for Buildings) is to establish and manage the EES&L system and Component E (Energy Management Program) is to establish the Energy Management System and Energy Audit System. For Component B and E, DOE officers make the most of their own skills to conduct the energy audit in Industrial and Commercial sectors. Component D (Government Enercon Program) includes the energy management system for governmental buildings implemented under DOE. Component C (Alternative Fuels and Technologies) means benchmarking for vehicles, but the scheme has not yet been completed. Component F (Monitoring & Evaluation) includes the national energy efficiency awards as the only EE&C evaluation scheme in the Philippines and the details are described in the latter part of this chapter. Component G (Voluntary Agreement) means that the DOE encourages the private sector to implement EE&C measures by themselves on a voluntary agreement with DOE.

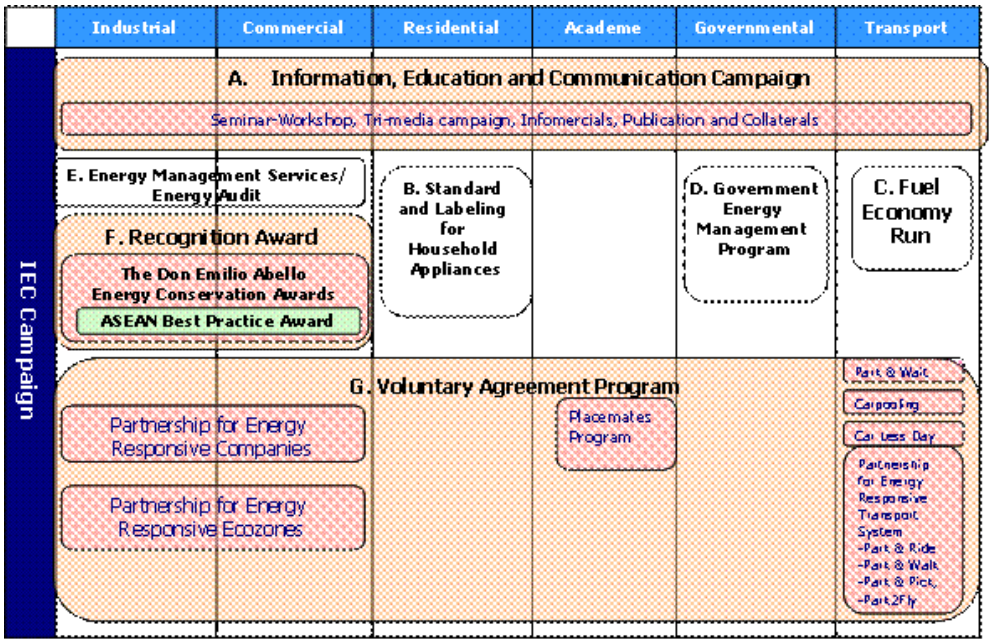
Table 9-2 Contents of NEECP

Components	Target Sector	Contents	Desctiption
A. Information, Education and Communication Campaign	Industrial, Commercial, Residential, Governmental and Transport	-Seminar-Workshop -Tri-media campaign (Print/ Broad Sheet/ Newspaper, TV Ad, Radio Ad) -Infomercials (Website) -Publication and Collaterals (Flyers, Brochure, Messages)	Using mass-media to promote
B. Standard and Labeling for Household Appliances	Residential	-Room Air Conditioner -Household Refrigerator -Compact Flourescent Lamp -Fluorescent Lamp Ballast -Linear Fluourescent Lamp -Circular Fluorescent Lamps	Labeling for energy efficiency home appliances
C. Fuel Economy Run	Transport	Benchmark for cars (under discussion)	Enpowers the consumer in choosing the more energy efficient brand or model of vehicle.
D. Government Energy Management Program	Governmental	-10% reduction in electricity and fuel consumption -energy consumption monitoring -recognition program only for governmental sector	Aims to integrate energy efficiency concepts in to the procurement practices of government agencies, bureaus and offices.
E. Energy Management Services / Energy Audit	Industrial and Commercial	DOE officers conduct energy audit.	Energy audit for companies/establishments.
F. Recognition Award	Industrial and Commercial	Don Emilio Abello Energy Efficiency Award	Awarding of outstanding companies and energy managers who have undertaken or are responsible in implementing energy efficiency and conservation programs.
G.Voluntary Agreement Program	Industrial, Commercial and Tranport	-Partnership for Energy Responsive Companies -Partnership for Energy Responsive Ecozones -Placemates program -Park & Wait, Car Less Day, Carpooling -Partnership for Energy Responsive Transport System (Park & Ride, Park & Walk, Park & Pick and Park 2 Fly)	Government-private sectr partnership to encourage industrial ecozones to voluntarily monitor their energy consumption and implement EE&C programs

(Source: DOE)

Next, the NEECP components are ordered from a bird's-eye view in Figure 9-4, and it is convinced that NEECP components cover all target sectors. On Figure 9-4, the colored programs are included in IEC, and it is obvious that a large part of NEECP is for IEC and various IEC campaigns to each sector are implemented under DOE.

Among the IEC campaign of the NEECP components, some programs have been introduced as follows: *Don Emilio Abello Energy Efficiency Awards,* Seminar-workshop on EE&C for Industrial and Commercial sectors and EE&C materials.



(Source: made by JICA Study Team based on DOE documents)

Figure 9-6 Bird's-eye View on NEECP

***<Don Emilio Abello Energy Efficiency Award>* (F. Recognition Award)**

The name of *Don Emilio Abello* comes from Emilio M. Abello, who is Philippines.Since 1973, these awards have lasted as the only awards for EE&C in the Philippines. In the beginning, it was called *the Enercon M* and the name was changed to the *Don Emilio Abello Energy Efficiency Aw* when Emilio passed away. The awarding ceremony is held every December which is a special month for EE&C.

Don Emilio Abello Energy Efficiency Awards 2010

(Source: DOE)

There are various awards with their criteria as shown in Table 9-2. The best one is the Secretary Award. The difference from the EE&C awards in Japan is that the DOE gives no award money to the winners. The competitors presume an advantage to win the awards as an opportunity to show consumers EE&C measures as CSR activities. If a competitor wins the award in the Philippines, it could have a chance to enter to win the *ASEAN Energy Award*, which is targeting all ASEAN countries.

Table 9-2 shows the evaluation criteria for *Don Emilio Abello Energy Efficiency Award*. This table contains not only the energy saving rate, but also the plan and organizational structure for EE&C measures that are important for evaluation.

Table 9-3 Evaluation Criteria of *Don Emilio Abello Energy Efficiency Awards*

Criteria and Mark Structure

Criteria Group	Contents			Maximum Marks Allocation
Impact	1.1	Energy Saving (kWh/year,ktoe)		30%
	1.2	Environmental Effect		12%
	1.3	Economic Effect	investment	6%
			payback period	6%
	1.4	Energy Efficiency Index (kWh/m2/year, GJ/ton,etc)		6%
Sustainability	2.1	Level of participation and involvement		35%
	2.2	Top level management commitment		10%
	2.3	Short and long term plan		10%
	2.4	Organization	Established organization for Energy Management	5%
	2.5	Capacity Building	activities	5%
			educational training	
Replicability	3.1	Management Practive and Measures		20%
	3.2	Technology		10%
Originality	4.0	Creativity/Innovation		10%
Overall Presentation and Impression	5.0	Readability, Adherence to format		10%
TOTAL				100%

(Source: DOE)

Table 9-3 shows the variety of *Don Emilio Abello Energy Efficiency Awards* and the 2010 winners. The basis of the evaluation criteria is the change rate of energy consumption from the previous year and most winners are foreign-capital enterprises and large Philippine enterprises. This is the evaluation scheme not only for the large enterprises in the Industrial and Commercial sectors, also the middle/small enterprises. The difference between large enterprises and middle/small enterprises is the amount of yearly energy consumption as written below.

> "Large establishments refer to establishments with energy consumption of One Million Liters of Oil Equivalent (LOE) and above or 3.85 Million kwh of electricity annually. Small and Medium establishments refer to establishments consuming less than One Million LOE annually. The criteria for the awards of Large and Small & Medium establishments are the same." (Source: DOE)

Also, the winners put an article on the awards on their own CSR report and appeal to customers independently, since there are few chances to publicize nation-wide the winners via the mass media.

Table 9-4 Variety of *Don Emilio Abello Energy Efficiency Award* and Winners of 2010

Awards	Criteria	Winner of 2010
Secretary's Award	-Former Hall of Fame -At least 15% in Percent Energy Conservation (PECO) rating -EE&C programs -Enercon team and designated Energy Manager	-Toshiba Information Equipment (Philippines),Inc -TI Philippines Inc.
Hall of Fame Award	-A company which has received three Outstanding Awards within then years from the first Outstanding Awards. -EE&C programs -Enercon team and designated Energy Manager	-San Miguel Brewery Inc. -Greenbelt 4 -Northern Cement Corporation and others ı
Outstanding Award	-At least 5% in its Specific Energy Consumption (SEC) based on previous year -EE&C programs -Enercon team and designated Energy Manager	-San Miguel Brewery Inc. -Coca-cola Bottlers Phils -Citibank Philippines. -SM City Davao and others
Citation Award	-3%-5% in SEC -EE&C programs	-Essilor Manufacturing Phils -SM City
Special Award	-1%-3% in SEC	-Greenbelt -Greenhills Shopping Center
Indigenous Award	Plant's performance by the utilization of indigenous energy sources	
Awards of Recognition	i. ASEAN EE&C Best Practices Competition in Buildings ii. ASEAN Best Practice Competition for Energy Management in Buildings and Industries (2 awareded, 3 entried)	-Market! Market! (awarded) -Philippines Epson Optical, Inc. (awarded) -Dole Philippines, Inc. Cannery Site (entried)
Outstanding Energy Manager	Individual appointed as the Energy Manager for successful reduction in energy consumption of the company	39 energy managers

(Source: DOE)

Figure 9-5 shows a correlation between the former *ASEAN Energy Awards* and *Don Emilio Abello Energy Efficiency Awards*. If a competitor wins the first prize for the *Don Emilio Abello Energy Efficiency Awards*, they are next eligible to enter the *ASEAN Best Practice Competition for Energy Management in Building and Industry* or the *ASEAN EE&C Best Practice Competition in Building*. Even if a competitor enters the competition, it is not easy to win the first prize of the ASEAN awards. In 2010, the first winner of the *ASEAN Best Practice Competition for Energy Management in Building and Industry* from the Philippines was *Market! Market!* .

(Source: DOE)

Figure 9-7 From *Don Emilio Abello Energy Efficiency Awards* to *ASEAN Energy Awards*

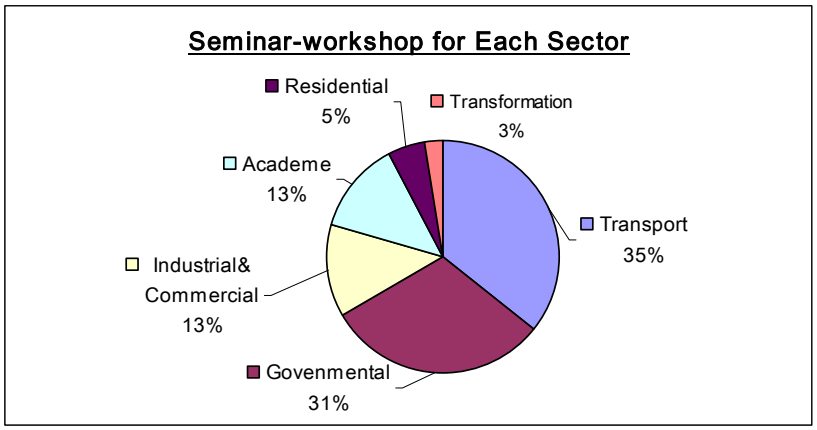
<Seminar-workshops on EE&C for Industrial and Commercial sectors>

(A. Information, Education and Communication)

This seminar-workshop is a program of NEECP called *Power Conservation and Efficiency*. The curriculum is composed of the technical and professional contents of the EE&C. For example, the concept of the energy management system and good EE&C practices are introduced, and the representatives of private entities and NGOs

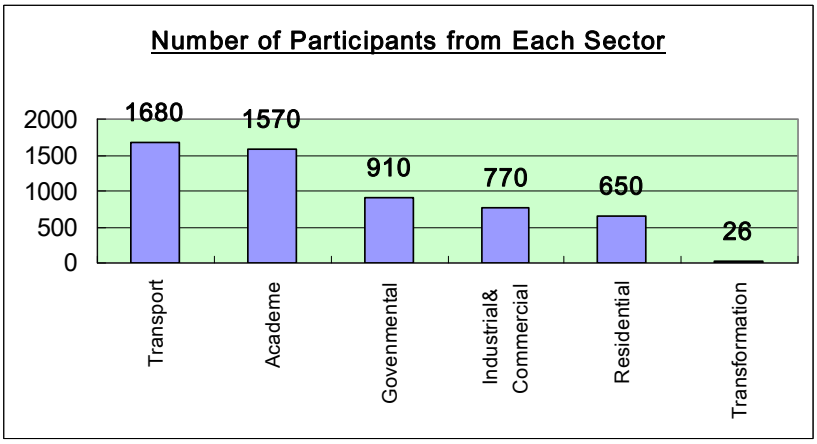
which promote EE&C are invited to make a presentation on EE&C to encourage trainees. The DOE has implemented the seminar-workshop in cooperation with the DAP since 2010.

Compared with the number of seminar-trainings and the number of participants in 2010, there are the largest number of participants from transport sector. The DOE has conducted seminar-trainings in 14 big cities and gathered 5,606 participants. The participants are from managers and vehicle drivers of carriers. The Seminar-workshop for the Transport sector is included in a program called "Fuel Conservation and Energy Efficiency" in Figure 9-4,, the DOE hopes to continue to conduct many IEC campaign .



(Source: DOE)

Figure 9-8 Number of Participants from Each Sector-1



(Source: DOE)

Figure 9-9 Number of Participants from Each Sector-2

In 2011, the DOE implemented the seminar-workshops from January to July in 11 cities. Different from the schedule of 2010, which targeted all sectors, 2011 seminar-trainings targeted the Industrial and Commercial sectors. The DOE hopes to continue the collaboration with the DAP.

Figure 9-10 EE&C Training-Workshop in Cavite and T-shirts with Message of "EC way of life"

Presently, there is no fee for the seminar-workshop and the budget is set by the DOE. In 2010, the DOE did not verify how well the participants absorbed the contents after the seminar-trainings. In order to improve the curriculum of the seminar-trainings, it is necessary to collect the trainees' opinions.

<Seminar-workshop for Academe sector> (A. Information, Education and Communication)

In 2010, there was a large number of seminar-trainings conducted at colleges and universities. Participants include students in the field of engineering, officers and managers in administration office. Per one training-workshop,,200-300 participants joined on average, and the largest number of participants was approximately 600.

In addition, depending on the request from the school, the DOE conducted seminar-trainings at an elementary school. The DOE is collaborating with the DepEd in the Academic sector as mentioned in (b).

The curriculum for the primary school is about how to read the electric meter, the importance in monitoring energy consumption voluntary for the EE&C, and the distribution of materials such as EE&C posters and leaflets. Ultimately, the goal is for students to submit periodical energy consumption reports.

Now there is no definition of EE&C education and educational activities do not cover the whole Academic sector. Hereafter, it is necessary to legislate EE&C education based on discussions among DOE, DENR, DepEd and CHED.

For secondary education, DOE has implemented Poster Making Contests as shown below.

Figure 9-11 Awarded EE&C Poster in 2009 and 2010

<IEC materials (leaflets and advertisements)> (A. Information, Education and Communication)

The DOE has already made various leaflets. The leaflet covers can be seen in Figure 9-8. The ones surrounded by the red line border are TEPCO leaflets. DOE leaflets have no characters such as TEPCO's Denko-chan, who is an original character used only for EE&C campaigns, and DOE leaflets are not colorful. Besides, the official logo of the *EC way of life* does not stand out in the leaflet. In conclusion, there is room for improvement of DOE materials using TEPCO' s leaflets as examples.

(Source: DOE)

Figure 9-12 Leaflets for Residential Sector by DOE and by TEPCO

In the beginning of 2011, new IEC message to promote EE&C campaign of "BRIGHT NOW! DO RIGHT! BE BRIGHT!", used with DOE official logo as below. Advertisements with this new message are shown as below.

Figure 9-13 DOE Official Logo on EE&C "EC way of life" and New Message "BRIGHT NOW! DO RIGHT! BE BRIGHT!"

Figure 9-14 Advertisement to Promote Eco Drive (Left: English, Right: Tagalog)

<Tentative programs>

Moreover, DOE is planning new programs and has not decided the priority and the contents of the programs. Most of the new programs aim at EE&C technologies as the names of programs contain a key word such as *Energy Smart.*

- Promotion of EM Standard in the Manufacturing Industries
- Energy Conservation Guideline in Buildings
- EE&C Opportunities in Power Sector
- EE&C In-house Seminar for Industrial & Commercial Sector
- Promotion of EE & Environmental Product & Services
- Promotion of Energy Smart Building
- Promotion of Energy Smart Industry
- Promotion of Energy Smart Transportation

- Promotion of Energy Smart Community
- Energy Smart Industry Awards
- Energy Smart Building Awards
- Energy Smart Community Awards
- Energy Smart Transportation Awards

b. DepEd

Next, IEC for EE&C under DepEd has been described as follows. The educational system in the Philippines is 6-4-4 (primary education: 6 years, secondary education: 4 years and higher education: 4 years), the same as western countries, and primary education for 7-12 year olds is compulsory and free. Compared with other east-Asian countries, the Philippines education penetration levels are higher, primary school attendance levels are almost 100% and is up to 82% for secondary education.(DepEd, *Fact Sheet* ,2010) In order to promote nationwide awareness on EE&C it is necessary to educate the next generation, and DOE should collaborate with DepEd to achieve this end.

In order to promote EE&C education, the DepEd is now implementing an IEC campaign under discussion with DOE: the DepEd adds EE&C education to the curriculum as environmental education (especially in the areas of mathematics, health& science, and civics & culture), production and distribution of EE&C leaflets, holding seminar-training for teachers, and EE&C contests.

In the Philippines, primary education and secondary education are under the DepEd, and higher education is under CHED (Commission on Higher Education). If the DepEd and CHED become DOE partners of IEC for EE&C, the EE&C education system will improve.

Table 9-5 IEC Campaign of DepEd

Public Awareness	
Mass Media	TV, radio, newspaper, tabloid paper, magazine, journals
Leaflets	One or two leaf flyers
Brochures	Information materials about products (AC, TV, electric fan, iron and refrigerators
Website	Access to internet research
Face-to-face Education	
Curriculum	Integration of energy conservation in mathematics, health & science and subika at Kultura (civic and culture)
Intensive Training	Seminar for trainers, School-building facilities engineers and technicians
School Forum	Contests
	a. on the spot painting contest
	b. Essay writing contest
	c. Singing and dance contest on the theme “Energy Conservation”
	d. Poster-making contest

(Source: DepEd)

c. DENR

Next, the IEC campaign under DENR, which is the ministry that controls environmental education, is described as follows.

Per the *ASEAN Environmental Education Action Plan for 2008-2012*, the *Environmental Education Act (Republic Act No. 9512)* was enacted in 2008. Since then, following the enactment, DENR has promoted environmental awareness through active programs that are primarily against air pollution, sea pollution, and the destruction of nature. DENR-EMB (Environmental Management Bureau) is leading the awareness campaign. For instance, DENR-EMB

conducts environmental awards for various sectors and various organizations, and collaborates on projects with the private sector, using social networking services such as Facebook for disseminating information and collecting opinions from the public. One of the environmental award schemes is as shown below.

Ex. National Competition for Sustainable and Eco-friendly Schools

- Program Outline: Awarding for environmental activities in academic sector
- Objective: Improvement of concern, skill and understanding on environmental issues for students in the primary, secondary and tertiary education and for managers in colleges and universities
- Stakeholders: DENR, DepEd, CHED, and Smart Communications
- Example of an Environmental IEC campaign:
  - developing environmental policies for the school
  - energy conservation and demand management
  - water conservation/water management (maintenance of potable water)
  - paper conservation/paper recycling
  - waste reduction, waste segregation, recycling and composting
  - offering of environmental degrees/certificate programs
  - environment and natural resource-related research works and studies
  - linkages and exchanges on the environment with the following sectors: national government agencies, non-government organizations, religious organizations, local government units, the business and industry sector, among others
  - environmental awareness and community education

To spread the above campaign, the stakeholders support the academic sector with human resources and money.

The evaluation criteria and submission procedures are described below. Especially, online submissions can be used for the Don Emilio EE&C Award.

Table 9-6 Evaluation Criteria and Points

Criteria for determining the level of sustainability and eco-friendliness of the schools	Points
Environment-related Aspects of the School's policy	20 pts
Environment-friendly School Operation and Presence of Environmental Programs	30 pts
Environment-related Features of the School Curriculum	30 pts
Presence of Vibrant Eco Organizations in Campus	10 pts
Presence of Partners and Linkages in Environment Programs/Projects	10 pts

* Only one entry per school will be accepted

Table 9-7 Submission Procedure

Submission	
By mail	Submit entries in three (3) hard copies to respective DepEd division Offices for elementary and high school categories, and to EMB Regional Offices for the higher education category by the deadline
Online	Submit entries online in JPEG form at with a resolution of 300 dots per inch (dpi), a minimum size of 1536 x 2048 pixels, and a maximum file size of 1MB. Entries may be emailed to ecofriendlyschool@gmai.com. The top entry per category for every region will be forwarded to the EMB Central Office for national judging.

(Source: DENR Website)

Different from the Don Emilio EE&C Award, prize money is given to winners. Many schools have budget problems when it comes to implementing IEC campaigns, however, the winning school can cover the shortage costs for the IEC campaign with the prize money.

Table 9-8 Prize for Winners

	National level (Elementary/ High/ College	Regional level
1st Prize	Plaques of recognition and a cash prize of PHP 50,000	Certificate of recognition and a cash prize of PHP 10,000
2nd Prize	Plaques of recognition and a cash prize of PHP 40,000	Certificate of recognition and a cash prize of PHP 10,000
3rd prize	Plaques of recognition and a cash prize of PHP 30,000	Certificate of recognition and a cash prize of PHP 10,000

(Source: DENR Website)

(2) IEC Campaign in Private Sector

In the private sector, large enterprises and utilities are implementing IEC for EE&C toward workers and consumers as CSR activities. Private entities play an important role in promoting EE&C awareness. They can increase awareness on EE&C in the Industrial and Commercial sectors, change the awareness and behavior of workers and consumers, and ultimately increase awareness in the Residential sector. Besides, private entities can afford the cost of IEC minus assistance from the DOE. Hereafter, it is desirable that more entities from more sectors engage in EE&C as CSR activities.

According to the interviews with MERALCO, MARKET! MARKET!, Toshiba Information Equipment (Phil) and ENPAP, the current IEC campaign in the private sector is shown in Figure 9-10. Since a private entity in the Transport sector has not been interviewed, the "Transport" table is blank in Figure 9-10. Basically, five organizations implement the IEC campaign based on their business operations. Some investigate environmental awareness changes effected from the IEC through the annual survey.

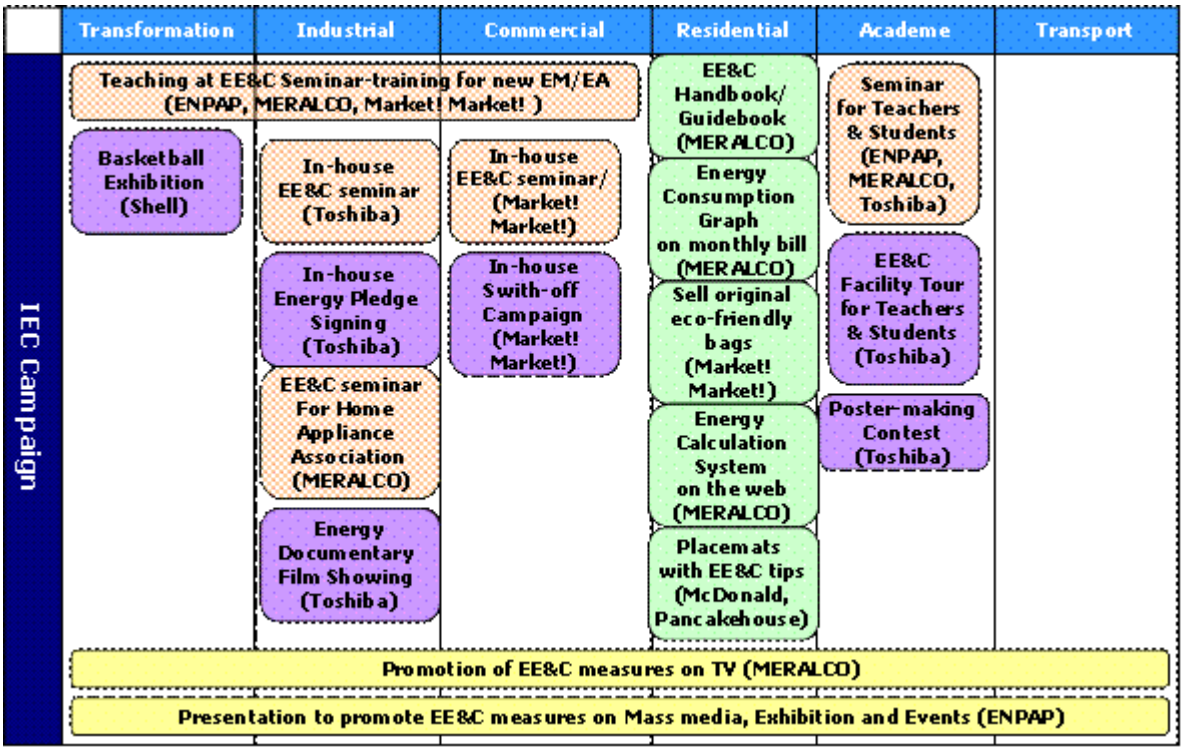


Figure 9-15 IEC Campaign in Private Sector

Especially, ENPAP supports DOE on many IEC campaign. For example, ENPAP plays an important role as trainer on the national EE&C training-workshop.

Public Awareness		
Awards	Don Emilio Abello EE Awards	Steering and technical evaluation committees under DOE
Face-to-face Education		
Seminar	ASEAN Energy Management Handbook	Making presentation over the country
	High Efficiency Motors	Making presentation over the country
	BERDE professionals training (PGBC)	Speaker on Energy Category
	Philippine Energy Efficiency Forum (ECCP)	Speakers on EE on Industrial Effectiveness
	Engineering training & seminar (PSME, IIEE, PICHE)	Speaker on EE&C
	AEMAS (ACE)	Managing AEMAS project and training scheme
Convention	ECCP convention	Presentation of AEMAS
Others		
Philippine Efficient Lighting Transformation Project (PELMATP)		Partner of DOE on PELMATP
Philippine Green Building Council (BERDE-rating system)		Partner of PGBC, Chair of Energy Committee (guidelines for buildings)
Philippine Association of Water Districts (PAWD)		-ENPAP's Energy Audit Guidebook for Water Utilities on the Philippines during their 32nd National Convention in Davao.
Now planning		
EE&C course in University or College		Teaching on EE&C

Figure 9-16 IEC Campaign by ENPAP

Regarding the placemats (as shown in Figure 9-11) released a few years ago with the DOE label, there were some collaboration programs between the DOE and some fast-food restaurants such as McDonald's and PANCAKEHOUSE.

McDonald's PANCAKEHOUSE

(Source: DOE-NEECP website)

Figure 9-17 Collaboration of Placemats

As a new media campaign by MERALCO, an IH (Introduction Heater) cooking heater advertisement is made of LED and shown on MERALCO Road. Some pictures are shown below.

Figure 9-18 IH Cooking Heater Advertisement by MERALCO (in Tagalog)

9.1.3 IEC on Enercon Bill

In order to review the contents of the IEC written in the Enercon Bill, the contents in the existent Bill is introduced below.

Angara Bill (Senate Bill No.2027)

Some Bills were submitted. The Angara Bill is the latest one.

First, the IEC actors are stated as DOE, DENR, DOST, DOTC, DepEd and CHED in the public sector, private and

non-governmental agencies in the private sector. The contents of IEC activities are EE&C education. Second, regarding the contents of IEC activities, it is written that "DOE shall have the responsibility to design and embark on an extensive Energy Management Education Program that will increase consciousness of the Energy Efficiency and Conservation Program". Third, IEC target population is the Industrial, Commercial, Household and Government sectors. Fourth, regarding EE&C measures, it is written that "to educate various sectors through the use of the television, radio and newspaper media regarding energy efficiency and conservation"

Contents on the new Bill are written in 9.3.

9.2 Issues on IEC for EE&C

IEC campaign's essential features are analyzed; Issues on IEC Actors, Issues on the IEC Implementation Process and Issues on Activities. The result of the analysis is shown inTable9-5. The main points are explained as follows.

(1) Issues of IEC Actor

1) Energy consumer

Industrial and Commercial Sector

Many entities cannot afford to implement EE&C measures although almost all of them are willing to due to energy expense reduction, global warming and CSR. Concerning the Don Emilio EE&C Award of the DOE IEC campaign, some people are aware of the award, however, they do not apply due to lack of incentives.

Residential Sector

EE&C measures for lighting are very popular. People in the Philippines remain passive when it comes to other measures.

Academe Sector

Many schools and teachers are willing to introduce EE&C education into certain subjects. School buildings are designed with EE&C ideas and technology. The school administrators' awareness of EE&C is very high. Regarding EE&C, an official curriculum by the DepEd has yet to be devised.

Transport Sector

As the IEC campaign by DOE, there are many programs, such as Carless Day, Park and Wait, Park and Walk, Park and Pick, Park and Ride and others. The most famous program is Carpooling, of which approximately 70 % of interviewees are aware. 43% of interviewees out of the 70 % have Carpooling experience, whose implementation rate is very low. It is necessary to disseminate easier measures to the target population.

2) IEC supporter

<Government>

Government issues comprise mainly three points: 1) networking to promote IEC for EE&C among ministries is weak, 2) key influential goods and the people of each target population have not been analyzed, selected and used

effectively, and 3) the lack of IEC professionals.

<Information provider/ Appliance provider>

IEC with support from the mass media or the appliance provider easy for targets to access often can have more effect than the IEC that the government directly applied to the targets. However, there are few IEC with support from information providers and appliance providers and no incentive for the information providers and appliance providers.

<Key influential goods and people>

With key influential goods and people (For example, industry associations and utility providers), awareness and behavior change can be realized at a faster rate. However, the DOE has not identified key influences and targets. The key influential goods and people are up to the area. National surveys or local characteristics can be used in researching key influences.

(2) Issue of IEC Implementation Process

IEC implementation process issues are as follows.

1) Planning

There are two issues. One is no cost consideration priorities, although the DOE does not have a sufficient IEC budget. Another is lack of clarification of goals on EE&C awareness and behavior in each sector.

2) Implementation

As mentioned in (1), now the cooperating structure for IEC for EE&C among ministries is weak. Besides, the duration of collaboration programs for IEC is shorter than one year, which is necessary to last longer.

3) Evaluation

Don Emilio Abello Energy Efficiency Awards is an award scheme to evaluate good EE&C practices in the private sector, but there is no award scheme to evaluate the IEC campaign. Hereafter, it is necessary that an award scheme should be used to analyze the EE&C effect from EE&C, evaluate the IEC implementation process and propose recommendations.

4) Feedback

There is no periodical awareness survey in the Philippines. In order to increase nationwide awareness and improve DOE activities on EE&C, the objective facts concerning awareness and behavior on EE&C should be visualized and feedback provided to the target population and DOE itself to improve the next plan.

(3) Issues of Activities

Issues of activities are as follows.

1) Government

<DOE>

IEC activities to promote EE&C concepts are as a whole weak.

- Leaflets are the primary IEC materials on EE&C. However, it is necessary to improve the materials to attract the targets' attention because the leaflets lack unity in color or design.
- There is are no EE&C events held in the public arena. There are national and local holidays, so local events could be held more frequently.
- DOE already has an official EE&C logo. A character attracting the attention of young people and the unconcerned people is key to being influential.

<DepEd>

Every school faces budget issues when it comes to IEC campaigns, though many schools are planning EE&C awards by themselves.

<DENR>

The DOE is not included in the main actors for the Environmental Education Act.(Republic Act No. 9512, Dec 12, 2008)

2) Private Sector

There are three private sector issues as follows. First, since there is no award money and other incentives for a winner of Don Emilio Abello Energy Efficiency Awards, participants in private sector have no motive to implement EE&C measures. Second, the DOE publicizes the information on the winners of the awards. Third, the current award scheme is targeting only EE&C measures in the Industrial and Commercial sectors. More various sectors and the target population should be evaluated and awarded in the future.

9.3 Proposal

As result of a discussion with the DOE and the current issues in the Philippines, the recommendations have been stated as follows.

9.3.1 Conceptual Design

1) Implementation Process

Priority

The priority making scheme has been proposed based on the establishment of an organizational structure to promote IEC and the effect survey of the IEC campaign (The impact is estimated from the number of the impacted target population). While the DOE budget is limited, the target population is all the people in the Philippines. Therefore, it would be effective to have DOE cooperate with other departments and private organizations which impacts the target population more than the DOE itself.

Goal Setting

Goal setting for each sector has been proposed below. It is important to identify the target population as the goal in each sector. Then activities will be clear and effective.

Table 9-9 Goal Setting in Each Sector

Sector	Industrial & Commercial	Residential	Academe	Transport
Objective	To make energy efficiency and conservation (EE&C) a way of life			
Goal	To achieve energy savings equivalent to10% of the annual final energy demand from 2009-2030			
Sectoral Goal for IEC	100% knowledge of President/project manager on 1) EE&C management scheme 2) EE&C awards 3) EE&C appliance 4) EE&C Managers & Auditors accreditation	100% awareness on EE&C meausres and change behavior to save energy inside the house 1) Know labeling of home appliance 2) Buy a motive to buy EE&C appliance 3) Save energy to use electric appliance 4) Know the value of fuels 5) Know how electircity is made and sent to the energy consumers 6) Educate next generation		100% awareness of car operators in public/private transport sector to change behavior to save energy when driving 1) Buy EE&C cars 2) Use public transport more than own car 3) Drive with a plan to save fuel
Target Population	Especially, in Metro Manila 1) Shopping mall 2) Department store operators 3) Hotel operators 4) Building administrators 5) Energy managers 6) Technical personnel & consultant 7) Energy service companies	1) Housewives 2) Household helpers 3) Civic group	Especially in primary and secondary school, 1) Students 2) Teachers	1) Transport association 2) Private vehicle/fleet owner 3) Bus operators 4) Taxi operators 5) Jeepney operators and drivers

Key Influential Goods and People

It is also important to identify key influential goods and people for the target population. As a result of the local survey, the key influences are identified below. At the same time of the implementation of EE&C measures, it is necessary to implement IEC campaign via the key influences.

Industrial and Commercial sector:

-Information dissemination to entities:

Periodical meeting sponsored by the industry association, Training-workshop by DOE

-In-house information dissemination:

Establishment of energy management group in charge of EE&C measures,

Periodical meeting, poster making

Residential sector:

-Information dissemination to households:

Media campaign (Internet and TV), IEC campaign of utility providers

9.3.2 New Bill

Role allocation of DOE and the private sector regarding the IEC campaign and the EE&C award (Don Emilio EE&C Award) are stated in a new Bill. As regards the private sector, a new Bill states that energy suppliers and EE&C equipment suppliers endeavor to promote EE&C measures to consumers. This has been proposed based on the Japanese example that utility providers and home appliance suppliers have implemented active an IEC campaign on TV and radio. Concerning the EE&C award, it has been stated that evaluation committee is to select the winner composed of utility providers and the private sector.

Role of DOE:

-Plan and implementation of Energy Management Education Program for all sectors

-Plan and implementation of mass media campaign in cooperation with PIA

-Study and establishment of school curriculum for primary, secondary and tertiary education in cooperation with DepEd and CHED

-Promotion of ESCO and other EE&C service providers

Role of Private Establishments:

-Information dissemination to consumers (Energy suppliers and EE&C equipment suppliers have to endeavor to promote)

EE&C Award:

-Requirements for winners: private establishment that reduces a certain energy consumption amount in a particular period

-Evaluation system: Evaluation committee is composed of governmental organization, utility providers and NGOs.

9.3.3 IEC Activities

Recommendations on existing IEC programs and proposals are indicated as follows.

Recommendations on existing IEC programs

1)Improvement of Don Emilio EE&C Award

2)Improvement of EE&C training-workshop

Proposals

3)Introduction of periodical IEC effect survey

4)Introduction of EE&C school curriculum

5)Introduction of EE&C character

6)Introduction of EE&C event

1) Improvement of Don Emilio EE&C Award

1-1) Expansion of target sector and target population

Details is mentioned 1-2).

Table 9-10 Expansion of Target Sector and Target Population

	Current target	Recommendation
Sector	Industrial, Commercial	+ Residential, Academe, Community, Product, Retailer, Transport
Personnel	Energy manager	EE&C leader in various sector

As the above table shows, there is an award scheme only for the Industrial and Commercial sectors.

However, the target of the IEC campaign for EE&C is all sectors and the DOE needs to monitor and evaluate each activity. Therefore, residential, academic and transport sectors, equipment providers and local communities should have a chance to be awarded. For example, the following awards are recommended.

-Academe ("EE&C Education Program Award", "Excellent EE&C School Lecture Award")
-Community ("EE&C Community Award")
-Products ("EE&C Equipment, Appliance Award")
-Retailer ("Excellent Retailer Award")
-Transport ("EE&C Car Manufacturer Award", "EE&C Carrier Award")
-Others ("Excellent EE&C local leader from NGOs")

1-2) New evaluation committee setting

If the target sector and population are expanded and the DOE evaluates participants of the award scheme impartially, it is not enough to collect energy consumption data on the periodical report and not enough to conclude the winners in the existing committee. It is necessary to collect well-informed people and set a new evaluation committee to decide the winners. The following image shows the structure of the new committee.

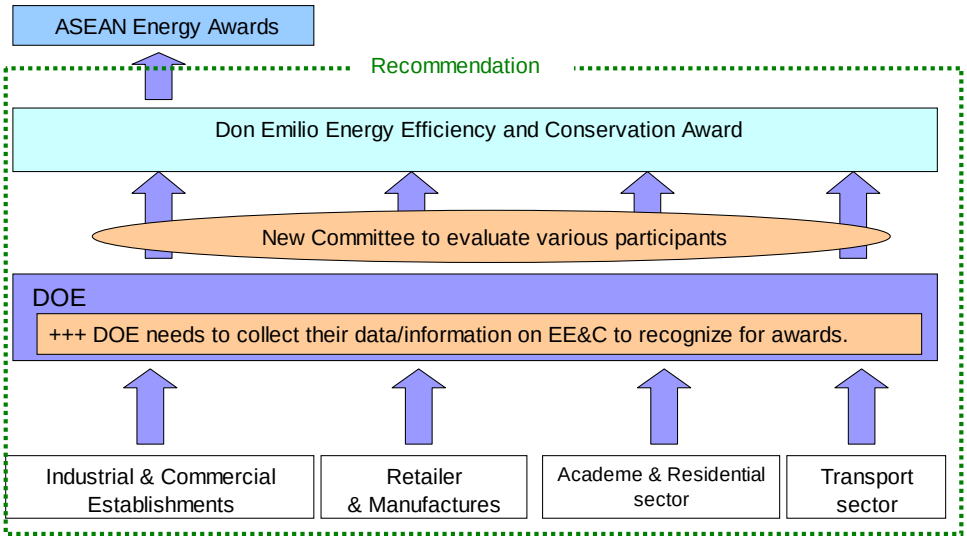


Figure 9-19 New Evaluation Committee Setting

2) Improvement of EE&C training-workshop

2-1) Cooperation with LGU/NGO and DENR

At present, the DOE has many burdens such as having to not only select the participants, sending out invitations to participants, but also the cost of textbooks, foods and accommodation. In addition, it takes some DOE officers a long time to come to join the workshop to make presentations. The DAP now conducts a reservation and the setting up of a venue and the coordination of other aspects of the workshop. It has been recommended that some parts of the DOE roles should be shifted to LGU or NGO to reduce

the DOE's burden, which can be effective in enforcing the cooperating network between LGU/NGO and DOE.

For instance, it is recommended that the selection of participants and the sending out of invitations be entrusted to other governmental or nongovernmental organizations. In consideration of the possibility to be realized, the LGU can be involved with the residential sector. The NGO can be involved with industrial, commercial, power and residential sectors.

It has also been recommended that DENR be a co-sponsor with DOE of the training-workshop. DENR has conducted training-workshops on environmental issues and the environmental management system in order to raise environmental awareness. The details are mentioned in 2-2).

2-2) Expansion of workshop theme

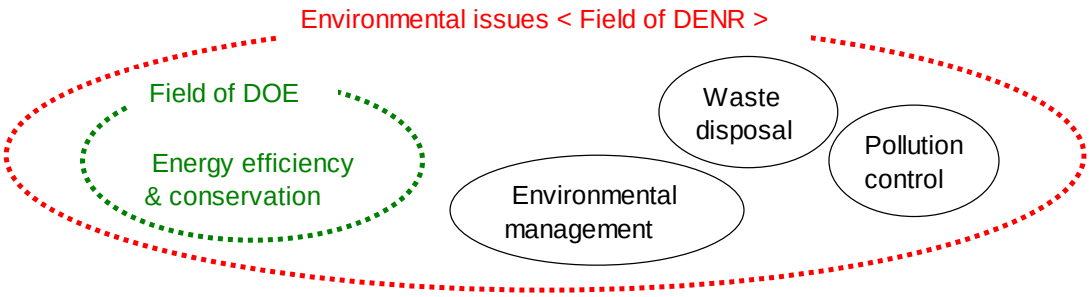


Figure 9-20 Proposal of Workshop Theme

The current theme of the training workshop is an explanation of the energy management system based on the *Energy Management Handbook for ASEAN*（ASEAN-PROMEEC）, which targets engineers in the industrial and commercial sectors. The DOE plans to conduct an EE&C training-workshop for all sectors, however, the DOE may not collect participants under the current theme due to low EE&C interest. Therefore, it is recommended that DOE sponsor a training-workshop with DENR, which has abundant training-workshop experiences in the environmental field (especially waste disposal and water treatment). The DOE also thinks that if the training-workshop has the two themes of environmental management and energy management, the participants would be satisfied because they are often in charge of both management roles.

3) Introduction of periodical IEC effect survey

Until now, the effects of the IEC campaign have never been measured. (The effects refers to not the effects of EE&C, but the awareness rate in this context.) DOE's big issue is that the DOE has not yet estimated the budget allocation based on the effects of the IEC campaign. In order to plan the IEC campaign, it is necessary to collect information periodically, identify the target and select particular mass media, which will impact the target. The study team proposes the following measures:

Venue: Venues of the training-workshop around the Philippines

Target: All participants of the training-workshop sponsored by the DOE

By whom and how to: By the DOE, Once a year

Contents of questionnaire: The main questions are shown in the following table.

The DOE decides the details

Result of questionnaire: Be publicized on the official website of DOE and training-workshop..

Table 9-11 Contents of Questionnaire

	Industrial, Commercial, Residential, Transport	Academe
Question Example	■ What kind of activities people do for EE&C ■ How percentage of awareness on EE&C raise compared with list year ■ Know/ do not know IEC campaign by DOE ■ Which measures by DOE influences people behavior ■ How people get information on EE&C	■ Understanding rate of EE&C lecture at school ■ How many teachers can teach EE&C ■ How often lectures are conducted each school ■ Any awarding scheme inside school
Actor	DOE	DepEd and CHED
How and when	・To distribute/ collect questionnaires before/ after Training-workshop ・ To publicize the result of questionnaire	• To distribute/ collect questionnaires in the end of semester • To publicize the result of questionnaires

4) Introduction of EE&C school curriculum

DepEd implemented curriculum improvements focusing on environmental education, however there is no curriculum tailored towards the concept of EE&C or energy security. As a result of the Study, it was revealed that the DepEd would like to conclude a memorandum with the DOE to cooperate in the creation of a textbook to be revised once every two years. Therefore, the Study Team proposes a new curriculum based on the *Energy Education Guideline* in Japan.

Table 9-12 EE&C Curriculum for Primary and Secondary Education

Recommendation based on Japanese curriculum		
School	Subject related to EE&C	Goal
Elementary	Social studies, Science, Home economics	To acquire basic knowledge and aware of energy and environmental issues around themselves
Junior	Social studies, Science, Home economics	To understand and study energy and environmental issues
High	Civics, Geography, Science, Home economics	To study local/global energy and environmental issues and make various proposal/suggestions

Table 9-13 EE&C Curriculum for Tertiary Education

Recommendation based on Japanese curriculum		
Student to be	Name of course	Contents
Technical Engineer	Energy Manger course	In university and graduate school, EE&C lecture should be a compulsory subject for students major in Architecture, Electronic and Mechanical engineering who is supposed to be a worker for EE&C. And, after graduation and if having experiences to work for EE&C and pass the national exam, they may get Energy Manger licenses.
Energy Policy Expert	Socio-Environmental Energy Science course	Universities and graduate school have Socio-Environmental Energy Science course; it includes the class such as “Energy Economics”, “Energy and Information”, “Energy Policy”, and “Energy Ecosystem”

5) Introduction of EE&C character

Currently, there is a unified character or an illustration of EE&C materials and a media campaign. That is the main reason the materials do not impress the target population. Therefore, the establishment of a new character for EE&C such as TEPCO's Denko-chan in Japan has been proposed. The production costs for a new character can be an additional issue, so the existing poster-making contest conducted by DOE should be utilized as a realistic measure for creating a new character.

6) Introduction of EE&C event

The DOE does not have enough budget and human resources and is short of know-how for national events such as ENEX in Japan. Therefore, the priority of holding EE&C events is low, but has been proposed as an IEC effective measure for the future.

The Study Team visited Green Exhibition (sponsored by DTI, events for new products, similar to EcoProducts in Japan) and found that foreign suppliers had booths that many students and Philippine companies had joined. It is clear that there are many similar events in the Philippines and that many sponsors already exist. If information dissemination is conducted during such an event, the positive impact of the IEC campaign should be quite high. The proposal is that the DOE holds a national EE&C event every December, an energy efficiency awareness month, and holds the awarding ceremony of the Don Emilio Award in cooperation with other stakeholders and the private sector.

Figure 9-21 Advertisement of Green Exhibition and Message Board of Governors

9.4 Summary

In this chapter, current IEC activities in the Philippines were surveyed, main issues were identified and recommendation/ proposals were given. Almost all activities implemented by DOE classified as IEC activities, DOE' s IEC activities expand among Industrial, Transport and Household sectors. Budget and members involved in IEC activities are very limited. However, it is implemented well. In order to propose basic recommendations, issues were identified in the different aspect such as the Planning and Implementing Process, IEC Actors and IEC Activities.

(1) Current Situation and Issues

Main issues are as follows.

＜IEC Actors＞

- Awareness on EE&C and IEC activities (such as Don Emilio EE&C Award) by energy consumers is very low.

- Regarding EE&C Supporters (Government, Information/Appliance Providers and Key Influential), issues are the weakness of networking to promote IEC for EE&C among ministries, the lack of IEC professionals, and lack of incentives for Information/Appliances Providers.

＜Planning and Implementing Process＞

Issues in Planning and Implementing Process are as follows.

- In planning, one is no cost consideration priorities, although the DOE does not have a sufficient IEC budget. Another is lack of clarification of goals on EE&C awareness and behavior in each sector.
- In implementation, the cooperating structure for IEC for EE&C among ministries is weak. Besides, the duration of collaboration programs for IEC is shorter than one year, which is necessary to last longer.
- There is no evaluation and feedback process on IEC (periodical awareness survey).

(2) Proposal/Recommendation

In the Bill, role allocation of DOE and private establishments were stated. Also, the recommendation for implementing process is prioritizing and setting goal of each activity. Outline of proposed IEC activities are as follows.

Table 9-14 Outline of Proposed IEC Activities

Items	Outline
Improvement of Don Emilio EE&C Award	1) Expansion of the target sector and target population: Creation of awards for academe, communities and retailers etc. 2) New evaluation committee setting according to 1).
Improvement of EE&C training-workshop	1) Cooperation with LGU/NGO and DENR. 2) Expansion of workshop theme: Integration of "EE&C" and "Environment" and cooperation with DENR.
Introduction of periodical IEC effect survey	Questionnaire survey for training/workshop participants and survey of the effects (awareness and understanding) when providing training/workshops
Introduction of EE&C school curriculum	Introduction of "EE&C" in environmental education in cooperation with Dep. Ed
Introduction of EE&C character	Currently, no unified characters are used. Thus, the creation of a new EE&C character through e.g. poster contests.
Introduction of an EE&C event	Introduction of an EE&C event like a Japanese ENEX

Chapter 10 Database

In order to draw out and introduce the energy-conservation policy and the measures based on quantitative data, collecting, organizing and analyzing energy-concerning data is important. EECD is utilizing a database as a tool for analyzing energy consumption of energy intensive consumers for years. It started collection of the data in 1993, and 16,000 energy consumption data has been accumulated in the database.

In this chapter, firstly, current status and challenges of an existing database and future database plan in EECD will be clarified. Next, some Japanese databases which are proven for promotion of energy conservation will be introduced, and the possibility of adoption for these databases to the Philippines will be considered.

10.1 Current Situation

10.1.1 Outline of Existing Database

There are three elements on existing database in DOE. They are 1) existing database in EECD, 2) DOE Portal site, 3) DOE database vision. Followings are outlines of these elements.

(1) Existing Database in EECD

EECD manages the National Energy Conservation Database (hereinafter called NECD). This is only the existing energy-conservation-related database in DOE. This is the database under energy management system, whose data source are periodical reports from energy intensive consumers. Main objective of the database is analysis of the periodical reports and its application to energy conservation planning, however it is only used to nominate winners of the Don Emilio Award. It is the MS-DOS age, stand-alone, single-user database. It has few analysis functions, therefore demand of redesigning is high. (Details are described in 10.1.2)

Other database for collecting reports of GEMP is now under development by DOE-ITMS.

(2) DOE Portal Site

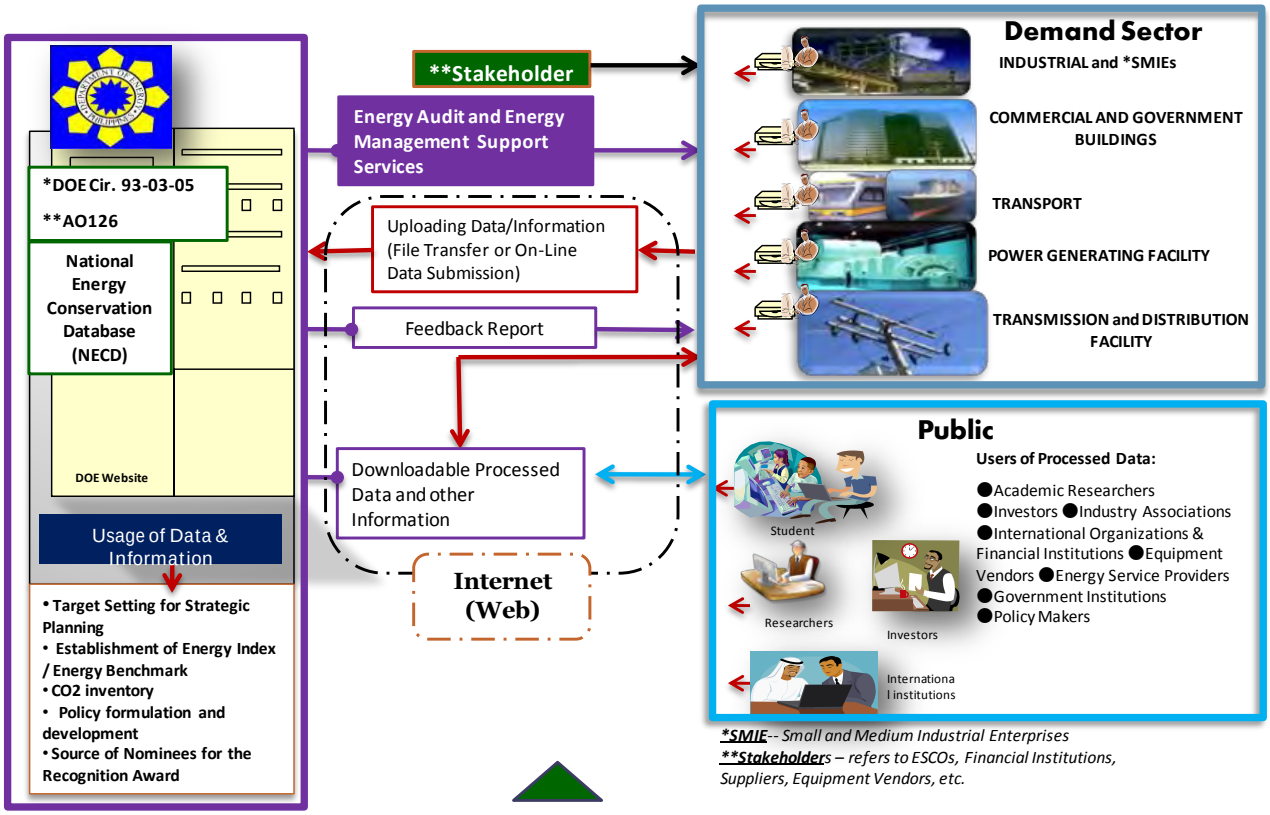
This is the website operated by DOE-ITMS. Both system management and content development are conducted by ITMS itself. Information is provided statically at present from this site, and it has potential to host an online report submission system and a web database system to provide processed information dynamically.

(http://www.doe.gov.ph/)

(3) DOE Database Vision

As shown in the figure 10.1, DOE has a vision of Web-based database system whose objective is report collection and data provision through a Web site. In addition to the database, dispatch service of energy managers and energy auditors is incorporated to the total system design.

- Usage of collected information is assumed as follows.
- Situational analysis on energy conservation
- Target setting for energy conservation
- Setting of energy conservation index (such as specific energy consumption)
- Benchmarking
- CO2 emission analysis
- Energy conservation policy making
- Winner selection of Don Emilio award
- Feedback to report submitters
- Disclosure of processed result of reports to the public.



(Source: a project proposal in DOE)

Figure 10-1 Energy Conservation Database Vision of DOE

10.1.2 National Energy Conservation Database

NECD (The National Energy Conservation Database) is the only existing database for energy conservation. Table 10-1 shows outline of the database.

Table 10-1 Outline of NECD

Type	Database under energy management system
Objective	Energy conservation planning
Operated by	DOE-EUMB-EECD
Disclosure status	Closed
Legal basis for data collection	DOE memorandum circular 93-03-05 The report submission is not compulsory.
Data source	Energy intensive consumers in industrial, commercial, transport and power sectors
Data collection mode	Periodical reports
Threshold of energy consumption and period to submit report	• Establishments consuming more than one million fuel oil equivalent liters (loe) of energy annually are required to submit quarterly energy consumption reports. • In addition to quarterly reports, establishments consuming more than two million loe annually are also required to submit annually energy conservation reports
Report items (CU1)	• Establishment (Company name, Address, Manufacturing or business activity, Plant location) • Total energy consumption (Energy source, Fuel consumption, Liters of Oil Equivalent) • Energy consumption in Transportation • Electricity generation (Electricity generated, fuel consumption) • Steam generation (Fuel type, Fuel consumption, Steam generated) • Electricity and steam utilization • Waste oil utilization (Lube oil consumption, Waste oil collected, Waste oil sold, Waste oil recycled) • Energy consumption in production • Production volume/gross floor area • PSIC code (PSIC: Philippines Standard Industrial Classification)
Report items (CU2)	• Establishment (Company name, Address, Manufacturing or business activity, Plant location) • Energy conservation project started (Measures, Date started, Estimated completion date, Energy savings, Total investments) • Energy conservation project completed (Measure, Date started, Date completed, Total savings realized, Total investment) • On-going energy conservation project (Measure, Date started, Estimated completion date, Energy savings, Total investment) • Energy conservation potential (Measure, Estimated energy savings, Estimated expenses/investment, Problems or constraints) • Target and Actual energy consumption in reporting year and Current year • Target energy consumption by product lines/activities • PSIC code • Specific energy consumption (Energy intensity)
Analyses and report outputs	Total energy consumption, Energy consumption by products, Electricity generation, Steam generation, Information of establishment, Quarterly energy consumption, Fuel consumption, Fuel

	cost, Recycle of waste oil, Specific energy consumption
System	Windows 98, Dbase4 application, Single user, Standalone
Database whereabouts	DOE-EUMB-EECD

(1) Present State of NECD

The current state of NECD is described as follows

1) Report submission

- 239 establishments from industrial, commercial, transport sectors have been registered as of June, 2011. This is 24% of the registered establishments around 1991.
- The registered establishments does not always submit report because of no obligation for submitting reports. Report submission in the year 2009 was about 80. This is 33% of the registered establishments.
- Registered establishment does not always submit a report for each quarter.

2) Usage

- To select winners of the Don Emilio Award (ECCD)
- To estimate demand side energy consumption utilized in creating energy balance table. (EPPB)

* Voluntary report submissions with a lot of missing data makes analysis and utilization to energy conservation planning difficult.

3) Software

- Dbase4, standalone application written in MS-DOS age
- No built in function to compare between different sectors or to make time series analysis.
- No extendibility in analysis using external software such as EXCEL, because there is no data exporting function.
- Because it is a single user application and it does not have data import function, data entry with multiple operators is impossible. Therefore data entry management will be difficult when the report number increases.
- At present, no difficulty has been triggered in data entry against the current number of report submissions.

(2) Challenges on NECD

Six future challenges have been identified as follows.

1) Necessity for more report submission for reliable analysis result

- The number of report submission in fiscal quarter 2009 was 80 on average. This is less than 10% of the past maximum number of establishment registered. (1000 registrations around 1991) Whereas

total sales of electricity in the same year for industrial and commercial sectors is 31,840GWh[1], total purchased electricity calculated by the reports submitted is 2,057GWh. This is 6.5% of the total sales. The figure 10-2 shows total sales of electricity against purchased electricity from 1994 to 2009.

- Under the situation with 80 report submissions, aggregation by sub-sectors will be difficult. And a lot of missing quarterly submissions make difficult to guarantee the reliability of the analysis.

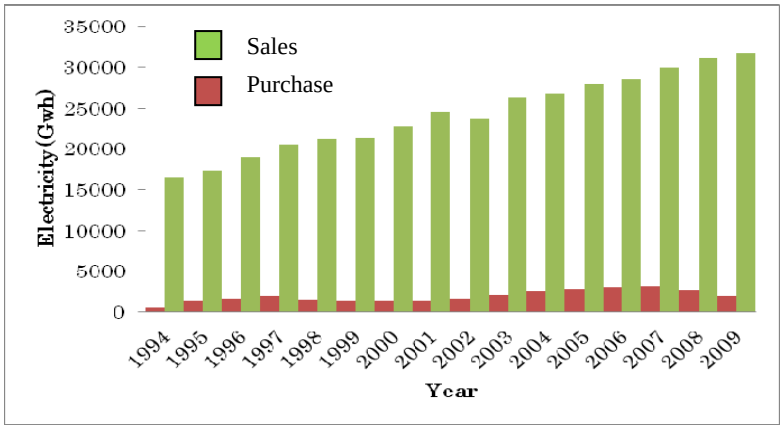


Figure 10-2 Total Sales of Electricity for Industrial and Commercial Sectors and Purchased Electricity Calculated by Submitted Reports

2) Necessity for redesign NECD responding to future increase in number of report submission

- There is dissatisfaction on utilizing NECD on the job such as poor usability and poor analytical capabilities resulted by its design in obsolete technology in MS-DOS age.
- Redesigning and restructuring of NECD is required, because present NECD will not be able to manage to process increasing number of report submissions after when energy conservation law will be enacted in the future, and the report submission is obligated.
- There is no data that shows the level of increase of the number of establishments for submitting reports. However, maximum number of the establishments estimated roughly are 3000 under current threshold (1Mloe/year) and 5000 under half threshold (0.5Mloe/year). Grounds of this estimation is as follows.
  - Assuming that energy consumption is proportional to size of establishment.
  - The past maximum number of registered establishments (1000 around the year 1991) is near to the number of large establishments in 1994. Therefore we assume that the threshold of energy consumption to submit reports was originally designed to pick up the large establishments.
  - The current number of the large establishments is estimated to be 3000. (NSO, "Establishments in the Philippines in 2001") Therefore the estimated number of target establishments under current threshold (1Mloe/year) is 3000.
  - DOE has the intention to lower the threshold to half its present value, in order to increase the number of report submissions. In this case, the threshold must be set carefully not to make small and micro establishments be targeted. Because small and micro establishments are accounting for 99% of the

[1] Source: DOE Portal, Power Statistics
http://www.doe.gov.ph/EP/Powerstat.html

whole establishments, if the threshold is set to low enough to target small and micro establishments, the number of reports submission increase substantially and the reporting system will lose management. Therefore, it is necessary to suppress the number of submissions to about 6000; that is the total of the number of large establishment and middle establishment which is estimated as the data in the year 2001. And DOE estimated this value as 5000 under the threshold of 0.5Mloe/year. However, grounds of this estimation could not be clarified.

- According to this estimation, it is possible that the number of report submissions will increase up to 40 to 60 times against the number of report submissions in 2009. This is a difficult number to manage using the current stand-alone single-user system.

3) Improvement required in the report forms

- The present report forms CU1 and CU2 are specialized to the industrial sectors. Therefore, there are some parts not clear when establishments in other sectors try to fill the form. For example,
  - ◆ There are no fields to fill gross floor area which is necessary for commercial sectors, etc.
  - ◆ There are no fields to fill tons-kg which is necessary for transport sectors.
- Following solutions can be considered
  - ◆ Use CU1 and CU2 as they are, and publish an example of filling the form for each sector in the DOE Portal site.
  - ◆ Prepare a specialized reporting form for each sector
  - ◆ Add missing fields to CU1 and CU2 so that they can be used for all the sectors

4) Additional report items requiring consideration

- Indices of establishment scale (adding to CU1 and CU2 or making a new establishment registration form with the indices) These indices can be utilized in energy conservation planning or benchmarking etc.
  - ◆Followings are examples of establishment scale indices
    - ✧ Number of employees
    - ✧ Gross floor area
    - ✧ Total assets (to be divided into some groups)
    - ✧ Self-reported scale of establishments (large, middle, small, micro)
- Questions about obstacles in promotion of energy conservation (CU2)
  - ◆Collect following items in order to grasp obstruction factors in promoting energy conservation activities, and utilize the information to create supporting strategies.
    - ✧ obstruction factors against promoting energy conservation
    - ✧ changes of above factors before and after energy audit

5) Making of CU2 database

- There is no database for CU2 at present
- Making of a database for CU2 is significant because CU2 has items such as trends of energy consumption and energy intensity based on an energy conservation program, and items to measure energy conservation potential.

- Obtaining data entry staff is one issue. The number of data entry staff members depends on the backlog of CU2.

6) Review of industrial classification code

- CU1 and CU2 are designed to classify sectors using PSIC (Philippines Standard Industrial Classification). At present, it is supposed to be difficult for reporters to fill the field for PSIC code for the following reason. Actually, most of the reports are submitted with the PSIC fields left blank.
  - PSIC code for a sector can be retrieved on the NSCB website (http://www.nscb.gov.ph/activestats/psic/). However, as this is the classification for statistical purpose, retrieving a code itself is difficult for reporters who are not familiar with statistics.
  - There is no description in the instruction of filling the forms about which layer of PSIC or how many digits of the code should be used.
- Other information about PSIC in the forms
  - PSIC is classification of industrial sectors therefore it does not have codes for type of buildings.
  - PSIC code is stored in the database as an attribute of a product line. This is effective to classify such establishments that produce several kinds of product in different sector classification. But, code for this classification do not have to be PSIC. It can be some custom code set.
- Filling PSIC code on entering data at DOE could be a solution for the blank PSIC field. This still have the following difficulties.
  - Inquiries to reporters may be required, that results in a delay of data entry.
  - The number of data-entry operators should be increased when the number of report submission increase.
- Generally, merit of using PSIC is as follows.
  - No need to develop a new classification.
  - Increasing possibility of analysis combined to the other statistics classified by PSIC
  - Determinable aggregation level according to the number of digits to tally
- There is another sector information in the master table for establishments in the database. Its characteristics are as follows.
  - The field is an attribute of establishment
  - The number of establishments by sector is shown in Table 10-2.
  - Under the present number of registered establishment, disaggregation into sub-sector is difficult for almost all the registered sector.
  - Currently, tally result for such sectors as agriculture, petroleum, ceramics and coconut cannot be published since the reporters for these sectors will easily be identified.

Table 10-2 Number of Establishments by Sector (as of June, 2011)

Sector	Establishments	Sector	Establishments
Agriculture	1	Power Gen.	0
Buildings	64	Pulp & Paper	8
Cement	12	Rubber Tires	0
Ceramics	2	Semicon	29
Chemicals	13	Steel/Metal	17
Coconut	2	Sugar	24
Construction	0	Textile	7
Food	20	Tobacco	0
Glass	7	Transport	5
Mining	6	Wood	0
Petroleum	1	Others	21

10.2 Issues

In this section, the future possibility of application in the Philippines and challenges about the following databases shown in Table 10-3, that are used practically in Japan but have not been used in the Philippines, will be considered.

Table 10-3 Adoption of Databases to the Philippines in the Future and Challenges

Database in practical use in Japan	Outline	Challenges in applying to the Philippines
(1) Home and business energy saving equipment database	Providing energy saving characteristics to retailers and consumers	Effectiveness to general consumer is small under present penetration rate of broad-band services.
(2) Industrial energy saving equipment database	Providing whereabouts of the industrial energy saving equipment on the Internet to establishments that is planning to replace or to newly install energy saving equipment.	No objectivity in judging if an equipment is energy saving or not, as manufacturer of the equipment cannot help judging this by itself because of lack of energy saving standards for industrial equipment. There is a negative opinion in hosting this database using the DOE Portal Site, saying the government should not endorse private sectors' advertising activities.
(3) Energy audit database	Various analysis for target equipment, energy conservation measure, energy consumption, energy conservation potential etc. will become possible by making database of energy audit result report.	Forms of energy audit report should be standardized in advance.
(4) Energy manager retrieving service	Providing information of energy managers who have not been appointed to any establishment	License system or accreditation system of energy managers is required in advance.

In the following sections, possibilities and challenges in applying respective databases are explained in detail.

10.2.1 Home and Business Energy Saving Equipment Database

Table 10-4 shows outline of home and business energy saving equipment database.

Table 10-4 Outline of Home and Business Energy Saving Equipment Database in Japan

Type	Database of energy saving equipment in residential and office section
Objective	• To support retailers in retrieving energy saving equipment and printing energy saving labels • To provide information of energy saving characteristics of equipment to general consumers
Disclosure status	• Open to public in the ECCJ website (http://www.seihinjyoho.jp/) • Data linkage with an energy saving navigation website: "Shinkyu-san" (http://shinkyusan.com/)
Operated by	• ECCJ (Consignment from Ministry of Economy, Trade and Industry Agency of Natural Resources and Energy) • "Shinkyu-san" is operated by The Ministry of the Environment
Legal basis for data collection	Law Concerning Rational Use of Energy (Obligation of retailer's effort to disseminate information)
Data source	Manufacturer of energy saving equipment
Data collection mode	(1) Registration of manufacturer: ECCJ registers according to the registration application from the manufacturer. (2) Registration of equipment: Manufacturer registers by itself through a special website
Analysis	Sorting by achievement rate against energy conservation standard, energy conservation efficiency, etc.
Usage	Retrieval of energy saving equipment, printing energy saving labels, tabulating energy conservation performance information

(1) Adoption of the Database and Challenges in the Philippines

1) Necessity of the database

- In Japan, energy saving labels are attached to equipment at retail shops, therefore this database is required for retail shops to retrieve their equipment and print energy saving labels.
- In the Philippines, database for printing energy saving labels purpose is not necessary because manufactures attach energy saving labels to equipment before shipping.
- DOE discloses list of following certified equipment in PDF on the DOE Portal.
  - Refrigerators
  - Split-type room air conditioners
  - Window-type room air conditioners
  - Ballast
  - Compact fluorescent lamps

2) Impact to consumer behavior

- Impact to the consumer behavior of this database supposed to be low in the Philippines for the

following reasons.

- Penetration rate for the internet broad-band service is not high (1.9% in the Philippines, 75% in Japan, Source: ITU[2] 2010)
- Such a consumer seems to be rare, who buys equipment after checking its energy-saving performance written in a PDF file on the DOE Portal site.

➢ In the case of Japan, impact that the database in the ECCJ website gives consumers directly is also supposed to be low for the following reason.

- Though everybody can access to the database in ECCJ website, the ECCJ website itself is not well known to general consumers.

3) Cooperation with other sites

➢ Even if the impact of a web site given to consumers is small, it is possible to increase the impact by cooperating with other sites. Some examples in Japan are as follows.

(3-1) Cooperation with a website of the Ministry of the Environment: "Shinkyu-san"

- ECCJ provides data of the home and business energy saving equipment database to a website "Shinkyu-san" operated by the Ministry of the Environment.
- Using "Shinkyu-san", consumers can compare some energy saving indicators of equipment being used now and its replacement. The differences of values for each indicator such as amount of power consumption in a year, cost of electricity in a year, CO2 emission in a year and CO2 absorption (the number of Japanese cedar trees required to absorb the CO2 reduced) are shown visually. (see figure 10-3 right)
- Human interface of ECCJ database looks stiff and formal showing signs of professionals. On the other hand, "Shinkyu-san" has a fun and visual, consumer-friendly design using a lot of graphics and animations. Therefore, a lot of visits from general consumers can be expected for "Shinkyu-san".
- It is possible to access energy saving equipment database in ECCJ from the interface of "Shinkyu-san".

Figure 10-3 Energy Saving Equipment Replacement Navigation Site "Shinkyu-san"

[2] International Telecommunication Union
(http://www.itu.int/ITU-D/ICTEYE/Indicators/Indicators.aspx)

(3-2) Energy conservation labeling in online shops

<Online appliance shops in Japan>

- Recently, energy conservation performance rating and image of energy saving label is displayed on the product information page on major online shopping websites and online price comparison websites. (Figure 10-4)
- The number of visitors of these sites is far more than the number of visitors of ECCJ website and "Shinkyu-san" website. (Presumption from the number of hits of Google search) Therefore, effectiveness that the energy conservation label is published on website of online shops is large.
- The image of the energy conservation label for website publishing can be created by using the label printing function of the ECCJ energy saving equipment database.
- Efforts of retail shops mentioned in the Japanese energy conservation law is to display energy conservation performance of a product. Sticking an energy saving label on the case of the product is not the only means. Therefore, online shops have to make an effort to display energy conservation performance of their goods. Publishing an image of energy saving label for an appliance is an easy means for web designers because they do not have to design any graphics.

(Source: Bic Camera website: accessed in June 2011)

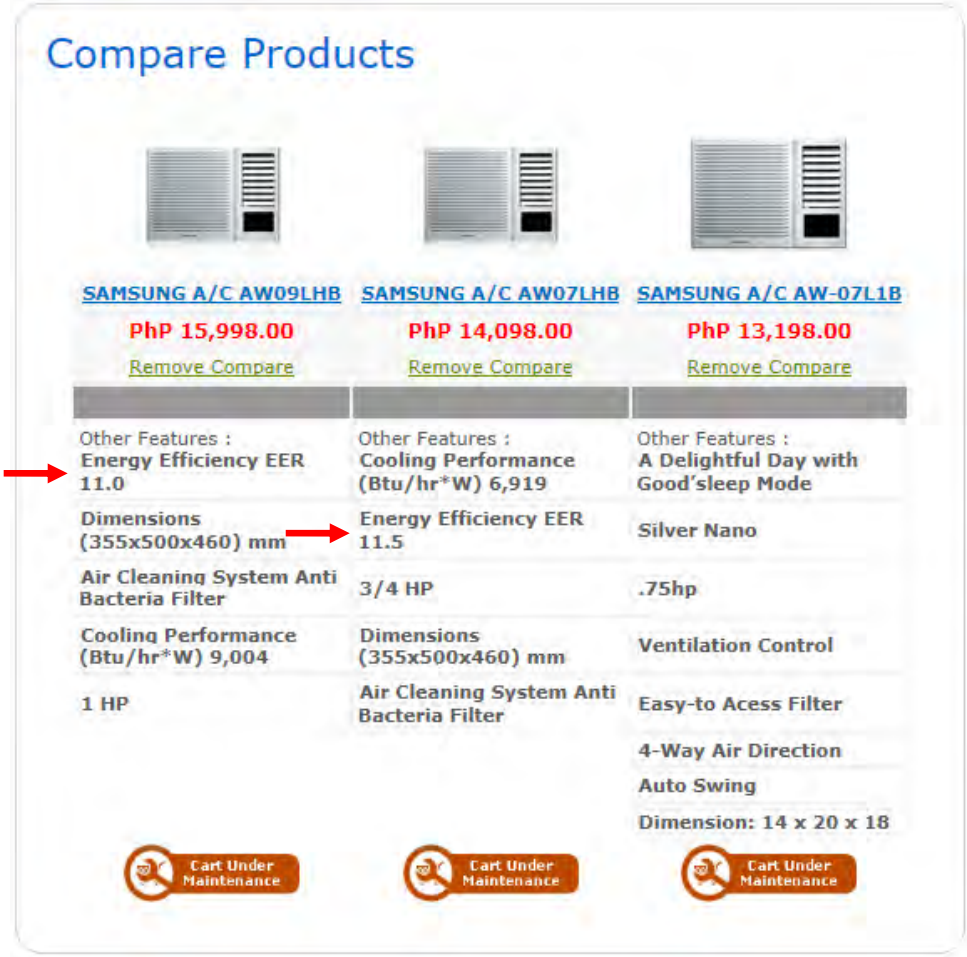
An Example in Bic Camera.com An Example in Bic Camera Rakuten Ichiba

Figure 10-4 Examples in Bic Camera

<Online appliance shops in the Philippines>

- The number of online appliance shops in the Philippines is still a few. The figure 10-5 shows one example.
- As shown in the figure 10-5, energy efficiency is displayed for some equipment. (Online shops in the Philippines are obliged to display energy efficiency or energy saving rating for the certified equipments.)

- Visual impact of this example is smaller than the visual impact of the Japanese examples because only the numerical value is displayed for the energy efficiency. So, we might overlook the description in many cases.
- In the Philippines, cumbersome work is required to display an energy saving label on the website. They have to read the label with a scanner to create an image of the label because the website by which they can create the image of the energy saving label does not exist in the Philippines.



Source: www.abenson.com.ph

Figure 10-5 An Example of Online Shop (ABENSON)

(2) Challenges on Making of Home and Business Equipment Database in the Philippines (Summary)

- Under the current situation that internet penetration rate is low, effectiveness of internet-based means of dissemination to the general consumer is low. Therefore, the current means, disclosure of the list of energy conservation equipment by PDF file, is enough at present. DOE need not make the database of energy saving equipment immediately.
- Once internet penetration rate has improved in the future, disclosure of information using a database will be recommended. Challenges in that case are as follows.
  - Data source
    - ✧ It is uncertain depending on the labeling system in the future.

- ✧ DOE-LATL has data of equipment whose test was conducted by DOE-LATL, but does not have data of equipment whose test was conducted by other organization.

- Hosting site
  - ✧ DOE Portal seems to be suitable.
- Data linkage with other website through the Internet
  - ✧ Exploring possibility of data linkage. (linkage partner, linkage effectiveness)
  - ✧ Providing means to access database through the Internet
  - ✧ Providing a module such as CGI, Server-side script or Servlet that returns an image of energy saving label if it is called with parameters like ID of a products, name of a products etc. (Assistance for website designers of online shops)
- Effort to collect more visitors
  - ✧ Improvements to the website
  - ✧ Mutual link with another site
  - ✧ SEO (Search Engine Optimization)*
  - ✧ Providing information of the website by printed matter etc.

*Note: Search engine optimization (SEO) is the process of improving the visibility of a website or a web page in search engines via the "natural" or un-paid ("organic" or "algorithmic") search results. SEO is conducted by a professional engineer in many cases.

10.2.2 Industrial Energy Saving Equipment Database

Table 10-5 shows outline of Industrial energy saving equipment database in practical use in Japan.

Table 10-5 Industrial Energy Saving Equipment Database

Type	Database of URLs that shows whereabouts of energy saving equipment on the Internet
Objective	Providing whereabouts of industrial energy saving equipment on the Internet to establishments that is planning to replace or to newly install energy saving equipment.
Disclosure status	Open to public in the ECCJ website (http://eccj06.eccj.or.jp/equip-e/)
Operated by	ECCJ
Legal basis for data collection Related regulation	Using classification of energy saving equipment written in the METI notification "Guidelines for the creation of medium and long-term plan"
Data source	Manufacturer, vender and engineering company, etc.
Data collection mode	• To be registered, an application form should be filled and sent to EJJC. • Data donor such as manufacturer judges whether it is energy saving equipment because there are no energy conservation standards with a few exceptions such as motors, transformers, etc. • ECCJ does not examine or accredit energy saving equipment. • A lot of URLs are in the database because disclosure of the URL of data page of an equipment through the database can work as advertising of the equipment.
Analysis	None
Usage	Users can retrieve URLs of some equipment by name or type of equipment. Users can jump to a product description page by clicking a URL. Users have to use the database on their risk.

(1) Possibility of Adoption of the Database to the Philippines

1) Demands of the database in the Philippines

- It is supposed that URLs are often retrieved after energy audit is conducted. Energy audit is at least conducted at about 50 establishments in a year by official organizations. (The number of cases by ESCO will join this) Therefore, demand for this database will increase if the number of energy audit cases increase in the future.

2) Data collection

- Data collection is conducted by self-report base.
- There is no obstacle in the data collection because there is an advertising potential for the establishments to register their products on the database.

3) Lack of energy conservation standards

- In the Philippines there are no energy conservation standards for industrial equipment. Therefore it is impossible to judge objectively whether equipment is energy-saving for outsiders. The judgment should be left to the equipment manufacturer. (This is the same situation as Japan) The judgment might become advantageous for the manufacturer because it is a self-judgment.

- Use of this database is on user's risk.

4) Consideration of penetration rate

- Broadband penetration rate is not needed to consider because user is not a general consumer but an ESCO or an establishment who is planning to exchange or to newly procure equipment.

(2) Adoption of the Database and Challenges

- DOE can easily start this service using DOR Portal site without any technical difficulties. However, there is an opinion that DOE Portal site is not suitable to host such a database that uncritically stores URLs of equipment which manufactures judged energy-saving, that endorses establishment in advertising, and that is used on user's risk. So, where the database is being hosted is a challenge.
- Hosting abroad may be possible. Actually, there is an example that EPPB offers energy balance data to the APEC Energy Database which is hosted by the Institute of Energy Economics Japan.
- In operation of the database there are some technical challenges such as protection against registration of hazardous site, protection against registration by identity theft, maintenance of broken links, etc.

10.2.3 Energy Audit Database

Table 10-6 shows outline of Energy audit database in practical use in Japan.

Table 10-6 Energy Audit Database

Type	Database of energy audit result report
Objective	Accumulation and utilization of energy audit technologies and energy audit cases collected from the reports of energy audit conducted by ECCJ
Disclosure status	Nondisclosure
Operated by	ECCJ
Legal basis for data collection Related regulation	None. It is only for ECCJ internal purpose.
Data source	Energy audit reports written by energy auditors in ECCJ
Data collection mode	Copy of energy audit report
Analysis	Target equipment, Energy saving method, Energy consumption, Energy saving potential, The number of energy audit by sector Other analysis might be available by adding queries to the database.
Usage	Retrieving energy saving method and energy saving cases, Training of energy auditors, Creating documents

(1) Consideration for Adoption of the Database in the Philippines

1) Characteristics of the energy audit database

- ECCJ is a juridical foundation under the Agency of Natural Resources and Energy. It is conducting various activities on energy conservation such as promotion of energy conservation, CO2 reduction, Human resource development, International cooperation, National exam of energy manager, etc. As for energy audit, it provides a free energy audit service, so it is in a different standpoint from general ESCO.
- The energy audit database here is for internal purpose of ECCJ, which is constructed for smooth execution of energy audit activities.
- Data will not be exposed to outside users because it is confidential business information.

2) Possibility of adoption of the database to the Philippines

- In the Philippines, such organizations as DOE-EUMB-EECD, DOST-PCIEERD, DOST-ITDI, ENPAP, PECCI and ESCO conduct energy audits. But the total number of energy audit cases per year is not many at present.
- Effectiveness of energy audit database in ECCJ is based on more than 14,000 energy audit cases accumulated over many years. There is no guarantee to result good effectiveness even though establishments in the Philippines adopt this database.
- On the other hand, DOE's effort to collect success cases like in ECCJ and to disclose them through the DOE Portal site or by printed matters is effective for promotion of energy audit database adoption in establishments.

a) Possibility of collecting energy audit data by DOE

When DOE collects data concerning energy audit, there are two data sources. One is an organization which conducted energy audit. The other is an establishment at which the energy audit was conducted. If only the energy intensive establishments are the target of analysis, collecting data of energy audit from the periodical report under energy management system (CU2) is a useful solution. If all the establishments which received energy audit service is the target of analysis, collecting data of energy audit from the organizations which conducted energy audit is required. In this case any legal grounds to collect data of energy audit will be required. Though collectable items are the same, there are small differences as follows by data source.

- Collectable items
  - ◆the number of cases, sector/subsector which received energy audit, target equipment, energy saving method, energy saving potential (estimated energy reduction, estimated amount of capital investment, payback period)
- Difference by data source
  - ◆Collecting data from organization which conducted energy audit
    - ✧ Direct measurement for activity of energy audit service provider
    - ✧ Legislation of energy audit system might be required for collecting data
    - ✧ Reporting form with a suitable aggregation level which does not violate the

confidentiality of energy audit result must be developed.

◆Collecting data from establishment at which energy audit was conducted

- ✧ Indirect measurement for activity of energy audit service provider
- ✧ Legislation of energy management system might be required for collecting data.
- ✧ Revision of annual report (CU2) is required to collect items above.
- ✧ Additional data collection on energy conservation barrier is available by revision of CU2.
- ✧ Only the establishment whose energy consumption is more than 2Mloe is targeted.

b) Possibility of energy conservation data linkage between DOE and other public organizations such as DOST

In considering the above possibility, known information, merit of data linkage, reality and challenges are as follows.

- ➢ Information already-known
  - ◆Information in the analysis report level is available
  - ◆Provision of raw data or micro data is impossible due to protection of business information
  - ◆No public organization has database of energy audit result at present
- ➢ Merit of data linkage with other site
  - ◆More variety of analysis will be available by cooperating energy auditors with different area of specialty.
  - ◆Reliability of analysis increases so that the number of energy audit cases increases.
- ➢ Reality and challenges of data linkage
  - ◆Is it really required under the existence of alternative to collecting energy audit data from CU2?
  - ◆There is a risk that an establishment is identified and its business information is leaked in some aggregation level because the number of energy audit cases is not big enough at present.
  - ◆Though no organization has database of energy audit result, manual tabulation might be possible because the number of energy audit cases is small.
  - ◆Development of a system to link data and standard data format to exchange energy audit result will be required.
  - ◆It needs to be considered whether the provision of analytical report is really insufficient.

First of all, DOE should start making a database of energy audit reports.

10.2.4 Energy Manager Retrieving Service

Table 10-7 shows outline of the database for Energy manager retrieving service.

Table 10-7 Outline of the Database for Energy Manager Retrieving Service in Practical Use in Japan

Type	Database to retrieve energy managers who are not appointed
Objective	Providing information of energy manager licensee to establishment which is recruiting energy managers.
Disclosure status	Open
Operated by	Consignment from Agency of Natural Resources and Energy, METI ECCJ (2003.4 - 2010.3) P2 company co. ltd. (2010.4-2011.3) (http://energy-kanrisi.com/) It is closing as of July, 2011.
Legal basis for data collection Related regulation	None
Data source	Licensee of energy manager
Data collection mode	Registration using a Website, Sending required documentation, After confirmation of the qualification, information will be open to the public.
Analysis	None
Usage	Information of energy managers can be retrieved by specifying region.

(1) Characteristics of Energy Manager Database

Figure 10-6 shows the flow of the energy manager registration processing in Japan.

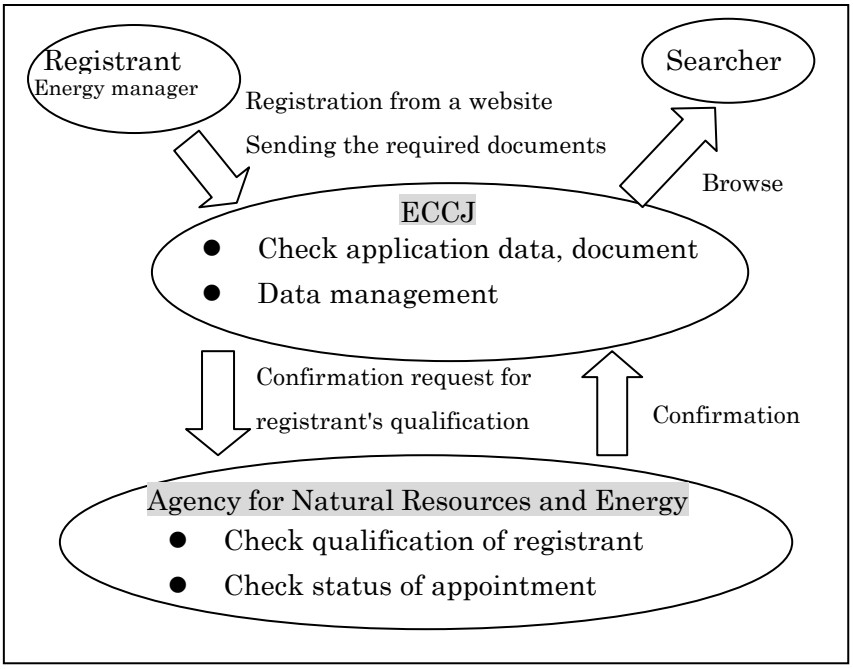


Figure 10-6 Energy Manager Registration Flow

(2) Consideration towards Adoption of the Database to the Philippines

The condition for applying this database to the Philippines is as follows.

- Qualification or accreditation system for energy manager is required in advance
- Condition to be a host of the system is as follows considering the work to confirm registrant's qualification.
  - ◆Hosting at the license issuing authority or qualification accrediting authority of energy manager
  - ◆Hosting at any trustee from above authority

* DOE Portal will be suitable as a hosting site if DOE will be a license issuing authority or qualification accrediting authority in the future.

10.3 Proposal

10.3.1 Development of New NECD System

Restructuring of the current NECD is one of the much needed issues of EECD. Firstly, the JICA Study Team conducted a conceptual design of the new NECD system, and developed the new NECD system based on the design, and the data in the old NECD system was migrated to the new system, finally proposed its implementation. Detail is described in sequence.

(1) Conceptual Design

NECD is the database system currently running in EECD. Therefore the new system should work independently of enactment of the energy conservation law. Also, the increase in the report submission number after enactment should be considered.

The conceptual design consists of the following 12 items from 1) to 12).

1) System configuration

System will be in accordance with the "Energy conservation database vision of DOE" (Fig. 10-1) and to realize the online submission of the reports.

2) Designed Maximum data processing rate

The number of establishments with report submission duty based on any statistical analysis could not been obtained during this study. However, as is described in the section 10.1.2, the threshold of energy consumption of an establishment to submit report should be determined carefully so that the majority of the target will consist of large and middle-sized establishments. In that case, the maximum number of the report submission can be estimated as 6,000, which is an approximate summation of the number of large and middle sized establishments. So, the system will be designed to aim at handling 6,000 input-work by one person-month.

Maximum data processing rate = 6,000 [reports/person-month].

Therefore, input-work for one submission-term ends within a month operated by one person.

3) Reduction of input labors

When an input work is performed by one person, 25 to 33 reports must be processed in an hour to finish processing 6,000 reports in one month. This means that an operator can spend only about two minutes for one report. It is apparent that the rate cannot be achieved by taking traditional manual input of printed report. This system reduces the input labors as follows.

① When a report is submitted, it is acknowledged by showing the report title in the notification area in the main screen.

② When noticed, operator will open the report.

③ When report is opened, the system will automatically validate consistency of the report according to the pre-defined rule.

④ Operator will correct the report if needed by automatic consistency check, and will perform visual test additionally.

⑤ Operator will store the report in the database by pressing the "Store" button after consistency test.

The key point is, what the operator should do is not manual-input of the report, but correction of the report according to the result of automatic consistency test, because the system receives the report on-line

In principle, it is even possible to perform above ① to ⑤ fully-automatically, but a manual process to test the consistency of the report has been left to the system after consulting with EECD, because the possibility of report submission with a mischief cannot be erased.

4) User registration

Before each establishment make on-line submission, it needs to register as a user, and it needs to acquire establishment ID. Once an establishment acquired the ID, it will use the same ID upon on-line report submissions of any kinds. CAPCHA authentication[3] and e-mail authentication will be used in the procedure of the online report submission, in order to prevent automatic registration by malicious scripts or registration using an email address that does not exist.

Figure 10-7 CAPTCHA Authentication

The procedure of user's registration is described below.

① Open a registration page linked from the DOE Portal.

② Input user information in the page. Information to be collected are as follows.

- Company name
- Address
- Tel. number
- e-mail address
- Plant location
- Region number
- Business activity
- Sector
- Approx. number of employees by gender[4]
- Contact person1
- Position 1
- Contact person 2
- Position 2

[3] Authentication requesting a response which machines cannot perform. Such as reading distorted letters in a noisy picture.

[4] The number of employees is added to analyze relationship between size of establishment and energy consumption. It is supposed that there is not remarkable relationship between energy consumption to the number of employees by gender. The classification by gender is added by the request of DOE because gender is one of the hot issues in the Philippines.

③ Go to the confirmation page and after confirming the user information, input the following items.
- Any password
- Confirmation of the above password
- A secret question and its answer. (Such as 'What is your oldest child's nickname?'.)
- Letters in CAPTCHA

④ When user press the "Register" button, system try to send a e-mail to the registered e-mail address. If it failed to send e-mail, system notifies it. Registration processing is not completed yet.

⑤ There is a link to a page to complete registration in the e-mail sent by system. User should click the link.

⑥ When user open the page, a message of the completion of registration will be displayed. An establishment ID is issued and written in the message.

⑦ In order to prevent user from losing the establishment ID, another e-mail with the ID will be sent to the user. This is the end of user registration process.

5) User page

- User can open its private page linked from DOE Portal. Authentication to enter the page will be performed by the password registered and the establishment ID. The page provides following services.
- Edit user information
- Change password
- Download a template of a report

  Some text in the reports such as plant names must be common unless there is a change. User must manage these texts, and to ease this management, using the last report submitted as a template is helpful.
- Search and download submitted reports of the user
- Create and download time-series charts and data of energy consumption of the user

6) Password recovery

When user lost the password, the only way to recover it is as follows.

① User will send the establishment ID and answer of the secret question from the password recovery page.

② When the establishment ID and answer of the secret question are verified, temporal password will be sent to the e-mail address which was registered.

③ User will open the private page with the temporal password and change it with the favorite password.

For security purposes, the system will not keep user's password but keeps an hash[5] value generated

[5] A hash value is a result of conversion from source data (such as a password) using a hash function. Different source data often result different hash value, but not necessarily different. Inverse transform from hash value to source data is impossible, therefore system cannot know a user's password from a hash value kept in the system.

from the user's password. Therefore, the system cannot notice user the password directly as it cannot know the password itself. This is why the system must take the way to recover password using a temporal password.

7) Online report submission

There are two prominent types of online submission.

a. Submitting a web-form reproducing a report format.

b. Submitting a report form in any format such as Excel format from a online submission page.

This system takes b. by the reasons below.

- b. is similar to the way of submission in the present system which uses report form in the Excel format.
- User can take other options on submission such as submission by e-mail attachments, by postal mail or by hand.
- Filling a report form will be easier because user can utilize editing function of a specified application such as Excel.
- Reproducing a form with a lot of items in a webpage is normally not a good idea, in terms of memory consumption, available editing functions and lightness of the website.

8) Storing reports in the database

See "3) Reduction of input labors" in the page 10-20.

9) Analysis

Analysis of reports will be performed by tabulation and chart-drawing.

a. Tabulation
   - Creation of two-dimensional crosstab.
   - Export of the crosstab in Excel97 format.
   - Export of the original table of the crosstab.

b. Chart drawing
   - Chart type is selectable from Bar, Column, Stacked bar, Stacked column, Line, Pie and Funnel.

c. Analysis variables
   - Variables in a report such as Overall energy consumption, Product energy consumption, Electricity generation, Steam generation, Quarterly consumption, Transportation consumption, Steam/Electricity utilization, Waste oil utilization, Specific energy consumption, Production volume, Energy consumption reduction ratio, CO2 emission, etc.

d. Classification items
   - Classification items in a report such as Region, Energy Source, Sector, Year, Quarter, Company ID, Energy consumption group, etc.

e. Tally functions

   The functions as Average, Minimum, Maximum, Count row, Standard deviation, Variance and

Summation

10) Registration of a new report

The CU1, which is the present report form as of the design phase of this system, is specialized in reports of the industrial sector. But it is used for commercial buildings as well although the industrial sectors and commercial buildings should have different report forms. EECD may prepare new reports forms for other sectors like transportation sector in the future, or may modify some reporting items when the energy conservation bill is enacted, according to the proposed energy threshold or report frequency. And each new or modified report must have its own database structure. Therefore the system should not be just a replacement of the current database of the CU1, but it should be a general online reporting purpose application which can accept any report forms. To be so, the system should have a function to register new report templates. The required functions are as follows.

- Registration of a report template
  - ✓ A function to record report structure such as location of each cell and information in the cell.
- Specifying corresponding database structure
  - ✓ Table definition to keep information in a report
  - ✓ Relationship between fields in the tables and cells in a report
- Specifying automatic calculation
  - ✓ Specifying a formula just in case there is an item calculated from other items automatically
- Specifying data consistency check
  - ✓ Verifying the required items in a report are existing
  - ✓ Verifying constraint conditions such as a dependent cell derived by other cells
- Specifying analyzing items
  - ✓ Reading external files to define items to analyze and methods of analysis

11) Customizing system parameters

Some parameters will be defined in external configuration files so that Admin users can customize the system. Such items are,

- ✓ Texts in e-mails sent on user registration,
- ✓ List of secret questions used on user registration,
- ✓ IP address of a mail server.

12) Customizing web page design

Since the design of a user interface needs to maintain a feeling of unification with the DOE Portal site, it should be considered so that the Web designer of ITMS can customize

13) Treatment of the PSIC columns

EECD told in the discussion that the column for the PSIC is not necessary since it is scarcely filled by users. It is true that disaggregation by detailed industrial classification is almost meaningless with the

current number of report submissions. However, increase in the report submission number will be expected if the energy conservation bill is enacted. In consideration of the case when more detailed classification than the present classification by sectors in the master table of the establishments is required, general-purpose columns for classification not only for PSIC will be reserved.

(2) System Development and Data Migration

Reconstruction of the database for CU1 was performed according to the conceptual design described in (1).

1) Specification

Specification is shown in the Table 10-8.

Although Linux has been chosen as the platform in this work due to the availability of the license, the system is operational similarly on Windows Server working in DOE.

Table 10-8 Specification of the System

Platform	Linux (LAMP), Windows (XAMPP or WAMP Server)
Server side script	PHP, Zend Framework Using Zend Framework, programmer can write logic and design of the system separately. This allows the web designers in ITMS to customize design of web pages easily.
Client side script	Javascript/JQuery Javascript can be simplified by using jQuery. Intuitive description is available using JQuery which specifies objects in a page using CSS selectors which are familiar to web designers.
Communication with database	Data in JSON format Asynchronous communication using Ajax
Report format	Excel97 format A form should be designed keeping constraints below. ・ A report form identifier should be placed in the A1 cell. ・ One cell should keep one data. In case an input item straddles two or more cells, the cells must be combined into one. ・ All the other cells than input cells should be locked.
Analysis	Analysis is performed by tabulation and charts A library "FusionChartFree" is used for drawing charts.
Owner of the system	DOE/EUMB/EECD
Administrator of the system	DOE/ITMS
After service	Free support by e-mail and a support website Support website: http://masiii.com/necd e-mail: wh6x@yahoo.co,jp

2) User registration

The user registration page is shown in the figure 10-8.

In addition to the user information, arbitrary password and text for the CAPTCHA must be given on registration.

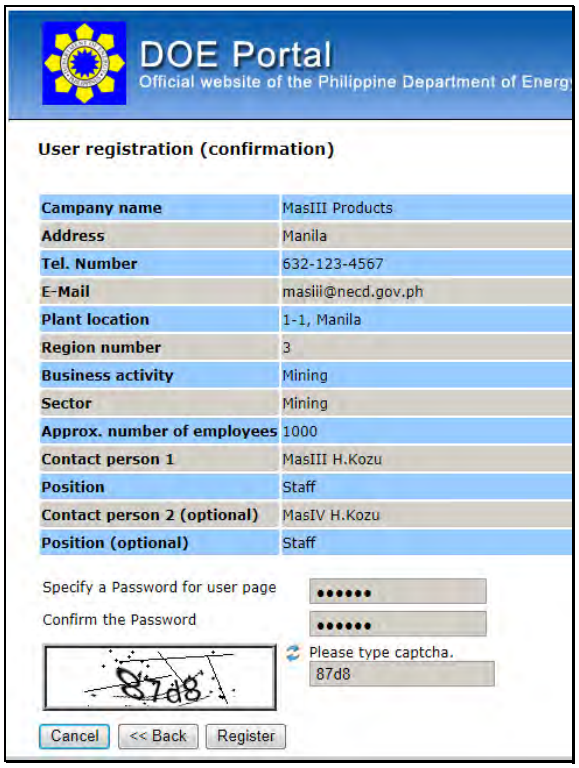


Figure 10-8 User Registration Page

When the register button is pressed, an message in the Figure 10-9 will be shown and a link to complete the registration process will be sent to the e-mail address which is specified in the registration form.

Figure 10-9 E-mail Notification Message

Message is customizable.

The message to send is as Figure 10-10.

Figure 10-10 An E-mail with a Link to Complete Registration

Message is customizable.

When the link in the above e-mail is clicked, An establishment ID will be issued and the registration process will be completed.

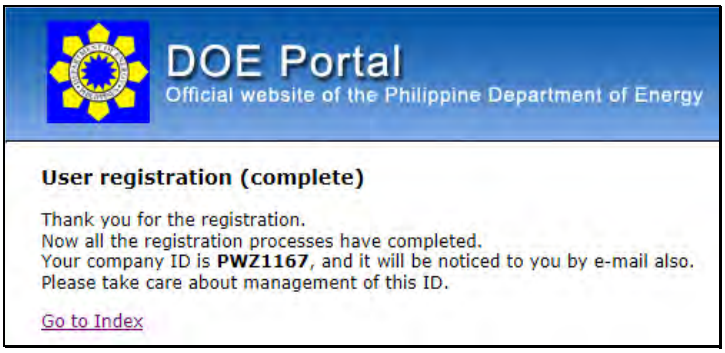


Figure 10-11 Notification for Completion of a User Registration

An establishment ID is in the e-mail (PWZ1167 in this example). Message is customizable.

An e-mail with the same establishment ID will be sent to the user.

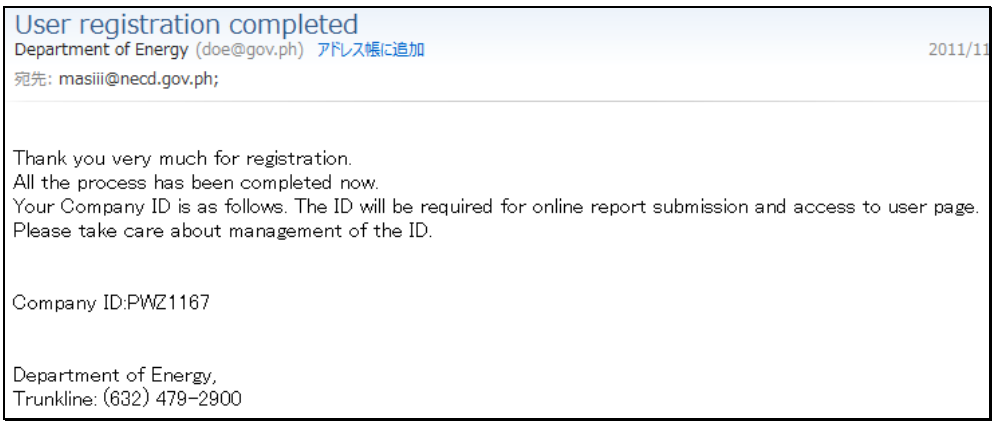


Figure 10-12 The Completion Mail of User Registration

Message is customizable.

3) Design of a report template

A report form must be designed in Excel97 format.

The design is free except the following requirements.

- The first page contains identifiers of a report
  - ✓ A1 cell in the first page is for a report form identifier.
  - ✓ The first page must contain input cells for all the items shown in the Table 10-9.
- In case an input item straddles two or more cells, the cells must be combined into one so that one cell contains one data.

* Since the present report form (CU1) did not satisfy the above requirements, it was redesigned upon database re-creation.

Table 10-9 Indispensable Reporting Items

Indispensable item	Description
Sheet No.	Default value is one (1). If additional report forms are required, serial numbers like two, three, four... should be assigned accordingly.
Year	Year in four digits like 2011, 2012...
Term of a year	1H (the first half of a year) 2H (the second half of a year) 1Q, 2Q, 3Q, 4Q (quarters of a year) A (annual)
Company ID (= establishment ID)	Unique ID to identify an establishment

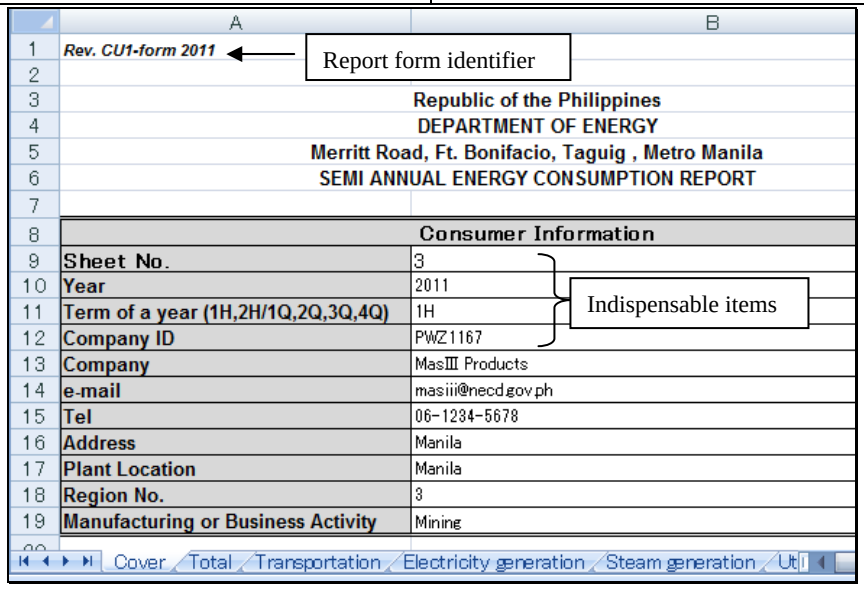


Figure 10-13 Example of the First Page of a Report

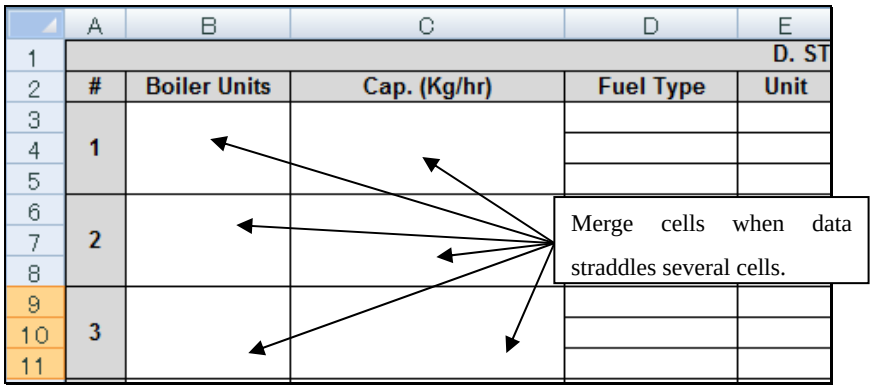


Figure 10-14 Example of Data Input Fields

4) Online report submission

User can submit a report from the report submission page (Figure 10-15) linked from the DOE Portal by pressing the submit button after specifying following items.

- The location of the report file in the User's PC
- User's password registered
- CAPTCHA text

Authentication of the user will be done using the password above and the establishment ID filled in the report. When the data is submitted, the system verifies the indispensable items mentioned in 3) and checks for duplicate of submission in the same submission period. And if they are validated a receipt message (Figure 10-16) is displayed.

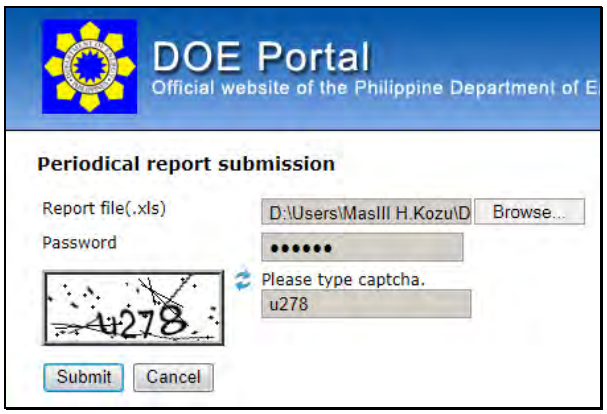


Figure 10-15 Online Submission Page

Figure 10-16 Receipt Message

5) Report submission in other ways (Offline submission)

Following options in report submission are available for the users who have difficulty in using the online report submission.

a. Submission of a report file in Excel format by email attachment.
b. Submission of a report file in Excel format by postal mail
c. Submission of a printed report by postal mail

In the case of a. and b., a data entry operator in EECD will carry out the report submission for a user, using an administrative web tool in Figure 10-17. Since report submission is carried out by operators who have administrative privileges, the CAPTCHA attestation and password input are unnecessary. Report authentication is done using only an establishment ID filled in the report.

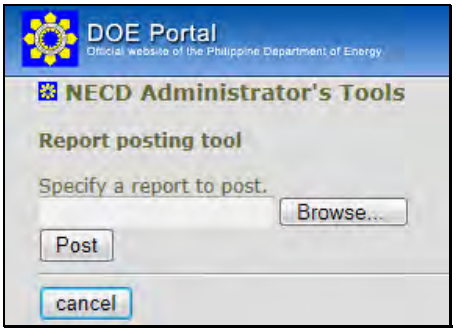


Figure 10-17 Offline Report Submission Page

In the case of c. an input operator firstly fills the report form in Excel format manually. And he/she submits the report using above offline report submission tool. Since this manual process takes a long time, EECD must encourage users not to take the option c. Option a. and b. are acceptable since data processing rate will not be reduced significantly if some operators are assigned to carry out off-line report submission.

6) Data verification and storing

The main window of administrator's tool is shown in the Figure 10-18.

This web tool is accessible only from the DOE local area network but from the Internet. Only the registered administrators can use it. And before using the tool, administrator must be authenticated with an ID and a password.

When the system receives a report, the filename of the report, name of establishment, e-mail address and phone number are displayed in the notification area in the window. The notification area will automatically update every 10 minutes. The latest information can also be acquired by pressing the update button.

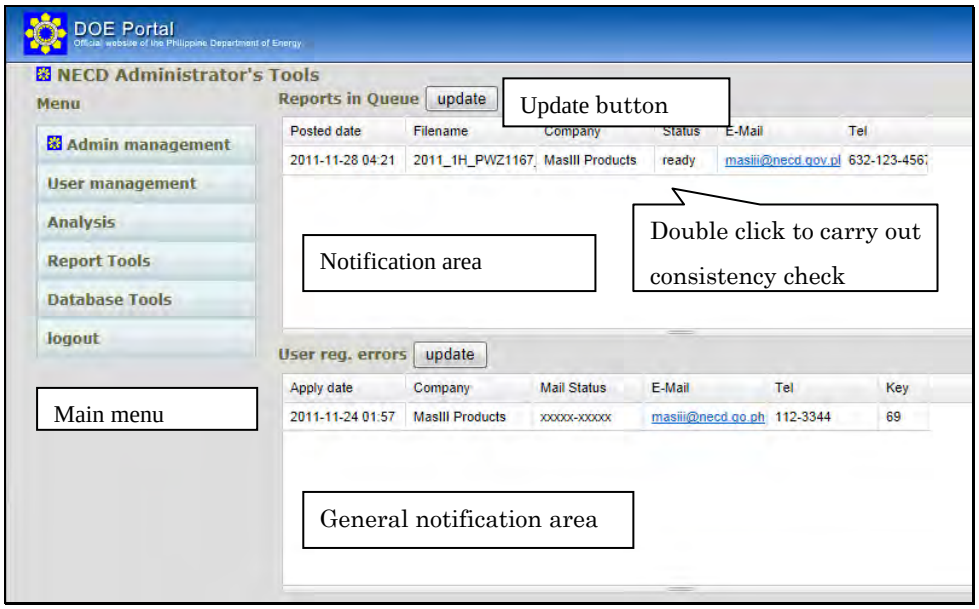


Figure 10-18 Main Window of Administrator's Tool

A report is opened in double-clicking the line of the notification, and consistency check process is started.

The consistency check page is shown in the Figure 10-19.

- The image of an Excel form is reproduced in the consistency check page. Locked cells are displayed in gray. The gray cells are not editable.
- When a white cell is clicked, an input box appears and editing of the cell becomes possible.
- Fixed calculations are performed automatically according to the rules written in the schema which is explained in 8).
- Other consistency checks, such as checking missing data or checking values in two or more cells whose value must be equal to, are also performed automatically according to the schema. And the cells with inconsistency are notified.
- After correcting inconsistency if needed, the report is stored in the corresponding database by pressing the save button.
- If an operator judges that the report was submitted apparently with a mischief, he/she can delete the report by pressing the delete button.
- When an operator saves or deletes a report, the corresponding line will be removed from the notification area in the main window.

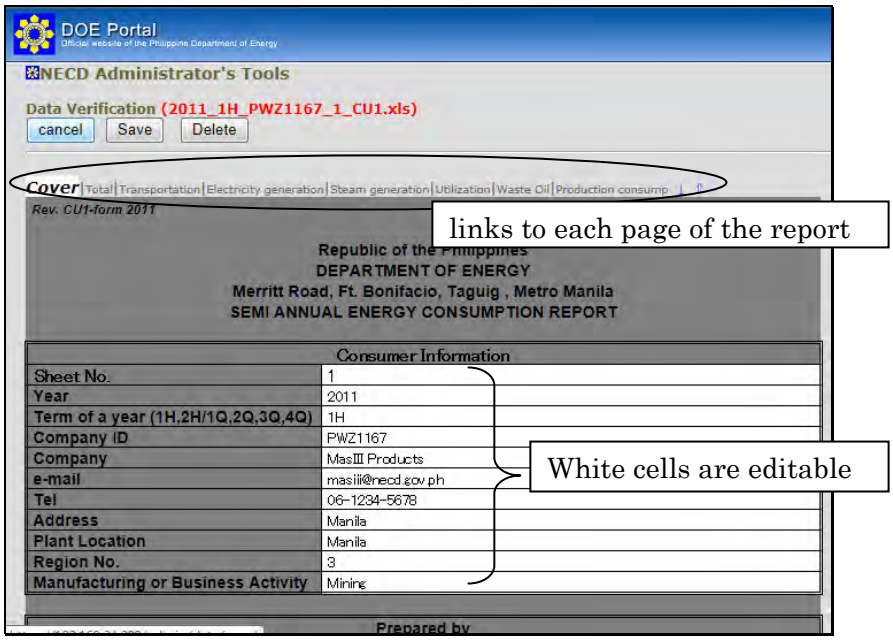


Figure 10-19 Admin Tool: Consistency Check

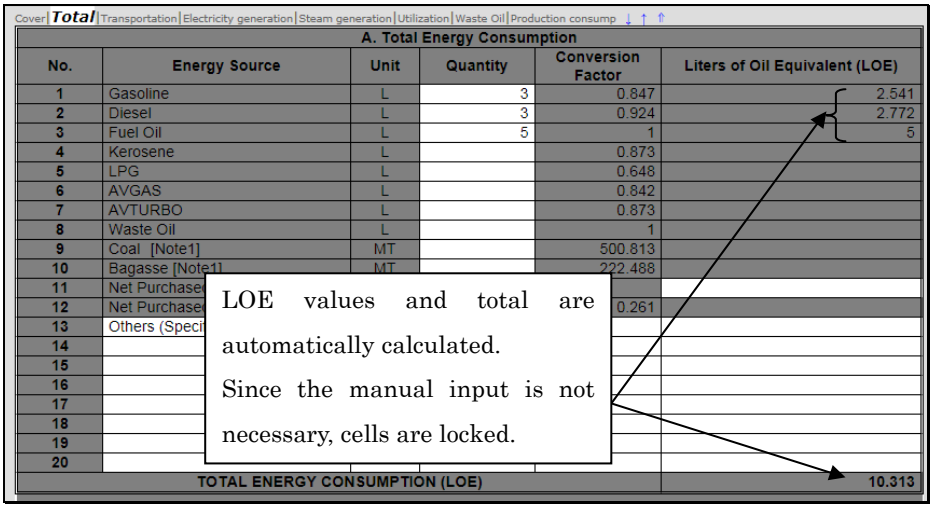


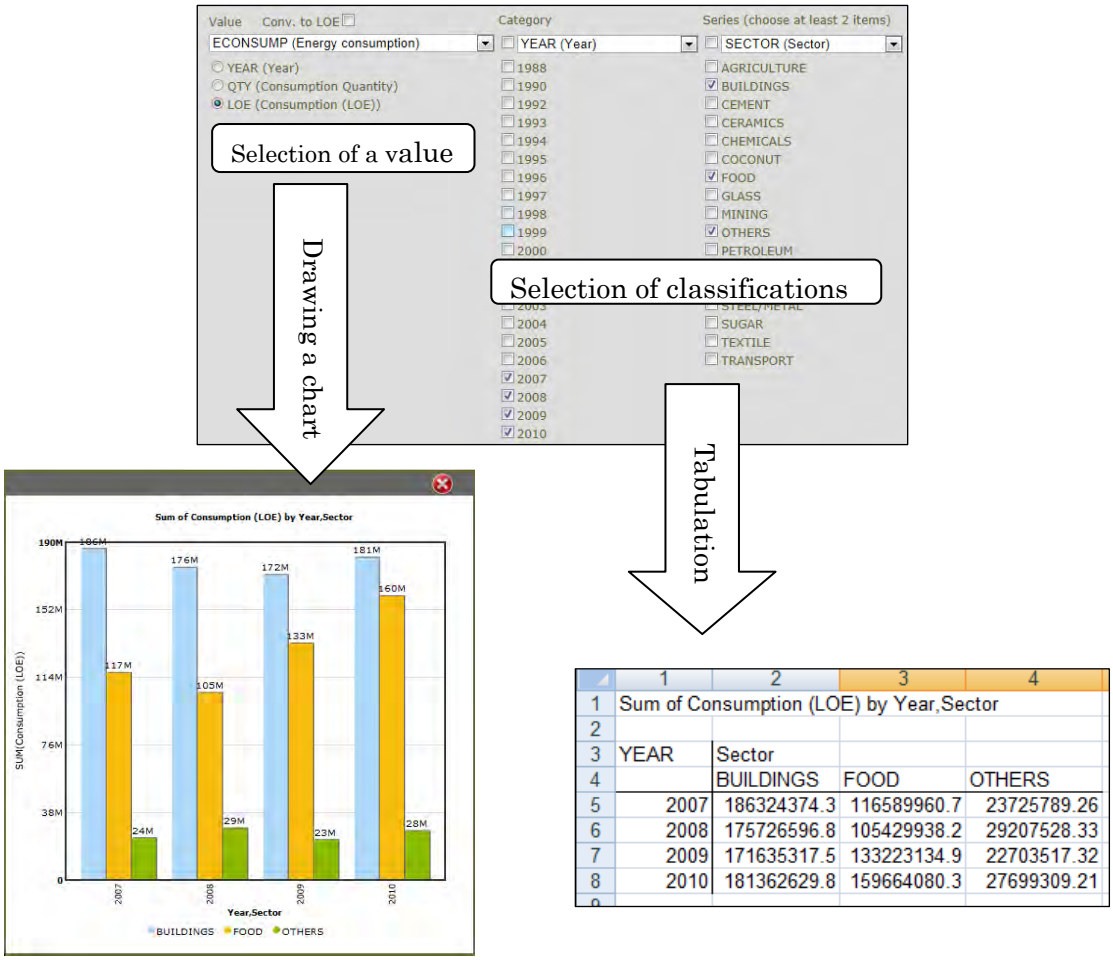
Figure 10-20 Admin Tool: Consistency Check (An example of automatic calculation)

7) Analysis

Analysis is performed by tabulation and creating chart

A chart type can be chosen from Bar, Column, Stacked Bar, Stacked Column, Line, Pie, and Funnel.

An aggregate function can be chosen in Sum, Average, Minimum, Maximum, Standard deviation and Variance.



	1	2	3	4
1	Sum of Consumption (LOE) by Year,Sector			
2				
3	YEAR	Sector		
4		BUILDINGS	FOOD	OTHERS
5	2007	186324374.3	116589960.7	23725789.26
6	2008	175726596.8	105429938.2	29207528.33
7	2009	171635317.5	133223134.9	22703517.32
8	2010	181362629.8	159664080.3	27699309.21

Figure 10-21 Examples of a Chart and a Table

A table or a chart will be created by aggregating a selected value using a selected tally function classified by selected classifications. The created table can be downloaded in Excel97 format. Operator can make a further analysis of the data using the downloaded Excel file. Figure 10-21 shows the selection window for a value and classifications, and an example of chart and table created from the selection.

8) Registration of a report template and support functions for creating a schema for the template

A blank report form (= template) which satisfies the requirement described in "3) Design of a report template" has to be registered prior to use. The report form registration page (Figure 10-21) is under the menu "Database-Tools"-"Form Registration" in the main window.

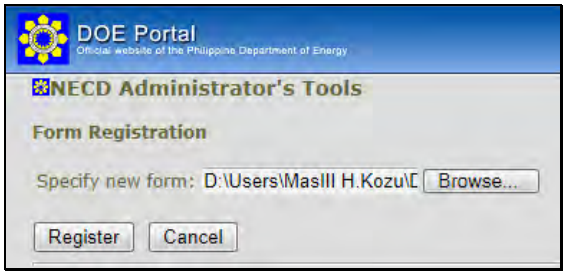


Figure 10-22 Admin Tool: Report Form Registration

When the register button is pressed, specified report form will be registered and its design will be displayed. (Figure 10-23)

The display pane is provided with the following support functions for schema creation.

- Switching between report view and locator view
  - ✓ This function is to support creating schema.
  - ✓ A locator represents a value and a location of a cell in a report. A locator will be assigned to a specific field of a particular table in a database.
  - ✓ Locator has a format like "s"+sheet number+"r"+row number+"c"+column number. The numbers here start from zero. For example, the locator "s1r2c3" represents a value in the cell in the second row 1, third column 3 and first sheet in a Excel form.
- Selection of texts (item names, locators, etc.), and copying the selected texts to the clipboard
  - ✓ Selectable copy direction (vertical or horizontal)
    This is to support writing field names of a table and locators in a schema.
  - ✓ Selectable delimiter (+, -, *, /)
    This is to support writing formulas for automatic calculation in a schema.

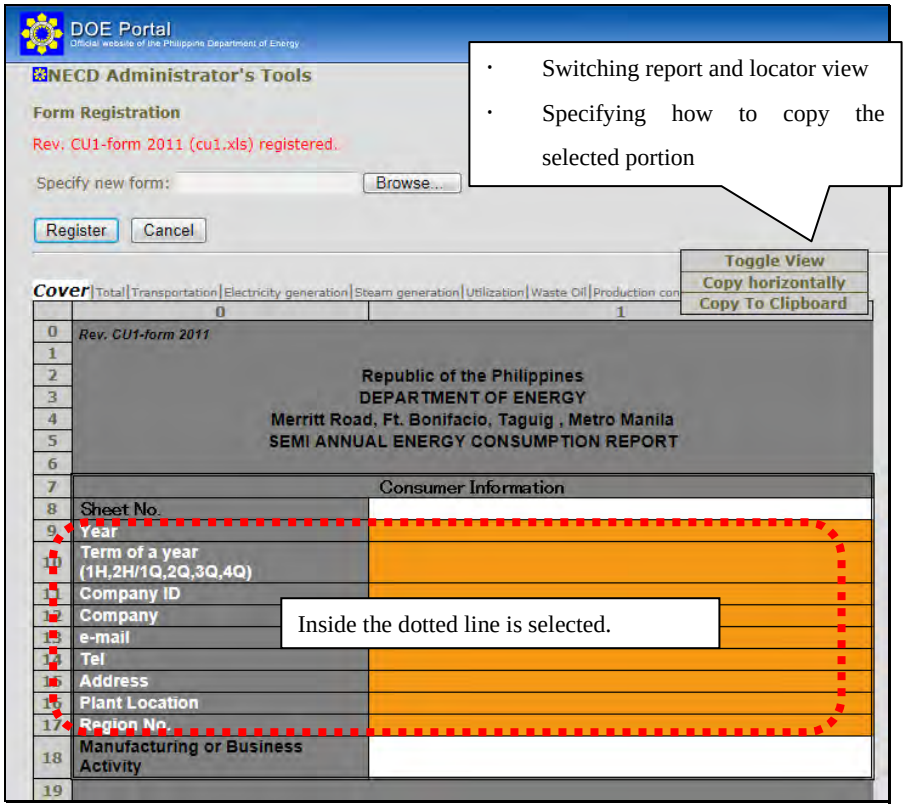


Figure 10-23 Report Form Registration Page (Report view)

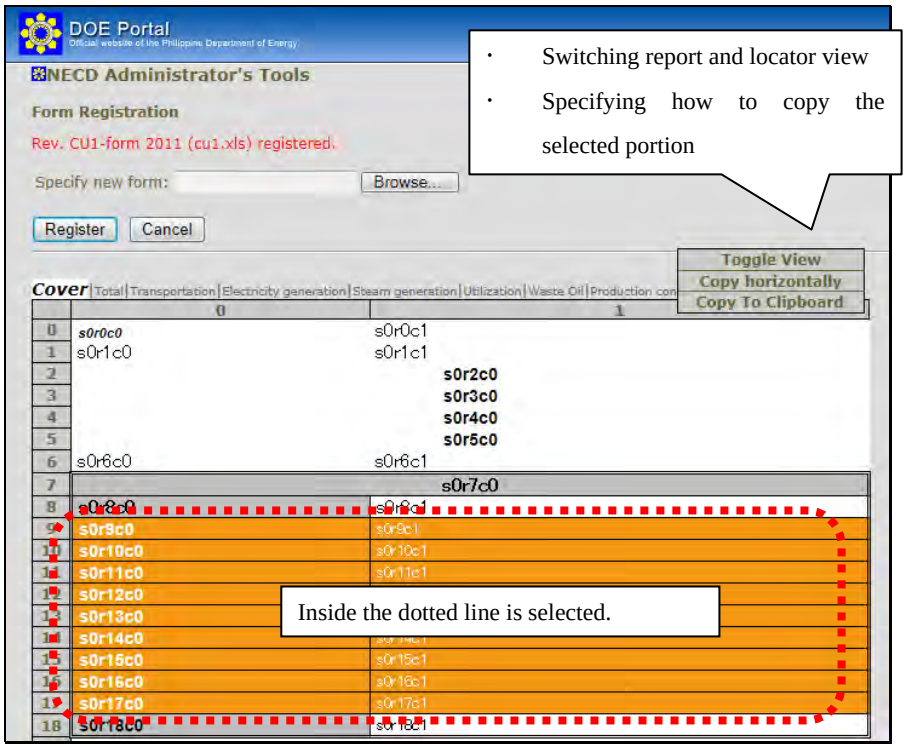


Figure 10-24 Report Form Registration Page (Locator view)

9) Registration of a schema

Each report has one schema. A schema is designed in Excel97 format. A schema has following information.

- Corresponding report template
  - ✓ Specified by a report form identifier
- Definition of a corresponding database
  - ✓ Database name
  - ✓ Description of the database
- Definition of tables in the database
  - ✓ Table names
  - ✓ Description of each table
  - ✓ Column names in each table
  - ✓ Description of each column
  - ✓ Data type for each column
    - ➢ TEXT (Text, character strings)
    - ➢ INT (Integer)
    - ➢ FLOAT (Floating decimal point)
    - ➢ BOOL (Boolean)
- Definition of formulas for automatic calculation
- Definition of consistency check for report items

* Refer to the NECD reference manual for design of schema in the attached CD.

	A	B	C	D	E
1	DB Name	CU1			
2	DB Description	Business Sector Energy Consumption Report			
3	Form ID	Rev. CU1-form 2011			
4					
5	Table Name	ECONSUMP			
6	Table Description	Energy consumption			
7	Columns	SOURCE	UNIT	QTY	LOE
8	Column Descriptic	Energy Source	Unit	Quantity	LOE
9	Type	TEXT(32)	TEXT(8)	FLOAT	FLOAT
10	Special	SOURCE	SUNIT		
11	ROW	s1 r2 c1	s1 r2 c2	s1 r2 c3	s1 r2 c5
12	ROW	s1 r3 c1	s1 r3 c2	s1 r3 c3	s1 r3 c5
13	ROW	s1 r4 c1	s1 r4 c2	s1 r4 c3	s1 r4 c5
14	ROW	s1 r5 c1	s1 r5 c2	s1 r5 c3	s1 r5 c5
15	ROW	s1 r6 c1	s1 r6 c2	s1 r6 c3	s1 r6 c5

Figure 10-25 An Example of Schema

If you apply a schema from the schema registration page under "Database Tools"-"Apply Schema" menu (Figure 10-26), a database corresponding to the specified report will be generated and online submission for the report will be available. You have to be careful for applying a schema. If a database of a same name already exists, the database will be deleted and a new database will be created.

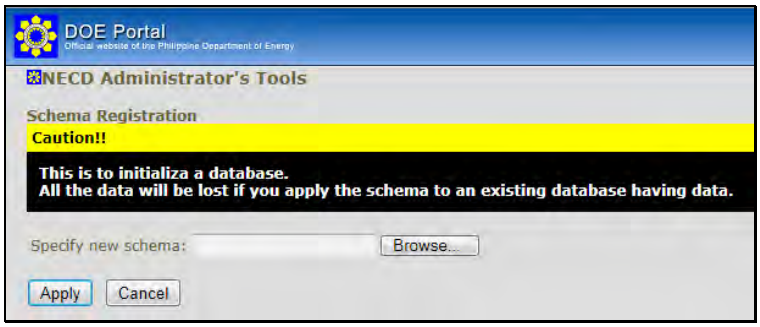


Figure 10-26 Schema Registration

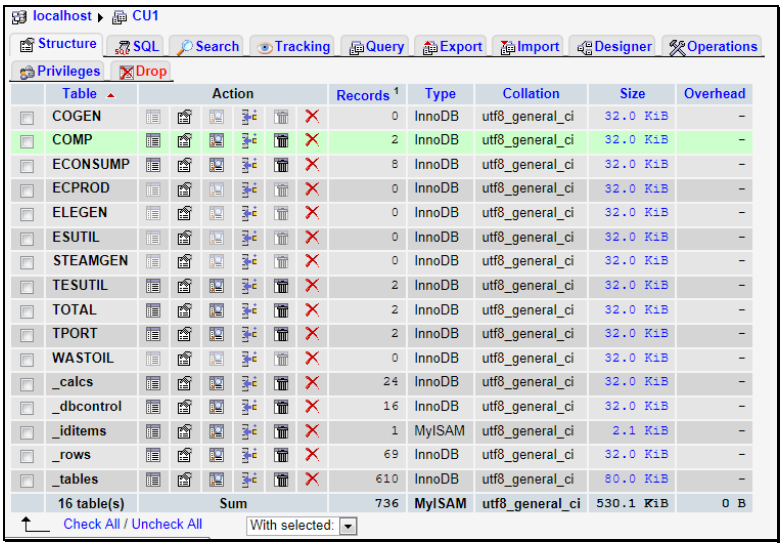


Figure 10-27 Database for CU1 Created by Corresponding Schema (shown by phpMyAdmin)

10) Functions for the administrator's tool

The functions of the administrator's tool were placed under the main menu. Table 10-10 shows the content of functions.

Table 10-10 Menu of Administrator's Tool

Main menu	Sub menu	Description
Admin management	Browse admin	Showing a list of registered administrators
	Add admin	Adding a user with administrative privileges
	Update admin	Correction of administrator's information (Login ID, Password, e-mail, name)
	Delete admin	Removing an admin user
User management	Add user	Adding a general user (establishment) manually
	Delete user	Removing a registered general user (establishment)
	Modify user	Correction of general user's information
	Issue initial password	Issuing an initial password (for recovering forgotten password manually)
Analysis	Chart/Table	Creating charts and tables
Report tools	Post off-line report	For report sent by e-mail or postal mail
	Browse/Edit report	Search, retrieves and correction of a report stored in the database
Database tools	Browse registered form	Showing a list of registered report form
	Form registration	Registering a report form
	Apply schema	Applying a schema and creating a database corresponding to the report specified
	Delete registered form	Removing a registered report form
	Database management	Starting a database management application (phpMyAdmin[6])
Logout	NA	Logout of the system

(3) Implementation

1) Technical side (ITMS)

The following technical works are required in introducing the system. According to the ITMS, all the following works except ① are simple matters to which ITMS can respond on the same day or in several days.

① Customizing interfaces for the general users in order to maintain a feeling of unification with the DOE Portal site,

② Assignment of a server (Currently a small PC is assigned)

③ Assignment of a fixed local IP address to the server

④ Assignment of a global IP address and domain name for the system and configuration of DNS servers

⑤ Configuration of the edge router so that the server can be accessed from the Internet using the system domain name

⑥ Creating a mail account for the system and customizing configuration files of the system related

[6] http://www.phpmyadmin.net/home_page/index.php

to e-mail confirmation.

⑦ Starting database management

2) Administrative side (EECD)

EECD should take any measures in order to implement the online submission system smoothly. The JICA Study Team proposed EECD not to be hasty in reducing the energy threshold for energy consumption report submission because it results increase in number of the report. However EECD has intention of lowering the threshold to one half of the present. It is recommended that EECD should improve its efficiency of data processing by implementing online submission system prior to reduce the threshold. Recommended procedures are as follows.

① Distribution of the new report form and the instruction to fill the form to the general users

- Announcement to use the new CU1 form
  The form CU1 was redesigned because the old one did not satisfy the system requirement. Announcement by DOE Portal site, news papers, mass-media, email, etc. is necessary prior to start using the new form.
- Distribution of the new CU1 form
  The new CU1 form must be distributed by DOE Portal, post, email attachment, etc.
- Distribution of an instruction for filling the form
  Not something like the old instruction, more user-friendly instruction manuals, booklets, or audio-visual materials with a lot of example to fill, and a lot of visual aids should be developed and distributed by DOE Portal site, post, email attachments. Creating user-friendly instructions results less errors in the submitted reports. And Shortening of working hours for the report consistency check is expectable as a result.
- Design and distribution of the forms for the other sectors than industrial sector
  Since the old CU1 is used together for the industrial sectors and for the commercial buildings, filling form becomes complicated and it is easy to produce a mistake. Reduction of errors in the report can be expected by creating an individual report form for each sector.
- Creation and distribution of instruction manuals to fill the above forms
  Preparing report form specialized in each sector, its instruction manual becomes simple and reduction of errors in filling the form can be expected.
- Holding briefing sessions on how to fill the new forms
  Briefing session on filling the forms should be held if necessary.
- Creation and distribution of table of the industrial classification code
  Only when detailed classification is performed using present PSIC fields for general purpose, a table showing each industrial classification code and its description should be developed, and distributed to the users. A field for aggregation is a required field. If this field is missing and EECD staffs have to fill the field for a user, it will take a longer time than usual and the data processing rate will fall down. It is important to distribute an intelligible and easy-to-use classification code table so that a user can fill in a code correctly. Moreover,

implementation of the code entry support by the telephone or email is desirable.

② Off-line reception of the new report form
- Receiving reports off-line until online report submission service starts.
- Announcing that only the report in Excel format sent by post or by email attachment will be accepted but printed forms in principle.
- Creating a mail address only for report submission and informing to the user for efficient data processing.

③ Notice of the opening day of the online report submission service
Notifying launch schedule for the online report submission service using DOE Portal site, mass-media, news papers, email, pamphlets, etc.

④ Distribution of user's manual for the online report submission system to general users
Create and distribute user-friendly instruction materials with a lot of visual aids for general users.

⑤ Holding of briefing sessions for the online report submission service.
Briefing session on utilizing the online report submission service should be held if necessary.

⑥ Starting the online submission service

3) Time limit for implementation
Web-database technology is constantly advancing. If its implementation takes more than three years, it is recommended that DOE should give up to implement this system and redevelop the system using the up to date technologies. At that time, this system and corresponding documents such as conceptual design, user and administrator's manual and source codes can be utilized for creating specifications of the new system which is necessary on ordering the system to an application developer.

10.3.2 Application of the Developed System to Other Online Report Submission System

The developed system is an general online report submission system using Excel97 format. Therefore, all kind of online information collection system can be built by only creating a report format and its schema in conformity with the specification. Using online submission, automation of the such procedures as data entry, database creation, aggregation become possible, and significant reduction of data processing time/load can be expected.

The following can be considered as examples of application in DOE.

- Database creation of CU2
  CU2 is a report about energy conservation and its planning however database creation of CU2 is not carried out at present. Since the present CU2 is not satisfying the system requirement, it must be redesigned. Using the new designed CU2 and its schema, online submission of CU2 will be available.
  If such items as descriptions of the energy conservation technologies to be implemented, adoption of multiple choice should be considered in order to enable aggregation.
- Energy consumption database for commercial buildings, transportation sector and energy sector etc.
  Online report submission for each sector become possible by creating individual form for each sector and a corresponding schema.

- GEMP

  Automation of aggregating GEMP report is attained by creating a GEMP report form by Excel and receiving it online.
- Data collection system for creating an energy balance table in EPPB
- Energy audit database

  Creating a report form of energy audit carried out by DOE in Excel format, you can make an energy audit database using this system.
- Industrial energy saving equipment database

  Though hosting this database in DOE might not be suitable, an industrial energy saving equipment database mentioned 10.2.2 can be realized using this system as follows.
  - ① Start online submission of a registration form for industrial equipments by creating the form and corresponding schema.
  - ② A dummy establishment ID is beforehand written in the form. And put the form on some page in the DOE Portal so that users can download it.
  - ③ Prepare a special registration page with a password embedded in.
  - ④ Registration of an equipment is carried out by uploading the registration form from the registration page above. No password nor establishment ID are required since they are already embedded in.
  - ⑤ Prepare a page for searching equipment, embedding the same dummy establishment ID and the password so that every user can access the page without any authentication.
- Energy manager database

  A database for energy manager searching service which is mentioned in 10.2.4 can also be built in the same manner as the above Industrial energy saving equipment database, using the same manner of embedding a dummy establishment ID and a password.

10.3.3 Handing over of the NECD System

Prior to handing over the developed system to DOE, trainings shown in Table 10-11 were carried out. A local consultant was hired to carry out web security training which is necessary as a preparation for starting online report submission. Contents of the training are shown in Table 10-12.

The NECD system was installed in a server PC and handed over to EECD. Relevant document was not be printed considering security issue. They will be uploaded on a support website[7] after reflecting the latest update. The latest downloadable contents on this website are shown in Table 10-13..

Even in case the NECD system will not be adopted by DOE, the relevant documents and the source code of the system can be utilized in writing a specification to order when DOE orders the same kind of application to a company.

Update of the NECD system can be carried out by simply overwriting the old system by the updated system. ITMS can conduct this task as they have trained how to update, backup and restore the system.

7 http://masiii.com/necd
(ID and Password are required to open this site.)

Table 10-11 Trainings Carried Out

Training	Target	Trainer
Web Security	EECD, ITMS	Local consultant
Zend Framework	ITMS	Expert/JICA Study Team
System customization	ITMS	
Demonstration of the system	EECD, ITMS	
Design of form and schema	ITMS	
Installation of the system	ITMS	
Maintenance of the system	ITMS	
Admin user training	EECD	
Explanation of relevant document	EECD, ITMS	

Table 10-12 Web Security Training

Consultant	Informatics Holdings Philippines, Inc. (www.informatics.edu.ph)	
Contents	**Date**	**Number of participant**
Web security general training General seminar on web security for non-IT staff. Internet crime, Vulnerability of website, Virus and worm statistics, Virus life, etc.	Dec.9 (4 hours, half day)	18 (DOE, EECD, ITMS)
Network security Training on secure server and network settings for ITMS network and database administrators.	Dec.21 Jan.9 - Jan.12 (Full day)	8 (ITMS: Network and Database Administrators)
Secure programming Training for ITMS programmers on hacking methodologies and programming against the hacking methodologies.	Jan.9 - Jan.12 (Full day)	4 (ITMS: Programmers)

Table 10-13 Contents on the Support Website

Contents
Instruction manual for general user
Administrator's manual
System installation manual
System maintenance manual
System source code with comments (Zipped with a password)
System specification (Zipped with a password)
System itself (Zipped with a password)

10.3.4 Proposal about Web Tools

Here, two web tools are proposed.

(1) Designated Establishment Checker

It is convenient if a checker of whether a user is a designated establishment required to submit an energy consumption report is in the DOE Portal site.

Figure 10-28 is an example of a tool to convert from annual electricity consumption (kWh) to LOE value. And if LOE value exceed half million, the value is displayed in red. This tool is written in jQuery and the source code is shown in the Figure 10-28.

Energy source is limited only to electricity in this example for simplicity, and following expansion is easy.

- ✓ Adding other energy sources such as oil, and when total energy consumption exceeds 0.5Mloe, the sum is displayed in red.
- ✓ Instead of displaying in red, displaying by text like "You need to submit a report".

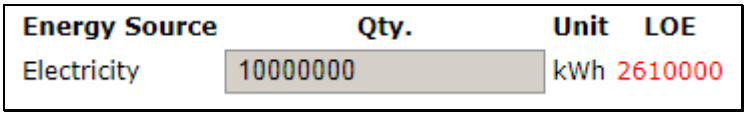


Figure 10-28 Example of Designated Establishment Checker

```
<script type="text/javascript" src="/necd/js/jquery-1.6.4.min.js" ></script>
<script type="text/javascript"> // <![CDATA[
$(function(){
        $('#elec').keyup(function(){
                c=$('#elec').val();
                if(isFinite(c)){
                        c=Math.round(26.1*c)/100;
                        $('#ans').text(c);
                        if (c>=500000)          $('#ans').css('color','red');
                        else                    $('#ans').css('color','black');
                }
                else{
                        $('#ans').text(0);
                }
        });
});
//]]></script>
```

Figure 10-29 Judgment of the Necessity for Report Submission Written in JQuery

(2) Energy-saving Label Image Creation Tool for Online Stores

An example of energy efficiency display in a Filipino online shop is shown In the page 10-13. In this example energy efficiency is written in text and its legibility is not high. Although list of energy-saving appliance is provided in PDF format at present, if database creation of the list is carried on, an application of the database to a support tool for online shops can be considered. The tool helps web designers of the online shop so that they can attach an image of an energy saving label on an image of an appliance on their web page.

The tool is accessed specifying a name of manufacturer and model number of an appliance like:

http://xxxx.gov.ph/manufacturer name/model number.

And the tool replies an image of the energy saving label having energy efficiency of the specified appliance on. Displaying energy efficiency using several images of stars should also be considered for better visibility. Design of a label for website and a label for attachment should be deferent each other to prevent unauthorized use of the label image on a website.

The tool will be used in the code of website of a online shop using Ajax written in jQuery like:

$("#label").load("http://xxxx.gov.ph/manufacturer name/model number");

10.3.5 Proposal about Industrial Classification Code

As is described in 10.1.2(2)6), CU1 is originally designed to classify product lines using PSIC code set. But this classification is not utilized since it is difficult for general users to fill the column of PSIC because of lack of instruction to fill the column and lack of a PSIC code table both of which should have been available from the DOE Portal website. Even though the column for PSIC is filled and classification by PSIC is available, this classification is not convenient for analysis because it is too detailed against current number of report submissions. Practically, classification using 22 sectors in the SECTOR master table is enough at present.

On the other hand, comparison between a sector and another sector using the SECTOR master table is sometimes not adequate since this classification is not well structured. For example, 'Agriculture' which normally appears in large classification and 'Tobacco' which normally appears in middle or small classification are in the same level of the classification. For the compatibility in analysis of existing data, we have to keep the current way of classification using SECTOR master table.

A Classification using PSIC 'Section' and 'Division' level is proposed when the number of report submission increase after the enactment of the energy conservation bill and enforcement of compulsory report submission. Table 10-14 shows PSIC's levels of classification and the number of items in each level. Considering classification of less than 6,000 reports, though we might disaggregate the reports up to 'Group' level, Section-Division level is proposed thinking of balance between detailed classification and easiness for general user to find a classification code. Table 10-15 shows a part of the Section-Division level code table.

Table 10-14 Level of Classification and Number of Items in PSIC

Classification level	Number of Items	Number of digits
Section	21	1
Division	88	2
Group	245	3
Class	520	4
Subclass	1,271	5

Table 10-15 A Part of the Section-Division Level Code Table

A: AGRICULTURE, FORESTRY AND FISHING	
	01 Crop and Animal Production, Hunting and Related Service Activities
	02 Forestry and Logging
	03 Fishing and Aquaculture
B: MINING AND QUARRYING	
	05 Mining of Coal and Lignite
	06 Extraction of Crude Petroleum and Natural Gas
	07 Mining of Metal Ores

10.4 Summary

In this study, present condition and future plan of energy conservation database which is essential for the promotion of energy conservation in the Philippines was investigated. At present whereas NECD held by EECD is the only energy conservation database, as a future plan, as shown in the Figure 10-1, the practical use of variety of energy data from various sectors to the energy policy deployment, and the feedback of analysis results of the data to energy consumers through database was considered and shown as a proposal.

Furthermore, reconstruction of NECD was carried out since the present NECD has shortage of capacities and are not very convenient. The new NECD was built implementing the evolution of the ongoing energy consumption reporting system (web submission) and taking future expansion of the system into account. In more details, in the newly established database, imputing data, which had been by done manually by hand will be semi-automatically processed. As for the analysis of specific energy etc., the creation of tables and graphs will be conducted automatically just by choosing the necessary items. Thus, DOE’s work load will be reduced greatly. These functions are already possible to use.