

## **Piloting the Way to a More Effective Energy Strategy: Thailand's Simplified Subsidy and Finance Initiatives**

*Sirinthorn Vongsoasup, Thailand Department of Energy, Development and Promotion*

*Prasert Sinsukprasert, Thailand Department of Energy, Development and Promotion*

*Peter du Pont, Danish Energy Management A/S*

*Thomas Hernoe, Danish Energy Management A/S*

### **ABSTRACT**

For the past five years, Thailand has been implementing its Energy Conservation Promotion Act, which requires large commercial and industrial end users to conduct energy audits, develop plans, and implement energy-efficiency projects. The Act is accompanied by a “carrot” in the form of the Energy Conservation Promotion Fund (ENCON Fund), which provides financial incentives to install energy-efficiency measures. Unfortunately, due to a number of factors – lack of interest in energy conservation, lack of capital due to the economic crisis of the late 1990s, and excessively bureaucratic procedures and paperwork -- implementation of the Act has progressed at a very slow rate, and inflows to the ENCON Fund far exceed subsidies allocated to energy-efficiency projects.

In order to reduce bureaucratic procedures, more effectively disburse the ENCON Fund, and expedite the implementation of energy-efficiency projects in large buildings and factories, Thailand is launching three large-scale pilot programs, which it will implement over the coming 18 months. One is a US\$50 million revolving fund, which will be initiated in early 2002 and which will provide zero-interest funds to banks for lending at a low interest rate to commercial and industrial end users. The second and third programs are simplified subsidy schemes that will provide a 30% incentive for buildings and factories that implement energy-efficiency projects. The schemes are based on the Standard Measures and Individual Projects program concepts, which have been successfully implemented in Denmark since the mid-1990s.

Implementation of these three pilot programs could provide the basis for the Thailand Department of Energy Development and Promotion to shift its focus from a primarily step-by-step approach focused on energy audits and reporting, to a more results-based approach that emphasizes simplified procedures, measurable results, and market-based project development.

### **Background**

Thailand's Department of Energy Development and Promotion (DEDP) has the primary government responsibility for stimulating improvements in the energy efficiency of large commercial and industrial end facilities. A recent market survey<sup>1</sup> found that the potential for cost-effective investments in energy-efficiency projects in large facilities over the next five to seven years ranged from THB 14 billion to THB 30 billion (US\$320 million to US\$ 700 million).

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<sup>1</sup> IIEC 2000.

Yet, despite this vast potential, DEDP's programs have proceeded slowly over the past five years, for a number of reasons – lack of interest in energy conservation, lack of capital due to the economic crisis of the late 1990s, and excessively bureaucratic procedures and paperwork. This paper focuses on DEDP's efforts – through three pilot programs -- to stimulate energy-efficiency investments in the large commercial and industrial facilities (called Designated Facilities) that are regulated under Thailand's comprehensive Energy Conservation Promotion Act of 1992. In order to expedite implementation of energy-efficiency projects in these large facilities, DEDP is initiating a number of programs that are designed to be more customer friendly and to speed up the implementation of energy-efficiency projects in buildings and factories. These initiatives are designed as pilot programs, with the goal of reducing the bureaucratic procedures and red tape involved in DEDP's compulsory energy audit and reporting program.

## **Policy Overview**

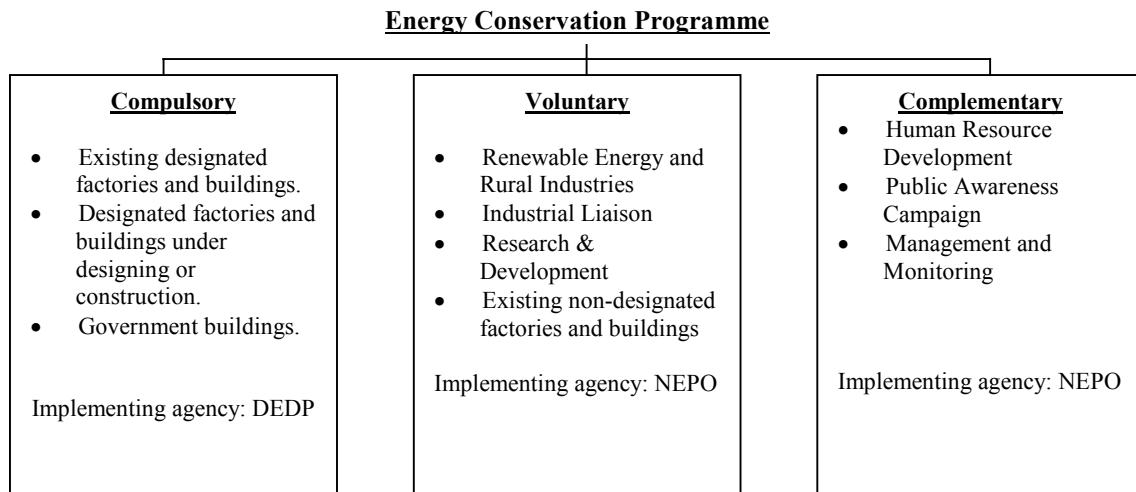
The Energy Conservation Promotion Act is the primary legislation guiding Thailand's energy conservation and renewable energy policy. The Act outlines three major program areas: a compulsory program for large commercial and industrial facilities (Designated Facilities); a voluntary program that applies to smaller facilities (primarily small and medium-sized enterprises, or SMEs); and a complementary program that covers a range of activities such as research, demonstration and development, information campaigns, and other special projects.

An important feature of Thailand's energy policy is the Energy Conservation Promotion Fund (ENCON Fund), which receives inflows from a small tax on all petroleum products sold in Thailand. The Fund receives annual inflows of approximately US\$40 million to \$50 million per year, and currently has a balance of more than THB 15 billion (US\$350 million). The allocation of ENCON Funds toward activities that support energy efficiency and renewable energy is thus an important government priority. The ENCON Fund is organized to provide direct financial support to activities under the Compulsory, Voluntary, and Complementary Programs (see Figure 1).

There are three primary government organizations responsible for energy-efficiency activities in Thailand.

The National Energy Policy Office (NEPO) is under the Office of the Prime Minister and is the agency responsible for formulating overall energy policy, as well as strategic policy for energy efficiency and renewable energy. NEPO also has responsibility for promoting efficiency and renewables through its role as Secretariat of the Voluntary and Complementary Subcommittees of the ENCON Fund.

**Figure 1. Three Primary Channels for Funding Energy Efficiency Activities through the Energy Conservation Promotion Fund (ENCON Fund)**



The Department of Energy Development and Promotion (DEDP) is the primary government agency responsible for implementing energy efficiency under the Compulsory Program of the Energy Conservation Promotion Act, which was passed in 1992. The Act requires large buildings and factories (Designated Facilities) to appoint an energy manager, submit data on energy use to DEDP every six months, conduct energy audits, and develop targets and plans for energy saving. DEDP oversees the Designated Facilities and also has authority to develop and issue minimum performance standards for energy-using equipment. DEDP's parent agency, the Ministry of Science, Technology, and Environment, is the Secretariat of the Compulsory Subcommittee of the ENCON Fund.

The Electricity Generating Authority of Thailand (EGAT) is a state-owned generating company that has been implementing a demand-side management (DSM) program in Thailand since the mid-1990s. EGAT's DSM programs covering fluorescent tube lamps, energy labels for refrigerators and air conditioners, and compact fluorescent lamps, have reduced peak demand by more than 400 peak MW since the programs' inception in 1995 (Phumraphand 2001). Initially, funding for EGAT's DSM programs came from a surcharge on the electricity tariff, along with a grant from the World Bank's Global Environment Facility, which mainly provided technical and consulting assistance. The DSM programs are now funded in part from the ENCON Fund.

Thailand is also in the process of restructuring its energy bureaucracy and developing a new Ministry of Energy, which will be initiated in late 2002. Currently, energy activities are dispersed across a number of ministries, including Ministry of Science, Technology, and Environment (where DEDP is located); the Ministry of Interior (where the country's two distribution utilities are located); the Ministry of Industry; and the Office of the Prime Minister (which oversees both NEPO and EGAT). The new Ministry of Energy will oversee all of these energy functions, as well as additional energy-related state enterprises, such as the Petroleum Authority of Thailand. It is expected that the restructuring will lead to improved coordination of policy, planning, and implementation in the energy sector.

## Barriers Encountered in the Designated Facilities Program

As the Implementing Agency for the Compulsory Program, DEDP is responsible for ensuring that the approximately 4,000 Designated Facilities<sup>2</sup> nationwide take actions to save energy. Under the Energy Conservation Promotion Act, these Designated Facilities are required to appoint an energy manager, submit data on energy use every six months, submit preliminary and detailed energy audits, and finally submit targets and plans prior to receiving a financial subsidy to implement energy-efficiency projects. The financial subsidies are intended to assist the facilities to achieve a mandatory efficiency levels established under Thai law. The levels have been established for commercial buildings, but not yet for factories.<sup>3</sup>

To date, most of the work carried out in Designated Facilities has been geared toward the initial reporting and auditing. It is recognized that awareness of energy-efficiency opportunities, the priority given to energy costs in management decision-making; and access to capital due to the economic crisis are all factors that have hindered implementation. However, even with these barriers, DEDP has recognized that excessive bureaucracy and paperwork associated with the energy audit and reporting program have hindered progress.

The main barriers as outlined in a report by Chulalongkorn University (2000) are as follows:

- Poor quality of many of the audits performed by energy consultants. A small but significant percentage of the audits had recommendations that were either inadequate or needing improvement. In particular the investment analysis and presentation of the economic returns of suggested measures was found to be weak. In addition, another recent review of audits (IIEC 2000) found that they tended to focus almost exclusively on a few simple measures lighting and air-conditioning measures, and thus missed additional measures with large energy-saving potential.
- Slow time for government approval of the audit reports. The report found that the approval time for audit reports was slow. However, approval times have increased somewhat in the past two years, as DEDP has focused attention on this issue.
- Lack of a penalty for non-compliance with the ENCON Act requirements. The report found that there was no penalty for fraud among the energy consultants, nor for lack of implementation of the measures required under the ENCON Act.
- Lack of authority of energy managers. The report found that only a very small percentage of the facility energy managers had the authority within the company to approve funds for implementation of energy-efficiency projects. For factories, only 17% have authority, and for buildings, only 5% did.

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<sup>2</sup> Designated Facilities are classified under the 1992 Energy Conservation Promotion Act as facilities with electrical demand greater than 1,000 kW or annual energy use of more than 20 TJ/year of electrical energy equivalent.

<sup>3</sup> The quantitative requirements for Designated Buildings are the following: the OTTV of exterior walls or air-conditioned parts of a building shall not exceed 45 W/m<sup>2</sup> for new buildings and 55 W/m<sup>2</sup> for existing buildings; RTTV shall not exceed 25 W/m<sup>2</sup>; lighting power density shall not exceed 16 W/m<sup>2</sup> for office buildings, hotels, and school, and 23 W/m<sup>2</sup> for department stores; and air-conditioner efficiency is regulated in kW/ton, depending upon the type and category of system (e.g., centrifugal, reciprocating, packaged, water-cooled or air-cooled).

## **Addressing the Barriers**

DEDP is well aware of the slow progress in its Designated Facilities program and is taking action to address the issues mentioned above. It is currently revising the Ministerial Order covering energy audits for Designated Facilities in order to simplify the reporting process. At the same time, DEDP has decided to initiate a set of voluntary pilot programs designed to shift the focus from paperwork to implementation, and to reduce the number of steps and procedures involved in government approval of financial incentives for energy-efficiency projects.

The three pilot programs that DEDP will implement are the EE Revolving Fund, the Standard Measures Program, and the Individual Projects program. All three of these programs are completely voluntary, and have a simplified set of procedures that building and factory owners can follow in order to receive funding support for EE projects in their facilities. The funding for these programs comes from Thailand's ENCON Fund, and the programs will be implemented by DEDP, with assistance from implementing agencies selected by DEDP.

These three pilot projects are being managed by DEDP's Technical Division, within the Bureau of Energy Regulation and Conservation. The Danish government is providing technical assistance during program design and assistance, and a team of experts is based at DEDP to provide ongoing assistance (DANCED 2002).

### **The EE Revolving Fund**

With support from the World Bank, Thailand in 1999 initiated an ESCO Development Support Project, aimed at expediting investment in EE projects and nurturing the development of an ESCO industry in Thailand. The project activities have led to design and formal approval of an Energy Efficiency Revolving Fund, which was formally approved by the ENCON Fund Committee in November 2001 and launched in mid-2002. The initial amount in the EE Revolving Fund will be THB 2 billion (approximately US\$46 million). Funds will be released from the ENCON Fund at 0% interest, repayable by DEDP to the ENCON Fund in seven years. Thai banks can subsequently lend money from the EE Revolving Fund at an interest rate of no more than 4%. The maximum loan size is THB 50 million (approximately US\$ 1.1 million).

The funds are managed by commercial banks that have been approved by DEDP. In theory, any Thai commercial bank can have access to the funds in theory. Initially, DEDP has selected 4 primary commercial banks and given each a credit line in the range of ~THB 400 to 500 million (~US\$9-11 million). Four additional banks were pre-approved to submit proposals to access the balance of the EE Revolving Fund on a project-by-project basis.

The banks are responsible for all aspects of the loan, including marketing, technical/economic assessment, credit approval, and, importantly, loan repayment in case of default. They are also required to submit regular reports on project status so that DEDP can track fund use, investment in EE equipment and projects, and estimated energy and demand savings.

The role of DEDP is (a) to ensure that the projects are primarily energy-saving projects, and not simply equipment replacement; (b) to monitor the performance of the banks

to ensure they meet their targets in terms of projects, lending, and repayments and (c) to evaluate the program to measure energy savings.

By shifting nearly all of the program administration and responsibility outside of DEDP (i.e. to the banks), DEDP expects to expedite investments in energy-efficiency projects in Designated Facilities.

## **The Standard Measures Program**

Thailand's Standard Measures program is based on a successful Danish program that provides customers with a "pre-approved" list of equipment eligible for subsidies. In the Standard Measures program, DEDP will provide a direct 30% subsidy for installation of any one of 11 different Standard Measures.

### **Background on the Standard Measures Concept**

The Standard Measures concept was imported to Thailand from Denmark, where it has been widely applied since the mid-1990s. Standard Measures offer a simple, convenient, and inexpensive way for facilities to apply for subsidies for energy-efficiency projects. The measures are standardized EE technologies or products that are generally present or can be applied by a large number of potential applicants and have a proven minimum energy-efficiency. Since the measures are "standard" (i.e. widely applicable), the evaluation and handling of applications can be simplified and performed more quickly. This is done by pre-defining and describing the measure or product.

A "Standard Measure" will usually include a single energy-efficiency technology (e.g. energy efficient lighting or insulation for pipes and surfaces etc). Within a particular measure category, there might be flexibility to adapt for different needs, sizes, capacities etc.

The information needed in the application for a Standard Measure is usually limited to information about the company and identification of the equipment that the applicant intends to buy. The energy-savings are not evaluated for each Standard Measure application, but are evaluated in general terms when the Standard Measures are made. The amount of subsidy is specified by simple indicators as number of lamps installed, the impact of energy-efficient electric motors, surface area insulated, etc.

In Denmark, Standard Measures are generally directed to smaller companies that do not have the knowledge and human resources for implementing larger or complicated energy-efficiency projects. However, larger industrial companies have also applied for certain types of Standard Measures projects. The subsidy given for Standard Measures in Denmark is up to 26%, but the subsidies given in some Standard Measures are considerably lower. The Standard Measures have been a success in Denmark, with more than 14,000 subsidy projects in the 5-year period 1996-2000. The total amount of subsidies given is THB 1.9 billion (~US\$44 million). The Danish government has not conducted a comprehensive evaluation of the energy savings from this program.

## DEDP's Pilot Standard Measures Program

After an initial technical assistance program funded by the Danish government<sup>4</sup>, Thailand's DEDP implemented Standard Measures as a pilot program in 2000-2001 in small and medium-sized enterprises (SMEs). It will be expanded and implemented as a full-scale program in SMEs in mid-2002. At the same time, Standard Measures will also be initiated as a pilot program in the larger Designated Facilities, also starting in mid-2002. The 11 pre-approved Standard Measures are shown in Table 1 below.

Two evaluations of the pilot program in SMEs found the following (Team Consulting 2002, ECCT 2002):

- Initially, there was little interest in the program among the targeted companies. Program promotion was difficult, and the promotional budget provided was inadequate.
- The standard price set for the measures was too high. As a result, the subsidies paid for the equipment ended up being as high as 60% in some cases.
- Investment in the higher-cost standard measures was low, in part because of the poor economic situation.
- Some of the projects were free riders, with very low payback times.
- The time for approval of project subsidies, while faster than other DEDP programs, were still somewhat slower than expected.

**Table 1. The 11 Pre-Approved "Standard Measures" in the Thailand Program**

High-frequency electronic ballasts	Air-to-air heat exchanger
Variable-speed drive on air compressors	High-efficiency electric motors
Variable-speed drive on pumps	Luminaire reflectors and high-efficiency fluorescent luminaries
Insulation of pipes and surfaces	Power control for lighting
Heat-recovery equipment	Voltage regulator
Controller of air supply for combustion	

DEDP has attempted to address these problems by revising the program design before re-launching the program in SMEs and expanding it as a pilot program in Designated Facilities. For example, DEDP will increase the promotional budget. They have changed the reimbursement procedure, so that the subsidy is 30% of either the invoice price, or the "standard price" in the market, whichever is lower. They have conducted an updated survey to determine a new standard price and have also developed simplified forms and checklists to speed up the approval process.

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<sup>4</sup> The program ran from 1996-2000 and was funded through the Danish Cooperation for Environment and Development (DANCED) program. DANCED has since been absorbed into the DANIDA program under the Ministry of Foreign Affairs in a government restructuring.

## **The Individual Projects Program**

The Individual Projects program is a companion program to Standard Measures. The difference is that, while Standard Measures provides a 30% subsidy for installation of pre-approved “Standard” measures, the Individual Projects program depends on the facility owner to design an energy-saving project. In this sense, Individual Projects is a “customized” energy-efficiency subsidy program. The applicant defines, describes and documents the project’s financial, technical and energy saving aspects. The Individual Projects concept provides possibility to subsidy nearly all kinds of energy-efficiency projects in one program, as long as project applied for meet the requirements of the subsidy scheme.

In Denmark, the Individual Projects program has been a success, with more than 7,000 subsidy projects in the 5-year period 1996-2000. The total amount of subsidies provided exceeds THB 4,900 million (~US\$ 110 million). Again, the Danish government has not conducted a comprehensive evaluation of the energy savings from this program.

In the Thai program, any energy-efficiency project that is not a Standard Measure will be eligible for funding. The only criteria for DEDP funding are: (1) the project has a payback time of less than 7 years and (2) the project does not result in an increase in CO<sub>2</sub> or other pollutants associated with fuel combustion. DEDP will conduct a technical review of the project proposal to ensure that it meets the first 2 conditions. DEDP expects that the launching of an Individual Projects program will significantly increase investment in industrial energy-efficiency projects, as well as more technical complicated energy-saving projects in commercial buildings.

## **Implementation of the Combined 30% Subsidy Program**

The Standard Measures and Individual Projects programs for large buildings and factories (Designated) will be implemented as a combined program, with a single team of DEDP and outsourced staff to operate the program. The subsidy budget for the 18-month pilot program is THB 100 million (~US\$2.3 million).<sup>5</sup> An additional THB 30 million has been allocated for program management and consultancy, promotion and marketing, and evaluation. The number of projects that DEDP will need to develop in order to distribute these subsidies ranges from 100 to 200 projects, depending on conservative and optimistic estimates of typical project size. While this may seem like a modest number of projects, it is significantly higher than the rate of implementation under DEDP’s existing compulsory Designated Facilities program.

Below are some of the primary features of the program implementation plan:

- Companies can apply for either program in the same way: by submitting a short form to DEDP with an application for subsidy.
- An Implementing Agent, a firm or organization hired by DEDP to screen applications and ensure they meet program criteria, will handle the applications. The Implementing Agent is paid as a percentage of the size of the project (12%) up to a ceiling level.

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<sup>5</sup> DEDP has estimated the 5-year budget for an expanded program (including the initial THB 100 million for the pilot program) to be THB 690 million (approximately US\$ 16 million). This budget has been included in DEDP’s 5-year Master Plan.



- Within a few weeks, the company is guaranteed notification of whether a subsidy has been approved.
- Once an application for subsidy is approved, the company may implement the approved EE measures or project.
- Once the installation of equipment and measures is complete, DEDP or its agent conducts an on-site evaluation, checks the equipment invoices, and approves the payment.

## **Expediting Project Implementation**

A major goal of the DEDP pilot programs is to simplify procedures, reduce paperwork, and focus on achieving energy savings. DEDP expects that the following aspects of its program will help to expedite investments in energy-efficiency projects, compared to the existing energy audit and reporting program for Designated Facilities.

### **Delinking the Audit Requirement**

The conducting and review of audits for the Designated Facilities compulsory program has been a major bottleneck. The pilot programs remove this bottleneck by delinking the subsidy from the energy audit. Companies can apply directly for a subsidy without having conducted an audit. In order for their project to be approved, they will have to demonstrate that it meets the criteria (i.e. bank approval for the EE Revolving Fund; technical approval for pre-approved Standard Measures; and technical and payback approval for the Individual Projects).

### **Shifting Responsibility for Implementation Outside of DEDP**

A central principle of the pilot programs is that DEDP should set the guidelines and then let outside parties be responsible for program implementation. To this end, DEDP will be outsourcing implementation to the private sector. In the EE Revolving Fund, the banks themselves will be responsible for assessing and approving the loans, and will also assume the credit risk in case of loan default. In the 30% subsidy programs, DEDP will hire Implementing Agents (IAs), who will be responsible for recruiting facilities to participate in the program, screening and pre-approving the subsidy applications, reviewing the equipment invoices, and conducting site inspections to verify the equipment is installed and operating.

### **Voluntary Rather than Compulsory**

The major experiment involved with these pilot programs, compared to normal DEDP procedure, is that the programs are voluntary rather than compulsory. DEDP expects to have a much higher level of interest among the targeted large commercial and industrial end users because there will be no mandatory prerequisites or strings attached to the energy-efficiency subsidies.

## **Program Challenges**

### **Management Challenge**

The three DEDP pilot projects are being managed by DEDP's Technical Division, within the Bureau of Energy Regulation and Conservation (BERC). The Danish government is providing technical assistance during program design and assistance, and a team of experts is based at DEDP to provide ongoing assistance. In addition, the Global Environment Fund is providing technical consulting assistance to DEDP in the design and the EE Revolving Fund, the development of a training program for industry and banks, and the development of a credit guarantee facility.

As the programs succeed and expand, they will need to find an institutional home at DEDP. The programs will eventually need to be assimilated into DEDP's staffing and management structure. While these programs are all pilot programs, it is expected that they will continue and become long-term efforts if the pilots are successful.

An additional management challenge is related to simplified procedures and involves the evolution toward a truly streamlined decision-making process. For example, the current process for approving subsidies for energy-efficiency projects involves pre-screening by DEDP staff, consideration by a DEDP committee, and final sign-off by the Director-General of DEDP. This decision-making structure creates a bottleneck and limitation on the number of projects that can be processed. In Denmark by comparison, subsidy applications can be approved with the single signature of a division manager. It is hoped in the future that DEDP will consider going from a committee to line-manager approval of project subsidies.

### **Marketing Challenge**

Traditionally, DEDP has been an extremely technical agency, and it is still dominated by engineers. Its promotional efforts have generally been weak, and this is an area where DEDP is trying to improve. It is for this reason that much of the technical assistance provided by the Danish government is focusing on support for program promotional efforts. Since these pilot programs are targeting only the 4,000 Designated Facilities, this will provide DEDP with a well-defined target audience and reduce the need for broad-based promotion and advertising in the mass media.

**Table 2. Summary of Thailand's 3 New Pilot Programs**

	<b>EE Revolving Fund</b>	<b>Standard Measures</b>	<b>Individual Projects</b>
<i>Eligible Projects</i>	Any	11 pre-approved Standard Measures	Any installation of EE Equipment (except Standard Measures)
<i>End Users Likely to Apply</i>	Large commercial and industrial customers with EE investment projects typically above US\$100,000	Small and large commercial and industrial customers with smaller EE investment projects (typically below US\$50,000)	Small and large commercial and industrial customers with smaller EE investment projects (typically below US\$50,000)
<i>Approval Criteria</i>	1. DEDP must approve project in principle as an “energy-saving project” in line with objectives of ENCON Fund 2. Final approval based on bank's own assessment	Proposed Measures meet pre-approved technical and payback criteria	Project complies with: SPP $\leq$ 7 years No net pollution increase
<i>Subsidy Level</i>	4% annual interest rate, compared to 9% market interest rate. Maximum loan amount is THB 50 million (US\$1.1 million)	30% of equipment and installation costs Minimum subsidy = THB 15,000/measure Maximum subsidy = THB 2 million/facility (SM and IP)	
<i>Budget</i>	THB 2 billion available in fund Additional budget for consulting assistance to help manage the program	Subsidies = THB 100 million Implementing Agent fees, public relations, project management, evaluation = THB 30 million	
<i>Other items</i>	Loan period is not more than 7 years.	Fee for Implementing Agent is THB 10,000 + 10% of subsidy value, up to a maximum of THB 40,000.	Fee for Implementing Agent is THB 10,000 + 15% of subsidy value, up to a maximum of THB 80,000.

Note: 1 US dollar = ~45 Thai Baht (THB)

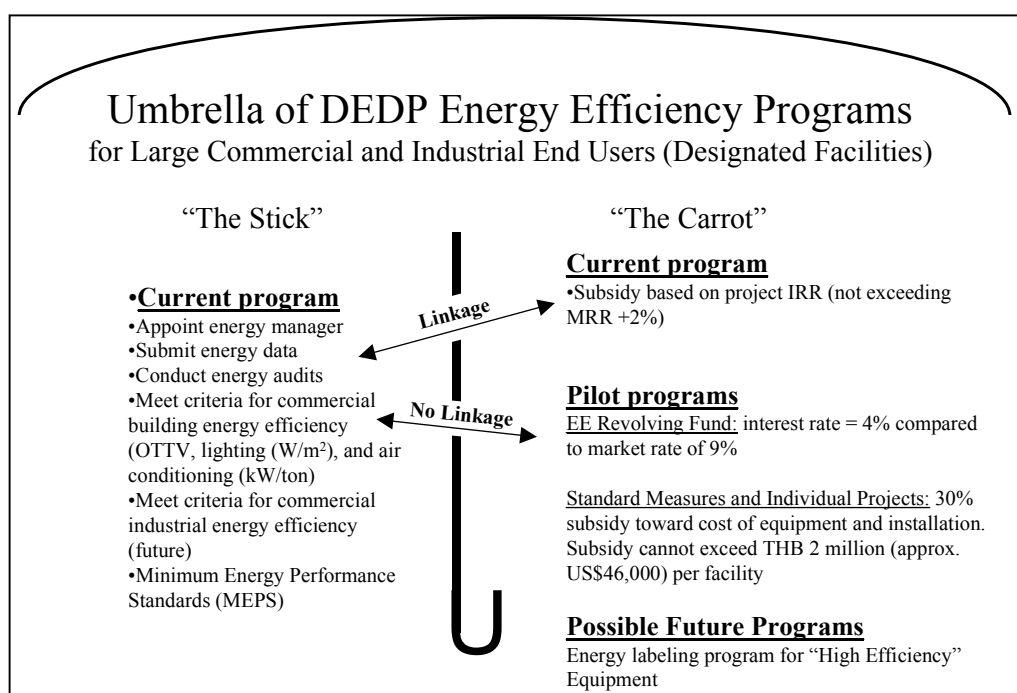
In addition to the general marketing challenge, DEDP will need to integrate its marketing efforts across the three pilot programs (EE Revolving Fund, Standard Measures, and Individual Projects). The pilot programs will need to be marketed jointly in a clear and comprehensive manner, in order not to confuse the customers, many of whom believe that DEDP's current programs are either slow or ineffective. One of the biggest challenges will be to clearly communicate to the customer the program choices.

Table 2 summarizes the three pilot program choices. The pilot programs provide three different channels for getting financial incentives to large commercial and industrial end users on a voluntary basis. The EE Revolving Fund is likely to be mostly accessed for projects with large commercial and industrial end users, with investment amounts over THB 5 million (~ US\$110,000); while the 30% subsidy programs (Standard Measures and Individual Projects) will likely be accessed for smaller commercial and industrial projects, typically smaller than THB 2 million (about US\$46,000).

## Linking the Voluntary and Mandatory Programs

Currently, DEDP's compulsory programs (audits, data reporting, targets and plans) are implemented through its Regulatory Division. The new pilot programs are voluntary. Figure 2 below describes the relationship between the two types of programs targeted at Thailand's large commercial and industrial users (Designated Facilities).

**Figure 2. How DEDP's Compulsory and Voluntary Programs Fit Together**



The pilot programs provide DEDP with an opportunity to open up a new, non-regulatory channel to release money from the ENCON Fund for investment in commercial and industrial energy-efficiency projects. Currently, the Voluntary pilot programs are completely delinked from the compulsory requirements for Designated Facilities – that they appoint an energy manager, conduct energy audits, develop a target and plan, and (for buildings) achieve the legally specified efficiency levels for envelope performance, lighting efficiency, and air conditioning efficiency. However, DEDP feels that if the pilot programs are successful and expanded, they must somehow be linked to the compulsory requirements. Effectively integrating the voluntary and compulsory elements of this program represents a future challenge for Thailand's DEDP.

## Conclusions

Thailand's Department of Energy Development and Promotion is undertaking three new pilot programs in an effort to expedite government investment and implementation of energy-efficiency projects in large buildings and factories. One of the main characteristics of the programs is that much of the implementation is outsourced to the private sector (e.g., banks, university institutes, consultants). The implementation of the pilot programs will

begin in mid-2000 and will last about one-and-a-half years. The programs represent a sharp departure from DEDP's current mandatory programs, which are burdened by excessive paperwork, bureaucracy, and reporting regulations. If these programs succeed – by speeding up the number of projects implemented, the amount of government subsidies distributed, and the amount of energy saved – they could provide a new way forward for DEDP as the lead government agency implementing energy-efficiency in Thailand. However, the agency must squarely address a number of challenges, including institutional barriers, improvement of program promotion, and effective monitoring and evaluation, in order to overcome implementation barriers and ultimately succeed.

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