

ENERGY CONSERVATION

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Introduction

As the prices of imported oil are expected to increase gradually and in order to avoid the heavy burden of foreign exchange, a national energy policy and program has been formulated and is being implemented in the 5th National Economic and Social Development Plan covering a period of 5 years from 1982-1986. This plan aims at reducing as much imported oil as possible through an acceleration for the development of indigenous energy resources, an acceleration of energy conservation by increasing the efficiency primarily in the industrial sector and the transportation sector as well as reducing the consumption, and a restructuring of energy pricing especially the petroleum pricing.

A current energy conservation program has been conducted satisfactorily through the joint efforts of the government sector, the private sector as well as local educational institutions. The program consists of several inter-related aspects including (I) promotional campaign to create awareness among economic sectors; (II) technical assistance to identify and evaluate opportunity for energy savings; (III) incentives and legislation to encourage energy savings investment and (IV) financial support to carry out energy saving projects. Some aspects have been conducted continuously while some are in a preliminary stage of being introduced and being implemented.

According to the data recently available, the industrial sector has a very good potential to save annually, on the average, 17 per cent of petroleum consumed normally and 3 per cent of the electric energy consumed normally through the house keeping measures alone. This is equivalent to approximately 60 million U.S. dollars of saving in foreign exchange.

1. Energy Policy, in Thailand

1.1 Energy Policy

As the prices of imported oil are expected to increase gradually and in order to avoid the heavy burden of foreign exchange, a national energy policy and program has been formulated and is being implemented in the 5th National Economic and Social Development Plan covering a period of 5 years from 1982 to 1986. This plan aims at reducing as much imported oil as possible. The policy can be summarised as follows:

(1) To accelerate the development of indigenous energy resources available technically and economically, especially natural gas, lignite and hydro power as well as to increase the amount of oil stockpile for security purposes.

(2) To accelerate energy conservation by increasing the efficiency of utilization as well as reducing the consumption, especially in the industrial and the transportation sectors.

(3) To set energy prices in a more realistic approach in order to avoid substantial government subsidies, to avoid wide discrepancies in the prices of alternative kinds of energy and to distribute benefits and costs equitably among all concerned.

1.2 Targets

The main targets expected to be achieved by the end of the 5th Plan are described as follows :-

(1) The average annual growth rate of the energy consumption should not exceed 4.6%.

(2) The amount of imported oil will be decreased at an average rate of 7% per annum. This will be mainly due to oil substitution by indigenous sources of energy.

(13) The dependence on imported oil will be reduced from 75% of total energy requirements to 46% by the end of 1986.

2. Energy Conservation Program in Thailand

2.1 The energy conservation implementation program was included in the Fifth National Economic and Social Development Plan (1982-1986). It concentrated mainly on the industrial and transportation sectors. The National Energy Administration (NEA) has been entrusted by the Government to:

- (1) Determine the energy conservation potential.
- (2) Formulate energy conservation guidelines and regulations.
- (3) Provide relevant technical information.
- (4) Provide Technical consulting service for energy audits.
- (5) Organize appropriate training programs for energy personnel.

2.2 The Energy Conservation Center (ECC) has been established in the National Energy Administration since 1981 and is supported by a budget allocated by the government. The center consists primarily of 4 sections namely. :

- (1) Energy audit (heat) section
- (2) Energy audit (electricity) section
- (3) Publication and information section
- (4) Technical section

2.3 The ongoing activities of the center can be described as follows:

(1) Two energy auditing teams from the government sector with measuring equipment and technical advisors have been visiting factories free of charge on a request basis to investigate energy utilization and to provide recommendations on ways and means to conserve energy. To date, about 126 factories from 9 different types of industries have received this kind of service. The result of analysis and recommendation are shown in Table 1.

The annual potential for energy saving of these 126 factories was estimated to be about 55.3 million litres of oil and 36.5 million kilowatt-hours of electricity which is approximately 17 percent and 3 percent saving respectively from normal uses. This is equivalent to 280 million baht of savings per annum. The investment costs of the efficiency improvement is estimated at 91 million baht. If one assumes that the figures are applicable to the whole industrial sector, Thailand could save as much as million US\$ 60 of foreign currency.

The number of factories requesting this type of services will increase as the factory owners gain more confident, It is estimated that another 100 factories will request for this service next year.

Table 1
Potential of energy Conservation in Factories

Type of Industry	No. of factory	Fuel Saving		Electricity Saving	
		Ml/y	Million Baht/y	MkWh/y	Million Baht/y
- Non metal	21	15.1	71.8	3.5	3.8
- Metal	15	11.5	11.6	2.2	4.3
- Paper	17	13.0	57.9	8.0	14.7
- Food	30	4.0	17.6	3.2	6.4
- Chemical	17	3.9	20.3	4.0	5.8
- Textile	19	4.9	25.7	14.0	24.0
- Tobacco	3	0.4	1.6	0.2	0.5
- Rubber	3	0.9	4.0	1.0	2.2
- Wood	1	1.6	7.4	0.4	0.6
Total	126	55.3	217.9	36.5	62.3

As a result of these audits, the following improvement are identified:

(a) To improve efficiency of liquid fuel utilization

- Boiler combustion improvements
- Furnace combustion improvements
- Pipes and equipment insulation
- Steam leak repair

- Steam trap maintenance and replacement
- Lowering steam pressure Utilization
- Waste heat recover

(b) To improve the efficiency of electricity Utilization:

- Power factor improvement
- Peak demand management
- repair of compressed air leakages
- Optimum load improvement for transformer
- Optimum load improvement for motors and electric equipments.
- Electric equipment maintenance.

(2) Information service: Publications on technical information

have been distributed to energy users. Some of them are as follows:

- Economic Use of Oil Fired Boiler
- Electricity Savings in Industries
- Power Factor Improvement
- Factory Energy Management
- Factory Energy Audit
- Electricity Savings in the home
- Energy Conservation Newsletter
- Condensate and Flash Steam Utilization
- Economics Thickness of Insulation.

(3) Training, Seminar, Conderence:

(a) The National Eenrgy Management Conference was held in February 1982. The conference was supported by several energy related agencies and oil companies. Top management personnel from 150 factories participated in the conference.

(b) More than five energy conservation seminars are conducted annually by the government sector as well as by the private sector. About 350 engineers from various industries participated in the seminars.

(4) Fiscal incentives: The Government has established the Committee to consider possible incentives for investors through tax and import duties exemption/deduction of machines, material and equipment which are required for pollution control and energy conservation activities. Import duties of those equipment have been reduced to the rate of 10 percent since November 1983 as a fiscal incentive to investors.

(5) The Energy conservation demonstration program: The aim of the program is to encourage implementation of energy conservation technologies in industries. These selected factories will be used as the demonstration models to convince other factories that wise investments in energy conservation could lead to the efficient use of energy as well as money savings. The first stage of this program would be to demonstrate way and means of conserving energy in 3 selected factories. Each factory would receive a low interest loan from the government for its investments and the results of this improvement program will be published.

FIGURE 1 ENERGY FLOW CHART 1983 - THAILAND

