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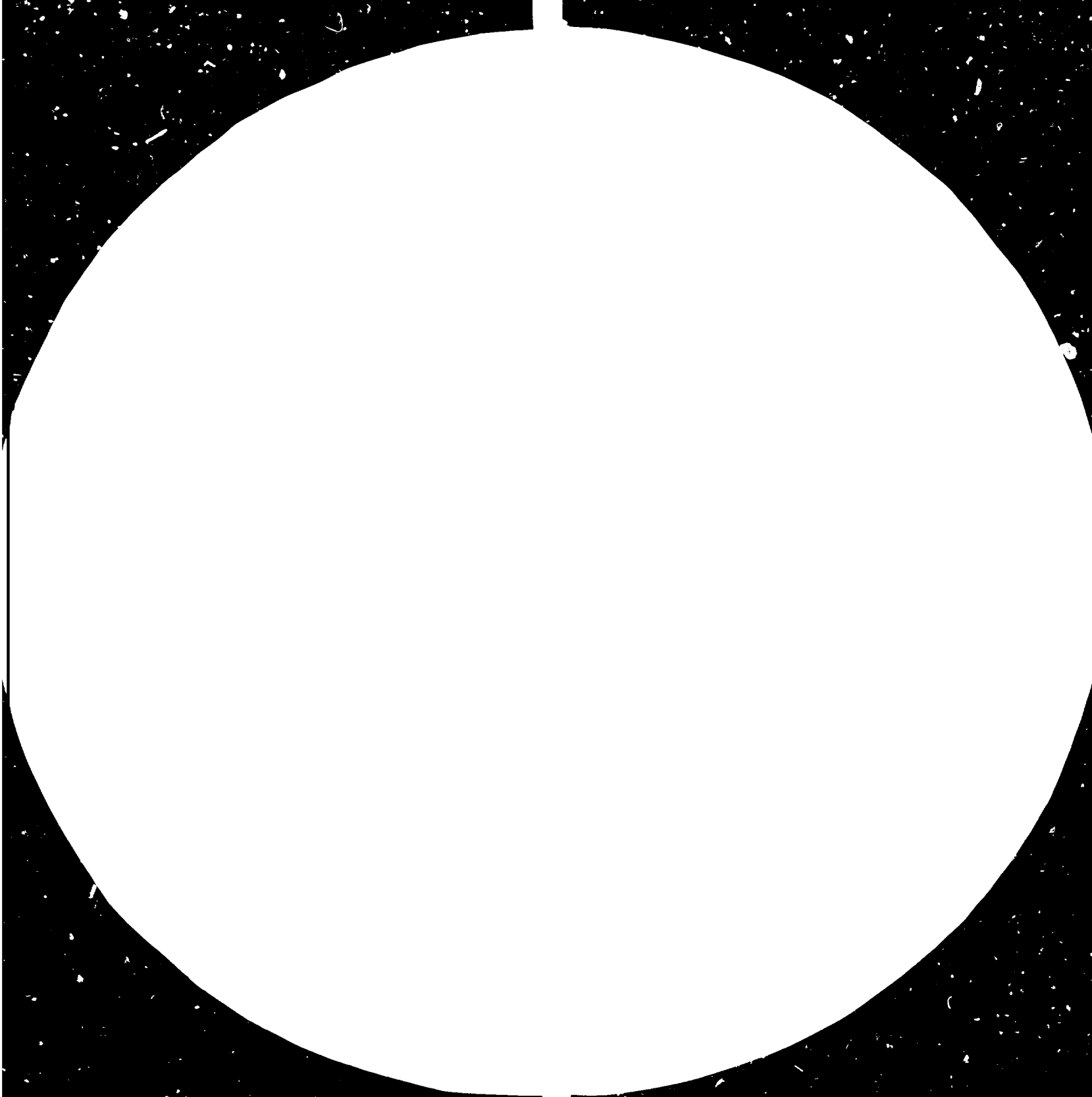

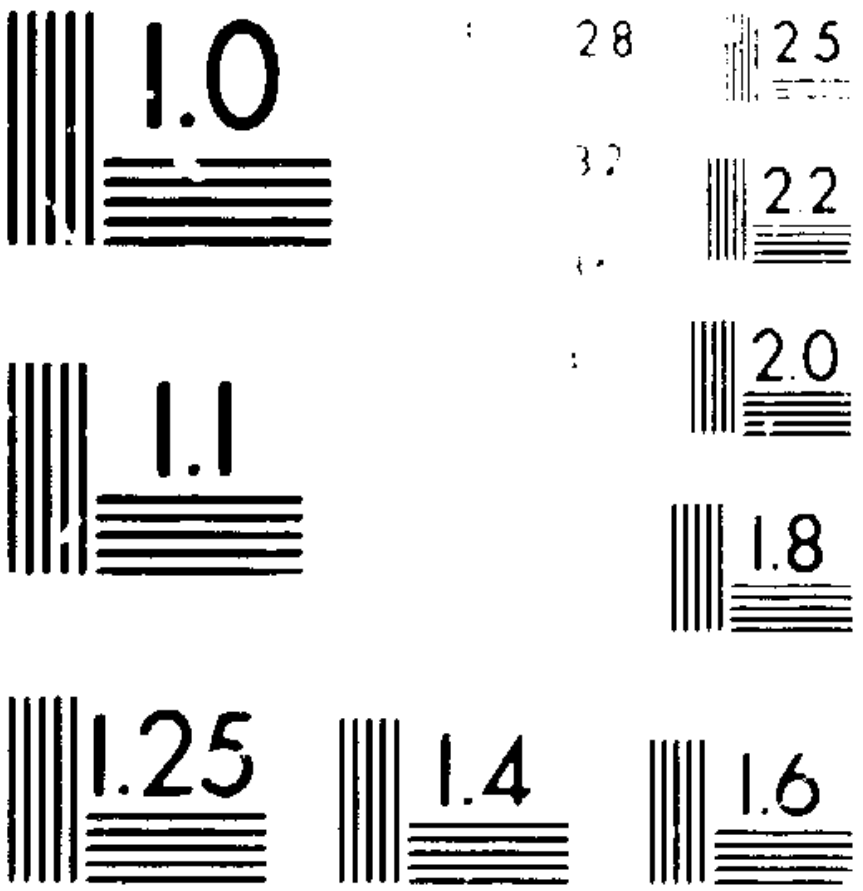

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ENERGY CONSERVATION IN THAILAND*

by

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(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:

1.1 Determine the energy conservation potential.

1.2 Formulate energy conservation guidelines and regulations.

1.3 Provide relevant technical information.

1.4 Provide Technical consulting service for energy audits.

1.5 Organize appropriate training programs for energy personnel.

(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 primarity of 4 sections namely. :

2.1 Energy audit (heat) section

2.2 Energy audit (electricity) section

2.3 Publication and information section

2.4 Technical section

(3) The ongoing activities of the center can be described as follows:

3.1 Two energy auditing teams with measuring equipment and technical advisors have been visiting factories on a request basis

to investigate energy utilization and to provide recommendations on ways and means to conserve energy. To date, about 100 factories which have been divided into 9 sectors have received this service. They include:

- Non metal	21	factories
- Metal	14	"
- Paper	17	"
- Food	17	"
- Chemical	8	"
- Textile	17	"
- Tobacco	3	"
- Rubber	2	"
- Wood	1	"
Total	100	"

As a result of these audits, the following items which needed improvement were identified:

3.1.1 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 recovery

3.1.2 To improve the efficiency of electricity utilization:

- Power factor improvement
- Peak demand management
- Compressed air leak repair
- Optimum load improvement for transformer
- Optimum load improvement for motors and electric equipment
- Electric equipment maintenance

The annual potential for energy saving of these 100 factories was estimated to be around 43 million litres of oil and 34 million kilowatt hours of electricity, totalling 260 million baht of savings per annum. The investment costs of the efficiency improvement is estimated at 84 million baht.

The number of factories requesting this type of service will increase as the team gains more experience and the factories feel more confident. It is estimated that another 100 factories will request this service next year.

3.2 Energy conservation information service. The center distributes technical information for energy users as follows:

- Economic Use of Oil Fired Boiler (pamphlet)
- Electricity Savings in Industries (booklet)
- Power Factor Improvement (booklet)
- Factory Energy Management (booklet)
- Factory Energy Audit (booklet)

- Electricity Savings in the home (booklet & pamphlet)
- Energy Conservation Newsletter (every 2 months)
- Condensate and Flash Steam Utilization (booklet)
- Economics Thickness of Insulation (booklet, in the process of printing)

3.3 Energy conservation training

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

(b) Five energy conservation seminars were held during 1982. About 350 engineers from various industries participated in the seminars.

3.4 The Energy conservation demonstration program. The aim of the program is to encourage implementation of energy conservation technologies in industries as examples in Thailand and widerspread of adoption of the technologies which lead to the efficient use of energy in other factories. The first stage of this program would be to demonstrate ways 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 would be published.

3.5 Import duty and Tax exemption/deduction for energy conservation equipment: The Government has established the Committee on Import duty and tax exemption/deduction for machines, material and equipments which relate to pollution control and energy conservation,

chaired by the Permanent Secretary, Ministry of Science Technology and Energy, to consider possible incentive for investor through tax and import duties exemption/deduction of machine, material and equipment which are required to be used in pollution control and energy conservation activities. At present, importers of those material and equipment can make request for import duty and tax exemption/deduction from this committee

(4) Conclusion

From past experiences, it can be concluded that:

- Factories which received the services from the center were primarily interested in house-keeping improvement, insulation, steam leak repairing and steam trap replacement. These are because this type of improvement required low investment and easily utilized.

- The majority of factories have problems concerning finance, marketing and high product rejection rate. The last problem is one of the major factors of inefficient energy use.

- Factories with financial problems are not interested in investing energy conservation.

- Industries are constantly on the look-out for sources of loan with lower interest rates.

- Publicity of available technical services from NEA needs to be strengthened.

(5) Energy Conservation Imposed Measures

5.1 Regulations, legistative and other direct control

5.1.1 Transportation sector

1) Set the speed limit of 90 km. per hour for cars and 80 km. per hour for other public transports on highways and insist on effective and full enforcement.

- Result : an annual saving of 20 percent gasoline and diesel oil should be obtainable.

2) Provide bus lanes in 19 major metropolitan Bangkok streets along with taxi standing by in order to allow buses to flow.

- Result : Average speed is improved from 10-15 km. per hour to 15-22 km. per hour. Less time is spent in waiting for buses and 30% of the passengers find it a more expendient form of transport.

3) Extend the no parking time and ban parking in 39 major streets in Bangkok.

- Result : an annual saving of 10 percent gasoline and diesel oil should be obtainable.

4) Prohibit heavy trucks to enter the Bangkok, municipal area during rush hours, (06.30 am - 9.30 am. and 04.00 - 06.30 pm.)

- Result : Traffic congestion during rush hours was considerably relieved.

5) Close all gas stations in the Bangkok metropolitan area between 6.00 pm - 6.00 am from Monday to Saturday and all day on Sunday

- Result : According to the evaluation made during December 2 - Feb. 30, 1980 a monthly saving of approximately 7 million liters of gasoline was obtained.

6) Order strict control and full enforcement of traffic law and regulations and impose heavier penalty on the violaters.

- Result : Law enforecement is considerably improved.

7) Delay the opening time of various government institutions, educational institutions and private agencies in order to relieve the traffic congestion during rush hours.

- Being considered by the government.

5.1.2 Industrial sector

Energy management law is being drafted.

5.1.3 Electricity sector

1) Reduce the opening hours of the places of entertainment. Night clubs will be open from 9.00 pm. - 01.00 am. tea hours from 4.00 pm.- 10.00 pm. On week-days and 12.00 am. - 10.00 pm. on holidays; massage parlors from 6.00 pm. - 12.00 pm. on week-days and from 2.00 pm. - 12.00 pm. on holidays; food shop restaurants, tea houses with 2 or more pieces of music instrument to entertain clients, from 11.00 am. - 2.00 pm. and 6.00 pm. - 12.00 pm., barber shops from 8.00 am. - 8.00 pm.

- Result : 35 percent opening hours reduction and 30 percent annual electricity saving dus to overlapping of performance.

2) Turn off light on all advertising signs, except the name board which is the only sign allowed for each shop between 6.00 pm. - 9.00 pm.

- Result : 15 MKwh annual saving.

3) Ban television broadcast between 6.30 pm. - 8.00 pm.

- Result : this measure will reduce the peak load of 89 MW.

4) Prohibit industries which consume major and intensive power in excess of 800 KW and which need not run continuously to operate 6.00 pm. - 9.00 pm.

- Result : voluntary cooperation from industrialists have led to a reduction of 120 MW. of power and a shift in the peak period. (20% using their own diesel generation.)

5.1.4 Government Sector,

1) Cut down oil and electricity consumption in government agencies by 5 percent during July 1979 - January 1980 and 10 percent during February 1980 - January 1981.

- Result : 50 MKwh saving in the first phase and 100 MKwh in the later phase

2) Limit the capacity of new engines in government cars to 1,300 c.c.

3) Cut down illumination on all main streets by about 50 percent.

5.2 Incentive

5.2.1 Transportation sector

1) Encourage private investment in off street parking facilities by providing interest - free loan with a repayment of 3 years.

5.2.2 Industrial sector

1) Providing soft loans to manufacturing enterpriaes for energy investment saving.

2) Tax exemption/deduction for energy equipments.

5.2.3 Government sector

1) Awards to be given to government agencies which have successfully conducted energy saving.

National Energy Administration

Ministry of Science Technology and Energy

November 1983