

AEON eco-store principles for the creation of energy efficient and sustainable policies in Bangkok retailer industry

Nao Tanida

UNEP-Tongji institute for environment and sustainable development
Mingjing Building, School of Environmental Science and Engineering
Tongji University, Shanghai
China
naotanida@gmail.com

Keywords

eco store, retailer, Environmental Management System (EMS), Thailand, environmental accounting, economic cost and benefit analysis

Abstract

Retailers in Bangkok, Thailand, are rapidly developing and have started to consume more and more energy and resources, pioneering retailing in other developing countries in South East Asia. Some of the biggest chain retailers in Bangkok are now trying to implement environmental management into their business in order to attract green-minded customers. However, most retailers are not willing to take steps at the cost of losing their economic benefits. This paper focuses on environmental management aiming to ensure triple benefits (minimizing resource use, economic benefits, and the abatement of CO₂ emissions) based on the management system by AEON, which is one of the biggest Japanese retailers. AEON is known as the pioneer of eco-store and is also expanding its economic benefit simultaneously. The paper highlights the fact that one needs to have a longer term view instead of focusing on first-cost only (though it may be difficult to convince people to adopt life-cycle analysis when one is not sure about what the distant future holds for us). In this context, the paper will demonstrate the need for policy changes at the macro level to send the right signal to the concerned stakeholders in the country (as has been shown by the example of Thailand's creation of an Energy Conservation Fund which has allowed "Revolving Fund" to lend money at a preferential interest rate to those who are willing to implement energy saving technologies), and how the AEON eco-store principles can be developed into a suitable practice for the situation of Bangkok.

Introduction

Thailand is located in the centre of the Southeast Asia, and it covers 514,000 square kilometres. It shares borders with Laos to the Northeast, Myanmar to the North and West, Cambodia to the East, and Malaysia to the South.¹ Its population is 63.04 million, and GDP per capita is 3,720 US dollars (= 2932 Euro)² with 4.8% of economic growth.³ Thailand is a developing country and it is developing rapidly compared to the rest of South East Asia. While its economics are developing, Thailand's emission of GHGs is increasing rapidly. As shown in the following graph of World Primary Energy Consumption per Euro of GDP, 1991-2006, Thailand's energy use is increasing compared to the developed countries.⁴

Especially in the energy use, the percentage of commercial and industry occupy a very high rate. As of 2003, residential and commercial sector occupies 21% and industry sector occupies 36% in the energy consumption in total economic sectors.⁵ In the section of industry, food and beverage occupies 30.5% in the total consumption of 19.988 ktoe in year 2003. In Thailand, the density of retailers is the highest in the world⁶.

Therefore to raise the energy efficiency of retailers in Thailand would contribute to the reduction of GHGs emissions. In addition to it, it is important for Thailand to be energy efficient because it can be followed by other developing countries in South East Asia.

-
1. Royal Thai Embassy, Tokyo (2007)
 2. Calculated with the rate 0.78820 Euro/US Dollars
 3. Ministry of Foreign Affairs of Japan (2007)
 4. Source: <http://www.eia.doe.gov/pub/international/lealf/tablee1g.xls>
 5. Thailand Energy Situation Report, 2003. DEDE
 6. Peter McGoldrick. 2002. Retail Marketing.

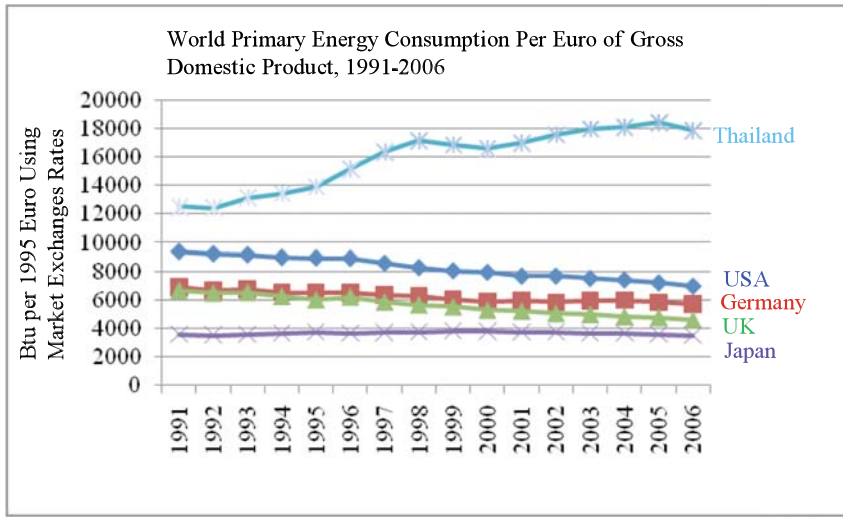


Figure 1. World primary energy consumption per Euro of Gross Domestic Products, 1991-2006 (Source: Energy Information Administration International Energy Annual 2006)



Figure 2. Density of Retailers, 2000 (Units per 1,000 persons) (Source: Peter McGoldrick, 2002. Retail Marketing.)

Raise energy efficiency in shops and saving costs

Many retailers in developing countries including Thailand think that raising energy efficiency implies high costs and therefore it is not worth to invest it. However, retailers can get triple benefit if they invest and make effort to raise energy efficiency. The

book “Factor Four-Doubling Wealth, Halving resource Use” was published by Ernest Ulrich von Weizsacker, Amory und Hunter Lovins in 1995. Factor Four is one of the indicators which describe environmental efficiency with the methodology that reduces the use of resources and energy to one fourth and maintains the same goods and services. With this method we can make the wealth double, and reduce the environmental burden by half. This concept was introduced in “the first global revolution” as in the report by Rome Club. There are 50 examples such as apartments with solar energy, high efficient refrigerators and energy saving compact fluorescent lamps, which are introduced in the book. Based on this concept, this paper describes how retailers in Bangkok can get triple benefit from policy, operation, and equipment aspects. In the next section, policy related energy conservation in Japan and, further on, the activities by Japanese retailer AEON based on the Japanese policy, will be shown.

Policy tracking related to energy efficiency in Japan

In Japan, the framework law related to environment is the Environment Basic Law which was established in 1993.

Japan joined UNFCCC in 1993. With the entry into force of Kyoto Protocol in 2005, “The Plan to Achieve Kyoto Protocol Target” was established. In the plan, compared to the figures of 1990, the target set was to: i) increase 0.6% of CO₂ generated from energy; ii) reduce 0.3% of CO₂ not generated from energy; iii) increase 0.1% of alternative freon gases; iv) reduce 3.8% with maintaining forest sinks; v) compensate the rest of 1.6% through The Mechanisms under Kyoto Protocol such as Emissions Trading, The Clean Development Mechanism (CDM) and Joint Implementation (JI).

There were 6 big changes in law and the following are the two main related points.

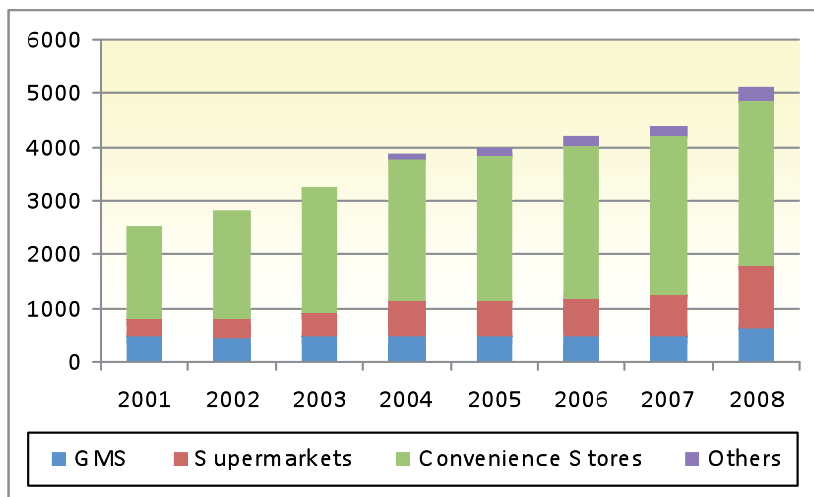


Figure 3. Numbers of Stores of AEON group (Source: AEON Sustainable Report)

I. Establishment of the Law Concerning the Promotion of the Measures to Cope with Global Warming, 1998

This law is the framework law to promote the measures to face global warming, and it sets the responsibility of each sector of society, such as country, municipal government, companies and citizens.

II. Partial amendment to the Saving Energy Law, 1998

This law intends to carry out thorough rationalization of energy use in factories and offices, and strengthen the targets related to global warming such as standards of energy saving and standards of fuel consumption of cars and household electrical appliances.

The indicated period to reduce GHGs emissions in Kyoto protocol started in April 1st, 2008 (2008-2012). In Japan, as an Annex 1 Country, in order to reduce 6% of GHGs' emission compared with the amount of based year (1990), the government revised the existing laws in the following point.

OBLIGATION OF REPORT AND DISCLOSURE

Japanese government made a cabinet decision to improve the Law Concerning the Promotion of the Measures to Cope with Global Warming and the Law Regarding the Rationalization of Energy Use. Regarding the Law Concerning the Promotion of the Measures to Cope with Global Warming, it had targeted only the factories that were above a certain scale. However, in the revised version, it started targeting groups and franchise chains that emit more than a certain amount of GHGs and obliged the emission calculation, its periodic report and disclosure. Its target includes those small and medium scale stores and branch offices which individual emission is not so high. As a result, the coverage of its target for operation section is estimated to increase from 13% to 50% approximately. Its purpose is mainly to strengthen the countermeasure both for the operation section such as office and store (41.7% of increase in 2006 compared with the amount of 1990), and household

section (30.4% of increase in 2006 compared with the amount of 1990)⁷.

As above, Japan is trying to tackle global warming in a certain degree; however, the total CO₂ emission increased 8.0% as of 2004 compared with 1990 which is far from achieving the target of Kyoto Protocol. This shows that global warming should be coped not only with policy frameworks but also with a positive attitude by industry sectors.

In the next section, AEON's activities are described based on the policies which were introduced in the previous section.

AEON's Activities on Energy Efficiency in Japan

COMPANY PROFILE OF AEON

AEON is a retailer that was established in 1926 in Japan. AEON consists of 169 companies and operates in Japan and in other 6 countries with a total number of employees of 76,624 as of 1998. AEON is known as a successful company that is achieving both environmental management and economical growth as shown in figure 3 representing the growth of numbers of stores.

AEON's business principle is "We are committed to creating a future of limitless promise by transforming daily life through our open, dynamic approach. The centre of philosophy is our customers. Our consistent mission is to provide benefit to our customers. We are a company that is committed to maintaining customer focus". The word 'AEON' has its origin in a Latin word meaning "eternity", and AEON raises three elements such as peace – a company whose operations are dedicated to the pursuit of peace through prosperity, people - a company that respects human dignity and values personal relationship, and community – a company rooted in the local community life and dedicated to making a contribution to the community"⁸.

7. Mainichi Shinbun, 31 March, 2008

8. AEON Environmental and Social Report 2008, http://www.aeon.info/environment/report/english/e_2008pdf/e_all.pdf

ENVIRONMENTAL MANAGEMENT OF AEON

As a retailer, AEON is trying to actively carry out environmental conservation efforts through the provision of products and services at its stores in order to contribute to the establishment of a sustainable society. AEON acquired ISO14001, international standards for environmental management systems, in all of its stores and all offices in its group in 2000. This involves the entire company's employees of about who are about 100 thousand.

AEON considers that ascertaining the impact on the environment is the basic principle of all environmental activities. Retailers are stores which are the most accessible to customers. The impact on the environment as a result of its business activities does not only occur as the direct outcome of energy use at stores and other facilities. In addition to the direct negative impact on environment generated by its business activities such as packaging materials, there are also various other indirect effects that occur at the time of production and delivery of the products by suppliers. AEON is endeavouring to ascertain precisely the impact that is exerted on the environment, including these factors.

BASIC POLICY ON THE PREVENTION OF GLOBAL WARMING

AEON established "basic policy on the prevention of global warming (CO₂ emissions reduction target)" to firmly achieve the objectives as below.

1. We respect the spirit of the Kyoto Protocol and will contribute to the pursuit of its goals.
2. To achieve our emission reduction targets, we aim to reduce our CO₂ emissions in our business activities. The shortfall will be covered through the mechanisms under Kyoto Protocol such as Emissions Trading, The Clean Development Mechanism (CDM) and Joint Implementation (JI).
3. To minimize our environmental impact, we continually revise and improve the production and transport of the products that we offer in our stores.
4. We test various biodegradable and biomass packaging materials and endeavour to choose new materials that have minimal environmental impact.
5. We use electricity from renewable energy sources and innovative, energy-saving technologies in 100 of stores each year. We also will pursue socially-responsible procurement of building materials of our "AEON eco-stores" to contribute to the reduction of global warming.
6. We adopt CFC substitutes in the heating, ventilation and refrigeration systems in our store. We will also test energy-saving non CFC refrigerants in our refrigeration systems.
7. We will take the initiatives in encouraging our customers and associates to bring their own shopping basket and shopping bags. By cooperating with the Ministry of Environment, the local authorities and members of the community, we hope we can spread the Bring your Own Bag campaign.
8. We will actively pursue our tree-planting activities such as the AEON Hometown Forest Program and the AEON One Town, One Forest Program and choose materials that have

minimal environmental impact with Forest Stewardship Council (FSC) Certification.

Using the amount in 2006 as base line, AEON set the target of CO₂ reduction as 1.85 million tons with customers' collaboration. AEON is trying to achieve this goal with the methods as below.

1. through AEON's products and supply chain: 570 thousand CO₂ tons
2. through AEON's stores: 500 thousand CO₂ tons
3. through tree-planting activities: 310 thousand CO₂ tons
4. through using of Kyoto mechanism: 470 thousand CO₂ tons

AEON developed the concept of "Eco-Store" in order to achieve these concepts above. In the next section, its basic principles are described.

ECO STORE

AEON raised three concepts of Eco-Store. The first one is Renovation and Innovation, the second one is Learning and Cooperation and the third one is Information Disclosure.

1. Renovation and Innovation
Adopting new energy saving and environmental friendly technologies
2. Learning and Cooperation
Cooperating with the local community to increase children's awareness of environmental problems
3. Information Disclosure
Providing easy-to-understand information about AEON's initiatives

In addition to these three concepts, there are nine perspectives of Eco-Store as below.

Equipment and building⁹

1. Energy saving/generation: To use environmental-friendly energy sources
Example: Solar Panel
The Panel generates approximately 140,000 kW of power per year. This figure corresponds to the power used by about 40 households (approximately 3,500 kW/year each) every year.
2. Environmental Efficiency: To build stores using materials which have minimal environmental impact
Example: Blocks made from shirasu volcanic ash
Blocks used at the store are made from shirasu volcanic, or volcanic ash that is found in certain areas of Kagoshima prefecture. The blocks feature a superior capacity to hold water, which prevents temperature increases.

9. Website of Takenaka Koumuten <http://www.takenaka.co.jp/environment/sw/project/aeon.html>

3. Natural Light by Light-Well, Eco-Void

Using “Eco-Void” which makes green, light and wind sweep past to inside the shopping mall, and “Light-Well” which leads natural light from the roof to the ground floor, and the outside louver with the lumber from thinning, reduce the burden of electricity for lightning and air conditioning.

4. Use Well Water

Taking advantage of the location which has plenty of river’s water, sprinkle well water and use as toilet water and cooling water of air conditioning. Furthermore, establish the reservoir for rain water and use it as sprinkling water and toilet water.

5. Centrifugal Chiller

Using centrifugal chiller and inverter centrifugal chiller as heat source of air conditioning. Furthermore, use hyper multi gas heat pump air conditioning as gas source in order to raise the efficiency of machines.

Operation¹⁰

1. Safety, Security, Environmental Concerns: To provide environmental-friendly commodities

Example: Biomass Packaging Materials

The plastic packaging materials made from biomass, a biological resource, do not increase the amount of GHGs in the atmosphere even when they are incinerated. Biomass materials are also used for shopping baskets on the apparel and home/fashion floors.

2. Promotion of Recycling Activities: To promote recycling activities with local community members

Example: Recycling of Food Reuse

Food waste is recycled into compost used to grow sweet potatoes, which are in turn used to make shochu (Japanese liquor).

3. Contribution to Community: To build stores which serve the community

Example: Bring own shopping bags campaign

This campaign is aimed at reducing CO₂ by encouraging customers to bring their own shopping bags or baskets.

4. Disclosure: To provide easy-to-understand information about AEON’s activities

Example: Eco Information

The current amount of power generated by the solar panels and amount of CO₂ reductions are indicated to consumers.

AEON is trying to innovate environmental-sounds technology and resource positively, and to make negative elements minimize from economical, environmental and social perspectives, and also make positive elements maximize.

Whenever AEON designs a store, it takes its impact on the local area into consideration combining all of the environmental friendly technology, resources and equipment in the store’s design process with the environmental expertise. Opened in 2005, the AEON Chikusa Shopping Centre became the first store to be based on this concept. Using the drawing gained through Chikusa Shopping Centre, AEON Kashiwa Shopping Centre was opened in the same year. Based on the concepts of incorporating more greenery, making better use of natural sunlight and enhancing energy-saving facilities, AEON Kashiwa Shopping Centre features, 1,400m² of wall space covered in greenery and solar panels with a rated power output of 12kW and has successfully reduced energy consumption using technology such as thermal storage systems. In addition to improvements to the building itself and other physical aspects of the shopping centre, AEON is addressing environmental issues through intangible measures such as promoting environmental preservation activities in partnership with members of the local community in an effort to establish the shopping centre as the centre of the community.

Efforts to cut CO₂ emissions in Chikusa Shopping Centre:

- Solar power generation: 2,646 kg of CO₂
- Wind power generation: 44 kg of CO₂
- Light wells: 21,988 kg of CO₂
- Hyper GHP (in air conditioning systems): 25,238 kg of CO₂
- Wooden loopers: 3,958 kg of CO₂
- Automatic escalators: 42,020 kg of CO₂
- Automatic chiller cabinets: 119,373 kg of CO₂
- Eco-reflect: 4,347 kg of CO₂
- Daylight sensors: 4,187 kg of CO₂
- Hf fluorescent lights: 6,008 kg of CO₂

Through these activities, this shopping centre has been evaluated BEE=2.8 (rank A) by CASBEE¹¹ which is the top class as a commercial shopping centre.

ENVIRONMENTAL ACCOUNTING

AEON started introducing environmental accounting in 2001 to provide an objective understanding of the costs involved in environmental conservation activities and their effects. This is the one of the most useful tools to manage benefit in long term.

Policy tracking on energy efficiency in Thailand

For more than 30 years, the Thai Government has been implementing 5-year National Economic and Social Development Plans for the social and economic development of the country. Increasing deterioration of natural resources and environment during the 1960s prompted the government to seriously act on natural resource and environmental conservation.

10. AEON Sustainability Report 2008

11. CASBEE: Comprehensive Assessment System for Building Environmental Efficiency. Its purpose is to promote sustainable architecture which uses market mechanisms, its environmental evaluation system is based on concepts such as environmental efficiency.

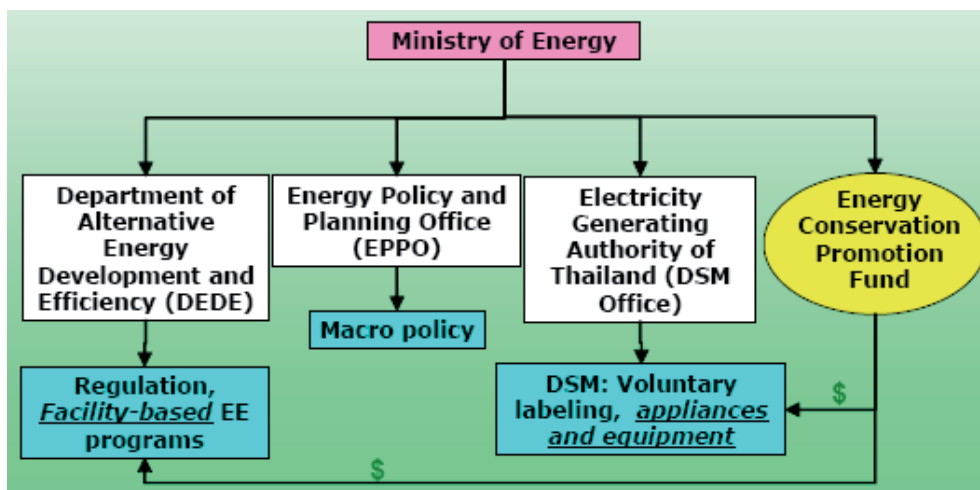


Figure 4. Thai Government Agencies Responsible for Energy Efficiency Activities (Source: Asia-Pacific Economic Cooperation, 2005)

Sustainable development efforts have been accelerated in the 1980s and early 1990s. The Enhancement and Conservation of Environmental Quality Act promulgated in 1992 has strengthened the natural resources and environmental conservation of the country.

In March 1992, the government of Thailand has passed the Energy Conservation Promotion Act. In conjunction with the legislation, the energy conservation fund (ENCON) was established to provide financial support to government agencies, state enterprises, non-government organizations, individuals and business that wish to follow the Act by implementing measures to increase efficiency in energy utilization.

The objective of the Energy Conservation Program is to promote:

- Energy Conservation
- Efficient Use of Energy
- Sustainable Use of Natural Resources
- Development and Use of Renewable Energy
- Development of Energy Conservation (ENCON) technology
- Environmental Protection

In Thailand, the responsible agency on energy efficiency is Ministry of Energy which is established in 2002 and is responsible for all energy functions in Thailand. Under the Ministry of Energy, there are three primary governmental agencies which are responsible for energy efficiency activities.¹²

- The Department of Alternative Energy Development and Efficiency (DEDE)

Primary government agency which is responsible for implementing energy efficiency under the ENCON act

- The Energy Policy and Planning Office (EPPO)

Responsible for formulating energy policy, as well as strategic policy for energy efficiency and renewable energy.

- The Electricity Generating Authority of Thailand (EGAT)

A state-owned electricity generating company that has been implementing a demand-side management (DSM) programme in Thailand since the mid-1990s.

After Thailand ratified the United Nations Framework Convention Climate Change (UNFCCC) the Ministry of Science, Technology and Environment (MOSTE) established two national committees to implement the obligations. The National Climate Change Committee (NCCC), chaired by the Permanent Secretary, is the highest body involved in the implementation of UNFCCC. A subsidiary committee consisting of members from independent entities has been appointed by the NCCC. The committee is usually chaired by the Secretary General of the Office of Environmental Policy and Planning (OEPP) of MOSTE. The main function of the subsidiary committee is to give independent opinions and technical advice to the NCCC. OEPP is designated to be the national focal point of Thailand.

Actual implementation of the UNFCCC would benefit from a climate change action plan, among others. The action plan can also assist in implementing sustainable development initiatives in Thailand and a part of the national communication. The support provided by the US Country Studies Program has assisted Thailand to investigate possible climate change related actions. The action plan does not, however, represent any binding commitments for Thailand, either in a voluntary or legally binding sense. Thailand, as a Non-Annex I country, has no reduction target obligations under the Convention for the mitigation of GHG emission. Annex I countries must take the lead in GHGs reduction. Thailand will, however, endeavour to cooperate with other countries to assure that the risk of adverse climate change impacts is minimized. This will be done through implementing a range of projects, which have mitigation objectives as part of the overall project objectives. For example, some on-going energy efficiency projects were implemented without a climate change focus; however, emission reduction have been achieved. In addition, some AIJ and GEF projects have been officially endorsed by the NCCC in collaboration with local entities.

In 1997, after the economic crisis struck South-East Asia, Thailand started to notice that its economy should not rely on other countries. The King of Thailand initiated the concept of

12. Asia-Pacific Economic Cooperation. 2005. Thailand's Energy Efficiency Revolving Fund: A Case Study.

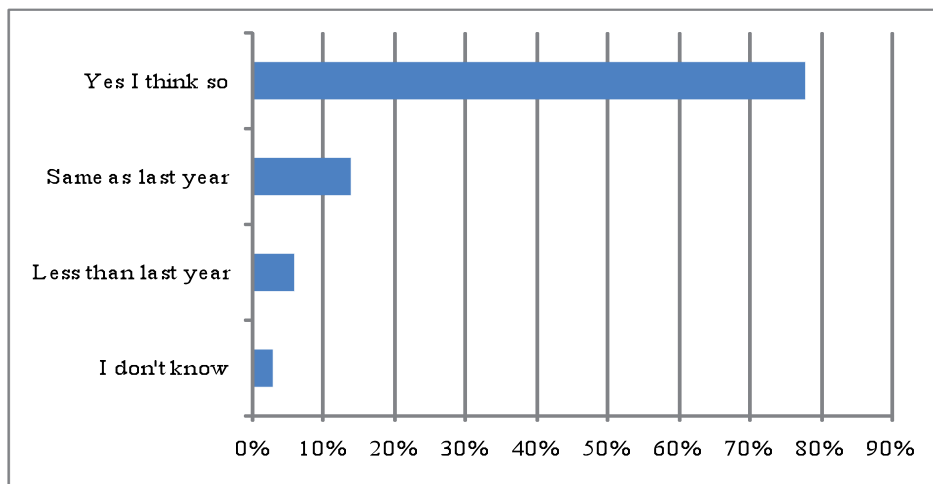


Figure 5. Questionnaire Results. Question No.1

“sufficiency economy” to encourage people to be “more happy with less”. It is a very meaningful concept for the achievement of sustainable development. One can do many things outwardly but if there is no change in mind-set, all initiatives will come to a half if there is a change in management or if there is a crisis situation. Therefore bringing about change in the thinking process is the biggest challenge in the whole system. For this to happen, much awareness and sensitization is needed and people should also be open to ideas. Otherwise, it will result in a lot of “green washing”, as is being practiced by many corporate houses today. The key to sustainable development can perhaps be summarized as “how to get more services and satisfaction with less resource and less pollution”. Therefore the first step is to adopt “right strategy”. “Right strategy” means the strategy that allows people to the life cycle in long term view rather than only its initial effects.

How to Implement AEON's Principle in the Retailer in Bangkok, Thailand

The Mall group which is one of the largest retailer groups and owns stores such as Siam Paragon and Emporium along with six malls, is now estimated to use 150 million plastic bags per year. Therefore, the Bangkok Metropolitan Authority (BMA) has launched a campaign, passing out 30,000 canvas bags with the logo “Let's Make Bangkok Cool” to encourage consumers to reduce the use of plastic bags.

The metropolis accounts for more than 40% of the country's CO₂ emissions, and each Bangkok citizen leaves a carbon footprint of 7.3 tons of CO₂ per year which is almost same as that of London.

Thai government hoped to reduce Bangkok people's carbon footprint by 1 ton by the year 2012, through a variety of campaigns including getting motorists to change to bio-fuels, promoting energy-efficiency and growing more trees.

Although it is generally accepted the shopping bag strategy is a minor step as a method to mitigate global warming, it is at least a step forward in the right direction, especially for the Bangkok city's elite.

ASSESSING THE ACCEPTABILITY OF ENERGY EFFICIENCY IN THE MALL GROUP, BANGKOK

The Result of the Questionnaire

In order to examine the awareness of consumers, an anonymous questionnaire has been sent in the stores of The Mall Group (The Mall, Siam Paragon) which targets 600 consumers who are more than 15 years old.

The figure 5 shows the answer of the question “Do you think you started concerning about environmental problem more than last year?”

The figure 6 is the result of the question “Please choose the environmental topic that you concern the most”. (multiple answer allowed)

According to the answer of the questionnaire 1 and 2, consumers in Bangkok have high concern on GHGs reduction. From this perspective, the possibility that raising energy efficiency and disclosing such activities can bring the raise of profit is very high. Furthermore, since consumers' concern on environment becomes greater year by year, it becomes an advantage both in cost and competitiveness perspectives if the investment is done earlier. In addition to it, to involve the community and promote transparency of information would cause the raise of profit because it becomes easier to listen to consumer's voice.

There are two perspectives to save energy, such as operational saving energy, which can be started soon, and raise energy efficiency of equipment, which can be expected to provide greater effects.¹³

Saving Energy by Operation

Examples

- Turn the light off when it is not in use
- Assess the flowing of the external air inside
- Assess the temperature of showcase, etc.

13. Ministry of Economy, Trade and Industry. 2008. Inryou Syokuhiin Kourigyou ni okeru Shou Energy Jisshi Youkou (Outline for Saving Energy on Food and Beverage Retailers).

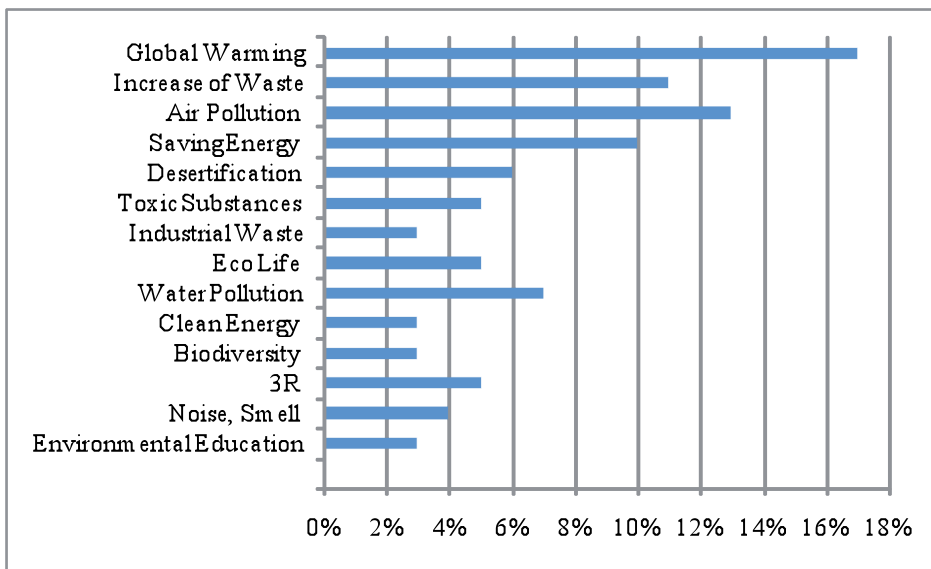


Figure 6. Questionnaire Results. Question No.2

Characteristics

- Investment for equipment is not necessary
- It is possible to carry out soon

For example, many retailers keep turning the light on sales floor while they are preparing before shops open and while cleaning up after the shops close. If only the necessary lights are kept turned on during opening hours, 109,000 Japanese Yen (=875 Euro)¹⁴ of electricity fee and 6.7-CO₂ of carbon dioxide can be reduced yearly. (The rate of reduction per equipment is 15.3%.)¹⁵

Effect

1. Condition

- Electrical power consumption:
110W2 (225W)*10 lights * 5 rows are turning off
(2/3 of total)
- Working hours: 2 hours before opening, 1 hour after closing (Opening hours: 10 hours)
- Target period: 360 days
- Electrical Fee: 9.0 Japanese Yen (=0.07 Euro)/kWh
- Coefficient of CO₂ emission: 0.555 kg-CO₂/kWh

2. Result of calculation

$$\{(225W*10\text{ lights}*5\text{ rows})*3\text{hours/day}*360\text{ days}*9.0\text{JPY}(\cong 0.07\text{ Euro})/\text{kWh}\}/1000 \cong 109,000\text{JPY} (\cong 875\text{ Euro})$$

14. Calculated with the rate 0.00803 Euro/Japanese Yen

15. Ministry of Economy, Trade and Industry. 2008. Inryou Syokuhin Kourigyoku ni okeru Shou Energy Jisshi Youkou (Outline for Saving Energy on Food and Beverage Retailers).

$$\{(225W*10\text{ lights}*5\text{ rows})*3\text{hours/day}*360\text{ days}*0.555\text{ kg-CO}_2/\text{kWh}\}/1000 \cong 6.7\text{t CO}_2$$

Raise Energy Efficiency by Equipment

To successfully realize any low-energy building, the design team must make cost-effective energy minimization a high-priority design goal. The building's energy use and energy cost depend on the complex interaction of many parameters and variables¹⁶.

Example

- Set the equipment of high energy efficiency lightning
- Bring inverter air conditioning
- Bring demand control, etc.

Characteristics

- Comparatively greater energy saving effect
- It is possible to maintain energy saving without any operation by staffs

Initial step in implementing sustainability is information collection such as document review and store walk-through. The second step is problem identification such as identification of roots cause. The third step is to set objectives and targets.

In the assessment communities the term "green" is commonly used to estimate how different a building is as compared to a business as usual scenario. Becoming sustainable would require an understanding of "the absolute impact or stress that building design and operation place on ecological systems to ensure that it is within the assimilative capability of the local and global ecosystems"¹⁷. For achieving sustainable buildings, an energy

16. Judkoff, 1995

17. Cole, 1998

audit is one of the tools used in the overall management of energy expenditures of a building. The management of energy expenditures considers the following elements:

- the energy needed to achieve the building function and maintain customer and staff comfort
- the maintenance and retro fit plan for the building
- reducing the unit cost of purchased energy and reducing energy consumption

Effect of Inverter Lighting

If lighting in the shop with copper and iron ballast is changed to electronic ballast, 300 thousand Japanese Yen (\approx 2409 Euro) of electric fee and 18.5 tons of carbon dioxide are reduced.

1. Condition

- Electricity Consumption:

Before: Copper and iron ballast 110W 106 lightnings
23.99 kW

After: Electronic ballast 110W 106 lightnings
17.79 kW

- Lighting Hours: 15 hours/day 360 days
- Electrical Fee: 9.0 Japanese Yen/kWh ($=0.07$ Euro)
- Coefficient of CO₂ emission: 0.555 kg- CO₂/kWh

2. Result of Calculation

$$\{(23.99 \text{ kW} - 17.79 \text{ kW}) * 15 \text{ hours} * 360 \text{ days} * 9.0 \text{ Japanese Yen/kWh}\} \approx 300 \text{ thousands}$$

Japanese Yen ($=2409$ Euro)

$$\{(23.99 \text{ kW} - 17.79 \text{ kW}) * 15 \text{ hours} * 360 \text{ days} * 0.555 \text{ kg-CO}_2/\text{kWh}\} \approx 18.5 \text{ tCO}_2$$

SUGGESTION ON HOW TO CHANGE CURRENT THAILAND'S POLICY

Since climate is a "common concern" to all countries, it follows that there is a responsibility on the side of countries to protect it. Who should be responsible of climate change is a function of each country's historical responsibility for the problem, its level of economic development, and its capability to act¹⁸. This was suggested by Principle 23 of the 1972 Stockholm Declaration, which states that it is essential to consider "the extent of the applicability of standards which are valid for the most advanced countries but which may be inappropriate and of unwarranted social cost for developing countries"¹⁹. Thailand is not an Annex 1 country. At this moment, there is no existing data on the amount of GHGs emitted by retailers in Thailand. However, in order to get triple benefit, to create the policy for data collection

(obligation for retailers to submit how much energy they used) and analyze how to become energy efficient and saving money at the same time is very profitable for retailers in Thailand after all. As AEON introduced, the visualization is the base in order to mitigate climate change and also save money.

Conclusion

Thailand is developing rapidly. Especially people in Bangkok are enjoying the shopping in supermarkets or department stores more often. Consumer there already noticed the importance of energy efficiency but it is still not so clear for them what to do as a first step and how much effects they can get. In this situation, the role of retailers is getting greater in Thailand.

In retail operating costs, energy is one of the most controllable sections. Energy management can reduce operating costs, particularly for department stores, where the physical layout and equipment are often similar from store to store. This makes it relatively simple to repeat energy-saving measures across all stores.²⁰

In Thailand, it is still considered that the retailers' role on energy efficiency is not so important. However, retailers have the closest relation with consumers and therefore their role is also useful for raising awareness on energy efficiency among the people in Thailand. To raise energy efficiency needs retailers' positive attitude. Maintaining to make efforts on raising energy efficiency in long term will give retailers great effect both for cost and energy saving. Regarding the reduction of GHGs, the retailers' collaboration is necessary with methods such as establishing Eco-Store, since retailers already more have know-how, technology, data and experience rather than government.

Since these activities are strongly connected to the expenses, marketing and research are inevitable for starting energy efficient activities in stores. For example, evaluating which and what kind of shop should be the Eco-Store model, which can attract consumers the most, according to the different areas.

In order to optimize the activities effectively, the government in Thailand also can establish a framework initiative with retailers. Especially, being retailer activities the closest to consumers, their involvement in energy efficiency issues would also be a good first step to catch people's awareness on environmental problems. However, to really attract consumers in the long term, it is very important to clarify and visualize the whole flow, put priorities, and disclose to all stakeholders.

To achieve this goal, Thai government needs to establish the plan step by step. Clarification and visualization of the current situation through life cycle assessment of products and services by business sectors are the most important steps. At the same time, the research on the situation in other countries or regions is also necessary. The most important here is to establish the cycle of reviewing. In developing countries, the systems tend not to last for long, but to achieve the development in a sustainable way, is the necessary step.

18. Harris, 1999

19. Declaration of the United Nations Conference on the Human Environment, June 16, 1972. Princ. 23.11.I.L.M. 1416,1420 (Stockholm Declaration)

20. Department of Energy, Utilities and Sustainability, New South Wales Government www.energysmart.com.au/wes/images/pdf/retail_paper_final.pdf

References

- AEON Study. 2009. Changing AEON.
- AEON Sustainable Report 2001-2008. AEON Co., Ltd.
- Asia-Pacific Economic Cooperation. 2005. Thailand's Energy Efficiency Revolving Fund: A Case Study.
- Cole, R.J. 1998. Emerging Trends in Building Environmental Assessment Method. Routledge, part of the Taylor & Francis Group.
- Criteria for the Registration of Energy Conservation Consultants for Designated Buildings. Announcement of the Ministry of Science, Technology and Environment, 1995.
- Demand Side Management in Thailand, Experience and Perspective. Demand Side Management Office, Electricity Generating Authority of Thailand, November 1997.
- Department of Energy, Utilities and Sustainability, New South Wales Government. www.energysmart.com.au/wes/images/pdf/retail_paper_final.pdf
- Dieter Brulez: The Thailand Energy and Environment Network (TEE-NET). Proposal for the Intermediate Central Secretariat and the Energy Efficiency Services (TEE-IS). ENEP Project, June 1997.
- Energy Information Administration. Official Energy Statistics from the U.S. Government. 2006. International Energy Annual. <http://www.eia.doe.gov/pub/international/iealf/tablee1g.xls>
- Green Purchasing Initiatives by AEON Co., Ltd. Asian Productivity Organization (APO).
- Harris, Paul, G. 1999. Environmental Security and International Equity: Burdens of America and Other Great Powers. *Pacifica Review*, vol. 11, no.1 (February 1999): 25-42.
- Hatakeyama, T., Otsuka, T., Kitamura, Y., 2007. *Kankyo Hou Nyumon (Introductory Environmental Law. Nikkei Bunko)*.
- Judkoff, R. 1995. Field Notes on Site and Weather Survey for Zion National Park Visitor Centre.
- Kritiporn, P., Pnanyotou, T., Charnprateep, K., 1990. The Greening of Thai Industry: Producing More and Polluting Less. Thailand Development Research Institute Foundation, Bangkok.
- Ministry of Economy, Trade and Industry. 2008. *Inryou Shokuhin Kourigyouni okeru Shou Energy Jisshi Youkou (Outline for Saving Energy on Food and Beverage Retailers)*.
- Ministry of the Environment (Japan) <http://www.env.go.jp/en/>
- Ministry of Science, Technology and Environment, Thailand. 2000. Thailand's Initial National Communication Under the United Nations Framework Convention on Climate Change
- Mitsuhashi, T., 2002. *Kankyo Keizai Nyumon (Introductory Environmental Economics)*. Nikkei Bunko.
- M. Thiruchelvam, S. Kumar, C. Visvanathan., 2003. Policy options to promote energy efficient and environmentally sound technologies in small- and medium-scale industries. *Energy Policy* 31, 977-987
- McGoldrick, Peter. 2002. *Retail Marketing*. McGraw Hill Higher Education; 2nd Edition.
- Prapat Wangskarn: Success of Energy Efficiency and Energy Conservation in Thailand. Paper presented at the Energy Day, November 13, 1997, Bangkok, Thailand. Department of Energy Development and Promotion, Ministry of Science, Technology and Environment, 1997.
- Pravit Teetakeaw: Energy Conservation Experience of Thailand. Paper presented at the International Seminar on Energy Efficiency Strategies, Madras, India, November 1997.
- Pongpisit Viseshakul: Thailand's Experience in Energy Conservation and Efficiency Programme. Paper presented at the Second National Seminar on Energy Conservation and Efficiency Programme in Viet Nam, Hanoi, 10-11 March 1998.
- Royal Decree on Designated Buildings. Ministerial Regulation Issued under the Energy Conservation Promotion Act. Department of Energy Development and Promotion (DEDP), Ministry of Science, Technology and Environment (MOSTE), 1995.
- Takenaka Koumuten. <http://www.takenaka.co.jp/environment/sw/project/aeon.html>.
- Thailand Energy Situation Report. 2003. Department of Alternative Energy Development and Efficiency (DEDE). Thailand Environmental Institute (TEI), www.tei.or.th/aprcp.
- Thailand Environmental Institute (TEI). 2000. National Action Plan on Climate Change of Thailand, Volume I: Main Report
- The Energy Conservation Promotion Act. Bureau of Energy Regulation and Conservation, Department of Energy Development and Promotion, April 1995.
- Visvanathan, C., Kumar, S., 1999. Issues for better implementation of cleaner production in Asian small and medium industries. *Journal of Cleaner Production* 7, 127-134.

Acknowledgements

We would like to thank the Mall group in Thailand for support of questionnaire in its stores. We would also like to thank Seiichi Ueyama in AEON group in Japan, Supanee Suwanachart and Supawan Wongprayoon in Department of Environmental Quality Promotion in Thailand for support of providing precious information and data. In addition, we would like to thank Wei Zhao and Mahesh Pradhan in United Nations Environmental Programme Regional Office for Asia and the Pacific (UNEP-ROAP) and Marco Silvestri in UNEP-Tongji Institute for Environment and Sustainable Development for helpful review and comments.