Measures against global warming that the owners and managers of small to mid-size buildings can take

Workshop for Owners and Managers of Small to Mid-size Buildings
Tokyo Building Owners and Managers Association　: BOMA (Tokyo)

1　Preface

The awareness of the global warming issues caused by greenhouse gas emissions has also been spread in Japan as problems common to all humankind. The Japanese government has revised the Act on the Rational Use of Energy (hereinafter called the Energy-Saving Law), requiring energy management to specified corporations whose annual energy consumption amounts to 1,500 kiloliters or over (equivalent to crude oil). The Tokyo Metropolitan Government has revised the Tokyo Metropolitan Environmental Security Ordinance and has obliged specified corporations holding office buildings and others to cut greenhouse gas emissions by an annual average of 8% over the five-year period until FY2014. However, both regulations are targeted on large-scale buildings, and regulatory energy-saving initiatives on existing small to mid-size buildings, which constitute a large part of the stock in terms of number, have been postponed.

Buildings held by the members of the Workshop for Owners and Managers of Small to Mid-size Buildings of BOMA (Tokyo) are not subject to the relevant regulations. Is this an excuse for being indifferent to environmental issues which all human beings are facing?　There must be something we can do. Inspired by such remarks of Norimi Inomata, a representative of the Workshop, a Work Group on CO_2 Measures was set up in November 2007. In June 2008, “Measures against global warming that the owners and managers of small to mid-size buildings can take” was released to show the actual situation surrounding energy-saving in small to mid-size buildings, together with their problems and countermeasures. Then, members have started to tackle energy-saving measures in their respective buildings.

Two years have passed since then. With the aim of examining the effects of the　countermeasures, and also in order to increase surveyed numbers for the enhancement of data reliability and to survey tenants’ consciousness about energy-saving, a second-stage Work Group on CO_2 Measures has been established. By incorporating small to mid-size buildings held by members of BOMA (Osaka) and BOMA (Kanagawa), “Measures against global warming that the owners and managers of small to mid-size buildings can take (2010 Edition)” was released in June 2010.

2　Survey Overview

2.1 Survey method　　Questionnaires

2.2 Survey period	From Oct.1 to Nov. 10, 2009
2.3 Surveyed bldgs	Tokyo: 24 bldgs of 19 companies Osaka: 12 bldgs of 11 companies Yokohama: 14 bldgs of 13 companies Total: 49 bldgs (223,000 ㎡)
2.4 Average outline of bldgs	Total floor area: 6,957 ㎡, Rentable area: 4,451 ㎡; Efficiency ratio: 68% 9 above-ground and 1 underground floors
2.5 Age of bldgs	Average: 33 years old 8 years old as newest, 80 years old as oldest
2.6 Surveyed tenants	Response from 300 out of 704 companies in 49 bldgs (43%); Total 90,000 ㎡ (40%)
2.7 Type of business	Ordinary offices (55%), Sales offices (29%), Shops (2%), Restaurants (2%), Others (9%), No answer (3%)
2.8 Average outline of Tenants	Occupied space: 319 ㎡; 23.6 staff; 13.5 ㎡. Per person 11.6 hrs/day for working; 253 hrs/month
2.9 Respondents	Head of tenants (25%); Manager (31%); Person in charge of energy saving (7%); Other workers (37%)

The average age of surveyed buildings was 33 years old, with their ages ranging from 8 to 80 years. More than 80% of surveyed buildings were office use (at least 75% of floor space being used as office). This survey shows the actual situation regarding energy saving among existing small to mid-size office buildings in Japan.

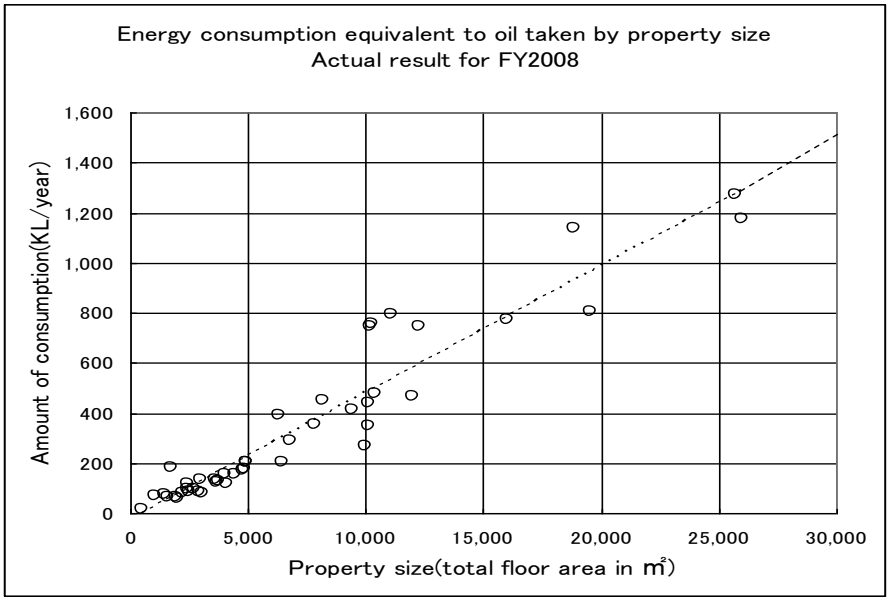
84% of surveyed tenants occupied for offices, and 63% of respondents were heads and managers who take the initiative in energy-saving efforts.

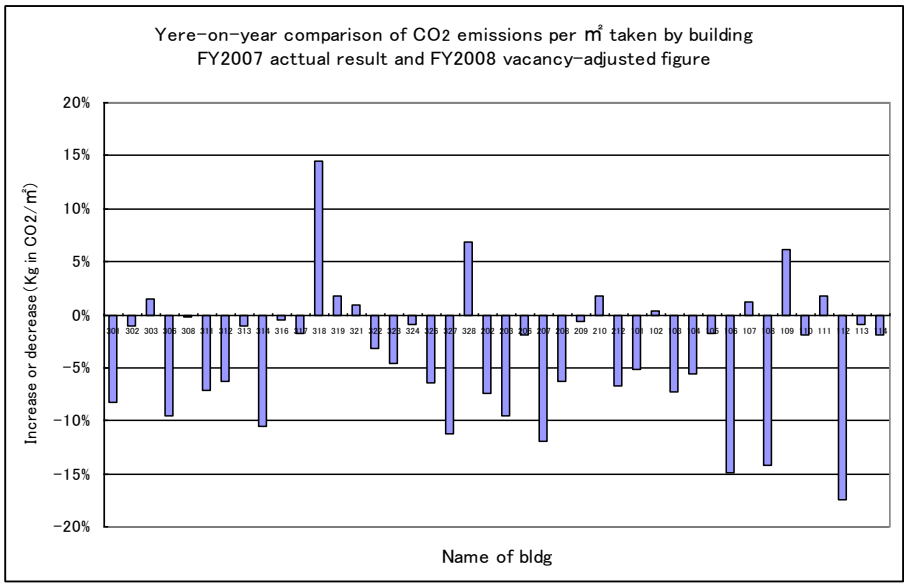
3 Energy consumption in FY2008

3.1 Energy consumption (equivalent to crude oil)	15,213 KL/yr, 338 KL/yr.per bldg
3.2 Energy consumption (eq.to CO_2)	20,159t-CO_2/yr, 59.6Kg-CO_2/㎡.yr
3.3 Energy consumption (base unit)	1,631MJ/㎡.yr
3.4 Energy (base unit) composition	Electricity (88.5%), Gas (9.1%), Heat supply (2.3%), Fuel oil (0.1%)
3.5 2007-2008 comparison (eq. to crude oil)	Actual result: minus 5.3%, vacancy-adjusted: minus 6.9%
3.6 2007-2008 comparison (eq. CO_2)	Reduction in 35 bldgs, increase in 10 bldgs Reduction in 78%

Currently, the Energy-Saving Law is applied to large-scale buildings with floor areas of at least 30,000 ㎡, and most of existing office buildings in this country are exempt. The accomplishment of

energy-saving is difficult without actions of small to mid-size buildings. Looking at the comparison of 2007 and 2008, energy consumption in crude oil equivalent decreased by 5.3% in real terms and decreased by 6.9% in adjusted figure by taking changes in vacancy rates into consideration. Year-on-year decreases were seen in 78% of buildings. Among the buildings which had been surveyed in the 2008 report, the ratio was 95%. "Visible actions for energy-saving (energy-use control and publicity) by building owners and managers" have proved effective.





4 Other survey items

4.1 Building equipment

Independent air-conditioners (59%), Electric heat pumps (67%), Highly-efficient inverter lighting (33%)

4.2 Meter reading

Direct meter reading (76%), Automated meter reading (20%), BEMS (4%)

4.3 Consultation by tenants on energy use

Ratio of specified corporations among tenants: 43%, 31% had talks on energy-saving, 43% requested energy use details.

4.4 Existence of engineers

30% of small to mid-size bldgs had engineer workers.

4.5 Whether energy-use control was implemented or not

Over 30% of respondents gave the answer of yes in 8 out of 20 items.

4.6 Whether energy-saving equipments were introduced or not

Over 30% of respondents gave the answer of yes in 9 out of 40 items.

4.7 Reaction of tenants

14% felt that tenants were positive about energy-saving efforts.

51% felt that energy-saving efforts were favorably received by tenants.

4.8 Plans for equipment retrofit

67% had plans for lighting equipment. 49% had plans for air-conditioners.

4.9 Reduction of crude oil consumption by equipment retrofit

3.1% by lighting equipment, 3.5% by air-conditioner, 1.5% by other equipment,

8.1% by all-equipment

Many of small to mid-size buildings had independent air-conditioning systems. The ratio of tenants requesting energy-use details was same as the ratio of specified corporations among tenants. In questions whether energy-use control was implemented and whether energy-efficient equipment was introduced, which came with several question items, the ratio of respondents answering yes was low, leaving much room for improvement. The problem was the scarcity of engineer workers. The reaction of tenants to energy-saving initiatives was generally favorable. Plans for equipment retrofit were focused on lighting equipment and air-conditioners because of their high energy-saving effects. However, reduction in crude oil usage was only about 8% in the entire office-building market.

5 Energy-saving actions of tenants

5.1 Recognition of Energy-Saving Law

9.7% knew about it very well. 34.7% knew about it roughly.

5.2 Own energy consumption

51% were interested in consumption of lighting. 46% were interested in consumption of air-conditioners.

5.3 Realization of own energy consumption

There was a proportional relation between the answer of “using a lot of energy” and the amount of occupied space. But respondents did not know what was wasted.

5.4 Energy-saving effort of bldg

14% paid attention to it. 61% were interested in it. 75% showed interest, with proportional relation with occupied space.

5.5 Opinion on energy-saving effort by tenants themselves

42% indicated its importance. 47% indicated their interest in it. 89% showed interest with proportional relation with occupied space.

5.6 Energy-saving actions taken by tenants themselves

The ratio of respondents who had introduced the presented 9 items ranged from 52% to 82%.

5.7 Energy-saving on central air-conditioning system

The ratio of respondents who accepted the presented 5 items ranged from 50% to 75%. The proportion of approvals to denials was 9 times regarding "room temperature adjustment" and 5 times regarding "restriction of outside air."

5.8 Energy-saving on common areas

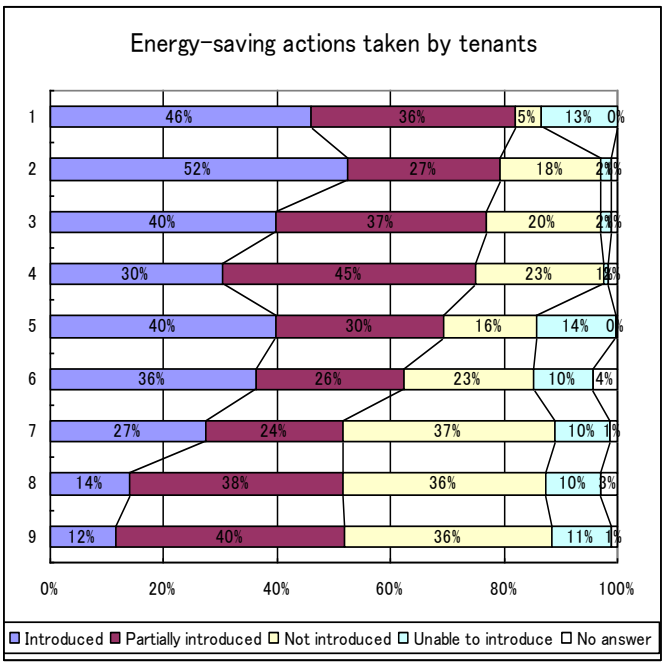
The ratio of respondents who accepted the presented 12 items ranged from 65% to 93%, except for "partial halt of EV." The proportion of approvals to denials was 47 times regarding "extinction in hot-water-supply room," more than 5 times regarding other 4 items, 0.3 times regarding "partial halt of EV" and 0.9 times regarding "halt of air-conditioning in overtime hours."

For rental office buildings, which are supposed to provide "comfortable workplaces," especially for small to mid-size office buildings where owners are readily accessible from tenants, there had been a strong concern that energy-saving actions in office buildings might undermine services for tenants. Accordingly, we conducted a survey to find out "Tenants' consciousness for energy-saving and the permissible range."

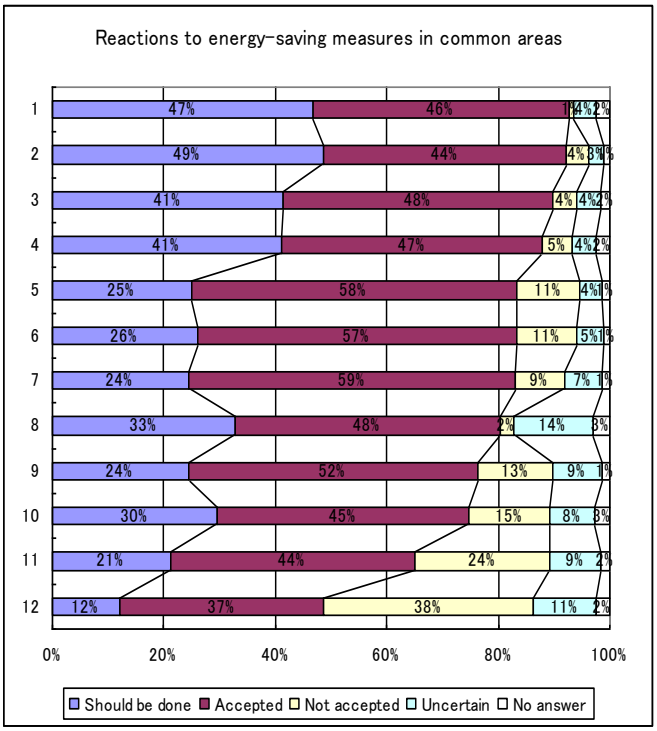
Although the Energy-Saving Law has not prevailed among tenants, they showed more-than-expected interest in energy-saving activities, and it has become certain that "energy-saving initiatives in small to mid-size buildings should be promoted in coordination with tenants." In questions about several concrete energy-saving actions and the permissible level for them (charts below), most of the items received affirmative answers from more than 50% of tenants. However, some items, including "partial halt of EV excluding peak times" and "halt of air-conditioning in overtime hours," received the answer of "unacceptable" from over 10% of respondents, and the proportion of approvals to denials (the ratio of pros to cons regarding presented energy-saving attempts) was less than 1. It is wrong to consider every energy-saving measures can be accepted.

It was suggested that there are measures that are highly recommendable in order to keep favorable relations with tenants and measures that require sufficient talks with tenants.

The importance of tenant relations has been reconfirmed.



1; Room temperature adjustment
2; Extinction during lunch and teatime
3; Power-off when leaving room
4; Halt of OA equipment when leaving desk
5; Halt of air-conditioning during lunch and teatime
6; Restriction of outside air
7; Extinction of window side during daytime
8; Shorten air-conditioning use in overtime hours
9; Halt of air-conditioning in overtime hours



1; Extinction in hot-water-supply room
2; Extinction in restroom
3; Room temperature adjustment
4; No heated toilet seats during summer
5; Reduce illuminance in corridors
6; Reduce illuminance in entrance
7; Reduce illuminance in stairways
8; Restriction of outside air
9; Shorten air-conditioning use in overtime hours
10; No hot water supply during summer
11; Halt of air-conditioning in overtime hours
12; Partial halt of EV

6. Energy-saving measures that existing small to mid-size buildings can take

The 2008 report advocated the following measures: Making a declaration to act for energy conservation; Implementing the visualization of energy; and Publicity works for energy saving. The effects of these measures have been shown in the 2010 report, and we have also proposed additional measures with a view to expanding our activities from BOMA (Tokyo) to BOMA (Japan) and the entire small to mid-size buildings in Japan.

■ Promotion to cooperate with tenants

- Establishment of a day to think about CO_2 emissions

  It was proposed that a date April 2nd (4/02 can be pronounced as CO_2 in Japanese language) is a day for building owners, managers and tenants to think about CO_2 emissions and energy-saving of buildings from their respective positions.

  Although energy conservation requires daily efforts, it is human nature to become less aware as days go by. It was proposed to plan events once a year to remind our determination to prevent global warming.

- Distribution of energy-consumption calculation sheets version2 and notification to tenants.

  The first step toward energy conservation is to know the amount of energy consumed by ourselves. The 2008 report came with the Excel Book to convert figures shown in utility meters into CO_2 emissions. In the 2010 report, the functions of base-unit calculation, breakdown taken by tenants and graph display have been added, and owners can report CO_2 emissions and base unit figures for each tenant by entering figures in utility meters. Thus, it is possible to "know" the amount of used energy and to "inform" tenants about it. The framework for small to mid-size buildings to manage energy consumption has been provided.

■ Continuation and expansion of the measures proposed in the 2008 report

- Visualization of CO_2 emissions (putting up bulletin boards)

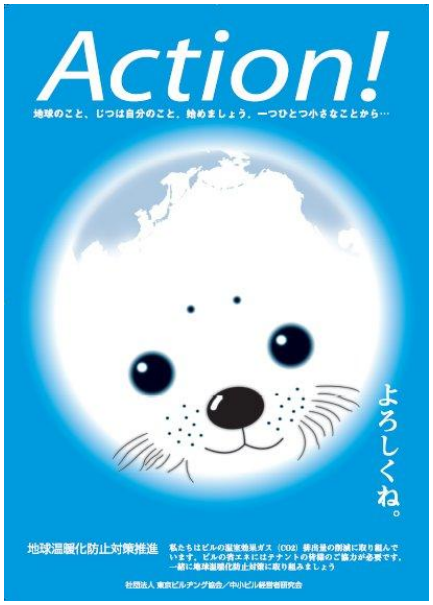
  At the entrance halls of buildings, the amount of CO_2 emissions of previous day is being posted to "show" tenants and visitors day-to-day changes in emissions to raise consciousness of everyone concerned.

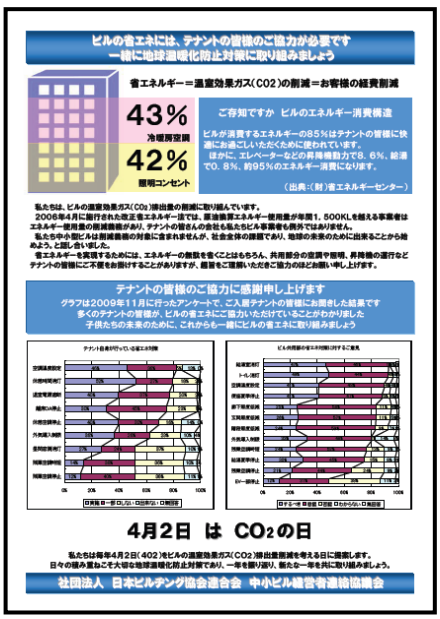
- Energy-saving action pamphlets

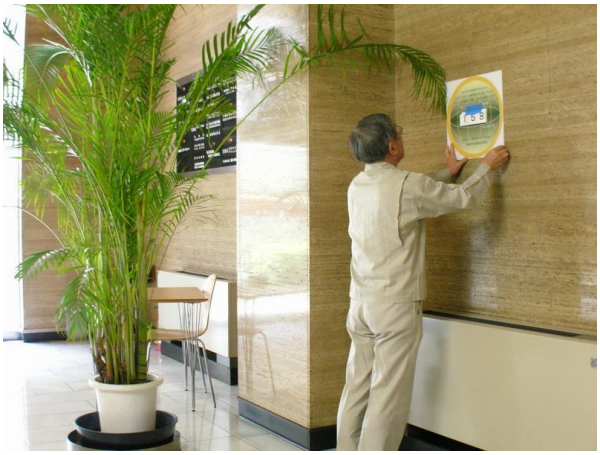
  Since it is important to inform everyone of "how to act to save energy" without numerous knowledge in energy-saving technology, pamphlets describing specified actions and the results of surveys on tenants have been prepared and distributed.

- Posters to promote energy conservation

  Two types of posters (large version for buildings and small version for tenants) have been prepared to show the declaration of energy-saving initiatives in buildings and to call for joint efforts toward global environment protection.







■ Promotion of equipment retrofit

- Introduction of LED bulbs as lighting fixtures in leased rooms

Under the Japanese business practices, lease contracts are generally made on a two-year basis with rights of cancellation during the contract period, and utility costs are borne by tenants. Therefore, equipment in leased rooms have hardly been touched, rather than been replaced to more energy-efficient equipment, as building owners cannot gauge investment recovery and tenants refrain from making long-term investments. Accordingly, there is the necessity of a renovation scheme that is beneficial to both owners and tenants, and we will set up a new study team to outline the direction to be taken by the end of FY2010.

- Encouragement of introduction of Energy Management System (EMS)

Although the efficient operations of building equipment through EMS are suggested, small to mid-size buildings are lagging behind in introducing this system, as building owners cannot gauge investment recovery from their individual buildings. Consequently, we consider that the EMS scheme jointly conducted by several small to mid-size buildings, called Area Energy Management System (AEMS), is promising, and we will set up a new study team to outline the direction to be taken by the end of FY2010.

6 Conclusion

Energy-saving actions as measures against global warming are earnestly taken by tenants of small to mid-size office buildings in Japan. As well as “safety” and “security” of buildings, “environment” is also coming up as a keyword. We are taking part in the urban society and also have responsibility to serve public goods. As blessings of the earth are shared fairly, duties as beneficiaries should also be shared evenly. In order not to pass on a negative heritage to the next generation, we have determined to continue efforts to encourage mutual enlightenment among building owners, managers and tenants.

End

From “Measures against global warming that the owners and managers of small to mid-size buildings can take (2010 Edition),” issued by Japan Building Owners and Managers Association on June 1st, 2010