**2008 Grand Prize of Minister of Economy, Trade and Industry**

# Aiming to Be an Environmentally Friendly Hospital through Energy Conservation and Introduction of Clean Energy

Nippon Steel Yawata Memorial Hospital
Energy Conservation Activity Promotion Committee

◎ **Keywords**: **Rationalization of fuel combustion, Rationalization of heating, cooling and heat transfer (heating facilities, air conditioning facilities, hot water supply facilities, etc.), Prevention of energy loss due to radiation, heat transfer, and resistance, etc. (prevention of heat loss due to radiation and heat transfer, etc.), Rationalization of conversion to power, heat, etc. (electrically driven equipment, electric heating equipment, etc., lighting equipment, elevators, office equipment, and household equipment), $CO_2$ Reduction, Public Relations Capabilities, Bottom-up Energy Conservation Committee**

## ◎ Outline of Theme

Our hospital was established in 1900 as the one attached to the government-run Yawata Steel Works. In 1974, the hospital was opened to general citizens, and in 1997 it became the medical corporation “Nippon Steel Yawata Memorial Hospital”. After its division into an independent general hospital, the hospital established an “Energy Conservation Activity Promotion Committee” to review its energy conservation activities once again by considering the actual activity from both software and hardware perspectives.

Taking the opportunity of the decrepit facility replacement, activities were carried out to realize energy conservation through switching the boiler fuel and improving operation efficiency (automatic control of the number of operated units due to conversion to high efficiency, small-sized and multiple boilers) by making good use of the ESCO business, introducing a water economizing system, and implementing diligently an energy

conservation campaign in a bottom-up manner in which the nurses taking the lead with catchphrases including “Let’s start immediately from items close at hand” and “Let’s copy effective activities from other places”. Details of the many energy conservation activities tackled in this “private hospital” are introduced in an omnibus style.

## ◎ Implementation Period for the Said Example

February 2004 – July 2008

- Project Planning Period February 2004 – October 2005 Total of 20 months
- Measures Implementation Period August 2005 – April 2007 Total of 20 months
- Measures Effect Confirmation Period November 2006 – July 2008 Total of 20 months

## ◎ Outline of the Hospital

- Regional Medical Treatment Support Hospital 20 treatment departments,
  Number of sickbeds: 453 beds (General sickbeds)
- No. of Employees 850 persons (Including 165 persons from commissioned companies)
- Type 1 designated energy management factory

## ◎ Process Flow of Target Facility (Hospital Layout)

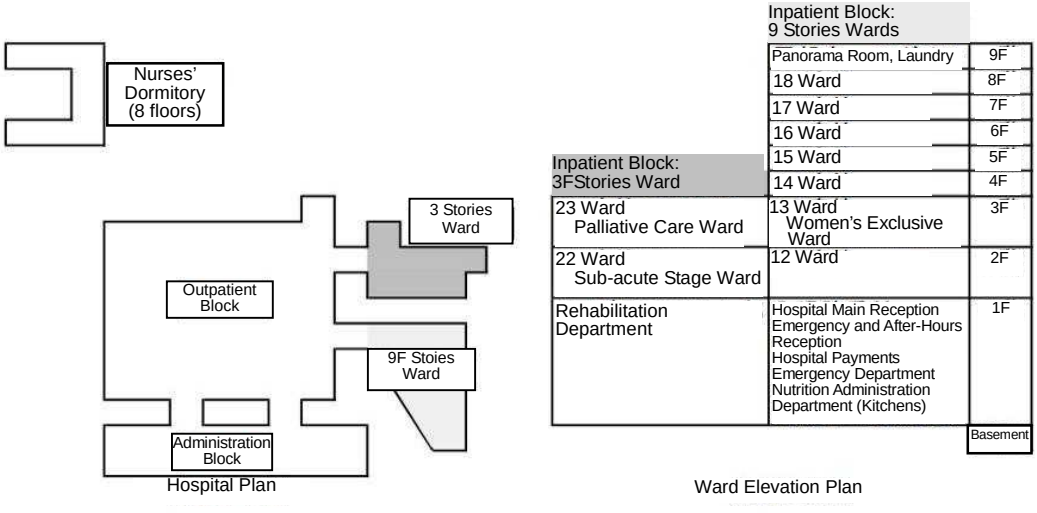



Fig. 1 General Layout of the Hospital

## 1. Reasons for Theme Selection

Environmental preservation, and particularly the prevention of global warming, is becoming a pressing issue internationally. Aiming to realize a “low-carbon society” through switching to energies with lower load to the environment, even greater efforts are being sought in energy conservation. Under these circumstances, particularly large amounts of energy are consumed in our hospital every day, comprising a wide variety of types including electric power, city gas 13A (LNG: Natural gas), kerosene, and liquid petroleum gas (LPG: Propane gas).

Accordingly, as the social responsibility of a hospital together with its philosophy aiming at coexistence with local society, our hospital has been striving to thoroughly pursue (1) “Energy conservation” and (2) “Further reduction in the environmental load”. Since global warming also has a harmful effect on the human body, a hospital’s mission is exactly to “maintain peoples’ health”.

## 2. Activity Target Settings

In fiscal year 2004, the “Basic Polices on Medium and Long-term Energy Cost Reduction” were set as follows.

1) Promotion of switch to Clean Energy (Switch to 100% Natural Gas)

① Consciousness of an oil-less situation (Fuel switch of Kerosene and LPG)

② Promotion of environmental load reduction and global warming prevention (Switch to low-carbon fuel)

2) Promotion and Enhancement of Energy Conservation Activities

① Establishment of energy management structure (Setting up an Energy Conservation Activity Promotion Committee)

② Review of energy management manuals whenever required

③ Training, education, and succession of energy managers (Taking 30 years ahead into account)

3) Replacement of Inefficient and Decrepit Energy Equipment

① Identification of equipment in which the efficiency is deteriorating due to decrepitude (Equipment that is 45 or more years old)

② As the time has come for the buildings to be rebuilt, incorporate the activity keeping in step with this timing .

③ When replacing equipment, introduce the latest high efficiency energy conservation type equipment

Based on the three main activity pillars described above, various activities were challenged.

| Implemented Activities |
|---|
| 1. Energy Conservation Key Point Management Activities in which the Nurses take the lead |
| 2. Boiler Replacement through Making Use of ESCO Business |
| 3. Introduction of Water Economizing System |
| 4. Change from Incandescent Lamps to Compact Fluorescent Lamps |
| 5. Introduction of Energy Conservation Type Automatic Vending Machines |
| 6. Enhancing of Steam Trap Management |
| 7. Simultaneous Shutdown of Personal Computers |
| 8. Meetings for Study on Other Company's Energy Conservation |
| 9. Visits of Boiler Site and Explanatory Meetings |
| 10. Energy Conservation Dissemination Activities through Hospital Internal and External Public Relations Magazines |
| 11. Lecturing Activities on "Evaluation of ESCO Business and Future Issues in Energy Conservation Improvement Seminars" |

| Activities Currently in Progress |
|---|
| 1. Turbo Chiller Energy Conservation Operation |
| 2. Sound Muffling (Imitative Sound) Equipment |
| 3. Conversion of Waste Food to Bioethanol |
| 4. Conversion of Turbo Chiller to Gas Fired Air Conditioners with Chilled/Hot Water |
| 5. Increase of Management Meters in Existing Groundwater System |

| Future Activities |
|---|
| 1. Investigation of Fuel Cell Introduction |
| 2. Investigation of Photovoltaic Generation System Introduction |
| 3. Investigation of Rooftop Greening |
| 4. Investigation of LED Lighting Introduction |
| 5. Development and Increased Use of Underground Water Veins |

## 3. Energy Conservation Key Point Administration Activities in which the Nurses Take the Lead

### (1) Establishment of a Committee for Promoting Energy Conservation Activities in a Bottom-up Manner (Known below as the Energy Conservation Committee)

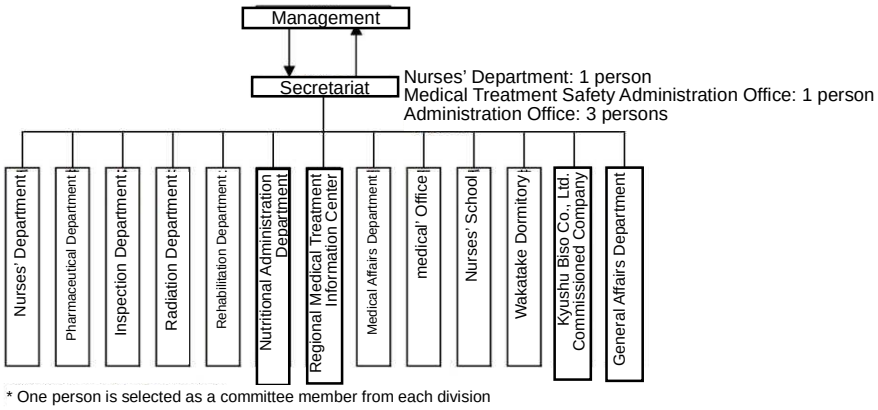
In our hospital, based on our experiences during the global oil shocks while the hospital was still attached to the Nippon Steel Yawata Works, energy conservation activities have been implemented with a company-wide effort. After the hospital's separation and independence, energy conservation and natural resource-saving activities were also continued to be carried out leaded by the Commodities Committee inside the Nurses' Department.

In fiscal year 2004, efforts to tackle energy conservation and conversion to clean energy were begun. Awareness of environmental problems heightened inside the hospital worked to provide the best opportunity for broadening the “Energy Conservation Campaign Activities” that had been carried out inside the Nurses’ Department to the whole hospital, and an “Energy Conservation Committee” was set up in cooperation with the Nurses’ Department.

## (2) Development of an Energy Conservation Campaign

- Display of catchphrases according to themes in each work place units
- Increase in awareness due to independently produced posters and comments
- Bottom-up activities implemented based on the motto of “Reasonably, steadily, and enjoyably”

Fig. 2 Energy Conservation Activities Promotion Committee Organization Diagram




### 1) Air conditioning temperature control (Photograph 1)

- In order to reduce energy consumption in the summer and winter seasons, temperature control for cooling and heating was implemented.

| Location | Summer Season | Winter Season | Other Measures |
|---|---|---|---|
| Outpatient | 28℃ | 20℃ | Investigations of air conditioning starting time and set temperatures, and operation control |
| Wards | 24℃±2℃ | 19℃±2℃ | |
| Others | 28℃ | 20℃ | Server Room temperature of 28℃ throughout the year, patrolling of the Nurses’ Dormitory |

### 2) Control of switching on and off the lights

- Putting up of “Switch-Off at Daytime” marks on lighting switches in each ward (Photograph 2)
- Carry out thorough awareness-building by putting up stickers such as “Please switch off the lights when not in use” (Photograph 3), kind of which is different according to the locations.


Photograph 1

Ward Air Conditioning Operation Panel


Photograph 2

Nurses’ Various Location Lighting Switches


Photograph 3

### 3) Water economizing measures (Photograph 4)

- Awareness-building by attaching “Water is Precious” stickers
- Introduction of a water economizing system

### 4) Natural resource-saving activities

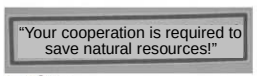
- Implementation of strictly sorted disposal of waste in the hospital in accordance with the “Collection of sorted garbage” by Kitakyushu City (Photograph 5). (The hospital is only obliged to separate its waste into general garbage, specially managed waste products, and medical waste products.)
- Improving awareness by putting up stickers to wash basin paper holders in toilets and other locations. (Photograph 6)

Photograph 4

“Water is Precious” water economizing sticker

Photograph 5

Boxes for Separating Waste




Photograph 6
Paper Holder Sticker

## (3) Social Contributions

Through a public relations magazine of the Kitakyushu City Environmental Bureau we became aware of the activity case by other companies, “Deliver Vaccines to the World’s Children”, and began collecting PET bottle caps from January 2008 on. Through exerting

our originality and ingenuity such as preparing original posters and installing collection boxes (Photograph 7), the hospital is motivating hospital visitors including staff to participate in the activity.

When we introduced the activity in our public relations magazines, responses were received from patients and their families as well as local clinics and citizens' centers, so that many caps were delivered. This helped establishment of the enlightenment activities towards natural resource preservation, environmental conservation and also social contribution.


Photograph 7

PET Bottle Cap Collection Box

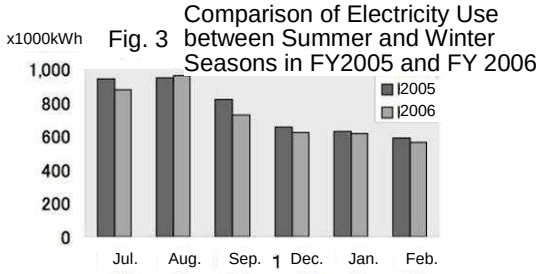



Fig. 3 Comparison of Electricity Use between Summer and Winter Seasons in FY2005 and FY 2006

### (4) Results of Activities

① During the fiscal year 2006 campaign period, the electricity use was reduced by 4.5% compared with that in the previous year. (Fig.3)
(In 2006: 4,359,600 kWh, in 2005: 4,564,300 kWh)

② The total amount of PET bottle caps collected was 202 kg, which is equivalent to 101 portions of vaccine (as of August 2008).

## 4. Boiler Replacement through Making Use of ESCO Business - Switch to Clean Energy

### (1) Understanding and Analysis of Current Situation: Overview of Making Use of ESCO Business

The hospital has had kerosene fired flue tube boilers (6 t/h x 2 tanks) that began operations in 1973, which were jointly used for supplying steam for sterilization of surgical and medical implements, for the dining room kitchens, and for heating in the wintertime. These were replaced in December 2005 with latest multi small-sized once-through boilers (2.5 t/h x 5 units) with high efficiency, and the fuel was switched to natural gas (= city gas 13A) which emits less $CO_2$.

Although this period was one in which the price of natural gas was higher than that of kerosene, in consideration of our hospital's policy and its mission, the hospital decided

without hesitation to promote energy conservation activities head-on through “Energy conservation and conversion to clean energy”.

## (2) Progress of Activities and Details of Measures: Main Progress of Making Use of ESCO Business

① Implementation of energy conservation audit
② Detailed investigation of the ESCO Business Plan and the explanation of energy basic policy
③ Construction work: Replacement of old boilers with new ones, commissioning - commercial operation start - break-in operation (Change to unmanned operation)

## (3) Effects: Verification of Energy Conservation Effect under ESCO Business

### 1) Measures period

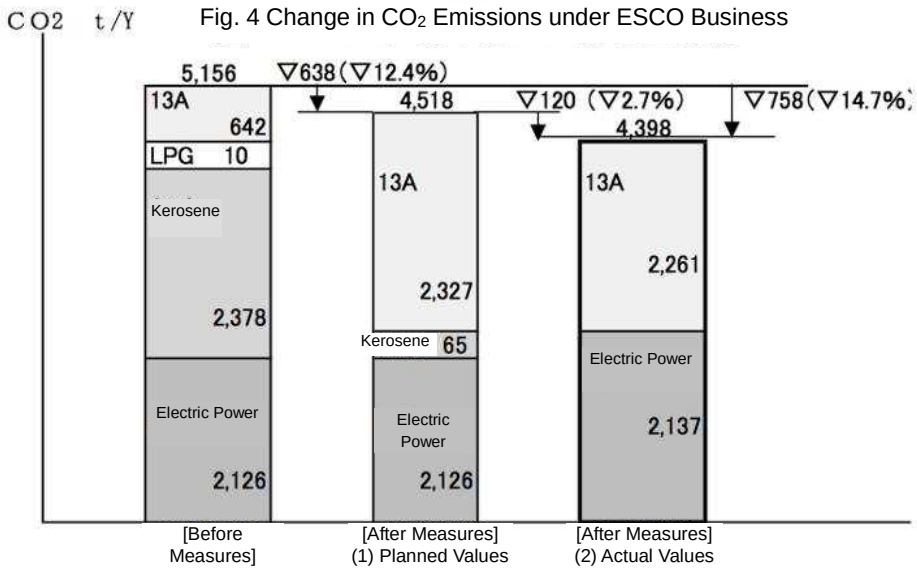
- ESCO Contract Period: 5 years
- Energy Conservation Effect Verification Period: December 1, 2005 – November 30, 2006 (1-year period)
- Manufacturer Maintenance Contract Period: December 1, 2005 – November 30, 2009 (4-year period)

### 2) Energy conservation effect

a. Standard Actual Consumption of Boiler Kerosene in Fiscal year 2004: 859.11 kl/year
b. Planned Energy Conservation: Boiler renewal (Conversion to automatic control of the number of operating units): 64.66 kl/year (-7.5%)
c. Actual Results Energy Conservation: City gas 13A: 166,912 N/year
(Kerosene equivalent): 198.2 kl/year (-23.1%)

As a result of these ESCO business applications, the hospital was able to realize a 14.7% reduction in $CO_2$ emissions. (Figure 4)

Fig. 4 Change in $CO_2$ Emissions under ESCO Business




* 1) Before Measures: Fiscal year 2004 Actual Results
* 2) After Measures: December 2005 – November 2006: ESCO Actual Results

# 5. Introduction of Water Economizing System

## (1) Understanding and Analysis of Current Situation

Based on the recognition that water is a precious natural resource, water use conditions were investigated targeting the 9 stories wards, and it was investigated that whether water saving would be achievable or not by introducing a water economizing system.

## (2) Target Settings

Using the water economizing plan by the construction company, a reduction of 11% compared with the average water use for the past three years was set as the planned values.

Because a favorable reaction was received when an experience demonstration was carried out in related departments before the introduction, the measure was implemented.

## (3) Details of Measures

An investigation was made into the water pressures at the faucets on each floor in the 9 stories ward, and the appliances to be mounted were selected.

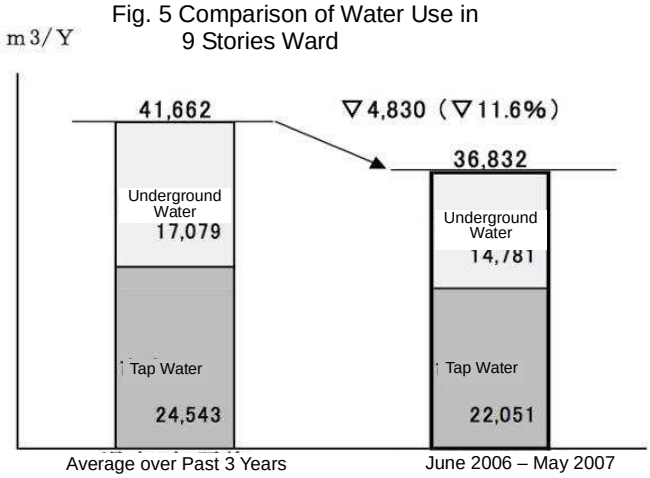
### (4) Problem Points and Responses

After installation, although the water use was reducing satisfactorily, abnormal values were found with regard to underground water use. As a result of the inspection, it was concluded that this was caused by the sticking of toilet tank levers in the ward private rooms. After implementing countermeasures, the situation is developing satisfactorily. In addition, an abnormal sound was emitted from the faucets in the kitchen due to the water differential pressure. By changing to devices with a lower water economizing rate, the sound was eliminated.

### (5) Effects

A reduction by 11.6% was achieved. (Fig. 5)

Fig. 5 Comparison of Water Use in 9 Stories Ward




## 6. Change from Incandescent Lamps to Compact Fluorescent Lamps

Following the announcement of the Japanese government's to halt manufacture of incandescent lamps, the Energy Conservation Committee immediately carried out an investigation of the locations where incandescent lamps were installed in the hospital, and proposed that they should be replaced by fluorescent lamps.

| | Incandescent Lamp | Compact Fluorescent Lamp | Energy Conservation Ratio |
|---|---|---|---|
| Lifetime | 1,000 hours | 10,000 hours | 10 times |
| Consumed Electric Power | 60W | 10W | 1/6 |

### (1) Understanding and Analysis of Current Situation

As a result of investigating the locations where incandescent lamps have been installed in the hospital, their use was confirmed at 1,167 places, and replacement was implemented. As the electric power consumption of a latest 60W type LED light is less than 10W, investigation will be made into their introduction in the future.

### (2) Effects

1,167 Incandescent Lamps: 70 kWh → Changed to Fluorescent Lamps: 12 kWh (Reduction of 83% was achieved)

## 7. Introduction of Energy Conservation Type Automatic Vending Machines

The annual total electric power used by the hospital's 24 automatic vending machines (12 units are directly managed, 12 units managed by the shop) was large, and an investigation was made into reducing their electric power consumption.

### (1) Understanding and Analysis of Current Situation

In order to carry out management of the automatic vending machines, each unit was assigned a managerial number, and a managerial register was prepared. As a result of discussions and investigations with the manufacturer, 21 units of the machines were found to be energy conservation types, but as for the remaining 3 units (Two directly managed, one managed by the shop) more than 10 years have passed since they were manufactured.

### (2) Details of Measures

① Under discussions with the installation companies, negotiations were made to replace the two directly managed machines with energy conservation type automatic vending machines, and replacement was carried out with the cooperation of each company.

② Regarding the old type automatic vending machine that is managed by the shop, the understanding and cooperation of the shop business company was obtained relating to the hospital's energy conservation. Negotiation with the company on the replacement with the latest machine type was requested, and the replacement was implemented.

③ Requests were made to the installation companies regarding the independent target for

the prospect of the automatic vending machine replacement. Replacement every five years was incorporated into the replacement plan by each company, and the companies were requested to select the latest machine types based on the 'top runner' method on the occasion of replacement of the deteriorated machines.

### (3) Effects

Replacement of the three automatic vending machines: Rated Power Consumption: 2.1 kWh → 1.8 kWh ( Reduction of 15% was achieved)

## 8. Enhancement of Steam Trap Management

## (1) Objective of Activity

Attention was paid to the vapor discharged from the steam traps. Investigations of trap malfunction at all locations concerned and replacement, as well as repairs of heat insulation material and steam leaked piping, unused piping separation, and optimum boiler pressure setting, are to be carried out, and a large effect is to be obtained under the cooperation of each work place together with a "Revolution in awareness concerning steam conservation" among the persons in charge at each work place.

### (2) Understanding and Analysis of Current Situation

As records of "What type of traps and where they are" were not available and the "Inspection intervals" have not been set, maintenance was limited to repairing large leaks of steam whenever they were discovered, with most of the work being left to consigned companies, so that the hospital's understanding of the trap conditions was insufficient.

### (3) Target Settings and Details of Measures

In consideration of the importance in role of the traps (for the steam for surgical tool and materials sterilization and for kitchen appliances used in providing meals) and in its maintenance, it was planned to implement a full investigation of the traps and surrounding pipes and valves, and to introduce number tags, to prepare an administration register, and to check with the piping route drawings. The main measure details consisted of the following six items.

① Putting Individual number tag on each trap (All 75 units were fully identified for the first

time) (Photograph 8)

② Judgment of the conditions of the trap function (Outsourcing: Assessment was entrusted with a manufacturer)

③ Defective trap replacement (Giving priority to use of the disk type traps in stock subject to future replacements with float and other types that are most appropriate for individual application)

④ Repair of traps that had no heat insulation and of defective part

⑤ Preparation of a “Steam Trap Administrative Register” (Fig. 6)

⑥ Preparation of a simplified “Trap Arrangement Drawing” (Currently investigating a system design in which photographs of on-site trap surroundings can be accessed using a personal computer)

## (4) Difficulties Experienced during the Actual Activities in Particular

Although the outside piping was exposed and the situation was easily understood, a great amount of time was required to look for the piping inside the building (buildings are old and there are many pipes above the ceilings of each floor and beneath the flooring). We were filled with deep emotion when the tags had been attached to each unit and the Managerial Register was completed.

## (5) Effects

① Out of 75 units, 15 traps were found to have problems such as leaks (fraction defective: 27%, leakage flow: 550 t/year) (Excluding 20 inactive units)

② The leaks from disk-type traps was the greatest in number, accounting for approximately 70% (360 t/year) of the total. → Investigation of the conversion to free floating types.

③ Effect of replacing the 15 defective trap units: 0.5 kl/year in crude oil equivalent

Photograph 8

Steam Trap and Number Tag Setting Condition

Fig. 6 Steam Trap Managerial Register Example

| Area No. | Trap No. | Installation Location | Application | Product Name | Model | Connection Specification | Mounting Direction | Operation Time (h/d) | |
|---|---|---|---|---|---|---|---|---|---|
| Total Number: 75 units | | | | | | | | | |
| 010 | 00010 | | Main Pipe | Disk | Disk | | Horizontal | 24 | |
| 010 | 0001 | High Pressure Header | Main Pipe | Bucket | Bucket | | Horizontal | 24 | |
| 010 | 000 | Low Pressure Header | Main Pipe 主管 | Bucket | Bucket | | Horizontal | 24 | |
| 010 | No. 1 Storage Tower Tank | | General Heating SF-345 | Disk | | | Horizontal | 24 | |
| 010 | No. 2 Storage Tower Tank | | General Heating SF-345 | Disk | | | Horizontal | 24 | |
| 010 | (Examination Block No. 1 | | General Heating Float | Float | | | Horizontal | 24 | |
| 010 | 0 | Examination Block No. 1 | General Heating Float | Float | | | Horizontal | 24 | |
| 010 | 0008 | Office System Heating | General Heating Sf-345 | Disk | | | Horizontal | 24 | |
| 010 | 0009 | Underground Heating | Main Pipe | 3010 | Disk | | Horizontal | 24 | |
| 010 | 0 | Pharmaceutical Sterilizer | Main Pipe | Disk | Disk | | Horizontal | 24 | |
| 010 | 0011 | Nurses' Waiting Room | Main Pipe | Disk | Disk | | Horizontal | 24 | |
| 010 | 00120 | Water Heater | Main Pipe | Disk | Disk | | Horizontal | 24 | |
| 010 | 00130 | 薬剤滅菌 | 主管 | ﾃﾞｨｽｸ | ﾃﾞｨｽｸ | | 水平 | 24 | |

# 9. Simultaneous Shutdown of Personal Computers (PCs)

## (1) Objective of Activity

In order to realize energy conservation and $CO_2$ emission reduction, the entire total of 325 desktop PCs in the Outpatient Block, Administration Block, and 3 stories Wards are to be automatically shut down at 24:00 o'clock to eliminate waste in electricity use caused by employees forgetting to switch off their PCs and to improve awareness of global warming prevention . (Started on June 10, 2008)

## (2) Understanding and Analysis of Current Situation

The PC energy consumption inside the hospital is approximately 50kWh/day, and the measures implemented realized a reduction of 8kWh/day. (However, individual employees were expected to shut down their PCs after finishing work before leaving the office, with the exception of the Doctors' Office.)

## (3) Target Settings and Details of Measures

This measure required the particular understanding and cooperation of the doctors in the Medical office for its implementation, and it results in the application of energy conservation even to the area of the information processing system, with the exception of some areas. Although it is usually desirable to have the PCs in a usable condition in order to support the complex and varied daily work including doctors' diagnoses, operations, ward patrols, pathological research, and external information exchanges with university hospitals, the implementation of this measure is made as the result of efforts to eliminate waste except case of urgency.

### (4) Difficulty Experience during the Actual Activities in Particular

Initially there were complaints from doctors about their PCs being suddenly shut down at the appointed time while some doctors might have been still using them, but now awareness of energy conservation has heightened and the measure is proceeding as planned.

### (5) Effects

4.3 kl/year in crude oil equivalent

## 10. Study Meetings on Other Company's Energy Conservation

With the objectives of acquiring new knowledge and technology, various energy conservation inspection visits to outside companies were implemented.

| Destinations | Main Contents |
|---|---|
| Gas Showroom | Generation and combustion equipment, heating and cooling and kitchen appliances, piping and outlets, etc. |
| Robot Factory Inspection Visit | Development of medical treatment type robot |
| Hospital Kitchen Inspection Visit | Introduction situation on kitchen facility with coolness |
| Bioethanol Facility Inspection Visit | Conversion of waste food to bioethanol (NEDO) |
| Water Economizing Equipment Manufacturing Plant | Inspection visit to hygienic ceramic ware factory, history of gradual development of water economizing |
| Experiment of Water Economizing Experience in the Hospital | Demonstration of water economizing appliances in the hospital by an outside company |

## 11. Boiler Inspection Visits and Explanatory Meetings for Other General Hospitals in the City

After introducing the boilers, the energy conservation effect was verified and a drastic reduction had been realized in $CO_2$ emissions compared to the previous boilers.

As an activity for implementing global warming preventing measures, the actual results obtained were provided as know-how to other hospitals and companies in the region. With the objective of further expanding energy conservation activities, boiler inspection visits and explanatory meetings were implemented for the gas company supplying the fuel for the new boilers, government agencies, manufacturers, and ESCO companies.

The mechanism of the small-sized once-through boiler and the energy conservation effect were demonstrated, and a highly favorable reputation was achieved. In particular, the talk by the manufacturer's side about the effects and experiences not from a one-sided view based on the actual introduction cases caused a great response.

## 12. Energy Conservation Dissemination Activities through Hospital Internal and External Public Relations Magazines

Under the hospital's policy of "coexistence with regional society", the situations on various activities were disclosed within the hospital and also widely in the region aiming to create opportunities to tackle energy conservation.

- Energy conservation examples were carried in public relations magazines targeting hospital staff, in a plan to educate them and share information regarding energy conservation.
- Public relations magazines containing energy conservation examples were widely distributed to medical institutions, government agencies, companies and citizens in the region.
- An article about tackling clean energy use and energy conservation was carried in the Kitakyushu City "Environmental Report".

## 13. Lecture Activities in "Evaluation and Future Issues of ESCO Business in Energy Conservation Improvement Seminars"

Through the organization of the city chamber of commerce and industry, building cooperatives, and government agencies, seminars on modification for energy conservation were held with the objective of reducing $CO_2$ emissions in the commercial sector such as buildings and the offices in the city. The persons in charge of energy management at the hospital were invited to talk about the background and effects of renewing the boilers making use of the ESCO business, and to give an evaluation of the ESCO business.

## 14. Summary

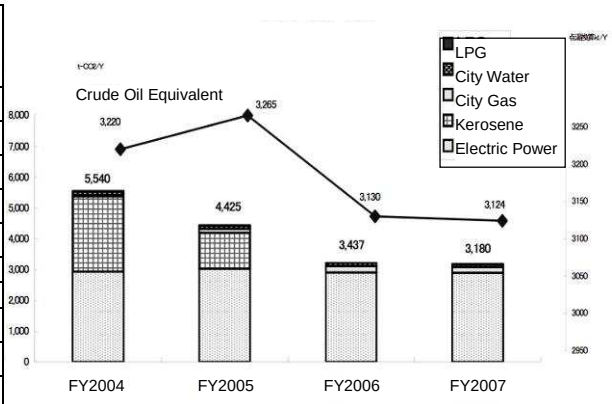
With fiscal year 2004 set as a starting point, the energy conservation activities continuously carried out in the Nurse's Department were spread throughout the hospital, and at the same time a switch to clean energy and energy conservation were implemented as measures for facility based on the hospital's management principles to build an energy conservation system throughout the entire hospital.

As a result of these activities, the switch to clean energy by single use of natural gas was achieved. The energy consumption and $CO_2$ emission continued to be reduced each year (Fig. 7). By building the energy conservation structure and also considering the environment and investing in facilities with an eye fixed on the future, this approach from both software and hardware perspective reduced energy consumption and created a sustainable energy conservation structure.

Result Summarizing Table

| Measures | Reduction in Energy Consumption (kl/year) in crude oil equivalent | Remarks |
|---|---|---|
| Energy Conservation Key Point Management Activities in which Nurses took the lead | 51.5 | |
| Boiler Replacement through Making Use of ESCO Business | 200.2 | |
| Introduction of Water Economizing System | (2.8) | $CO_2$ Reduction (t) |
| Change from Incandescent Lamps to Compact Fluorescent Lamps | 3.4 | |
| Introduction of Energy Conservation Type Automatic Vending Machines | 0.5 | |
| Enhancing of Steam Trap Management | 0.5 | |
| Simultaneous Shutdown of PC | 4.3 | |
| Study Meetings on Other Company Energy Conservation | - | |
| Boiler Inspection visits and Explanatory Meetings for Other General Hospitals in the City | - | |
| Energy Conservation Dissemination Activities through Hospital Internal and External Public Relations Magazines | - | |
| Lecture Activities in "Evaluation and Future Issues of ESCO Business in Energy Conservation Improvement Seminars" | - | |
| Total | 260.8 | |

Fig. 7 Changes in Energy Use by Energy Conservation Activities and Switch to Clean Energy




Note: The $CO_2$ Emissions Coefficient shown in the Environmental Household Account Book was used