Energy Conservation of Commercial Facilities

(Department Stores, General Merchandise Stores, and Shopping Centers)

Major points, measures, and successful cases of energy conservation of commercial facilities

The Energy Conservation Center, Japan

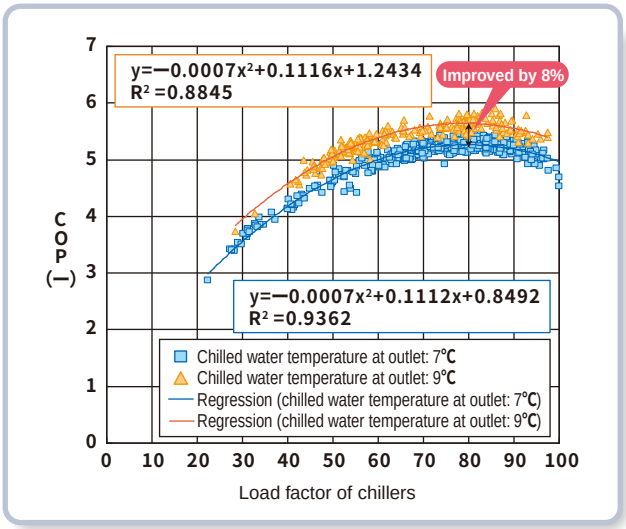
6 Successful Cases of Energy Conservation Measures of Commercial Facilities (3)

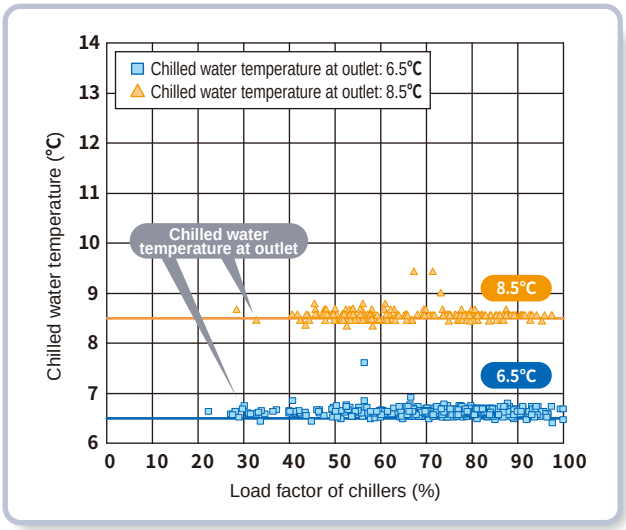
Successful energy conservation measure at department store - 3

Energy conservation was achieved by raising temperature setting, by 2℃, for chilled water at an outlet of a centrifugal (turbo) chiller, which is heat source equipment for air-conditioning units, during winter and other seasons with moderate climate.

Conditions

- Energy consumption performance was compared before and after changing temperature setting for chilled water at an outlet of the centrifugal chiller from 6.5 to 8.5℃. The following graph illustrates changes in COP of the chillers when load factor varied between 20 and 100% at 6.5 and 8.5℃ of temperature setting. Actual temperature range for the 6.5℃ setting was between 6.4 and 7.6℃, and for the 8.5℃ setting was between 8.4 and 9.4℃.





Results

- As shown in the upper-left graph, the change of the temperature setting of chilled water at an outlet from 6.5 to 8.5℃ has improved COP of the centrifugal chiller at 80% load from 5.27 to 5.69, demonstrating a 8% increase.
- During winter and other seasons with moderate climate, this measure could achieve reduction of power consumption by heat source equipment for cooling.
- Only the primary pump is used to send the chilled water, without requiring additional heat-conveying power.

Conditions for data selection

- Only the data which satisfied the following conditions were selected and used for the comparison.
- Cooling water temperature: between 25.7 and 26.3℃
- Load factor of chiller: between 20 and 100%

7 Effective Tools and Techniques for Promoting Energy Conservation by Improved Operation

ECCJ provides tools and techniques for further energy conservation useful for improving operations of large-scale buildings for business use without charge.
The three tools and techniques are:

❶ ESUM: Energy Specific Unit Management Tool

ESUM is computer software which estimates energy consumptions of a building and compares the consumptions before and after implementing an energy conservation measure to demonstrate the energy reduction effect.

❷ TuBE: Tuning of Building Systems for Energy Conservation

TuBE is a document which defines how to select and carry out operational improvement actions among various energy conservation measures.

❸ EAST: Energy Analysis Support Tool

EAST is computer software which compiles operation process data of air-conditioning units and heat source equipment and make a graphic presentation of the trends to help you analyze their operation conditions.

Combined use of the above three tools helps your making smoother energy conservation activities throughout the necessary steps for the activities; analysis on operation status and conditions, selection of improvement method, estimation of its effectiveness, and implementation of the measure.

How to obtain more detailed information on energy conservation of buildings for business use

ECCJ has a website to provide various kind of information on energy conservation of buildings.

The site includes:
- inputs from actual users of tools (e.g. ESUM and EAST) useful for enhancing your energy conservation activities for buildings;
- various forums for different types of facilities (e.g. office buildings, commercial facilities, hotels, and hospitals), which serve as an information exchange forum among members; and
- invitations to seminars and lecture classes which provides information on successful cases of improved energy conservation of buildings for business use and examples of effective use of various tools as well as materials for those seminars and lectures

URL http://eccj06.eccj.or.jp/bldg/index.php

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This is translated from the original Japanese document.
For precise information and nuances, please refer to the original.