IPEEC-Energy Management Action NetworK
5th Workshop (At Sydney)
Energy Efficiency in Small and Medium Manufacturing Businesses in Japan
---Subsidized Energy Audit in Japan---

February 27, 2014

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---Subsidized Energy Audit in Japan---

Outline

1. Introduction
   1-1 Why is a focus on EE&C improvement in manufacturing SMEs important?
   1-2 What key policies do we have in Japan?

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   2-1 What is Subsidized Energy Audit & what are the results so far?
   2-2 What are the lessons learned?
   2-3 Ongoing challenges and Future plans
1. Introduction

1-1 Why is a focus on EE&C improvement in manufacturing SMEs important?

1) Around 99% of the enterprises is SMEs.
2) Large enterprises are imposed EM measures by law.
3) Large enterprises have their own EM engineers.
4) SMEs do not have EM engineers and financial supports are not enough.
Number of Enterprises and Employees in Japan

**Number of Enterprises**
- SMEs, 99.70%
- LEs, 0.30%

**Number of Employees**
- SMEs, 69%
- LEs, 31%

**Definition of Japanese SME in Industry**
- **Capital:** Less than or equal to 300 million yen or,
- **Number of Employees:** Less than or equal to 300 Employees

(Source: The Small and Medium Enterprise Agency)

Data Source: METI
2-2 What key policies do we have in Japan?

1) **Financial Support** for EE&C Projects / Introduction of E.E. Equipment
   → Tax Incentive / Low Interest Loan / Subsidies

2) **Technical Support**
   → Guidelines and Criteria for Energy Management and EE&C
   → National Program to Disseminate Good EMS (ISO50001 etc.)
   → Free or Subsidized Energy Audit
   → Preparation of Tools Such as Software Tools for Analyses and Evaluation - Simulation Available to SMEs

3) **Provision of Useful Information and Data**
   → National Database
   → Award System
2. Subsidized Energy Audit in Japan
   2-1 What is Subsidized Energy Audit & the results so far?

1) **Outline** of Energy Audit (Diagnostic Studies) by ECCJ
2) **Flow** of Energy Audit Procedure
3) On site study by two experts (**on site Photo**)
4) **Concept** of ECCJ’s Energy Audit

The results so far

1) **Energy-saving percentages** by Energy Audit
   --- Factories
2) Energy-saving percentages by Energy Audit
   --- Buildings
3) **Examples** of proposals
1) Outline of Energy Audit (Diagnostic Studies) by ECCJ

- **Free of Charge**
  Subsidized by METI

- **First step to Start Energy Conservation**
  To Understand What is the Energy Conservation.
  To Know the Start Point of Energy Conservation Activity

- **“Walk-through” type energy audit**
  One-day on-site study by 2 experts (heat and electricity)

- **SMEs of energy consumption 100-1500kL-oe**
  More than 1500kL-oe Enterprises are Designated as Energy Management Factory

- **Fair, Neutral, Impartial Audit**
  ECCJ implements energy audit, and ECCJ is not a private sector
  Impartial Advice without Focusing on Specific Energy Source, Equipment, Supplier
2) Flow of Energy Audit Procedure

**Factory/Building**
- Fill Application Form with basic data

**ECCJ**
- Accept Application Form
- Preparation and Arrangement
- Judgment on terms of acceptance
- Review Preliminary Investigation Document
- Schedule Arrangement

**On-Site Audit**
- Conducting Improvement
- Receive and Review Report

**ECCJ**
- Prepare Audit Report
- Dispatch Expert
- Evaluation of Present Situation
- Advice how to improve
- Advise on energy improvement with estimation
  - Expected Energy Saving
  - Expected Energy Cost Down
  - Expected Investment
- Additional Meeting to Explain the Result of Audit

Data Source: ECCJ
3) On site study by two experts
4) Concept of ECCJ’s Energy Audit

**Basic Data/Document Investigation**
- Current Status of Energy Management
- Current Quantity of Energy Consumption (Existing Data)

**Current Status of Equipment/Investigation and Analysis**

**Electrical Items**
- Lighting
- Water Supply/Drainage
- Transforming Sub Station
- Electric Load Equipment
- Air Compressor

**Heat Energy Items**
- Heat Insulation
- Steam heating & Control
- Boiler
- Furnace
- Waste Heat Recovery

**Electric/Heat Items**
- Heat Pump
- Co-generation
- Air Conditioning
- Leveling Energy Demand
- Improve Process Line

**Proposal to Improve Energy Use**
- Category I  Improve of Operation without Investment
- Category II  Improve with Investment of Short Return
- Category III  Improve with Investment of Long Return

*Data Source: eccj*
The results so far?

• Expected energy saving in audit report reaches to 6 to 8 % of the factory’s energy consumption.

• According to the questionnaire survey, one-third of the proposals has already been carried out and the other one-third of the proposals is under consideration.
1) Energy-saving percentages by Energy Audit ---Factories

- Printing & publishing
- Machinery manufacturing
- Wood product manufacturing
- Apparel manufacturing
- Rubber product manufacturing
- Water treatment & supply
- Chemical industry
- Textile industry
- Furniture manufacturing
- Fur manufacturing & processing
- Petrochemical manufacturing
- Waste treatment/disposal

Average: 8%

Total proposals are equivalent to 46MI/y

Data Source: ECCJ
2) Energy-saving percentages by Energy Audit -- Buildings

- Expected energy saving in audit report is also 6 to 8 %
### 3) Examples of proposals

The followings are some of the proposals in the reports of energy audits.

<table>
<thead>
<tr>
<th>Business type</th>
<th>Number of employees</th>
<th>Main improvement proposals concerning energy conservation</th>
<th>Classification (Note 2)</th>
<th>Annual estimated effect</th>
<th>Energy conservation ratio (Note 3)</th>
<th>Monetary amount of conservation</th>
</tr>
</thead>
</table>
| Food manufacturing business (1,300 kL/year) | 160                 | (1) Optimization of boiler’s air ratio  
(2) Maintenance of steam trap and recovery of drain-off  
(3) Maintenance of thermal insulation for steam line  
(4) Thermal insulation for boilers and heaters                                                                                                                                             | I                        | 6.5 million yen         | 9.2%                             |                                 |
| Plastic products manufacturing business (720 kL/year) | 72                  | (1) Recovery of steam drain-off  
(2) Thermal insulation of injection molding machine  
(3) Install inverters to hydraulic motors  
(4) Install high-efficiency transformers                                                                                                                                                    | I                        | 5.3 million yen         | 13.5%                            |                                 |
| Ceramic products manufacturing business (1,450 kL/year) | 68                  | (1) Inverter control of dust collection fans  
(2) Recovery of exhaust heat from tunnel kiln  
(3) Quantitative control of compressors  
(4) Install regenerative burner for tunnel furnaces                                                                                                                                 | II                       | 11.8 million yen        | 14.9%                            |                                 |

Data Source: ECCJ
4. What are the lessons learned?

1. About 1/3 of the EM recommendations is not implemented
2. Major part of the recommendations is regarding utilities
5. Ongoing challenges and future plans

Thank You

Very Much

For More Information
The Energy Conservation Center, Japan
http://www.eccj.or.jp