

# **Energy Management Regulation & ESCO Industry Update In Japan**

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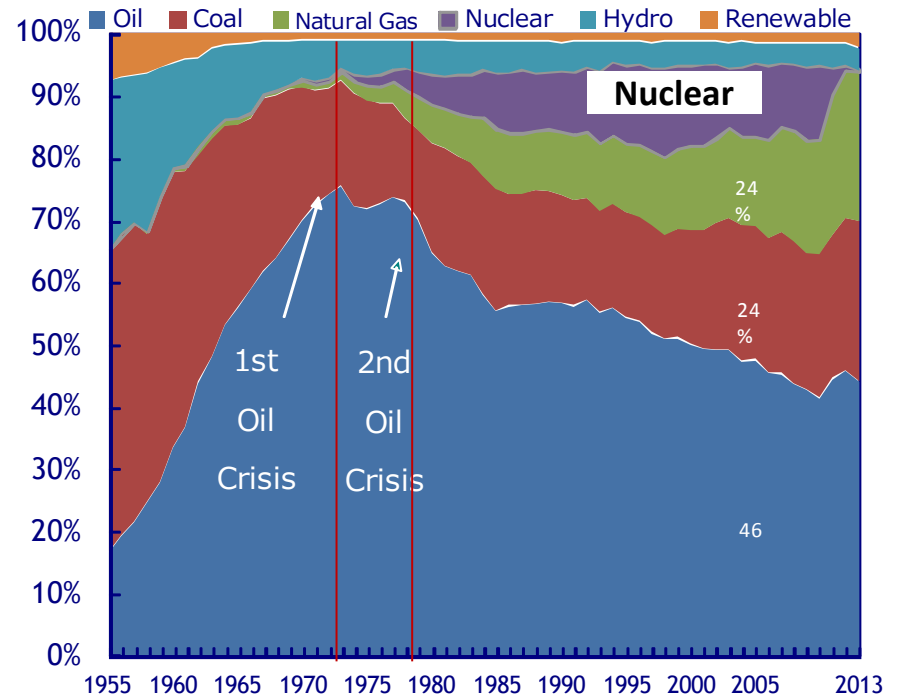
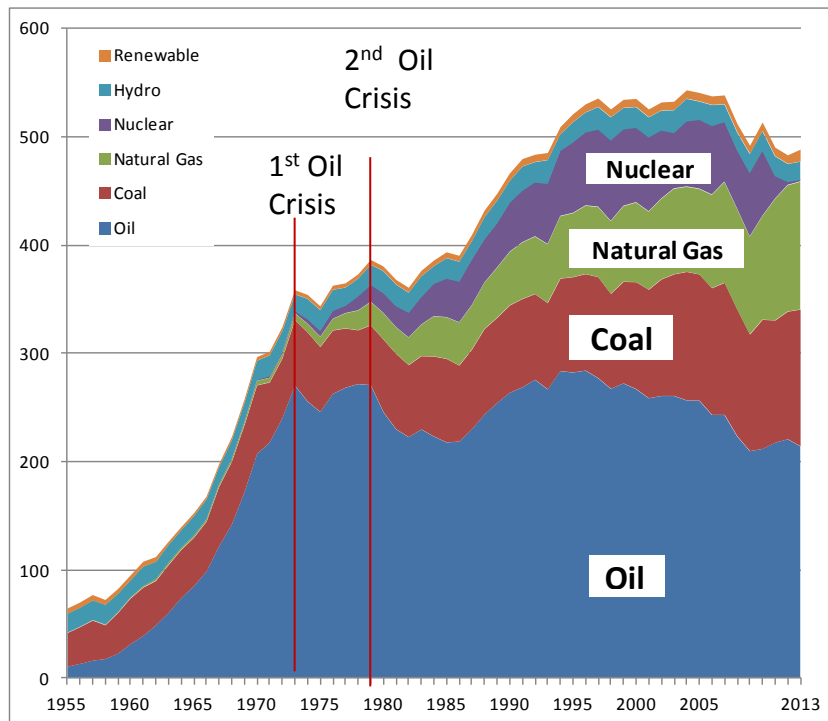
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# 1. Country Energy Status

## 1-1 Supply Side

- Japan has been reducing its dependence on oil by increasing natural gas and nuclear (until March 2011).
- After Fukushima accident in 2011, natural gas compensated the gap.



Primary Energy Supply Trend of Japan (1955-2013)

## 1-2 Global Warming Issue

- Japanese share of GHG emission is just 2.8% of the world.
- Japanese Government will declare in Paris to reduce GHG by 26% by 2030 compared to that of 2013.
- In order to achieve it, Japanese Government decided to aim for the following percentages of sources of energy to generate electricity, based on the reduction of electricity consumption by 17% by 2030.

Oil : 3%

Coal : 26%

Natural Gas : 27%

Renewable : 22-24%

Nuclear : 22-20%

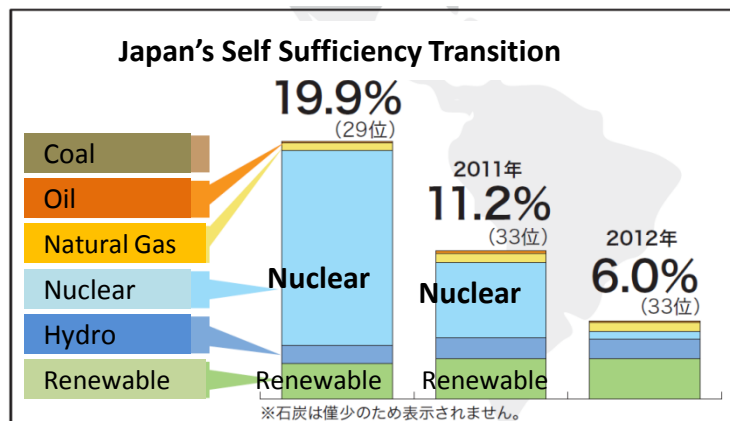
Geothermal : 1.0 - 1.1%

Biomass : 3.7 - 4.6 %

Wind power : 1.7%

Photovoltaic : 7.0 %

Hydro : 8.8 - 9.2 %



2030  
25%

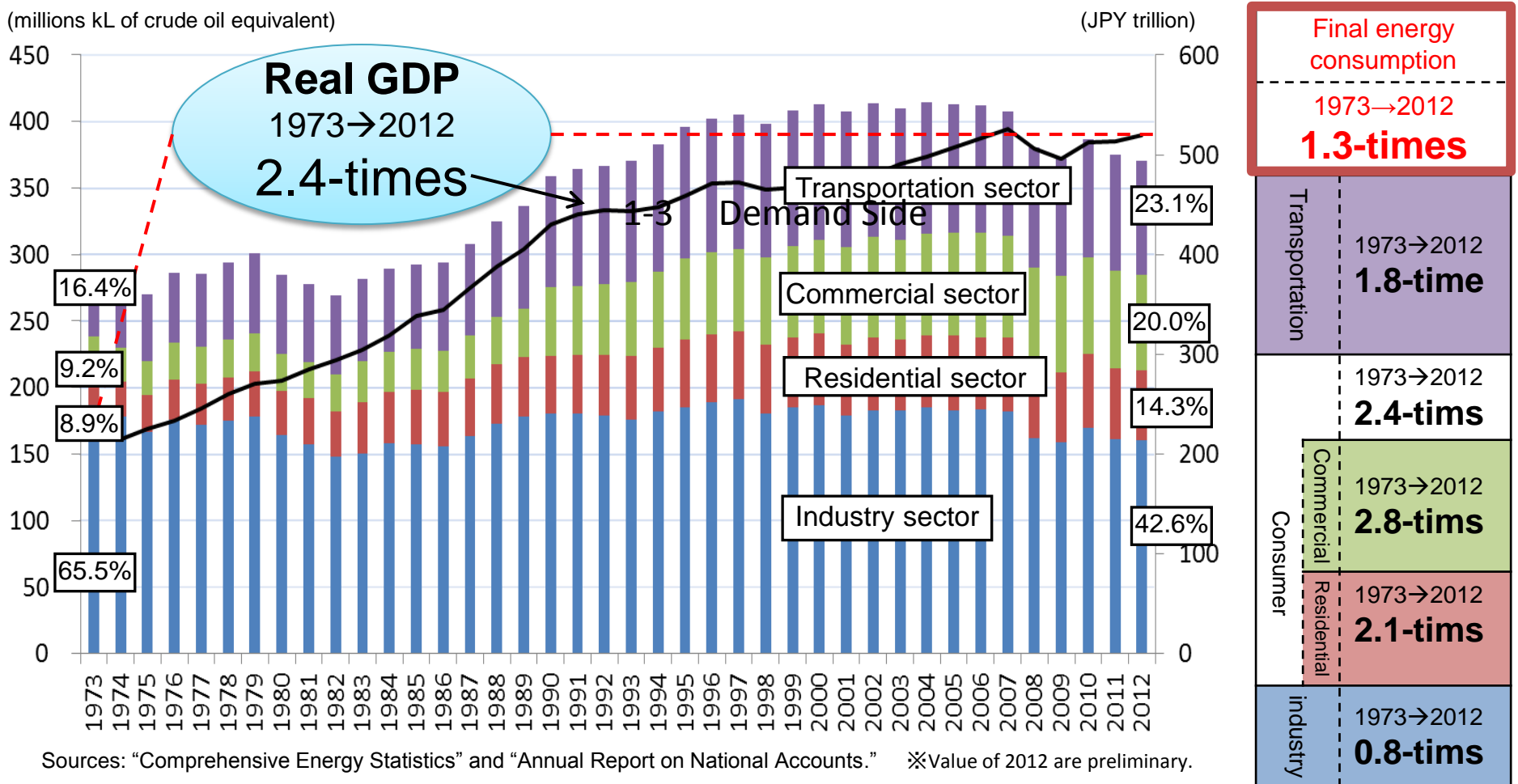
### Primary Energy Supply

- Renewable : 13-14%

- Nuclear : 11-10%

# 1-3 Demand Side

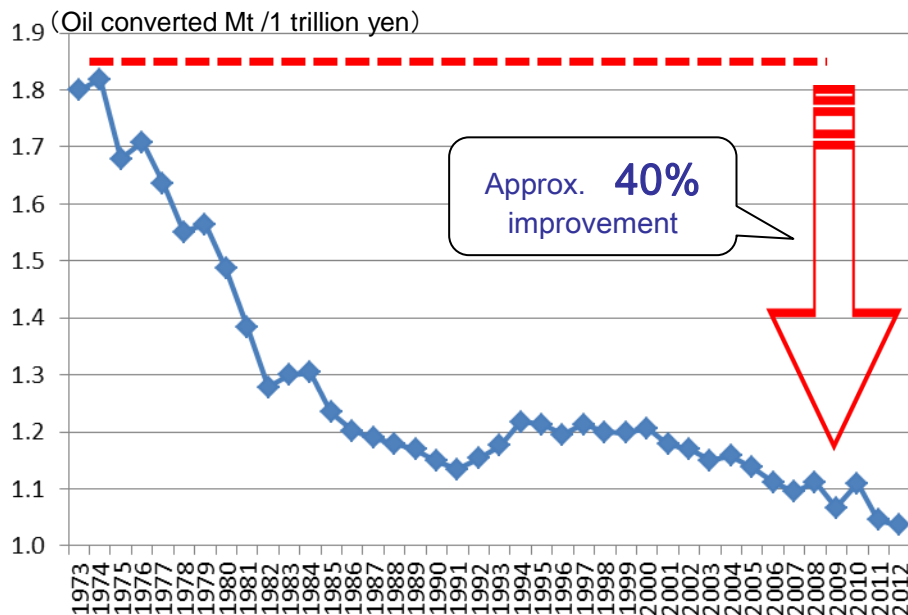
- The final energy consumption of Japan has basically consistently increased, except for periods immediately following the two oil crises and the recent economic downturn.
- Until 2012 the GDP continued increasing to about 2.4 times the 1973 level and the consumption of energy for individual sectors significantly increased with the Consumer sector increasing to **about 2.4 times**, while the transportation sector increased to **about 1.8 times**, whereas the industrial sector decreased to **about 0.8 times**.



## Japan's Energy Conservation Efforts after the Oil Crises

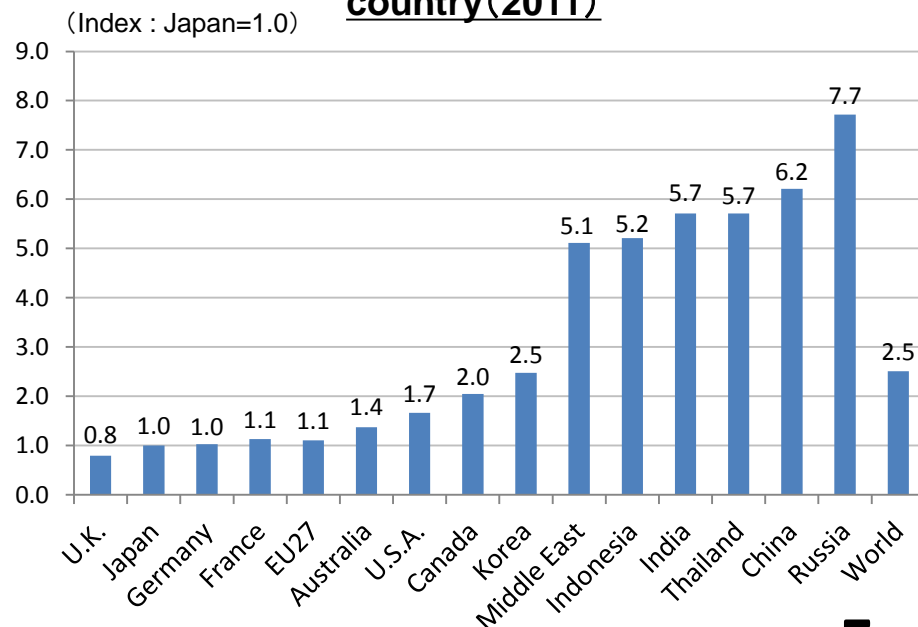
- Japan has improved energy efficiency by approx. 40% after the oil crises in the 1970s as a result of positive actions by both public and private industrial sectors.
- Japan intensively introduced "Energy Management System based on Energy Conservation Law", then achieved the lowest level of energy consumption per GDP in the world.

**Primary energy use per real GDP of Japan**



Source ) Total Energy Statistics by ANRE/METI

**Primary energy supply per GDP unit of each country(2011)**



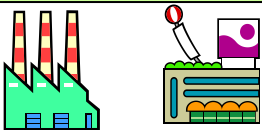
Calculated according to IEA statistics

## 2. National Policy about Energy Management

### 2-1 Energy Conservation Law

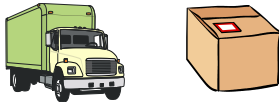
- “Energy Conservation Law” was introduced in 1979 .
- The Law covers industry, commercial & residential and transportation sectors.

#### (1) Manufacturing plants & business establishments



- ◆ Business operators with an annual energy consumption of at least 1,500kl (equivalent crude oil) at manufacturing plants and business establishments.

#### (2) Transportation



- ◆ Freight carriers with a transportation capacity of a minimum certain scale, such as 200 trucks or 300 railway cars for railroads, etc.
- ◆ Cargo owners with an annual freight transport order of at least 30 million tons .

#### (3) Residential buildings and structures



- ◆ Structures on a large scale with a total floor areas of at least 2000m<sup>2</sup>.
- ◆ Small to mid size structures with a total floor area of at least 300m<sup>2</sup>.
- ◆ Business operators who build and sell residential buildings (annually supplying at least 150 units).

#### (4) Machinery and equipment



- ◆ Passenger cars, air conditioners, television sets, etc., 29 items.  
(Comprises about 70% of household energy consumption.)

# Detailed regulations of Energy Conservation Law

## Manufacturing plants & business locations

### Obligation for business operators to make an effort and public disclosure of judgment standards

#### ○ Specified business operators and specified chain business operators

(Energy consumption of 1,500kl per year)

- Obligation to appoint Energy Managers, etc.
- Obligation to periodically report on energy consumption status.
- Obligation to submit medium and long term plans.
- Reduction efforts of 1% per year

## Transportation

### Obligation for business operators to make an effort and public disclosure of judgment standards

#### ○ Specified carriers (freight and passengers)

(Fleet of vehicles: At least 200 trucks or at least 300 railway cars for railroads, etc.)

- Obligation to submit medium and long term plans.
- Obligation to periodically report energy consumption status.
- Reduction efforts of 1% per year

#### ○ Specified consigners

(Annual transport volume of at least 30 million ton-km.)

- Obligation to submit plans.
- Obligation to periodically report consumption of energy related to consigned transportation.

## Residential buildings and structures

### Obligation for construction clients and owners to make an effort and public disclosure of judgment standards

#### ○ Specified buildings

(Total floor area of at least 300m<sup>2</sup>.)

- Obligations relating to the submission of notifications pertaining to energy conserving measures implemented by construction clients in relation to large scale modifications and obligations relating to reporting the status of overall maintenance.

#### ○ Housing providers

(Annual supply of at least 150 units.)

- Obligation to observe targets for improving energy conservation performance of supplied ready built residential housing.

## Provisions relating to machinery and equipment

### Obligation for manufacturers and import business operators of energy consuming equipment to make an effort

#### Top Runner Standards (29 units)

- Standards for energy conservation of passenger cars, air conditioners, television sets, etc. To exceed the performance of most superior products that have been commercialized at the present time is required of each type of unit.

## Provision of information

### Obligation to make effort in providing information to general consumers

- Provision of information on energy conservation (annual electric power consumption, fuel economy, etc.) that is easy to understand at storefronts of retailers who sell household electrical appliances, etc.
- Popularization of energy conserving equipment and the provision of information, etc., by electric power and gas companies.



## 2-2 Energy Management Regulatory Scheme.

- Business operators with overall annual energy consumption (head office, manufacturing plants, branch offices, sales offices, etc.) of **at least 1,500kl** in crude oil equivalent are subject to regulations.
- Business modes, such as franchised chains of stores, are also considered single business operators and those consuming at least 1,500kl for the whole chain are subject to regulations.



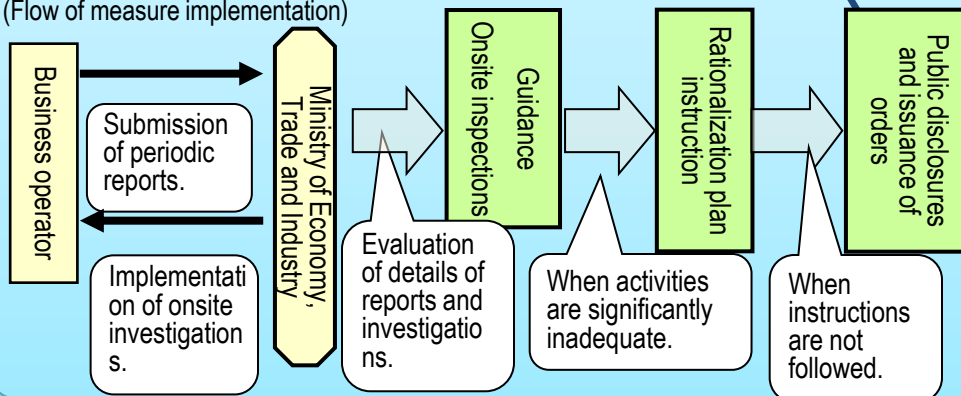
**On the basis of energy consumption, about 90% of the industry sector and about 40% of the commercial sector are covered subject to regulations.**

### ○ Obligation to report periodically

- ① Transition of energy unit consumption
- ② Status of activities relating to energy conserving measures
- ③ Obligation to annually report on status of benchmark indices (for subject business lines only), etc.

**Measures, such as instructions, public notices and orders (fines in case of violation against orders) implemented when energy conservation activities of a business operator are significantly inadequate.**

(Flow of measure implementation)



### ○ Numerical targets: **Reduction of annual average by at least 1%.**

### ○ **Guidelines** pertaining to energy conservation measures:

Stipulation of standards (guidelines) based on the Energy Conservation Law as observance items for energy management.

#### ➤ Energy conservation measures for business operators overall

- Maintenance of energy management organization.
- Allocation of persons in charge.
- Formulation of policies for activities pertaining to energy conservation targets, etc.

#### ➤ Energy conservation measures at individual manufacturing plants and business establishments (Example: Air conditioning systems.)

Preparation and implementation of management standards (manuals) pertaining to the following measures:

- Operational management (operating time, set temperature, etc.).
- Periodical measurement and recording of temperature, humidity, etc.
- Periodical maintenance and inspection of facilities.

### ○ New numerical targets to include in addition to existing targets

**Benchmark indices and standards to be targeted**

**Currently set business lines: Iron and steel, electric power, cement, paper manufacturing, petroleum refining and chemical.**

**Standards to be aimed for:** Levels satisfied by most superior business operators in respective industries (10 to 20%).

\* Fines imposed when orders are not followed.

# Energy Manager

- “Type 1 & 2 Designated Energy Management Factories” are obliged to appoint Following number of “Type 1 Energy Managers” or “Type 2 Energy Managers” depending on the industrial category and annual energy consumption
- Type 1 & 2 Energy Manager play a central role to promote energy management in Type 1 & 2 Designated Management Factories

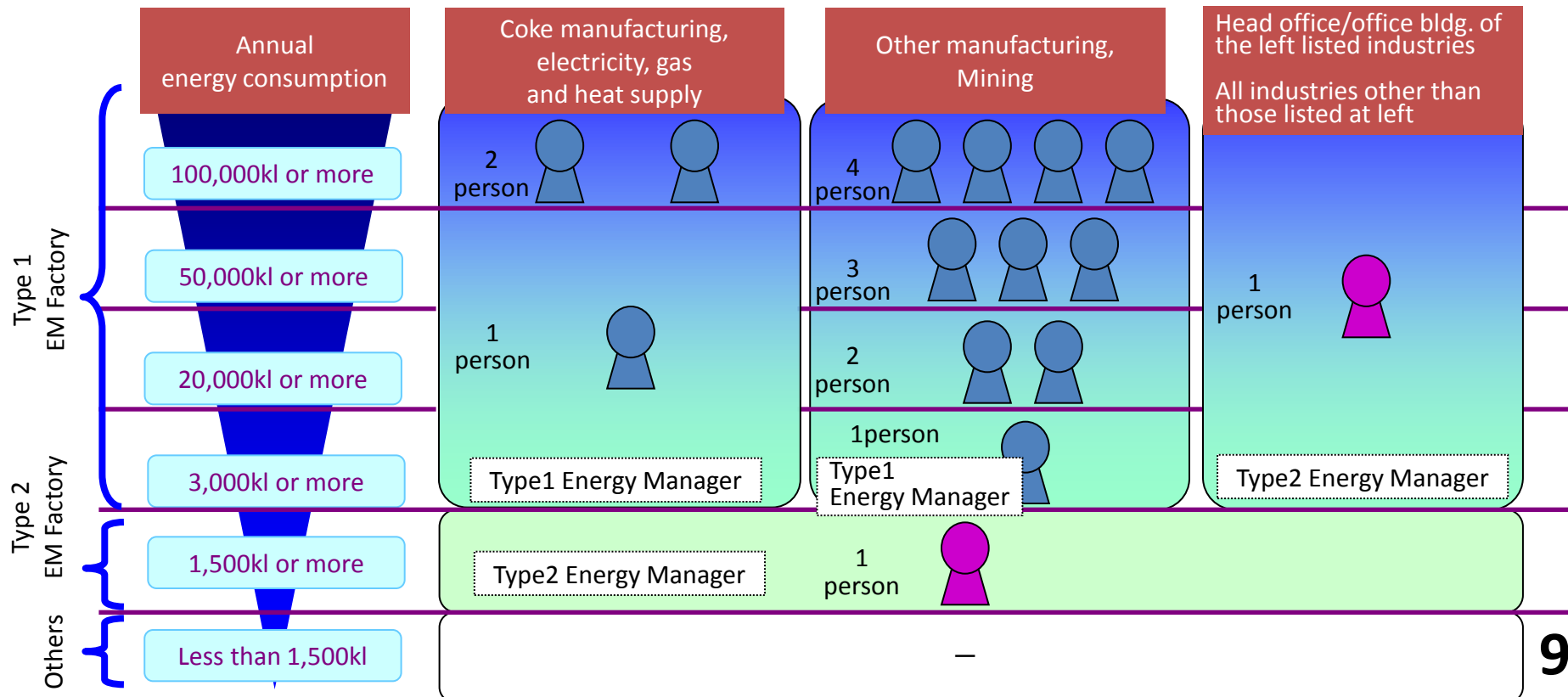
## Qualification of Type1 Energy Manager

- Person who has a Qualified Energy Manager's License



## Qualification of Type2 Energy Manager

- Person who has a Qualified Energy Manager's License
- Person who has completed Energy Management Seminar

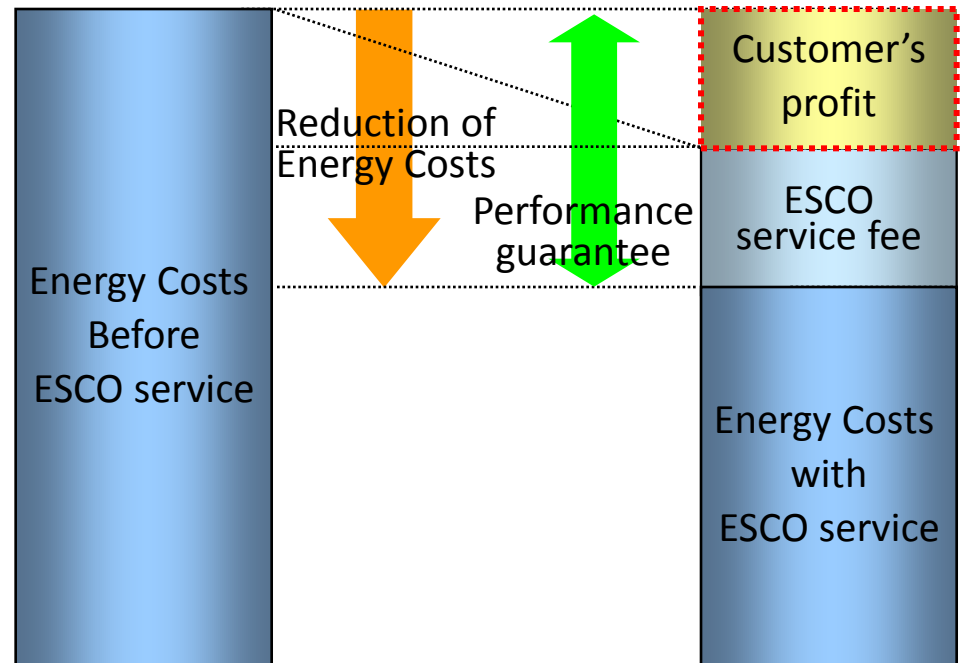


### 3. ESCO Industry in Japan

#### 3-1 ESCO in brief

There are two major characteristics of ESCOs.

- Guarantees Energy Efficiency Performance  
(Performance Contract)
- Investment cost is provided by ESCOs and service fee is covered from the savings of energy cost  
(Pay from the Savings)



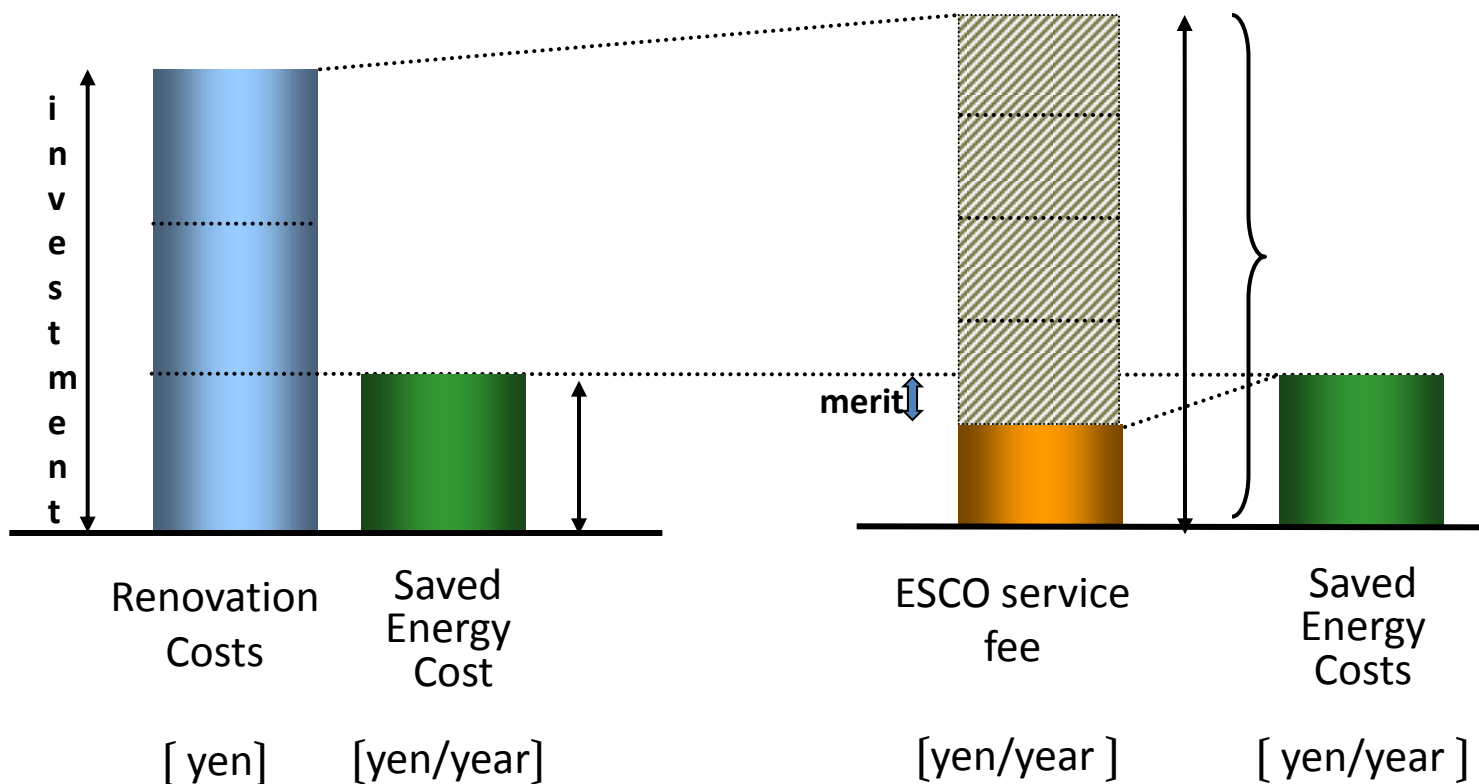
For the same amount of energy savings -----

Conventional Renovation

ESCO service

Payback years of  $X_m$

$X_n$  years of contract



# History of Japanese ESCO Industry

## Background

- Deregulation of Energy Market
- Global Environmental Issue

## History of ESCO Industry

- 1996 – Concept was Imported from US
- 1997 – First ESCO Company in Japan was established
- 1999 – JAESCO was established

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## Background of Active ESCOs in JAPAN

### Electric Power Companies

- Japan Facility Solutions, Inc.
- Kanden Energy Solution, Inc.
- C Energy Co. Ltd

### Gas Companies

- Tokyo Gas Engineering Solutions Corporation
- Creative Techno Solution Co.,Ltd

### Manufactures

- Azbil Corp.
- Hitachi, Inc.
- Miura Co., Ltd.

### Constructors

- Takasago Thermal Engineering Co.,Ltd
- Gunze Engineering Co.,Ltd

### Others

- The First ESCO, Ltd.
- Nippon Koei Co. ,Ltd.

### Leasing Companies

- Mitsubishi UFJ Lease & Finance Company

## Governmental policies to promote ESCO

### (1) METI

April 2007 : published “Manual for local governments to introduce ESCO”.

April 2010 : revision of the energy conservation law and its ordinance.

“large energy consumers must consider the performance contract provided by ESCOs in order to improve energy efficiency.”

April 2014 : revision of the ordinance of energy conservation law

“ large energy consumers must consider to introduce services of BEMS Aggregators and/or ESCOs to improve load leveling performance.”

### (2)MOE

December 2007 : law for procurement of environmentally conscious products

“ Government and public organizations must consider to procure ESCO services for their buildings and facilities.”

### (3)MLIT

May 2011 : revision of manual for public buildings to introduce ESCOs

## Recent Trend (1)

### - Downsizing of ESCO Market

Left Markets are :  
    (1) Central Governmental Buildings  
    (2) Major Real Estate Companies  
    (3) Factory Buildings & Industrial Processes  
where in-house engineers are bright & tough.

### - A few Local Governments keeps ESCO Procurement

More than 200 Projects has been procured since 1997

### - Subsidy from the Government ?

- Privileged Subsidy only for ESCO Projects has been abolished .
- Subsidy for Energy Efficiency Projects still exist with tough competition.



## Recent Trend (2)

### - New Governmental Procurement Law for better Environment (2007 + 2012rev.)

- (1) Adopted for Electricity, Car, Building, ESCO
- (2) Public Buildings are encouraged to procure ESCO Services
- (3) Contract Year can be extended to 10 for ESCO Services  
(other Governmental contracts are 1 year in principle)



BUT, no procurement of ESCO by the central Government so far.

### - ECCJ (Energy Conservation Center of Japan) and some local Governments provide free energy audit services

Both sides of effects for ESCOs.



一般社団法人

ESCO推進協議会

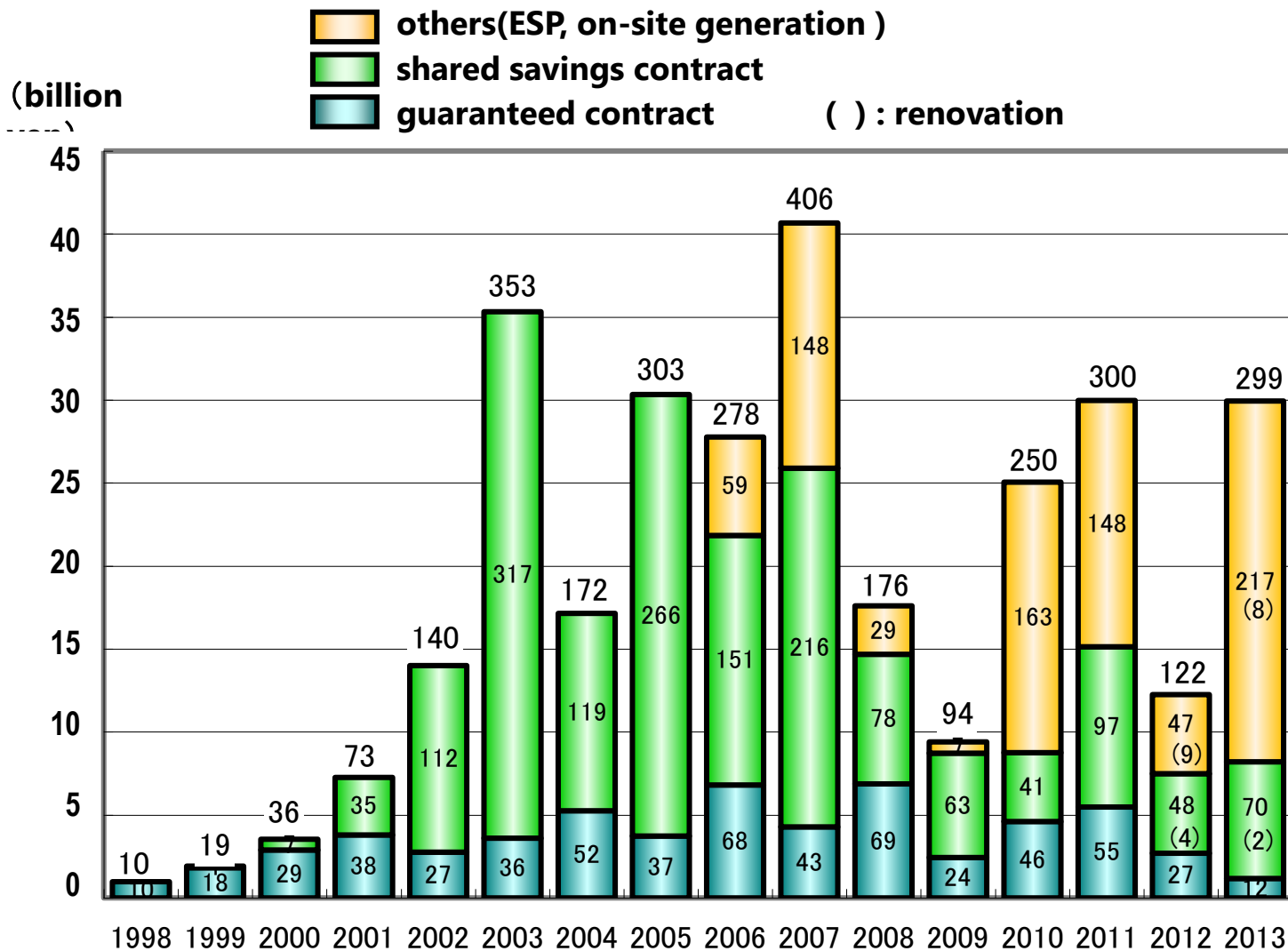
JAESCO Japan Association of Energy Service Companies

- Established in 1999
- Number of Member Companies: 80
- Roles of JAESCO
  - Policy related lobbying activities
  - PR and marketing of the ESCO concept
  - Training the staff of member companies
  - Information exchange between members
  - International cooperation
  - Others including publishing a book of ESCO

### Market Data of Japanese ESCO Industry

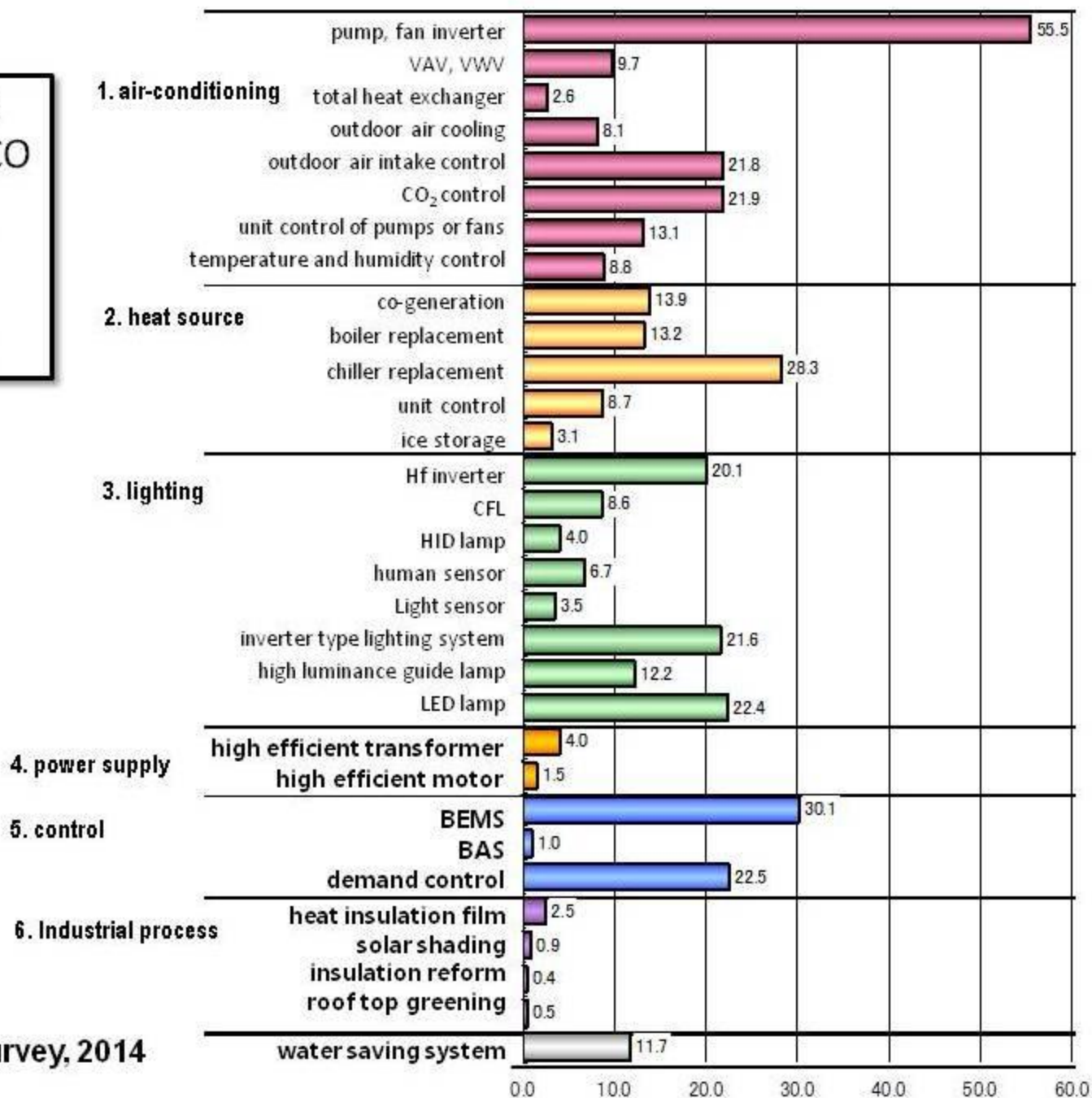
- (1) JAESCO has been collecting data from member companies about their business performance of ESCO services since 1998.
- (2) The data is fluctuating, maybe because of economic situation of Japanese economy, power supply conditions and so forth.
- (3) In addition, nowadays, non-member companies of JAESCO conduct ESCO services, which are not taken into account.
- (4) Please have a look at the following slides with these situation in your mind.

## Trend of ESCO Market Size in Japan



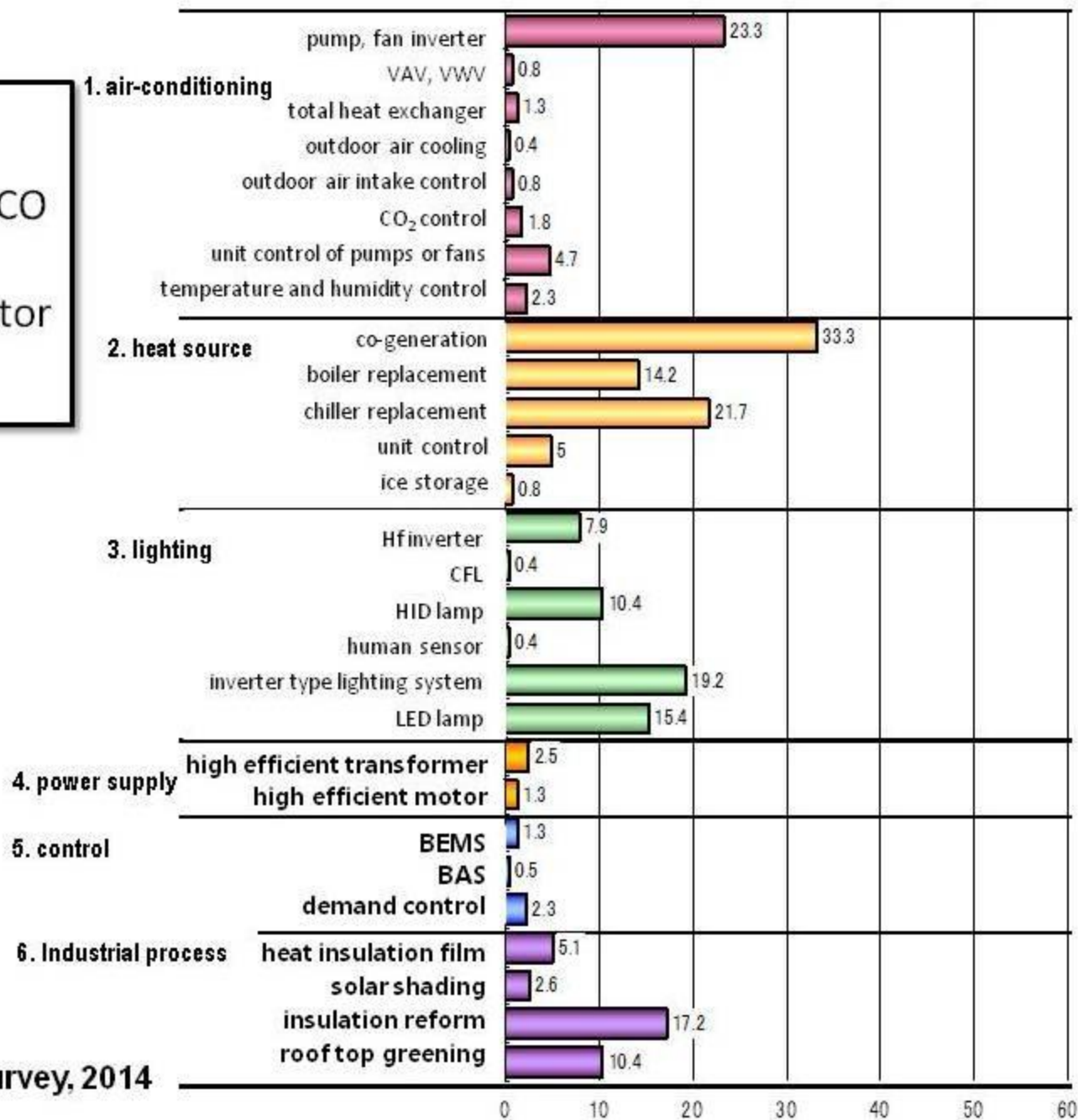
Source: JAESCO survey, 2014

Energy savings  
measures for ESCO  
projects  
in commercial  
sector  
(FY2001-FY2013)



Source: JAESCO survey, 2014

Energy savings  
measures for ESCO  
projects  
in industrial sector  
(FY2001-FY2013)



Source: JAESCO survey, 2014

### 3-3. Selected Best Practice of ESCOs

#### Yokohama 3 Municipality medical & social welfare facilities

横浜ラポール



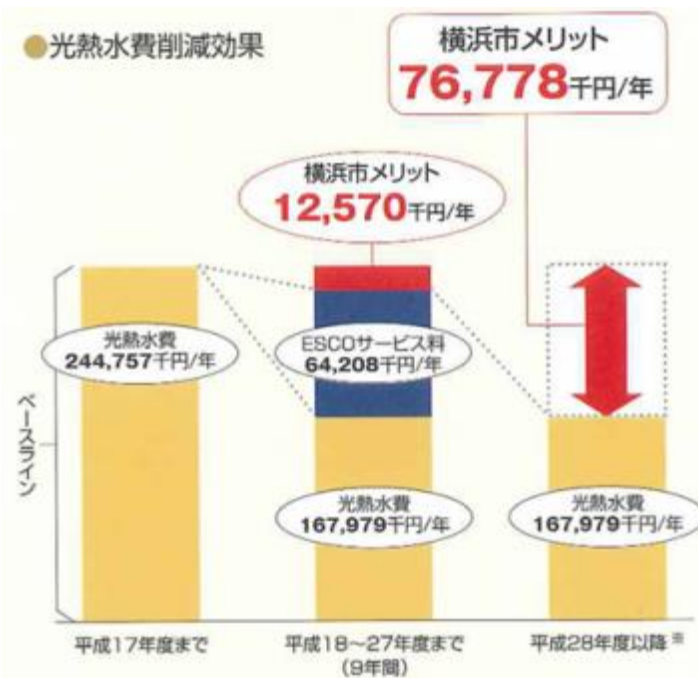
横浜  
リハビリテーションセンター



総合保健医療センター



Energy reduction : 18.2%  
CO2 reduction : 30.5%  
Cost reduction





## Chofu City Hall + Community Center

Energy + Cost reduction : 16%



## Shinjuku Nomura Building



## Bank of Tokyo-Mitsubishi-UFJ, Headquarter Blg.



# 15 Buildings in Edogawa Ward



	Facility Name	m <sup>2</sup>
1	General Culture Center	16,496
2	Hotel Seaside Edogawa	5,564
3	Edogawa City Office	15,774
4	Sports Center	10,230
5	Sports Land	6,169
6	General Gymnasium	5,257
7	Central Library	8,452
8	Nishi-Kasai Library	2,342

	Facility Name	m <sup>2</sup>
9	Koiwa Urban Plaza	7,538
10	Edogawa Community Center	9,465
11	Komatsugawa Community Facility	5,234
12	Kasai Community Center	4,927
13	Tobu Friend Hall	6,080
14	Koiwa Community Center	3,685
15	Shinseicho Community Center	2,899
<b>Total</b>		<b>110,112</b>

Energy + Cost reduction : 11%



## Kyoto Family Shopping Center



## Tokyu Department Store in Shibuya, Tokyo



## Kawaguchi Green City ,Shopping Center

Meiji Pharmaceutical University



Tokyo Metropolitan Hiroo Hospital



Energy + Cost reduction : 24%



Tohoku Historical Museum



# Energy Centre for Tokai University Hospital



Energy Centre



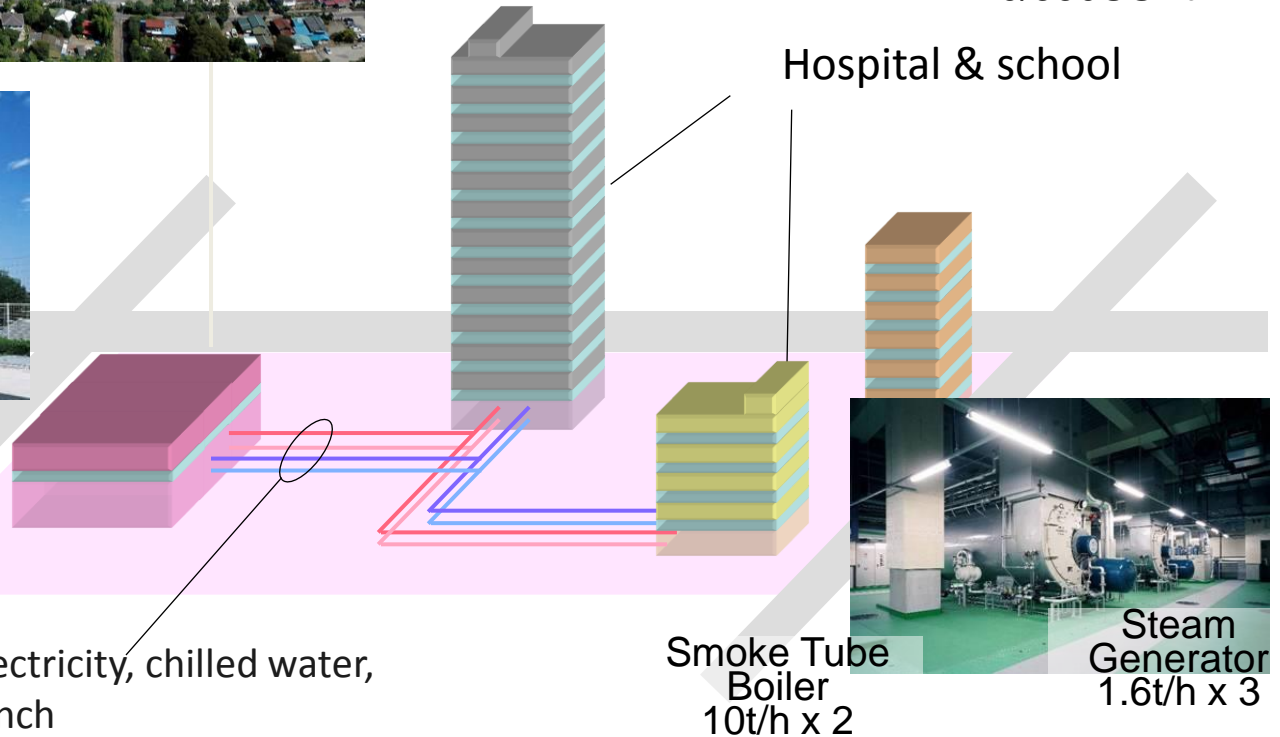
Centrifugal  
Chiller  
800USRt x 2

Brine Chiller  
740/550USRt x 2



10,000USRth  
Ice Storage Tank

Supplied energy includes electricity, chilled water,  
and steam, through the trench



Smoke Tube  
Boiler  
10t/h x 2

Steam  
Generator  
1.6t/h x 3

## 4. Suggestions to Russia

### For Policy Makers and Regulators

To introduce Regulations	<ul style="list-style-type: none"><li>- Report to the governments</li><li>- Official appointment of persons in charge of energy on site</li></ul>
To provide Incentives	<ul style="list-style-type: none"><li>- Subsidy</li><li>- Awards</li></ul>
To grow private EE industry	<ul style="list-style-type: none"><li>- Give chances by utilizing Governmental facilities.</li><li>- Establish Association</li><li>- Publish guidebooks</li><li>- Provide benchmarking data</li><li>- Encourage students</li></ul>
To learn from other countries	EMAK is a good chance!
others	

### For Energy Uses

CEO and Head of Factory	<ul style="list-style-type: none"><li>- Pay more attention to energy consumption of their facilities.</li><li>- Discuss with person in charge of energy once a month</li></ul>
Persons in charge of energy on site	<ul style="list-style-type: none"><li>- Recognize that they need measurement to control the facilities.</li><li>- Compare the energy data with other sites.</li><li>- Disclose the energy consumption data to employees on site every month with comparisons.</li></ul>
others	

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Thank you for your attention.

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