

eceee 2009 summer study



Current state of ESCO activities in Asia: ESCO industry development programs and future tasks in Asian countries

June 2009

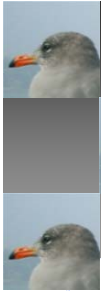
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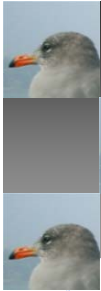
Overview of Presentation



- Definition of ESCO in this paper
- Market size of ESCO industry in Asia
- Promotion program of ESCO industry in Asia
- Conclusion



- **Definition of ESCO in this paper**



Definition of ESCO

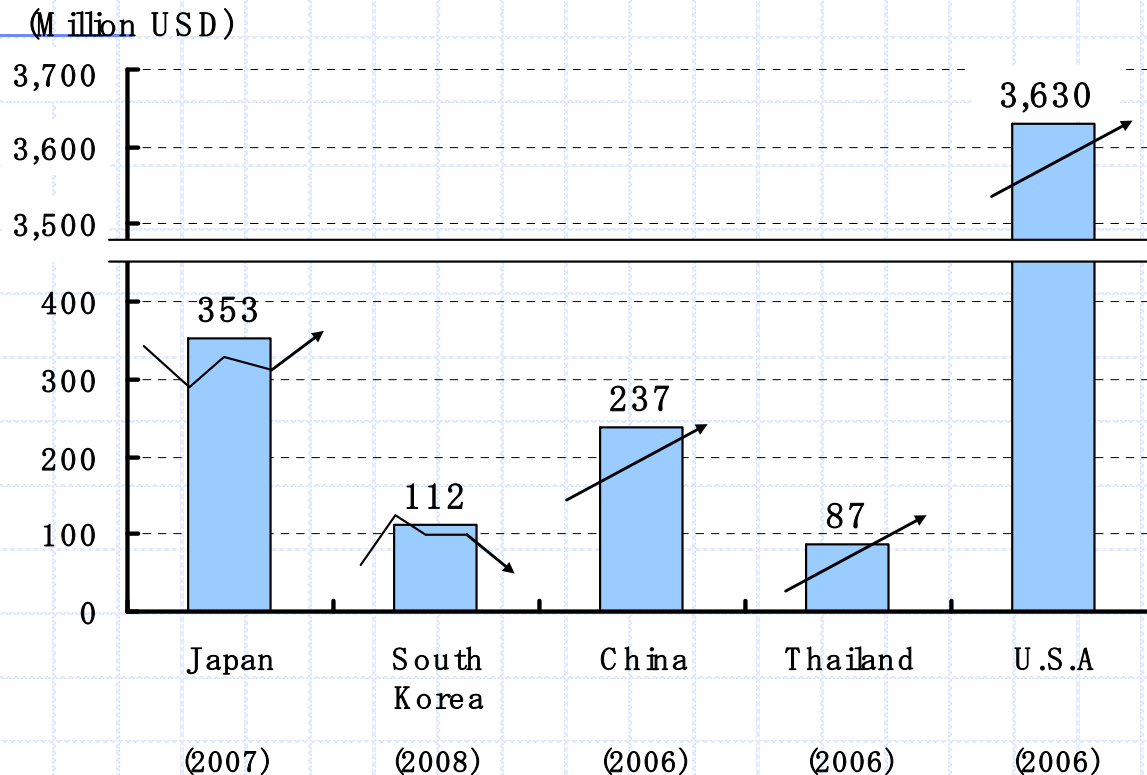


- The definition of ESCO in this paper is simple.
- ESCOs provide energy efficient retrofit projects with performance contracts that guarantee energy savings.
 - Introduction of ESCOs to Asia took place in the 1990s.
 - Almost all countries learned the ESCO concept from USA.
 - The definition of an ESCO in Asian countries is similar to the traditional ESCO concept in USA (before utility restructuring).



- **Market size of ESCO industry in Asia**

Market size of ESCO Industry in Asia



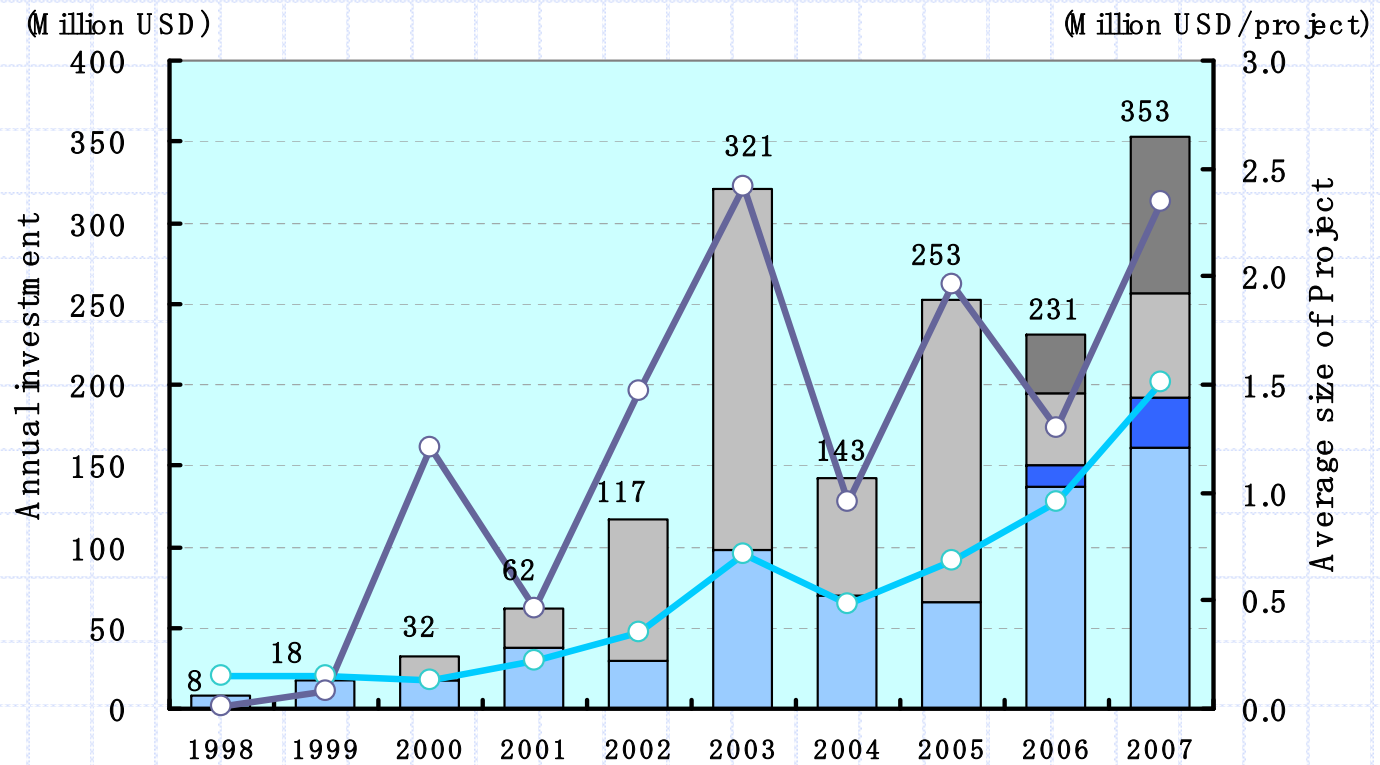
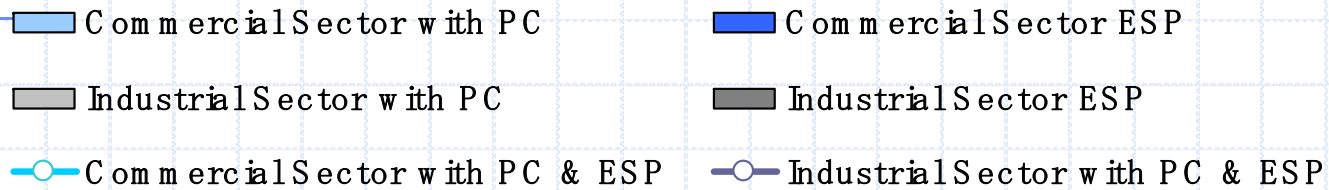
- Japan, South Korea, China and Thailand is limited performance contract based, and 69% is performance contract projects in USA.
- Annual growth is around 20% in China, Thailand and USA, increase in Japan and decrease in South Korea recently.



Market size of ESCO industry in Japan



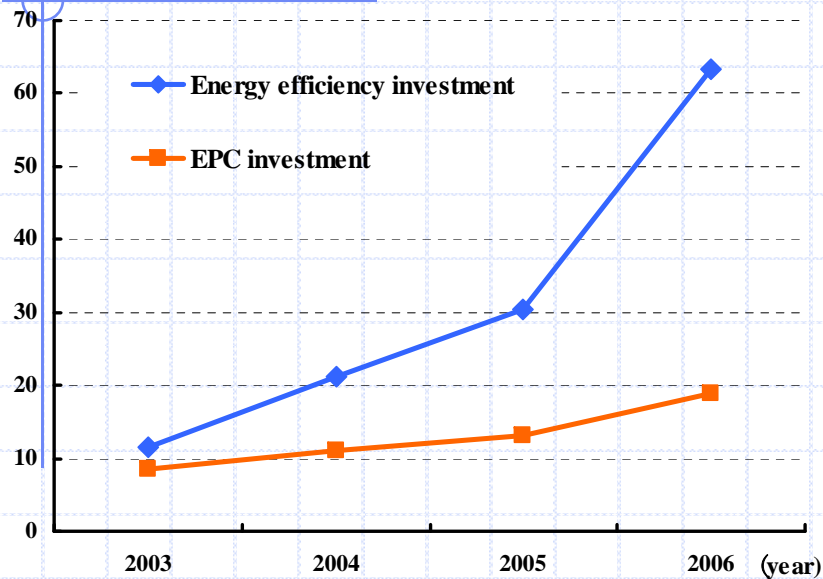
Annual investment
Ave size of project



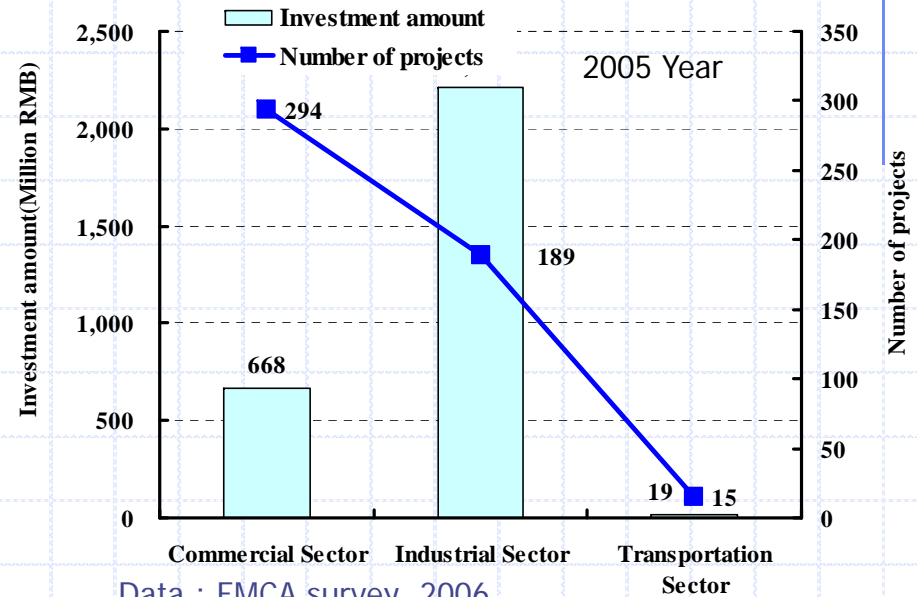
PC: Performance Contract / ESP: Energy Service Provider

Chinese EE Investment

(100 Million RMB)



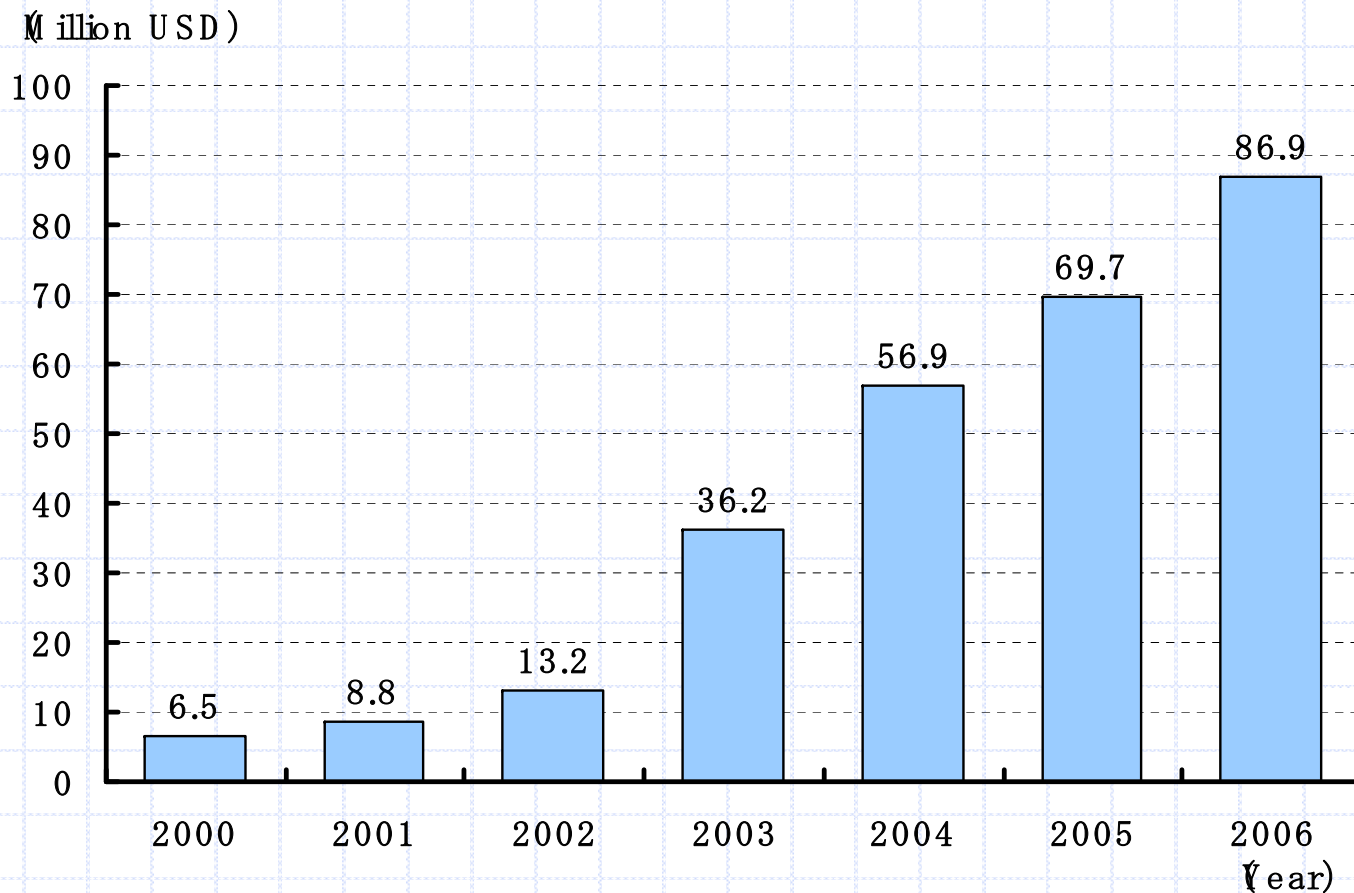
Data : Zhao Ming: EMCA and ESCO development in China, Proceedings of 2nd Asia ESCO Conference, Beijing, September 2007



Data : EMCA survey ,2006

- Investment for EE projects with PC in 2006: 237 Million USD
 - ✓ Energy savings in 2006: overall investment in EE as 4.16 Mtce/year, investment in EE with PC as 2.69 Mtce/year
- Industrial sector is major (76%).
- Investment per project: 1.43 Million USD for Industrial sector/ 280₈ thousand USD for Commercial sector.

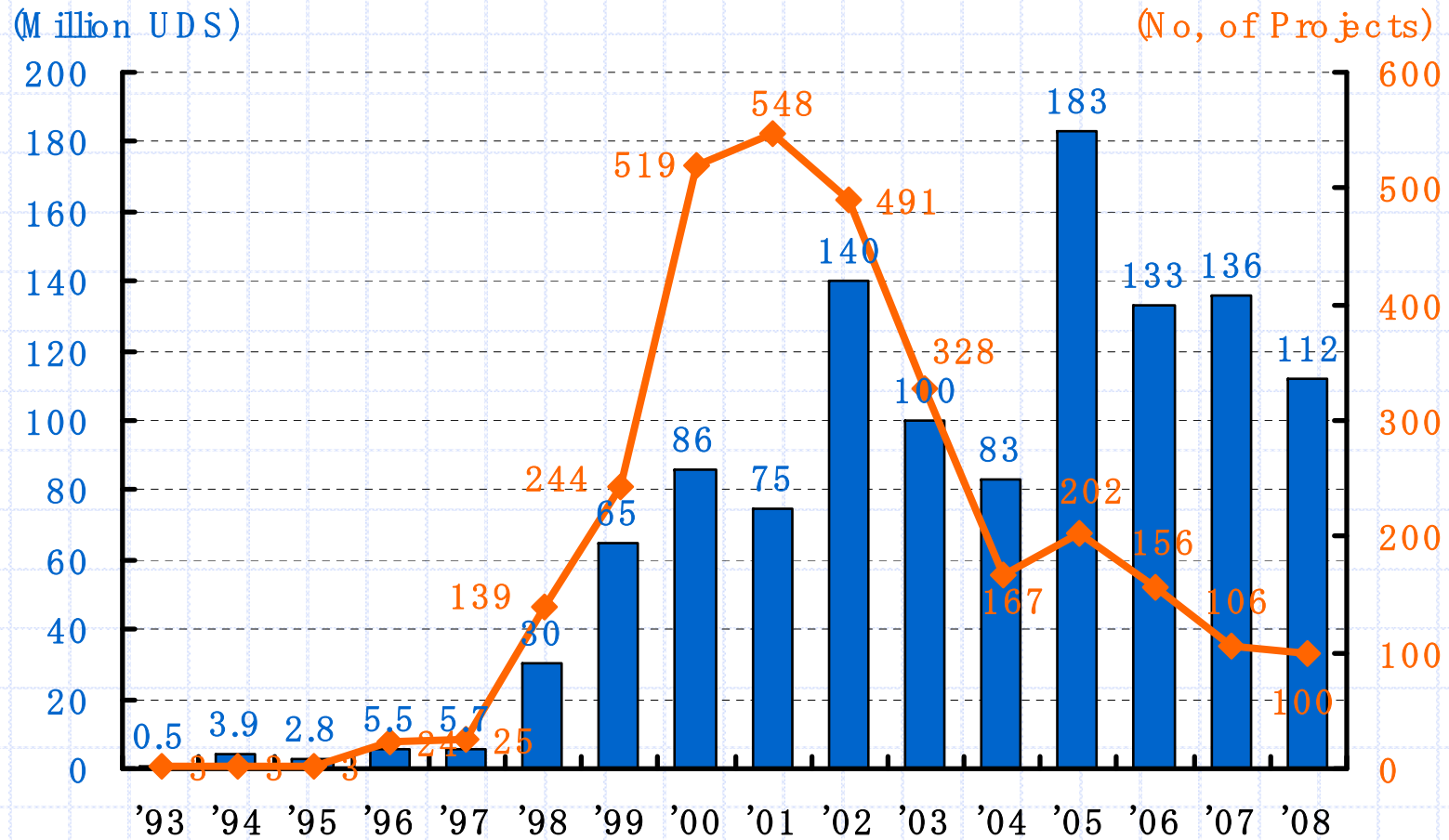
Market trends of ESCO industry in Thailand



Investment for EE projects with Performance Contract



ESCO market trend in South Korea

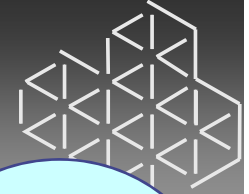


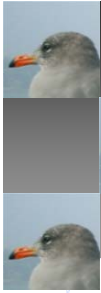
Data: Korean Association for Energy Service Companies (2008)



- **Promotion program of ESCO industry in Asia**

The step of market development of ESCO industry in Japan





Programs which had not adopted in Japan



- Tax incentive
- Low interest loan
- Loan guarantee program
- Reform of the procurement system in the national government

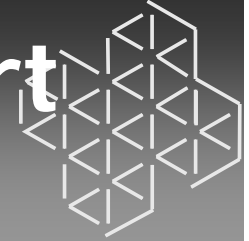


Brief trends of ESCO industry in China



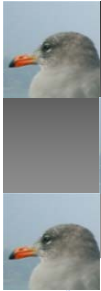
- 1992-1994: Survey by WB/GEF : China Issues and Option in GHG Emissions Control
- 1998: Enforced Energy Conservation Law
- **1998:WB/GEF “The China Energy Efficiency Project (CEEP)” started**
 - ✧ 1998-2003: First phase
 - ✓ Established 3 pilot ESCOs(1996) and NECIDC
 - ✧ 2003-2008: Second phase
 - ✓ Loan Guarantee Program, EMCA(ESCO association)
- 2006: 11th Five-year Development Guidelines, 20 % reduce energy consumption per GDP until 2010
- 2007: Strengthened Energy Conservation Law

International Financial Support on First phase



Funding Organization	Type of support	Amount	Allocation to each EMC
WB/IBRD	Loan	63 Million UDS	21 Million UDS
GEF	Subsidy	22 Million USD	5 Million UDS
EU	Subsidy	4 Million Euro	1 Million Euro
England	Subsidy	1.91 Million Pound	-
Total		89.4 Million USD	26.8 Millon UDS

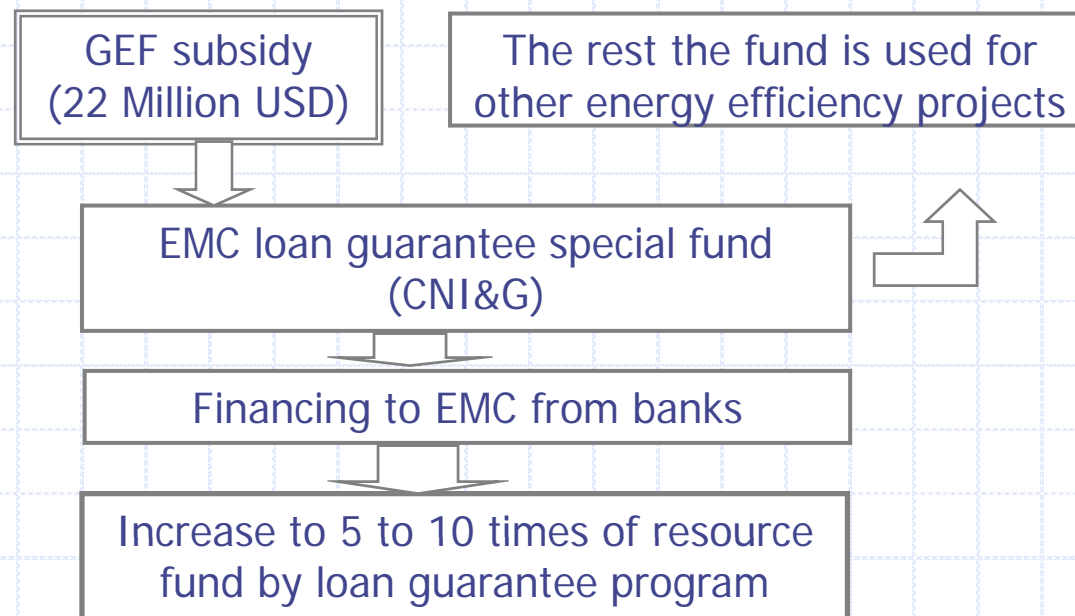
Note:Using 1996 exchange rates: 1.269 USD/Euro, 1.578 USD/Pound



Support on Second phase



- Set up ESCO association(EMCA)
 - ✓ Become independent until 2008
- Implemented “loan guarantee program”. Managed by CNI&G
 - ✓ let financial organizations avoid 90% credit risk

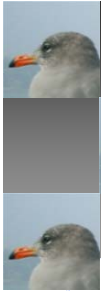




Brief trends of ESCO Industry in Thailand



- Energy audit carried out to 4 site in 1996 supported by GEF (6 Million Thai Bath)
- Only one factory carried out ESCO project(190 Million Thai Bath, SPP=4.9 year). Subsidized 30% by ENCON Fund.
- EGAT had supported to promote ESCO. And EGAT tried to establish ESCO company, but it had stopped.
- FTI (The Federation of Thai Industries) support to promote ESCO as ESCO association, now.
- 56 ESCOs registered to ESCO Fund.



Activities of Thai ESCOs

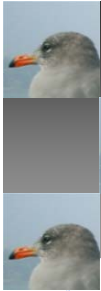


- 56 ESCOs in Thailand
 - ✓ Active Science Co.,Ltd, B.T.M.Engineering Co.,Ltd, Best Energy Service Co.,Ltd, Compress Air Management Co.,Ltd, Elyo-H Facilities Management Ltd., Energica Co.,Ltd, Energy Conservation System Co.,Ltd, Energy Design Concept Co.,Ltd, Energy Solution System Co.,Ltd, Excellent Energy International Co.,Ltd, Goldmark Technical Supply Co.,Ltd, Johnson Controls International Co.,Ltd, Schneider Ltd., Solecell Intertrader Co.,Ltd, Thai Agency Engineering Co.,Ltd, Thai Energy Conservation Co.,Ltd, Vesta PMS Co.,Ltd
 - ✓ Hitach, Ltd. from Japan
- Market scale of EPC is 3.2 Billion Thai Bath (86.9 Million USD) in 2006
- FTI(The Federation of Thai Industries)
 - ✓ FTI support to promote ESCO industry as ESCO association
- ESCO Fund
 - ✓ Low interest loan provided by ENCON Fund

Promotion program of ESCO industry (1)



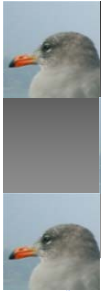
- Market development programs carried out can be categorized
 - (1) baseline surveys/feasibility studies
 - (2) skill development
 - (3) public awareness campaigns
 - (4) founding of core businesses and support for operations
 - (5) project development
 - (6) financial support
 - (7) strengthening of policies and systemic reforms
- In general, through providing such programs, it is possible to initiate an ESCO industry.



Success factors of ESCO in Asian countries(1)



- Similar programs had been in effect in Japan, China, Thailand and India, but success factors of these four main countries vary.
- Japanese case: most active in Asia
 - government initiative, regulation for energy efficiency (ECL), and the contributions of JAESCO and leasing companies as private sector participants
- Chinese case: most active in Asia
 - initiative and intensive investment by WB/GEF to pilot ESCOs and a loan guarantee program



Success factors of ESCO in Asian countries(2)



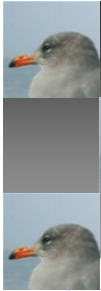
- Indian case: still very small market
 - initiative by international organizations
- initiatives of international organizations were concentrated in China, but dispersed in India
- Thai case: middle developed in Asia
 - government initiative, regulation for energy efficiency (ENCON Act), and financial incentives



Asian EE market leached turning point



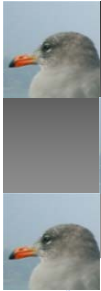
- ✧ EE market would be increase under steady economic growth condition
 - Target of EE: increase profitability
 - ✓ Bakery with long line: Focus investment to increase products
 - ✓ Bakery with no line: Focus investment to increase profitability and quality
 - It would be leached turning point in Asia
- ✧ Jump in oil price
- ✧ Strengthen EE policy and regulation
 - Set up production by investment to EE
 - Reinforcement of competitiveness and increase employment by development of EE innovation



Conclusion(1)



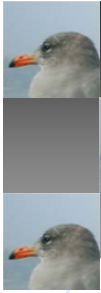
- Asian countries introduced ESCO, with reference to the US model. In this process, measures to introduce and spread ESCO have been carried out in each country.
- Market size of ESCO industry exist 353 million USD in Japan(2007), 237 million USD in China(2006), 112 million USD in Korea(2008), 87 million USD in Thailand(2006) and 3.6 billion USD in USA(2006).
 - This data limited performance contract based in Asian countries and 69% is performance contract projects in USA. Annual growth is around 20% in China, Thailand and USA, increase in Japan and decrease in Korea recently.



Conclusion(2)



- Market development programs can be categorized as (1) baseline surveys/feasibility studies, (2) skill development, (3) public awareness campaigns, (4) founding of core businesses and support for operations, (5) project development, (6) financial support, and (7) strengthening of policies and systemic reforms.
- In general, through providing such programs, it is possible to initiate an ESCO industry.
- It is important to strengthen energy efficiency policy, reform procurement systems of government, develop financial mechanisms, receive intensive investment by government or international organizations and develop an ESCO association.



Conclusion(3)



- Asian EE market leached turning point.
- Amid the current global financial crisis, we wonder if energy efficiency investment will be reduced.
- But, we would like to insist that now is a good chance to invest in energy efficiency and ensure future profitability.

**Thank you for
Listening !!**



Idea source: Thomas Friedman "Green Revolution"

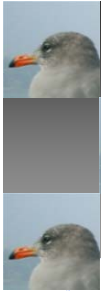


Thank You for Listening !

<http://www.jyuri.co.jp>

Help! I need
some ESCO!

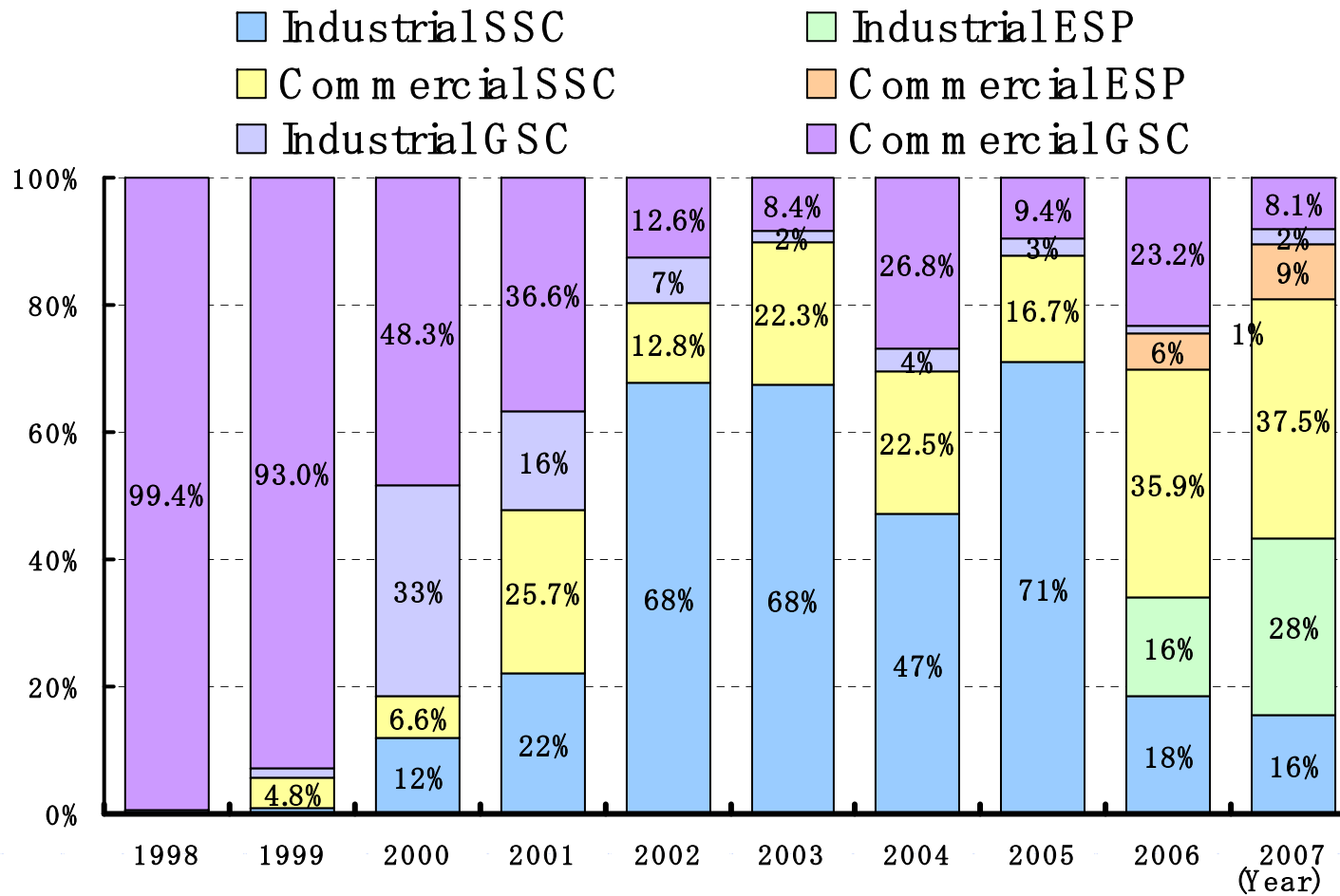




Back ground slides



Share by type of contract

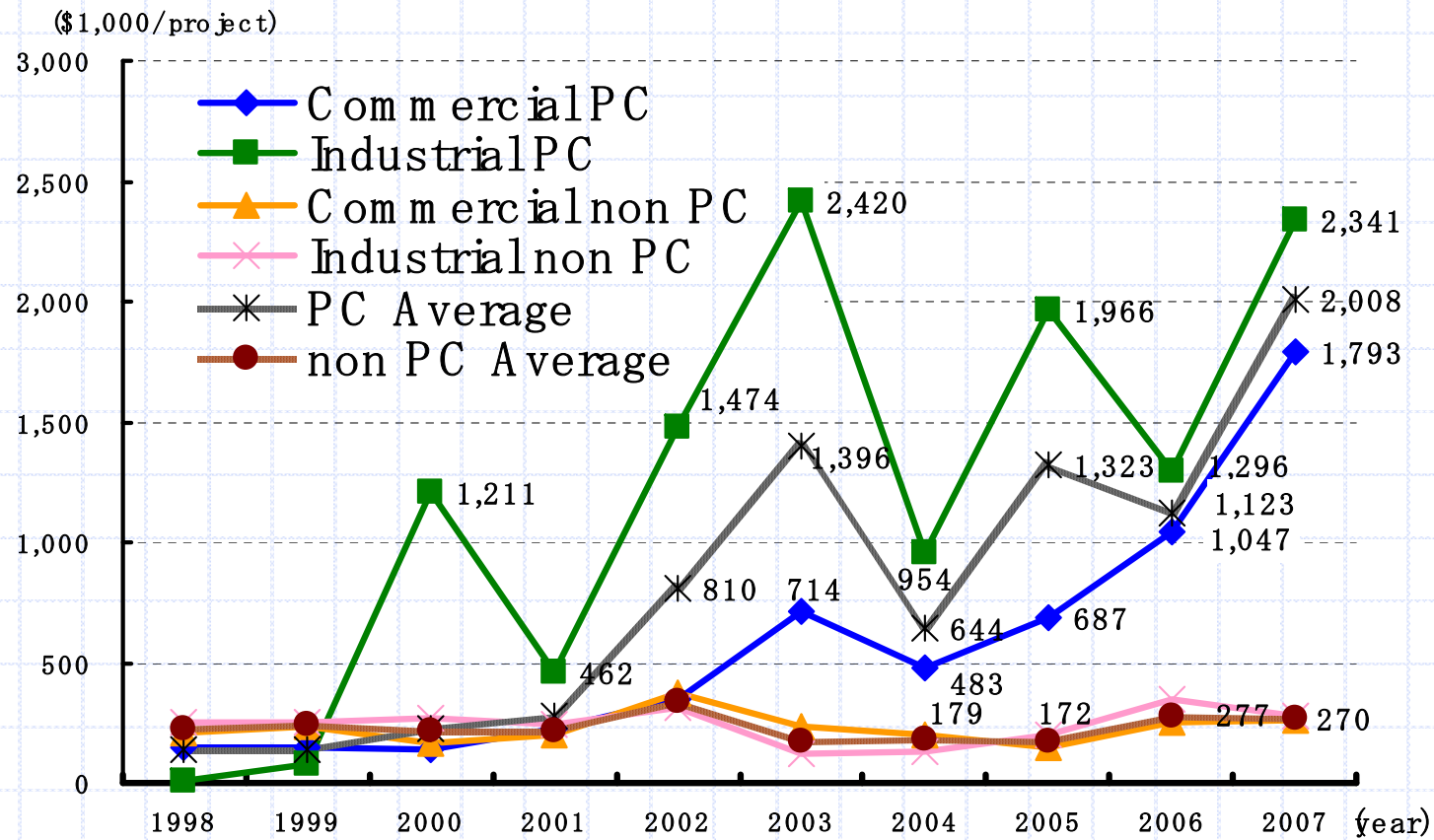




Investment per project



Energy-efficiency retrofit projects



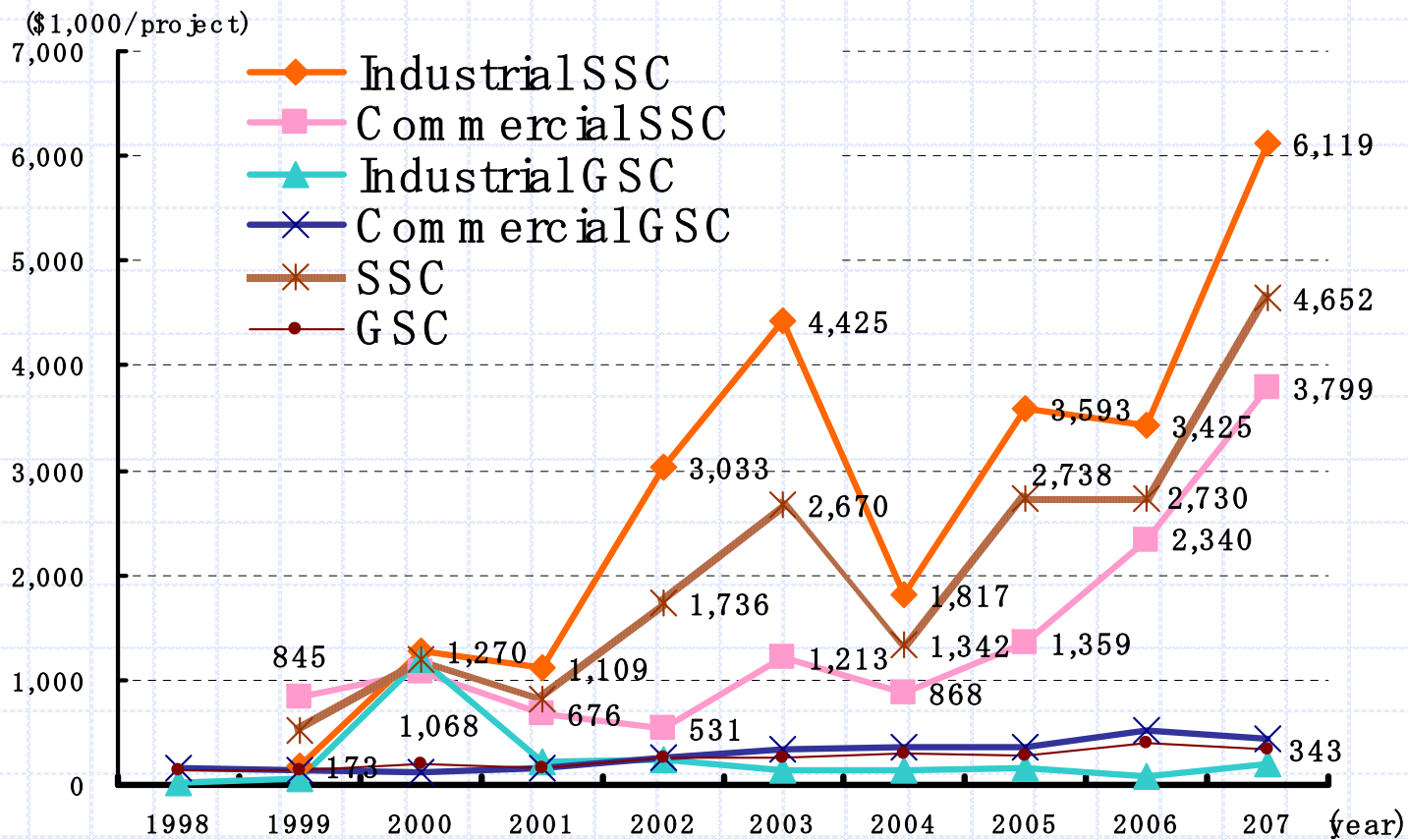
Data source: JAESCO survey, 2008



Investment per project



Performance contract projects



Data source: JAESCO survey, 2008



Conclusion(1)



- **It has been 13 years since the approach toward the ESCO business in Japan started in 1996**
- **The ESCO business is expanding the market with strengthening of governmental support**
- **ESCO (EPC) market are extending doubling annually, it grew up into \$353 Million in 2007**
- **Shared savings contracts are over 90% in 2003, 70% in 2004, 90% in 2005, 70% in 2006 and 90% in 2007**
- **Average rate of energy savings is at 12-13% for both commercial and industrial facilities**
- **Average simple payback period for PC projects is at 9 years for both commercial and industrial facilities**



Conclusion(2)



- **Private sector building hold the major market share**
- **ESCO business have mainly been “blue chip” companies in good standing**
- **In the meantime, the number of entities who enter into ESCO business are increasing primarily with the participation from the large companies**
- **Financial environment for ESCO business is delay**
- **Japan is pressed to promote energy saving measures toward the ratification of the Kyoto Protocol**
- **The ESCO business is expected to play one of the important roles with government’s countermeasures against the global warming**



- **The step of market development of ESCO industry in Japan**



Roughly categorized of ESCO promotion programs(1)



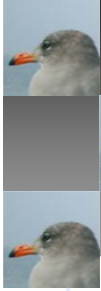
- Improving policy infrastructure
 - ✓ Elaboration of the warming countermeasures and energy-saving policies (various laws and systems and action plan)
 - ✓ Positioning ESCO in energy-saving policies, and taking measures to support ESCO (the energy consumption curtailment target for ESCOs, subsidies, etc.)
- Supporting ESCO in starting stage (Introductory study, feasibility Investigation, experimental project, market research)



Roughly categorized of ESCO promotion programs(2)



- Capacity building (measurement & verification guideline, standard contract, introduction guideline for local authorities)
- Engaged in spread and enlightenment activity (explanatory meeting, conference, exhibition, commendation system)
- Promoting of public facility Introduction
- Establishing and fostering of propulsive organization



Adopted programs to promote ESCO industry in Japan(1)



- Initiation of ESCO introductory study (1996)
- Implementation of feasibility study (1997)
- Implementation of demonstration projects and preparation of a standard contract form (1998)
- Development of Measurement & Verification Protocol guideline (1999 - 2002)
- Establishment of the Japan Association of Energy Service Companies(JAESCO) (1999)
- ESCO explanatory meeting and distribution of case study (2000 - Present)



Adopted programs to promote ESCO industry in Japan(2)



- Introduction of full-scale ESCO projects to local authorities (2001)
- ESCO promotion as a policy target (2001)
- ESCO market size survey start (2001 - Present)
- The General Principle to Promote Counter Measures for Global Warming (2002)
- Toughening of regulations by revising the Energy Conservation Law (2002 / 2005)
- Preparation of guideline to introduce ESCO projects to local authorities (2004)

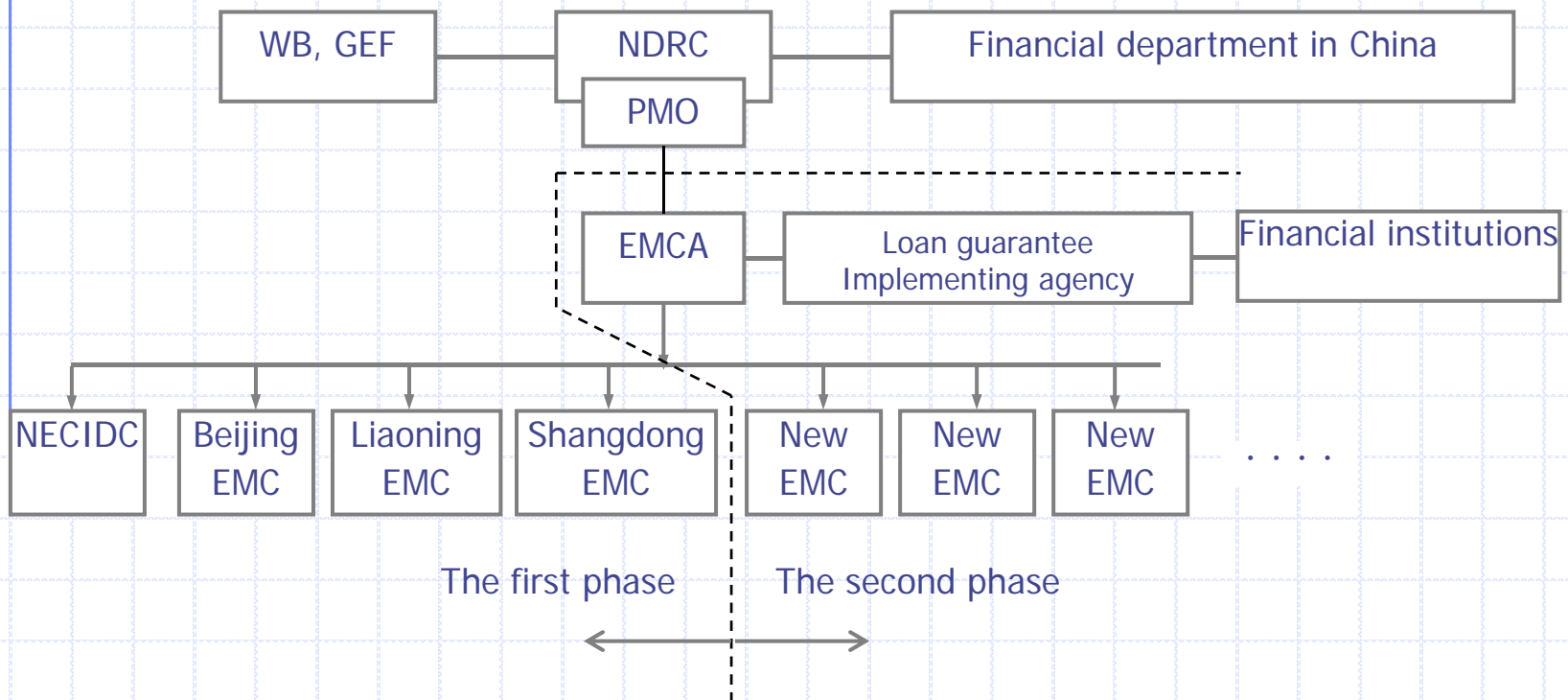


Adopted programs to promote ESCO industry in Japan(3)



- ESCO project introduction start to local authorities under the PFI Law (2003)
- ESCO project Introduction to national facilities (2004)
- The Kyoto Protocol effectuation (2005)
- The First Asia ESCO Conference (2005)
- Start of Superior ESCO Project Commendation (2005)
- The Second Asia ESCO Conference (2007)
- The Law Concerning Environmental Consideration Contracting (2007)
- The Energy Conservation Law was revised(2008)

World Bank/GEF China Energy Efficiency Project organization chart



Note) NDRC: National Development and Reform Commission

PMO : Project Management Office

NECIDC : NDRC Energy Conservation Information Dissemination Center



Measures to promote and expand ESCO in China



- **Systematization of financial system by Government**
 - ✓ Systematization of recovery after bankruptcy
- **Reform of business customs for acquire trust from market**
 - ✓ Develop and promote standard contract/ Regulation of non-fulfillment of a contract
 - ✓ Promote original ESCO concept to ESCOs, customers and financial organizations
 - ✓ Implement a system to recognize superior ESCOs
- **Capacity Building of ESCOs**
 - ✓ Develop guideline of M&V/ Training of energy audit, EE skills, Technology information, M&V and contract
- **Develop data base**



- **Promotion program of ESCO industry in Asia**



Promotion program of ESCO industry (1)



<Preliminary review>

- Basic research for ESCO introduction: Description of ESCO business, issues to address for introduction, review of introduction program
 - ✓ China with the support of WB/GEF
 - ✓ India with the support of USAID



Promotion program of ESCO industry (2)



<Capacity building>

- Preparation of technical guidelines: guidelines on M&V, standard contract, etc.
- Preparation of ESCO introduction manuals: manuals for customers to explain method of introducing ESCO
- Capacity building for financial institutes: proved information, guideline for method of evaluating energy efficiency, support for development of finance products
- Capacity building for ESCOs: lecture, trainings, technical instruction
- ✓ 3-CEE project (countries in scope are China, India and Brazil) supported by the WB group.
- ✓ Capacity building for ESCOs.

Also, in several countries including India, technical trainings are provided by USAID, etc.

Promotion program of ESCO industry (3)



<Promotion program>

- Publish successful case studies.
- Seminar, conference, exhibition
- Provide information such as news letters, websites etc.
- Commendation program for excellent ESCO projects
- ✓ In India was supported by USAID and 3-CEE.
- ✓ In China, EMCA was supported by GEF.

On the other hand, like in Malaysia or Thailand, government or governmental organization play a main role in these activities, because there is not ESCO association.

Promotion program of ESCO industry (4)



<Establishment of project body/operation support>

- Set up of ESCO association/operation support
- Support to set up ESCOs
- Accreditation program for ESCOs: BEE in India. Preliminary accreditation system to simplify government expedition procedure (Super ESPC in USA, Australia, etc.) and accreditation system (NAESCO etc.) for nurturing excellent ESCOs are available.
- ✓ The typical program for it is the supports to establishment of ESCO providers in China by GEF.
- ✓ In India, USAID supports operators by supplying supports to ESCOs in information business. In addition, supports to establish ESCO association is being provided by 3-CEE project (ICPEEB:Indian Council for Promotion of Energy Efficiency Business) .



Promotion program of ESCO industry (5)



<Development of business>

- Implementation of energy audit (corresponding to FS research)
- Implementation of pilot project
- Implementation of IRP/DSM programs
- Introduction of ESCO projects into governmental facilities
- ✓ Energy audit is conducted by GEF in Malaysia
- ✓ The pilot project is implemented aided by low interest financing by GEF fund.
- ✓ In Thailand, the energy audit is conducted by GEF and the subsidy from ENCON Fund is allocated for pilot projects.

While no pilot project is conducted in China, GEF supports to establishment of ESCOs and the low interest financing by the WB have sufficiently covered the demands.



Promotion program of ESCO industry (6)



<Finance support>

- Implementation of low interest finance
- Offer of subsidies
- Implementation of loan guarantee programs
- Tax rebate
- ✓ The low interest loan and loan guarantee are the main part of it.
- ✓ Low interest finance: by WB in China/ by WB, ADB, JBIC, USAID, etc. in India/ and by GEF in Malaysia.
- ✓ Loan guarantee: by GEF In China, 3-CEE in India
- ✓ Governmental subsidy program: by the national fund based on ENCON fund in Thailand
- ✓ Tax rebate: in Thailand and China



Promotion program of ESCO industry (7)



<Reinforcement of policy/ reformation of acquisition regulation>

- Reinforcement of regulations for energy conservation
- Reformation of acquisition regulations to introduce ESCO in governmental facilities

Promotion program of ESCO industry (2)



program		China	Thailand	India	Malaysia	Philippines	Japan
Primary review	Basic research for ESCO introduction	GEF		USAID			METI
Capacity building	Technical guideline	3-CEE	EGAT	3-CEE			ECCJ
	ESCO introduction manuals		EGAT				ECCJ
	Capacity building for financial institutes	3-CEE		3-CEE			
	Capacity building for ESCOs	3-CEE	EGAT	USAID/3-CEE	PTM		JAESCO
Promotion program	Publish successful case studies						ECCJ
	Seminar, conference, exhibition	EMCA/JAESCO	DEDE/JAESCO	PRCA/FICC	PTM		ECCJ/JAESCO
	News letters, website etc	EMCA/3-CEE	DEDE	3-CEE	PTM		ECCJ/JAESCO
	Commendation program for ESCO projects		DEDE				ECCJ
Establishment of project body and operation support	Setup ESCO association/ operation support	GEF	FTI	3-CEE	PTM	DOE	ECCJ/JAESCO
	Support to set up ESCOs	GEF		USAID			
	Accreditation program for ESCOs			BEE			
Development of business	Energy audit	NDRC	GEF/ENCON Fund	USAID	GEF	DOE	ECCJ/NEDO
	Pilot projects		ENCON Fund	USAID	GEF		NEDO
	IRP/DSM program			USAID			
	Introduction ESCO projects into government						METI
Finance support	Low interest finance	WB	ESCO Fund	WB/ADB USAID	/JBIC/ GEF/MIDF		
	Subsidies program	NDRC	ENCON Fund				NEDO
	loan guarantee program	GEF/3-CEE		3-CEE		(IFC/GEF)	
	Tax rebate	NDRC	DEDE				
Reinforcement of policy	Reinforcement of regulations for EE	NDRC	DEDE	BEE		DOE	METI
	Reformation of acquisition regulations						

Note: The blank cells represent unavailability of the corresponding program.

PTM: Pusat Tenaga Malaysia, MIDF: Malaysian Industrial Development Finance Bhd, IFC: International Finance Corporation

3-CEE is supported by UNDP and funded by UNF, ESMAP, ASTAE and DFID

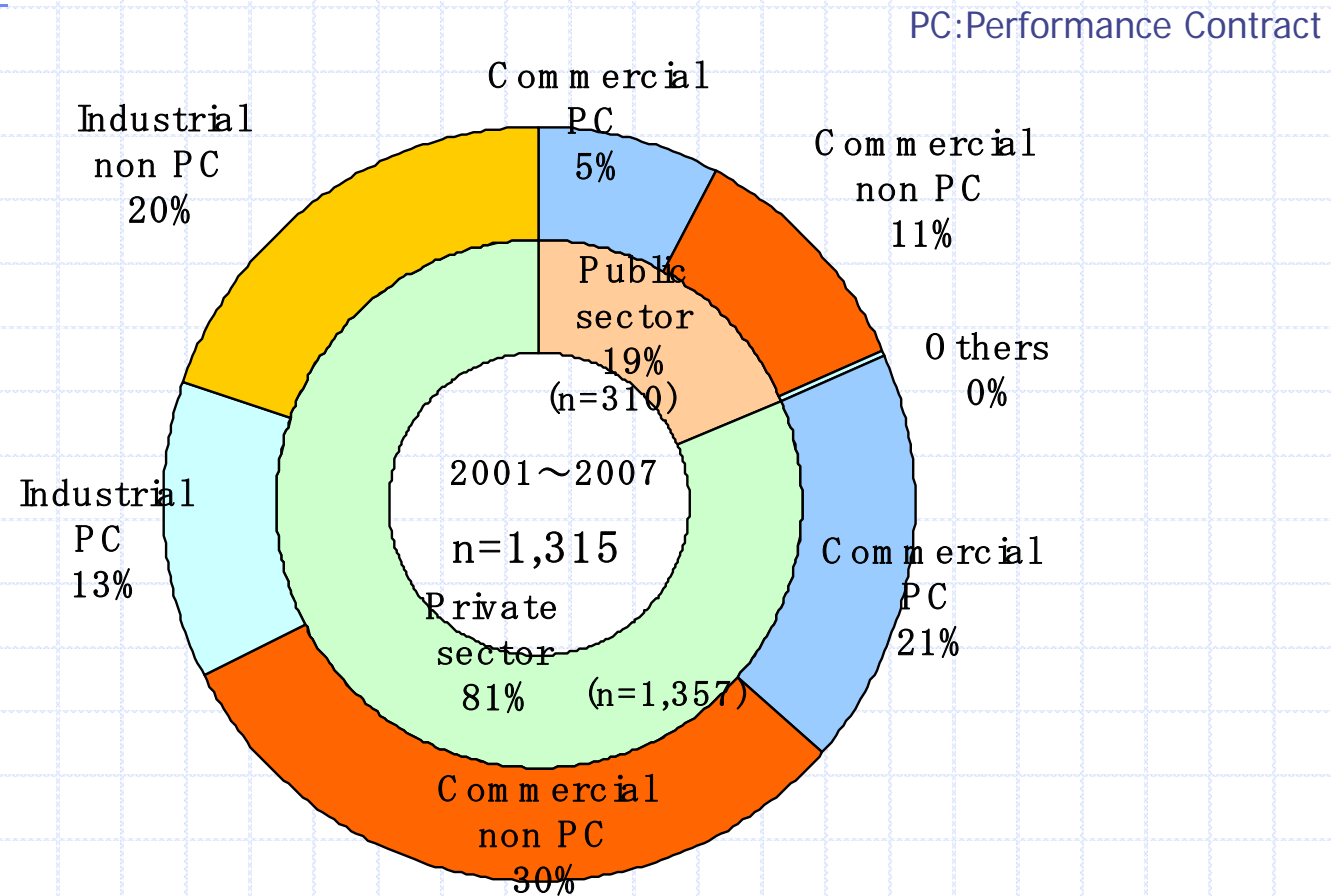


EE Business is net-work business



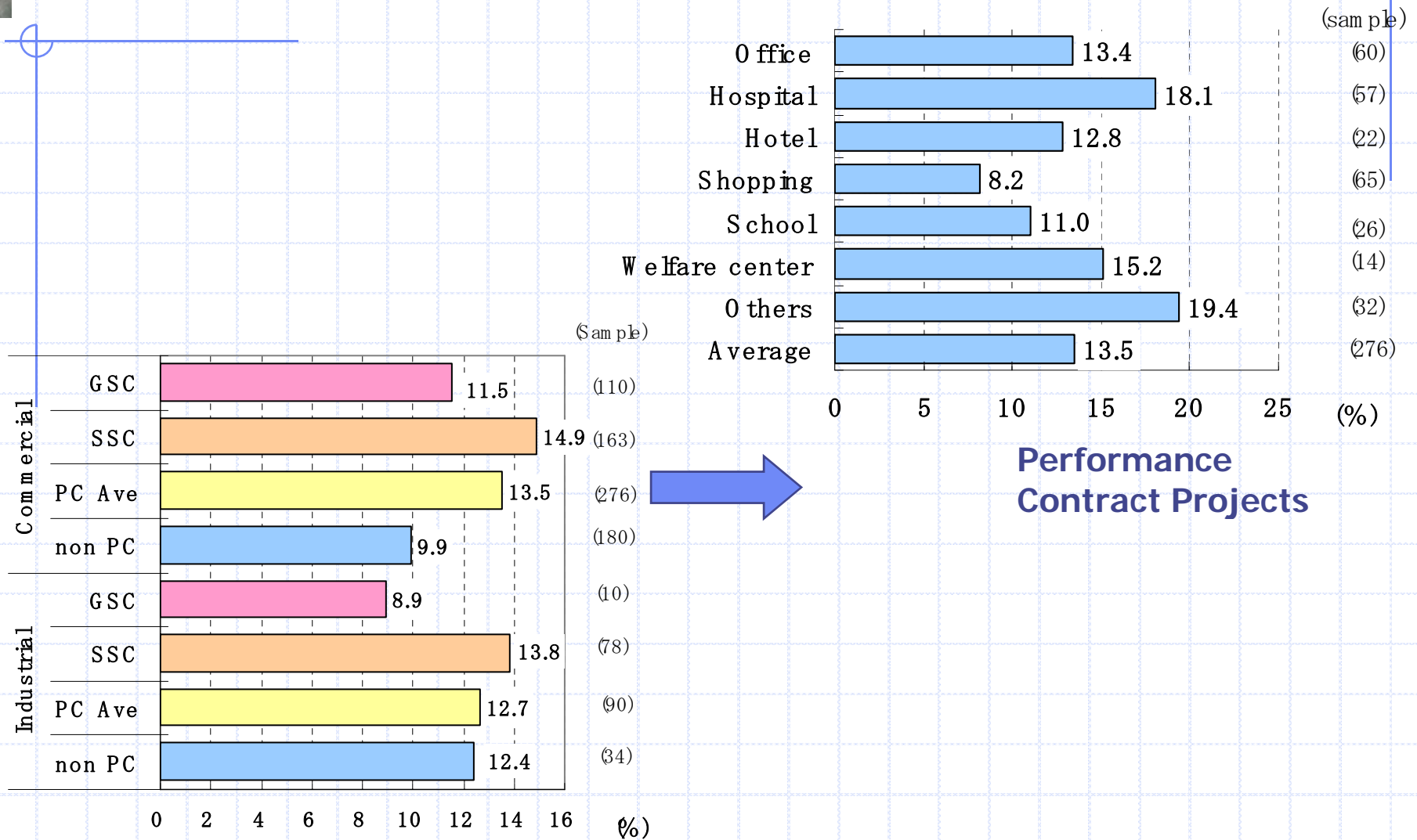
- Develop maintenance net-work system which keep up with on time
 - ✓ Design services is first step
 - ✓ Energy audit
 - ✓ Management of construction or installation
 - ✓ Provide maintenance services
 - ✓ M&V
 - ✓ Financial arrangement
- Provide comprehensive services to keep EE performance long term
- Establish brand image

Detail survey for ESCO activities from 2001 to 2007 year



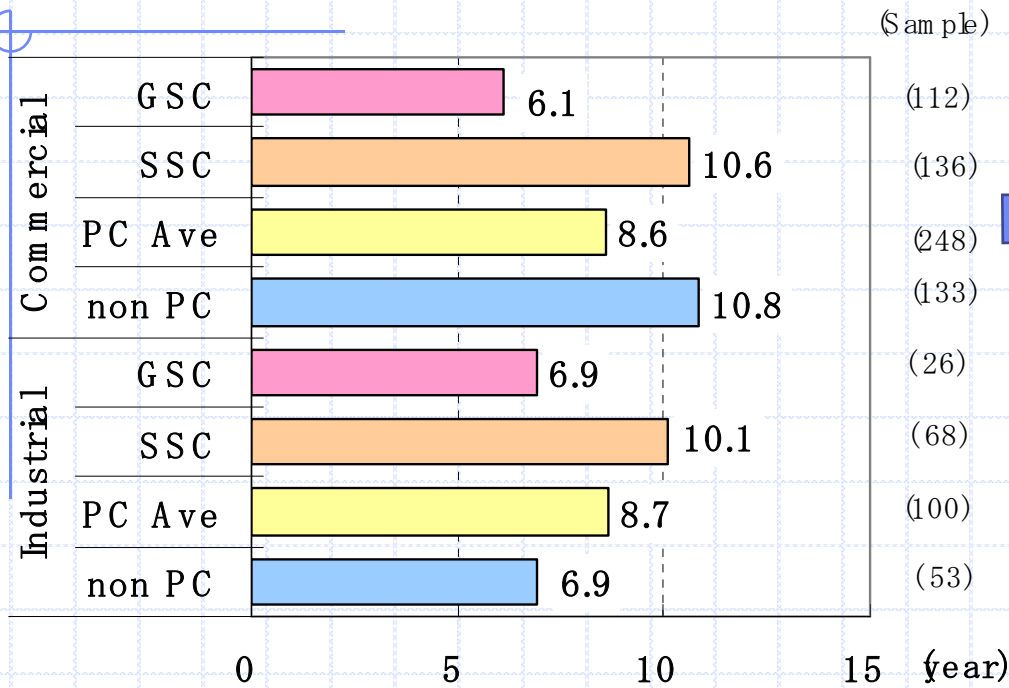


Ratio of energy savings

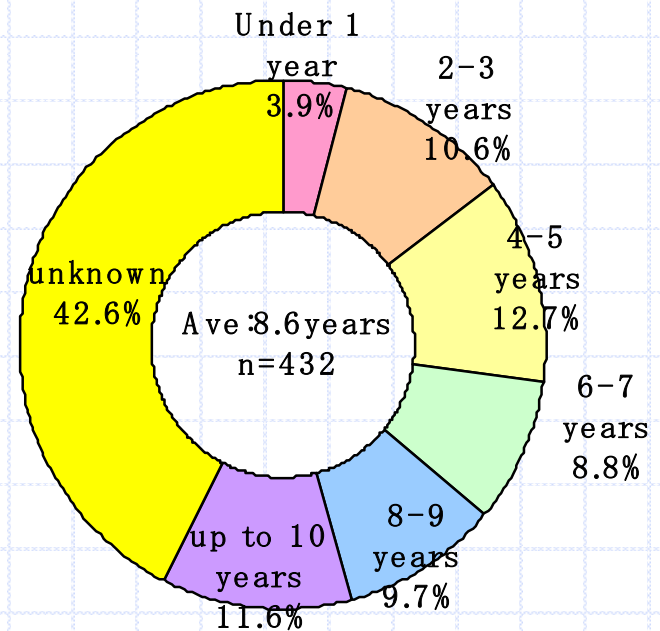


Data source: JAESCO survey, 2008

Simple pay-back period



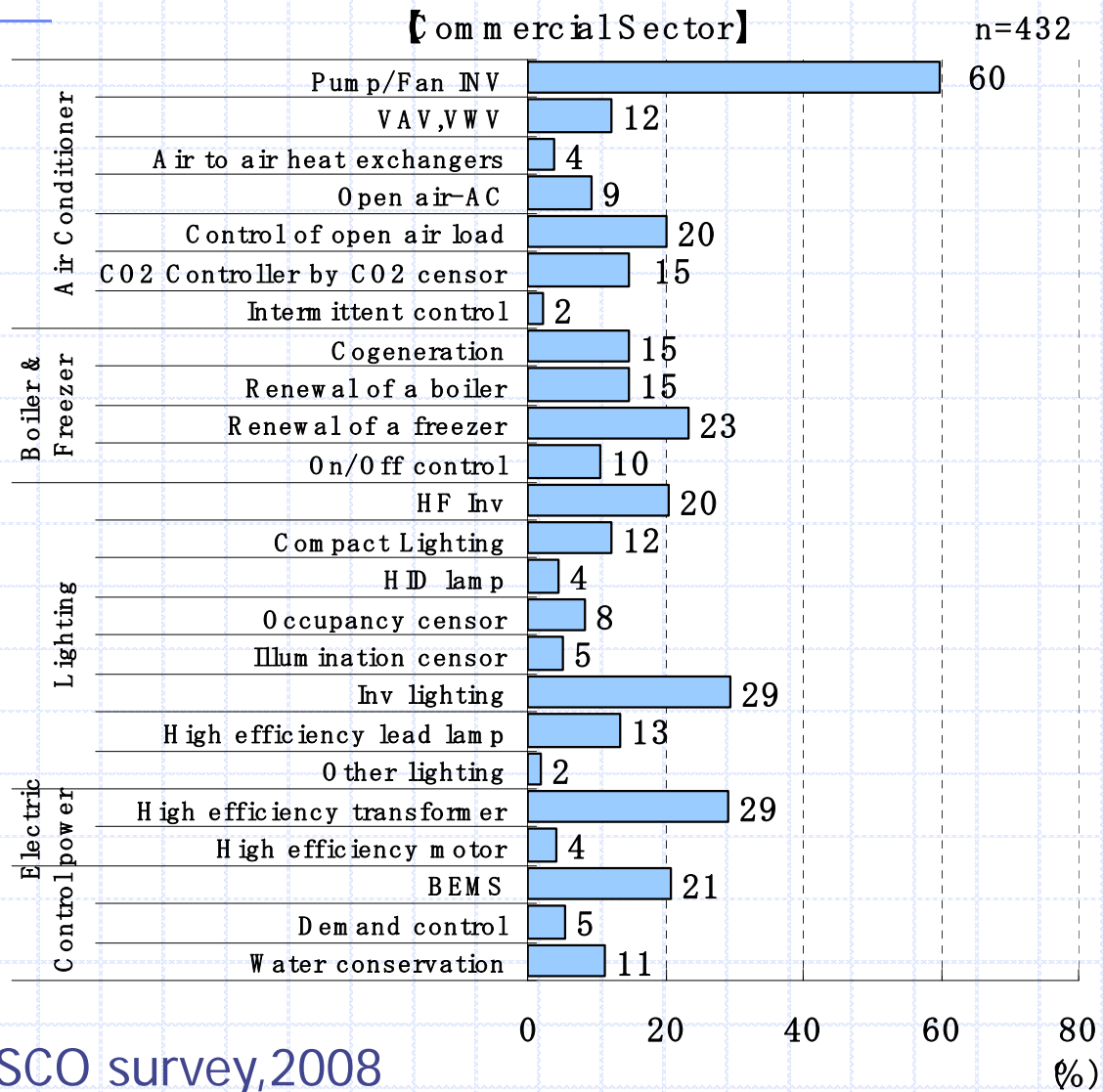
Performance Contract Project of commercial buildings



Data source: JAESCO survey, 2008

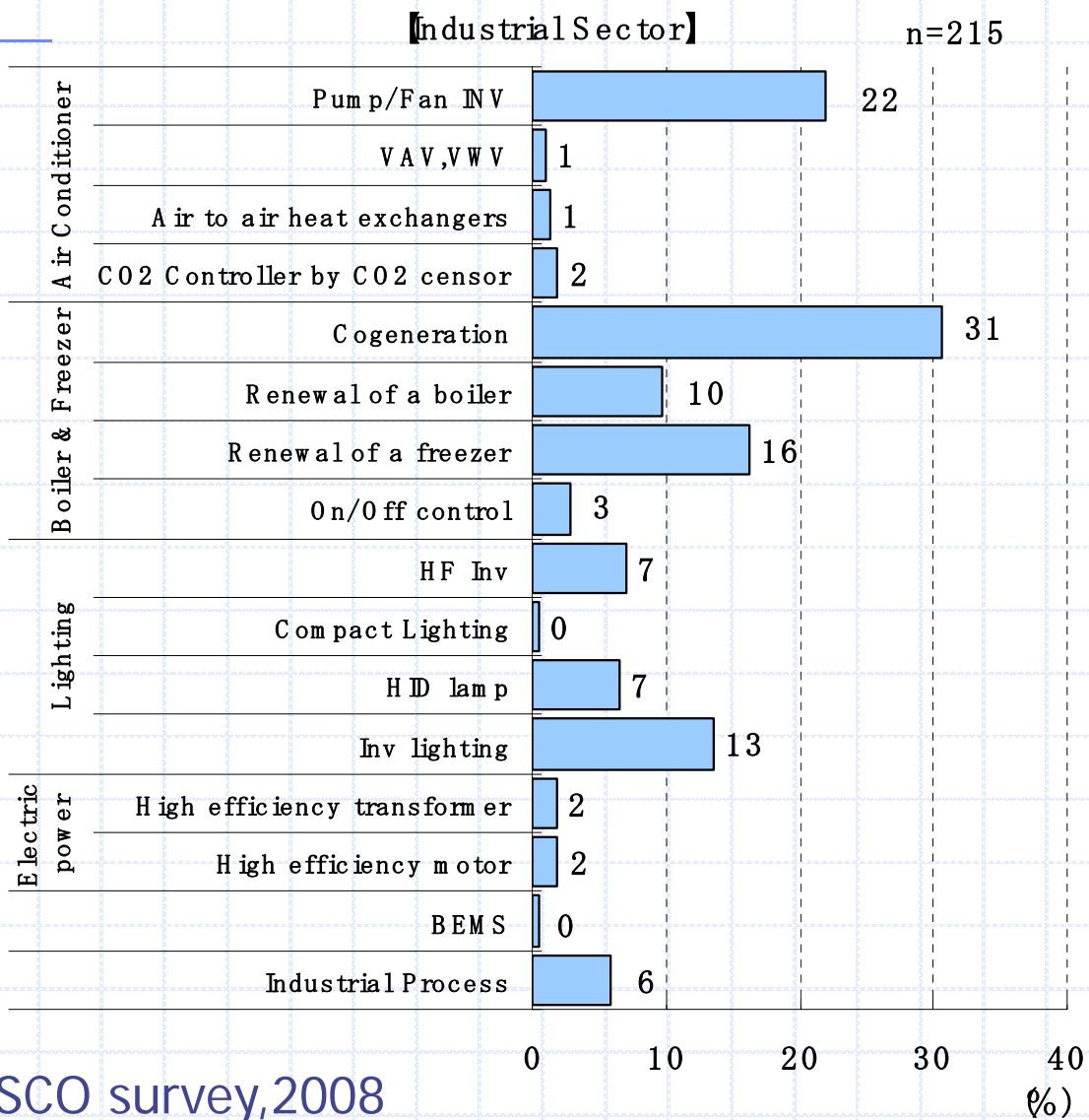


Energy efficiency measures for commercial sector PCPs



Data source: JAESCO survey, 2008

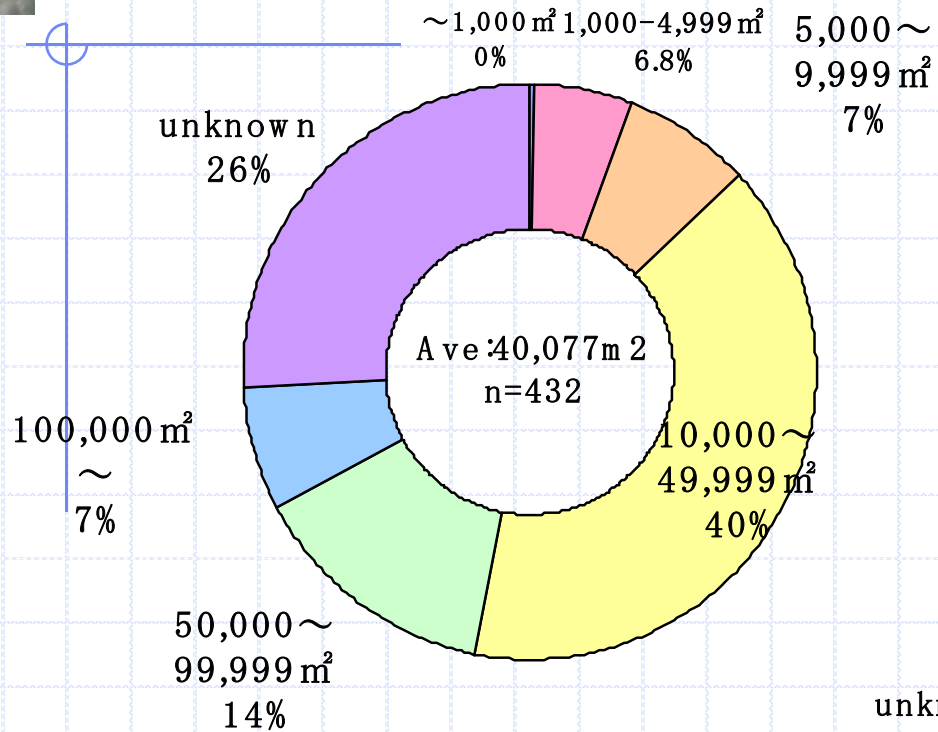
Energy efficiency measures for industrial sector PCPs



Data source: JAESCO survey, 2008

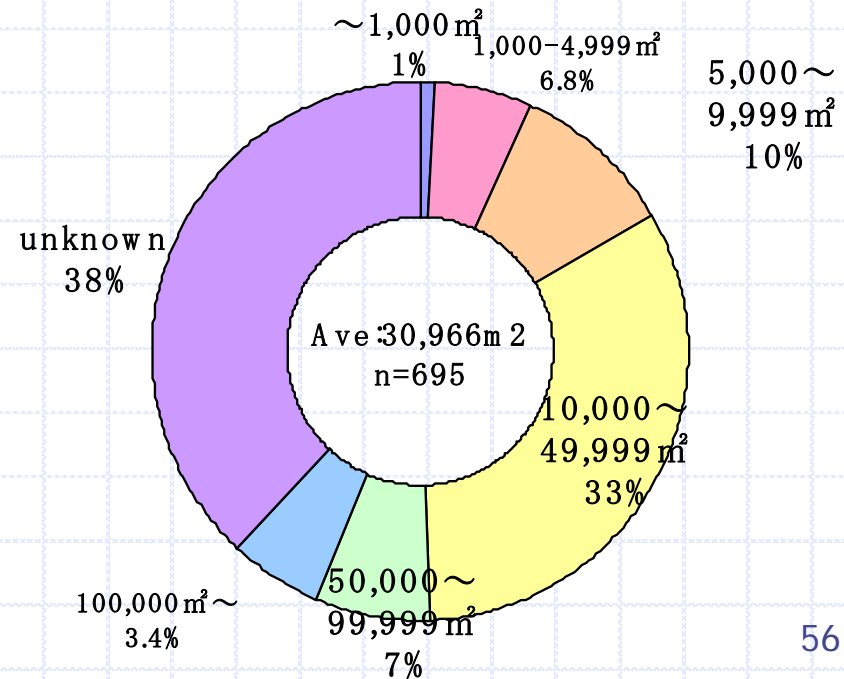


Distribution of floor area in commercial facilities



Non-Performance contract projects

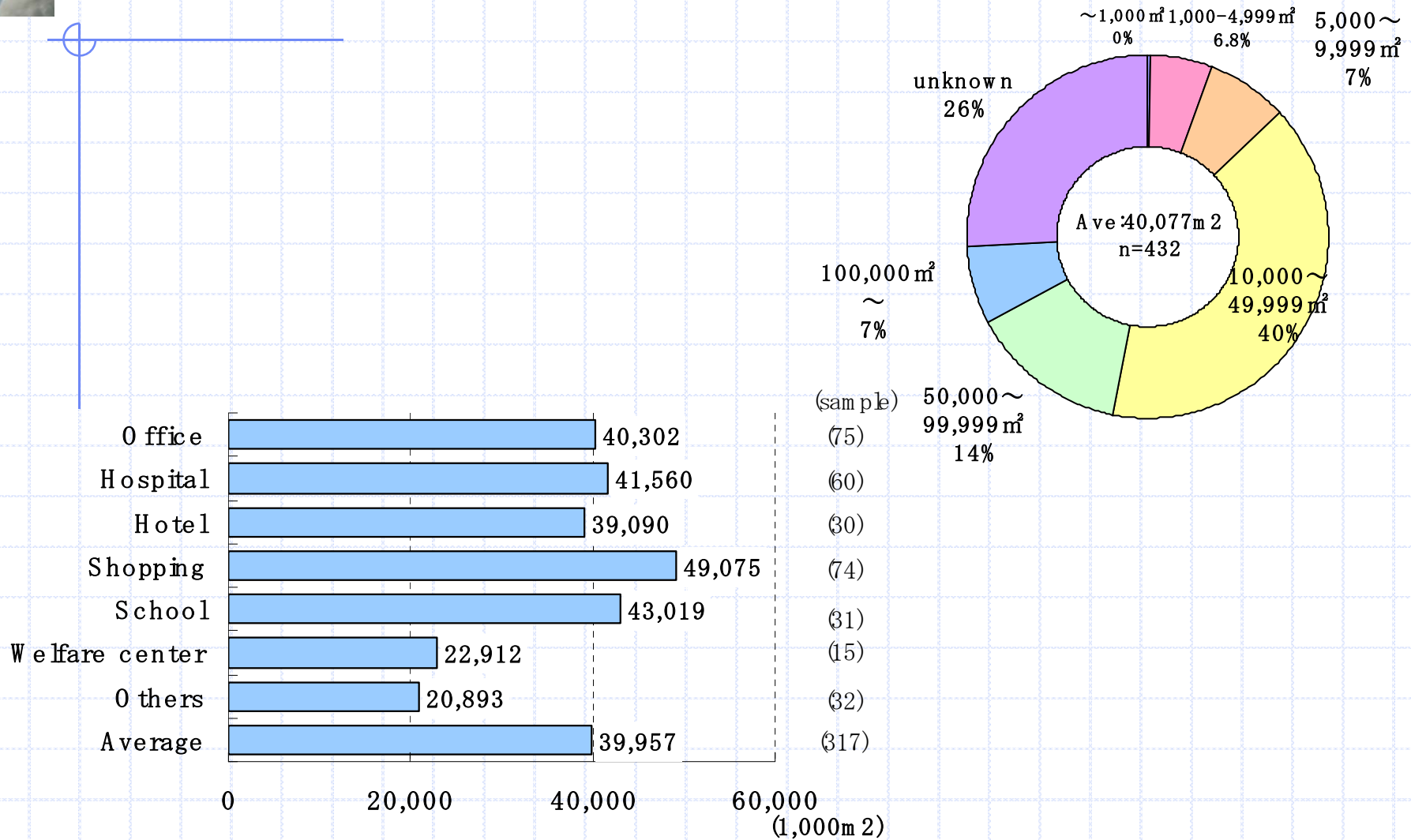
Performance contract projects

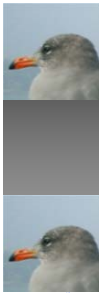


Data source: JAESCO survey, 2008

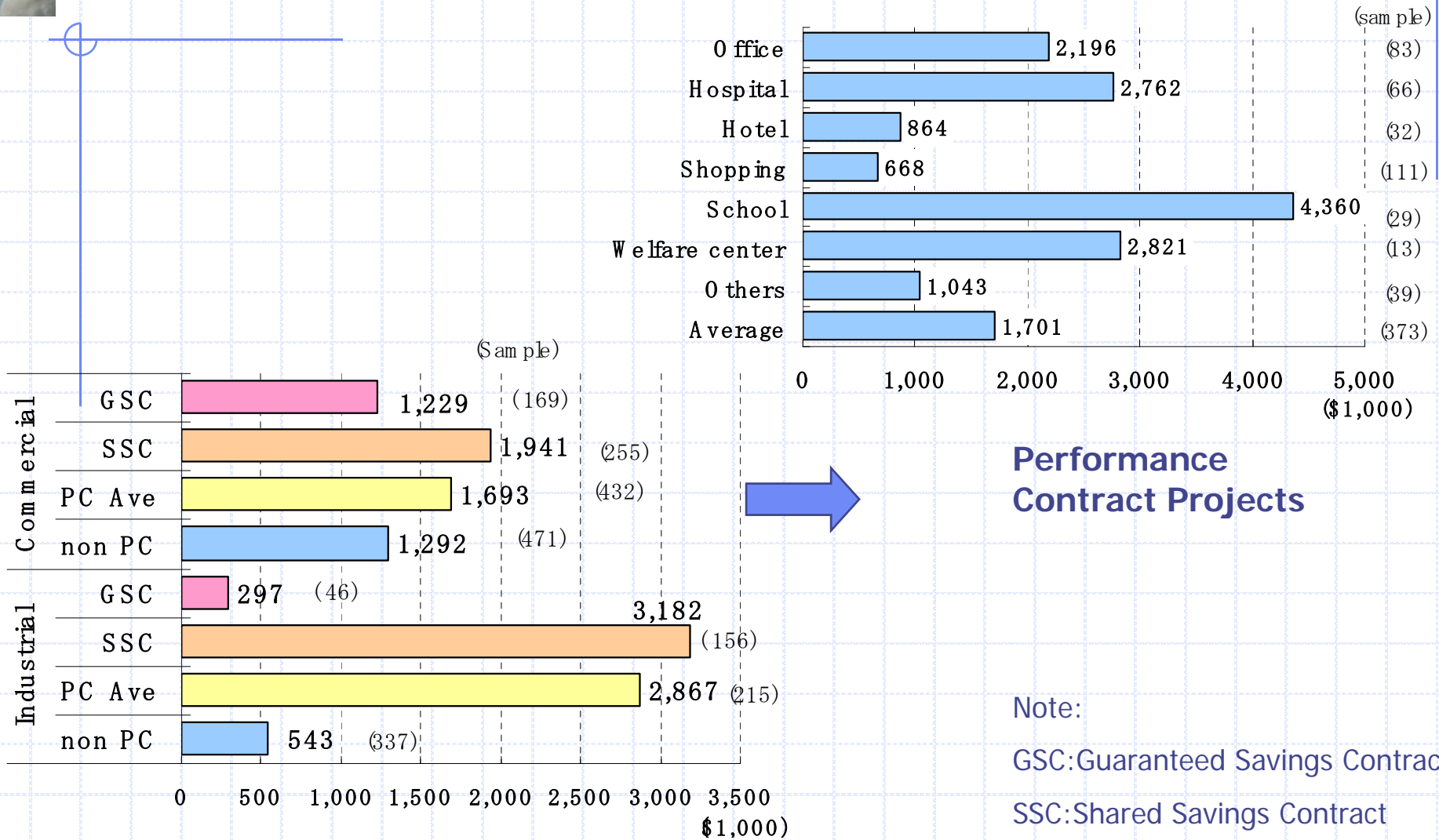


Floor area of commercial building's PC projects



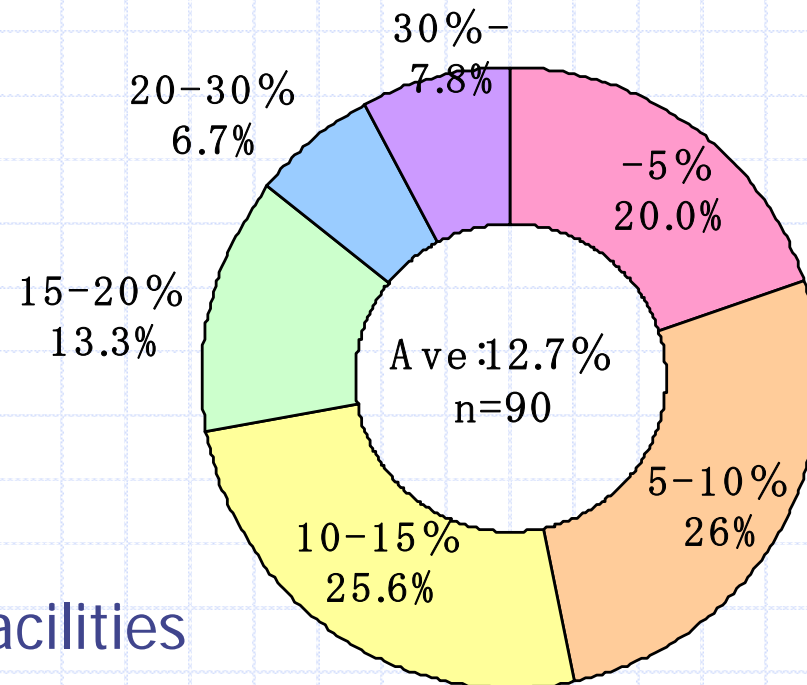
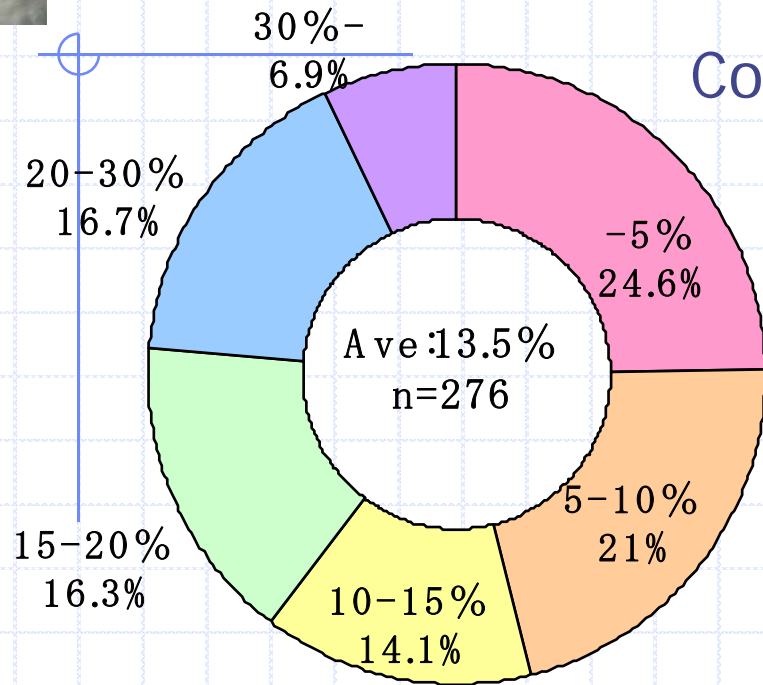


Project scale

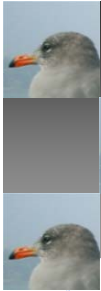




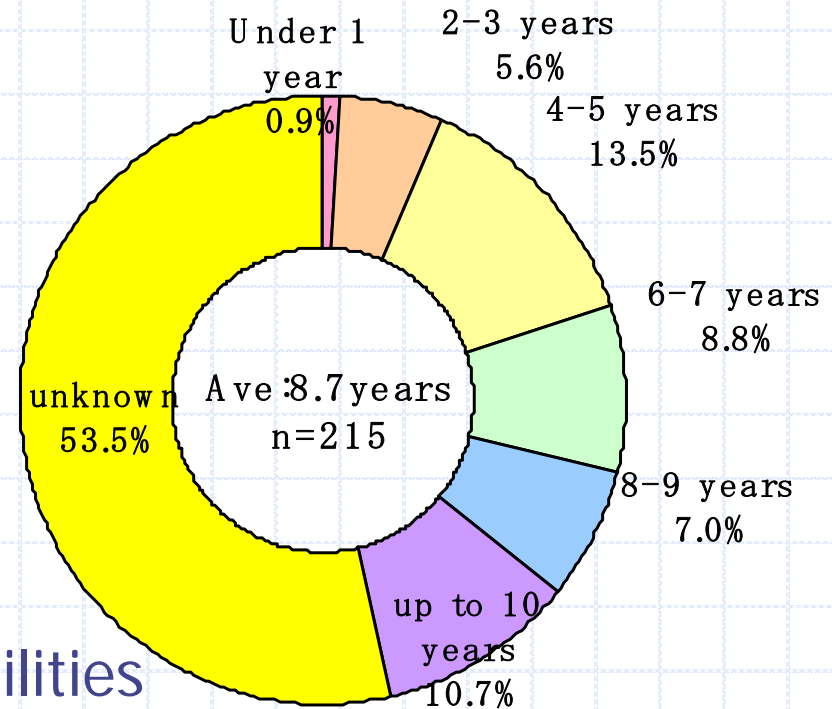
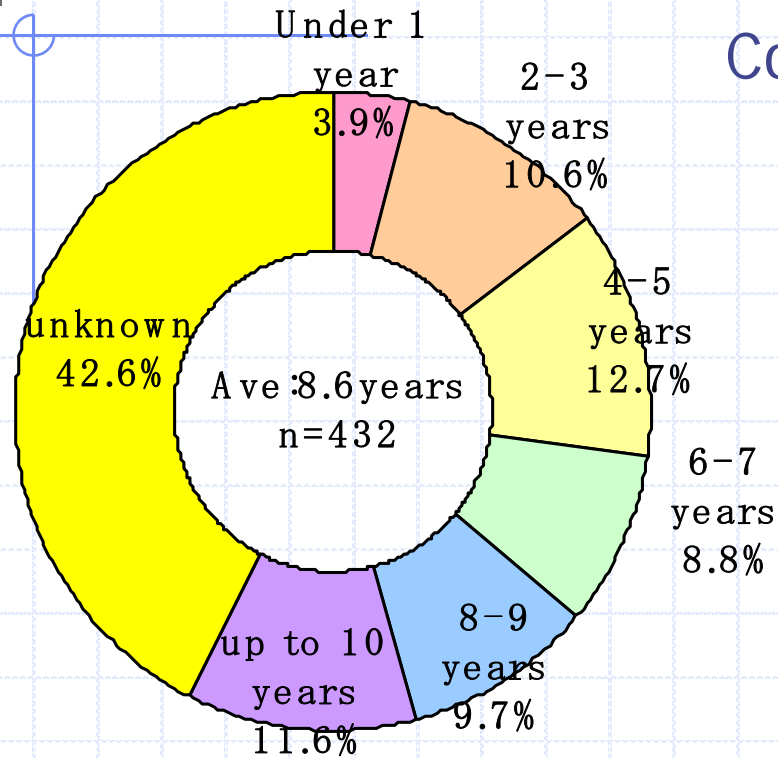
Ratio of energy savings of PC projects



Data source: JAESCO survey, 2008

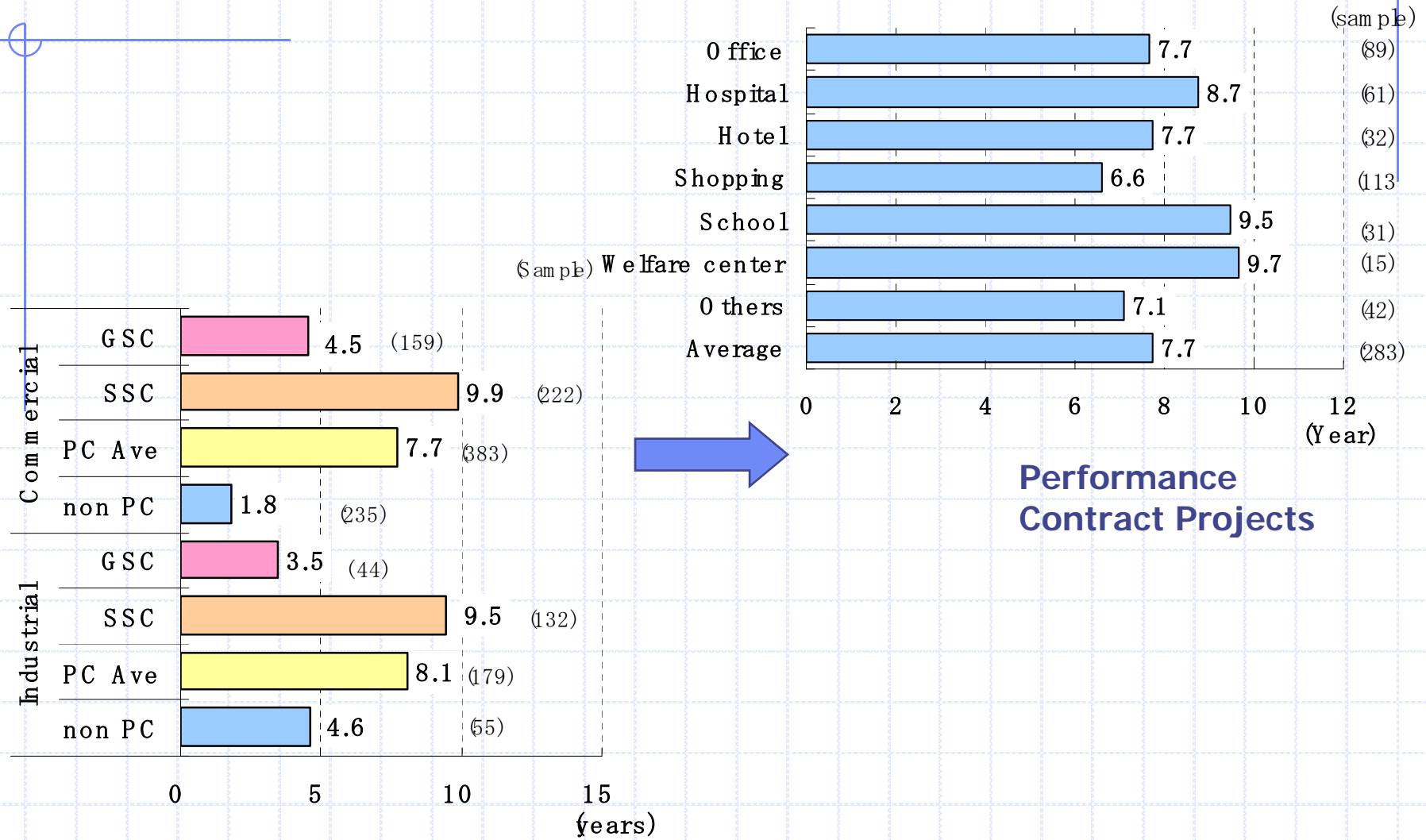


Simple pay-back period of PC projects





Contract period

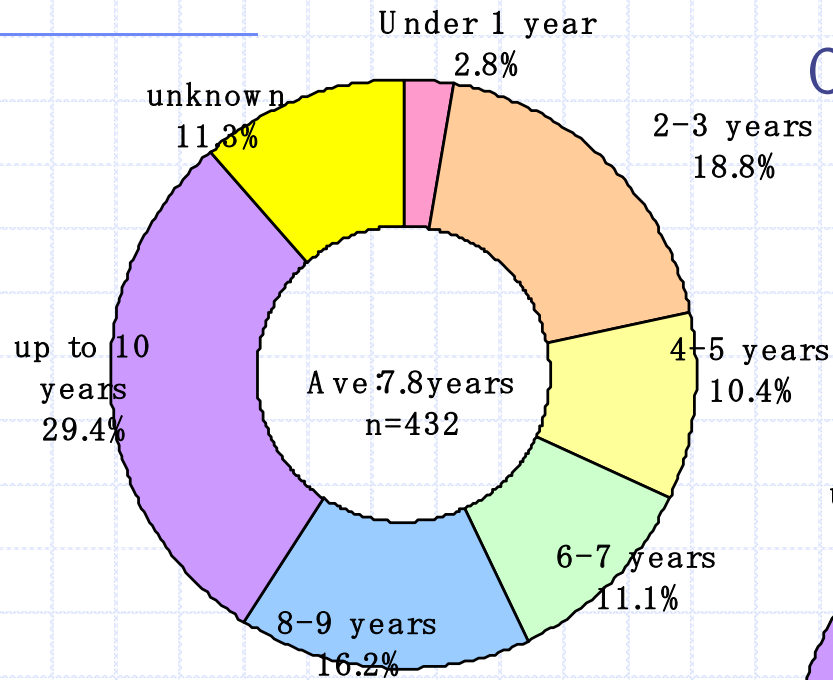




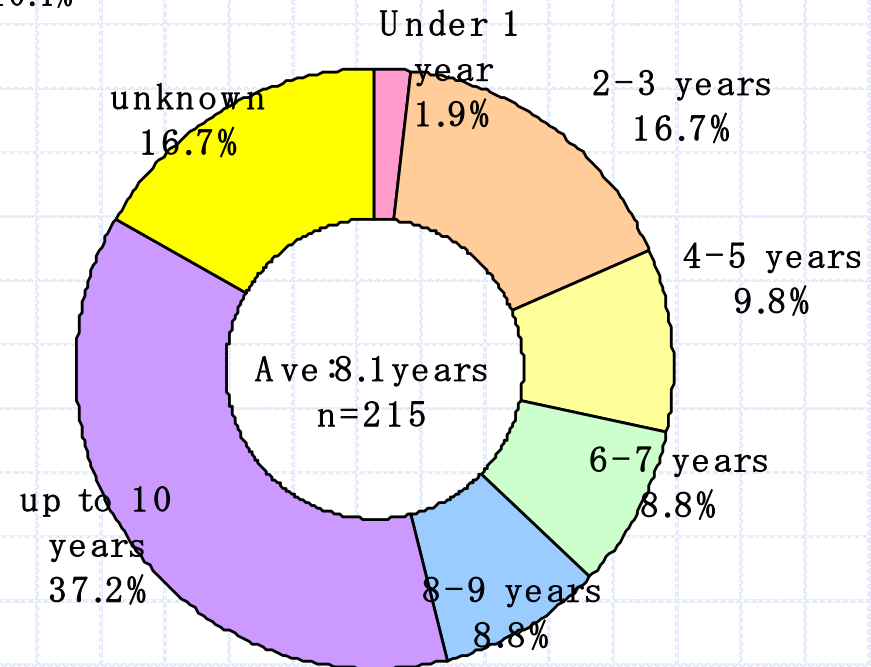
Contract period of PC projects

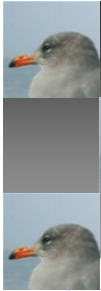


Commercial buildings



Industrial facilities





Thai ESCO market leached turning point



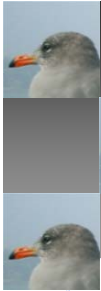
- There are many big Japanese companies
 - ✓ We thought Japanese ESCOs would on advantage
 - ✓ Japanese ESCO started in 2003 and left in 2007
 - ✓ Many Thai ESCOs started to provide ESCO services to Japanese companies
 - ✓ Based on close connection with Japanese companies and Thai companies
- Main players to develop EE market is local companies
- ▣ It is better that Japanese Government support local players direct



Japan Association of Energy Service Companies: JAESCO

Brief introduction of JAESCO

<http://www.jaesco.gr.jp>

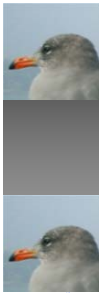


Objectives of JAESCO

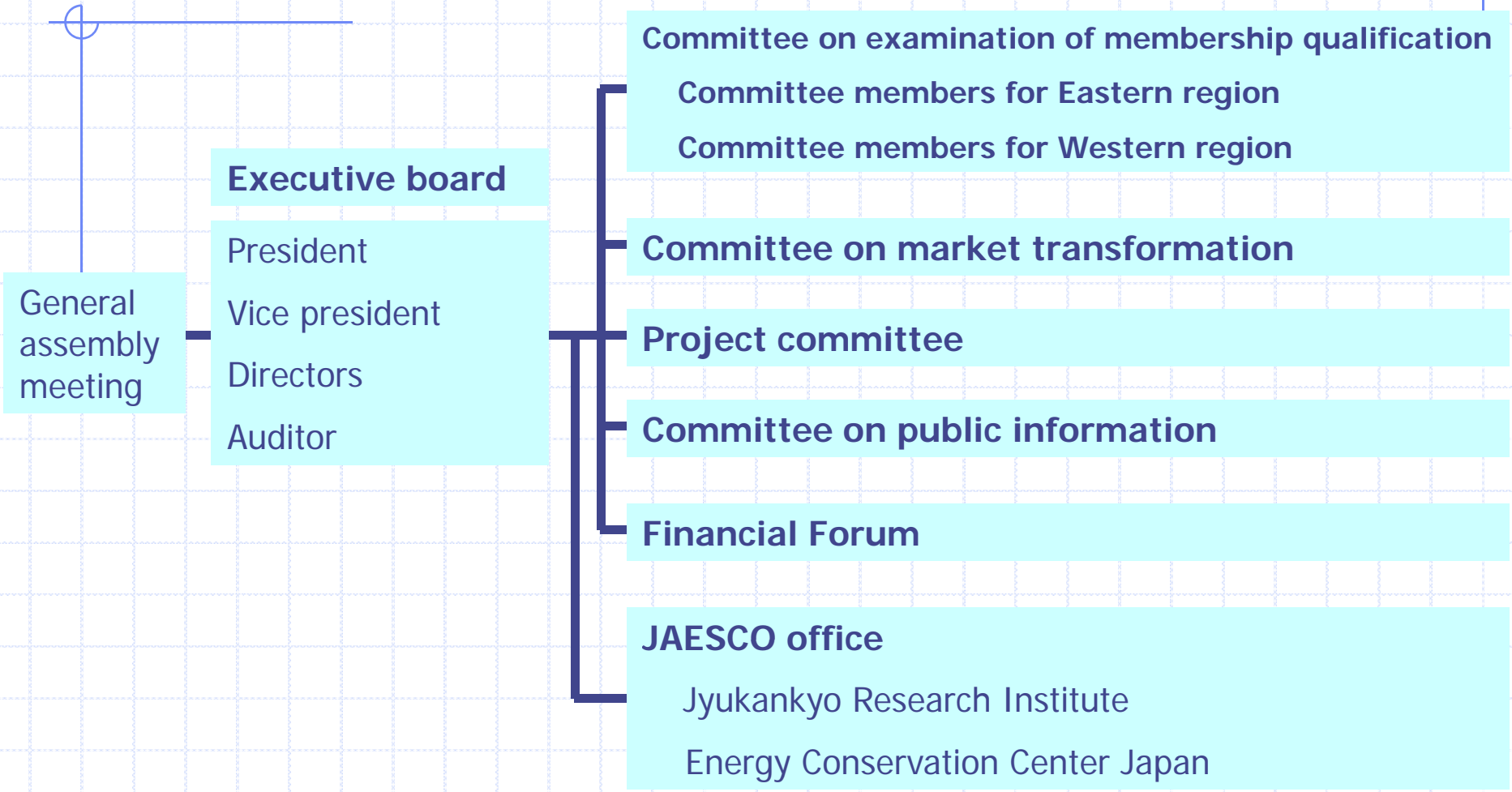


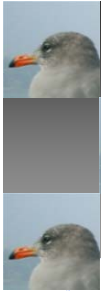
- JAESCO was established to support development of ESCO market
- as well as ensure sound evolution of ESCO industry
- to provide customers energy efficiency with comprehensive services of high cost-performance
- thereby, resulting in progress of energy conservation and global environment protection.





Organization





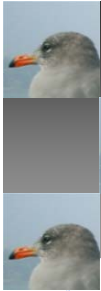
Activities of committees



Committee on market transformation

- ✓ Aiming at the most effective evolution of ESCO industry and its contribution to society by exploring and advising measures to improve business environment surrounding ESCOs
- ✓ Exploring measures to encourage adoption of ESCO projects by governments as well as seeking solution to difficulties confronted for introduction of ESCO projects
- ✓ Fulfilling data based on a in-depth market survey and collecting actual performance data of member's ESCO projects
- ✓ Examine how to manage the association





Activities of committees:continue



Project committee

Seminar WG

Holding seminars for members on the latest activity close about ESCOs three or four times annually, taken part by 100-200 members

Training WG

Planning two or three days training for members

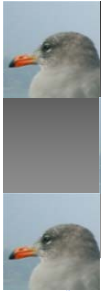
ENEX WG

Running booths at ENEX (Energy & Environment Exhibition) held by the Energy Conservation Center Japan in Tokyo and Osaka

Exhibition WG

Holding ESCO exhibition and provide members with opportunities to exchange information among members and with parties concerned





Activities of committees:continue



Committee on public information

Carrying out plans to popularize ESCO industry such as advertising via mass media, cooperating to news reporters and taking part in various related projects

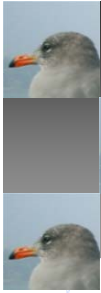
Conference WG

Holding annual conference & vendors showcase on the latest activity surrounding ESCO industry.

Lectures and panel discussion are held with leader of each business world and professionals.

Wide-ranging discussion is extended together with more than 300 participants on topics directly linked to business including governmental policies & programs, technology, finance and contracts.





Activities of committees:continue



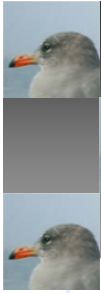
Financial Forum

Making discussion about new financial scheme for ESCO projects

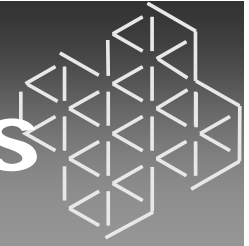
News letter WG

Publish news latter for members





Feature of JAESCO Members



- JAESCO established with 16 members in 1999
- 137 members have joined in 2008
- Large companies most members and all most utilities have joined JAESCO
- Over 50 ESCOs which is experienced in PC



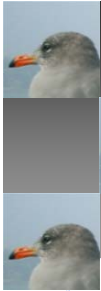


Asia ESCO Associations Network: AEA-Net



Objectives of AEA-Net

- Share information about activities of ESCO industries in the world
- Support upbringing ESCO industry of each countries
- Built international relationship of ESCO associations to cope with countermeasure against global warming, especially Asia



Asia ESCO Associations Network: AEA-Net:continue



Role of AEA-Net

- 1st meeting on Feb 2007 in Tokyo.
- 2nd meeting on Sep 2007 in Beijing.
 - ✓ Each association's directors or representative attend the meeting.
- Each members give a presentation for activities of ESCO industry.
- Discuss how to develop ESCO market in Asia and possibility of relationship of ESCO associations.
- JAESCO host the meeting.

