

JICA Group Training Course on Energy Conservation

# Japan's International Cooperation in Energy Conservation

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# 1. The Energy Conservation for The Next Generation

- Prevention from the **Global Warming** by reduction of greenhouse gas emission
- Security of **Energy Supply**

# Global Warming

## **Increase of CO<sub>2</sub> % in the Air :**

265 - 285 ppm before the Industrial Revolution (1750 - 1800)

365 ppm in 1996

Over 600 ppm estimated by the end of 2100

## **Rising of the Earth's Average Temperature :**

0.3 - 0.6 has risen over the past 100 years.

1.4 - 5.8 will rise between 1990 - 2100.

## **Rising of Sea Levels :**

10 - 25 cm has risen over the past 100 years.

9 - 88 cm will rise between 1990 - 2100.

# WORLD ENERGY SITUATION

## ENERGY RESOURCE RESERVES (2000)

	Oil	Natural gas	Coal	Uranium
Proved recoverable reserves	1,046 trillion barrels	150 trillion m <sup>3</sup>	984.2 billion tons	3.95 million tons
Annual production	26.2 barrels	2.4 trillion m <sup>3</sup>	4.34 billion tons	35,000 tons
Recoverable years	39.9 years	61 years	227 years	64 years
Source	BP statistics (year 2001)			OECD/IAEA URANIUM (year 1999)

Note 1: The annual production includes lignite.

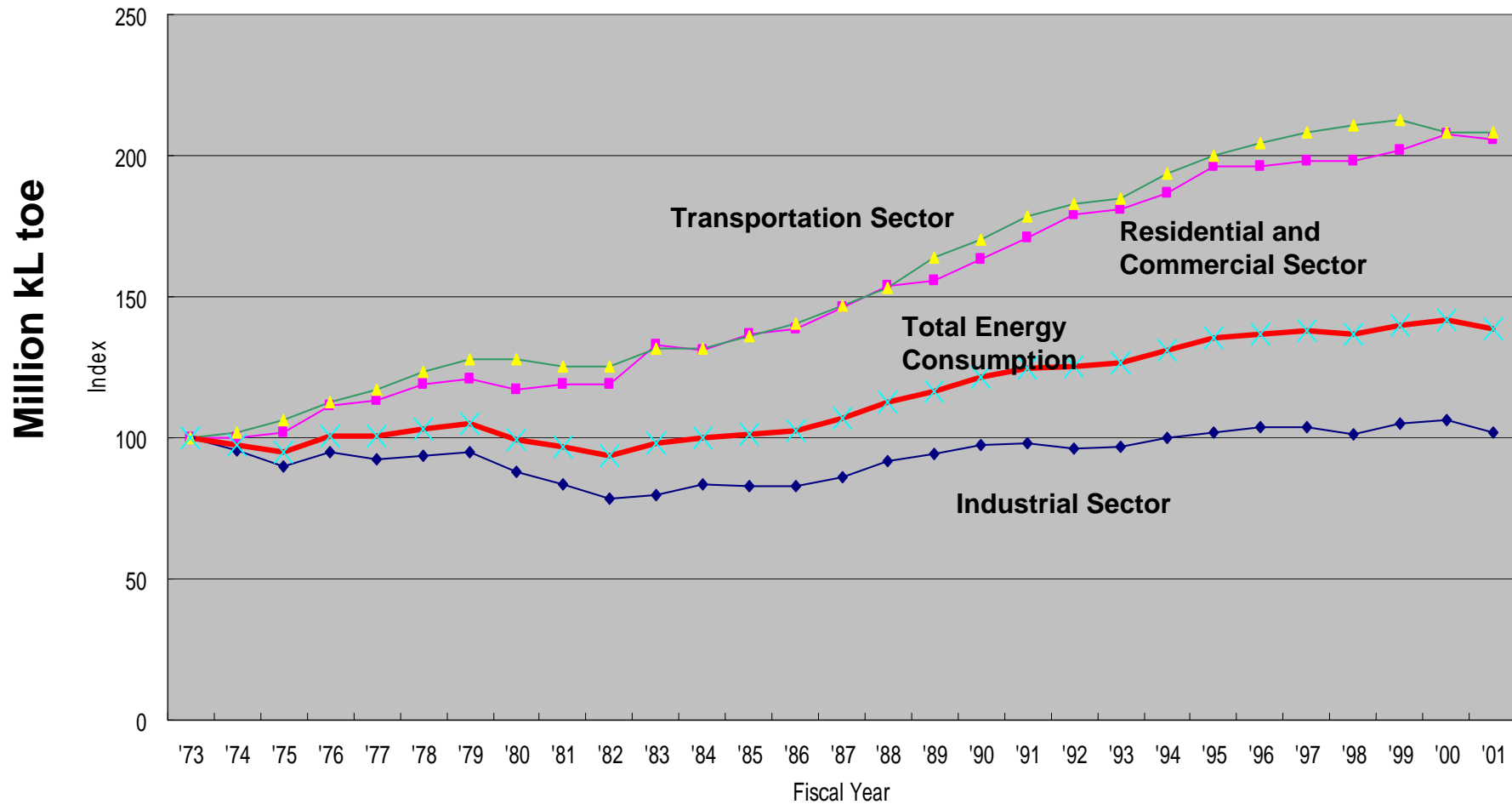
Note 2: Uranium stock is on hand, which makes the annual production lower than the annual demand (62,000). Therefore, the recoverable years of uranium is the value of proven recoverable reserves divided by the annual demand.

## 2. The Effort for the Energy Conservation in Japan

# Final Energy Consumption by Sector (Japan)

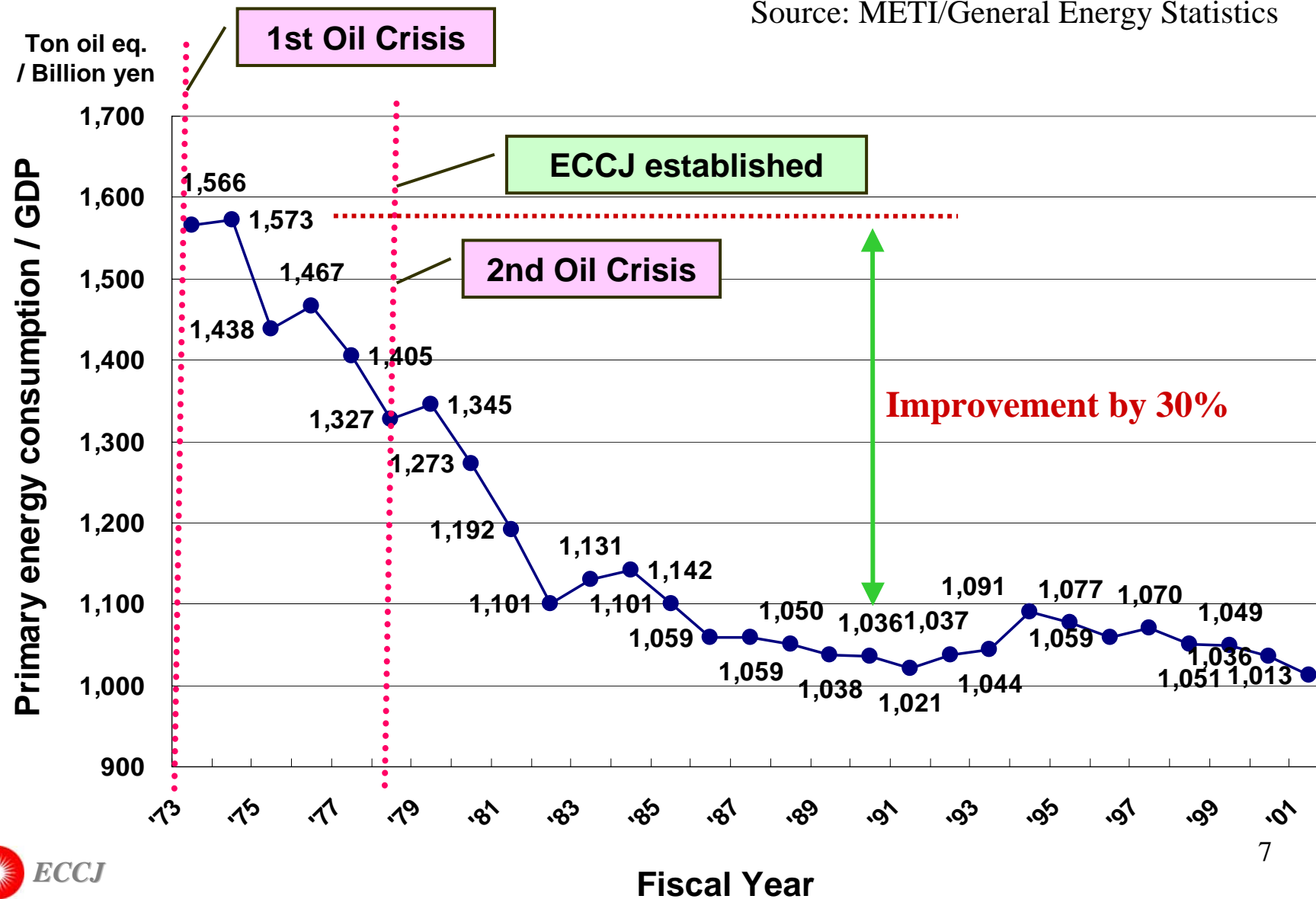
Source: METI/General Energy Statistics

Trend in Final Energy Consumption by Sector(Japan)



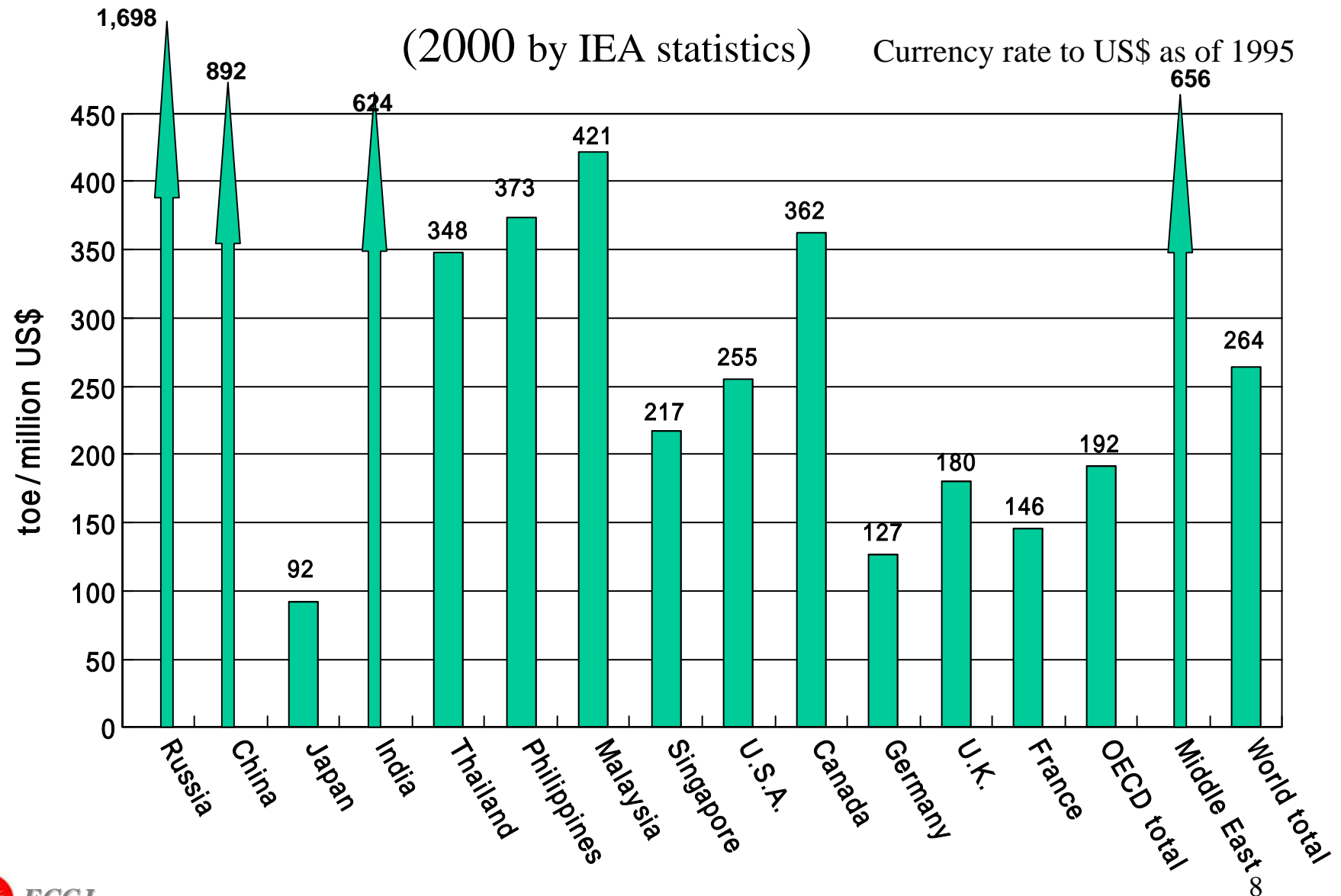
# Trend of Primary Energy Intensity per GDP in Japan

Source: METI/General Energy Statistics





# Primary Energy Intensity per GDP



# **3 . International Cooperation by Japanese Government**

- **The Policy of the Japanese ODA**
- **The details of the Japanese ODA**
- **ODA for the Counter-measures to arrest Global Warming.**

## <Back Ground of International Cooperation>

### Japanese Official Development Assistance

**ODA policy of Japanese government is this:**

Japan, as the world second largest economy the 2nd largest donors(year 2003) of ODA, takes the important responsibility of contributing to development of society and economy and improvement of welfare in developing countries.

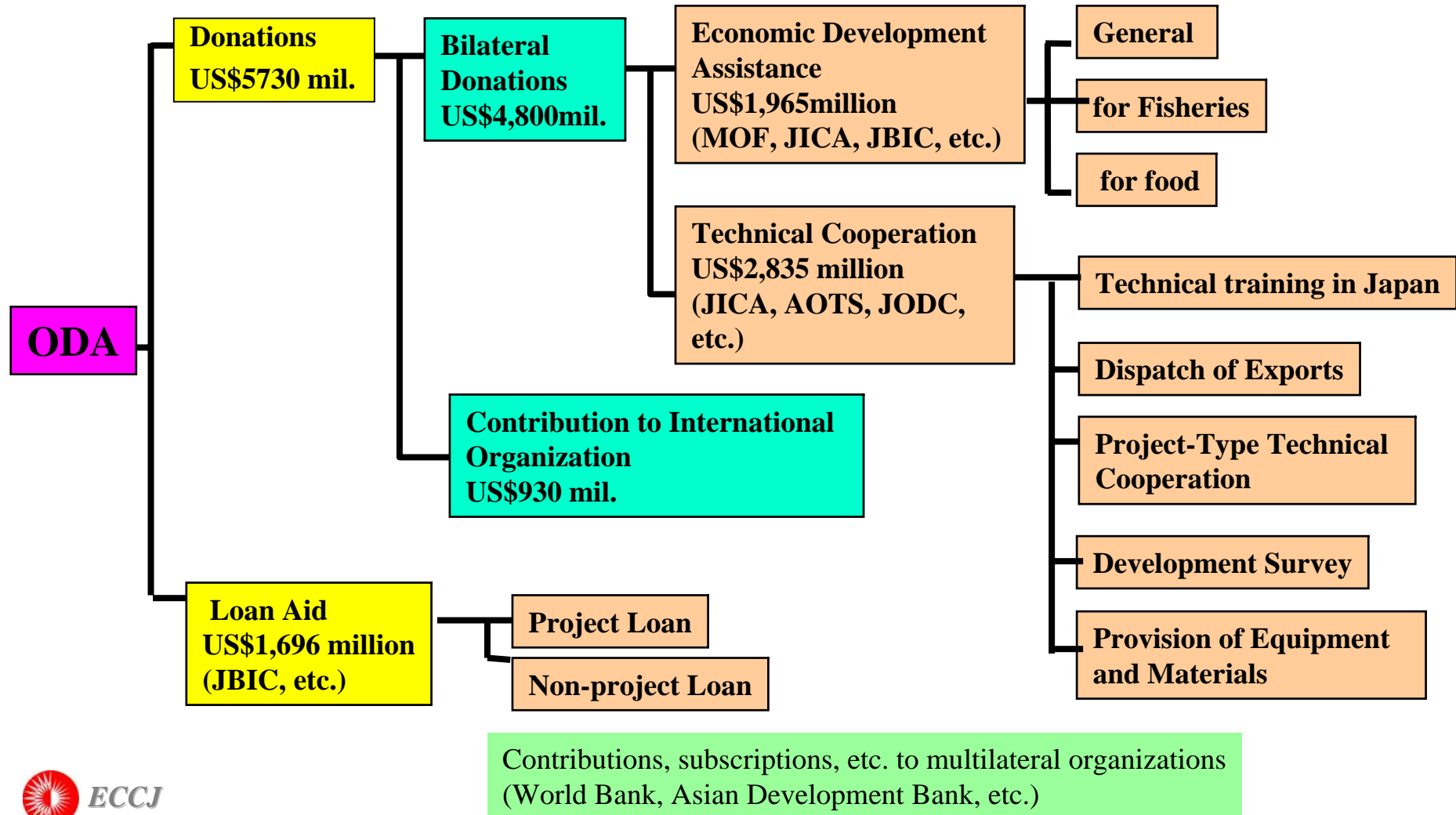
Japanese ODA, through this role, can not only make Japan win the confidence and appreciation from the international communities, but also ensures Japan's own stability and prosperity by promoting Japan's best interests, including the maintenance of world peace and the importation of resources such as energy, food, and other basic materials.

We should remember that when Japan lay almost in ruins half a century ago just after the last world war, foreign aid helped Japan in order to rebuild and lay the foundations for the present prosperity which Japanese people enjoy today.

## <Back Ground of International Cooperation>

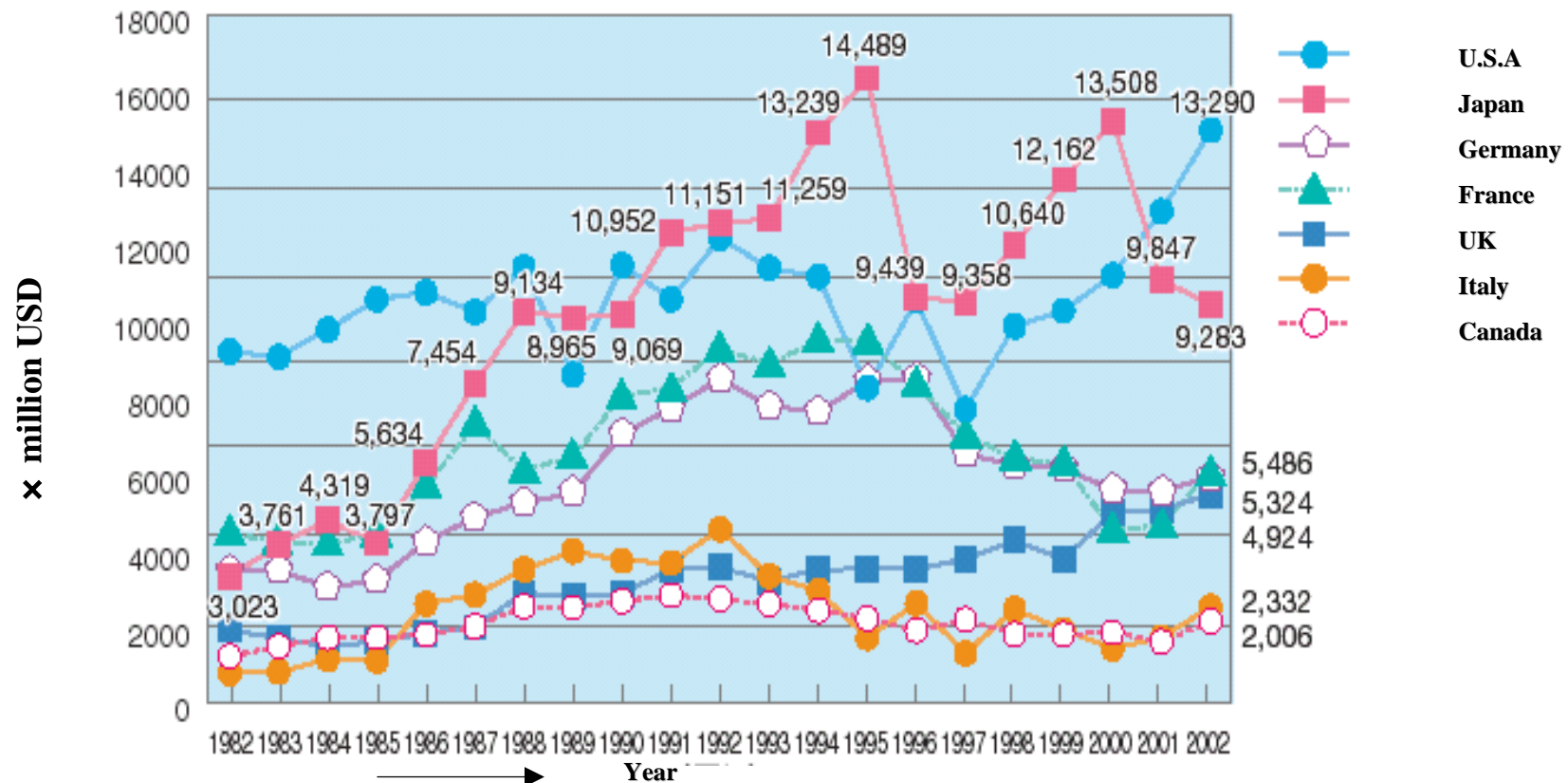
# Budget for Japanese ODA in FY2004

Rate: ¥110/US\$



# Major DAC Countries' ODA (Net disbursement basis)

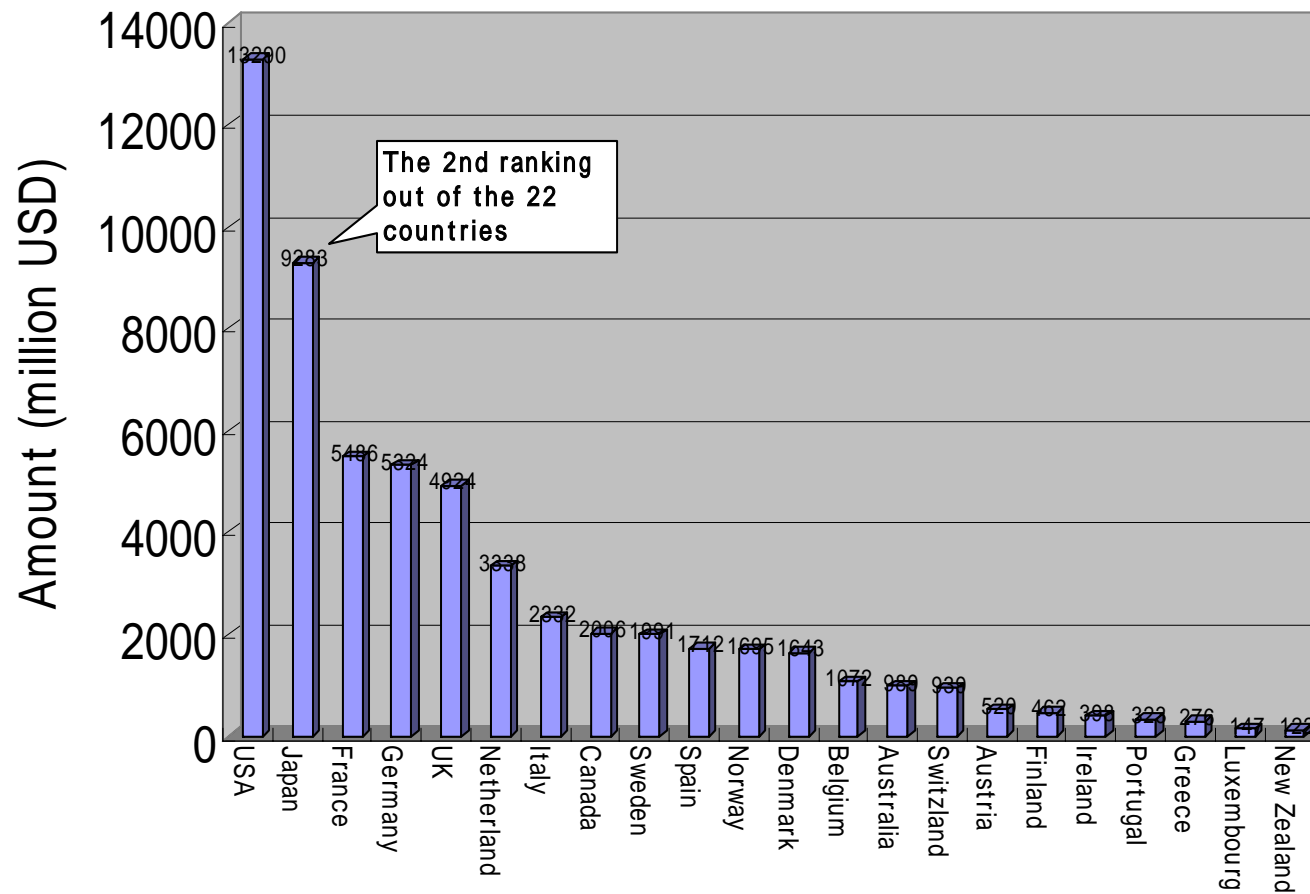
DAC: Development of  
Assistance Committee



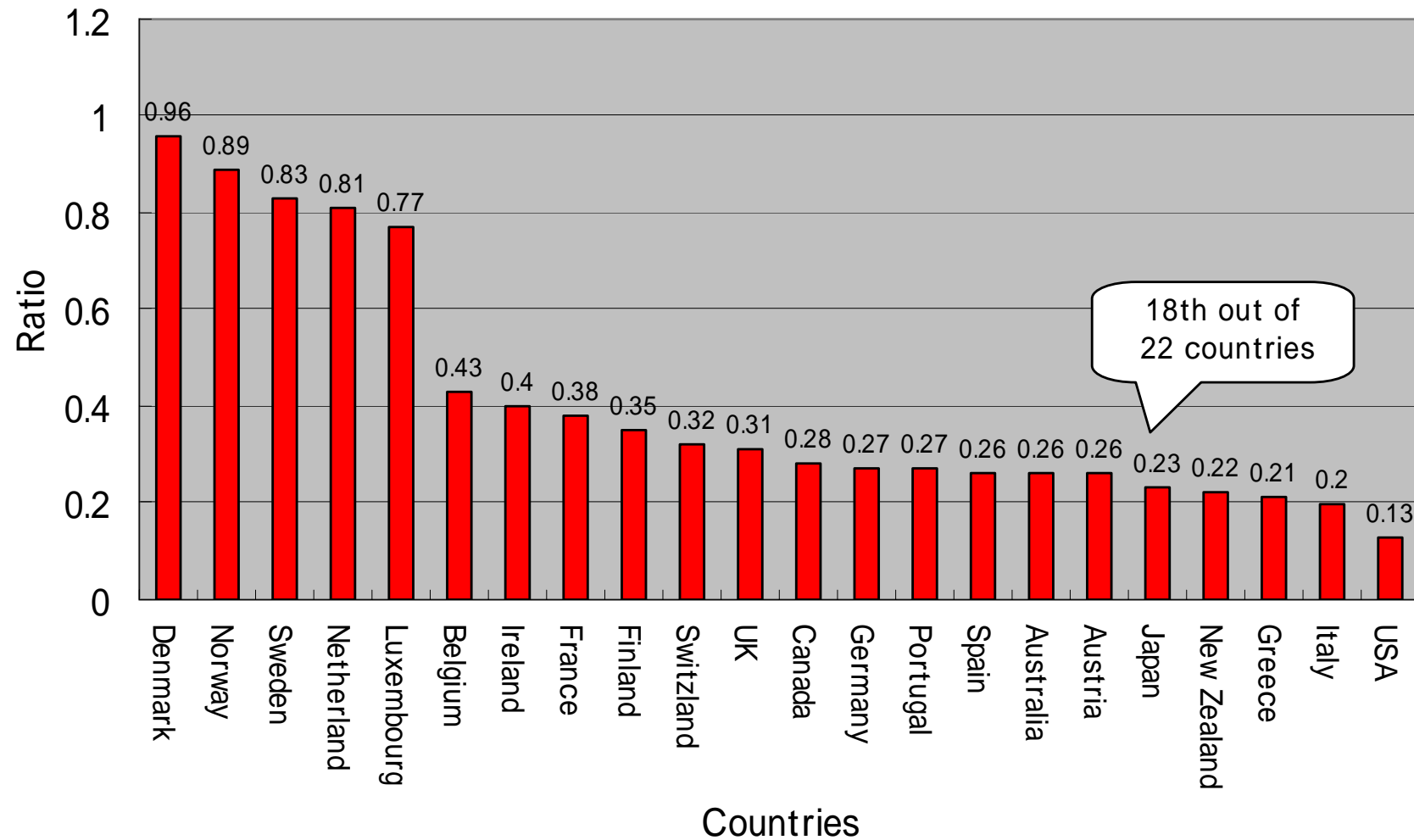
- Source : 2003 DAC Press Release
- Note : Excluding aid to Eastern Europe



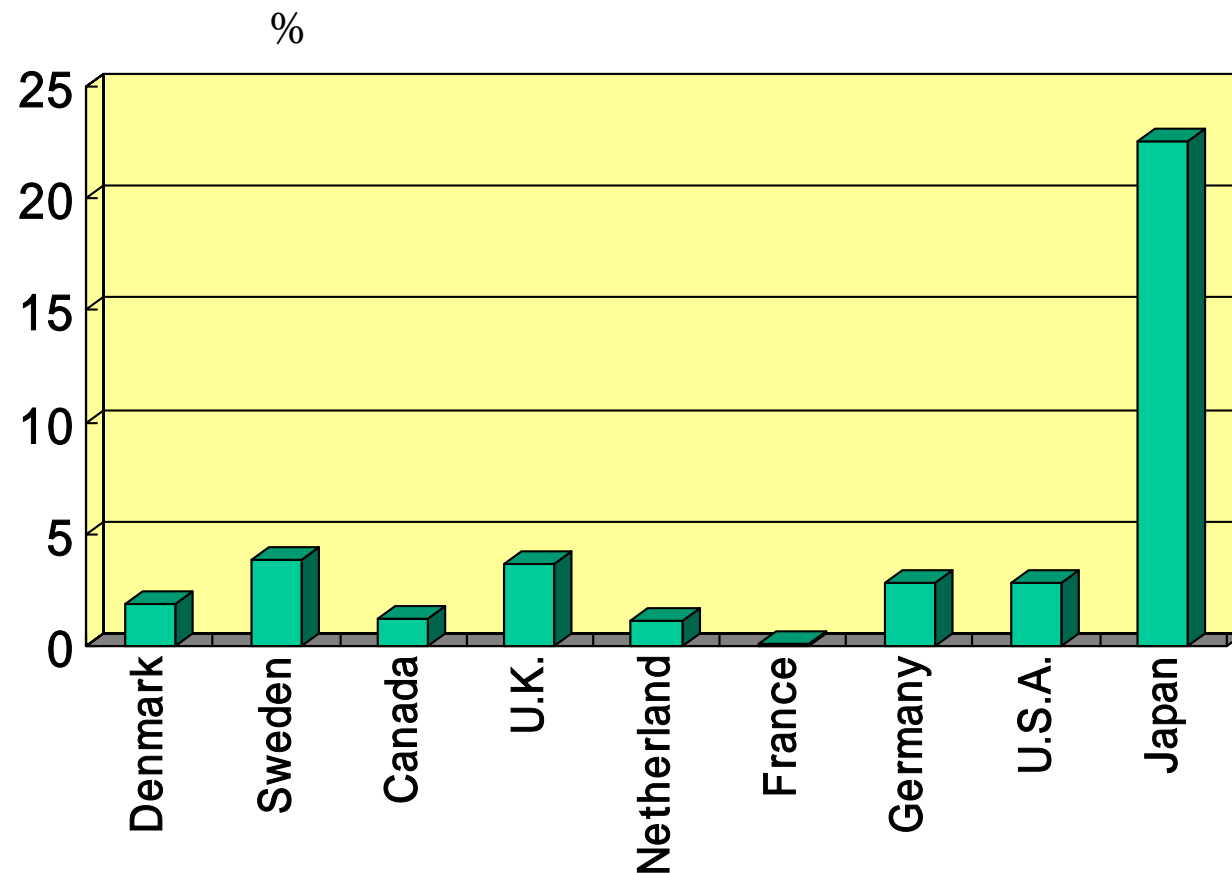
## Amount of ODA of DAC Members (2002)



## ODA per GNP of DAC Members



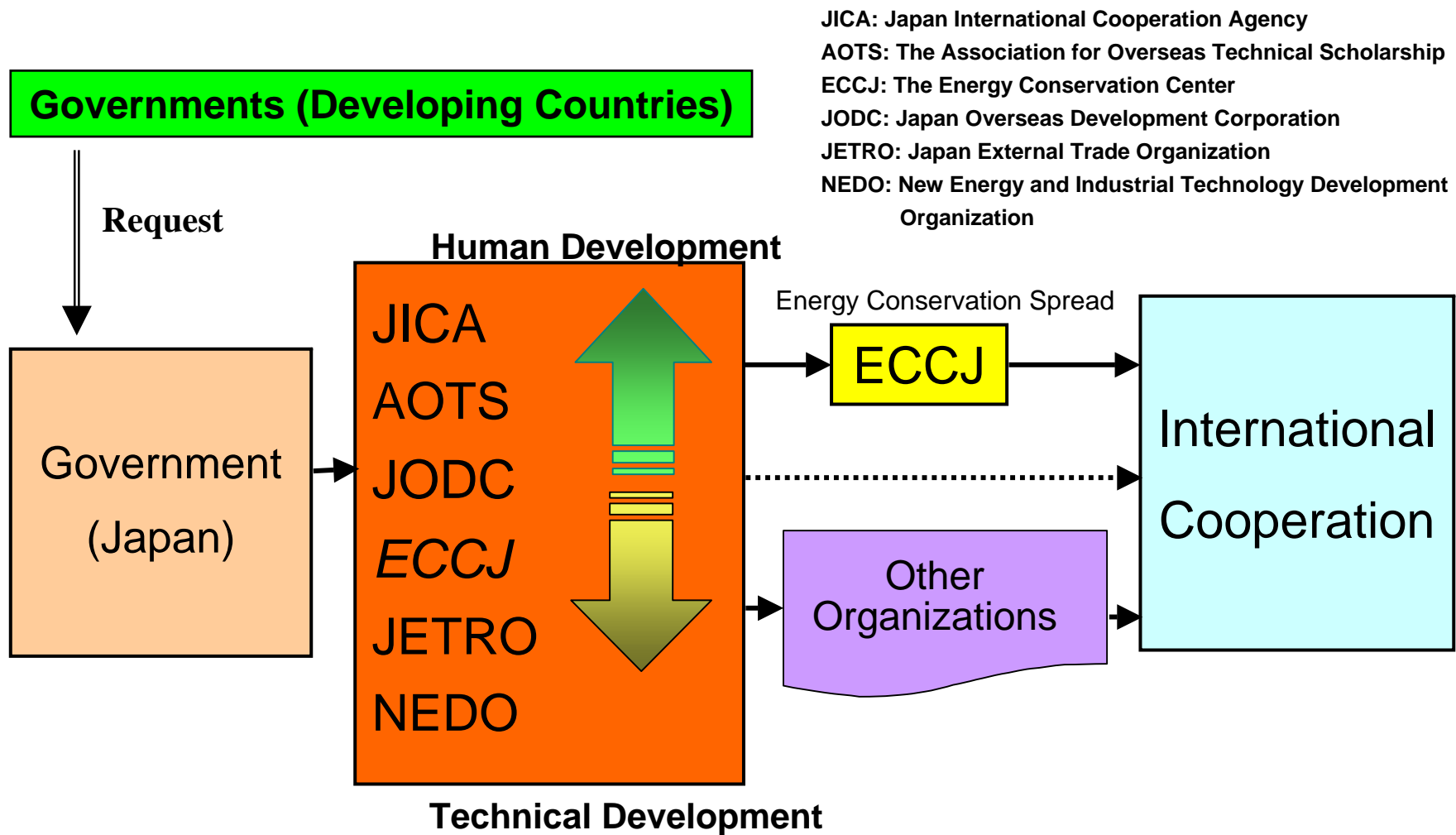
**Ratios of**  
**(ODA used for the counter-measures to arrest global warming)**  
**against (total ODA amount)**  
**in DAC countries**



<Reference: the report on ODA concerning Global Warming Arrest, by MOFA & Mitsubishi Research Institute, March 2002>



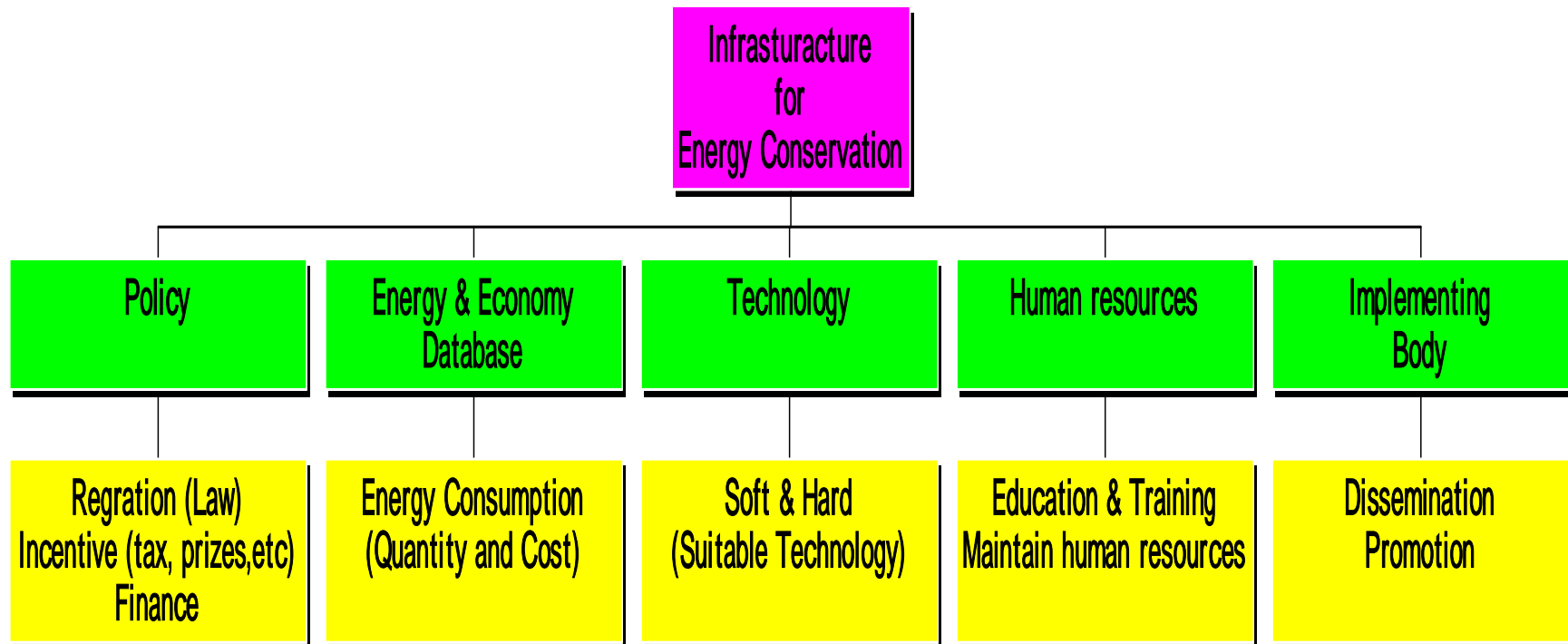
# Cooperation Scheme through ECCJ



## 4. The Energy Conservation by ECCJ

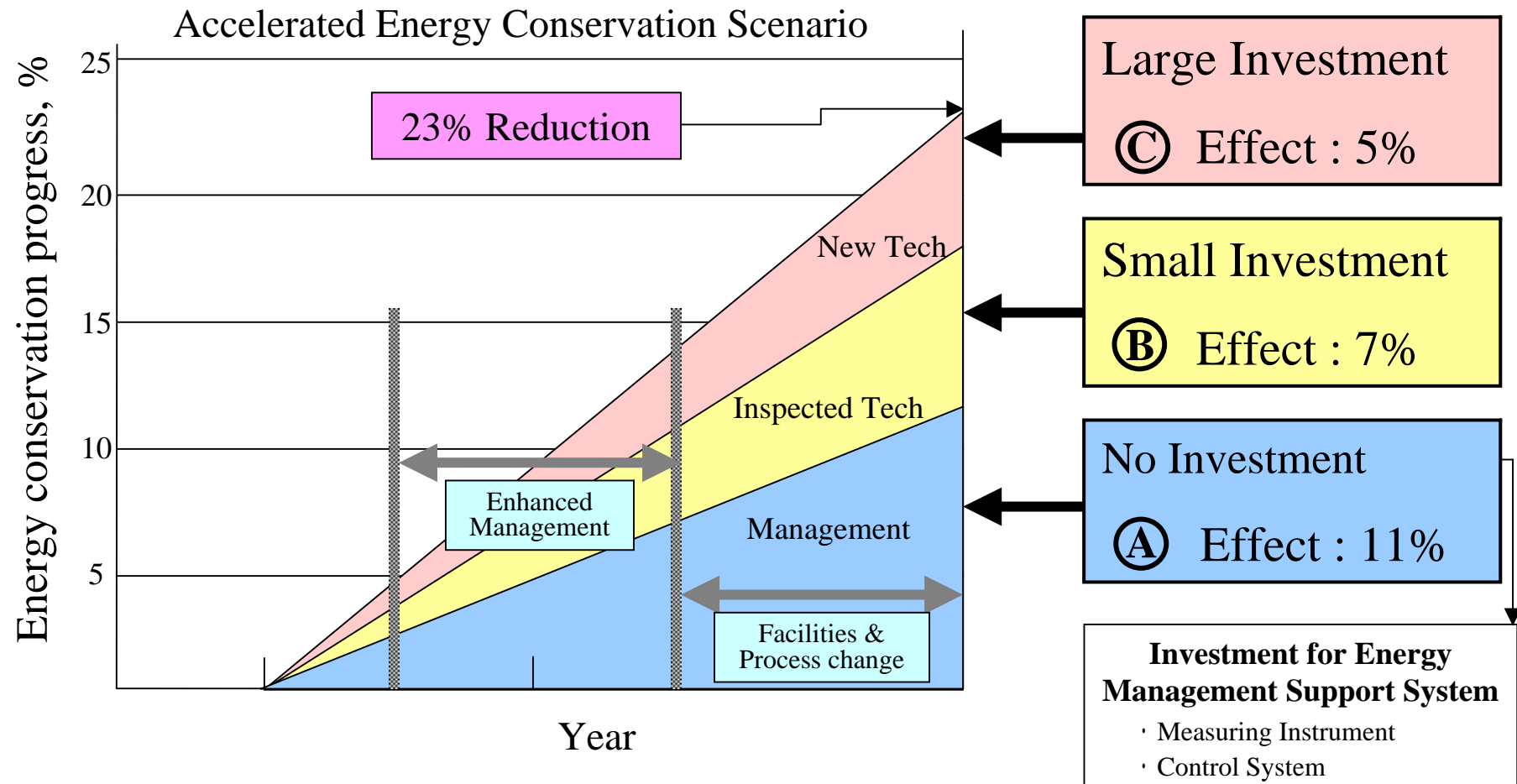
- Infrastructure of the energy conservation
- The examples of the energy conservation  
by ECCJ

# Infrastructure for Energy Conservation



# Effect of Energy Conservation

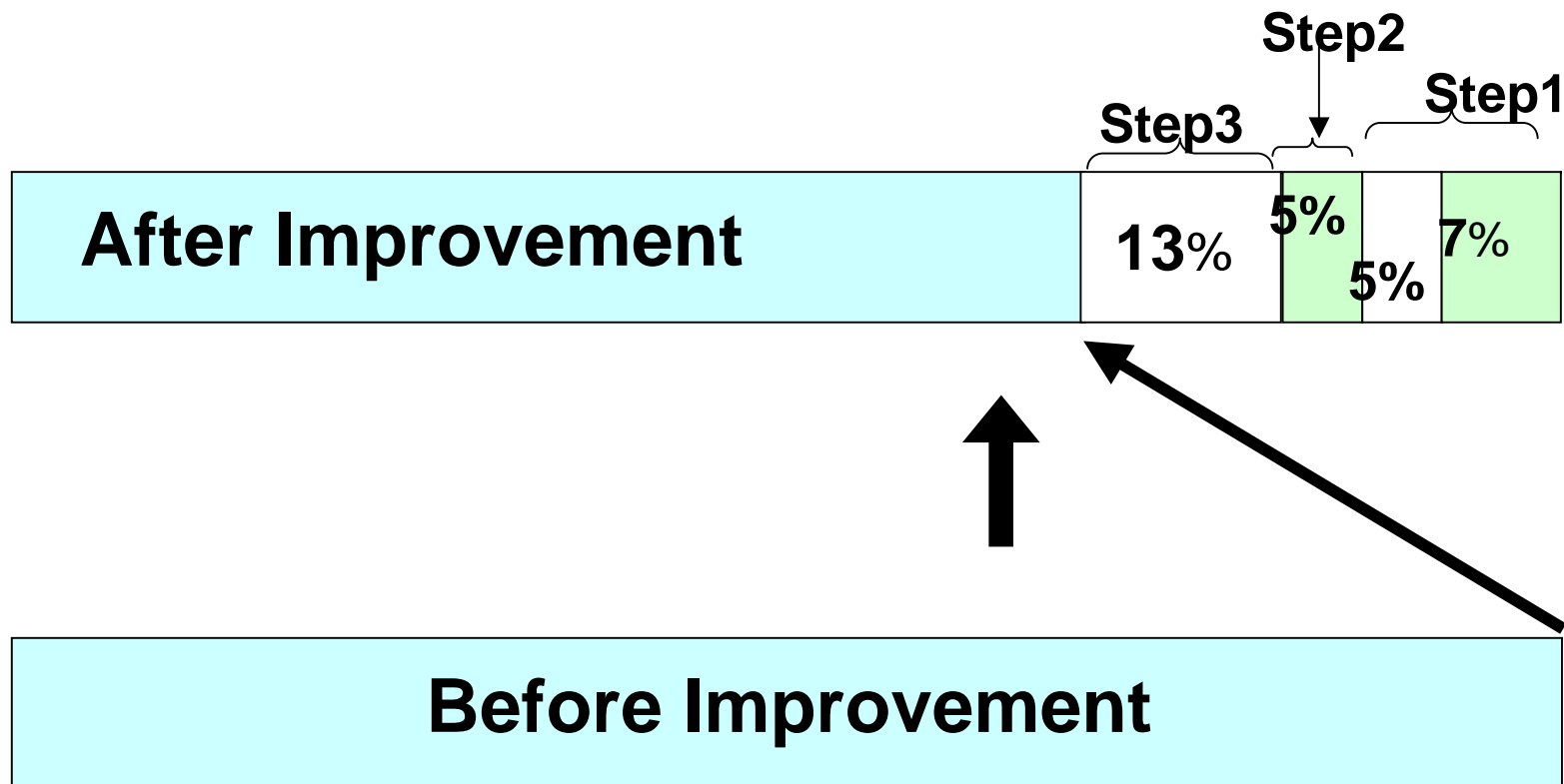
“Energy Management is most profitable”



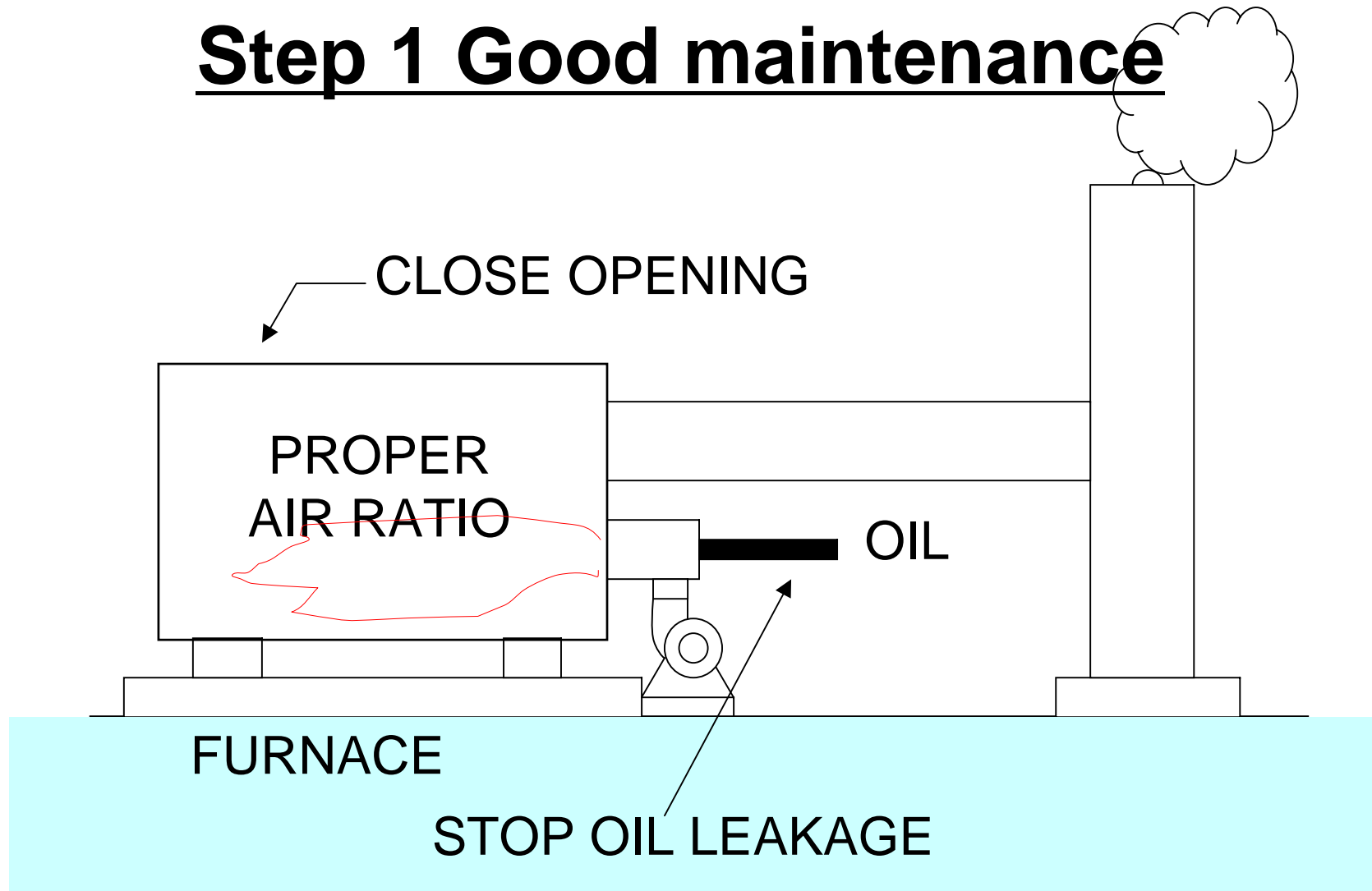
<an example of audit in Japan>

# The Example of Energy Conservation Measures

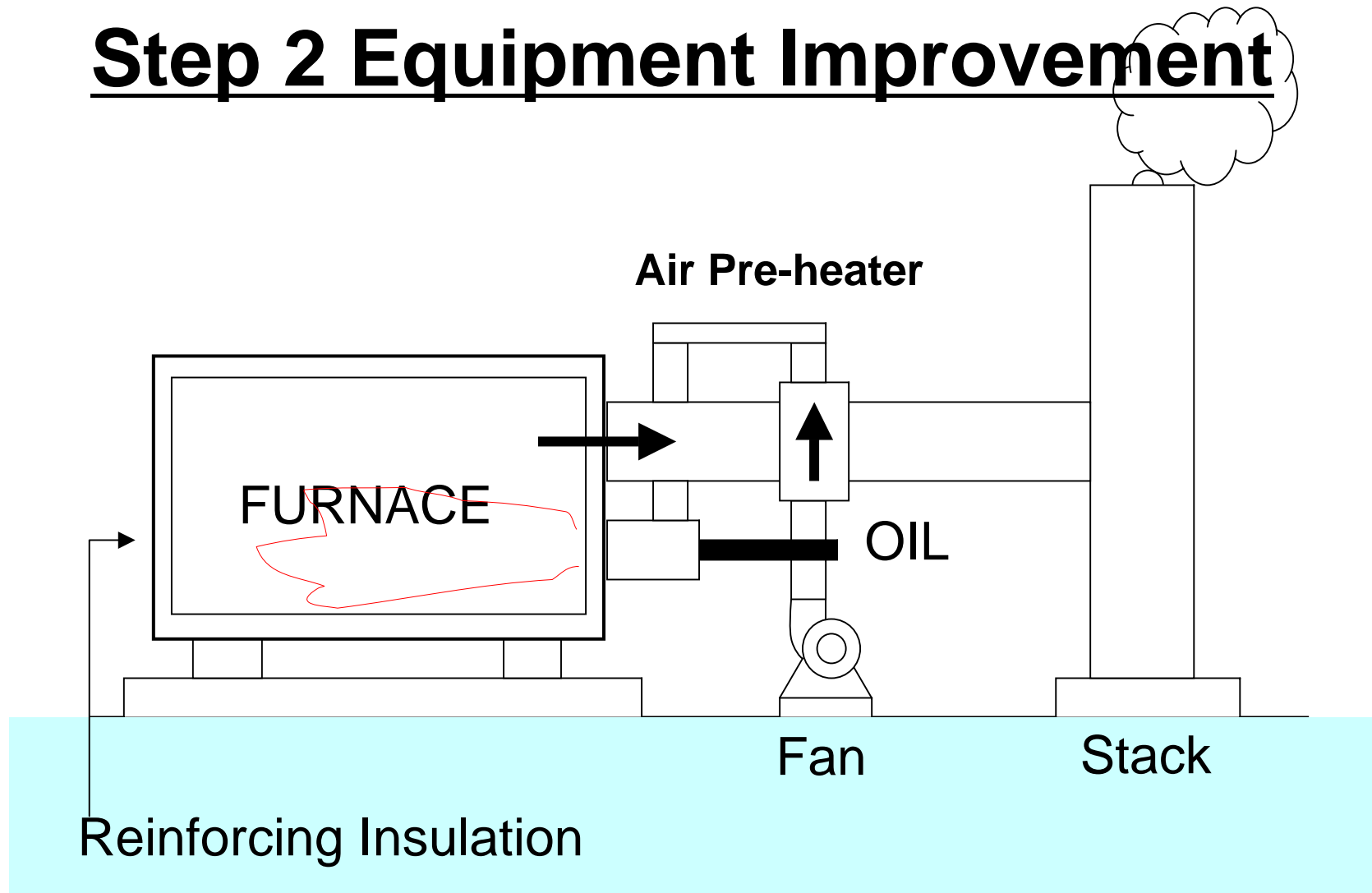
(The average of previous cases - International)



# Step 1 Good maintenance

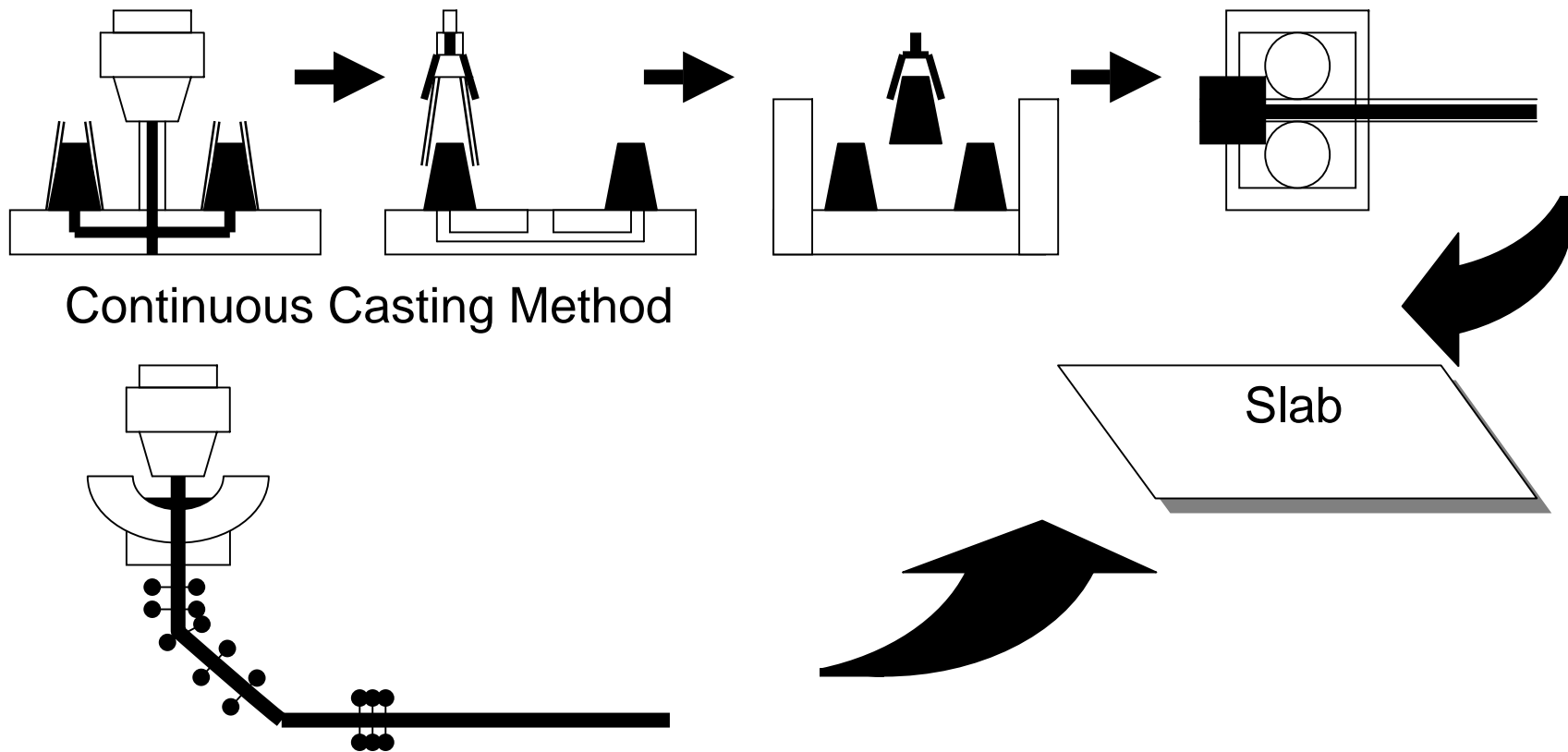


## Step 2 Equipment Improvement



# Step 3 Production Process

## Ingot Casting & Slabbing Method





# **5. International Cooperation by ECCJ**

## **5.1 General**

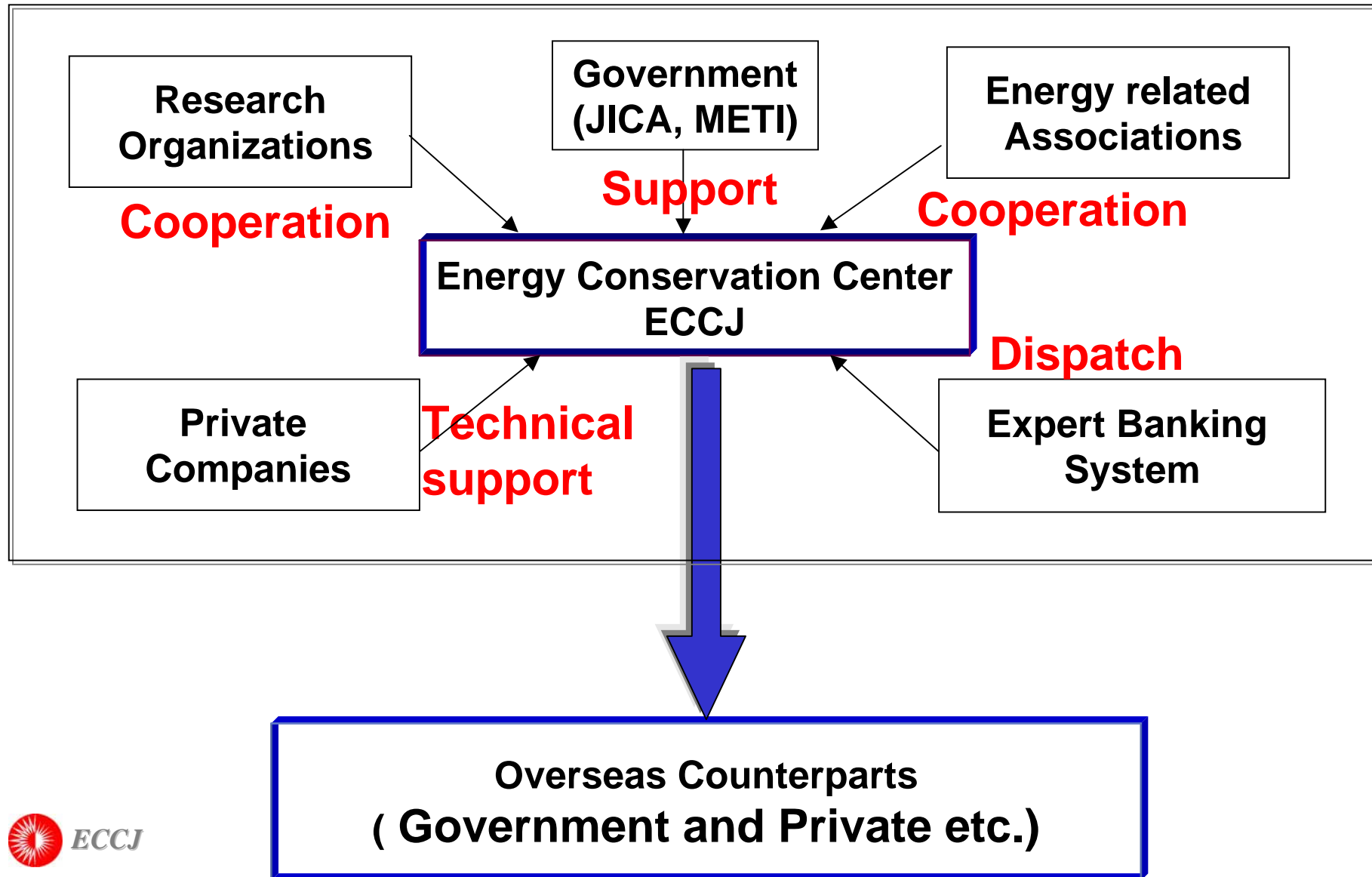
## **5.2 Training Course for EEC in Japan**

## **5.3 Project-type Technical Cooperation**

## 5. 1 General

- **Cooperation Network around the ECCJ**
- **Main Function of ECCJ's International Cooperation**
- **ECCJ's International Cooperation  
(The involved Countries)**

# Cooperation Network of ECCJ



# Main Function of ECCJ's International Cooperation

## 1. Proposal for Policy Making

- Study of energy consumption and energy conservation policy
- Survey and feasibility study of the potentials on the energy conservation and the reduction of GHG emission

## 2. Capacity-Building

- Provision of the training courses at home and overseas
- Dispatching experts to the overseas for seminars

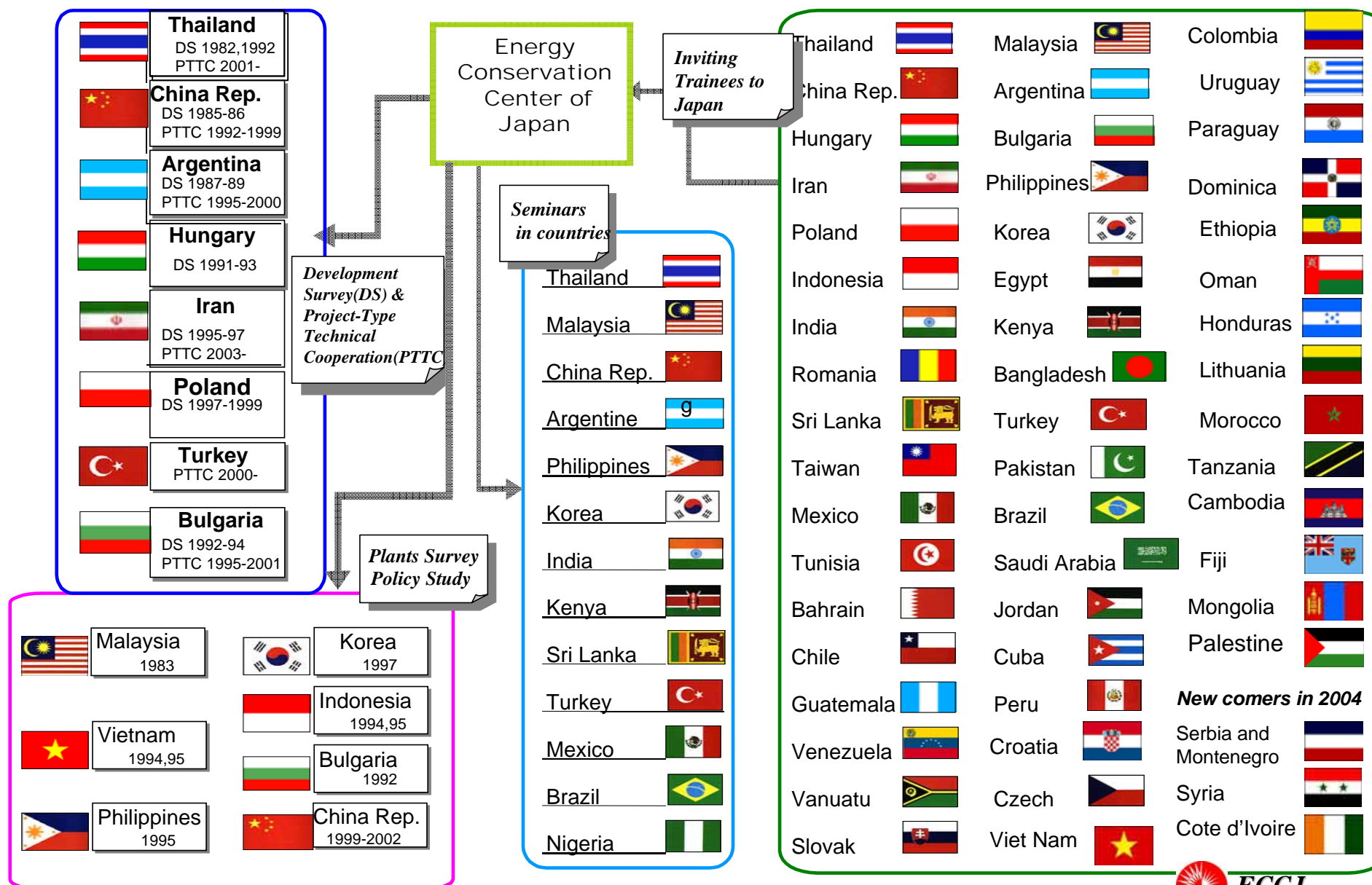
## 3. Technical Cooperation

- Factory energy audit and advice for the improvement based on the results of plant surveys, energy conservation audit, etc.
- Cooperation and support for the establishment and operation of the Energy Conservation Center or the same organization.

# ECCJ's International Cooperation

May 2004

Rev.2



## **5. 2 Training Courses for EEC (Energy Efficiency & Conservation) in Japan**

- **Number of the trainees and their countries**
- **Examples**

# Energy Efficiency & Conservation Training Course by ECCJ (Joined countries and number of trainees)

		in Japan	overseas
Asia	India	11	90
	China	49	30
	Indonesia	26	60
	Korea	24	-
	Malaysia	16	30
	Philippines	19	35
	Thailand	51	160
South America	Argentina	29	60
	Brazil	16	-
	Mexico	12	30
Europe	Poland	23	-
	Hungary	17	-
	Bulgaria	32	-
Middle East & Africa	Iran	21	-
	Egypt	15	90
	Turkey	23	30
	Kenya	13	-
Other countries		107	-
<b>Total</b>		<b>504</b>	<b>615</b>
		<b>1,119</b>	

## <Example of Training Course in Japan - general>

### JICA /ECCJ Energy Efficiency and Conservation

Duration: May 13, 2003 – July 3, 2003 (52 days)

Number of Participants: 13 (10 Countries)

<every year from 1986>

#### Objectives: to understand

1. The energy situation and energy policy in Japan
2. The promotion policy for EE & C and its enforcement procedure
3. EE & C measures in the industrial, commercial and residential, and transport sector.
4. Energy management methods in buildings and factories.

#### Program:

Lecture, Plant visit to study successful cases, Practical exercises (measurement of energy consumption), and Workshop (discussion and presentation).





## <Example of Training Course in Japan>

### JICA /ECCJ Energy Efficiency & Conservation Program for East Europe

Duration : October 20, 2003 – November 14, 2003 (19 days)  
<every year from 1994>

Number of Participants : 13 (9 Countries)

#### Objectives: to understand

1. The energy situation, and energy policy and regulation in Japan
2. The promotion policy for EE & C and its enforcement procedure
3. EE & C measures in the industrial, commercial and residential, and transport sector.
4. Energy management in buildings and factories.
5. R & D of New energy

#### Program:

Lecture, Plant visit to study successful cases, Practical exercises (measurement of energy consumption), and Workshop (discussion and presentation).



## <Example of Training Course in Japan - general>

### JICA /ECCJ Iran Energy Efficiency & Conservation Program for Iran

Duration: February 9, 2003 – February 20, 2003 (9 days)

Number of Participants: 10 trainees (government officers)

#### Objectives:

1. To understand the energy conservation policy and the law, and energy management in Japan.
2. To develop leadership for promote the energy conservation in Iran

#### Program:

1. Lecture : The energy conservation policy, regulation, management, procedures, etc.
2. Visit to ENEX2004 to learn the energy conservation and new energy in Japan
3. Plant visit to understand successful cases .



## <Example of Training Course in Japan- project basis>

### JICA /ECCJ Turkey Energy Conservation Project

<Project: August 2000 – July 2005>

Duration: November 17, 2002 – December 14, 2002 (28 days)

Number of Participants: 3 counterparts(experts)

#### Objectives

1. To understand the energy conservation policy and the Law, and energy management in Japan.
2. Brash-up the skill for the expert (auditor, trainer).
3. To understand successful cases in the energy conservation .

#### Program:

1. Lecture & observation on measuring instruments and training facilities (i.e. boiler,furnace, inverter-controlled system, lighting etc.).
2. Training for audit technique (heat and electricity measurement, calculation, reporting etc.)
3. Participation to the practical on-site audit conducted by Japanese experts



## **5.3 Project-type Technical Cooperation (EC Project)**

- **Procedure for the EC Project**
- **Contents of the Technical Cooperation in the EC Project**
- **Examples**
- **The Energy Conservation Center in the Overseas**
- **Establishment of the EC Project**

# Procedures for EC Project

## 1. Public Relations & Education Activities

Seminar, pamphlets, Media, etc.

## 2.F/S for Energy Conservation Program

Energy Audit, Technology Transfer

## 3. Regulations & Incentives

## 4. Organizations for Implementation

Public Relations, Education and Consultation

## 5. Development of Human Resources

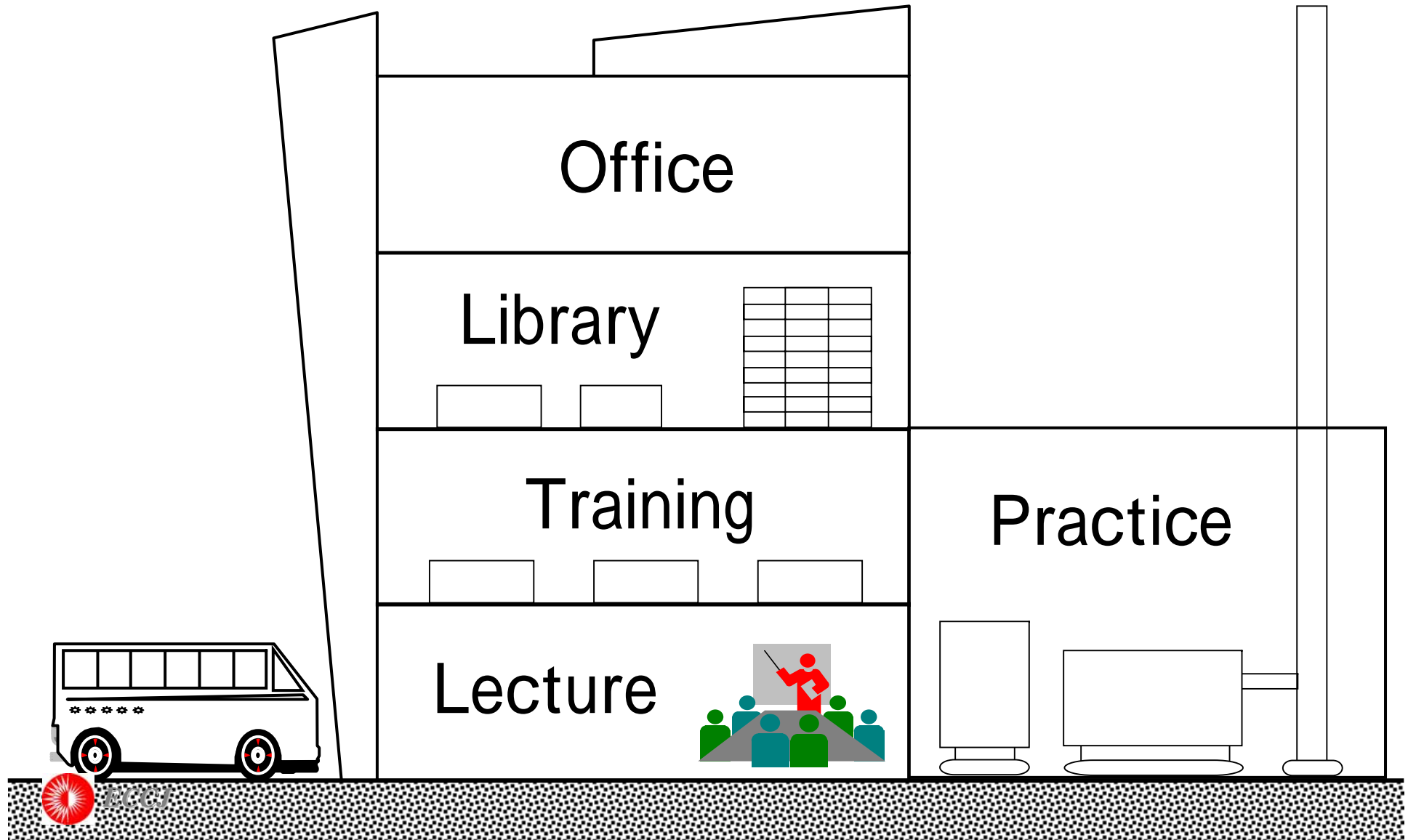
## 6. Model Project

Demonstrate the actual successful project

# Contents of Technical Cooperation in the EC Project

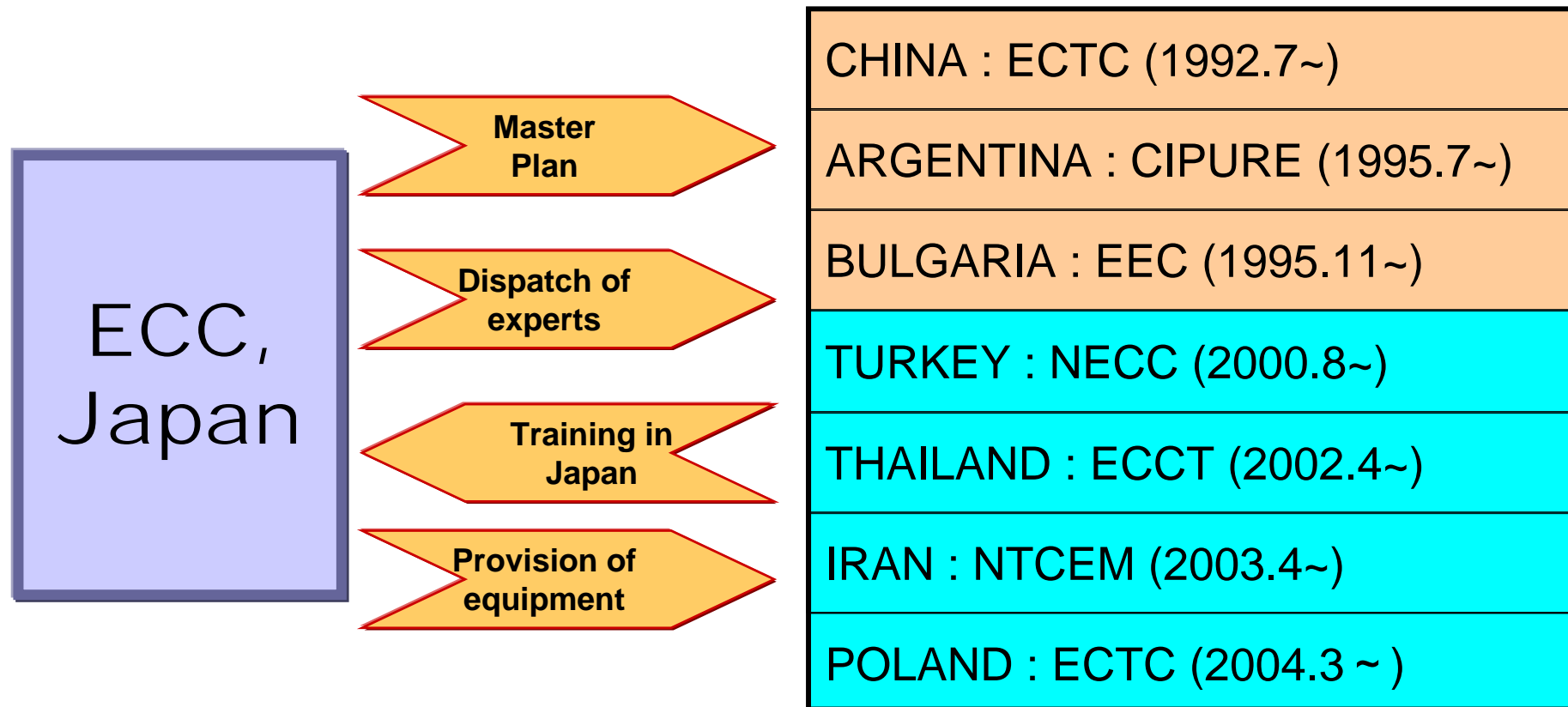
- Development study
  - Energy supply and demand situation
  - Energy audit for the energy intensive industry
  - Preparation of the study report explaining energy conservation potential, energy conservation policy, etc.
  - Provision of measuring devices by the JICA study team for the counterparts
- Project type technical cooperation
  - Establishment of research and training center:
    - Building : by the counterpart side
    - Equipment and devices: by JICA
  - Sending of technical experts: JICA
  - Technical transfer on factory energy audit and training course by experts: by JICA

# Energy Conservation Research/Training Center




# International Cooperation

## Establishment of Energy Conservation Center



**ECC** : The Energy Conservation Center  
**ECTC** : Dalian China Energy Conservation Training Center  
**CIPURE** : The Rational Use of Energy Center  
**NECC** : The National Energy Conservation Center  
**ECCT** : The Energy Conservation Center ,Thailand  
**NTCEM** : The National Training Center for Energy Management

 In progress





## JICA/ECCJ Thailand Energy Conservation Project

**Duration:** April 2002 – March 2005

**Counter part:** ECC Thailand (ECCT)

Department of Alternative Energy Development and Efficiency (DEDE)

### **Object:**

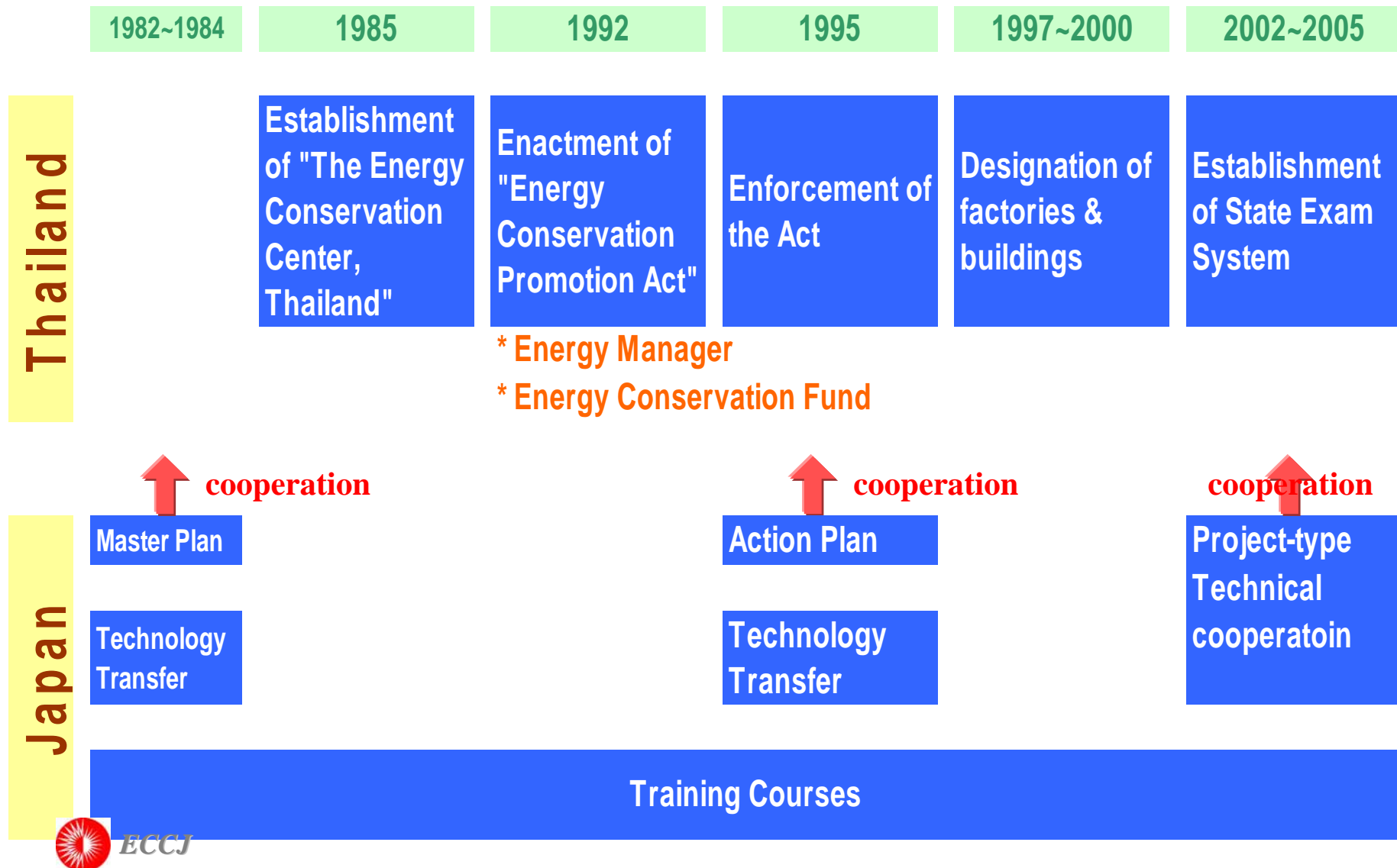
**Establishment of the National Training and Examination System for Qualification of the Certified Energy Manager(EM)**

### **Program:**

- **Cooperation to establishment of the National Training and Examination System.**
- **Preparation of texts and instruments & facilities for the training.**
- **Cooperation to start up the training course and national examination of EM.**
- **Cooperation to establishment of the system to support the activities of the Certified Energy Managers.**
- **Training of the counter parts in Japan.**
- **Seminar in Thailand.**



# Cooperation for Energy Conservation in Thailand



## **JICA/ECCJ Turkey Energy Conservation Project**

**Duration:** August 2000 – July 2005

**Counter part:** EIE / NECC(National Energy Conservation Center)

### **Object:**

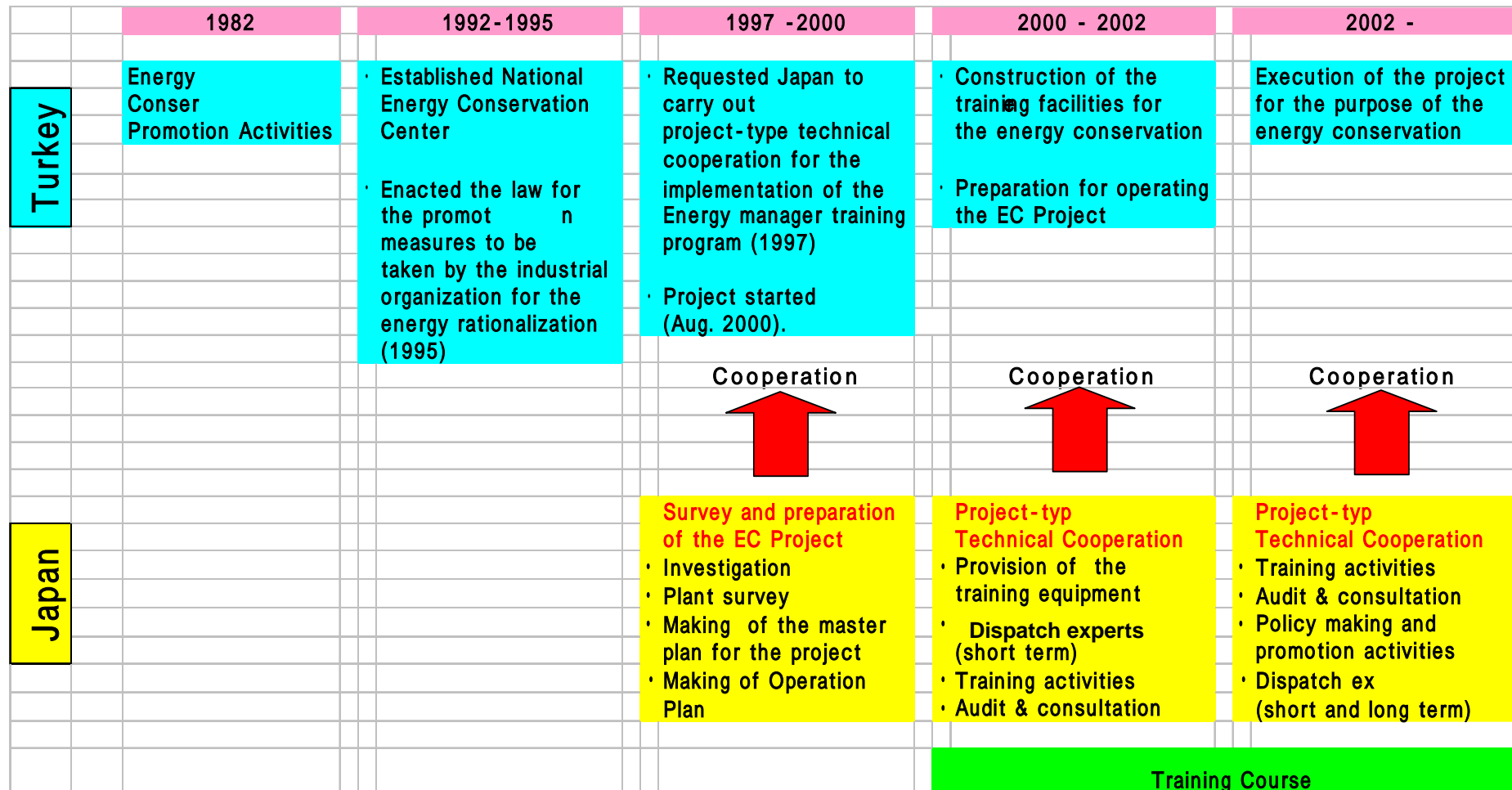
Support to the establishment and operation of the Energy Conservation Center so that they can contribute to the energy conservation in the Turkey industries.

### **Program:**

- Advice to the government how to promote the energy conservation policy
- Provision of the necessary facilities to the ECC for the education and training for the engineers for the energy managers
- Education and training of the personals who can manage and maintain the energy conservation training center in Turkey
- Training course in Japan
- Plant survey and audit
- Seminar and workshop



# Cooperation for Energy Conservation in Turkey



## JICA/ECCJ Iran Energy Conservation Project

**Duration:** April 2002 – March 2005

**Counter part:** Energy Efficiency Office Iran (EEO)  
Azarbaijan Higher Educational and Research Complex (AHERCC)

### **Object:**

**Support the Energy Management Training Center to contribute to the energy conservation in the industries in Iran**

### **Program:**

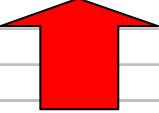
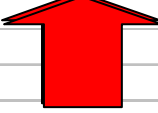
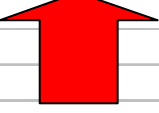
- **Advising to the government how to promote the energy conservation policy**
- **Provision of the necessary equipment to the ECC for the education and training the engineers for the energy managers**
- **Education and training of the personals who can manage and maintain the energy conservation training center**
- **Training course in Japan**
- **Seminar and workshop**



# Cooperation for Energy Conservation in I.R.Iran

	1990 - 1994	1996 - 2000	2000 - 2005	
<b>Iran</b>	<p>The 1st 5-year Economic, Social and Cultural Development (1990-1994)</p> <p>Established the Energy Efficiency Organization (EEO) in Ministry of Energy (1994).</p>	<p>The 2nd 5-year Economic, Social and Cultural Development (1996-200)</p> <p>EEO established Iran Energy Efficiency Organization: IEEO (SABA) (1996)</p> <p>Preparation of the Law of the management of energy consumption (1999)</p>	<p>The 3rd 5-year Economic, Social and Cultural Development (2000-2005)</p> <p>Iran government requested Japan the project-type technical cooperation to establish the Energy Conservation Center (2000)</p>	<p>The project started (2003)</p> <p>Execution of the project for the purpose of the energy conservation</p>
		Cooperation	Cooperation	Cooperation
<b>Japan</b>	<p>IEEJ proposed:</p> <p>Energy Development Plan by IEEJ</p>	<p>ECCJ &amp; IEEJ provided and proposed:</p> <ul style="list-style-type: none"> <li>• The Master Plan of Energy Conservation</li> <li>• Data-base for improvement</li> </ul>	<p>Survey and preparation of the EC Project</p> <ul style="list-style-type: none"> <li>• Investigation</li> <li>• Plant survey</li> <li>• Making of the master plan for the project</li> <li>• Making of Operation Plan</li> </ul>	<p>Project-type Technical Corporation</p> <ul style="list-style-type: none"> <li>• Provision of the training equipment</li> <li>• Dispatch experts</li> <li>• Training activities</li> <li>• Audit &amp; consultation</li> <li>• Workshop &amp; seminar</li> </ul>
	Training Course			

# Cooperation for Energy Conservation in Poland

	1990 - 1996	1997 - 1999	2000 - 2003	2004 -
<b>Poland</b>	Established the Polish National Energy Conservation Center (KAPE) to promote the energy conservation	<ul style="list-style-type: none"> <li>Poland Government requested JICA to propose the Master Plan for EC</li> <li>Enactment of Energy Law and stipulations related to energy conservation promotion (1999)</li> </ul>	Poland Government requested Japan the project-type technical cooperation to establish the Energy Conservation Technology Center (2000)	<p>The project started (2004)</p> <p>Execution of the project for the purpose of the energy conservation</p>
		Cooperation 	Cooperation 	Cooperation 
<b>Japan</b>		<p>ECCJ &amp; IEEJ provided and proposed.</p> <ul style="list-style-type: none"> <li>The Master Plan of Energy Conservation</li> <li>Data-base for Improvement</li> </ul>	<p>Survey and preparation of the EC Project</p> <ul style="list-style-type: none"> <li>Investigation</li> <li>Plant survey</li> <li>Making of the master plan for the project</li> <li>Making of Operation Plan</li> </ul>	<p>Project-type Technical Corporation</p> <ul style="list-style-type: none"> <li>Provision of the training equipment</li> <li>Dispatch experts</li> <li>Training activities</li> <li>Audit &amp; consultation</li> </ul>



<Example of abroad factory diagnosis and improving advise  
based on measurements (plant survey, energy conservation audit)>

**NEDO/ECCJ Survey Project on the Energy Conservation in the Industrial Sector in  
the Republic of China** **<started in 2001>**

**Objectives:** Evaluate the energy saving potentialities in the chemical industry sub-sector.  
Find the energy conservation counter-measures by energy audit.  
Recommend the above mentioned measures and to make them disseminated over the sub-sectors.

**Duration:** July 22, 2002 – January 25, 2003  
( 1<sup>st</sup> step:10 days, 2<sup>nd</sup> step:3 weeks, 3<sup>rd</sup> step:10 days )

**Factories where auditing survey was done:** 天津大沽化工厂、 沈陽化工厂

**Program:** 1<sup>st</sup> step: pre-survey (general information on energy consumption, preparation for the full-scale audit)  
2<sup>nd</sup> step: The auditing survey with measurement. Discussed of the measuring data and audit results, and recommended the tentative measures.  
3<sup>rd</sup> step: Submission and presentation of the study report to the Chinese Government.

Followed by the implementation of the tentative counter-measures,  
recommended the suitable measures for the surveyed factories.





# Energy Conservation Center in the Overseas

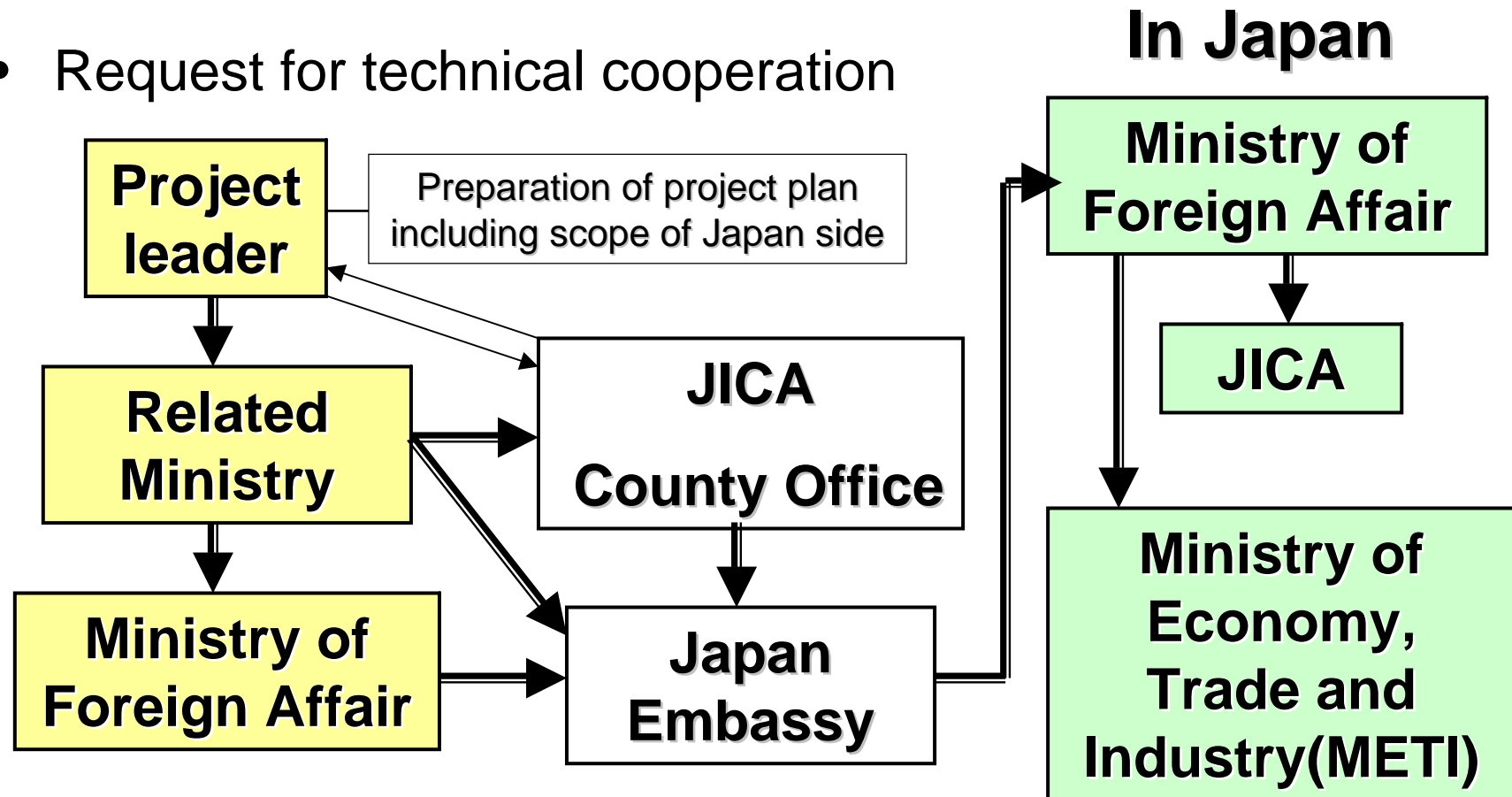
Country	Organization Name	Upper Organization	Budget		Main activity
			Staff Cost	Operation Cost	
China	China Dalian Energy Conservation Training Center	Dalian City	by ECC	by ECC	Training
Argentina	The Rational Use of Energy Center	National Institute of Industrial Technology	by Gov't	by ECC	Training Audit
Bulgaria	Energy Efficiency Center	Ministry of Industry	by Gov't	by ECC (by Gov't)	Audit
Turkey	The National Energy Conservation Center	Ministry of Energy ,Energy Efficiency Office	by Gov't	by Gov't (by ECC)	Training Audit Policy, PR
Poland	Energy Conservation Technology Center	National Energy Conservation Agency	by ECC	by ECC	Training Audit
Thailand	The Energy Conservation Center, Thailand	Ministry of Energy, DEDE	by ECC	by ECC	Training Audit Policy, PR
Iran	Energy Efficiency Office / Azarbaijan Center(AIHER)	Ministry of Energy	by Gov't	by Gov't	Training Audit Policy, PR

# Establishment of New Project (1/2)

- Technical cooperation project to be created by:
  - 1) Project forming by request of foreign country
  - 2) Project forming by project finding mission
- Typical case of project forming
  - 1) Preparation of project plan by project leader in consideration of Japan side support
  - 2) Request of technical cooperation to JICA Office or Japan Embassy in your country through Ministry of Foreign Affairs or related Ministry
  - 3) Project finding mission and/or study mission by JICA
  - 4) Signing of Minutes of Meeting or Record of Discussion by JICA and Counterpart representative
  - 5) Start of Development Study or Project Type Technical Cooperation

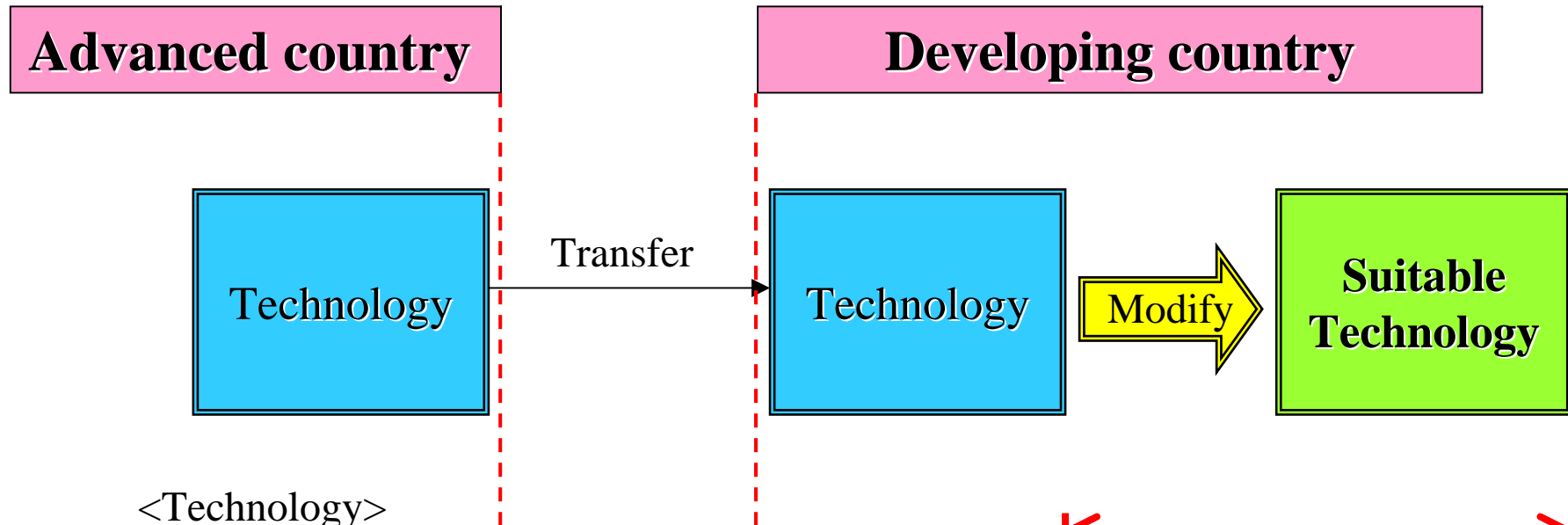
# Establishment of New Project (2/2)

- Request for technical cooperation



# Technology Transfer

“ Transferred technology should be modified suitable for the developing country !”

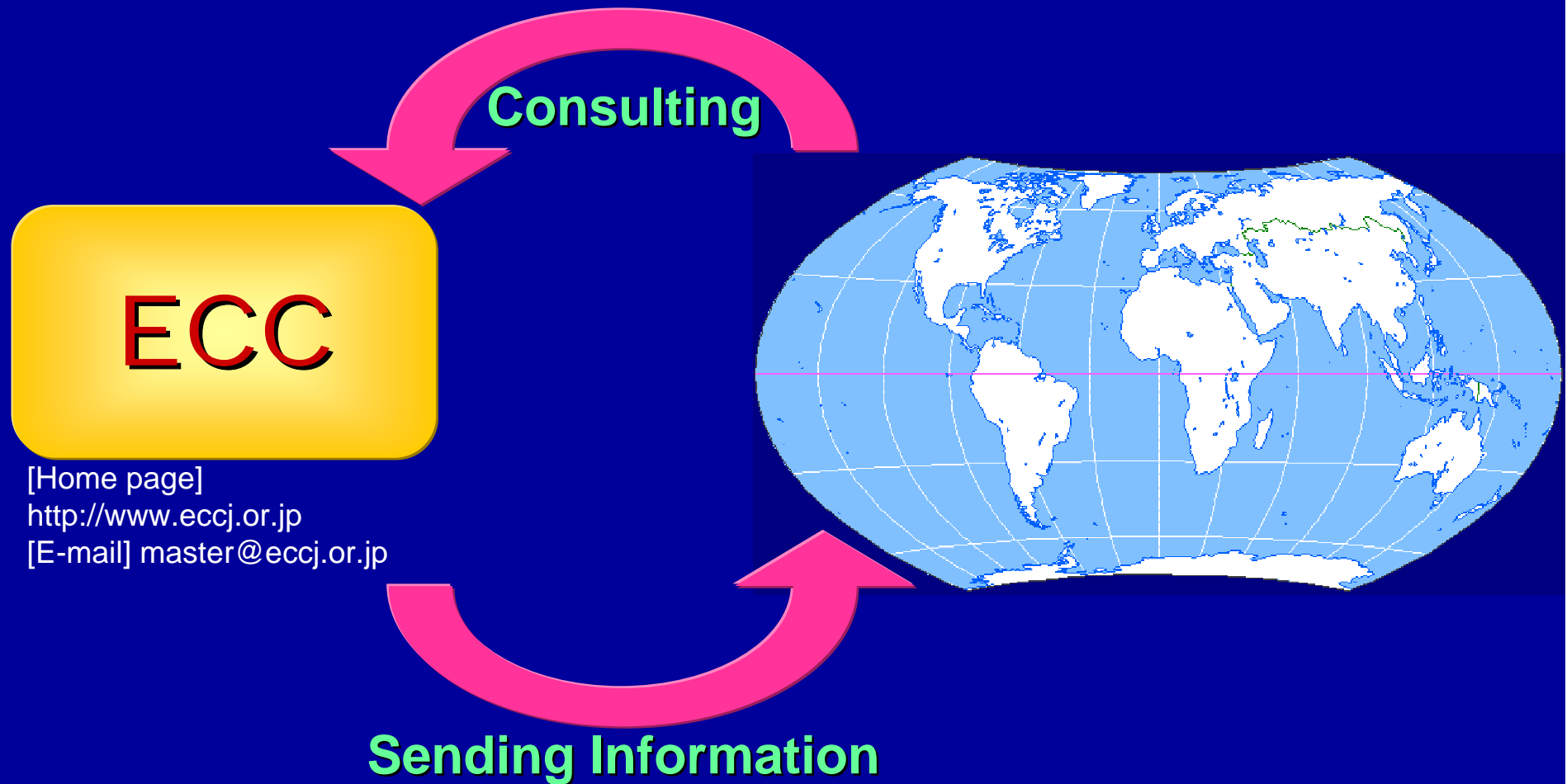


<Technology>

- Inspection Technologies
- New Technologies (examples)
  - Regenerative Burner (Industry)
  - Monitoring System (Residential)
  - Direct Injection (Transportation)
  - Measuring & Control System (General), etc.

Very Important

# Follow-up Consulting



- \* Follow-up consulting after technical cooperation
- \* General consulting for energy conservation & environment to developing countries
- \* Information dissemination (Statistics, energy conservation activities, others)

*Thank you*

