

DaNang Department of Industry and Trade,
Socialist Republic of Vietnam

Summary Report

Verification Survey with the Private Sector
for Disseminating Japanese Technologies
for
Energy Saving Analysis and Improvement
by Simplified Energy Measurement
in Vietnam

9th June, 2017

Japan International Cooperation Agency

OSUMI Co.,Ltd

1. BACKGROUND

In recent years, GDP of Socialist Republic of Vietnam (hereinafter “Vietnam”) has been growing at a rate of 6% to 7% per year, yet the energy consumption rate is growing at an even faster rate of over 10% per year. It is concerned that Vietnam will be forced to shift to an importing country from an energy exporter in near future. Therefore, energy utilization including energy efficiency and conservation are seen as an essential issue in order to secure sustainable economic development.

The government of Vietnam has been implementing many activities in the energy efficiency and conservation sector such as the Vietnam National Energy Efficiency Program (VNEEP) from 2006 to 2015. Moreover, the government of Vietnam enforced “the Law on Economical and Efficient Use of Energy (No.50/2010/QH12)” in 2011 (hereinafter “Law on Energy efficient use”) with the intention of management and promotion of consumption efficiency by designated enterprises through energy management system and energy audit system.

Based on these activities, cooperation in the field of energy saving by Japanese ODA has been implemented continuously such as supporting for the development of Law on Energy Efficiency use in Vietnam. Promoting energy saving at the provincial level as well as enacting the laws and regulations at the central level are also important tasks. However, it is difficult to implement the tasks due to lack of technology and resources at present.

Under the above condition, OSUMI Co., Ltd. (hereinafter “OSUMI”) implemented the "Project Formulation Survey" under the Governmental Commission on the Projects for ODA Overseas Economic Cooperation in FY2013 named “Feasibility Study on Service for Development of Energy Saving Plan by Simplified Environment Measurement and Promoting an Environmental Education” (hereinafter “the Feasibility Study”) in Da Nang City from September 2013 to March 2014. Through the Project Formulation Survey, OSUMI confirmed the current condition and agenda on energy saving management in Da Nang city, Vietnam. The results of the Project Formulation Survey are as described below.

- (1) Da Nang City has set the goal to become “the environment-friendly city” by 2020 according to “Da Nang Socioeconomic Development Plan (Decision No.1866/QD-TTg)” and “Da Nang Urban Development Plan (Circular No.41/2008/QD-UBND). Therefore, they have been interested in acquiring effective technologies and knowledge on both energy saving and environmental management.
- (2) Companies in Da Nang City have been interested in implementing energy saving in order to aim at reducing their operational costs. Therefore, they also need effective technologies and knowledge related to energy savings.
- (3) OSUMI found the potential to disseminate its technology on energy saving management; especially in combustion facilities because companies in Vietnam have not yet applied energy saving technologies to combustion facilities while they have been practicing energy saving in electricity facilities.

2. OUTLINE OF THE PILOT SURVEY FOR DISSEMINATING SME’S TECHNOLOGIES

(1) Purpose:

To support Da Nang City’s goal “to become an environment-friendly city” from the aspect of energy saving, to implement effective energy saving monitoring and verify the effectiveness of proposed technology through the Project.

(2) Activities:

To achieve the purposes mentioned above, the following outputs and activities are set:

- (Output 1) To select target private companies who consume large energy in Da Nang City, and to implement energy saving monitoring with a simplified method to them.
- (Output 2) To implement detailed energy saving monitoring at the 4 public companies and/or organizations, and to develop the roadmaps based on the results of monitoring.
- (Output3) To make a manual on energy saving management with simplified methods for Department of Industry and Trade (hereinafter “DOIT”) and Da Nang Industry Promotion and Development Consultancy Center (hereinafter “IPDCC”) mandate.
- (Output4) To disseminate the proposed technology and it shall be acknowledged by potential

customers in Vietnam. To formulate a business strategy and its development plan of OSUMI.

(Activity1) To implement energy saving monitoring with simplified methods for the selected companies

- 1-(1) To set proper criteria for energy saving and to select the target companies.
- 1-(2) To implement simplified monitoring the selected companies.
- 1-(3) To make a report for each of target companies based on the results of monitoring and submit the report to each of them.

(Activity2) To develop roadmaps on energy saving for the four companies and/or organizations.

2-(1) To implement energy saving monitoring at the four companies and/or organizations. The names of the 4 companies are as mentioned below.

- Da Nang New Administration Center (hereinafter “New Administration Center”)
- Hoa Tho Textile & Garment Company (hereinafter “HOATHO”)
- Da Nang Cancer Hospital (hereinafter “ Cancer Hospital”)
- Song Han Hotel

2-(2) To develop the roadmaps on energy saving for the 4 companies and/or organizations based on the results of monitoring.

2-(3) To conduct consultations based on the roadmaps for the 4 companies and/or organizations.

(Activity3) To make a manual on energy saving management with simplified methods for DOIT/IPDCC mandate.

3-(1) To make a manual on energy saving management with simplified methods together with DOIT/IPDCC, through the activities 1 and 2 mentioned above.

3-(2) To support DOIT/IPDCC for utilizing the manual.

(Activity4) To disseminate proposed technology and to formulate a business strategy and its development plan of OSUMI.

4-(1) To identify potential customers in Vietnam.

4-(2) To hold seminars on energy saving during the Survey in cooperation with public entities in Da Nang City and in Vietnam. Expected Participants are from public entities and companies concerned.

4-(3) To formulate a business strategy and its development plan of OSUMI.

(3) Information of Product/ Technology to be Provided:

The devices/equipment for implementing the energy saving monitoring in the Survey will be provided. They are as mentioned below.

- Clamp on Power Logger
- Clamp on High tester
- Data collector and logger
- Hot-wire Anemometer
- Slope Manometer
- Thermocouple Thermometer
- Radiation Thermometer
- Illuminometer
- Thermography
- Gas Sampling Pump and Detector tubes
- Pitot Tube
- Consumable supplies

The proposed technology on energy saving monitoring is featured by monitoring and evaluating for combustion facility such as boiler on site to grasp

energy saving potential.

In addition, the technology will be able to evaluate potential for reducing emission gas such as CO₂ from the monitoring data as well. Such a co-benefit approach is also one of the specific features.

(4) Counterpart Organization:

The main counterpart of the Project is DOIT who has responsibility of energy management in DaNang city. And, IPDCC is also supporting implementing Energy Saving Monitoring.

(5) Target Area and Beneficiaries:

Target Area: Da Nang City in Vietnam

Beneficiaries:

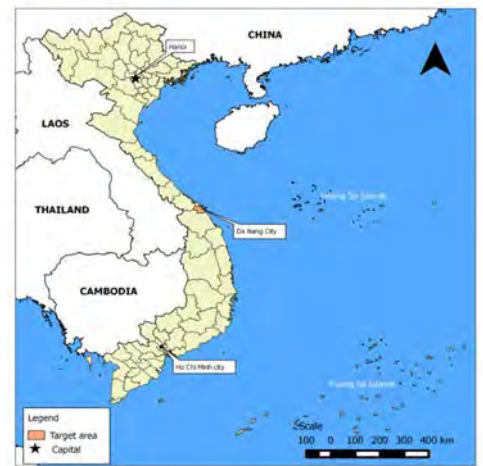
(1) Companies, Public Companies and/or organizations in Vietnam who use energy (* especially, the listed companies as a measure consumer of energy by the energy saving law)

(2) Administrative agency that has responsibility of energy saving management

(6) Duration:

Two (2) years from the day of the signing of the contract between Osumi and JICA.

From 10th July 2015 to 9th July 2017

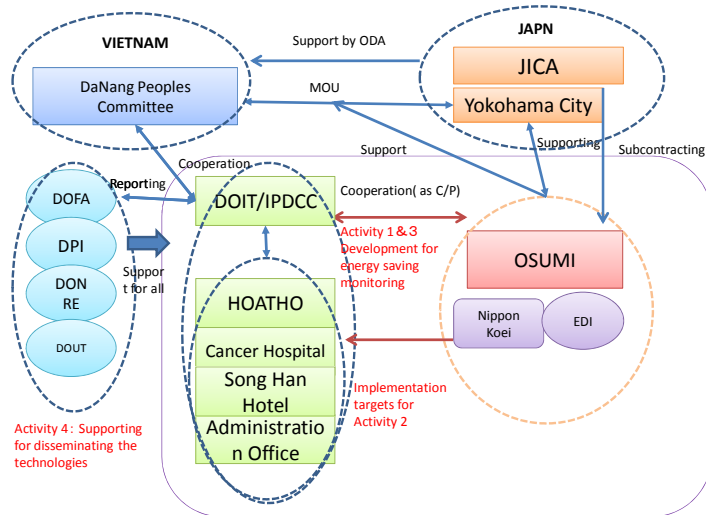


(7) Progress Schedule: See ANNEX1 “the contents of Progress Schedule”

(8) Manning Schedule: See ANNEX2 “the contents of Manning Schedule”

(9) Implementation System: See the figure as below.

Viet Nam Side: DOIT/IPDCC appointed by DaNang People’s Committee



3. ACHIEVEMENT OF THE SURVEY

(1) Outputs and Outcomes of the Survey:

(Activity1) The result of implementing energy saving monitoring with simplified methods for the selected companies

We had purchased the devices/equipments regarding on energy saving monitoring and transported those from Japan to Da Nang by sea transportation. It was transported at 2 times on October 2015 and November 2016. And, it was stored at the DOIT office which Da Nang City Administration Building 19F safely.

During the project period, we implemented the energy saving monitoring with simplified methods to totally 20 companies by the above devices/equipments. There were 16 domestic local companies, and 4 Japanese companies. We reported the results to the companies.

Annex 3 “The result of Activity 1 to each target company” shows more detailed.

(Activity 2): To develop roadmaps on energy saving for the four companies and/or organizations.:

During the Project period, energy-saving monitoring was implemented at four state-owned enterprises / organization.

①Da Nang Administration Center :

We implemented the energy saving monitoring from October 2015 to December 2015. And the roadmap for energy saving countermeasure was developed by the result of monitoring as below.

See the Table 3-1 for more information as below "The Road Map of Da Nang Administration Center".

No	Propose items	Level			省工本対策実施開始年					
		L	M	H	2017y	2018y	2019y	2020y	2021y	
1	Set the water temperature according to outside temp. (Seasonal setting)	○			■	■	■	■	■	▶
2	Control temp of air conditioner (recommend 27 °C)	○			■	■	■	■	■	▶
3	Cleaning the fin of heat exchange of chille		○		■	■	■	■	■	▶
4	Cool down for out door units (Water fog freeze)		○		■	■	■	■	■	▶
5	Repairing compressor of NO.2 chiller		○				■	■	■	▶
6	adopted for chiller system			○				■	■	▶
7										
8										
9										
10										

Table 3-3 "The Road Map of Cancer Hospital"

④ Song Han Hotel:

We implemented the energy saving monitoring from February 2017 to April 2017. And the roadmap for energy saving countermeasure was developed by the result of monitoring as below.

See the Table 3-4 for more information as below "The Road Map of Song Han Hotel".

No	Propose items	Level			Road Map Year					
		L	M	H	2017y	2018y	2019y	2020y	2021y	
1	Making air flow in room with Circulator or fan	○			■	■	■	■	■	▶
2	Improving Air-conditioning system at the entrance lobby	○			■	■	■	■	■	▶
3	Heat pump type hot water supply system		○			■	■	■	■	▶
4	exchanging LED lighting		○				■	■	■	▶
5	the BEMS (Building Energy Management Systems)		○				■	■	■	▶
6	Attaching heat insulation film of window			○				■	■	▶
7	Solar generation system			○					■	▶
8										
9										
10										

Table 3-4 "The Road Map of Song Han Hotel"

3)_(Activity3) The result of making a manual on energy saving management with simplified methods for DOIT/IPDCC mandate.

We made the manual on energy saving management with simplified methods during the Project period. It is expected for DOIT/IPDCC to use it for their mandate continuously. There are Japanese version, English version and Vietnamese Version. And the Vietnamese version was putted with the Logo of both the DaNang People's Committee and OSUMI Company.

According to the request of DOIT/IPDCC, 100 booklets were made and distributed to related persons.

4) (Activity4) The result of to disseminate proposed technology and to formulate a business strategy and its development plan of OSUMI.

① Held the seminars in Da Nang :

We held the seminars during the Project period as below.

1) The kick-off seminar:

It is held on July 29, 2015. And related entities and companies were participated at the seminar.

2)The Interim seminar :

It is held on May 17, 2016. And related entities such as Mr. Viet as Deputy vice chairman of the People's Committee of Da Nang and some companies were participated at the seminar.

3)The Final Seminar:

It is held on April 20, 2017. And related entities such as Mr. Ho Ky Minh, as Deputy vice chairman of the People's Committee of Da Nang and some companies were participated at the seminar.

As the report by OSUMI on the results and outputs of the Project, Mr.Ho Ky Minh declared that DaNang city shall be improving energy saving management by the results and outputs of this Project. and all participants agreed on that both IPDCC and OSUMI signed on the “MOU” regarding on business alliance.

②Held the training in Japan :

It is held in Yokohama city, JAPAN from September 22 to September 30 in 2016. The 10 participants of related entities were joined, and they learned advanced measures on energy saving management in Japan through the training.



③Formulated business strategy and development plan of OSUMI :

According to the result and the outputs of activities, OSUMI was able to formulated the business strategy and development plan.

④Successful promotion and dissemination of the project :

With cordial support from Danang Peoples committee and JICA, The results and outputs of the Project was promoted and disseminated more than we had expected.

The examples of promotion were shown as below

- a. JICA “Nantaka-Shinakya project” PV (May 2016)
- b. Contribution to monthly Ishigaki brocher (May 2016)
- c. JICA Yokohama panel exhibition (many times),
- d. Lecture at Y-PORT seminar (many times),
- e. Courtesy call for the embassy of Japan (October 2016)
- f. Danang Urban Development Forum (December 2016)
- g. NHK-WORLD broadcasting (February 2017)

(https://www.jibtv.com/programs/urban_smart_solutions_for_asia/)

(2) Self-reliant and Continual Activities to be Conducted by Counterpart Organization

DOIT has responsible to improve energy saving management in DaNang city according to “Law on Energy Efficient use”. It is expected to be implemented on the energy saving monitoring with simplified method based on the outputs of the Project.

The key essence of the proposed technology by the Project is to consider about “the System of energy saving” (hereinafter “the System”).

The concept of “the System” is as below.

- The unit such as boiler and freezer and the surroundings for example, piping and related equipment, etc.) is an entire "System".
- To propose counter measures of energy saving from view point of entire system, which leads to appropriate proposal without high initial cost.

The manual which made by the Project shows more details information about “the System” including some examples. So it should be referred materials continuously.

4. FUTURE PROSPECTS

(1) Impact and Effect on the Concerned Development Issues through Business

Development of the Product/ Technology in the Surveyed Country :

1) Contribution to solving problems of enterprises:

Various obligations, such as making annual or 5 years plan on implementation of energy saving, are given to Key Energy-consuming Enterprises. The result of energy saving analysis conducted by Osumi through the project can be used for preparing these plans and reports and contribute for enterprises to perform these obligations.

2) Contribution to solving problems in Da Nang city:

The issue of Da Nang city is to prevent increasing energy usage rapidly. Especially measures for energy saving in the building such as hotel is an urgent task because new buildings are constructed in association with developing to tourism city (Number of tourists is increasing 20~30% annually and total numbers of the hotel also increasing). There is great contribution by the project because project target were enterprises, factories, and hotel, etc. and concrete measures for that tasks were clarified.

DOIT/IPDCC's capacity of energy saving analysis was developed through the implementation of energy saving analysis with them through the project. Continuous energy use management of Osumi's technology can be conducted by themselves with “ Document of Implementing Energy-Saving Check”.

3) Contribution to solving problems in Vietnam:

The issue of Vietnam is to implement “Energy Saving Act” smoothly by a unit of central and local government and public and private enterprise and to reduce energy use effectively.

The project outputs became one of the energy conservation management good practices at the local provincial level. This results led to a proposal to the central government concerning the tasks and solutions relating to the implementation of the Energy Conservation Act. Also, it is expected that the central government will deal with the cases in Da Nang and deploy them sideways to other cities, leading to good enforcement of the overall energy saving law.

(2) Lessons Learned and Recommendation through the Survey

- Appropriate energy use such as reduction of electricity use and greenhouse gas emission are necessary for the goal of Da Nang city which is “becoming eco-city by 2020”. Making a plan on “Appropriate energy use” with mainly DOIT is effective.
- To support to make a draft plan, concrete measures based on outputs of this project are suggested as follows.

1) Installation of energy management system such as BEMS etc.:

This is the system which manages energy use comprehensively in buildings or factories or a vast area. Examples are raised as follows.

- Building Energy Management System(BEMS)
- Community Energy Management System(CEMS)
- Energy Service Company (ESCO)

Installation of these systems and comprehensive and systematic energy use

management leads a large scale and effective reduction of energy use.

2) Installation of energy generation technology:

This is the development of cogeneration technology and usage of renewable energy such as solar power etc.. When energy generation technology is developed and generated energy is consumed in Da Nang city, reduction of energy use is expected in Vietnam.

- Yokohama city has a lot of experiences and lessons of above measures. To keep a relationship with Yokohama city and to transfer experiences and technologies lead to implement concrete measures.

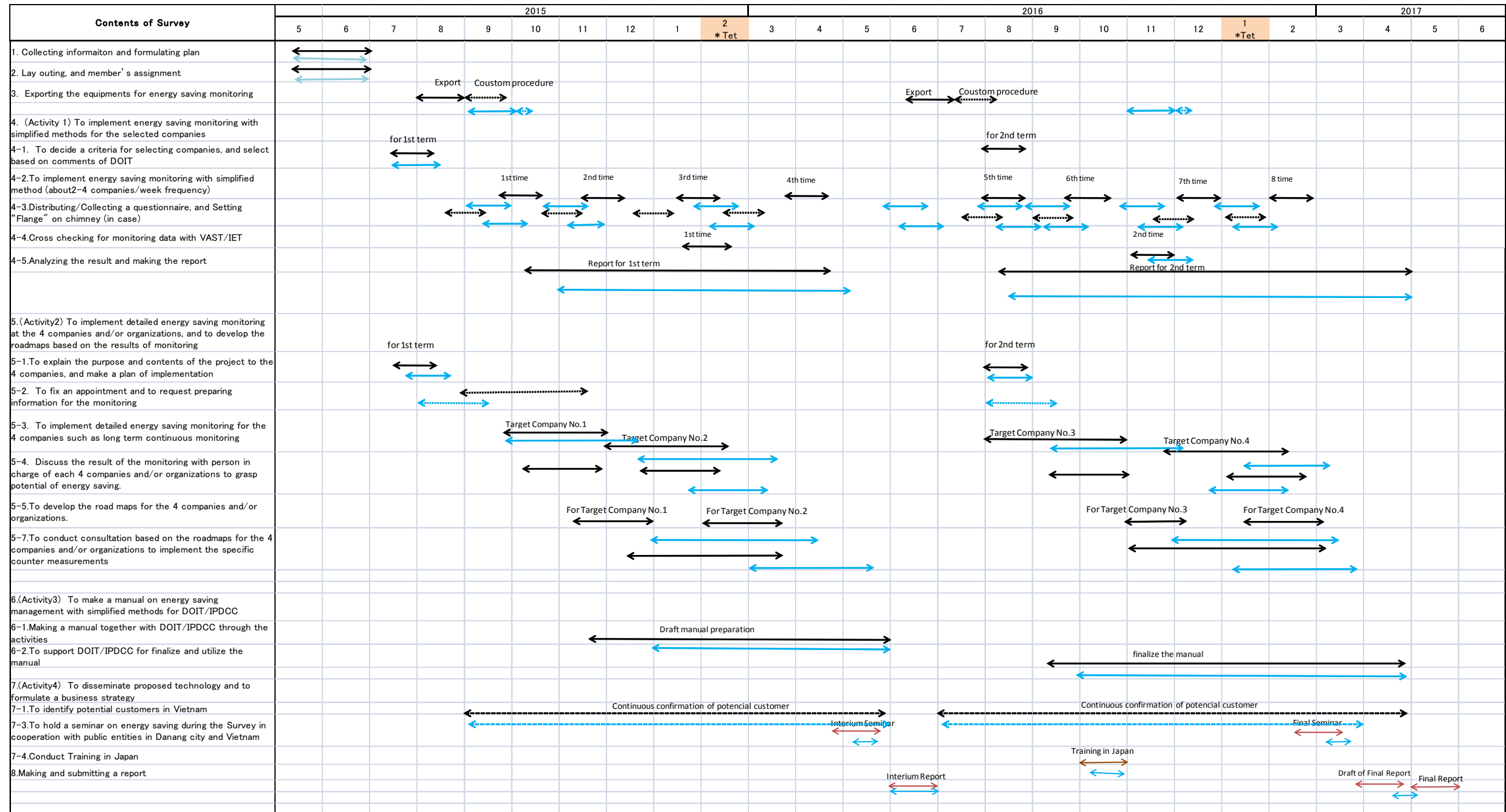
ATTACHMENT: OUTLINE OF THE SURVEY

Annex 1 “the contents of Progress Schedule”

Annex 2 “the contents of Manning Schedule”

Annex 3 “The result of Activity 1 to each target company”

Annex 1 “the contents of Progress Schedule”



Annex 3 “The result of Activity 1 to each target company”

Industry sector	Facilities Name	Using energy type	Countermeasures for energy-saving
Paper manufacture	A company	Wood:	<ul style="list-style-type: none"> -Dry use for fuel (wood) -Making for Air ration properly (10.5%) -Excucing heat insulation of piping -Waste heat recovery (pre-heat of air) or renew boiler -Making highly effective of separator -leaking prevention of pipe -Recovery heat of drain and insulation of piping)
Steel processing	B company	Electric Power	<ul style="list-style-type: none"> -Reduction amount of using electric power of motor -Improvement of mechanical decaling -Edge adjustment of dice -Insulated repair of electric furnace
Seafood processing	C company	Electric Power	<ul style="list-style-type: none"> -Making sun shade for outdoor units -Installed ref-piping -Installed vinyl curtain at refrigerated warehouse -Arrangement of exhibition at refrigerated warehouse
Tire manufacturing	D company	<ul style="list-style-type: none"> -Electricity: Approx. -Diesel oil: Approx. -Combustion gas: JPN/y -Gasoline: 	<ul style="list-style-type: none"> • Exchanging lighting from Hg to LED • Recovering waste steam and insulation of piping • Exchanging pump to energy saving type
FRP manufacturing	E company	Electric Power	<ul style="list-style-type: none"> • Adjustment air compressor (amount of discharged air, proper pressure) • Decrease leaking rate of air piping • Reduced electric power by INV • Exchange lighting to LED at factory • Making sun shade for outdoor unit • Improvement of AC-control
Seafood processing	F company	<ul style="list-style-type: none"> -Electricity: -Diesel oil: -Coal 	<ul style="list-style-type: none"> • Installation high efficiency chiller unit • Pre-heating to water at the coal combustion boiler • Exchange to high efficiency pump • Taking insulation piping
Ceramic Product	G company	<ul style="list-style-type: none"> -Electricity: -Coal: 	<ul style="list-style-type: none"> • Making of air ratio properly • Adjustment density CO at gasification furnace • Reusing waste heat at gasification furnace • Attaching saving energy V-belt to the fans
Fishing tool	H company	<ul style="list-style-type: none"> -Electricity: -Diesel oil: -Combustion gas: approx. 	<ul style="list-style-type: none"> • Repairing insulation of piping and leaking • Cleaning of compressor • Adjustment end pressure of compressed air system • Heat radiation reduction in fusion furnace and fusion face • Accumulator installation on hydraulic power unit
Cement manufacturing	I company	<ul style="list-style-type: none"> -Electricity: -Diesel oil: 	<ul style="list-style-type: none"> • Attaching saving energy V-belt to the fans • Introduction of preliminary disintegrator • Exchanging to high efficiency transformer
Spinning industry	J company	-Electricity :	<ul style="list-style-type: none"> • Dry use for fuel (wood) • Making of air ratio properly • Excuting heat insulation to wall of furnace • Installation high efficiency boiler • Preheating supplied air of boiler

Seafood processing	K company	-Electricity : -Combustion gas :	Cleaning for Cooling tower and Pipes of Chillers heating on water for Boiler -Replacing with LED in frozen vault
Heas phone processing	L company	-Electricity : -Combustion gas : -Diesel oil :	<ul style="list-style-type: none"> • Cooling of outdoor units of air-conditioner and heat exchangers • Cleaning filters for Compressors • Pre cooling down of Air for Compressors • Control for number of Compressors. • Covering sealinder for reducing waste heat
Industy park management	M company	• Electricity :	<ul style="list-style-type: none"> • Use more appropriate capacity for motors • Control for appropriate amount of water flow to companies • Install Micro-babble method for waste water management • Maintenance for Pumps.
Cement manufacturing	N company	-Electricity : -Diesel oil : -Combustion gas :	<ul style="list-style-type: none"> • Replace to PM (Permanent Magnet Type Synchronous Motor) • Install for Mill-motors with Inverter • Install OK mill and CK mill
Cun Manufacturing	O company	-Electricity :	<ul style="list-style-type: none"> • Continuous Tuning for Compressor • Install the displacement air-conditioner • Replacing mercury lamp for ceiling lighting with LED
Hotel	P company	• Electricity : • Diesel oil :	<ul style="list-style-type: none"> • Adjustment Power ratio • Adjustment for pump pressure • Insulation for Steam Pipe • Cleaning for Cooling tower • Install LED lighting of outdoor
Hotel	Q company	• Electricity : • Diesel oil :	<ul style="list-style-type: none"> • Insulation for Steam Pipe • Pre cooling down of Air for Coppersors • attaching heat insulation film of window • Upgrading into V belt of the energy-saving type
Hotel	R company	• Electricity : • LPG : • Diesel oil :	<ul style="list-style-type: none"> • Insulation for Steam Pipe • Stop leaking steam • the adjustment air ratio of the boiler • sprinkled water to the outdoor unit of PAC • attaching heat insulation film of window
Hotel	S company	• Electricity : • LPG : • Diesel oil :	<ul style="list-style-type: none"> • Insulation for Steam Pipe • Stop leaking steam • the adjustment air ratio of the boiler • sprinkled water to the outdoor unit of PAC • attaching heat insulation film of window • Pre cooling down for compressor air • Install small power generator type of boiler • the solar lighting of outdoor
Stock Manufacturing	T company	• Electricity : • Diesel oil : • Coal :	<ul style="list-style-type: none"> • Maintenance for V Pury • Install for V-Velt • Contoll for coal flow • Automation for heating system