

4. Survey of Use of Energy in Model Factories

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(1) Summary of factories

The summary of surveyed 10 factories (9 industries) is shown in Table 4-1. All the factories are of medium and small scale with less than 300 employees, and some factories have no engineer. Their energy consumption scale is not large except glass factory. The majority of these factories have converted the fuel to natural gas, and one of the remainder two is preparing such a conversion.

The market was stagnant at the time of survey, so many factories reduced the employees or cut the operation time, and the operating rate was pressed down on low level.

Table 4-1 Summary of Surveyed Factories

Type of industry	Food	Food	Textile	Paper	Leather	Chemical	Plastics	Cast steel	Metal manu- facturing	Glass
Name of factory	Jugos	Ventura Darsena	Wells	Ansabo	Ventura Hermanos	Norenplast	Plastimet	Cadafe	Tifec	Rayen Cura
Product	Condensed juice	Canned fish	Woolen cloth	Corrugated cardboard paper	Leather	Acryl plate, etc.	Hose	Cast steel products	Automobile gear	Wine bottle
Production	3,500 t	1,100 t	600 thousand m	6,900 t	88,000 sheets	2,900 t	1,200 t	Molten steel 1,200 t	122 t	47 million bottles
No. of employees	44	150	300	66	44	148	80	98	96	175
No. of engineers	2	1	1	2	0	2	0	3	5	1
Energy consumption										
Natural gas	1,529		883	1,579		850		102	494	7,886
Heavy oil		420			183					
Electricity	837	200	2,186	3,279	312	1,130	1,242	1,234	816	4,189
Energy/cost ratio	3	2		20		<1			5	20
Annual operating time	2,400	3,025	4,992	6,960	2,125	6,000	6,000	2,375	2,502	8,760

(2) Situation of energy management

a. Completeness of company policy

The objective factories of this survey neither set up concrete target of energy conservation nor show the target to employees, so these factories did not establish the plans and start systematic energy conservation activity.

Though many managerial officers had a strong interest in energy conservation, they attributed the lack of policy to the following recognition:

The energy cost occupies small part of the total cost.

For the time being, the necessary countermeasures for the equipment have been taken for the equipment.

There was no room for improvement in ordinary operation.

The investment in equipment was difficult unless it would result in the increase of sales due to the depression.

In this connection, Table 4-2 shows the results of investigation by the preliminary survey table on the factory hindring the promotion of energy conservation. The shortage of investment fund and the lack of measuring instruments were selected most in Table 4-2.

The energy conservation does not take effect unless all the employees face this problem squarely. The managerial officers should show their policy and desire concretely to promote energy conservation fixing the items to be executed, target values of saving, allotment of jobs, term of performance, etc.

As individual measures, a factory called out the power-saving showing it on a blackboard and another put out lights rigorously at rest time.

As measures for equipment, the improvement of power factor and recovery of condensates were well executed.

Table 4-2 Problem in Course of Promotion of Energy Conservation

Item	Number of mark
Uncertainty of energy price prospect	2
Less impact of energy cost to the whole cost	0
Expectation of cancelling the incremental cost to the raising price	0
Little room for promoting further energy conservation	0
Shortage of engineers	1
Difficulty in obtaining good energy conservation equipment	0
Unreliable results from energy conservation equipment	0
Uncertainty about return on investment energy conservation	3
Difficulty in obtaining good information such as active case	0
Insufficient system of research and development	3
Shortage of fund for facility improvement	6
Superannuated facilities	2
Low consciousness of employees	0
Lack of personnel who can educate the employees	0
Shortage of measuring equipment	4
No time to analyze energy consumption rate	3
Shortage of information on government's measures	2
Shortage of government's subsidiary measures	1

b. Control by data

In order to improve energy unit and productivity as well as quality, it is necessary to record daily data which show the actual circumstances of the factory and find out the problems by analyzing these data.

The Table 4-3 shows the interval of record of energy consumption in the surveyed factories.

Table 4-3 Interval of Record of Energy Consumption

Interval	1/day	1/week	2/month	1/month	at receipt	No record	Total
Fuel	0	1	1	5	1	1	9
Power	2	1	1	5		1	10

Of these factories, a factory calculated the energy consumption unit rate every day, and other 3 factories calculated it monthly.

Almost all factories grasped the energy consumption by the monthly slips. The energy consumption meters were almost equipped for business only. There were few meters in the factories, but they were broken or did not record the indication. The daily report at each workshop was seldom elaborated.

Such being the case, if there was any change in the energy consumption, it was difficult to determine the cause or to take measures in relation with the operating conditions. If any energy conservation measure was taken, it was impossible to confirm the effect. In the factories which have boilers, it is desired at least to install the feed water flowmeters.

c. Improvement of quality of employees

Energy conservation is the activity in which all the employees should participate, and the improvement of quality of the participants has great significance. Though the engineers have fundamental knowledge, they can plan a more effective measure if they know technics on energy conservation or the example of execution in other factories.

According to the present survey, the exchanges of information on the technics of energy conservation such as the holding of technical lecture meetings, distribution of technical information magazines, exchange of information in the interior of the trade were not so active.

However, a juice factory studied the production technique by the joint efforts of some colleagues and INTI, and the cast steel industry held the technical lecture meetings, published the technical magazines and invited factory visits. We hope that such activities will extend to other industries.

The education for field workers was not done except the instructions given by managerial officers.

The waste of energy is invisible, and its influence on the cost is almost unknown by workers. The offer of such information may bring a spontaneous energy conservation action.

Inviting proposal by the employees and commendation for effective activities are useful to induce the employees' will.

d. Management of equipment

The maintenance and repair of equipment were effected fairly well, but the breakdown of steam trap, leakage from the steam piping, deficient heat insulation, the breakdown of measurement control equipment and deficient arrangement of drawing were observed.

(3) Problems on energy consumption and estimated effect of improvement

Tables 4-4 and 4-5 show the summary of the problems on energy consumption and estimated effect of improvement. About 16% of energy saving can be expected as a whole, though the values are different by factories. The majority of such saving can be obtained by reinforcement of heat insulation which can be done economically.

a. Improvement of operation

High air ratio was observed in many boilers and heating furnaces. When the combustion air becomes excessive, the exhaust gas loss increases, so the air ratio must be maintained at reasonable value. The air ratio was increased by the following reasons:

Defective adjustment or breakdown of the air control equipment

Excessive air suction at low load or when main burner stopped.

Regarding the electric furnace, it was operated with the door opened in spite of high temperature, hence the heat loss became high.

Additionally, we observed excessively high heating temperature and high steam pressure as well as no-load transformers connected.

Prompt execution of countermeasures is desired as the improvement of the above mentioned defects requires no special expenses.

b. Repair of equipment

Insufficient heat insulation was remarkable. In the steam system, the steam piping was comparatively well heat-insulated, but the valves, flanges, condensate tubes, etc. were seldom heat-insulated well. The cost to heat-insulate these equipment can be recovered within one year.

Reinforcement of heat insulation is remarkably effective regarding the glass melting furnace due to its high temperature, and the cost of heat insulation can be recovered within one month.

Profitability of heat insulation was sometimes low regarding the equipment as their annual operating time was short.

Almost half of the steam traps leaked. Probably the reason is the trouble shooting may be difficult because the condensate was collected and the cycle was closed.

The leakage of compressed air was often observed.

c. Improvement of equipment

As the condensate is collected, the exhaust gas heat from the boiler can be seldom used for feed water preheating. Its use for air preheating was considered, but the economic efficiency was not so good as the exhaust gas temperature was relatively low.

Regarding the heating furnace, there was a case in which an air preheater removed in converting the fuel could be used.

The weight reduction of heat insulating materials to lower the heat capacity of the batch type heating furnace is very effective and its economic efficiency is also high.

The control equipment of plastic extrusion molding machine was bad and simultaneous heating and cooling caused electric power loss, so if the control equipment is replaced by a new model, the cost can be recovered in a short term.

Table 4-4 Expected effects of improvement (fuel)

Total Consumption Fuel Gas 1000m ³ /y Fuel Oil kℓ/y	Food - 1 %	Food - 2 %	Textile %	Paper %	Leather %	Chemical %	Plastics %	Cast Steel %	Metal %	Glass %	Total Gas %	Total Oil %
	1529	391	1213	2283	213	604		110	494	7886	14119	604
Improvement of Operation	33.2 2.2	41.4 10.6	32.5 2.7	135.0 5.9	15.0 7.1	19.9 3.3		27.5 25.0	6.1 1.2	154.0 2.0	408.2 17.6	56.4 34.9
Air Ratio	33.2 2.2	41.4 10.6	9 0.7	135.0 5.9	3.5 1.6	17.3 2.9		27.5 25.0	6.1 1.2	154.0 2.0	382.1 16.5	44.9 27.8
Temperature etc			17.9 1.5		11.5 5.4	2.6 0.4					17.9 0.8	
Change of Steam Press											2.6 0.1	11.5 7.1
Prevention of Idling			5.6 0.5								5.6 0.2	
Maintenance	32.4 2.1	59.8 15.3	53.5 4.4	206.1 9.0	33.2 15.6	2.9 0.5			2.3 0.5	1340.0 17.0	1637.2 70.7	93.0 57.6
Insulation	29.1 1.9	54.4 13.9	29.3 2.4	94.6 4.1	15.8 7.4	2.9 0.5			2.3 0.5	1340.0 17.0	1498.2 64.7	70.2 43.5
Repairs of Steam Leakage	3.3 0.2	3.7 0.9		16.8 0.7	2.9 1.4						20.1 0.9	6.6 4.1
Repairs of Steam Trap		1.7 0.4	24.2 2.0	7.0 0.3	14.5 6.8						31.2 1.3	16.2 10.0
Boiler Cleaning				87.7 3.8							87.7 3.8	
Improvement of Equipment	80.8 5.3	12.1 3.1	23.2 1.9	44.6 2.0		2.8 0.5		18.7 17.0	1.4 0.3	98.6 1.3	270.1 11.7	12.1 7.5
Waste Heat Recovery	28.1 1.8	12.1 3.1	23.2 1.9					4.3 3.9		98.6 1.3	154.2 6.7	12.1 7.5
Decrease of Heat Capacity								14.4 13.1	1.4 0.3		15.8 0.7	
Concentrator Vapor Cycling	52.7 3.4										52.7 2.3	
Drainage System				44.6 2.0							44.6 1.9	
Heating Method						2.8 0.5					2.8 0.1	
Heat Total	146.4 9.6	113.3 29.0	109.2 9.0	385.7 16.9	48.2 22.7	25.6 4.2		46.2 42.0	9.8 2.0	1592.6 20.2	2315.5 100.0	161.5 100.0

Table 4-5 Expected effects of improvement (Electric Power)

Total Consumption Electric Power 1000 kWh/y	Food - 1 %	Food - 2 %	Textile %	Paper %	Leather %	Chemical %	Plastics %	Cast Steel %	Metal %	Glass %	Total %
	837	200	2186	3279	312	1130	1242	1234	816	4189	15425
Improvement of Operation	0	0	11.7 0.5	0	1.0 0.3	0	1.6 0.1	186.0 15.1	7.8 1.0	26.3 0.6	234.4 50.4
Transformer operation			11.7 0.5				1.6 0.1	19.4 1.6			31.1 6.7
Compressed air pressure					1.0 0.3				7.8 1.0	26.3 0.6	2.6 0.6
Air compressor operation								100.0 8.1			34.1 7.3
Arc Furnace								66.6 5.4			100.0 21.5
Induction Furnace											66.6 14.3
Maintenance					1.2 0.4			30.8 2.5			32.0 6.9
Repairs of air leak					1.2 0.4			30.8 2.5			32.0 6.9
Improvement of Equipment	18.9 2.3	0.8 0.4	14.4 0.7	0	0	0	160.0 12.9	0.0	4.6 0.6	0	198.7 42.7
Improvement of power factor	5.5 0.7	0.8 0.4									6.3 1.4
Blower impeller cut			14.4 0.7						4.6 0.6		14.4 3.1
Effective illumination	13.4 1.6						160.0 12.9				18.0 3.9
Extruder control system											160.0 34.4
Electric Power Total	18.9 2.3	0.8 0.4	26.1 1.2	0 0	2.2 0.7	0	161.6 13.0	216.8 17.6	12.4 1.5	26.3 0.6	465.1 100.0

5. Reference to Formulate the Technical
Guideline for the Promotion of Rational
Use of Energy in Industry

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We summarize here the items which may be helpful for INTI to prepare necessary guideline to promote energy conservation diagnosis in future or for the education of factory engineers in the lecture meeting, etc.

We mention fundamental affairs and examples of energy conservation regarding 9 classes of industries surveyed this time and common affairs such as boilers and electricity.

It is expected that INTI will accumulate gradually many information obtained through the diagnosis, etc. based on these data.

Attached Data

Survey team members

Attached Data 1

No.	Name	Assignment	Work schedule
1.	Takashi NIKURA	Leader (1987)	First Field Survey Home Office Work
2.	Mitsuo IGUCHI	Energy Management (1987) Leader (after 1988)	Preliminary Field Work First Field Survey Second Field Survey Home Office Work
3.	Issei FURUGAKI	Energy Management	Second Field Survey Home Office Work
4.	Teruo NAKAGAWA	Diagnostic Techniques Heat Management	Preliminary Field Work First Field Survey Second Field Survey Home Office Work
5.	Kaoru NAKAO	Food Process Heat Management	First Field Survey Home Office Work
6.	Takashige TANIGUCHI	Fiber Process Heat Management	First Field Survey Second Field Survey Home Office Work
7.	Akira KOIZUMI	Paper Process Heat Management	Second Field Survey Home Office Work
8.	Genzo EMA	Leather Process Heat Management	Second Field Survey Home Office Work
9.	Naoshi HONDA	Chemical Process Heat Management	Second Field Survey Home Office Work
10.	Keiji SAWADA	Plastic Process Heat Management	Second Field Survey Home Office Work
11.	Yukio NOZAKI	Steel Process Heat Management	Second Field Survey Home Office Work
12.	Shoji NAKAI	Glass Process Heat Management	Second Field Survey Home Office Work
13.	Isamu TAKI	Electric Furnace Dissolution Heat Management	Second Field Survey Home Office Work
14.	Ken-ichi KURITA	Electric Management	First Field Survey Home Office Work
15.	Toshio IIMORI	Electric Management	Second Field Survey Home Office Work
16.	Toshio SUGIMOTO	Electric Management	Second Field Survey Home Office Work

No.	Name	Assignment	Work schedule
17.	Hiroaki WAKIYASU	Promotion of Energy Conservation	First Field Survey Home Office Work
18.	Kazuto OGASAWARA	Energy Policy	First Field Survey Home Office Work
19.	Jiro KONISHI	Heat Management Metal Process	Home Office Work
20.	Masao TANAKA	Heat Management	Home Office Work
21.	Tadayasu IKAWA	Electric Management	Home Office Work
22.	Hirokazu HIRATA	Energy Conservation Policy Promotion of Energy Conservation	Home Office Work
23.	Yukio FUSE	Energy Conservation Policy Promotion of Energy Conservation	Home Office Work

No.	Name	Assignment
1.	Mr. Mario OGARA	Mission Leader
2.	Mr. Daniel AFIONE	Mission Leader
3.	Mr. Ernesto M. LEIKIS	Mission Leader
4.	Mr. Marcelo A. SILVOSA	Electric Power Facilities Unit Operation and Process
5.	Mr. Jorge A. FIORA	Mission Leader Unit Operation and Process
6.	Mr. Alberto BERSET	Heat and Steam using Device
7.	Mr. Anibal MONZON	Heat Area and Driver of Mobil Unit
8.	Mr. Miguel BERMEJO	Electric Power Facilities
9.	Mr. Arturo D. VERGHELET	Electric Power Facilities
10.	Mr. Hector G. CITADINO	Training Member
11.	Mrs. Patricia M. KOHLER	Training Member
12.	Mr. Ignacio F. COZZA	Training Member
13.	Mrs. Beatriz R. MARTINEZ	Training Member
14.	Mr. Oscar W. FUENTES	Training Member
15.	Mr. Pedro L. COZZA	Training Member
16.	Mrs. Maria L. GOMEZ	Training Member
17.	Mr. Roberto DOMECCO	Training Member
18.	Mr. Juan C. BALMAYOR	Training Member
19.	Mr. Osvaldo H. FRANCO	Training Member
20.	Mrs. Patricia ARROSSAGARAY	Process Adviser
21.	Mrs. Patricia BARES	Process Adviser
22.	Mr. Hugo E. VELEZ	Process Adviser
23.	Mr. A. ESCUARISI	Process Adviser

Field Survey Schedule

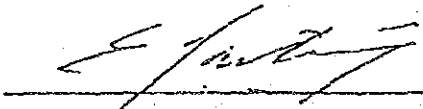
Attached Data 3

Date	Item
<p>Preliminary Survey (2 members) 1987. Dec. 8 -- Dec. 9 Dec. 10 -- Dec. 18 Dec. 19 -- Dec. 21 Dec. 21 -- Dec. 23</p>	<p>From Tokyo to Buenos Aires Explaining survey outline to JICA and Embassy of Japan Preliminary Survey of the ten factories to be audited Meeting with INTI and Bureau of Energy Signing Minutes Reporting the survey results to JICA and Embassy of Japan. From Buenos Aires to Tokyo</p>
<p>Team A (2 members) 1988. Feb. 22 -- Feb. 23 Feb. 24 Feb. 25 -- Feb. 28 Feb. 29 -- Mar. 18 Mar. 19 -- Mar. 20 Mar. 21 -- Mar. 23</p>	<p>From Tokyo to Buenos Aires Explaining survey outline to JICA and Embassy of Japan Explaining Inception Report to INTI Preparations for survey Survey INTI, UTN, YPF, ESSO, SHELL, SEGBA, GAS DEL ESTADO, NATIONAL DEVELOPMENT BANK, AGUA Y ENERGIA, IACRE, BUREAU OF FINANCE, JAPAN CHAMBER OF COMMERCE AND INDUSTRY, JETRO, CNEA, EL CRONISTA COMERCIAL, AAPURE Signing Progress Report at INTI Reporting the survey results to JICA and Embassy of Japan</p>
<p>Team B (5 members) 1988. Feb. 22 -- Mar. 11 Mar. 5 -- Mar. 11 Mar. 7 -- Mar. 11 Mar. 12 -- Mar. 19 Mar. 20 -- Mar. 25 Mar. 26 -- Mar. 28 Mar. 29 -- Mar. 31</p>	<p>From Tokyo to Buenos Aires (First Group, 1 member) Preparation for Survey From Tokyo to Buenos Aires (Second Group, 1 member) Preparation for Survey) From Tokyo to Buenos Aires (Third Group, 3 members) Preparation for Survey From Buenos Aires to Neuquen Surveying Juice Factory From Neuquen to Mar del Plata Surveying Fish Cannery From Mar del Plata to Buenos Aires Signing Progress Report at INTI Reporting the survey results to JICA and Embassy of Japan From Buenos Aires to Tokyo</p>

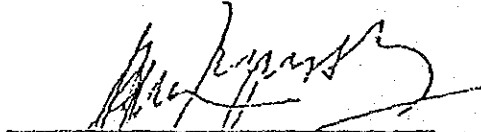
Date	Item
<p>Second Survey Team A (6 members) 1988. Sept. 26 – Sept. 28</p> <p>Sept. 29 – Oct. 2</p> <p>Oct. 3 – Oct. 8</p> <p>Oct. 9 – Oct. 15</p> <p>Oct. 16 – Oct. 21</p> <p>Oct. 22 – Oct. 23</p> <p>Oct. 24 – Oct. 26</p>	<p>From Tokyo to Buenos Aires</p> <p>Explaining survey outline to JICA, Embassy of Japan and INTI</p> <p>Meeting with INTI</p> <p>Preparations for Survey</p> <p>Surveying Fiber Factory (Buenos Aires)</p> <p>Surveying Paper and Pulp Factory (Buenos Aires)</p> <p>From Buenos Aires to La Plata</p> <p>Surveying Leather Factory (La Plata)</p> <p>From La Plata to Buenos Aires</p> <p>Preparation of progress report and arrangements with Team B</p> <p>Reporting the survey results to JICA and Embassy of Japan</p> <p>From Buenos Aires to Tokyo</p>
<p>Team B (5 members) 1988. Oct. 20 – Oct. 23</p> <p>Oct. 24 – Oct. 29</p> <p>Oct. 30 – Nov. 4</p> <p>Nov. 5 – Nov. 6</p> <p>Nov. 7 – Nov. 9</p>	<p>From Tokyo to Buenos Aires</p> <p>Preparation for Survey and Arrangements with Team A</p> <p>Surveying Chemical Factory (Buenos Aires)</p> <p>Surveying Plastic Factory (Buenos Aires)</p> <p>Preparation of progress report and arrangements with Team C</p> <p>Reporting the survey results to JICA and Embassy of Japan</p> <p>From Buenos Aires to Tokyo</p>
<p>Team C (6 members) 1988. Nov. 3 – Nov. 6</p> <p>Nov. 7 – Nov. 11</p> <p>Nov. 12 – Nov. 18</p> <p>Nov. 19 – Nov. 25</p> <p>Nov. 26 – Nov. 28</p> <p>Nov. 29 – Nov. 30</p> <p>Dec. 1 – Dec. 3</p>	<p>From Tokyo to Buenos Aires</p> <p>Preparation for Survey and Arrangements with Team B</p> <p>Surveying Cast Steem Factory (Buenos Aires)</p> <p>From Buenos Aires to Cordoba</p> <p>Surveying Metal Processing Factory (Cordoba)</p> <p>From Cordoba to Mendoza</p> <p>Surveying Glass Factory (Mendoza)</p> <p>From Buenos Aires to Tokyo</p> <p>Submitting Progress Report to INTI</p> <p>Explanation of Interim Report</p> <p>Maintenance of Survey Equipment</p> <p>Reporting the survey results to JICA and Embassy of Japan</p> <p>From Buenos Aires to Tokyo</p>

SCOPE OF WORK
FOR
THE STUDY
ON
THE RATIONAL USE OF ENERGY IN INDUSTRY
IN
THE ARGENTINE REPUBLIC
AGREED UPON BETWEEN
INSTITUTO NACIONAL DE TECNOLOGIA INDUSTRIAL
AND
JAPAN INTERNATIONAL COOPERATION AGENCY

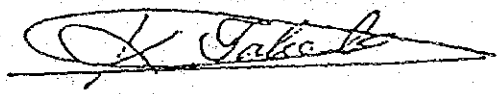
March 24, 1987



Ing. Enrique Mario Martínez
Presidente de INTI



Embajador Oscar Tujnovsky
Subsecretario de Cooperación Internacional
Ministerio de Relaciones Exteriores y
Culto



Mr. Keiichi Takeda
Leader of the Preliminary
Survey Team

The Japan International
Cooperation Agency

1. Introduction

In response to the request of the Government of the Argentine Republic (hereinafter referred to as "Argentina"), the Government of Japan has decided to conduct a study on the rational use of energy in industry in Argentina (hereinafter referred to as "the Study") in accordance with the Agreement on Technical Cooperation between the Government of Japan and the Government of Argentina.

The Japan International Cooperation Agency (hereinafter referred to as "JICA"), the official agency responsible for the implementation of the technical cooperation programs of the Government of Japan, will undertake the Study, in close cooperation with authorities concerned of the Government of Argentina.

The present document sets forth the scope of work with regard to the Study.

2. Objective of the Study

The objective of the Study is to contribute to the promotion and strengthening of rational use of energy in the field of manufacturing industry in Argentina by ^(a) studying the technical and managerial applicability of rational use of energy in selected manufacturing industry ^(b) and formulating the report for the promotion of rational use of energy in industry.

3. Scope of the Study

In order to achieve the above objective, the Study will cover the following items:

- (1) literature survey on the energy situation in Argentina

① To survey the energy situation in Argentina

② To survey the situation of energy use in the field of whole manufacturing industry in Argentina

(2) Study on the promotion of rational use of energy in the manufacturing industry

① To investigate current program for rational use of energy

② To study and evaluate the INTI's activities

ⓐ the current activities for promotion of rational use of energy

ⓑ the achievements of past activities

ⓒ the future plan/program for promotion of rational use of energy

(3) Study on the situation of energy use in the selected factories of each industry

① To survey the situation of energy use in each factory

ⓐ the outline of the factory

ⓑ the situation of energy management

ⓒ energy flow chart

ⓓ the situation of major energy consuming equipment

ⓔ the problems found in each factory and countermeasures without changing the existing production process

ⓕ the estimated effects of the countermeasures

② To prepare the reference to formulate the technical guideline for the promotion of rational use of energy in industry

(4) Recommendation for the promotion of the rational energy use in Argentina

① To recommend with measures to promote rational use of energy in the

field of small and medium sized manufacturing industry

② To recommend with activities of INTI for rational use of energy

4. Steps and Schedule of the Study

(1) Steps

Step 1: Preparatory field work in Argentina

Step 2: Preparatory work in Japan

Step 3: First field work in Argentina

Step 4: Home office work in Japan

Step 5 ①: Second field work in Argentina

②: Presentation of and discussion on the interim report

Step 6: Home office work in Japan

Step 7: Presentation of and discussion on the Draft Final Report

(2) Schedule

Schedule of the Study is shown in Annex.

5. Reports

JICA shall prepare and submit the following reports written in English to the Government of Argentina within the time periods indicated below:

- | | |
|--|-----------|
| (1) Inception Report at the commencement of the Step 3: | 10 copies |
| (2) Progress Report at the end of the Step 3 and 5①: | 10 copies |
| (3) Draft Final Report and its summary within 15 (fifteen) months after the commencement of the Step 3: | 15 copies |
| (4) Final Report and its summary within 3 (three) months after the receipt of comments on the Draft Final Report from the Government of Argentina: | 30 copies |

6. Undertakings of the Government of Argentina

(1) The Government of Argentina shall accord privileges, immunities and other benefits to the Japanese study team (hereinafter referred to as "the Team") in accordance with the Agreement on Technical Cooperation between the Government of Japan and the Government of Argentina.

(2) In order to facilitate the smooth implementation of the Study, the Government of Argentina shall take necessary measures:

① To secure the safety of the Team,

② To permit the members of the Team to enter, leave and sojourn in Argentina for the duration of their assignment therein, and exempt them from alien registration requirements and consular fees,

③ To exempt the members of the Team from taxes, duties and other charges on equipment, machinery and other materials brought into Argentina for the implementation of the Study,

④ To exempt the members of the Team from income tax and other charges of any kind imposed on or in connection with any emolument or allowance paid to them for their services in relation to the implementation of the Study,

⑤ To provide the members of the Team with necessary facilities for remittance as well as utilization of the funds introduced into Argentina from Japan in the course of the implementation of the Study,

⑥ To secure the permission for the members of the Team to enter into private properties and restricted areas for the implementation of the Study,

⑦ To secure the permission for the members of the Team to take all data and documents (including photographs and maps) related to the Study.

out of Argentina to Japan.

⑧ To provide medical services as needed and its expenses will be chargeable on the members of the Team.

(3) The Government of Argentina shall bear claims, if any arises against the members of the Team resulting from, occurring in the course of, or otherwise connected with the discharge of their duties in the implementation of the Study, except when such claims arise from gross negligence or willful misconduct on the part of the members of the Team.

1) INTI shall act as counterpart agency to the Team and also as coordinating body in relation with other governmental and non-governmental organizations concerned for the smooth implementation of the Study.

(5) INTI shall, at its own expense provide the Team with the following, in cooperation with other relevant organization:

- ① Available data and information related to the Study
- ② Counterpart personnel
- ③ Suitable office space with necessary equipment
- ④ Identification cards

7. Undertaking of JICA

For the implementation of the Study, JICA shall take the following measures:

- (1) To dispatch, at its own expense, the Team to Argentina
- (2) To pursue technology transfer to Argentine counterpart personnel in the course of the Study

8. Consultation

JICA and INTI shall consult with each other in respect of any matter that may arise from or in connection with the Study.

Tentative Schedule of the Study

Annex 2

Year & Month	1967												1968						1969						
	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	
Preparatory Field Work																									
Preparatory Work																									
Field Work (1)																									
Home Office Work																									
Field Work (2)																									
Discussion of I.II ⁽¹⁾																									
Home Office Work																									
Submission of D.F.II ⁽²⁾																									
Discussion of D.F.II																									
Submission of F.II ⁽³⁾																									*

In Japan In the Argentine Republic

(1) I.R : Interim Report (2) D.F.II : Draft Final Report (3) F.II : Final Report

The Minutes of Discussions

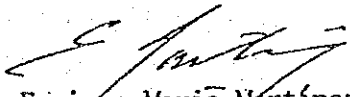
The preliminary survey team of the Japan International Cooperation Agency, headed by Mr. Keiichi Takeda, visited the Argentine Republic from March 17 to 25, 1987 and had discussions with the Instituto Nacional de Tecnología Industrial and the Secretaría de Energía and other agencies concerned on the scopes of work and the methods of implementation of the Study on the Rational Use of Energy in Industry in the Argentine Republic.

Through the discussions and consultations, both parties agreed upon the matters as follows:


- I - The sub-sectors and the number of factories to be surveyed in the Study are:
 - a) Sub-sectors:
(1) Metal; (2) Glass; (3) Iron & Steel; (4) Chemical; (5) Paper & Pulp; (6) Food; (7) Textile; (8) Leather and (9) Plastic.
 - b) Number of factories: Aproximately ten (10)
- II - The selection of small and medium sized factories in each sub-sector of industry shall be done by INTI based upon the criteria agreed upon between both parties.
- III - The Japanese side suggested INTI to finish the questionnaire survey toward the selected factories before the arrival of the preparatory field survey team in September 1987, and INTI agreed to it.
- IV - INTI requested the Japanese side to provide the equipment listed in the attached paper upon the completion of the said study, and the Japanese side agreed to it.

- V - The Japanese side asked INTI to forward the A-4 Form for the above mentioned equipment through the proper channel of the Argentine side, and INTI agreed to it.
- VI - The Argentine side emphasized the importance of technology transfer to the Argentinian counterparts in the field of factory energy audit and data analysis through either the implementation of the field survey in Argentina or counterpart training in Japan, and the Japanese side took a good note of it.

March 25, 1987



Ing. Enrique Mario Martínez
Presidente de INTI



Mr. Keiichi Takeda
Leader of the Preliminary
Survey Team
The Japan International
Cooperation Agency

ATTACHED PAPEREquipment List
for
Factory Energy Audit

page 1

No	Item	Numbers
1	Equipment Carrying Vehicle with Rack and Lifter	1
2	Portable Type Equipment for Heat Audit	
	1) Ultrasonic Flow Meter for Fuel Oil	1
	2) Ultrasonic Flow Meter for Water	1
	3) High Temperature Anemometer	1
	4) Heat Flow Meter	1
	5) Pocketable Oxygen Meter	1
	6) Zirconia Type O ₂ Analyzer	1
	7) CO ₂ and CO Gas Tester	1
	8) Gas Sampling Tube	1
	9) Surface Thermometer	1
	10) Sheath Thermo Couple (CA)	10
	11) Compensated Cable for Thermo Couple	10
	12) Digital Thermometer for Thermo Couple	2
	13) Water Conductivity Meter	1
	14) pH Meter	1
	15) Digital Low Pressure Meter for Gas	1
	16) 12-Channels Hybrid Recorder	2
	17) 3-Channels Pen Recorder	1
	18) Infrared Radiation Thermometer (-50 to 1000 C)	1
	19) Infrared Radiation Thermometer (600 to 3000 C)	1
	20) Infrared Radiation Thermal Video System with Personal Computer	1
	21) Voltage Stabilizer of Supply Power	2
	22) Steam Trap Checker	1
	23) Desk Size Wagon	2
	24) Power Supply Cord and Reel	1
	25) Pocket Computer	1
	26) Stop-Watch	1
	27) Glass Thermometer	1
	28) Cobalt Glass for Eye Protect	1
	29) Heat Resisting Gloves	1
	30) Camera	1
	31) Flow Meter for Gas and Steam	1

No	Item	Numbers
3	Portable Type Equipment for Electricity Audit	
	1) Clamp-on Type Watt-Power Factor Meter (6-Channels)	1
	2) Clip-on AC Power Meter	1
	3) DC Volt-Ammeter	1
	4) Watt-Hour Meter	1
	5) 12-Channels Hybrid Recorder	1
	6) 3-Channels Pen Recorder	2
	7) Power Line Transducer (A,V,kW,kVar,PF)	2
	8) Circuit Tester	1
	9) Tachometer	1
	10) Lux Meter	1
	11) Voltage Stabilizer of Supply Power	1
	12) Desk Size Wagon	1
	13) Power Supply Cord and Reel	1
	14) Pocket Computer	1
	15) Frequency Meter	1
	16) Voltage Detector	1
	17) Insulation Gloves	1

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5101/5201/5251/5351. Sede Central: Leandro N. Alem 1067, 5º, 6º y 7º piso - 1001 Cap. Federal - Repú-
blica Argentina - Tel.: • 313-3013/3093/3253/3403 - Telegramas: INTIBAIRE\$ - Télex: 021859 INTIAR.

PREPARATORY FIELD WORK TEAM FROM JICA

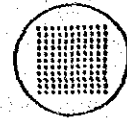
December 9-21 1987

MINUTES OF DISCUSSIONS

Lic. Mario OGARA, Head
Department of Energy
INTI

Mr. Teruo NAKAGAWA
Leader of Preparatory
field Work Team
The Japan International
Cooperation Agency

Dr. Enrique GRUNHUT, Head
Department of International
Relations and Projects
INTI



Laboratorios: Parque Tecnológico Miguelete - Av. Gral. Paz e/ Albarillos y Constituyentes - C.C. 157 - 1650 San Martín - Prov. de Buenos Aires - Tel.: • 755-6161/6212/6314/6365/6416/6467/6518 y • 752-5281/5101/5201/5251/5351. Sede Central: Leandro N. Alem 1067, 5º, 6º y 7º piso - 1001 Cap. Federal - República Argentina - Tel.: • 313-3013/3093/3253/3403 - Telegramas: INTIBAIRES - Télex: 021859 INTIAR.

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The Minutes of Discussions on Study on Rational Use
of Energy in Industry in the
Argentine Republic

The preparatory field work team of the Japan International Cooperation Agency (JICA) visited the Argentine Republic from December 9 to 21, 1987. The team had preparatory survey and discussions with the Instituto Nacional de Tecnología Industrial (INTI).

Through the discussions and consultations, both parties agreed upon the matters as follows:

1.- The Japanese team had the preparatory survey of ten factories selected by INTI in nine industries. As the result of the survey, the Japanese team approved the factories suitable to be surveyed in the first and second field work.

Name, type of industry, and address of each factories are as follow:

1) JUGOS S.A.

Food Industry

Parque Industrial Reginense, Villa Regina C.C., 156 Prov. de Río Negro.

2) DARSENA S.A.

Food Industry

José Hernandez 145 Mar del Plata, Prov. de Bs.As.

3) CADAFE S.R.L.

Iron and Steel (foundry) Industry

Aguero 4860, Villa Dominico, Prov. de Buenos Aires

4) TIFEC S.A.I.C.y F

Metal Industry

Cno. San Carlos km 2.5, Ciudad de Córdoba

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5101/5201/5251/5351. Sede Central: Leandro N. Alem 1067, 5º, 6º y 7º piso - 1001 Cap. Federal - Repu-
blica Argentina - Tel.: • 313-3013/3093/3253/3403 - Telegramas: INTIBAIRES - Télex: 021859 INTIAR.

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- 5) ANSABO S.C.A.
Paper and Pulp Industry
Isidoro Iriarte 1257 Villa La Florida Prov. de Bs.As.
- 6) WELLS S.A.
Textile Industry
Inglaterra 231, San Martín, Prov. de Bs.As.
- 7) VENIURA HNOS.
Leather Industry
Ruta Provincial 11 km 43, Magdalena Prov. de Bs.As.
- 8) RAYEN CURA S.A.
Glass Industry
Carril Nacional 6070, Rodeo de la Cruz, Prov. de Mendoza
- 9) NOREN PLAST S.A.
Chemical Industry
Ruta Nac. N° 3 km 35.4, Gonzalez Catán, Prov. de Bs.As.
- 10) PLASTIMET S.A.
Plastic Industry
Pampa 515, Bella Vista, Prov. de Bs.As.

2.- The Japanese team showed the following draft of survey schedule of ten factories to INTI, and asked INTI to make appointments with factories, and INTI agreed to it

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1st STAGE

1st GROUP

1) JUGOS S.A.	1988.2.29	3.4
2) DARSENA S.A.	1988.3.7	3.11
3) WELLS S.A.	1988.3.14	3.18

2nd STAGE

2nd GROUP

4) ANSABO S.C.A.	1988.10.10	10.14
5) VENTURA HNOS.	1988.10.17	10.21

3rd GROUP

6) NOREN PLAST S.A.	1988.10.24	10.28
7) PLASTIMET S.A.	1988.10.31	11.4

4th GROUP

8) CADAFE S.R.L.	1988.11.7	11.11
9) TIFEC S.A.I.C.Y E.	1988.11.14	11.18
10) RAYEN CURA S.A.	1988.11.21	11.25

The dates of the second stage will be confirmed not later than the first week of June, considering the visiting groups of experts.

INTI asked the Japanese team to inform the necessary preparatory tasks to be carried out in the factories before the second stage, not later than the first week of June.

Secretaría de Industria y de Comercio Exterior
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blica Argentina - Tel.: * 313-3013/3093/3253/3403 - Telegramas: INTIBAIRES - Télex: 021859 INTIAR.

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3.-The Japanese team asked INTI to prepare the following members as Argentinian counterpart who will work together with the Japanese team at the first and second field work, and INTI agreed to it.

1) Numbers of the Argentinian counterparts for factories survey at the first and second field work.

Heat engineer	2 or more
Electric engineer	1 or more

2) Numbers of the Argentinian counterparts for the survey of energy policy and energy conservation dissemination at the first field work.

Counterpart	1 or more
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4.-The Japanese team showed the attached survey schedule for energy policy and energy conservation dissemination and asked INTI to make appointments with visiting organizations, and INTI agreed to take all steps within its reach to satisfy this request.

ATTACHED SURVEY SCHEDULE

Schedule plan of research on energy demand & supply and energy conservation

DATE		Companies to be visited	Main issues
1988 Feb. 25	Thu	INTI	Explanation of details of research
26	Fri	INTI	Reconfirm of the schedule
29	Mon	INTI	INTI's policy and activity for energy conservation
Mar. 1	Tue	Bureau of Energy	Long term energy plan, energy prices, details of energy consumption
2	Wed	Bureau of Energy	National energy conservation policy
3	Thu	UTN	UTN's activities on energy conservation
4	Fri	YFF	Development plan, middle and long term market forecast and policy on oil
7	Mon	Esso, Shell	Development plan, middle and long term market forecast and policy on oil
8	Tue	Gas del Estado	Development plan, middle and long term market forecast and policy on gas
9	Wed	SEGSA	Development plan, middle and long term market forecast and policy on electricity
10	Thu	CNEA	Middle and long term development plan
11	Fri	Agua y Energia	Details of energy consumption
14	Mon	JETRO, Japanese chamber of commerce and industry	General research on energy
15	Tue	Bureau of Budget	Tax policy for energy conservation, international accounts
16	Wed	National Development Bank	Budget policy for small and medium-sized companies and for energy development and energy conservation
17	Thu	LRA, Clarin	Public information on energy conservation
18	Fri	Bureau of Energy	National energy policy

