

<b>Project No. 4.1 Introduction of a Preferential Purchasing System of SME Products by the Public Sector</b>
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**1. Rationale**

SMEs have a disadvantage in marketing power in general. Especially, when SMEs develop new market, they face a more severe situation than the large-size enterprises. One idea to support marketing efforts by SMEs is for the public sector to open its market by granting more opportunities to SMEs for supplying contractual services and goods. The public sector including governmental offices periodically purchases goods and services in large quantities so that if those offices and institutions allocate a certain volume of business to SMEs it can have a substantial impact. This system can be seen in many countries including Japan and the U.S., but has not been adopted by Thailand.

For reference:

- Target amount of the Japanese Government in 1998 was 4,906 billion yens.
- Target amount of the Federal Government of the USA in 1995 was 61.7 billion dollars.

**2. Purpose**

To preferentially provide SMEs with access to the market for public sector purchases of goods and services.

**3. Output of the Project**

- (1) Legislative base for the preferential purchase of SMEs by the public sector
- (2) Increased opportunities for SMEs to supply goods, works and services to the public sector

**4. Project Description**

- (1) To release advance information related to purchase of goods and others.

- (2) To determine those items of goods and services purchase of which is to be a matter of priority for SMEs, and to accept competitive bids from SMEs for purchase of these goods and services.
- (3) To simplify the proceedings from bidding to contracting and to simplify the required documents.
- (4) Establishment of a law will be required for implementation of this project.
- (5) The objective of this project is to increase the opportunities of SMEs to receive orders.

## **5. Implementation Body and Financing Source**

Thai government and public institutions are the implementation body of the project. No significant special expenditure will be needed.

## **6. Activities**

- (1) Official organizations (including state corporation) should submit to the SMEs promotion office in each fiscal year for its approval, the amount of procurement of goods and services including the amount of contracts for construction work, in the form of estimated amounts of the contracts with specific description of the target amount to be allocated to the SMEs.
- (2) The offices shall summarize this and publish the information as governmental policy for expanding the opportunities for SMEs to do business with the government.
- (3) Official organizations should report the actual results to the office at the end of each fiscal year. The office is to be empowered to request the authorities concerned to submit measures to increase the opportunities of the order to SMEs if required.
- (4) By registering the names of SMEs that wish to become a general contractor, or subcontractor, to the government in database, access to governmental organizations should be facilitated. In order to assure smooth operations so as to allow SMEs to participate, an efficient ordering system should be built by reducing paperwork and simplifying procedures, as well as by providing a window for advice on public sector procurement.
- (5) From the standpoint of local area development, the procurement by local public organizations should be made to the enterprises from the local area or neighboring area as much as possible.

**7. Expected Benefits of the Project**

Improved market access for SMEs.

**8. Weakness of the Project**

Difficulty in ensuring equitable treatment to all companies, and in justifying preferential treatment for SMEs.



<b>Project No. 4.2 Strengthening of Export Promotion Activities</b>
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## **1. Rationale**

The key factor for expanding exports of SME products is to improve their international competitiveness in terms of quality, cost, delivery, and development. The improvement of SMEs' international competitiveness, however, is thought to premise the following conditions.

- (1) Thai SMEs make their products better familiar to foreign consumers.
- (2) Thai SMEs have enough information about export demand.

It would be impossible for SMEs to improve the competitiveness of their products if these conditions were not fully met. Apparently, SME products are less familiar with foreign consumers than LE products and SMEs have less information on export demand than LEs.

The above conditions, however, cannot be satisfied by SMEs' marketing efforts alone. It will be necessary for the government to support their strenuous efforts in cooperation with industrial associations.

Moreover, according to the new questionnaire survey on SMEs, "marketing/sales promotion" ranks first in their response to the question about, what they desire from the government. Among 201 SMEs, 87 (43.3%) hope for marketing/sales promotion by the government. The government's marketing/sales support to SMEs can be thought to mean the improvement of their marketing conditions.

## **2. Purpose**

The purpose of the project is to assist SMEs in upgrading their marketing capability.

### **3. Outputs of the Project**

- (1) Thai SMEs make their products more familiar with foreign consumers.
- (2) Thai SMEs can have more information about export demand.

### **4. Project Description**

The project targets SMEs which are not well-known to the export markets and do not have enough information about export demand. The project is implemented by the government agencies and industrial associations, and intended to lay the foundation of export promotion by SMEs.

The project is composed of various kinds of activities which can be divided into two groups with different aims. The first group aims to make the existing SME products more familiar with foreign consumers. Its activities include making databases for SMEs and their products, opening of home pages for SME products, encouraging SMEs to participate in foreign trade fairs and exhibitions, giving packaging services for SME products, and campaigns for SME products via the mass media. The second group aims to make SMEs more familiar with demand in the export markets. Its activities include making a database of potential buyers in foreign countries, holding seminars on the market trends of foreign countries, and dispatching trade missions abroad.

The project aims at supporting SMEs' efforts for export marketing, through the above activities. For the implementation of the project, the DIP and the DEP will work out a five-year program, in cooperation with the FTI and the TCC.

### **5. Implementation Body and Financing Source**

The DIP and the Department of Export Promotion (DEP) of the Ministry of Commerce should form a joint committee in cooperation with the Federation of Thai Industries and the Thai Chamber of Commerce. At the DIP, the Bureau of Industrial Sector Development (BISD) and the Bureau of Supporting Industries Development (BSID) should play leading roles as the government organizations working for the SMEs.

The DIP and the DEP should make the most of the FTI and the TCC to collect information on SMEs and their products, to carry out trade fairs and exhibitions, and to give marketing support like joint packaging services. Furthermore, Industrial Promotion Centers of the DIP should act as the core organizations for expanding export promotion activities in each region.

For financing the project, the government should make an annual budget.

## **6. Activities**

- (1) To make a database of potential foreign buyers
- (2) To make a database of Thai SMEs and their products
- (3) To make home pages for Thai SMEs and their products
- (4) To develop packaging designs for Thai products
- (5) To hold regular trade fairs for Thai SME products in Bangkok and other provinces
- (6) To participate in trade fairs held in foreign countries
- (7) To make marketing surveys on Thai SME products
- (8) To hold regular seminars on export demand
- (9) To dispatch trade missions abroad to collect marketing information
- (10) To carry out campaigns for publicizing Thai SME products

## **7. Expected Benefits of the Project**

The project can encourage SMEs to promote their export sales. Through the implementation of the project, exports from SMEs will increase in volume, value, and variety, to correct the trade imbalance and create employment.

## **8. Weakness of the Project**

The project will not have immediate effects on the project purpose. Since the project is "foundation work," it may take much time to be effective.





## **Project No. 5.1 Development of Information Networks for SMEs**

### **1. Rational**

The surroundings of business firms are changing constantly. In particular, the progress of information-centered society, as represented by the internet and electronic commerce, is remarkably fast. Large enterprises are using advanced information technology to take strategic measures which go beyond mere rationalization. On the other hand, small and medium-size enterprises are far behind LEs even in the use of information technology for productivity improvement due to shortage of management resources, insufficient knowledge of information technology, or unwillingness to accept anything new. In Thailand too, there is no doubt that the delay in the use of advanced information technology will become a great obstacle to business activities in the future. In fact, for SMEs in the inland areas, it has already become a difficult problem how to obtain information which is useful for gaining access to their potential markets.

In order to disseminate information technology in remote areas, the Ministry of Industry is about to implement specific plans. However, those plans are intended primarily to improve the communications between the central and local offices of the Ministry of Industry. They do not contain measures to provide SMEs with direct support for participating in the on-going information revolution. Even so, the information improvement projects the Ministry of Industry is going to implement this year can be taken as its first step to support SMEs in using information technology. It is, therefore, realistic to work out an information promotion project for SMEs based on those projects of the Ministry of Industry. Of them, the projects being implemented by DIP and DIW can be a stepping stone for the proposed project.

- (1) **Dissemination of information on investment and trade for SMEs through IT**  
This is one of the IRP projects for this year. DIP is implementing this project in cooperation with the NSTDA, DEP, FTI, BOI, and others. The purpose of the project is to build a database of investment/business information in local areas and publish it through DIP's website. By this,

DIP aims to promote investments and business negotiations and increase employment opportunities in local areas. DIP first builds the database in nine months. In order to install terminal devices in the PIO offices throughout the country, PIO has purchased personal computers to train the staff of its local offices. The database is to contain the following information.

Geographical information

Investment opportunities

Governmental supports

Information about sites for industrial plants

Population, education, labor, etc.

Industrial structure and characteristics of individual industries

Strategic local industries

(2) DIW information network plan

This is a project being implemented by DIW, which manages the registration of industrial plants located throughout the country, for building an information network within it. For the moment, the information network will be used to exchange plant data between Bangkok and local areas. Ultimately, DIW plans to link the network to the LAN scheme of the Ministry of Industry. In order to install terminal devices in the PIO offices throughout the country, DIW Bangkok has already purchased personal computers. Currently, they are loading the personal computers with necessary software. According to one of the persons involved in the information projects of the Ministry of Industry, the SMEs that have introduced personal computers still account for less than 50% of all SMEs in the country. Thus, as far as SMEs are concerned, the improvement in terms of computer hardware is needed more urgently than the improvement in terms of software. During this year, each PIO office will have acquired two terminal devices, including one for DIP. The 11 local offices of DIP already have more than one personal computer. Using these terminal devices to show concretely the characteristics of information technology and demonstrate its usefulness to the managers of SMEs in local areas is the first step of information support to SMEs.

**2. Purpose**

- (1) To provide SMEs in local areas with a support for introduction of information technology
- (2) To promote investments and businesses of SMEs through the supply of accurate, reliable information

**3. Output of the Project**

- (1) An information network for promoting economic activities of SMEs will be built.
- (2) Proper maintenance of information for promoting economic activities of SMEs will be implemented.
- (3) Mutual enlightenment among SMEs will be promoted through the use of the information network.

**4. Project Description**

In order to enable SMEs to expand their economic activities through the use of information technology and help to advance their management innovation smoothly, the project provides them with information support in the form of computer hardware and software. For SMEs in local areas which introduce information processing hardware, consulting services and a favorable depreciation plan or a tax incentive shall be offered. In terms of software, the use of the information network for effective utilization of information technology, the maintenance/supply of certain types of information, the consulting service of advisers, etc. shall be afforded to the SMEs. All these should be incentives for SMEs to introduce information technology. Concerning the education and training of employees of SMEs which are introducing information technology, there are already a good number of private institutions which provide appropriate services. In this project, therefore, they are left out of consideration.

The project focuses on the enlightenment of SMEs in information technology. Depending on the contents of incentives offered to SMEs, it will become necessary to provide a budgetary measure for encouraging SMEs to introduce information technology.

Linkage of information network between MOI and other ministries and public institutions will also be taken into consideration for further IT development.

## **5. Implementation Body and Financing Source**

Industrial Information Center, Bureau of Industrial Promotion Policy and Planning of MOI; Budget Bureau of MOF

## **6. Activities**

- (1) A working group for disseminating information technology among SMEs in local areas shall be installed within the Ministry of Industry. This working group shall consist of representatives of IIC of DIP (the main member) and of BIED, ISMED, DIW, and OJE.
- (2) The working group shall discuss means of information support of the government and make necessary adjustments with related agencies.
- (3) IIC shall deploy the investment information data base project of IRP that is being implemented in specific areas in other areas as well and carry out demonstrations through local offices of the Ministry of Industry.
- (4) In order to promote the investment in information technology by SMEs, the Ministry of Industry shall engage in enlightenment activity at its local offices.
- (5) Certain incentives shall be afforded to SMEs which invest in information technology in line with the present project.

The roles that the individual departments and bureaus of the Ministry of Industry can play in the enlightenment activity at the local offices shall be discussed by the working group.

## **7. Expected Benefit of the Project**

- (1) SMEs in local areas can expand their economic activities by obtaining reliable product information.
- (2) The information available at DIP's website helps promote investment.
- (3) Much of the money that would otherwise be spent on the development of new markets in the Metropolitan area and overseas can be saved.

## **8. Weakness of the Project**

The communication network infrastructure has been developed and maintained in the greater part of Thailand. There are, however, some areas where the infrastructure is incomplete. Besides, in terms of line speed and line capacity, the communication network infrastructure in Thailand is still inadequate.



**Project No. 5.2 Improvement of Standards and Conformance  
Infrastructure to Promote Export**

**1. Rationale**

**1.1 Background of the Development of Standards and Conformance Infrastructure**

The purpose of a national standards and conformance infrastructure is to provide the technical basis for everyday economic activities which include orderly commerce, national and international trade, technical coordination between manufacturers, and governmental regulatory activities. Fundamental to the achievement of this is an effective infrastructure for physical measurement, standards writing, testing, trade measurement, competency assessment and compliance certification.

The standards and conformance infrastructure facilitates the efficiency and competitiveness of a nation's industry. It contributes to economic performance by providing a common ground for members of a community to express volumes, quantities and technical characteristics of objects such as goods, services and systems. A highly respected and efficient standards and conformance infrastructure is a vital element in achieving international credibility and competing with the world's best.

**1.2 What Is "Standards and Conformance Infrastructure" ?**

The standards and conformance infrastructure is an important element of the set of infrastructures that support a nation's economic activities. The infrastructure can be generally divided into three components; measurement systems and services, the development of voluntary and regulatory standards, and conformance testing and certification.

**(1) Measurement:** Measurement provides the foundation without which our commercial and scientific activities would fail. A readily identifiable,

strongly scientifically based, and comprehensive measurement system is the foundation of a high quality standards and conformance infrastructure.

- (2) Standards provide the basis for efficiency in producing and trading goods suited to the needs of the community.
- (3) Conformance provides confidence in performance and certainty that goods and services meet specifications and that regulatory needs are being met.

### BASIC FUNCTIONS OF STANDARDS AND CONFORMANCE INFRASTRUCTURE

Measurement System	Standards Development	Conformance
<ul style="list-style-type: none"> <li>• Establish and maintain primary standards (physical standards) and secondary standards of measurement</li> <li>• Approve measuring equipment</li> <li>• Calibrate measuring equipment</li> </ul>	<ul style="list-style-type: none"> <li>• Develop and publish standards (standards writing) for goods, services and systems</li> </ul>	<ul style="list-style-type: none"> <li>• Accredite testers and certifiers to recognise their competence</li> <li>• Provide certification that products or systems meet standards</li> <li>• Test the attributes of goods, services and systems</li> </ul>

Source: IDCJ Y/S

### 1.3 The Case In Thailand

Unfortunately most of the developing economies are little behind the world tendency on this issue. In case of Thailand, voluntary and compulsory standards are not yet clearly defined and regulated, and there are not many testing and calibration laboratories that are accredited and utilized. These issues are more critical for those SMEs that try to promote business on the basis of their products' quality and the company's credibility since they are not able to afford in-house testing laboratories as owned by large companies and multinational companies.

The above chart shows the components of standards and conformance infrastructure, and the proposed project is targeting at "Standards Development" and "Conformance" whereas currently in Thailand, National Institute of



Metrology (Thailand), with the support from the Government of Japan has been in the process of development of a national metrology system (targeting at left side of the above chart.) Therefore, both projects would complement each other.

## **2. Purpose**

To support and improve the competitiveness of Thai industry to be accepted by overseas market through the improvement of standards and conformance infrastructure.

## **3. Output of the Project**

- (1) Study on economic impact for standards development by sector.**
- (2) Develop documentation and standardization of voluntary & compulsory standards with TISI.**
- (3) Conformance Assessment Infrastructure for Standards to be accepted by the international market.**
- (4) Establishment of strong position of Thai government to Mutual Recognition of Agreement.**

## **4. Activities of the Project**

### **4.1 Study on Economic Impact for Standards Development by Sector**

#### **4.1.1 Underlying Conditions**

Table 1 indicates the "Manufactured Exports by Technological Category (1980-1995)." Thailand's exports analyzed by their technological base are still relying on cheap labor oriented or labor intensive manufacturing products. As of 1995, 36% of total exports is labor intensive although it has been continuously decreasing since 1980. Technologically complex products which include scale-intensive, differentiated and science based products have a 53% share and that is moderately increasing since 1990 when it was 40%.

In order to promote the exports of those technologically complex products, it becomes necessary to demonstrate the conformance on international standards or ISO/IEC standards. In the case of Thailand, looking at the export trend by commodities, electrical and electronics products are constantly increasing

(refer to Table 2). Since the electrical and electronics industry has three concepts as above mentioned (scale-intensive, differentiated, science based products), the study sets its target on this sector.

**Table 1 Manufactured Exports by Technological Category 1980-1995**  
Unit: %

Thailand	1980	1990	1995
Type of Exports			
Resource based	22	14	11
Labor-intensive	47	46	36
Scale intensive	8	6	8
Differentiated	22	14	20
Science based	1	20	25
Technologically	31	41	54

Technologically complex products include scale-intensive, differentiated and science based products.

The study should be conducted in four phases as follows.

#### **4.1.2 Phase I: Verify the Actual Situation of Document Standards and Set up Strategic Direction**

- (1) Study on electrical and electronic market: To find out the most influential products and country as well as their potential.
  - World trend (imports & exports) in the electrical and electronics market
  - Electrical and electronics market in Thailand based on its trading partners by country and by product and parts.
- (2) Collect information on currently used compulsory and voluntary standards of TISI for the electrical and electronics industry in Thailand.
- (3) Compare TISI standards with international standards (ISO/IEC) or documentary standards to verify the harmonization.
- (4) Collect information of compulsory and voluntary standards of the electrical and electronics industry of major import and export countries.
- (5) Establish strategy to implement the standards of voluntary standards which is essential for export promotion and compulsory standards (including safety standards and others).

- (6) Hold a workshop to discuss the pros and cons of the implementation of strategy (5). The participants will be representatives of the Thai Chamber of Commerce, the Federation of Thai Industries, EEI, major export companies, MOI, MOC, MOSTE and other related organizations.

#### **4.1.3 Phase II: Study on Callbratlon & Testing Activities In Electrical and Electronics Industry**

The study will conduct the following:

- (1) A questionnaire survey in Thailand of electrical and electronics companies
- (2) Visits to electrical and electronics companies for interviews
- (3) Getting information from the Chamber of Commerce and FTI
- (4) Questionnaire survey to main trading countries such as Malaysia

#### **4.1.4 Phase III: Study on Conformance Infrastructure in Thailand**

The study will be executed by the following steps;

- (1) Visit technical conformance related laboratories and organizations, such as NIMT, TISTR, DSS, EEI, TPI to collect information on actual activities and technical credibility. This includes the range of calibration services, testing services, uncertainties, period to complete requested calibration and testing service, fee charge, etc.
- (2) Information on traceability of above mentioned related laboratories and organizations.  
This is important for Phase 4.
- (3) Workshop: Based on the result of this study by the participation of NIMT, TISTR, EEI, Chamber of Commerce, FTI and major exporters.

#### **4.1.5 Phase IV: Study on Bottlenecks to Maintaining a Strong Position of the Government of Thailand to Achieve Mutual Recognition of Agreement**

#### **4.2 Develop Documentation and Standardization of Voluntary & Compulsory Standards with TISI**

- (1) Start to develop the documentation of voluntary and compulsory standards with TISI based on the above completed study.
- (2) Promotional campaign to let the public understand the importance of the standards and conformance issue.
  - Based on the study 4.1, the Government of Thailand coordinates with industry based organizations such as Chamber of Commerce and FTI about the practical effect of the introduction of compulsory standards.
  - Facilitate the access to public and private testing and calibration services.
  - Establish Thai safety regulations harmonized with international documentary standards.
  - Application of voluntary and compulsory standards to Thai industry including but not limited to imported products.

#### **4.3 Conformity Assessment Infrastructure Improvement for Standards to be Accepted by International Market**

- (1) Justify necessary standards' traceability charts and their technical acceptability in APEC.
- (2) Promote intercomparison of standards of above 4.3 (1) which work for base of MRA

#### **4.4 Establishment of Strong Position of Thai Government to Mutual Recognition of Agreement**

- (1) Promote the results of above intercomparison to APEC region countries to promote the technical credibility of standards infrastructure of Thailand.
- (2) Promote the results of above intercomparison to industry and prepare directory of accredited laboratories to facilitate exports.
- (3) Expand counter-part countries and sectors for Mutual Recognition of Agreement.

## 5. Project Description

### 5.1 Implementation Body

The Thai Industrial Standards Institute, MOI, is the core implementing agency of this project with strong coordination of Ministry of Industry, Ministry of Commerce, and National Institute of Metrology.

### 5.2 Implementation Schedule

	4th Q-1999	1st Q-2000	2nd Q-2000	3rd Q-2000	4th Q-2000	1st Q-2001
Study on economic impact						
Phase	████████					
Phase	████████					
Phase		████████				
Phase			████████			
Implementation of voluntary & compulsory standards			████████	████████	████████	████████
Improvement of conformity assessment infrastructure					████████	████████
MRA expansion activities						████████

### 5.3 Points Needing to be Mentioned

For the success of this proposed project, Activity No. 4.1 "Study on economic impact for standards development by sector" is the most important part. The study should take place for six month in total as stated in the implementation schedule above. The following actions and strategies differ depending on the results of the study.

Human resource planning for the six months is as follows;

- (1) One project manager (standards and conformance expert)
- (2) One coordinator/economist (standards and conformance expert)
- (3) One voluntary standards expert
- (4) One compulsory standards expert
- (5) Sector expert



<b>Project No. S1: Setting-up of Thailand Automotive Institute</b>
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## **1. Rationale**

### **1.1 Policy of the Ministry of Industry**

#### **1.1.1 Background of the Concept for Institutional Building**

In January 1998, The Government of Thailand has announced its Cabinet approval of the Industrial Restructuring Plan proposed by the Ministry of Industry. The purpose of IRP is to cope with the Thai's economic recession through the improvement of Thai's international competitiveness and export expansion, and the "Concept for Institutional Building" is one of the means to execute IRP's Action Plans.

The Ministry of Industry consists of six departments, namely (1) Office of the Permanent Secretary, OPS; (2) Department of Mineral Resources, DMR; (3) Department of Industrial Works, DIW; (4) Department of Industrial Promotion, DIP; (5) Thai Industrial Standards Institute, TISI; and (6) the Office of Industrial Economics, OIE. Under Ministry of Industry there are three state enterprises and seven non-profit institutes some of which including Thailand Automotive Institute are in the process of setting up.

Although the MOI's main responsibilities are policy-making, budget distribution and monitoring, ministry has become deeply involved in service activities directly affecting the industries, such as research, inspection, testing and human resource development and training, and in turn, their main responsibilities were left behind. In order to focus on the policy-making, budget planning and distribution and monitoring, the MOI has been promoting institution building to transfer some of their activities to those institutes.

Thailand Automotive Institute is an independent and non-profit organization under Industrial Development Foundation, Ministry of Industry, was established in July 1998. The automotive related activities which Thai Industrial Standards Institute has been offering such as testing and certification services will be transferred to TAI. Mr. Alongkot Chutinan from the Siam Cement Public Company Limited was selected as Managing Director for Thailand Automotive Institute. The primary objective of the institute is to enhance the competitiveness of the Thai automotive industry in the global market. The budget for the first year beginning August 1998 was 16 million bahts. After five years the institute is to become independent from the Government support.

Its initial responsibilities when TAI was established were as follows;

- (1) Provides testing for automobiles, automotive parts as well as raw materials in the following areas;
  - Emission Testing
  - Safety Testing
  - Product Testing
  - Material Testing
- (2) Provides automotive-related information, consultation and training to elevate the standard of Thai automotive industry to the international level.
- (3) Coordinates and cooperates among related agencies, including governmental and private and local and international agencies, to ensure systematic development of the Thai automotive industry.
- (4) Conducts research on automotive-related topics in order to make recommendation on policies, strategies, and development plans for the industry.

## **1.2 Desires of the Automotive and Auto-parts Industry**

Thailand leading automotive assemblers, mostly Japanese assemblers, have been shifting their effort from the domestic market to exporting market to cope with the



recession. In the structure of automotive industry, under assemblers, there are three types of suppliers:

- (1) Global suppliers in Tier 1 suppliers
- (2) Local suppliers in Tier 1 suppliers
- (3) Local suppliers in Tier 2 suppliers or lower.

Tier 1 means the suppliers selling parts directly to assemblers, and Tier 2 means the suppliers selling parts to Tier 1.

There used to exist a small gap between global and local suppliers in overall capabilities, such as quality, cost, delivery and development. The gap is now getting wider because of the shift of assemblers' target from the domestic to the export market. The local suppliers are now being left behind that they are not able to improve their standards enough to cope with world competitions.

The Thailand Automotive Institute through its activities tries to solve those problems existing in the industry and to meet its needs in order to improve SMEs competitiveness for export. TAI will also act as a coordinator between the Thai government and automotive industry.

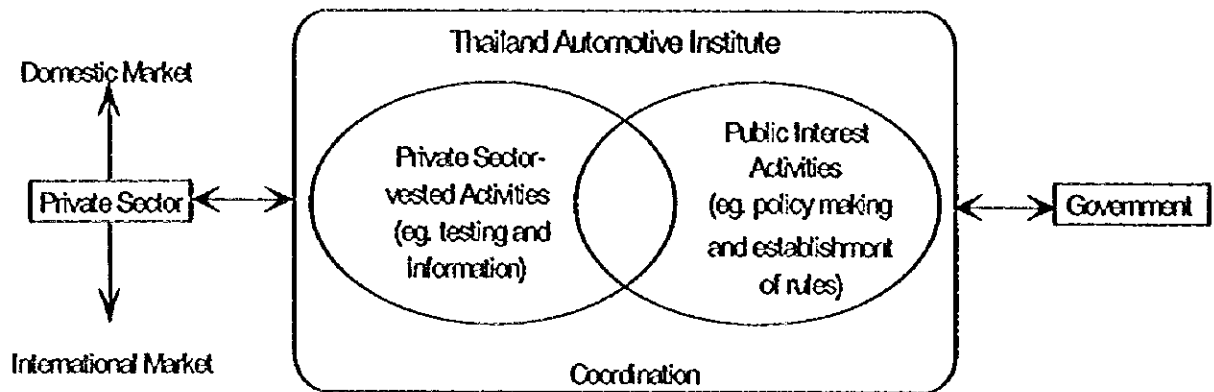
## **2. Purpose**

The purpose of establishing of the Thailand Automotive Institute is to meet the needs of the private sector and to support and promote their competitiveness in the domestic and international market.

## **3. Output of the Project**

The principal mission is to achieve good coordination between private sector and the government under the single umbrella of TAI.

**Private Sector and the Government under the TAI Umbrella**



### **3.1 Policy Making Support**

In order to promote the automotive industry, the MOI needs all sorts of research and survey for the policy making process. TAI will execute those research and survey tasks on and the basis of contracts with MOI.

### **3.2 Information Service**

TAI provides all sorts of information such as market and technology information through their publications and data base. With this service, TAI will assist the automotive industry.

### **3.3 Testing and Certification Services**

TAI provides testing and certification services in order to contribute for the improvement of consumer protection for domestic market and to upgrade Thailand's automotive and autoparts market competitiveness.

### **3.4 Consultation Services**

TAI transfers technology, and administrative and management skills in order to improve the competitiveness of automotive parts industry.

## **4. Project Description**

This project is aimed at servicing private sector needs for testing, certification and consultation services. At the same time, the project will support the Ministry of Industry in strategy making for the automotive industry's development.

### **4.1 Implementing Agency**

Thailand Automotive Institute is the implementing agency for this project. TAI was established by the Ministry of Industry and it is an independent, non-profit organization.

#### **4.1.1 Location**

(1) Head Office: For the first one year starting from May 1999

Address: 6th Floor, Technology Promotion Institute  
534/4 Soi Phatthanakarn 18, Phatthanakarn Rd.,  
Suanluang, Suanluang, Bangkok 10250

Expenses: Bt 250/sq.meter \* 240sq.met = Bt 60000/month

From the second year

Address: BSID

Expenses: initial cost for renovation  
rents free

(2) Testing Center: TISI-Bamboo Testing Center

#### **4.1.2 List of Available Equipment and Facilities at TISI**

Equipment and facilities of TISI-Bamboo Testing Center will be transferred to TAI and EEI, and they are now in the procedure of separation. TISI has following facilities and equipment;

- Building and equipment for emission testing of benzine oil automotive
- Building and equipment for measuring of toxic gas from benzine
- Building and equipment for emission testing of motorcycle
- Building and equipment for emission testing of small car using diesel oil
- Building and equipment for emission testing of big car using diesel oil
- Building and equipment for two-step engine oil testing
- Safety testing equipment for helmet (Industrial Standard No. 369)
- Safety testing equipment for automobile glass  
(Industrial Standard No. 196,197, 198)
- Testing equipment for tire especially for small cars  
(Industrial Standard No. 367)
- Testing equipment for tube (Industrial Standard No. 651)
- Testing equipment for tire and tube for motorcycle  
(Industrial Standard No. 682, 683)
- Testing equipment for lead-acid type battery for automobile  
(Industrial Standard No. 6)
- Exhaust pipe testing machine for motorcycle (Industrial Standard No. 341)
- Exhaust pipe testing machine for automobile (Industrial Standard No. 340)
- Testing equipment for break pad of automobile and motorcycle  
(Industrial Standard No. 97)
- Vibro tester
- Pincer tester
- Coil spring tester

#### **4.1.3 Government Budget Plan for Setting up TAI**

For the five years starting with fiscal 1999, the TAI will receive a total of 100 million bahts. This five-years budget is considered to be an initial setting-up

budget. Afterward, the TAI can ask for a supporting budget to compensate for additional investment and operational cost.

Together, the head office and testing center are provided by MOI free of charge.

Total of Bt 100 million for 5 years

1st Year (Oct. 1, 1999 -- Sep., 2000)

Bt 16.2 million (This amount is paid in three tranches)

(1) 5.97 million

(2) 8 million

(3) the rest

2nd Year Bt 20 million (tentative)

## **5. Implementation Body and Financing Source**

Thailand Automotive Institute

## **6. Activities**

In order to achieve the above mentioned output, the following sets of activities should be implemented.

### **6.1 Policy Making Support**

It is important to set up an early warning system for quick monitoring of global economic and trade problems as well as the generation of proposals for appropriate solutions to maintain the competitiveness of the Thai automotive industry. This policy making support should be contracted for and paid for in reasonable compensation for the expenditure needed, by the government.

### **6.1.1 Automotive and Auto-parts Sector Studies**

When asked by the government, TAI will always be prepared to offer the sector studies and trend, market projections and industry strategic analysis based on its sophisticated data base which is established with the activities listed in 4.2.

### **6.1.2 Policy Recommendation Studies**

The TAI will fully utilize the voice and opinions of industry so that they can be reflected in policy recommendations to the government.

### **6.1.3 Specific Sector Studies**

The TAI is capable of conducting specific sector studies such as emerging issues. Because it is close to the industry and keeps its database, it can respond quickly to the issues of the industry and make current sound recommendations to the government.

### **6.1.4 Standards Development with TISI**

TAI will support standards development with TISI for automotive industry and auto-parts industry.

The Industrial Product Standards Act, B.E.2511 (1968) has been the basis of industrial standards in Thailand for manufacturers and importers until now. These standards and regulations are implemented and maintained by TISI. In the Industrial Products Standards Act, B.E.2511, standards are defined as listed below.

Specifications on one or many of descriptions concerning the following ;

- (1) Kind, type, shape, dimension, manufacture, equipment, quality, grade, component, faculty, durability and safety of the industrial products

- (2) Methods of manufacture, design, drawing, usage, material used for the industrial products and safety concerning the manufacture of the industrial products
- (3) Kind, type, shape, dimension of packages or other kinds of containers including the making of packages or other kinds of containers, and methods of packing, wrapping or binding and materials used therefore
- (4) Methods of experiment, analysis, comparison, examination, testing and weighing and measuring in volume and size concerning the industrial products.

Based on the globalization, world is in the process of standardization of such product standards and methods of testing due to market demand and TAI will follow such movement to keep the competitiveness of Thai automotive industry. To achieve such a purpose, TAI will work together with TISI to develop new standards.

## **6.2 Information Service**

### **6.2.1 Development of a Databases for the Automotive and Auto-parts Industries**

TAI sets up and up-dates periodically the following data bases;

#### **(1) Automotive and Auto-parts Industry Data**

**(1-1) Production Volume in Thailand & in the world (country by country) for passenger cars, 1-ton pick up trucks, heavy trucks, motorcycles, etc.**  
The following categories should be included;

- (a) Vehicle assemblers production capacity and utilization**
- (b) Parts manufacturers (engine, plastic, electrical equipment, etc.)**
- (c) Supporting industries (sheet metal, casting, plastic, molds & dies, etc.)**

- (1-2) Employment structure of (1-1) by category
- (1-3) Sales volume in Thailand and the world
- (1-4) Market share in Thailand by types of cars
  
- (2) Automotive and Auto-parts Company Profiles
  - Thai and foreign companies active in Thai should be listed.
  
- (3) Thai and Foreign Companies' Investment Trend in the Automotive and Auto-parts Industries
  
- (4) Information source include the following
  - Board Members of the TAI
  - Office of Industrial Economics, Ministry of Industry
  - Department of Export Promotion, Ministry of Industry
  - Department of Industry Promotion, Ministry of Industry
  - The Federation of Thai Industry
  - Auto-Parts Industrial Club
  - The Federation of Thai Industries
  - Thai Automotive Industry Association
  - Thai Auto-Parts Manufacturers Association
  - Thai Auto-Parts Manufacturers Association
  - Thai Society of Automotive Engineers
  - Japanese Chamber of Commerce, Bangkok
  - JETRO

### **6.2.2 Publication of Data and Data Analysis**

Based on the information collected in 4.2.1, TAI can publish those data and data analyses.



### **6.2.3 Publication of Sector Studies**

Based on the information collected in 4.2.1, TAI conducts sectoral studies as mentioned in 4.1 activities and publishes them.

### **6.2.4 Publication of Periodical Sector News**

Based on the information collected in 4.2.1, TAI publishes its periodical sector news, distributed to TAI-registered or listed companies in return for their offering of data to TAI. Also, the publication can be used for marketing and public relations on behalf of TAI activities.

### **6.2.5 Development of a Consultants Database**

The development of a database for consultants is directly connected to the activities of 4.4, the consultation services. The TAI lists the details of consultants including, name, contact address, status, and area of skills and technics, so that the TAI can match the needs of a company with an appropriate available consultants.

## **6.3 Testing and Certification Services**

TAI executes testing and certification services based on Thai Industrial Products Standards Act 1968. These activities are directly transferred from TISI. The activities cover the following areas.

### **6.3.1 Safety Testing and Certification**

The regulatory requirements of Thailand related to Automotive Testing to demonstrate of compliance and , such as;

TIS 196-2536 (1993) Automobile Safety Glass : Laminated Safety Glass

TIS 197-2536 (1993) Automobile Safety Glass: Tempered Safety Glass

TIS 198-2536 (1993) Automobile Safety Glass: Zone Tempered Safety Glass  
TIS 721-2539: Automobile Safety Belts

### **6.3.2 Emission Testing and Certification**

The regulatory requirements of Thailand related to Automotive Emission Testing and Certification, such as:

TIS 1440-2540 (1997) Gasoline Engined Vehicles: Safety Requirements:  
Emission from Engine, Level 5

TIS 1435-2540 (1997) Light Duty Diesel Engined Vehicles:  
Safety Requirements; Emission from Engine, Level 4

### **6.3.3 Testing for Importing Products and Parts Based on TISI Standards**

Based on Ministerial Regulation No.6 (B.E.2516) issued under the Industrial Product Standards Act, B.E. 2511, a person who intends to import for sale in the Kingdom any industrial products which are required by Royal Decree to conform with the standard shall apply for testing to TAI.

### **6.3.4 Testing for Exporting Products and Parts Based on Counterpart Standards**

Based on the counterpart standards, TAI will execute testing for exporting products and parts. For example, the following are the requirements from Australian Authorities ( Federal Office of Road Safety );

Australian Design Rule 8/01 Safety Glazing Material

Australian Design Rule 37/01 Emission Control for Light Vehicles

Australian Design Rule 30/00 Diesel Engine Exhaust Smoke Emission

Australian Design Rule 70/00 Exhaust Emission Control for Diesel Engined  
Vehicles

Australian Design Rule 4/03 Seat Belts

## **6.4 Consultation Services**

### **6.4.1 Factory-Clinic Services**

Based on the Data Bank for Consultants as mentioned in 4.2.5, the TAI provides so-called "Pinpoint-Clinic Services" to clients. A client or company asks for advice and improvement of a certain issue to the TAI, and the TAI defines the issues and matches the most appropriate consultant to the client. Those consultants listed in the databank are not only from or connected to Thailand but also from all over the world.

### **6.4.2 R&D Support Services**

Based on the Data Bank for Consultants mentioned in 4.2.5, the TAI also provides R&D supporting services for SMEs through the TAI's factory-clinic services. The purpose of that is to improve the R&D capability for the SMEs.

### **6.4.3 Intermediary Services to Other Institutes**

There are seven institutes under MOI including the TAI together with other private and non-profit institutes and organizations. The TAI can share the data base of those institutes and can act as a contact point in order to maximize the utilization of existing institutes.

## **7. Expected Benefit of the Project**

The expected benefit of the project is two ways. One is that the project contributes to support Thailand automotive industry through their activities to meet the needs of private sectors and to support and promote their competitiveness in the domestic and international market. Secondly, the project contributes to the Thai Government for their policy-making on automotive industry development in Thailand.

There are some strength of this project to be successful such that (1) a huge demand is expected for the services offered by the TAI, (2) word-class assemblers in Thailand are supportive for the activities of the TAI, and (3) some of the equipment and machinery has already been prepared through TISI.

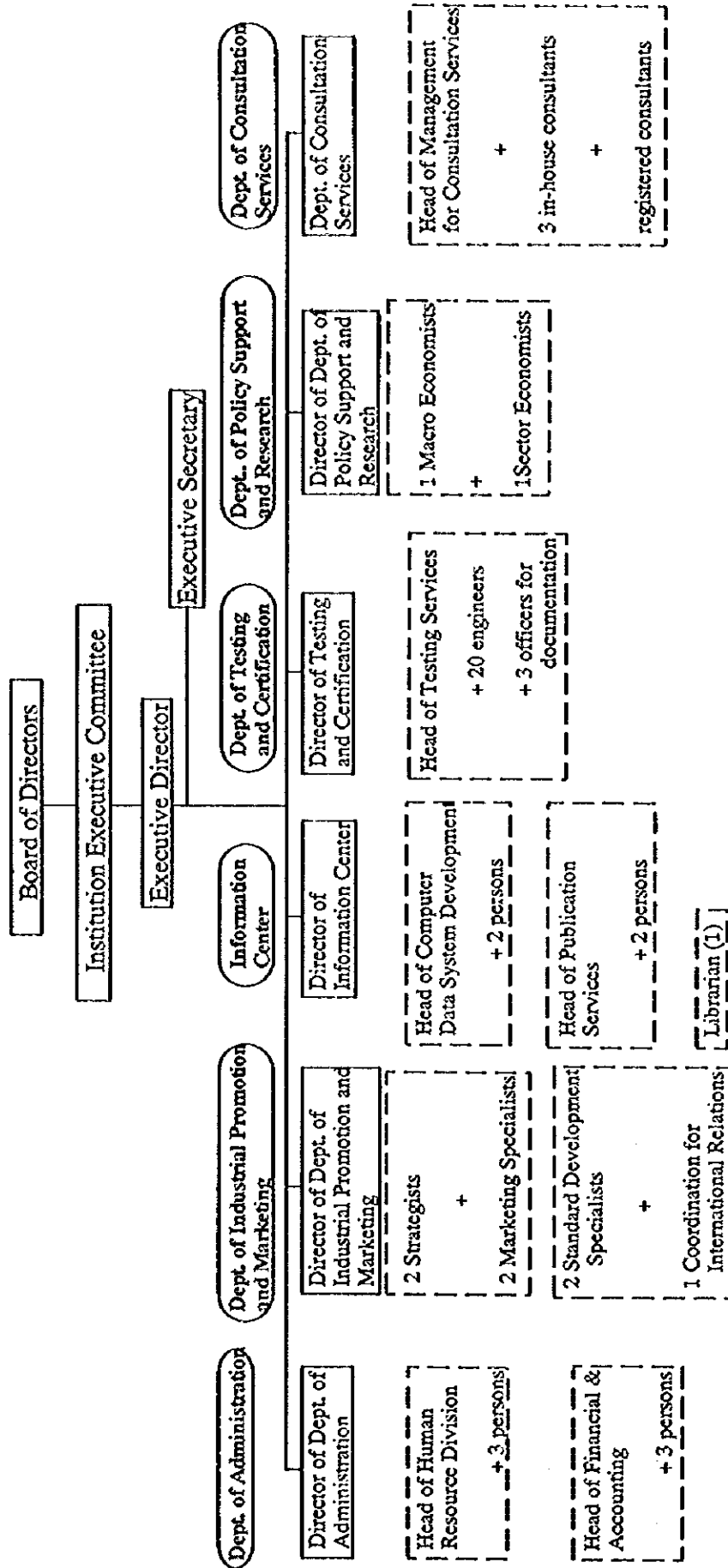
#### **8. Weakness of the Project**

- A strong marketing effort is needed to take in as many players possible as in the demand market.
- A number of engineers should be trained.

9 Implementation Schedule  
 9.1 Implementation Schedule: 5-year Plan for the Thailand Automotive Institute

	1999	2000	2001	2002	2003
i. Policy Making Support					
	1.1 Automotive and Auto-parts Sector Studies				
	1.2 Policy Recommendation Studies				
	1.3 Specific Sector Studies				
	1.4 Standards Development with TISI				
ii. Information Service	1.5 International Coordination for Standards Development and MRA				
	2.1 Development of Data Base for Automotive and Auto-parts Sectors				
	2.2 Publication of Data and Data Analysis				
	2.3 Publication of Sector Studies				
	2.4 Publication of Periodical Sector News				
iii. Testing and Certification Services	2.5 Development of Data Bank of Consultants				
	Phase-1: Using Current TISI-Standards				
	3.1 Safety Testing and Certification of Products and Parts Based on TISI				
	3.2 Compulsory Standards Testing Based on TISI				
	3.3 Voluntary Standards Test				
iv. Consultation Services	3.4 Safety Testing and Certification of Products and Parts Based on International Standards				
	4.1 Factory Clinic Services				
	4.2 R&D Supporting Services for SMEs				
	4.3 Intermediary Services to Other Institutes				

9.2 Organization Chart and Human Resource Planning for Automotive Institute (1999-2003)



10 Financial Projection

10.1 Explanatory Notes and Conditions

- (A) Salary Plan for TAI is based on the per-person salary amounts for the year of 1999 proposed by TAI.  
\*Compared with EEI, TAI sets their salaries higher, and this may become a burden for their cashflow.  
TAI: B37,000/person-month      EEI: B28,000/person-month  
\*\*No adjustment is made for inflation and the cashflow analysis uses year 1999 prices.
- (B) Overhead is calculated as 100% of salary and wages and includes the following:  
- Pension contribution  
- Insurance  
- Medical allowance  
- Allowance for committee meetings  
- Training and others  
\* EEI sets the overhead as 50% of their salary and wages.
- (C) For the Material Expenditure, the TAI plans a budget of 1,400,000 bahts per year.
- (D) For the Utilities, the TAI plans a budget of 1,980,000 bahts per year.
- (E) For the Durable Articles, Land and Building, the TAI plans a budget of 2,000,000 bahts per year.

- (F) The Miscellaneous fee is calculated as 10% of the total of Salary & Wages and Overhead & Other Expenditure.
- (G) Total Operating Cost is considered to be, in turn, "Expected Income" or "Income Target." This Expected Income is divided among income generating departments in order to set a target income for their activities.
- 10.2 Explanatory Notes and Conditions in Detail on Income for Thailand Automotive Institute
1. Policy Making Support - Contract research for the Government
- 1.1 Study projects for sub-sector, policy recommendation and specific issues H
- (1) For the 1st year: 5 studies/year x 300,000 bahts = B1,500,000/y
- (2) One study shall be added annually until the 5th year
- 1.2 Coordination for making product standards I
- (1) For the 1st year: 1 person x 8 man-months/year x B111,000 = B888,000/y  
- three times the annual wage of B37,000-
- (2) For the 2nd year to 5th year: 2 persons x 8 man-months/y x B111,000 = B1,776,000/y
- 1.3 Profit and Loss
- Profit from the Policy Making Support services will be one of the main sources of revenue for the TAI.
2. Information Service
- 2.1 Member Fees
- (1) For the 1st year: 100 companies x B20,000 = B1,000,000/y
- (2) 50 companies shall be added annually until the 5th year
- \* Member shall get the following free of charge



- (a) Publication of data and data analysis reports
- (b) Publication of sector study reports
- (c) Publication of monthly newsletters

**2.2 Publication (1) Publication of Data and Data Analysis Reports**

- (1) For the 1st year: 50 copies x B500/copy = B15,000/y
- (2) For the 2nd year to 5th year: 30 copies are added annually

**2.3 Publication (2) Publication of Sector Report**

- (1) For the 1st year: 50 copies x B500/copy = B15,000/y
- (2) For the 2nd year to 5th year: 30 copies are added annually

**2.4 Seminar**

- (1) For the 1st year: not feasible
- (2) For the 2nd year: One Seminar x B200,000 = B200,000/y
- (3) For the 3rd year to 5th year: Two Seminars x B200,000 = B400,000/y

**2.5 Profit and Loss**

The Information Service is not the profit making services, however, regardless of this fact, their services are necessary for the industry itself as well as Thai Government to keep the records and statistics of the sector.

**3. Testing and Certification Services**

**3.1 Testing and Certification Services**

- (1) Number of units and price are based on the TAI proposal
- (2) About Operational Ratio:
  - For the 1st year: Operational Ratio shall be 50% since half of the engineers and technicians will be receiving training.

**K**

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- For the 2nd year to the 4th year: Operational Ratio shall be 70%, 80% and 90% consecutively.
- At the 5th year, Operational Ratio shall be 100% which is at the break-even point.

### 3.2 Profit and Loss

Testing and Certification Services will not make much profit for the beginning of the stage, however, with the development of compulsory and voluntary standards the needs for the services will expand and it will change to the profit making sector.

## 4. Consulting Services (Factory-Clinic Services: Consultation Services for R&D is also included) P

### 4.1 Conditions

- Two foreign experts will visit a factory once a month spending 3 days per visit for factory clinic services.
- The two can assist of 7 factories in one visit to Thailand and will continue a year for a factory or 3-day x 12-time visits for clinic.

### 4.2 Cost for Foreign Expert

- Remuneration: B400,000/mm x 12months/y = B4,800,000/y
- Out-of-pocket expenses: B100,000/mm x 12 months = B1,200,000/y
- Total Cost: B6,000,000/y (Cost per factory = B6,000,000/y)
- Each beneficiary factory will pay 25% of the total cost or B150,000/y and the rest shall be met by either government subsidies or foreign aid, or a combination thereof.

### 4.3 Income for the Institute

- 15% of the total cost or B900,000/y per pair shall be appropriated to management fee for the institute.
- For the 1st year: 3 pairs
- For the 2nd year to 5th year: 5 pairs

### 4.4 Profit and Loss

Consulting Service is also one of the profit making services.

### 10.3 Explanatory Notes for Maintenance Fee for Existing Equipment and Facilities of TISI

1. Maintenance fee for existing equipment and facilities which are transferred from TISI to TAI is considered as in Appendix 3.
2. Those cost should be covered by an additional government subsidy.

### 10.4 Explanatory Notes and Conditions on Acquisition of New Equipment for TAI

1. The JICA-Team recommends that for TAI the acquisition of new equipment for testing facilities is necessary, however, not until or with the establishment of automobile and auto-parts related regulations which are harmonized with international standards.
2. There are basically only four types of safety test for automobile and auto parts regulated by TISI, therefore, sales from testing services will be very limited. Therefore, the development of standards for the automotive industry to cope with the international standards is the priority issue not only for TAI but for MOI-TISI and much effort is required.
3. Thus, the TAI for the coming five years shall concentrate on policy making support services and consultation services.

### 10.5 Expansion of TAI Branches

It might be rational for TAI to establish branches in other industrial zones of Thailand such as Rayong, in order to facilitate automotive plants in terms of training services, and to act as ports to obtain auto parts from these plants, to be tested in Bagpoo testing center. The expansion of TAI branches however, will be considered and in active after the given 5-year project schedule. The priority for TAI is to establish a strong base for this given 5 years to be self-sufficient in order to expand their activities in the future.

**Cash Flow**  
**PROJECTED CASH FLOW OF THAILAND AUTOMOTIVE INSTITUTE**  
 (Unit: Million Bahts)

	Year 1 FY1999	Year 2 FY2000	Year 3 FY2001	Year 4 FY2002	Year 5 FY2003
<b>A. Cash Inflow</b>	<b>80.04</b>	<b>81.76</b>	<b>83.79</b>	<b>87.12</b>	<b>95.45</b>
A-1: Income from Operations					
(1) Policy Making Support	2.39	3.58	3.88	4.18	4.48
(2) Information Services	2.05	3.28	4.51	5.54	6.57
(3) Testing and Certification Services	6.00	10.50	16.00	18.00	25.00
(4) Consulting Services	2.70	4.50	4.50	4.50	4.50
A-2: Subsidies					
(1) Investment to Fixed Assets					
(2) Assistance for Factory Clinic Services	18.00	30.00	30.00	30.00	30.00
(3) Maintenance Fee for Equipment & Facilities of TISI	48.90	29.90	24.90	24.90	24.90
<b>B. Cash Outflow</b>	<b>98.21</b>	<b>109.77</b>	<b>114.54</b>	<b>118.45</b>	<b>122.35</b>
B-1: Operating Cost					
(1) Sales and Wages	11.54	19.98	24.42	26.20	27.97
(2) Overhead and other expenses	19.77	29.89	35.22	37.35	39.48
B-2: Investment to Fixed Assets					
B-3: Hiring of Thai and Foreign Consultants	18.00	30.00	30.00	30.00	30.00
B-4: Maintenance Fee for Equipment & Facilities of TISI	48.90	29.90	24.90	24.90	24.90
<b>C. Gross Cash Surplus (Deficit) A-B</b>	<b>-18.17</b>	<b>-28.01</b>	<b>-30.75</b>	<b>-31.33</b>	<b>-26.90</b>
D. Government Subsidy	16.00	22.00	22.00	20.00	20.00
<b>F. Net</b>	<b>-2.17</b>	<b>-6.01</b>	<b>-8.75</b>	<b>-11.33</b>	<b>-6.90</b>

## TAI Project Cost

### Project Cost of TAI Institute (Million Bahts)

Cost Items	Cost	Remarks
<b>A. Existing Facilities</b>		Facilities and properties transferred from TISI
A-1 Land at site	Rental, free of charge	TISI's Bamphoo Testing Center
A-2 Buildings at site	Rental, free of charge	
A-3 Equipment & machinery	Rental, free of charge	See Appendix1 (list of existing equipment & machinery)
A-4 Head quarter office	Rental, free of charge	
A-5 Maintenance fee for existing facilities	153.5	See Appendix3
<b>B. Acquisition of New Facilities</b>	9.4	
B-1 Equipment & machinery		
B-2 Office equipment	8.5	See Appendix2
B-3 Furniture & fixtures	-	See Appendix2
B-4 Miscellaneous and contingency	0.9	10% of B-1 to B-3
<b>C. Operating expenses</b>	271.8	See Option3
C-1 Salaries & wages	110.1	
C-2 Overhead	110.1	C-1*100%
C-3 Material Expenditure	7.0	
C-4 Utilities	9.9	
C-5 Durable Articles, Land and Building	10.0	
C-6 Others	24.7	
<b>Total Project Cost</b>	<b>434.7</b>	<b>Million Bahts</b>

Human Resources Plan for Thai Automotive Institute

	1999	2000	2001	2002	2003
Executive Director	1	1	1	1	1
Dept. of Administration					
Director	1	1	1	1	1
Division Head		2	2	2	2
Officer	2	2	4	4	6
<i>Dept. Total</i>	3	5	7	7	9
Dept. of Industrial Promotion and Marketing					
Director	1	1	1	1	1
Strategist		1	1	2	2
Marketing specialist	1	1	2	2	2
Standard Dev. Specialist	1	2	2	2	2
Internal Relations	0	1	1	1	1
<i>Dept. Total</i>	3	6	7	8	8
Information Center					
Director	1	1	1	1	1
Division Head	1	2	2	2	2
Officer		2	5	5	5
<i>Dept. Total</i>	2	5	8	8	8
Testing and Certification Center					
Director	1	1	1	1	1
Division Head	1	2	2	2	2
Engineer/Technician	7	14	16	18	20
Officer	1	2	2	3	3
<i>Dept. Total</i>	10	19	21	24	26
Dept. of Policy Support and Research					
Director	1	1	1	1	1
Economist	1	1	2	2	2
<i>Dept. Total</i>	2	2	3	3	3
Dept. of Consultation Services					
Director	1	1	1	1	1
Division Head		1	1	1	1
In-house Consultants	2	2	3	3	3
<i>Dept. Total</i>	3	4	5	5	5
Executive Secretary	1	1	1	1	1
Driver	1	2	2	2	2
<b>TOTAL</b>	26	45	55	59	63

### Salary Plan for Thai Automotive Institute

\*based on the amount of per-person salary for the year of 1999 proposed by TAI)

(Bahts)	1999	2000	2001	2002	2003	TOTAL
Average/person.month	37,000	37,000	37,000	37,000	37,000	37,000
Average/person.year	444,000	444,000	444,000	444,000	444,000	444,000
No. of Staffs	26	45	55	59	63	63
<b>TOTAL COST FOR HUMAN RESOURCES (A)</b>	<b>11,544,000</b>	<b>19,980,000</b>	<b>24,420,000</b>	<b>26,196,000</b>	<b>27,972,000</b>	<b>110,112,000</b>

### Overhead & Other Expenditure

	1999	2000	2001	2002	2003	TOTAL
1. Overhead (A) x 100%	11,544,000	19,980,000	24,420,000	26,196,000	27,972,000	110,112,000
2. Material Expenditure	1,400,000	1,400,000	1,400,000	1,400,000	1,400,000	7,000,000
3. Public Utility Expenditure	1,980,000	1,980,000	1,980,000	1,980,000	1,980,000	9,900,000
4. Durable Articles, Land and Building	2,000,000	2,000,000	2,000,000	2,000,000	2,000,000	10,000,000
Sub-total (B = 1+2+3+4)	16,924,000	25,360,000	29,800,000	31,576,000	33,352,000	137,012,000
5. Miscellaneous: (A+B) x 10%	2,846,800	4,534,000	5,422,000	5,777,200	6,132,400	24,712,400
<b>TOTAL: (C)</b>	<b>19,770,800</b>	<b>29,894,000</b>	<b>35,222,000</b>	<b>37,353,200</b>	<b>39,484,400</b>	<b>161,724,400</b>

### Total Operating Cost and Expected Income Analysis for TAI

						TOTAL
Total Operating Cost (A) + (C)	31,314,800	49,874,000	59,642,000	63,549,200	67,456,400	271,836,400
<i>Breakdown by Income Generating Department</i>						
Dept. of Policy Support and Research	3,131,480	2,770,778	4,066,500	3,971,825	4,047,384	17,987,967
Information Center + Dept of Industrial Promotion and Marketing	7,828,700	15,239,278	20,332,500	21,183,067	21,586,048	86,169,592
Dept. of Testing and Certification Center	15,657,400	26,322,389	28,465,500	31,774,600	35,077,328	137,297,217
Dept. of Consultation Services	4,697,220	5,541,556	6,777,500	6,619,708	6,745,640	30,381,624

Sales Breakdown and Profit/Loss Estimates for Thailand Automotive Institute

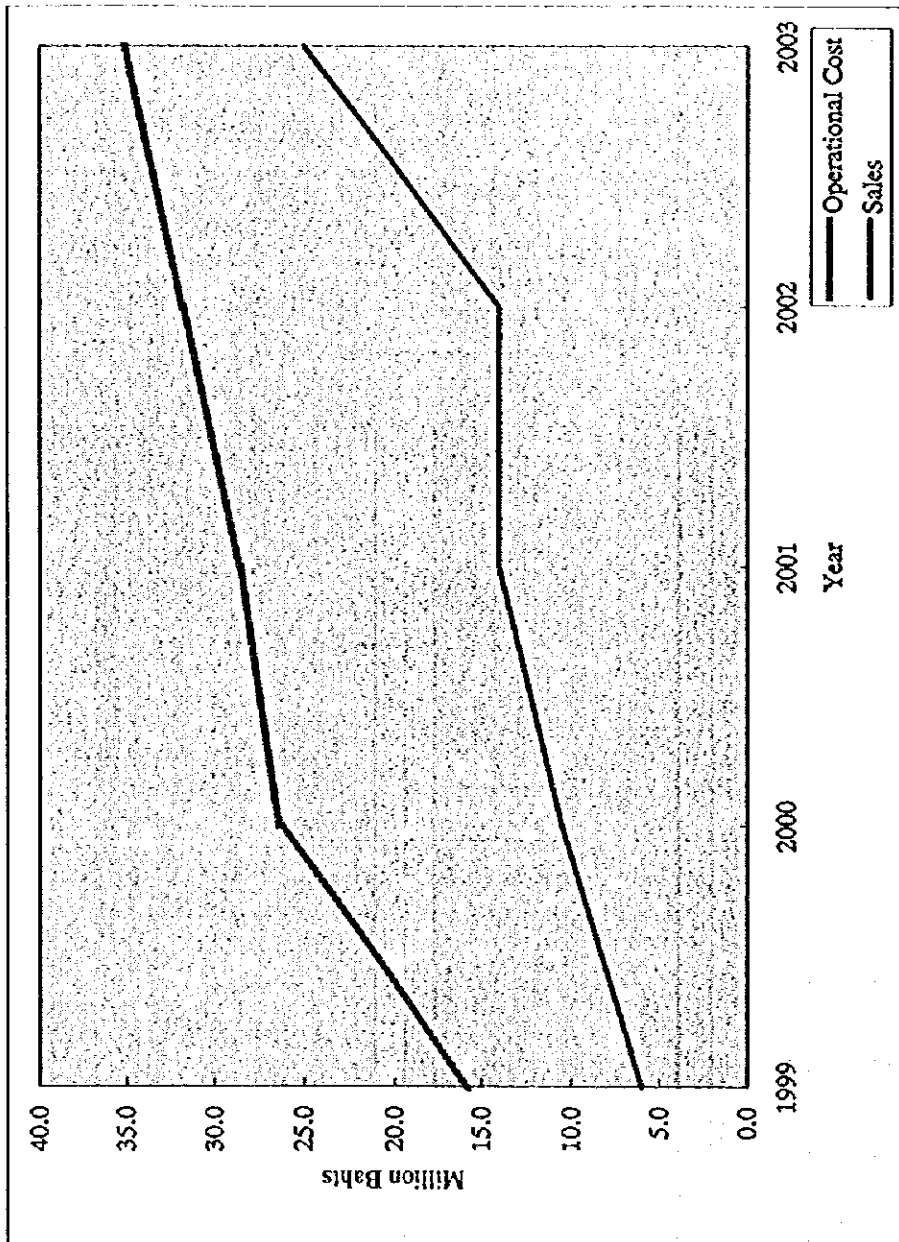
(Bahts)	1999			2000			2001			2002			2003			*
	Unit	Price/Unit	Total	Unit	Price/Unit	Total	Unit	Price/Unit	Total	Unit	Price/Unit	Total	Unit	Price/Unit	Total	
<b>1. Policy Making Support (Dept. of Policy Support and Research)</b>																
1.1 Study project	5	300,000	1,500,000	6	300,000	1,800,000	7	300,000	2,100,000	8	300,000	2,400,000	9	300,000	2,700,000	H
1.2 Standards Development	1*8	111,000	888,000	2*8	111,000	1,776,000	2*8	111,000	1,776,000	2*8	111,000	1,776,000	2*8	111,000	1,776,000	I
Sub-total			2,388,000			3,576,000			3,876,000			4,176,000			4,476,000	
Operational Cost			3,131,480			2,770,778			4,066,500			3,971,825			4,047,384	
Achievement(%)			76.3			129.1			95.3			105.1			110.6	
<b>2. Information Service (Dept. of Information Center + Dept. of Industrial Promotion and Marketing)</b>																
2.1 Member Fees	100	20,000	2,000,000	150	20,000	3,000,000	200	20,000	4,000,000	250	20,000	5,000,000	300	20,000	6,000,000	J
2.2 Publication (1)	50	500	25,000	80	500	40,000	110	500	55,000	140	500	70,000	170	500	85,000	K
2.3 Publication (2)	50	500	25,000	80	500	40,000	110	500	55,000	140	500	70,000	170	500	85,000	L
2.4 Seminar	0	200,000	0	1	200,000	200,000	2	200,000	400,000	2	200,000	400,000	2	200,000	400,000	M
Sub-total			2,050,000			3,280,000			4,510,000			5,540,000			6,570,000	
Operational Cost			7,828,700			15,239,278			20,332,500			21,183,067			21,586,048	
Achievement(%)			26.2			21.5			22.2			26.2			30.4	
<b>3. Testing and Certification Services (Testing and Certification Center)</b>																
3.1 T/C Services	1,200	10,000	12,000,000	1,500	10,000	15,000,000	2,000	10,000	20,000,000	2,000	10,000	20,000,000	2,500	10,000	25,000,000	N
Sub-total			12,000,000			15,000,000			20,000,000			20,000,000			25,000,000	
Utilization Ratio & Sales			50%			60.0%			70%			80%			90%	
Operational Cost			15,657,400			26,322,389			28,465,500			31,774,600			35,077,328	
Achievement(%)			38.3			39.9			56.2			56.6			71.3	
<b>4. Consulting Service (Dept. of Consultation Services)</b>																
3	900,000	2,700,000		5	900,000	4,500,000	5	900,000	4,500,000	5	900,000	4,500,000	5	900,000	4,500,000	P
Sub-total			2,700,000			4,500,000			4,500,000			4,500,000			4,500,000	
Operational Cost			4,697,220			5,541,556			6,777,500			6,619,708			6,745,640	
Achievement(%)			57.5			81.2			66.4			68.0			66.7	
<b>TOTAL SALES</b>			13,138,000			21,856,000			28,886,000			32,216,000			40,546,000	
<b>TOTAL OPERATIONAL COST</b>			31,314,800			49,874,000			59,642,000			63,549,200			67,456,400	
Profit/Loss(a)			-18,176,800			-28,018,000			-30,756,000			-31,333,200			-26,910,400	
Subsidy(b)			42.0			43.8			48.4			50.7			60.1	
(a) + (b) =			-2,176,800			-6,018,000			-8,736,000			-11,333,200			-6,910,400	



Utilization Ratio for the Testing and Calibration Services

Operating Ratio	1999	2000	2001	2002	2003
10%	1,200,000	1,500,000	2,000,000	2,000,000	2,500,000
20%	2,400,000	3,000,000	4,000,000	4,000,000	5,000,000
30%	3,600,000	4,500,000	6,000,000	6,000,000	7,500,000
40%	4,800,000	6,000,000	8,000,000	8,000,000	10,000,000
50%	6,000,000	7,500,000	10,000,000	10,000,000	12,500,000
60%	7,200,000	9,000,000	12,000,000	12,000,000	15,000,000
70%	8,400,000	10,500,000	14,000,000	14,000,000	17,500,000
80%	9,600,000	12,000,000	16,000,000	16,000,000	20,000,000
90%	10,800,000	13,500,000	18,000,000	18,000,000	22,500,000
100%	12,000,000	15,000,000	20,000,000	20,000,000	25,000,000

Million Bahrs	50%	70%	80%	90%	100%
	1999	2000	2001	2002	2003
Operational Cost	15.7	26.3	28.5	31.8	35.1
Sales	6.0	10.5	14.0	14.0	25.0



Appendix 1: List of Existing Equipment & Machinery at TISI-Bangkok

No.	Items	Quantity	Price (Baht)	Price (Yen)	Code	Registration Number	Name of Producer	Model/Size	Div. in charge	Location Room No.	Received from	Budget Year	Using Area WXL(m <sup>3</sup> )
1	High voltage testing device consists of 1. Control board 2. Impulse generator 3. Digital storage oscilloscope (for recording data) 4. Oscilloscope camera	1		8,878,000	C7.07.00 C7.07.00 B0Z0866	438/1-1 438/1-2 438/1-3	OGAWA SEIKI TTC TEKTRONIX	OSK6593 - 2221	1 1 1	108 108 108	JICA	1990	4.90x4.50(18)  in the cabinet in the cabinet
2	Card flexing tester consists of 1. Caplyre cord flexing tester 2. Load box 3. AC voltmeter	1		4,156,000	016-0359 Ca.10.00a	460/1-4 460/1	TEKTRONIX -	C-5C -	1 1	108 113	JICA	1990	in the cabinet 1.00x1.00(1)
3	Life Test Rack for in Candescence Lamp	1		28,333	44860 44861 60AE3252 C1.03.00	460/1.1 460/1.2 427/3	EVERTRON EVERTRON YEW	- - 2013 15.30V.	1 1 1	113 113 212	JICA	1990	in the cabinet 0.70x1.80(1.26) in the cabinet
4	Life Test Rack for in Fluorescent Lamp	1		1,766,000	C-90A-04 G1.20.00	474/1-1	TOSHIBA	-	1	113	JICA	1990	0.50x2.00(1)
5	Life Test Rack for Fluorescent Lamp	1		2,869,000	C-90A-05 G1.21.00	474/1-2	TOSHIBA	-	1	113	JICA	1990	0.50x1.50(0.75)
6	Life Test Rack for Fluorescent Lamp	1		2,869,000	G1.21.00	474/1-3	TOSHIBA	-	1	113	JICA	1990	0.50x1.20(0.6)
7	Set of Life Test Rack for Lamp	1	158,360			474/2	TOSHIBA	-	1	113	THAI	1994	0.60x2.00(1.2)
8	Variable AC source	1		1,629,000	00201 C7.06.00	424/18	MATSUNAGA	SVC-22136	1	113	JICA	1990	0.60x0.70(0.42)
9	Flexing tester on electrical machinery part	1				413/2		-	1	113	THAI	1992	0.70x1.80(1.26)
10	Stabilizer	1			90803	427/35	Stavel Matsunaga	TSA-1020F	1	212	THAI	1993	0.50x0.80(0.4)
11	Insulation resistance meter	1		414,000	CE2807QZ C7.18.01.1	202/11	TOA DEMP	SM-10E	1	211	JICA	1990	in the cabinet
12	Insulation resistance meter	1		414,000	CE2797QZ C7.18.01.1	202/10	TOA DEMP	SM-10E	1	211	JICA	1990	in the cabinet

No.	Items	Quantity	Price (Baht)	Price (Yen)	Code	Registration Number	Name of Producer	Model/Size	Div. in charge	Location Room No.	Received from	Budget Year	Using Area WXL(m <sup>2</sup> )
13	Variable AC source	1		1,233,000	48489053 C7.05.002	424/16	TAKASAGO	AA 2000F	1	114	JICA	1990	0.50x0.60(0.3)
14	DC power supply source	1		300,000	12989013 C7.03.01.1	424/4-1	TAKASAGO	GP035-50	1	212	JICA	1990	in the cabinet
15	Insulation+breakdown tester	1		157,000	29120706 C7.03.01.1	442/1	KIKUSUI	TOS8700	1	207	JICA	1990	1.00x1.00(1)
16	Insulation transformer	1		5,000	1034 C7.12.00.1	439/7	MATSUNAGA	WTC-1K 1 φ Max 4.5A	1	211	JICA	1990	in the cabinet
17	Insulation resistance meter	1		414,000	05791802 C7.18.00.1	202/8	ANDO	HR-4G	1	207	JICA	1990	0.45x0.90(0.40)
18	AC single phase voltage regulator	1		437,000	C00201 C7.01.00.3	437/6	MATSUNAGA	TA-229-V	1	207	JICA	1990	0.50x0.60(0.3)
19	Temperature overn	1		790,000	PHL-7468/40 E1.04.00	484/1	TAKASUGI	9078	1	212	JICA	1990	1.00x1.50(1.5)
20	Flamability tester	1		2,042,000	FLAMABILITY E1.08.02	466/1	EXCEL	BT-1500A	1	208	JICA	1990	1.00x3.50(3.5)
21	Temperature & moisture controlling machine	1			-	484/3	-	-	1	208	THAI	1994	0.45x0.70(0.31)
22	Hydrid recorder	1		691,167	40RA0195 CS.03.00	436/5	YEW	3087	1	219	JICA	1990	0.30x0.34(0.10)
23	Computer machine	1			SG70301538	154/236	HEWLETT PAKARD HP	VLA 5/133 M 1280	1	212	THAI	1997	0.80x1.50(1.2)
	Monitor	1			KR6S285164		HEWLETT PAKARD HP	D 2811	1	212	THAI	1997	
24	Computer machine	1			SG70301398	154/243	HEWLETT PAKARD HP	VLA 5/133 M 1280	1	212	THAI	1997	0.80x1.50(1.2)
	Monitor	2			KR6S285527		HEWLETT PAKARD HP	D 2812	1	212	THAI	1997	
25	Impact tester	1	50,000		CA.27.00	561/1			1	211	JICA	1993	1.26x0.55(0.69)
26	DC power supply source	1		1,352,000	2890577 C7.04.02	424/14	TAKASAGO	GP035-200R	1	211	JICA	1990	0.50x0.62(0.31)

No.	Items	Quantity	Price (Baht)	Price (Yen)	Code	Registration Number	Name of Producer	Model/Size	Div. in charge	Location Room No.	Received from	Budget Year	Using Area WXL(m <sup>3</sup> )
27	Arc resistance tester	1		1,398,000	KG9935-1-2 C7.20.02	445/1	TOKYO SEIDEN	OSK10229-C-SP	1	211	JICA	1990	0.62x0.62(0.38)
28	DC power supply source	1		329,000	17989018 C7.03.01.2	424/5	TAKASAGO	GP0250-10R	1	211	JICA	1990	0.45x0.50(0.22)
29	AC single phase voltage regulator	1		437,000	C00201 C7.01.00.1	437/2	MATSUNAGA	TA-229	1	211	JICA	1990	0.50x0.60(0.3)
30	Breakdown tester for electrical machine	1			Ca.22.00	492/1		-	1	212	THAI	1992	0.72x0.76(0.54)
31	Cord bending fatigue tester	1		1,402,000	Ca.10.00b	460/2	TESTER SANGYO	BE-801-M	1	113	JICA	1990	0.67x1.79(1.19)
32	Thermostat tester for iron				-	575/1		-	1	212	THAI	1996	0.80x1.80(1.44)
33	High frequency breakdown tester	1		781,000	14N1269 C7.19.00	435/4	TOKYO SEIDEN	OSK 10231-SP	1	212	JICA	1990	0.43x0.40(0.17)
34	Volt slider	1		31,500	KP863 C7.15.02.1	440/6	MATSUNAGA	SD269-J	1	211	JICA	1990	0.26x0.23(0.59)
35	Temperature and moisture controlling oven	1		735,946	13002131	484/2	TAKASUGI	PR-1 ST 9028	1	212	THAI	1994	0.78x0.96(0.74)
36	Tumble barrel	1		486,000	Ca.12.00	462/1	TAIYO KEIKI	-	1	113	JICA	1990	0.60x1(0.6)
37	Digital model of resistance meter	1		78,645	-	441/4	HIOKI	-	1	212	THAI	1994	0.90x1.50(1.35)
38	Hybrid recorder	1		764,000	40SB0130 C5.02.00.1	436/1	YEW	3081	1	211	JICA	1990	0.44x0.37(0.16)
39	Lamp Chamber tester	1		1,355,000	G1.19.00	473/1	TAIYO KEIKI		1	212	JICA	1990	1.20x1.20(1.44)
40	Hybrid recorder	1		691,167	40RA0193 C5.03.00	436/7	YEW	3087	1	212	JICA	1990	0.32x0.35(0.11)
41	Glow-wire test apparatus	1		805,000	CA.29.00	562/1	HITACHI	HAT-214	1	211	JICA	1993	0.72x0.75(0.54)
42	AC voltmeter	1		28,333	70AD00064 C1.03.02	427/9	YEW	2017 30,75,150,300V	1	212	JICA	1990	in the cabinet

No.	Items	Quantity	Price (Baht)	Price (Yen)	Code	Registration Number	Name of Producer	Model/Size	Div. in charge	Location Room No.	Received from	Budget Year	Using Area WXL(m <sup>3</sup> ) in the cabinet
43	Watt meter	1		59,000	60AN0530 C1.01.02a	204/11	YEW	2041 5.25A.120x50W	1	212	JICA	1990	in the cabinet
44	Thermo-couple type ammeter	1		105,000	60AJ00164 C1.10.01	428/54	YEW	2016 5.10.20.50mA	1	212	JICA	1990	in the cabinet
45	Earth continuity tester	1		131,000	10020412 C7.22.00	447/2	KIKUSUI	TOS 6100	1	212	JICA	1990	in the cabinet
46	Electronic Voltmeter	1		102,400	131361 Lo.05.00	427/26	NF	M-174B	1	211	JICA	1990	in the cabinet
47	Volt slider	1		31,500	KF865 C7.15.02.2	440/8	MATSUNAGA	SD269-J	1	212	JICA	1990	0.25x0.25(0.6)
48	AC single phase voltage regulator	1		436,666	C000201 C7.01.00.2	437/5	MATSUNAGA	TA-2245	1	212	JICA	1990	0.50x0.60(0.3)
49	Insulation+breakdown tester	1		157,000	10018608 C7.17.00.5	442/5	KIKUSUI	TOS8650	1	208	JICA	1990	0.60x1.20(0.72)
50	AC ammeter	1		29,600	60AE323 C1.03.04	428/32	YEW	2013 10.30.100.300m	1	212	JICA	1990	in the cabinet
51	Digital watt meter	1		222,333	50AH0016 C1.01.03	204/13	YEW	2509 MAX 10A	1	212	JICA	1990	0.60x1.20(0.72)
52	DC voltmeter	1		23,800	70AA02614 C1.09.01	428/34	YEW	2011 10.30.100.300m	1	212	JICA	1990	in the cabinet
53	AC three phase voltage regulator	1		1,325,000	00201 C7.02.00	437/7	MATSUNAGA	TA3-10-380G	1	212	JICA	1990	0.60x0.70(0.42)
54	DC power supply source	1		300,000	12989012 C7.03.01.1	424/2-2	TAKASAGO	GP035-50	1	212	JICA	1990	in the cabinet
55	Variable AC source	1		1,233,000	2890568 C7.05.00.3	424/17	TAKASAGO	AA 5000	1	211	JICA	1990	0.50x0.60(0.3)
56	Hybrid recorder	1		691,167	40RA0196 C5.03.00	436/6	YEW	3087	1	212	JICA	1990	in the cabinet
57	Hybrid recorder	1		764,000	40SB0131 C5.02.00.2	436/2	YEW	3081	1	212	JICA	1990	in the cabinet
58	Earth continuity tester	1		131,000	10020411 C7.22.00	447/1	KIKUSUI	TOS 6100	1	212	JICA	1990	in the cabinet

No.	Items	Quantity	Price (Bahr)	Price (Yen)	Code	Registration Number	Name of Producer	Model/Size	Div. in charge	Location Room No.	Received from	Budget Year	Using Area WXL(m <sup>3</sup> )
59	Testing circuits for fluorescent lamp	1		2,383,000	C-90A-07 G1.22.00	475/1	TOSHIBA	-	1	212	JICA	1990	0.78x1.82(1.41)
60	Testing circuit of starter	1		2,140,000	CA.24.00	552/1	Precision		1	211	JICA	1992	0.78x1.82(1.41)
61	Temperature oven	1	11,239,863		8466	484/5	Gallenkamp	HCC110.CFAJ	1	212	THAI	1997	1.32x1.95(2.5)
62	Moisture evacuation machine	1	15,300		-	125/3	-	-	1	212	THAI	1996	0.35x0.35(0.12)
63	Photometric integrating sphere consists of			29,325,000	G1.08.00	470/1	-	-	1	213	JICA	1990	4.00x6.00(24)
64	Photometric bench consists of			10,195,000	C-90A-02 G1.09.00	471/1	-	-	1	213	JICA	1990	2.00x4.50(9)
65	Colorimetry consists of			18,391,000	G1.16.00	472/1			1	213	JICA	1990	2.00x3.00(6)
66	Mechanical endurances test for speed regulator: Rotary Type			3,271,000	Be.05.01	486/1	TAIYO KEIKI	-	1	316-4	JICA	1990	1.00x2.00(2)
67	Mechanical endurances test for speed regulator: Push Type			2,804,000	Be.05.02	486/2	TAIYO KEIKI	-	1	212	JICA	1990	1.00x2.00(2)
68	Step-up transformer			374,000	7686 C7.10.00	439/1	OGAWA SEIKI	OSK 10235	1	212	JICA	1990	0.50x0.50(0.25)
69	Small size of compressor		22,149		-	182/3	IWATA CSP	SPC-1SP.B.	1	207	THAI	1993	0.50x1.00(0.5)
70	Fault condition test apparatus		106,950	465,000	CA.30.00	560/1			1	207	JICA	1993	0.70x1.00(0.7)

Appendix 2: List of Office Equipment, Furniture & Fixture for TAI

No.	Items	Quantity	Price/Unit (Baht)	Amount (Baht)
1	Car for Executive Director	1	1,200,000	1,200,000
2	Office Car	3	900,000	2,700,000
3	Table and chair for Director of Institute	1	15,000	15,000
4	Table and Chair for Director of Division	6	12,000	72,000
5	Table and Chair for Officer	56	7,000	392,000
6	Table and Chair for Meeting Room	10	5,000	50,000
7	Cabinet for Documents	20	3,500	70,000
8	Copy Machine	1	90,000	90,000
9	Personal Computer	8	40,000	320,000
10	Printer	6	20,000	120,000
11	Table and Chair for Computer work	8	3,500	28,000
12	Projector which use for computer	1	250,000	250,000
13	Facsimile Machine	2	34,000	68,000
14	Telephone Machine	20	1,500	30,000
15	Mobile Phone	4	30,000	120,000
16	Air Condition for Office	10	35,000	350,000
17	Air Condition for Testing/Calibration Labo.	10	35,000	350,000
18	Electrical Typewriter	1	34,000	34,000
19	Telephone Box, Line Box, and Equipment	-	260,000	260,000
20	Place Decoration Fee	400/m <sup>2</sup>	5,000	2,000,000
	<b>TOTAL</b>			<b>8,519,000</b>



Appendix 3: Maintenance Fee for Existing Facilities of TISI

	2000	2001	2002	2003	2004
(Thousand Bahts)					
1. Testing machinery and equipment for automobile pollution, evaporated oil and engine oil (6 items and total value is 30 million baht; average durability of item is 4 years for each.)					
1.1 Revitalization and Repair of existing facilities	30,000	15,000	10,000	10,000	10,000
1.2 Calibration Charge (approximately 0.3% of the value)	900	900	900	900	900
1.3 Maintenance Cost (approximately 3% of the value)	9,000	9,000	9,000	9,000	9,000
<b>Sub-total</b>	<b>39,900</b>	<b>24,900</b>	<b>19,900</b>	<b>19,900</b>	<b>19,900</b>
2. Testing machinery and equipment for safety (50 items, total value is 100 million bahts)					
2.1 Revitalization and Repair of existing facilities	5,000	1,000	1,000	1,000	1,000
2.2 Calibration Charge (approximately 1.0% of the value)	1,000	1,000	1,000	1,000	1,000
2.3 Maintenance Cost (approximately 3.0% of the value)	3,000	3,000	3,000	3,000	3,000
<b>Sub-total</b>	<b>9,000</b>	<b>5,000</b>	<b>5,000</b>	<b>5,000</b>	<b>5,000</b>
<b>Total cost</b>	<b>48,900</b>	<b>29,900</b>	<b>24,900</b>	<b>24,900</b>	<b>24,900</b>



**Project No.S2: Setting-up of Electrical and Electronics Institute**

## **1. Rationale**

Upon the request of MOI, the Team offers for this project a detailed concept and activities of the Electrical and Electronics Institute which was recently established.

### **1.1 Background of the Project**

In January 1998, The Government of Thailand has announced its Cabinet approval of the Industrial Restructuring Plan, proposed by the Ministry of Industry. The purpose of IRP is to cope with the Thai's economic recession through the improvement of Thai's international competitiveness and export expansion, and the "Concept for Institutional Building" is one of the means to execute IRP's Action Plans.

The Ministry of Industry consists of six departments, namely: (1) Office of the Permanent Secretary, OPS; (2) Department of Mineral Resources, DMR; (3) Department of Industrial Works, DIW; (4) Department of Industrial Promotion, DIP; (5) Thai Industrial Standards Institute, TISI; and (6) the Office of Industrial Economics, OIE. Under Ministry of Industry there are three state enterprises and seven non-profit institutes some of which including Electrical and Electronics Institute are in the process of setting up.

Although the MOI's main responsibilities are policy-making, budget distribution and monitoring, ministry has become deeply involved in service activities directly affecting the industries, such as research, inspection, testing and human resource development and training, and in turn, their main responsibilities were left behind. In order to focus on the policy-making, budget planning and distribution and monitoring, the MOI has been promoting institutional building to transfer some of their activities to those institutes.

Electrical and Electronics Institute is an independent and non-profit organization under the Industrial Development Foundation, Ministry of Industry, that was established in July, 1998. It has the objective of strengthening the competitiveness of Thailand's electrical and electronics industry in the international market. The institute is managed by an executive director reporting to the EEI board of directors, which consists of representatives from governmental, private and academic bodies. The responsibilities of the institute initially set by the board are as follows;

- (1) Provides quality, safety and environmental testing for electrical and electronic products.
- (2) Provides information on production technology, and trade.
- (3) Coordinates and cooperates with the governmental and private sectors at both domestic and international levels to develop the industry and its related businesses as well as to improve knowledge and skills of the workforce
- (4) Conducts relevant studies in order to make recommendations on policies, plans and measures for developing and solving problems of the industry.

## **1.2 Desires of the Electrical and Electronics Industry**

The electrical and electronics industry in Thailand may be divided into four categories depending on their characters as follows;

- |            |  |
|------------|--|
| Category A | Export oriented enterprises<br>(assemblers 100% foreign owned )                    |
| Category B | Domestic market oriented J/V enterprises<br>(joint venture assemblers)             |
| Category C | Local large-size enterprises<br>(Thai-owned assemblers and primary subcontractors) |
| Category D | Local SMEs<br>(parts manufacturers)  |

The crisis caused companies in categories B and C to shift their target to the export market. The local SMEs in category D were not able to follow this trend. The problems of the local SMEs are summarized as follows;

- Lacking in R&D capability
- Safety standards which are equivalent to international standards are not regulated enough
- Coordination between buyers and suppliers is lacking
- Promotion of electrical and electronics industries in Thailand is lacking

The local SMEs as well as foreign and domestic assemblers who need to buy electrical and electronics parts from the local SMEs are expecting strong support from EEI. Concretely, the needs from the private sector are as follows:

- (1) Product certification
- (2) Safety standards development
- (3) Standards accreditation
- (4) Market information
- (5) Calibration of testing equipment

Through the activities of EEI and strong participation of Thai's electrical and electronics industry, they will be able to gain international competitiveness and look for the export market.

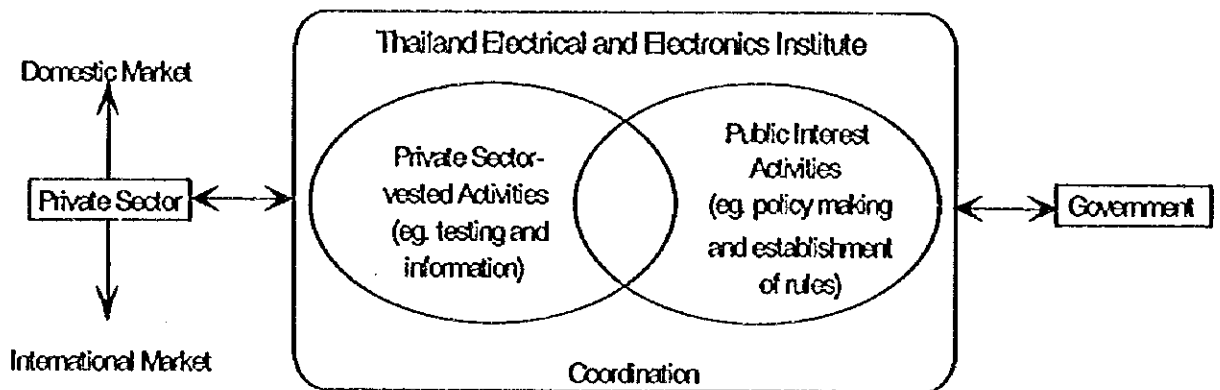
## **2. Purpose of the Project**

The purpose of the establishing the Electrical and Electronics Institute is to meet the needs of the private sector and to support and promote its competitiveness in the domestic and international market.

### 3. Output of the Project

The principal mission to achieve the project purpose is to have good coordination between private sector and the government under the single umbrella of EEI.

Private Sector and the Government under the EEI Umbrella



EEI will be designed to achieve the following outputs through their activities;

#### 3.1 Policy Making Support

In order to promote the electrical and electronics industry, the MOI needs to have done all sorts of research and survey tasks for their policy making process. EEI will execute research and survey assignments commissioned by the MOI.

#### 3.2 Information Service

EEI provides all sorts of information such as market and technology information through their publications and data base. With this service, EEI assists the automotive industry.

### **3.3 Testing and Certification Services**

EEI provides testing and certification services in order to contribute to the improvement of consumer protection for domestic market and to upgrade the Thailand's electrical and electronics market competitiveness.

### **3.4 Consultation Services**

EEI transfers their proper technology, administrative and management skills in order to improve the competitiveness of automotive parts industry.

## **4. Project Description**

This project is aimed at servicing private sector needs for testing, certification and consultation services. At the same time, the project will support the Ministry of Industry regarding strategy making for electrical and electronics industry development.

### **4.1 Implementing Agency**

#### **4.1.1 Implementing Agency**

Electrical and Electronics Institute is the implementing agency for this project. EEI was established by the Ministry of Industry and it is an independent and non-profit organization.

#### **4.1.2 Location**

(1) **Head Office:** For the first year starting from May 1999

**Address:** Department of Industrial Work  
6th Floor, Department of Industrial Building  
57 Thanon Phrasumen, Phranakorn, Bangkok 10200

**Expenses:** rents free  
furniture, water, electricity, telephone are in charge of EEI from the second year

**Address:** BSID

Expenses: initial cost for renovation  
                  rents free

(2) Testing Center: TISI-Bamboo Testing Center

#### **4.1.3 Government Budget Plan to EEI**

For next five years including the fiscal year starting 1999, the EEI will receive a total of 100 million bahts. And this five-years budget is considered to be an initial setting-up budget. Afterward, the EEI can ask for supporting budget to compensate their additional investment and operational cost.

Together, the head office and testing center are lent by MOI free of charge.

Total of Bt 100 million for 5 years

1st Year (Oct. 1, 1999 --Sep., 2000)

Bt 14.4million

2nd Year Bt 20 million (maybe)

#### **5. Implementation Body and Financing Source**

Electrical and Electronics Institute, MOI

#### **6. Activities**

##### **6.1 Policy Making Support**

The purpose of EEI is to meet the needs of the private sector and to support and promote its competitiveness in the domestic and international market.

Based on the "Guidelines for development of Thai's Electronic Industry during 1996-2000," six strategic measures for development of the electronics industry have been set.



- (1) Special zones for electronics industrial development will be considered in order to facilitate processing and trade of electronics industry.
- (2) Restructuring customs duties in order to promote processing of parts and components and supporting industry, and also strengthen the capabilities of Thailand's electronic products in the world's market.
- (3) Strengthen standardization of Thai's electronic industry in order to keep up with the world's standardization.
- (4) Deregulate the government's approving and licensing system in order to reduce costs and times of production and trade of electronic industry.
- (5) Human resources planning for electronic industry will be considered both in educational programs and training programs.
- (6) Technological base planning for future development of electronics industry will be considered. Research and development activities, multinational or joint venture in research activities will be promoted.

The EEI undertakes the function of (3) and (4) above in terms of testing the conformity to standards. To reflect the private sector's demand on (3) and (4), the EEI studies the situation in Thailand and in the world to make policy recommendations in order to maintain the competitiveness of Thailand's electrical and electronic industry.

This policy making support should be contracted for and paid for by reasonable compensation by the government.

### **6.1.1 Electrical and Electronics Sector Studies**

When asked by the government, EEI will be always prepared to offer the sectoral studies and trend, market projections and industry strategic analysis studies based on its sophisticated database.

### **6.1.2 Policy Recommendation Studies**

The EEI will seek to fully utilize the voice and opinions from the industry, to reflect it in the policy recommendations to the government.

### **6.1.3 Specific Sector Studies**

The EEI is capable of conducting specific sector studies such as emerging issues. Because they are close to the industry and updating their data base, they can respond quickly to the issues of the industry and make recommendations to the government.

### **6.1.4 Standards Development with TISI**

The EEI will support standards development with TISI for the electrical and electronics industry.

Industrial Product Standards ACT, B.E.2511 (1968) has been the base of industrial standards in Thailand for manufacturers and importers until now. These standards and regulations are implemented and maintained by TISI. In this Industrial Products Standards Act, B.E.2511, standards are defined as listed below.

Specifications on one or many of descriptions concerning the following;

- (1) Kind, type, shape, dimension, manufacture, equipment, quality, grade, component, faculty, durability and safety of the industrial products
- (2) Methods of manufacture, design, drawing, usage, material used for the industrial products and safety concerning the manufacture of the industrial products
- (3) Kind, type, shape, dimension of packages or other kinds of containers including the making of packages or other kinds of containers, and methods of packing, wrapping or binding and materials used therefore

- (4) Methods of experiment, analysis, comparison, examination, testing and weighing and measuring in volume and size concerning the industrial products.

Due to globalization, the world is in the process of standardization of such product standards and methods of testing due to market requirements and the EEI will follow such movement to sustain the competitiveness of the Thai electrical and electronics industry. To achieve such purpose, the EEI will work together with TISI to develop new standards.

## **6.2 Information Service**

### **6.2.1 Development of Data Bank for Electrical and Electronics Companies**

EEI set up and up date the following data.

<For Finished-products>

#### **(1) Electrical and Electronic Industry Data for Finished-products**

(1-1) Production Volume in Thailand & in the world (country by country) such as;

- (a) Consumer electronics (including TV, radio, audio, video cassette recorder, camcorder and electronic watches )
- (b) Office equipment (including copying machine, facsimiles, typing machine, calculator, computer )
- (c) Telecommunications equipment (including telephones, mobile, satellite receiver)
- (d) Industrial electronic equipment (including circuit breaker, switch gear, power transformer, numerical control system )
- (e) Electronic parts & components (including ICs, semiconductor devices, cathode ray tube passive components, PCBs, transformer)

(1-2) Electrical and electronic manufacturers' production capacity and utilization

(1-3) Employment structure of (1-1) by category

(1-4) Sales volume in Thailand and in the world (country by country)

(1-5) Market share in Thailand by category

(2) Electrical and Electronics Company Profile

Thai and foreign companies registered in EEI should be listed.

(3) Thai and foreign companies investment trend in the electrical and electronic sector.

<For Parts-products>

(4) Based on the guidelines for development of Thailand's Electronics Industry during 1996-2000, the following were chosen as target products; 1) wafer fabrication, 2) integrated circuit design, 3) optic fiber manufacturing, 4) switching and transmission equipment for telecommunication, and 5) software industry

EEI studies the same category of finished products, such as production, production capacity and utilization, sales, employment structure, market share, company profile, investment performance etc.

(5) Information source includes the following;

Board Member of the EEI  
Office of Industrial Economics, Ministry of Industry  
Department of Export Promotion, Ministry of Industry  
Department of Industry Promotion, Ministry of Industry  
The Federation of Thai Industry  
The Computer Association of Thailand  
The Engineering Institute  
The Telecommunication Association of Thailand

Electrical Engineering Department, Kasetsart University  
Telephone Organization of Thailand  
National Science and Technology Development Agency  
Japanese Chamber of Commerce, Bangkok  
JETRO

### **6.2.2 Publication of Data and Data Analysis**

Based on the information collected in 4.2.1, EEI can publish data and data analyses.

### **6.2.3 Publication of Sector Studies**

Based on the information collected in 4.2.1, EEI conducts sectoral studies as mentioned in 4.1 activities and publishes them.

### **6.2.4 Publication of Periodical Sector News**

Based on the information collected in 4.2.1, EEI publishes its periodical sector news, distributed to EEI-registered or listed companies in return for their offering of data to EEI.

Also publication can be used for marketing and public relations on behalf of EEI activities.

### **6.2.5 Development of a Consults Databank**

The development of a databank for consults is directly connected to the activities of 4.4, the consultation services. The EEI lists the details of consultants, including name, contact address, status, and area of skills and technics, so that the EEI can match the needs of a company with an appropriate consultants.

### **6.3 Testing and Certification Services**

The EEI executes testing and certification services based on Thai Industrial Standards Act 1968. These activities are directly transferred from TISI. The activities cover the following areas.

#### **6.3.1 Safety Testing and Certification of Electrical and Electronics Products and Parts Based on TISI Standards**

- (1) Eligible products and parts for testing and certification
  - (a) Electrical and Electronic Parts, such as Resistor, Condensor, Coil, Transistor, PCB, Switching, Speaker, Microphone, etc.
  - (b) White Electric Appliances, such as Refrigerator, Electronic Range, Cleaner, Mixer, Rice Cooker, Electric Iron etc.
  - (c) Home appliances, such as TV, VTR, CD, MD
  - (d) Telephone Equipment, Cordless Telephone
  - (e) Facsimile, Copy Machine and other OA machines
  - (f) PC and related equipment, TV Games and other electronic games
  
- (2) Range of Testing and Certification
  - Heat Test
  - Humidity Test
  - Vibration Test
  - Shock Resistance Test
  - Pressure Test
  
- (3) Related Standards in this category
  - TIS, JIS, IEC and other standards when requested by clients

#### **6.3.2 Compulsory Standards Testing Based on TISI**

TIS 23-2521 (1978) Ballast for fluorescent lamps

- TIS 293-2526 (1983) PVC-insulated aluminum cables
- TIS 366-2528 (1985) Electric iron
- TIS 183-2528 (1985) Starters for fluorescent lamps
- TIS 4 Part 1-2529 (1986) Incandescent lamps
- TIS 10-2529 (1986) Low-voltage distribution link fuses
- TIS 344-2530 (1987) Lampholders for tubular fluorescent lamps and starterholders
- TIS 11-2531 (1988) PVC insulated copper cables
- TIS 956-2533 (1990) Fluorescent lamps: safety requirements
- TIS 934-2533 (1990) A.C. electric fans: safety requirements
- TIS 870-2532 (1989) Electric stoves: open type heating elements: safety requirements

### **6.3.3 Voluntary Standards Test**

The EEI conducts testing services for voluntary standards to satisfy the demand from private sector for their export, import and manufacturing

#### **(1) Eligible products for testing**

- (a) Electric Products and Parts, such as TVs, VTRs, radios, computers and related equipment, switches, adapters, converters, connectors, etc.
- (b) Low voltage electric products and parts, such as lightening equipment, electric fans, electric cords and cables, switches, sockets, plugs, hair-dryers, electric ranges, cookers, air-conditioners, etc.
- (c) Telecommunication equipment and parts, such as telephone equipment, cordless telephones, etc.
- (d) Information related equipment and OA equipment, such as PCs and related equipment, facsimiles, copy machines and printers, etc.

#### **(2) Related Standards for Testing**

TIS, UL, CSA, IEC, SISIR, Electric Products Safety Requirements of Japan, etc.

#### **6.3.4 CE-Marking Test**

The EEI conducts the testing services based on EU Directive, which are essential factors for CE-Marking. For example, EMC is based on 89/336 EEC (original directive and was amended 92/31 EEC and 93/68 EEC accordingly). The EEI offers testing of Module B or C of CE-Marking. Related testing for CE-Marking should be developed to support exports to European countries.

### **6.4 Consultation Services**

#### **6.4.1 Factory-Clinic Services**

Based on the Databank for Consultants mentioned in 4.2.5, the EEI provides so-called "Factory-Clinic Services" to clients. A client or company asks for advice and improvement of a certain issue to the EEI, and the EEI defines the issues and matches the most appropriate consultant to the client. Those consultants listed in the databank are not only from or connected to Thailand but also from all over the world.

#### **6.4.2 Intermediary Services to Other Institutes**

There are seven institutes under MOI including the EEI together with other private and non-profit institutes and organizations. The EEI can share the database of those institutes and can act as a contact point in order to maximize the utilization of existing institutes.

### **7. Expected Benefit of the Project**

The expected benefit of the project is two ways. One is that the project contributes to support Thailand electrical and electronics industry through their activities to meet the needs of private sectors and to support and promote their competitiveness in the domestic and international market. Secondly, the project contributes to the Thai Government for their policy-making on electrical and electronics industry development in Thailand.



There are some strength of this project to be successful such that (1) a huge demand is expected for the services offered by the EEI, (2) some of the equipment and machinery has already been prepared through TISI.

#### **8. Weakness of the Project**

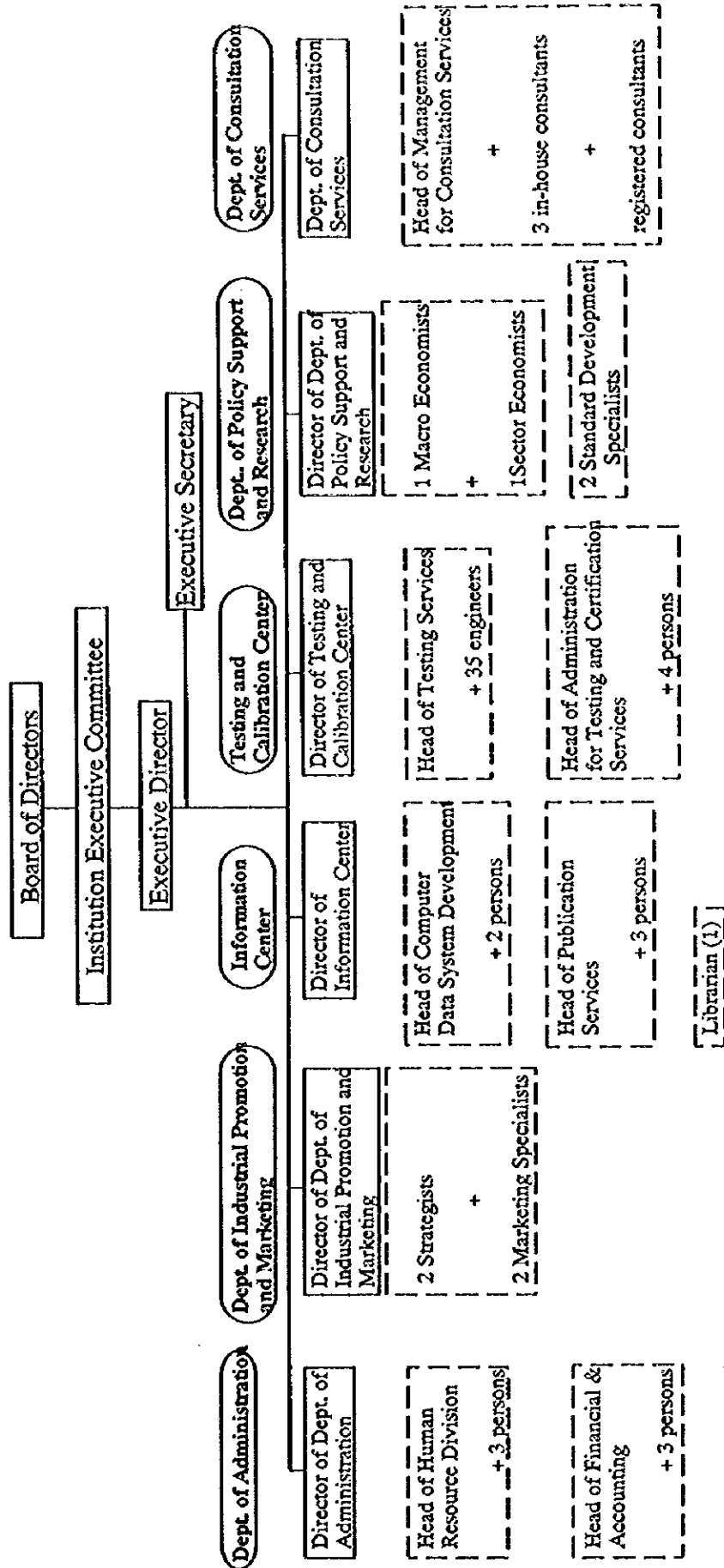
- Documentary standards (voluntary and compulsory) which are harmonized to international standards should be developed.
- A sufficient number of engineers should be well trained for testing and calibration work.

9 Implementation Schedule

9.1 Implementation Schedule: 5-year Plan for Electrical and Electronics Institute

	1999	2000	2001	2002	2003
	5-year Plan for Electrical and Electronics Institute				
I	Electrical and Electronics Sector Studies				
Policy	1.1 Electrical and Electronics Sector Studies				
Malong Supprt	1.2 Policy Recommendation Studies				
	1.3 Specific Sector Studies				
	1.4 Standards Development with TISI				
	2.1 Development of Data Base for the Sector				
Information	2.2 Publication of Data and Data Analysis				
Service	2.3 Publication of Sector Studies				
	2.4 Publication of Periodical Sector News				
	2.5 Development of Data Bank for Consults				
III.	Phase-1: Using Present Facilities				
Testing and	3.1 Safety Testing and Certification of Products and Parts Based on TISI				
Certification	3.2 Compulsory Standards Testing Based on TISI				
Services	3.3 Voluntary Standards Test				
	3.4 Calibration Services				
	Phase-2				
	3.5 Acquisition of New Equipment and Machinery				
	3.6 Training for the Usage of New Equipment and Machinery				
	Phase-3: Using Present and New Facilities				
	3.7 Safety Testing and Certification of Products and Parts Based on TISI				
	3.8 Compulsory Standards Testing Based on TISI				
	3.9 Voluntary Standards Test				
	3.10 CE-Marking Test				
IV					
Consultation	4.1 Factory Clinic Services				
Services	4.2 Intermediary Services to Other Institute				

9.2 Organization Chart and Human Resource Planning for Electrical & Electronics Institute (1999-2003)



- 10 Financial Projection
- 10.1 Explanatory Notes and Conditions
- (A) Human Resource Planning is based on their activities and Organization Chart (in 5.3). For the Testing and Calibration Center, the number of engineers (including technicians) will be increased with escalation to the level of a reasonable number by year 2003.
- (B) Salary Plan for EEI is based on the amount of per-person salary for the year of 1999 proposed by EEI.
- (C) Overhead is calculated as 50% of salary and wages and includes the following;
- Overtime allowance
  - Allowance for committee meetings
  - Medical allowance
  - Educational allowance for children
- (D) For the Material Expenditure, the EEI plans a budget of 126,000 Bahts per year.
- (E) For the Utilities, the EEI plans a budget of 2,340,000 Bahts per year.
- (F) For the Durable Article, Land and Building, the EEI plans a budget of 500,000 Bahts per year.
- (G) The Miscellaneous fee is calculated as 10% of total of Salary & Wages and Overhead & Other Expenditure.

(H) Total Operating Cost is considered to be, in turn, "Expected Income" or "Income Target". This Expected Income is divided among income generating departments in order to set a target income for their activities.

10.2 Explanatory Notes and Conditions in Detail on Income for Electrical and Electronics Institute

**1. Policy Making Support - Contract research for the Government**

1.1 Study projects for sub-sector, policy recommendation and specific issues

(1) For the 1st year: 5 studies/year x 300,000 Bahts = B1,500,000/y

(2) One study shall be added annually until the 5th year

1.2 Coordination for making product standards

(1) For the 1st year: 1 person x 8 man-months/year x B84,000 = B672,000/y

(2) Price/Unit: - three times of annual wage of B28,000-

**2. Information Service**

2.1 Member Fee

(1) For the 1st year: 100 companies x B20,000 = B2,000,000/y

(3) 30 companies shall be added annually until the 5th year

\* Members shall get the followings free of charge

(a) Publication of data and data analysis reports

(b) Publication of sector study reports

(c) Publication of monthly newsletters

2.2 Publication (1) Publication of Data and Data Analysis Reports

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L

- (1) For the 1st year: 30 copies x B500/copy = B15,000/y  
 (2) For the 2nd year to 5th year: 20 copies are added annually
- M**
- 2.3 Publication (2) Publication of Sector Report
- (1) For the 1st year: 30 copies x B500/copy = B15,000/y  
 (2) For the 2nd year to 5th year: 20 copies are added annually
- N**
- 2.4 Seminar
- (1) For the 1st year: not feasible  
 (2) For the 2nd year: One Seminar x B200,000 = B200,000/y  
 (3) For the 3rd year to 5th year: Two Seminars x B200,000 = B400,000/y
- O**
- 3. Testing and Certification Services**
- 3.1 Testing and Certification Services (1)
- (1) Given conditions: 1 engineer handles 76 testing  
 Average fee for the Testings is B9,000-  
 Number of engineers is based on human resource planning
- (2) For the 1st year: 5 engineer x 76 testings x B9,000 = B3,420,000/y
- P**
- 3.2 Testing and Certification Services (2)
- (1) Given conditions: 1 engineer handles 76 testing  
 Average fee for the EMC Testings is B20,000-  
 Number of engineers is based on human resource planning
- (2) For the 1st year: 2 engineer x 76 testing x B20,000 = B3,040,000/y
- Q**
- 3.3 About Utilization Ratio:
- For the 1st year: Operational Ratio shall be 50% since half of the engineers and technicians shall be receiving t

raining.

- For the 2nd year to the 4th year : Operational Ratio shall be 70%, 80%, 90% consecutively.
- At the 5th year, Operational Ratio shall be 100% which is a break-even point.

#### **4. Consulting Service (Factory Clinic Services)**

R

##### **4.1 Conditions**

- Two of foreign experts will visit a factory once a month spending 3 days per visit for factory clinic services.
- The two can assist 7 factories in one visit to Thailand and will continue a year for a factory or 3-day x 12-time visits for clinic.

##### **4.2 Cost for Foreign Expert**

- Remuneration: B400,000/mm x 12months/y = B4,800,000/y
- Out-of-pocket expenses: B100,000/mm x 12 months = B1,200,000/y
- Total Cost: B6,000,000/y (Cost per factory = B6,000,000/y)
- Each beneficiary factory will pay 25% of the total cost or B150,000/y and the rest shall be met by either government subsidies or foreign aid, or a combination thereof.

##### **4.3 Income for the Institute**

- 15% of the total cost or B900,000/y per pair shall be appropriated to management fee for the institute.
- For the 1st year: 3 pairs
- For the 2nd year to 5th year: 5 pairs

#### **10.3 Explanatory Notes for Maintenance Fee for Existing Equipment and Facilities of TISI**

1. Maintenance fee for existing equipment and facilities which are transferred from TISI to EEI is considered to be 10% of

their initial value.

2. Those costs should be covered by an additional government subsidy.

#### 10.4 Explanatory Notes and Conditions on Acquisition of New Equipment for EEI (Refer Appendix-2)

##### 1. Total Cost for Acquisition of Equipment is 536 Million Bahts

- 147 Million Bahts for Calibration Laboratories
- 389 Million Bahts for Testing Laboratories

##### 2. Necessary Equipment Amount for Calibration and Testing Laboratories are divided into following categories;

- (Calibration)
- Direct Current Low Frequency\_\_\_\_\_
  - High Frequency\_\_\_\_\_
  - Length and Shape\_\_\_\_\_
  - Temperature\_\_\_\_\_
- (Testing)
- Reliability Testing\_\_\_\_\_
  - Safety Testing\_\_\_\_\_
  - Parts Testing\_\_\_\_\_
  - Home Electronics Products Testing\_\_\_\_\_
  - AV Products Testing\_\_\_\_\_
  - Information Communication OA Testing\_\_\_\_\_

\* For the details of acquisition of new equipment, refer to Appendix 2.



3. Priority for the Investment  
(Calibration)
- Calibration services shall start from year 2000. However, since TISI's Bamboo Testing Center already does testing, EEI has to acquire the equipment for calibration services.
  - Priority area for the basic calibration services shall include such as length, shape and temperature.
  - Equipment for calibration services for length, shape and temperature shall be acquired in the year of 2000 at the costs of 58 and 24 million bahts respectively.
  - EEI shall expand and improve calibration services in other area as a second stage. Those include Direct Current Low Frequency in 2002 and High Frequency in 2003.
- (Testing)
- Testing Services shall start on the basis the existing main activities of TISI-Bamboo, which include Safety Testing, Parts Testing and Home Electronics Products Testing.
  - Existing equipment in TISI have been verified and found that those equipment are concentrated in Safety Testing, Parts Testing & Products Testing.
  - The priority for the acquisition of equipment for the testing services shall be invested as follows;
 

Year 2000	- Safety Testing
	- Parts Testing
Year 2001	-Reliability Testing
	- Home Electronics Products Testing
	- AV Products Testing in Year 2001
Year 2002	- Information Communication
	- The rest of AV Products Testing
Year 2003	- The rest of AV Products Testing

4. Planning for Acquisition of New Equipment (Refer to Appendix 2)

- Total amount of newly investment of 536 million bahts is divided by four years.

Budget for	Year 2000	107.0 million bahts
	Year 2001	141.7
	Year 2002	126.4
	Year 2003	161.0

Based on the above consideration, the following schedule was planned.

**Cash Flow**  
**PROJECTED CASH FLOW OF EEI INSTITUTE**  
 (Unit: Million Bahts)

	Year 1 FY1999	Year 2 FY2000	Year 3 FY2001	Year 4 FY2002	Year 5 FY2003
<b>A. Cash Inflow</b>	44.37	172.32	214.44	206.59	249.49
<b>A-1: Income from Operation</b>					
(1) Policy Making Support	2.17	3.14	3.44	3.74	4.04
(2) Information Services	2.03	2.85	3.67	4.29	4.91
(3) Testing and Certification Services	5.97	11.33	17.33	24.56	31.54
(4) Consulting Services	2.70	4.50	4.50	4.50	4.50
<b>A-2: Subsidies</b>					
(1) Investment to Fixed Assets	0.00	107.00	142.00	126.00	161.00
(2) Assistance for Factory Clinic Services	18.00	30.00	30.00	30.00	30.00
(3) Maintenance Fee for Equipment & Facilities of TISI	13.50	13.50	13.50	13.50	13.50
<b>B. Cash Outflow</b>	51.45	178.77	223.19	212.74	251.62
<b>B-1: Operating Cost</b>					
(1) Sales and Wages	11.76	16.80	22.51	25.87	28.22
(2) Overhead and other expenses	8.19	11.47	15.18	17.37	18.90
<b>B-2: Investment to Fixed Assets</b>	0.00	107.00	142.00	126.00	161.00
<b>B-3: Hiring of Thai and Foreign Consultants</b>	18.00	30.00	30.00	30.00	30.00
<b>B-4: Maintenance Fee for Equipment &amp; Facilities of TISI</b>	13.50	13.50	13.50	13.50	13.50
<b>C. Gross Cash Surplus (Deficit) A-B</b>	-7.08	-6.45	-8.75	-6.15	-2.13
<b>D. Government Subsidy for Five Years</b>	14.44	15.00	20.00	25.00	25.00
<b>F. Net</b>	7.36	8.55	11.25	18.85	22.87

**EEI Project Cost**

**Project Cost of EEI Institute  
(Million Bahts)**

<b>Cost Items</b>	<b>Cost</b>	<b>Remarks</b>
<b>A. Existing Facilities</b>		Facilities and properties transferred from TISI
A-1 Land at site	Rental at free of charge	TISI's Bamboo Testing Center
A-2 Buildings at site	Rental at free of charge	
A-3 Equipment & machinery	Rental at free of charge	See Appendix 1 (list of existing equipment & machinery)
A-4 Head quarter office	Rental at free of charge	
A-5 Maintenance fee for existing facilities	67.5	10% of A-3 (See Appendix 1); ask for government subsidy
<b>B. Acquisition of New Facilities</b>	<b>593.1</b>	
B-1 Equipment & machinery	536	See Appendix 2 (list of additional equipment & machinery)
B-2 Office equipment	3.2	See Appendix 3
B-3 Furniture & fixture	-	See Appendix 3
B-4 Miscellaneous and contingency	53.9	10% of B-1 to B-3
<b>C. Operating expenses</b>	<b>188.6</b>	
C-1 Salaries & wages	105.2	
C-2 Overhead	52.6	
C-3 Material Expenditure	0.6	
C-4 Utilities	11.7	
C-5 Durable Article, Land and Building	2.5	
C-6 Others	16.0	
<b>Total Project Cost</b>	<b>849.2 Million Bahts</b>	

Human Resources Plan for Electrical and Electronics Institute

	1999	2000	2001	2002	2003
Executive Director	1	1	1	1	1
Dept. of Administration					
Director	1	1	1	1	1
Division Head		2	2	2	2
Officer	2	2	4	4	6
<i>Dept. Total</i>	3	5	7	7	9
Dept. of Industrial Promotion and Marketing					
Director	1	1	1	1	1
Strategist		1	1	2	2
Marketing specialist	1	1	2	2	2
<i>Dept. Total</i>	2	3	4	5	5
Information Center					
Director	1	1	1	1	1
Division Head	1	2	2	2	2
Officer		2	5	5	5
Librarian	1	1	1	1	1
<i>Dept. Total</i>	3	6	9	9	9
Testing and Certification Center					
Director	1	1	1	1	1
Division Head	1	2	2	2	2
Engineer	15	20	25	30	35
Officer	2	3	4	4	4
<i>Dept. Total</i>	19	26	32	37	42
Dept. of Policy Support and Research					
Director	1	1	1	1	1
Economist	1	1	2	2	2
Standard Dev. Specialist	1	2	2	2	2
<i>Dept. Total</i>	3	4	5	5	5
Dept. of Consultation Services					
Director	1	1	1	1	1
Division Head		1	1	1	1
In-house Consultants	2	2	3	3	3
<i>Dept. Total</i>	3	4	5	5	5
Executive Secretary	1	1	1	1	1
Driver	1	2	2	2	2
<b>TOTAL</b>	36	52	66	72	79

**Salary Plan for Electrical and Electronics Institute**

\*based on the amount of per-person salary for the year of 1999 proposed by EEI)

(Bahts)	1999	2000	2001	2002	2003	TOTAL
Average/person.month	28,000	28,000	28,000	28,000	28,000	28,000
Average/person.year	336,000	336,000	336,000	336,000	336,000	336,000
No. of Staffs	36	52	66	72	79	
<b>TOTAL COST FOR HUMAN RESOURCES: (A)</b>	<b>12,096,000</b>	<b>17,472,000</b>	<b>22,176,000</b>	<b>24,192,000</b>	<b>26,544,000</b>	<b>102,480,000</b>

**Overhead & Other Expenditures**

1. Overhead (A) x 50%	6,048,000	8,736,000	11,088,000	12,096,000	13,272,000	51,240,000
2. Material Expenditure	126,000	126,000	126,000	126,000	126,000	630,000
3. Public Utility Expenditure	2,340,000	2,340,000	2,340,000	2,340,000	2,340,000	11,700,000
4. Durable Article, Land and Building	500,000	500,000	500,000	500,000	500,000	2,500,000
Sub-Total (B = 1+2+3+4)	6,548,000	9,236,000	11,588,000	12,596,000	13,772,000	53,740,000
5. Miscellaneous: (A+B) x 10%	1,864,400	2,670,800	3,376,400	3,678,800	4,031,600	15,622,000
<b>TOTAL: (C)</b>	<b>8,412,400</b>	<b>11,906,800</b>	<b>14,964,400</b>	<b>16,274,800</b>	<b>17,803,600</b>	<b>69,362,000</b>

**Total Operating Cost and Expected Income Analysis for Electrical and Electronics Institute**

						TOTAL
<b>Total Operating Cost (A) + (C)</b>	<b>20,508,400</b>	<b>29,378,800</b>	<b>37,140,400</b>	<b>40,466,800</b>	<b>44,347,600</b>	<b>171,842,000</b>
Breakdown by Income Generating Department						
Dept. of Policy Support and Research	2,050,840	2,732,912	3,376,400	3,316,951	3,359,667	14,836,769
Dept. of Information + Dept of Industrial Promotion	3,418,067	6,149,051	8,778,640	9,287,462	9,407,067	37,040,287
Dept. of Testing and Certification Center	12,988,653	17,763,926	21,608,960	24,545,436	28,221,200	105,128,175
Dept. of Consultation Services	2,050,840	2,732,912	3,376,400	3,316,951	3,359,667	14,836,769

Utilization Ratio for the Testing and Certification Services

Utilization Ratio	1999	2000	2001	2002	2003
10%	1,193,200	1,618,800	1,960,800	2,386,400	2,812,000
20%	2,386,400	3,237,600	3,921,600	4,772,800	5,624,000
30%	3,579,600	4,856,400	5,882,400	7,159,200	8,436,000
40%	4,772,800	6,475,200	7,843,200	9,545,600	11,248,000
50%	5,966,000	8,094,000	9,804,000	11,932,000	14,060,000
60%	7,159,200	9,712,800	11,764,800	14,318,400	16,872,000
70%	8,352,400	11,331,600	13,725,600	16,704,800	19,684,000
80%	9,545,600	12,950,400	15,686,400	19,091,200	22,496,000
90%	10,738,800	14,569,200	17,647,200	21,477,600	25,308,000
100%	11,932,000	16,188,000	19,608,000	23,864,000	28,120,000

Utilization Ratio	50%	70%	80%	90%	100%
Million Bahts	1999	2000	2001	2002	2003
Operational Cost	13.0	17.8	21.6	24.5	28.2
Sales	6.0	11.3	15.7	21.5	28.1