

## 付 録

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THE  
MAGAZINE  
OF THE  
AMERICAN  
SOCIETY  
OF  
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TEACHERS  
AND  
SINGERS  
PUBLISHED  
BY THE  
MUSIC  
TEACHERS  
ASSOCIATION  
OF AMERICA  
1910

付録1. 要請書

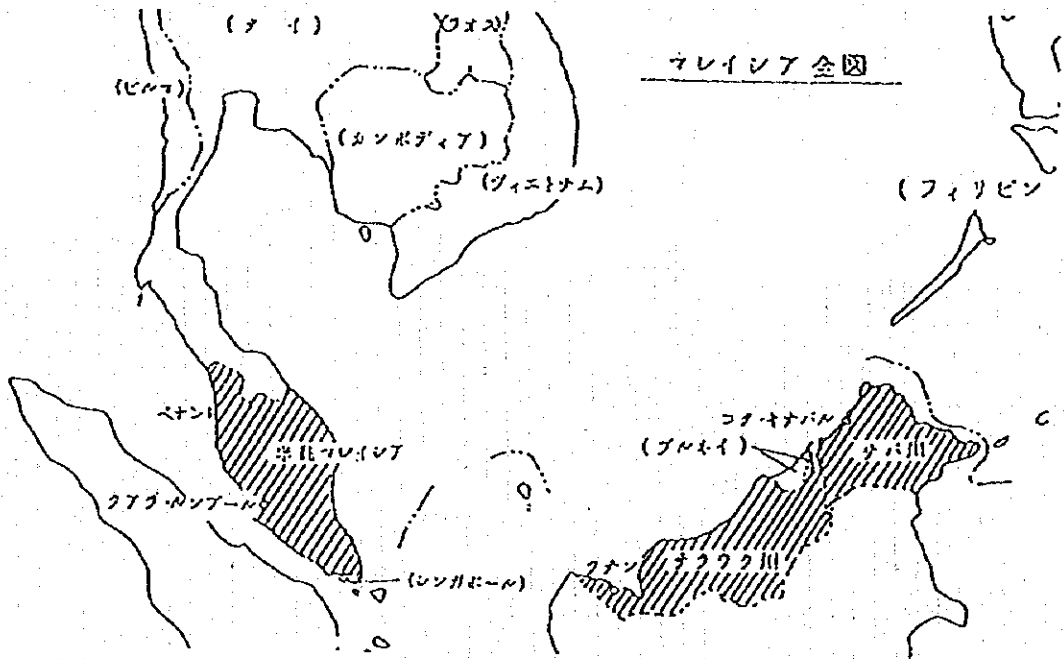
開発調査要請案件調審 (95年10月作成)					
国名	マレーシア	公館名	在マレーシア日本国大使館	担当書記官	森
案件名	和：省エネルギー推進計画 英：Study on Promotion of Energy Efficiency in Malaysia				
調査形態	M/P	調査分野	鉱工業		
実施機関名	エネルギー・通信・郵政省電力・ガス供給局				
正式要請書	(有) 無 (95年8月(入手済)・見込)	TOR	(有) 無 (95年8月(入手済)・見込)		
先方優先順位	件中 位	貴館優先順位	16 件中 3 位	(新規)・継続要請	
<p>I. 1. 要請案件の背景・目的・内容</p> <ul style="list-style-type: none"> <li>当国では、94年7月までにADBの援助により実施された調査等を通じ省エネルギーの必要性が確認されたところであるが、種々の産業に対する省エネに関する包括的基礎データ、ガイドラインの不備、エネルギー検査・省エネ手続きに精通した人材の不足、企業の経営者及び一般大衆の省エネ意識の欠如等により、既存の省エネ推進施策はほとんど効果を上げるに至っていない。</li> <li>このため、種々の産業における省エネルギー推進を目標に、工業、運輸、ビル建設、住宅産業におけるエネルギー使用状況の調査、世界標準に対するエネルギー利用効率の比較調査、省エネルギー推進施策の提言等を実施するものである。</li> </ul> <p>2. 具体的調査項目</p> <ol style="list-style-type: none"> <li>① 省エネ技術の進展のレビュー、重要分野の選定</li> <li>② 省エネプログラムの経済的評価</li> <li>③ セクター毎の省エネ技術の選定</li> <li>④ 省エネ振興のためのインセンティブ及び実施組織の検討</li> <li>⑤ 省エネ意識のレベル評価、障害の確認</li> <li>⑥ 省エネマーケティング、教育プランの検討</li> </ol> <p>3. 要請に至るまでの経緯</p> <p>平成5、6年度鉱工業プロジェクト選定確認調査</p> <p>4. 我が国・第3国・国際機関の経済協力等との関係 (要請・実施中、実施済みの案件)</p> <p>ADB「マレーシア産業における省エネルギー調査」</p> <p>5. 調査対象地域の治安状況</p> <p>良好 (特に問題なし)</p> <p>6. 事業実施の可能性</p> <p>概算事業費： 資金ソース：円借、無償、自己資金、世銀、その他( )、未定 貴館の評価：</p>					

II. その他関連情報

III. 貸借総合評価・所見

過去2カ年に実施された鉱工業プロ形調査により本調査実施の必要性は確認されており、当初疑問点の見られた先方の実施体制についても責任部局を明確にしたことで改善されている。ADB調査結果と今年度予定されているプロ形調査を通じ、実施体制等について確認の上、前向きに検討ありたい。

(調査対象地域略図)



## TERMS OF REFERENCE OF STUDY ON ENERGY EFFICIENCY AND CONSERVATION

### Introduction

The efficient use of energy is recognised as an important means of conserving resources, and effective results have been achieved in many industrial countries. There remains considerable potential for Malaysian industries to achieve similar gains.

There has been government policy support for efficient energy use, however, the impact has been relatively small. Among the problem areas are: a lack of comprehensive baseline data on the efficiencies of energy use in various sectors; an absence of standards relating to efficiency guidelines in various sectors; the small number of trained personnel with know-how in energy auditing and energy efficiency procedures; and a low level of energy efficiency awareness among the general public as well as among corporate leaders. Better results can be achieved with a comprehensive and sustained strategy.

There has been considerable progress in implementing innovative schemes to encourage energy efficiency in many industrialised countries, and several developing and industrialising countries are also embarking upon organisational, administrative and fiscal measures to encourage the efficient use of energy.

In July 1994, the Government of Malaysia with a technical assistance from the Asian Development Bank (ADB) completed a study on Energy Conservation In Malaysian Industries. The Ministry of Energy, Telecommunications and Posts was the executing agency for the Government in this study. The study among other things looked into the energy saving potentials in the industrial sector in the short, medium and long terms. According to the findings of the study on a short term basis with zero investment RM76 million could be saved. As a medium term measure an investment of RM900 million would be needed to save RM380 million annually. For the long term an investment of RM420 million would be needed to accrue a saving of RM685 million a year.

A number of energy audits were carried out at selected industries and from this energy saving potentials of between 10%-50% were identified, with the highest potential being for the food manufacturing industries.

This study will investigate the status of energy use in the industrial, transportation, building, and residential sectors; assess the efficiencies of energy utilisation in comparison with world standards; recommend ways in which energy efficiency can be increased; and outline implementation strategies.

The Terms of Reference of this study are as follows:

- (a) Review the progress on energy conservation and efficiency improvement, including past and on-going studies undertaken, and assess the effectiveness of current policy initiatives;
- (b) In consultation with EPU and Ministry of Energy, Telecommunications and Posts identify key areas in industry, transportation, design of buildings and residential sectors, at sectoral, sub-sectoral, or firm level as appropriate. Collate information on the efficiencies of energy use, and undertake a comparison with representative world best practices;
- (c) Conduct an appraisal of the potential of efficiency programmes in the selected sectors, and estimate the costs and economic gains to be derived from implementing such programmes;
- (d) Identification of Energy Efficiency Technologies in manufacturing, transportation, design of buildings and residential dwellings:
  - i) identification of technologies suitable for Malaysian industries particularly in the areas of waste heat recovery systems, variable highspeed efficiency motors, fluidised bed combustion, thermal storage systems and cogeneration;
  - ii) to carry out a survey of the availability of local technologies and how they could be utilized more fully;
  - iii) Assess the potential of cogeneration in Malaysia and recommend strategies and programmes to promote the scheme;
  - iv) provision of equipment and technical expertise to implement the technology;
  - v) to monitor and assess the energy savings after implementation of technology;
  - vi) training of local staff to maintain and operate the equipment;
  - vii) provision of an energy efficient bus complete with the necessary equipment;

- (e) Review market-based incentives which could be applicable in the Malaysian context to encourage greater energy efficiency, and appraise organisational and institutional structures from the viewpoint of promotion of energy incentives;
- (f) Assess the level of awareness of energy efficiency among operators in the various sectors, identify potential hindrances to the implementation of energy efficiency programmes, and suggest practical measures to mitigate these;
- (g) Develop a marketing/educational plan that would instil increased awareness among the users (industrial, commercial and residential) of the need to conserve the energy resources of the nation;
- (h) Institutional Set-up leading to a Energy Efficiency Centre:
  - i) to formulate in detail the concept and role of the Energy Efficiency Centre;
  - ii) to identify and define support activities to be undertaken by public and private sector institutions for the proposed centre;
  - iii) to formulate the organizational structure, facilities and other support systems for the centre;
  - iv) to draw up a detailed plan of action specifying the programmes, resources, physical infrastructure, equipments, financial and fiscal incentives, including the time frame in which the project should be developed and
  - v) to study the economic and financial viability of the Energy Efficiency Centre
  - vi) to provide guidelines for the subsequent formulation of energy efficiency standards and policy.

## Reports & Presentations

The study team will report to the Director General, Department of Electricity Supply and Gas, Ministry of Energy, Telecommunications and Posts. All reports and presentations will be done in English, using the metric system.

Energy Section,  
Economic Planning Unit,  
Prime Minister's Department.

July 1995

peb/EPFC1



付録2. 資料リスト

資料リスト (収集資料) (1/4)

番号	資料の名称	版型	ページ数	オリジナル コピーの別	部数	収集先名称 又は発行先機関	寄贈・購入 (価格)の別
1	Energy Conservation Study (ADB-TA No 1574-MAL) June 1984 ADEME (DRAFT)	A4	70	コピー	1	ADEME(フランス環境 ・エネルギー庁)作成	寄贈
2	TENAGA NATIONAL BERHD (Internet HOME PAGE)	A4	40	コピー	1	TNEB 作成	寄贈
3	JAPAN ENERGY CONSERVATION HANDBOOK 1996/1997	A4	72	コピー	1	日本 省エネルギー・ センター 発行	寄贈
4	日本のエネルギー情勢	A4	1	コピー	1	日本情勢・JBW	寄贈
5	マレーシアのエネルギー情勢	A4	1	コピー	1		寄贈
6	ENERGY STATISTICS AND BALANCES OF NON-OECD COUNTRIES 1993・1994 (Malaysia分のみ抜粋)	A4	2	コピー	1	INTERNATIONAL ENER- GY AGENCY	寄贈
7	PACIFIC PENINSULA TEXTILES SDN. BHD. ENERGY AUDIT REPORT APRIL 1994	A4	58	オリジナル	1	INSTITUTE SULTAN (SKANDAR (UTM))	寄贈
8	PERLIS CONSOLIDATED SDN. BHD. CHUPING, PERLIS. ENERGY AUDIT REPORT OCT. 1994	A4	26	コピー	1	ISI (UTM)	寄贈
9	TASEK CEMENT SDN. BHD. (POH, PERAK. ENERGY AUDIT REPORT JUNE, 1994	A4	15	コピー	1	ISI (UTM)	寄贈
10	SIEMENS COMPONENTS (ADVANCED TECHNOLOGY SDN. BHD.) ENERGY AUDIT REPORT JULY 1994	A4	15	コピー	1	ISI (UTM)	寄贈
11	DAMANSARA TOWN CENTER ENERGY AUDIT REPORT JANUARY, 1995	A4	52	コピー	1	ISI (UTM)	寄贈
12	NESTLE (M) SDN. BHD. ENERGY AUDIT REPORT MAY, 1995	A4	13	コピー	1	ISI (UTM)	寄贈
13	GUOCERA TILE INDUSTRIES (KLUANG) SDN. BHD. ENERGY AUDIT REPORT	A4	32	オリジナル	1	ISI (UTM)	寄贈
14	Development of Solid Polymer Electrolyte Fuel Cell	A4	14	コピー	1	ISI (UTM)	寄贈
15	ISI DOCUMENT---Scope of Consultancy Service, Organisa- tion Chart, Implementation Schedule(1993~1995). Summary of financial Proposal, Professional Fees, Estimated Reimbursable Expenses, Schedule of Payment	A4	11	コピー	1	ISI (UTM)	寄贈
16	SIRIM (業務案内 pamphlet)	(不定 形)	2	オリジナル	1	Standards and indus- trial Research In- stitute of Malaysia	寄贈

資料ソース (収集資料) (2/4)

番号	資料の名称	版型	ページ数	オリジナル コピーの別	部数	収集先名称 又は発行先機関	寄贈-購入 (価格)の別
17	PROMOTION OF CLEANER TECHNOLOGY IN THE MALAYSIAN INDUSTRY (SIRIM pamphlet)	A5	4	オリジナル	1	SIRIM 作成	寄贈
18	SIRIM Environmental Technology Center (No. 1, Nov. 1996) CLEANER TECHNOLOGY	A4	4	オリジナル	1	SIRIM 作成	寄贈
19	(SIRIM) ENVIRONMENTAL TECHNOLOGY CENTER	A4	2	オリジナル	1	SIRIM 作成	寄贈
20	Full Scale Demonstration Projects(FSDPs) Description (BC-ASEAN COGEN Programme annex x p.4 抜粋)	A4	1	コピー	1	SIRIM 提供	寄贈
21	The Seventh Malaysia Plan (抜粋-- Energy 関係) (英文30ページ、邦訳 28 ページ)	A4	58	コピー	1	JICA Malaysia Office	寄贈
22	REGION Food Industries (pamphlet)	A4	2	オリジナル	1	Region Food Indus- try	寄贈
23	FACT & FIGURES: 1995 : KTM	A7	24	オリジナル	1	Keretapi Tanah Melayu berhad	寄贈
24	STAR LRT (pamphlet)	A4	2	オリジナル	1	SISTEM TRANSIT ALIRAN RINGAN SDN. BHD.	寄贈
25	THE INVESTOR'S GUIDE TO MALAYSIA 1) INVESTMENT IN THE MANUFACTURING SECTOR, 2) MALAY- SIA; YOUR PROFIT CENTER IN ASIA, 3) Industrial Digest, 4) MAP OF MALAYSIA, 5) MALAYSIA; MAPS OF INDUSTRIAL ES- TATES, 6) POSITION OF INDUSTRIAL ESTATES (JULY 1996)	A4 A4 A4 A2 A4 A4	1) 76 2) 41 3) 16 4) 1 5) 31 6) 55	オリジナル	1	MALAYSIAN INDUS- TRIAL DEVELOPMENT AUTHORITY	購入
26	GUIDEBOOK FOR MALAYSIAN MANUFACTURERS ( Approval / Licensing, Joint-venture Policies, etc. CHAPTER 12 -- ASSISTANCE PROVIDED BY FOREIGN EXPERT SERVICES ORGANISATIONS APPENDIX I -- ORGANISATION CHART MALAYSIAN INDUS- TRIAL DEVELOPMENT AUTHORITY APPENDIX VII -- PUBLIC WORKS SERVICES AND LOCAL WATER AUTHORITY APPENDIX VIII -- TENAGA NATIONAL BERHAD )	A4	97	オリジナル	2	MIDA	購入

資料リスト (収英資料) (374)

番号	資料の名称	版型	ページ数	オリジナル コピーの別	部数	収束先名称 又は発行先機関	寄贈・購入 (価格)の別
27	1996 FMM Directory -- Malaysian Manufacturers (Incorporating The Malaysian Exporter -- Company Listings)	A4	366	オリジナル	1	Federation of Malaysian Manufacturers	購入
28	FMM Industry Directory -- Food & Beverage, 1996 (Company Listings)	A4	214	オリジナル	1	FMM	購入
29	FMM Industry Directory -- Building Materials, 1996/97 (CEMENT, STEEL, WOOD etc. -- Company Listings)	A4	234	オリジナル	1	FMM	購入
30	SIRIM Directory of Certified Products and Companies, and accredited Laboratories in Malaysia, 1995	A4	407	オリジナル	1	SIRIM	購入
31	ENERGY TECHNOLOGIES AND ENVIRONMENTAL ISSUES IN THE TRANSPORT SECTOR	A4	294	オリジナル	1	ISI (CTM)	購入
32	KUALA LUMPUR STOCK EXCHANGE ANNUAL COMPANIES HANDBOOK Volume 20, book 3, 1995	A5	836	オリジナル	1	KUALA LUMPUR STOCK EXCHANGE	購入 M\$ 35
33	<LAWS OF MALAYSIA> MALAYSIA BUDGET 1996: ABOLITION AND REDUCTION OF IMPORT AND SALES TAX DUTIES AND REDUCTION OF INCOME TAX	B5	222	オリジナル	1	MDC PUBLISHER PRINTERS SDN BHD	購入 M\$ 20
34	<LAWS OF MALAYSIA> ELECTRICITY SUPPLY ACT AND REGULATIONS : ELECTRICITY SUPPLY (SUCCESSOR COMPANY) ACT (ACT:447, 448)	B5	160	オリジナル	1	MDC	購入 M\$ 15
35	<LAWS OF MALAYSIA> PETROLEUM (INCOME TAX) ACT 1967 All amendments up to September, 1995	B5	97	オリジナル	1	MDC	購入 M\$ 15
36	<LAWS OF MALAYSIA> PRIVATE HOSPITAL ACT 1971 AND REGULATIONS 1973 All amendments up to June, 1994	B5	85	オリジナル	1	MDC	購入 M\$ 5
37	<LAWS OF MALAYSIA> ENVIRONMENTAL QUALITY ACT 1974 (ACT:127) & SUBSIDIARY LEGISLATIONS MADE THEREUNDER (AS AT 15TH JUNE 1995)	B5	198	オリジナル	1	International Law Book Services	購入 M\$ 20
38	<LAWS OF MALAYSIA> STREET, DRAINAGE AND BUILDING ACT 1974 (ACT:133) (AS AT 31ST JANUARY 1996)	B5	113	オリジナル	1	ILBS	購入 M\$ 12.5

貸出リスト (収集資料) (4/4)

番号	資料の名称	版型	ページ数	オリジナル コピーの別	部数	収集先名称 又は発行先機関	寄贈→購入 (価格)の別
39	<LAWS OF MALAYSIA> SMALL AND MEDIUM INDUSTRIES DEVELOPMENT CORPORATION 1995 (ACT:539) & KTA PERBAGANAN PEMBANGUNAN INDUSTRI KECIL DAN SEDERHANA 1995 (AKTA:548) (AS AT 5TH JAN. '96)	B5	45	オリジナル	1	ILBS	購入 M\$ 9
40	<LAWS OF MALAYSIA> UNIFORM BUILDING BY-LAWS 1984 [G.N.5178/85] (AS AT 1ST JANUARY 1996)	B5	174	オリジナル	1	ILBS	購入 M\$ 12
41	<LAWS OF MALAYSIA> HUMAN RESOURCES DEVELOPMENT ACT 1992 (ACT:491) & HUMAN RESOURCES DEVELOPMENT (REGISTRATION OF EMPLOYERS) REGULATION 1992 (AS AT 30TH JUNE 1995)	B5	29	オリジナル	1	ILBS	購入 M\$ 7.5
42	U-Turn? Malaysian Economic Development Policies after 1990: JOMO K.S.:1994	A5	119	オリジナル	1	Centre for East and Southeast Asian Studies, James Cook University of North Queensland, Australia	寄贈
43	Malaysia's Energy Crisis: The Real Issues; K.K. Soong	B6	170	オリジナル	1	ORIENTGROUP SDN BHD	寄贈

Questionnaire (1/8)

Main Item	Sub-item	Availability	Source	Notes
I. Policy on Energy	1. Economic Development Plan	*1)○	JICA KL にあり。	*1印)7th Malaysia Plan Energy 関係のみ 収録。
	2. Comprehensive Policy of Energy Development (Hydro, Coal, Oil, Gas and other type of Energy)	*1)○ 資料21		
	3. Energy Conservation Policy(Laws and Regulation, Implementation Plan)	*2)×	METP	*2) 今回、未入手である が入手可能な筈。
	4. Power Development Policy	*1)○ 資料21		
	5. Environment Protection Policy(Law and Regulation, Implementation Plan)	○ 資料87		
	6. Other data related to this Plan	*2)×	METP	
II. General Information regarding Energy in Malaysia	• Energy Sector Management Assistance Plan(ESMAP: World Bank)	*2)×	World Bank	
	• Energy Statistics	*2)×	METP	
	1. Total Primary Energy Supply (Table-1)	*2)×	METP	(Please reply to each sub-items in the form of attached tables.)
	2. Exported Energy (Table-2)	*2)×	METP	
	3. Total Domestic Energy Supply (Table-3)	*2)×	METP	
	4. Total Domestic Energy Supply (Table-4)	*2)×	METP	
5. Form of Energy Used by the Sectors Industry Sector/ Residential and Commercial Sector/Transportation Sector)	*2)×	METP		
6. Unit Consumption Ratios of Energy (Table-6)	*2)×	METP		
III. Electric Power	1. Latest Annual Report of TNB	○	TNB internet	Home Page
	2. Installed Capacity and Generation Record of Privately Generated Electric Power:	○		
	3. Energy Consumption Record of Each Industrial Sections, Transportation, building and residential dwellings	*2)×	METP	

LEGEND ○: Available; △: Indistinct; ×: Not Available; METP: Ministry of Energy, Telecommunication and Post;  
 MDA: Malaysian Industrial Development Authority; TNB: Tenaga National Berhad.  
 SCEE: The Strategic Committee for Energy Efficiency.

Questionnaire (2/8)

Main Item	Sub-item	Availability	Source	Notes											
IV. Transportation Sector	1. Rail ways	○	*3) XTM *3) STAR	(Please describe the current conditions of the energy supply of the transportation sector.)											
	2. Motor vehicles	△	現地踏査結果参照。												
	3. Others	△	現地踏査結果参照。												
V. Matter of Concern		△	*4) SIRIM	(Please describe the most important promotion field and/or the most serious field of the energy conservation)											
		△	*4) SIRIM : Standard and Industrial Research Institute of Malaysia												
VI. Arrangement for the Field Reconnaissance	1. Malaysia Technological University to study on the relationship between the study content of the University and the governmental policy formation, and to see the existing facilities for the energy conservation study.	○	*5) UTM *5) (ISI) SIRIM	*5印) UTM : University Technology Malaysia ISI : Institute Sultan Iskandar											
	2. A few candidate factories and buildings for which the counter measures for the energy conservation have been carried out and not.	*6) △ 資料7 ~資料14	UTM (ISI)	*6印) 整理された資料はないが、一部 部分的に分かるものもある。											
VII. Fuel and Process Steam	3. MIDA	×	MIDA												
	4. TNB	○	TNB												
VIII. Ratio of fuel and electricity in total energy of every energy-intensive branches	1. Ratio of fuel and electricity in total energy of every energy-intensive branches	*6) △ 資料7 ~資料14	UTM (ISI)												
<table border="1"> <tr> <td rowspan="2">item</td> <td>fuel</td> <td>electricity</td> <td>total</td> </tr> <tr> <td>for process</td> <td>for boiler</td> <td>for city</td> </tr> <tr> <td>Food Manufacturing</td> <td></td> <td></td> <td>100%</td> </tr> </table>					item	fuel	electricity	total	for process	for boiler	for city	Food Manufacturing			100%
item	fuel	electricity	total												
	for process	for boiler	for city												
Food Manufacturing			100%												
<p>LEGEND ○ : Available, △ : Indistinct, × : Not Available, MTPP: Ministry of Energy, Telecommunication and Post MIDA: Malaysian Industrial Development Authority, TNB: Tenaga National Berhad SCEE: The Strategic Committee for Energy Efficiency</p>															

Questionnaire (3/8)

Main Item	Sub-Item	Availability	Source	Notes	
VI. Fuel and Process Steam	1. Ratio of fuel and electricity in total energy of every energy-intensive branches	*6) Δ 資料7 ～資料14	*5) UTM *5) (ISI)	*5印) UTM : University Technology Malaysia ISI : Institute Sultan Iskandar *6印) 整理された資料はないが、一部の部分的に分かるものもある。  *4印) SIRIM: Standards and Industrial Research Institute of Malaysia	
	item				
	for process	fuel	electricity		total
	Textile				
	Wood				
	Paper				
	Chemical-product				
	Rubber				
	Plastics				
	Pottery				
	Glass				
	Non metallic				
	Iron and steel				
	Electric Machinery				
Transport equipment					
	2. The kind of fuel energy in typical plants or factories of every energy-intensive branches in Malaysia	*6) Δ	UTM (ISI)		
	3. Ratio of several fuel energy in the same plants or factories	*6) Δ	UTM (ISI)		
	4. Typical waste heat recovery equipment used in every energy-intensive branches in Malaysia	*6) Δ	UTM (ISI)		
	5. Level of instrumentation of typical boiler (large scale and small scale respectively) in Malaysia	Δ	*4) SIRIM		

LEGEND ○: Available, Δ: Indistinct, X: Not Available. METP: Ministry of Energy, Telecommunication and Post  
 MIDA: Malaysian Industrial Development Authority, TNB: Tenaga Nasional Berhad  
 SCEE: The Strategic Committee for Energy Efficiency  
 現地踏査報告(Original Food社等) 参照。

Questionnaire (4/8)

Main Item	Sub-item	Availability	Source	Notes
VII. Fuel and Process steam	6. Level of instrumentation of typical process in every energy-intensive branches in Malaysia	*6) Δ	*4) SIRIM	*4年) SIRIM: Standards and Industrial Research Institute of Malaysia
	7. Diffusion ratio of drain recovery system used in relevant plant of factory in Malaysia	X		
VIII. Fluidised bed Combustion	1. Diffusion ratio of fluidised bed combustion boiler in Malaysia	X	SIRIM	*6年) 整理されたものはないが、部分的に分かるものもある。
	2. Plot or planning about introduction of such facility in Malaysia	X	MSTP	

LEGEND

○: Available; Δ: Indistinct; X: Not Available; MSTP: Ministry of Energy, Telecommunication and Post.  
MIDA: Malaysian Industrial Development Authority; TNB: Tenaga Nasional Berhad.  
SOEE: The Strategic Committee for Energy Efficiency.



Questionnaire (5/8)

Table-1		Total Primary Energy Supply										REMARKS
Total Primary Energy Supply		1991	1992	1993	1994	1995	1996	2000	2005	2010		
A	Domestic Energy: Exported Energy Included											
1	Petroleum											
2	Coal											
3	Natural Gas											
4	Hydro Power											
5	New Energy and Others											
	SUB - TOTAL											
B	Imported Energy											
1	Petroleum											
2	Coal											
3	Natural Gas											
4	Hydro Power											
5	New Energy and Others											
	SUB - TOTAL											
C	Total Primary Energy Supply											
1	Petroleum											
2	Coal											
3	Natural Gas											
4	Hydro Power											
5	New Energy and Others											
	Total											

Table-2		Exported Energy										REMARKS
Exported energy		1991	1992	1993	1994	1995	1996	2000	2005	2010		
1	Petroleum											
2	Coal											
3	Natural Gas											
4	Hydro Power											
5	New Energy and Others											
	Total											

Table-3 Questionnaire (6/8)  
Total Domestic Energy Supply

Total Primary Energy Supply		1991	1992	1993	1994	1995	1996	2000	2005	2010	REMARKS
A	Domestic Energy: Exported Energy Included										
1	Petroleum										
2	Liquefied Petroleum Gas										
2	Coal										
3	Natural Gas										
2	Liquefied Natural Gas										
4	Hydro Power										
5	New Energy and Others										
1	Geothermal Energy										
2	Solar Energy										
3	Biomass Energy										
4	Wind Power										
5	Others										
	SUB - TOTAL										
B	Imported Energy										
1	Petroleum										
2	Liquefied Petroleum Gas										
2	Coal										
3	Natural Gas										
2	Liquefied Natural Gas										
4	Hydro Power										
5	New Energy and Others										
1	Geothermal Energy										
2	Solar Energy										
3	Biomass Energy										
4	Wind Power										
5	Others										
	SUB - TOTAL										
C	Total Domestic Energy Supply										
1	Petroleum										
2	Liquefied Petroleum Gas										
2	Coal										

Questionnaire (7/8)

Table-3 Total Domestic Energy Supply

Total Primary Energy Supply		1991	1992	1993	1994	1995	1996	2000	2005	2010	REMARKS
C	Total Domestic Energy Supply										
3	Natural Gas										
2	Liquid Natural Gas										
4	Hydro Power										
5	New Energy and Others										
1	Geothermal Energy										
2	Solar Energy										
3	Biomass Energy										
4	Wind Power										
5	Others										
	Total										

Table-4 Total Secondary Energy Supply

Total Secondary Energy Supply		1991	1992	1993	1994	1995	1996	2000	2005	2010	REMARKS
	Electricity: Composition of Power Source										
1	Hydro Power Generation										
2	Nuclear Power Generation										
3	Coal Fired Power Generation										
4	Petroleum Fired Power Generation										
5	Natural Gas Fired Power Generation										
6	Geothermal Power Generation										
7	Waste Power Generation										
	Petroleum Refined Products										
1	Naphtha										
2	Gasoline										
3	Kerosine										
4	Gas Oil: Light Oil										
5	Fuel Oil: Heavy Oil										
6	Others										
	Town Gas										
	Others										
	Total										

Table-5 Form of Energy by the Sectors in 1995

	Sector							Total
	INDUSTRY (Total)	RESIDENTIAL AND COMMERCIAL	TRANSPORTATION					
	Residential	Buildings	Others	Rail Way	Mortor Vehicles	Others		
1	Electricity							
2	Petroleum Refined Products							
1	Naphtha							
2	Gasoline							
3	Kerosine							
4	Gas Oil: Light Oil							
5	Fuel Oil: Heavy Oil							
5	Others							
3	Coal							
4	Natural Gas							
5	Tomn Gas							
6	Others							
	Total							

Table-6 Unit Consumption Ratios of Primary and Final Consumption Energy

	1991	1992	1993	1994	1995	1996	2000	2005	2010	REMARKS
1	Unit Consumption Ratios of Primary Energy									
2	Unit Consumption Ratios of Final Energy Consumption									

付録4. マレーシアと日本のエネルギー情勢

4-1. 日本のエネルギー情勢

I. 一般情勢

- (1) 人口：1億2,465万人 (1995年)
- (2) 面積：37万7,800km<sup>2</sup>
- (3) GDP：5兆1,140億ドル (1995年)

II. エネルギー情勢

1. ポイント

- (1) エネルギー供給の約8割を輸入に依存。そのうちの56%を占める石油供給のほとんどを海外、中でも中東地域からの輸入に大きく依存。
- (2) 一次エネルギー需要が米国、中国、ロシアについて大きい水準にある。
- (3) 石油危機後のエネルギーの効率化努力により、エネルギー原単位が先進国中最も低い水準にある。

〇トピック

石油・ガス・電力産業の規制緩和  
共同実施活動によるCO2排出量削減努力

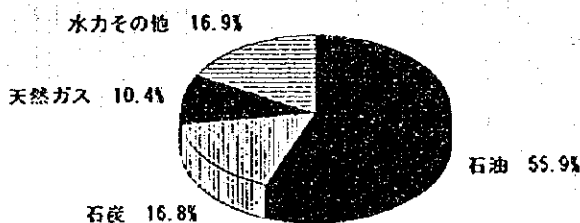
2. エネルギー事情 (1993年)

- (1) 一次エネルギー需要量：457.4石油換算百万トン
- (2) 1人当たり一次エネルギー需要量：3.67石油換算百万トン
- (3) エネルギー自給率：18.3%

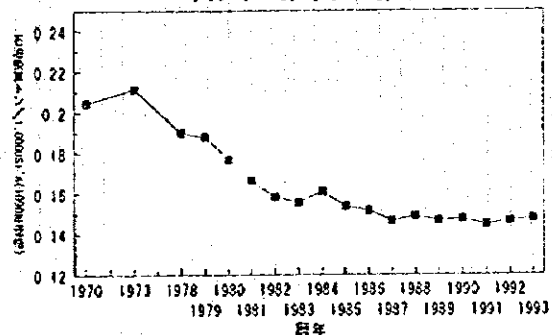
	国内生産(A)	総需要(B)	(A)-(B)	埋蔵量
石油 (石油換算百万トン)	0.87	285.87	-285.0	4,890万バレル
石炭 ( " )	3.98	76.83	-72.85	8億2,100万トン
天然ガス ( " )	1.94	47.66	-45.72	271億m <sup>3</sup>
発電電力量	899,047 (GWh) <うち原子力 27.7%> 運転中50基、建設中4基、計画2基			
エネルギー原単位	0.15 (石油換算トン/1,000\$US)			

(出所：IEA ENERGY BALANCES OF OECD COUNTRIES)

一次エネルギー需要構成



エネルギー原単位の推移



## 4.2. マレーシアのエネルギー情勢

### I. 一般情勢

- (1) 人口：1,905万人（日本の約15%）
- (2) 面積：33万km<sup>2</sup>（日本の約10分の9）
- (3) GDP：855億ドル（1995年）（日本の約1.7%）
- (4) 貿易：対日輸出額105億4,942万ドル、対日輸入額167億9,524万ドル

### II. エネルギー情勢

#### 1. ポイント

石油依存度を低下させるため、石油消費削減と新規油田の発見に力を入れるとともに天然ガスの利用促進を初めとしてエネルギー源の多様化を図っている。

#### ○トピック

##### <半島マレーシアガス利用プロジェクト>

マレー半島の東海岸沖合に賦存している天然ガスを半島を半周するパイプラインで供給しようとする計画が81年から段階的に推進されている。

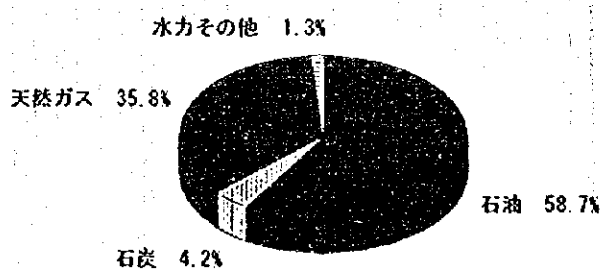
#### 2. エネルギー事情（1993年）

- (1) 一次エネルギー需要量：31.8石油換算百万トン（日本の約7%）
- (2) 1人当たり一次エネルギー需要量：1.67石油換算百万トン（日本の約半分）
- (3) エネルギー自給率：171.3%

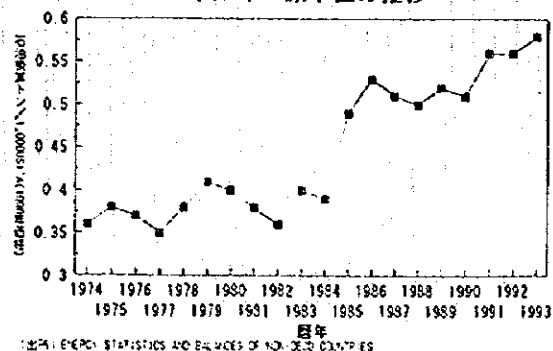
	国内生産(A)	総需要(B)	(A)-(B)	埋蔵量
石油（石油換算百万トン）	32.5	18.6	13.9	43億バレル
石炭（ " ）	0.16	1.33	-1.17	400万トン
天然ガス（ " ）	21.3	11.4	9.9	1兆9,244億m <sup>3</sup>
発電電力量	35,579 (GWh)（日本の約4%） <うち原子力 0%>			
エネルギー原単位	0.58（石油換算トン/1,000\$US）			

（出所：IEA ENERGY STATISTICS AND BALANCES OF NON-OECD COUNTRIES）

一次エネルギー需要構成

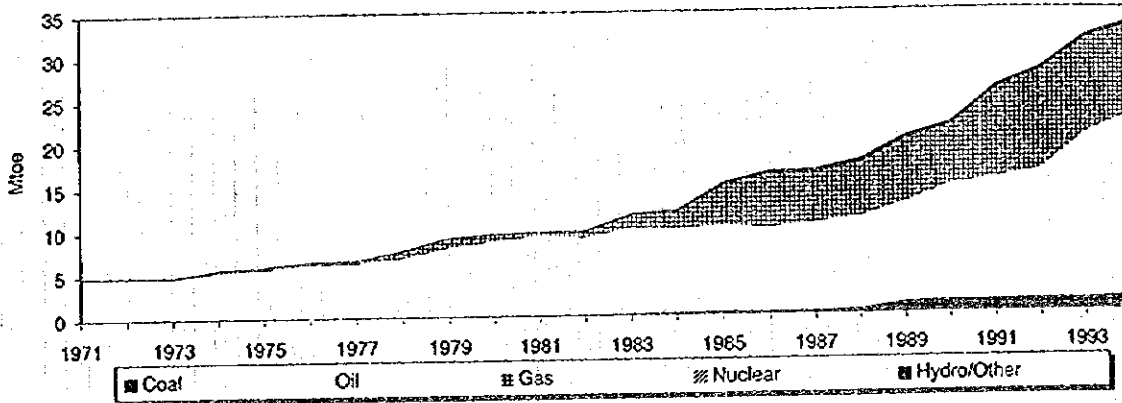


エネルギー原単位の推移

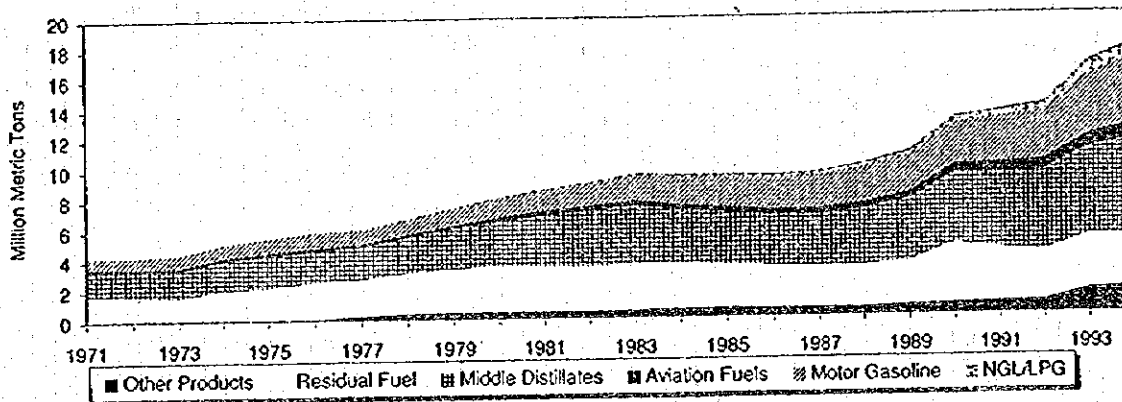


## Malaysia / Malaisie

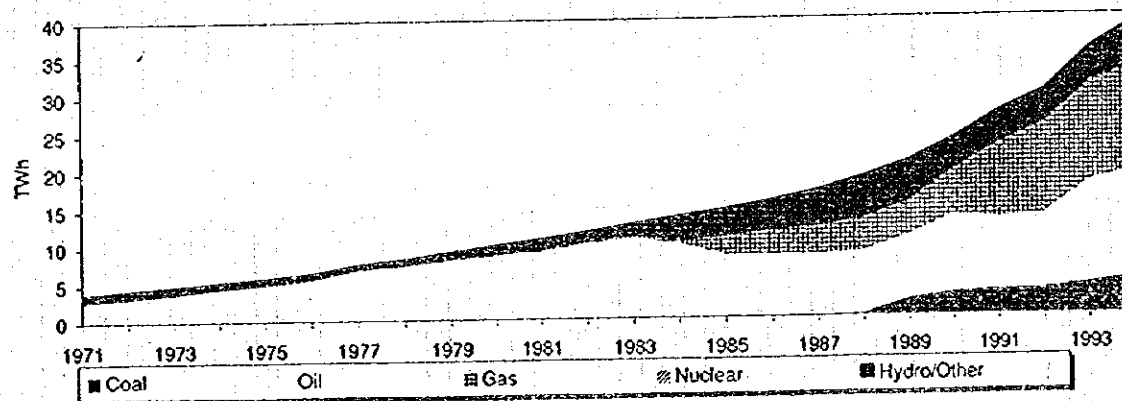
### Total Primary Energy Supply (Mtoe)\*



### Oil Product Consumption (Million Metric Tons)



### Electricity Production by Fuel (TWh)



\* Excluding electricity trade.

Malaysia / Malaisie : 1994

Thousand tonnes of oil equivalent / Millier de tonnes d'équivalent pétrole											
SUPPLY AND CONSUMPTION	Coal	Crude Petroleum Oil	Petroleum Products	Gas	Nuclear	Hydro	Geotherm. Solar etc.	Electricity	Heat	Total	Combust. Renew. & Waste etc.
APPROVISIONNEMENT ET DEMANDE	Charbon	Pétrole brut	Produits pétroliers	Gaz	Nucléaire	Hydro	Géotherm. solaire etc.	Électricité	Chaleur	Total	En. Ren. combust. & déchets
Indigenous Production	89	35471	.	20930	.	520	.	.	.	57011	.
Imports	1427	2223	8027	.	.	.	.	17	.	11693	.
Exports	-41	-20523	-3471	-10524	.	.	.	-13	.	-34573	.
Int'l. Marine Bunkers	.	.	-231	.	.	.	.	.	.	-231	.
Stock Changes	163	-239	-266	-149	.	.	.	.	.	-491	.
<b>TPES</b>	<b>1637</b>	<b>16933</b>	<b>4058</b>	<b>10257</b>	.	<b>520</b>	.	<b>4</b>	.	<b>33410</b>	.
Transfers	.	.	768	.	.	.	.	.	.	768	.
Statistical Differences	-41	-2184	-64	1651	.	.	.	.	.	-638	.
Electricity Plants	-925	.	-2071	-5118	.	-520	.	3362	.	-5272	.
CHP Plants	.	.	.	.	.	.	.	.	.	.	.
Heat Plants	.	.	.	.	.	.	.	.	.	.	.
Gas Works	.	.	.	.	.	.	.	.	.	.	.
Petroleum Refineries	.	-14749	13321	.	.	.	.	.	.	-1428	.
Coal Transformation	.	.	.	.	.	.	.	.	.	.	.
Liquefaction	.	.	.	.	.	.	.	.	.	.	.
Other Transformation	.	.	.	-3414	.	.	.	.	.	-3414	.
Own Use	.	.	-27	.	.	.	.	-95	.	-122	.
Distribution Losses	.	.	.	-1514	.	.	.	-339	.	-1853	.
<b>TFC</b>	<b>672</b>	.	<b>15966</b>	<b>1862</b>	.	.	.	<b>2932</b>	.	<b>21452</b>	.
<b>INDUSTRY SECTOR</b>	<b>672</b>	.	<b>4803</b>	<b>484</b>	.	.	.	<b>1567</b>	.	<b>7525</b>	.
Iron and Steel	74	.	.	83	.	.	.	.	.	162	.
Chemical and Petrochemical	.	.	.	385	.	.	.	.	.	385	.
of which: Feedstocks	.	.	.	.	.	.	.	.	.	.	.
Non-Ferrous Metals	.	.	.	.	.	.	.	.	.	.	.
Non-Metallic Minerals	598	.	.	11	.	.	.	.	.	608	.
Transport Equipment	.	.	.	.	.	.	.	.	.	.	.
Machinery	.	.	.	.	.	.	.	.	.	.	.
Mining and Quarrying	.	.	.	.	.	.	.	.	.	.	.
Food and Tobacco	.	.	.	.	.	.	.	.	.	.	.
Paper, Pulp and Printing	.	.	.	.	.	.	.	.	.	.	.
Wood and Wood Products	.	.	.	.	.	.	.	.	.	.	.
Construction	.	.	.	.	.	.	.	.	.	.	.
Textile and Leather	.	.	.	.	.	.	.	.	.	.	.
Non-specified	.	.	4803	.	.	.	.	1567	.	6370	.
<b>TRANSPORT SECTOR</b>	.	.	<b>8136</b>	<b>5</b>	.	.	.	.	.	<b>8141</b>	.
Air	.	.	1109	.	.	.	.	.	.	1109	.
Road	.	.	7010	.	.	.	.	.	.	7010	.
Rail	.	.	.	.	.	.	.	.	.	.	.
Pipeline Transport	.	.	.	.	.	.	.	.	.	.	.
Internal Navigation	.	.	17	.	.	.	.	.	.	17	.
Non-specified	.	.	.	5	.	.	.	.	.	5	.
<b>OTHER SECTORS</b>	.	.	<b>1585</b>	<b>211</b>	.	.	.	<b>1365</b>	.	<b>3161</b>	.
Agriculture	.	.	452	.	.	.	.	.	.	452	.
Commerce and Publ. Serv.	.	.	.	.	.	.	.	769	.	769	.
Residential	.	.	1133	211	.	.	.	504	.	1847	.
Non-specified	.	.	.	.	.	.	.	72	.	72	.
<b>NON-ENERGY USE</b>	.	.	<b>1462</b>	<b>1163</b>	.	.	.	.	.	<b>2625</b>	.
in Industry/Transf./Energy	.	.	.	.	.	.	.	.	.	.	.
in Transport	.	.	.	.	.	.	.	.	.	.	.
in Other Sectors	.	.	.	.	.	.	.	.	.	.	.
<i>Electricity Generated - GWh</i>	<i>4954</i>	.	<i>14202</i>	<i>13886</i>	.	<i>6051</i>	.	.	.	<i>39093</i>	.
<i>Electricity Plants</i>	<i>4954</i>	.	<i>14202</i>	<i>13886</i>	.	<i>6051</i>	.	.	.	<i>39093</i>	.
<i>CHP plants</i>	.	.	.	.	.	.	.	.	.	.	.
<i>Heat Generated - TJ</i>	.	.	.	.	.	.	.	.	.	.	.
<i>CHP plants</i>	.	.	.	.	.	.	.	.	.	.	.
<i>Heat Plants</i>	.	.	.	.	.	.	.	.	.	.	.

Energy Statistics And Balances of Non-OECD Countries, 1993-1994

International Energy Agency





SIMPANKAN SENASKAH UNTUK REKOD TUAN  
(KEEP ONE COPY FOR YOUR RECORD)

SULIT  
(CONFIDENTIAL)

No. Siri 910387  
(Serial No.)

PENYIASATAN MENGENAI SYARIKAT-SYARIKAT PERKILANGAN YANG DILULUSKAN DAN SEDANG  
MENJALANKAN PENGELUARAN SEPERTI PADA 31.12.1995  
(SURVEY OF APPROVED MANUFACTURING COMPANIES IN PRODUCTION AS AT 31.12.1995)

1. Nama Syarikat:  
(Name of Company) .....
2. Alamat Surat Menyurat:  
(Correspondence Address) .....
- Poskod: ..... No. Telefon: ..... No. Fax: .....  
(Postcode) (Telephone No.) (Fax No.)
3. Tapak Kilang:  
(Factory Location) .....
- No. Telefon: ..... No. Fax: .....  
(Telephone No.) (Fax No.)
4. Barang-barang Keluaran:  
(Products Manufactured)
- (i) .....
- (ii) .....
- (iii) .....
- (iv) .....
- (v) .....
5. Tarikh Pengeluaran:  
(Date of Commercial Production) .....

LEMBAGA KEMAJUAN PERINDUSTRIAN MALAYSIA  
(Malaysian Industrial Development Authority)

Tingkat G, 3 - 6, 9 & 11, Wisma Damansara, Bukit Damansara, Jalan Semantan, Peti Surat 10618, 50720 Kuala Lumpur.  
Kawat: MIDAMAL Telek: 'MIDA' MA 30752 Telefon: 03-2553633 Fax: 03-2557970

6. STRUKTUR MODAL +  
(CAPITAL STRUCTURE) +

i) Modal Dibenarkan  
(Authorised Capital)

..... Syer @ RM ..... nilai par  
(Shares @ RM) (par value)

ii) Para Pemegang Syer  
(Shareholder's Fund)

a) Modal Dibayar ++  
(Paid-up Capital) ++

b) Resab Am  
(General Reserves)

c) Untung Tertahan  
(Retained Profit)

Pada 31.12.1995 (As at 31.12.1995) (RM)

+ Sila kembalikan salinan Penyata Kewangan untuk tahun tersebut jika ada.  
(Please attach copies of the Financial Statement for the financial year of the company if available.)

++ Sila sebutkan modal yang diterbitkan jika berlainan. RM .....

7. STRUKTUR EKUITI SEBENAR  
(ACTUAL EQUITY STRUCTURE)

EKUITI MALAYSIA (MALAYSIAN EQUITY)	Pada 31.12.1995 (As at 31.12.1995) (RM)
i) Bumiputera a) Individu (Individuals)  b) Perbadanan Awam, sila nyatakan nama. (Public Corporations, state name.)  c) Agensi Amanah/Koperasi, sila nyatakan nama. * (Trust Agencies/Co-operatives, please state name.) *  d) Syarikat-syarikat, sila nyatakan nama. (Companies, please state name.)  e) Lain-lain, sila nyatakan. (Others, please state.)	
Jumlah Kecil (Sub-Total)	
ii) Bukan Bumiputera (Non-Bumiputera) a) Cina (Chinese)  b) India (Indian)  c) Lain-lain, sila nyatakan. (Others, please state.)	
Jumlah Kecil (Sub-Total)	
JUMLAH EKUITI MALAYSIA (TOTAL MALAYSIAN EQUITY)	

\*Seperti MARA, PERNAS, Perbadanan-Perbadanan Kemajuan Negeri dan lain-lain Agensi Kerajaan.  
(Such as MARA, PERNAS, State Economic Development Corporations and other Government Agencies.)

<b>(iii) EKUITI ASING (FOREIGN EQUITY)</b> Jumlah Ekuiti Asing Sila nyatakan nama syarikat/individu dan negara asalnya ** (Total Foreign Equity) (Please state name of company/individual and country of direct origin) **	Pada 31.12.1995 (As at 31.12.1995) (RM)
	a. ....
	b. ....
	c. ....
	d. ....
e. ....	
<b>JUMLAH EKUITI ASING (TOTAL FOREIGN EQUITY)</b>	

<b>(iv) Pinjaman *** - tidak termasuk overdraf bank (Loan *** - excluding bank overdraft)</b>		Baki pinjaman pada 31.12.1995 (Outstanding balance as at 31.12.1995) (RM)
	<b>Sumber (Source)</b>	<b>Jenis Pinjaman (Loan Category)</b>
a. Dalam Negeri (Domestic)		
Jumlah Kecil (Sub-Total)		
b. Luar Negeri (Foreign)		
Jumlah Kecil (Sub-Total)		
Jumlah Besar (Grand-Total)		

\*\* Sekiranya sumber dari Syarikat Induk berbeza sila nyatakan.....  
 (In case the Parent Source differs please indicate.....)

\*\*\* Sila nyatakan jenis pinjaman [jangka panjang (LT), jangka pendek (ST) atau jangka pertengahan (MT)] di bawah ruang Jenis Pinjaman.  
 (Please indicate type of loan [(long term (LT), short term (ST) or medium term (MT)] under Loan Category.)

8a. STRUKTUR GUNATENAGA  
(EMPLOYMENT STRUCTURE)

GUNATENAGA PADA 31.12.1995 - KATEGORI/JAWATAN  
(EMPLOYMENT AS AT 31.12.1995 - CATEGORY/POST)

Kategori-kategori Pekerja (Category of Workers)	Jumlah Jawatan Yang Diperlukan (Total Posts Required)	Jumlah Jawatan yang Telah Di isikan (Total Posts Filled)										Asing (Foreign)	Jumlah (Total)
		Rakyat Malaysia (Malaysian)											
		Bumiputera (Bumiputera)		Cina (Chinese)		India (Indian)		Lain-lain (Others)					
		L	P	L	P	L	P	L	P				
1. Pekerja-pekerja Mengurus (Managerial Staff) (a) Profesional (Professional) (b) Bukan Profesional (Non-Professional)													
2. Pekerja-pekerja Teknikal dan Penyeliaan (Technical & Supervisory)													
3. Pekerja-pekerja Kerani dan Pekerja-pekerja yang Berkaitan (Clerical & Other Related Workers)													
4. Pekerja-pekerja Jualan (Sales)													
5. Pekerja-pekerja Perkhidmatan (Service Workers)													
6. Pekerja-pekerja Kilang (Factory Workers) (a) Mahir (Skilled) (b) Tidak Mahir (Unskilled)													
7. Pekerja-pekerja Am (General Workers)													
Jumlah (1 hingga 7) Total (1 to 7)													

L - Lelaki (Male)  
P - Perempuan (Female)

8b STRUKTUR GUNATENAGA  
(EMPLOYMENT STRUCTURE)

GUNATENAGA PADA 31.12.95 - KATEGORI / GAJI  
(EMPLOYMENT AS AT 31.12.95 - CATEGORY / WAGES)

Kategori-kategori Pekerja (Category of Workers)	Gaji yang Dibayar (Wages Paid) [RM]								Bilangan Kekosongan Sekarang (No. of Existing Vacancies)				
	Gaji Pokok Sebulan Menurut Tanggagaji-Kecuali Rakyat Asing (Basic Monthly Wages as per Salary Scale - Except Foreigners)				% Purata Gaji Dibayar sebagai elaun dan lain-lain kemudahan (% of Av. Wages Paid as allowances and other benefits)								
	Gaji Permulaan (Wages on Entry)		Tingkatan Tertinggi (Highest Point)		Lelaki (Male)	Perempuan (Female)	Lelaki (Male)	Perempuan (Female)	Lelaki (Male)	Perempuan (Female)			
	Lelaki (Male)	Perempuan (Female)	Lelaki (Male)	Perempuan (Female)							*B	H	
1. Pekerja-pekerja Mengurus (Managerial Staff) (a) Profesional (Professional) (b) Bukan Profesional (Non-Professional)													
2. Pekerja-pekerja Teknikal dan Penyelidikan (Technical & Supervisory)													
3. Pekerja-pekerja Kerani dan Pekerja-pekerja yang Berkaitan (Clerical & Other Related Workers)													
4. Pekerja-pekerja Jualan (Sales)													
5. Pekerja-pekerja Perkhidmatan (Service Workers)													
6. Pekerja-pekerja Kilang (Factory Workers) (a) Mahir (Skilled) (b) Tidak Mahir (Unskilled)													
7. Pekerja-pekerja Am (General Workers)													

Sila nyatakan jumlah gaji (termasuk bonus & elaun) yang dibayar dalam tahun 1995 RM ..... \*B = Kadar Bulanan (Monthly Rate)  
(Please state the total amount of wages (including bonus & allowance) paid in 1995 RM ..... H = Kadar Harian (Daily Rate)

10. NILAI STOK YANG DIMILIKI  
(VALUE OF STOCKS OWNED)

	Nilai Buku (Book Value) (RM)	
	Dimiliki pada 1.1.95 (Owned as at 1.1.95)	Dimiliki pada 31.12.95 (Owned as at 31.12.95)
1. Bahan-bahan Mentah, Komponen-komponen dan Bekalan-bekalan (Raw materials, Components and Supplies)		
2. Bahan-bahan Pembakar (Fuels)		
3. Barang-barang yang Sedang Diproses (Goods in Process)		
4. Keluaran-keluaran yang Telah Siap (Finished Goods)		
Jumlah (Total)		

11. KEUPAYAAN PENGELUARAN, PENGELUARAN SEBENARNYA, JUMLAH JUALAN DAN EKSPORT DALAM TAHUN KALENDAR 1995  
(PRODUCTION CAPACITY, ACTUAL PRODUCTION, TOTAL SALES AND EXPORTS DURING CALENDAR YEAR 1995)

Keluaran-keluaran (Products)	Unit (Unit)	Keupayaan Terpasang Setahun (Installed Capacity Per Annum)			Pengeluaran Sebenarnya (Actual Production)			Jualan Tempatan * (Local Sales) *		Jualan Ekspot (Export Sales)		Nyalakan negara- negara yang utama kemana keluaran- keluaran diekspor (Please state the major countries to where the products were exported)
		Kuantiti (Quantity)	Nilai (Value) (RM)	Bilangan Shift (No. of Shift)	Kuantiti (Quantity)	Nilai (Value) (RM)	Bilangan Shift (No. of Shift)	Kuantiti (Quantity)	Nilai ** (Value)** (RM)	Kuantiti (Quantity)	Nilai ** (Value)** (RM)	
1.												
2.												
3.												
4.												
5.												
6.												
7.												
8.												
9.												
10.												
Jumlah (Total)												

\* Termasuk jualan ke Sabah dan Sarawak (including sales to Sabah and Sarawak)

\*\* Nilai diuar kilang (Ex-factory value)



12. KOS BAHAN-BAHAN YANG DIGUNA DALAM TAHUN KALENDER 1995  
 (COST OF MATERIALS USED DURING CALENDER YEAR 1995)

Bahan-bahan (Materials)	Unit (Unit)	Tempatan (Local)		Yang Dimport (Imported)		
		Kuantiti (Quantity)	Nilai (Value) (RM)	Kuantiti (Quantity)	Nilai (Value) (RM)	Nyatakan negara-negara utama dari mana bahan-bahan diimport (State the major countries from where materials were imported)
Jumlah (Total)						
Bahan-bahan Pembungkus (Packing Materials)						

\* Tidak termasuk import dari Sabah dan Sarawak  
 (Excluding imports from Sabah and Sarawak)

13. KOS-KOS UTILITI UNTUK TAHUN KALENDAR 1995  
(COST OF UTILITIES IN CALENDAR YEAR 1995)

Jenis-jenis Utiliti (Type of Utilities)	Unit (Unit)	Kuantiti yang Digunakan (Quantity Consumed)	Kos Penyampaian Di Kilang (Cost Delivered at Factory)
1. Air (Water)	Cu. Metres		
2. Bahan Pembakar (Fuels)			
(a) Minyak Pembakar (Fuel Oil)	Litres		
(b) Minyak Diesel (Diesel Oil)	Litres		
(c) Minyak Petrol (Petrol)	Litres		
(d) Minyak Tanah (Kerosene)	Litres		
(e) Lain-lain (Others)			
3. Kuasa Elektrik (Electricity)			
(a) Yang Dibeli (Purchased)	k.w.h		
(b) Yang Dibekalkan Sendiri (Generated)	k.w.h		

**PERAKUAN  
(DECLARATION)**

Saya mengaku mengikut pengetahuan saya bahawa kesemua keterangan dan maklumat yang diberi mengenai projek saya adalah betul.

( I hereby declare that to the best of my knowledge and belief all the particulars furnished contain true and correct information of my project.)

**NAMA  
(NAME)** : .....

**JAWATAN  
(DESIGNATION)** : .....

**Tandatangan  
(Signature)** : .....

**No. Telefon  
(Telephone No.)** : .....

**Tankh  
(Date)** : .....



## ENVIRONMENTAL TECHNOLOGY CENTRE

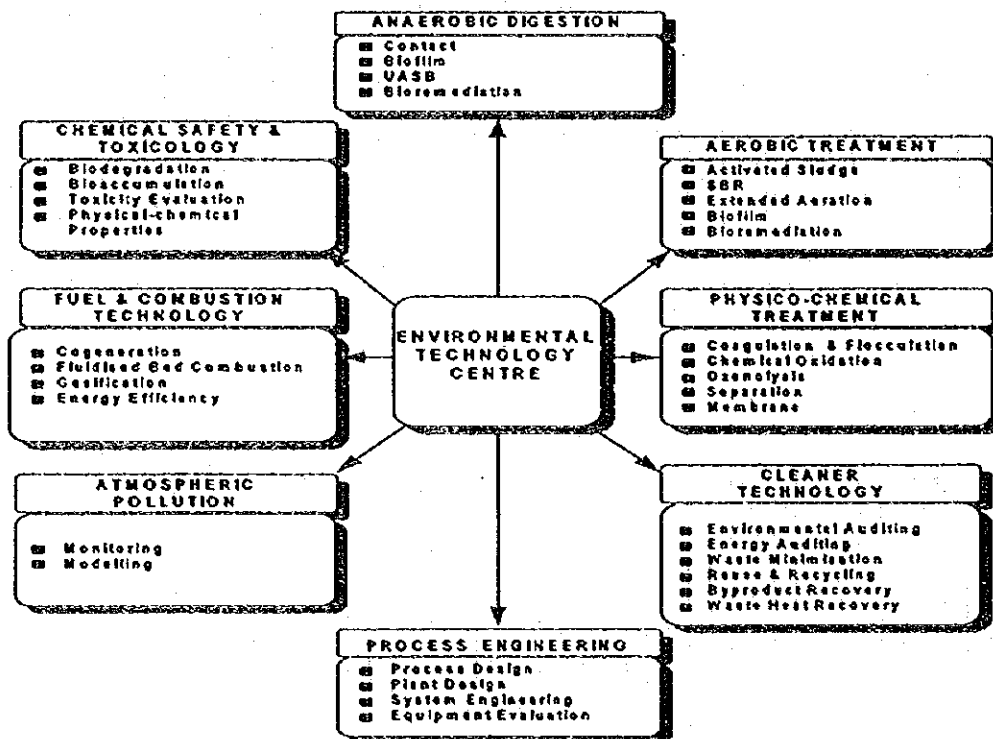
### INTRODUCTION

The Environmental Technology Centre is one of the twelve technology centres under the Research and Technology Development Division of SIRIM. Located at building 15 of the SIRIM complex in Shah Alam, Selangor Darul Ehsan, the Centre basically consists of two technology groups namely the Waste Management Group and the Energy Management Group.

### OBJECTIVE

To carry out research and development, consultancy and promotional activities relating to appropriate, sustainable waste treatment and management processes and systems, as well as clean efficient energy utilisation and management for industrial and other applications.

### TECHNOLOGY FOCUS



## SERVICES AVAILABLE

### 1. Contract research and consultancy in :

- Waste Characterisation
- Treatability and Feasibility Study
- Design Parameters for Treatment Systems
- Development of Appropriate Technology for Waste Management
- Treatment System Monitoring and Upgrading
- Efficient Energy Utilisation
- Toxicological Evaluation

### 2. Training in :

- Treatment Plant Operation
- Environmental Management
- Energy Management

### 3. Environmental and Energy Auditing

### 4. Standards Development

## FACILITIES

GC, GC-MS, LC-MS, GC-FTIR, HPLC, TOC, UV, AAS, Capillary Ion Analyser, Elemental Analyser, Biodegradation Test Equipment, Microorganisms Cultivation Equipment, Bioaccumulation Testing Equipment, Fish Nursing Facilities, Biological Waste Treatment Facilities, Bench-scale Reactors, Portable Combustion Analyser, Electrical Energy Analyser, Humidity Meter, Ultrasonic Flowmeter, etc.

## PROJECTS

The past and current research projects of significance include :

### 1. Environmental pollution control for the following industries :

- |                  |                      |
|------------------|----------------------|
| - Palm Oil       | - Alcohol Distilling |
| - Rubber Thread  | - Ceramic Products   |
| - Electroplating | - Sago Starch        |
| - Yeast          | - Oleochemical       |
| - Bleaching Clay | - Sewage             |
| - Sugar Refining | - Piggery            |
| - Tapioca Starch | - Rice Milling       |

### 2. Energy audit for the following industries:

- |                  |                   |
|------------------|-------------------|
| - Cement         | - Ceramics        |
| - Pulp and Paper | - Rubber Products |
| - Glass          | - Electronics     |
| - Food           | - Textile         |
| - Oleochemical   | - Iron and Steel  |

### 3. Monitoring of cogeneration plants using biomass residues as fuel.

### 4. International collaborative projects :

- SIRIM-JICA Project on Evaluation and Analysis of Hazardous Chemical Substances and Biological Treatment of Hazardous Wastes.
- SIRIM-NEDO Project on Development of a Simple Purification System for Industrial Wastewater.
- SIRIM-DANCED Project on Promotion of Cleaner Technology in the Malaysian Industry.
- ASEAN-EC COGEN Programme.
- ASEAN-NEW ZEALAND Project on Natural Gas Utilisation in Transport.
- ASEAN-Australia Project on Energy from Biomass Residues Supplemented by Fossil Fuels (AAECP III).
- ASEAN-Australia Project on Wastewater Treatment Technology Transfer and Cleaner Production Demonstration (AAECP III).
- ASEAN-Canada Project on Solar Drying Processes.

For further enquiries, please contact:

General Manager, Environmental Technology Centre  
STANDARDS AND INDUSTRIAL RESEARCH INSTITUTE  
OF MALAYSIA (SIRIM)  
Persiaran Dato' Menteri, P.O. Box 7038,  
40911 Shah Alam, Selangor Darul Ehsan, Malaysia

Tel : (603) 5567530/ 5567565  
Hotline : (603) 5503535  
Telex : MA 38672 SIRIM  
Fax : (603) 5567590/ 5508095  
Email : bgyeoh@sirim.my

**PROPOSED TERMS OF REFERENCE FOR CONSULTANCY  
ON ENERGY AUDIT FOR JICA PROJECT ON PROMOTION  
OF ENERGY EFFICIENCY IN MALAYSIA**

**Background**

In response to the request of the Government of Malaysia, the Government of Japan decided to conduct a study on Promotion of Energy Efficiency in Malaysia.

The Energy Management Group under SIRIM Environmental Technology Centre had the experience of carrying out 30 energy audits under the ADB Programme by Ministry of Energy, Telecommunication and Posts on energy intensive industries such as the steel, ceramic and glass, paper, tyre, oleochemicals, food and other industries. The Group also carried out evaluation on performance of biomass cogeneration plants. Under the SIRIM-DANCED Programme on Cleaner Technology Project, energy and environmental audits were carried out on 30 companies in the electroplating, food and textile industries. The Group also involved in the Fluidised-Bed Combustion Project, Natural Gas Utilisation in Transport Project, Cogeneration Full Scale Demonstration Projects etc. With the above experience, we are capable of delivering the objective and output as stated below.

**Objectives**

- To identify industrial sectors for the Project
- To identify 25 companies for the Project
- To carry out energy audit on selected companies

**Output**

- To carry out energy assessment on 25 companies
- To provide energy audit reports

**Time Duration**

To complete auditing and reporting within six (6) months on initiating the Project.

## Staffing

The following staffs with biodata enclosed will be participating in the Project.

Mr. Lu Sim Hoay  
Mr. Hamdan Mokhtar  
Ms Maznah Abdul Majid  
Ms Aminah Ang  
Mr. Mohd Fadzil Adnan  
Mr. Shamsol Effendy Dismal  
Ms Malini Pernalatha  
Ms Lim Paik Kooi

## Costing

Manpower : 6-man x 6 months x RM10,000/man-month = RM360,000  
*= 20,000,000.00*

Land travel : RM0.60/km

Air travel : as per air ticket

Hotel : rate as per resit

Per diem : RM100/day  
 $6 \times 6 \times 30 = 1080 \text{ d.p}$   
 $\times 100 = 108,000 \text{ Ra.}$   
*= 4,000,000.00*

**LIST OF EQUIPMENT AVAILABLE FOR ENERGY AUDIT  
ENVIRONMENTAL TECHNOLOGY CENTRE**

	NAME OF EQUIPMENT	MODEL & BRAND	PARAMETER TO MEASURE	SPECIFICATION & RANGES	ACCURACY	QUANTITY
<b>ELECTRICAL MEASUREMENT</b>						
1	NanoVIP Kit Power meter	Elcontrol	Voltage Ampere, kW, power factor	V - 0-600V A - 0-1000A Power factor		1
2	Digital Power Factor Meter	AEMC	Voltage, Ampere and Power Factor	V - 0-600V A - 0-1000A Power factor		1
3	Energy Analyser	VIP System 3	Voltage, Wattage Ampere, kWh, Power Factor, Frequency and DC current.	V - 0-600V A - 0-1000A Power factor DC current 1000	V +/- 0.2%FS A +/- 0.2%FS	1
<b>FLOW MEASUREMENT</b>						
4	Alnor Velometer	Series 6000P	Air Velocity and pressure	Velocity 0-50 m/s Pressure 0-250 mm H <sub>2</sub> O	+/- 2% FS	1
5	Airflow	TA2 Anemometer and Thermometer	Air velocity and temperature	Velocity 0-30m/s Temp 0- 80degC	+/- 2% FS	
6	Ultrasonic Flowmeter	Panametric	Liquid flowrate	0.03 - 30 m/s clamp on transducer	+/- 0.03	1
<b>EMISSIONS ANALYSER</b>						
7	Portable Gas Analyser	IMR 3000P	Oxygen contents Carbon monoxide Carbon dioxide Sulphur dioxide Nox Fluegas Temp	0-20.9% 0-4000ppm 0-max 0-4000ppm 0-2000ppm 0-1472 deg C	+/- 2%     1 K	1
8	Combustion Test Kit - Bacharach	Orsat Analyser	CO <sub>2</sub> O <sub>2</sub> Flugas Temperature Soot particles and Boiler efficiency	0-max 0-20.9% 0-950 deg F		1
9	Particulate Matter	GRIMM	Particulate contents in the stack	Volume 1.2l/min Measuring range 1 - 50 µg/m <sup>3</sup>		



FUEL ANALYSIS						
10	CHNS-O Analyser	EA 1108 Elemental Analyser	Carbon Hydrogen Sulphur Oxygen and Nitrogen	Measuring Range 100 ppm - 100% Detection limit - 10 ppm.	< 0.3% absolute Repeatability < 0.2%	1
11	Thermogravimetric Analysis	TG Mettler	Volatile Matter Carbon Content Ash			1
12	Drying Oven		Moisture Contents			1
13	Electric Oven	Muffle furnace	Ash Volatile Matter Carbon			
<b>WATER QUALITY</b>						
13	Atomic Absorption		Calcium Magnesium Hardness Iron Total Suspended Solid and Total Dissolved Solid			
14	pH meter		pH			1
<b>OTHERS</b>						
15	Recorder	Yokogawa HR 1300				1
16	Tachometer	HT 441				1
17	Thermometer					1
18	Infra red thermometer	DHS-28X	Flame Temperature	220-1400 deg C	+/- 0.3 FS	1
19	Moisture Analyser	Digi Sense Kit Model 91090-25	Moisture Relative Humidity Temperature	0-80 % RH	+/- 0.5%	1

**NAME** : LU SIM HOAY

**POSITION** : Manager, Energy Management Group  
Environmental Technology Centre

**QUALIFICATION** : B.Eng (Hons), Chemical Engineering, University of  
Malaya

**PREVIOUS POSITION** : ● Head of Pilot Plant Unit, R&D Division  
Research Manager, Energy Technology Group  
Research Manager, Energy & Environmental  
Technology Group

**WORK EXPERIENCE** : ● Major projects carried out:

- SIRIM - KOREA R&D project on alcohol production
- SIRIM-JAPAN project on manufacturing of light-weight building materials from rice husk ash.
- ASEAN Working Group Projects on Food Wastes Materials and Non-Conventional Energy Research.
- EC ASEAN COGEN Programme
- NZ ASEAN Natural Gas Utilisation in Transport Programme
- Australia - ASEAN Biomass Residues Programme
- SIRIM JICA hazardous waste project
- SIRIM NEDO Industrial Waste water Treatment Project.
- SIRIM-DANCED Cleaner Technology Project
- SIRIM DANCED Private Partnership Project

● Certification Marking Schemes for Malaysian Standard Mark

- Palm oil, rubber and steel industries
- Plastic injection and extrusion
- Electroplating and metal finishing.
- Separation technology, material processing
- Biomass energy and cogeneration

**SPECIALIZATION** : ● Energy management, audit and conservation

- Local materials and waste utilization
- Processes and pilot plant studies
- Environmental audit

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**NAME** : **HAMDAN MOKHITAR**

**POSITION** : Principal Researcher,  
Energy Management Group  
Environmental Technology Centre

**QUALIFICATION** : B.Sc (Hons), Chemical Technology, National University  
of Malaysia

Msc ( Energy Studies ), University Of Wales College,  
Cardiff, United Kingdom.

**PREVIOUS POSITION** : ● Head of Appropriate Technology Unit, R&TD  
Division

Research Officer, Energy Technology Group

**WORK EXPERIENCE** : ● Major projects implemented:

- ASEAN - AUSTRALIA on Fluidised Bed  
Combustion Technology.
- ASEAN Coordinator of ASEAN-Australia  
Fluidised Bed Project
- ASEAN Working Group Projects on Non-  
Conventional Energy Research.
- Monitoring ( Technology, Environmental and  
Economics ) of Full Scale Demonstration  
Project on EC ASEAN COGEN Programme
- Detail Energy Audit at various factories under  
Asian Development Bank
- Environmental Audit at various companies  
under SIRIM-DANCED Cleaner Technology  
Project
- Solar drying project on agricultural products

**SPECIALIZATION** : ● Energy Management, Audit and Conservation  
● Combustion Process.  
● Environmental audit

- NAME** : MAZNAH BINTI ABDUL MAJID
- POSITION** : Researcher,  
Energy Management Group  
Environmental Technology Centre
- QUALIFICATION** : B.Sc (Hons), Fuel and Energy Engineering, University  
of Leeds.  
  
MSc, Combustion and Energy, University of Leeds,  
1994
- PREVIOUS POSITION** : ● Research Officer in :
- Energy Section, Research Unit
  - Petroleum and Plastic Testing Unit
  - Standards Development Unit
  - Innovative Unit
- WORK EXPERIENCE** : ● Major projects carried out:
- EC-ASEAN Cogen programme
  - National Energy Conservation Programme
  - SIRIM-DANCED Cleaner Technology Project.
  - Testing of Petroleum and Rubber Products
  - Developing Malaysian Standards
  - Energy audits in the following industries
    - building
    - steel
    - textile
    - paper
    - washing plant (Sweden)
    - electroplating
    - food
- SPECIALIZATION** : ● Energy and fuel engineering  
● Combustion technology  
● Energy conservation techniques

**NAME** : **ANG BEE FUI @ AMINAH ANG**

**POSITION** : **Researcher**  
**Energy Management Group**  
**SIRIM Environmental Technology Centre**

**QUALIFICATION** : **B.Eng (Hons) Chemical Engineering**  
**University College of Swansea**

**PREVIOUS POSITION** : • **Quality Assurance Engineer, Nifco-Hill (Malaysia) Sdn Bhd, a plastic manufacturing company**

• **Temporary Research Officer, Pilot Plant Unit, SIRIM**

• **Research Officer, Energy and Environmental Technology Group, SIRIM**

**WORK EXPERIENCE** : • **Quality assurance and quality control under ISO 9002 and Underwriters Laboratory**

• **Formulation and development of inks, domestic and toiletry products**

• **ASEAN-EC Cogen Programme on cogeneration of biomass residues**

• **Biomass and energy survey**

• **Energy auditing in the Malaysian Industries**

• **Furnace evaluation in the steel industry**

• **SIRIM-DANCED Cleaner Technology Project**

• **Environmental auditing in the electroplating, food and textile industries**

• **Organisation of Energy & Environmental Technology Conference**

• **Secretary for the National Committee on Environmental Standards (ISO 14000 activities in Malaysia)**

**SPECIALIZATION** : • **Energy conservation, audit and management**

• **Non-conventional energy data base**

• **Environmental and industrial audit**

**NAME** : K.D. MALINI PEMALATHA

**POSITION** : Researcher,  
Energy Management Group  
Environmental Technology Centre

**QUALIFICATION** : B. Eng (Chemical & Process)  
Universiti Kebangsaan Malaysia

Msc, Environmental Pollution Control Management  
Heriot-Watt University, Edinburgh

**PROJECT** : Industrial Trainee at Food Specialities (M) Sdn Bhd  
(Nestle), Shah Alam

**WORK EXPERIENCE** : ● Estimation of steam consumption at Cereal Plant  
and at Ready to Drink (RTD) Plant  
● Quality Control at the QA Lab

**CURRENT WORK** : ● Involved in the SIRIM-DANCED Project on the  
Promotion of Cleaner Technology in the  
Malaysian Industry  
● Secretary to the Project Committee

**SPECIALIZATION** : ● Energy and environmental audit  
● Environmental pollution control management

**NAME** : SHAMSOL EFENDY DISMAL

**POSITION** : Researcher,  
Energy Management Group  
Environmental Technology Centre

**QUALIFICATION** : B.Sc (Hons), Chemical Process Engineering  
Major : Chemical Process Engineering  
Minor : Fuel Technology  
University of Sheffield, U.K

Msc, Combustion Science and Pollution Control  
University of Sheffield, Sheffield, U.K.

**PREVIOUS POSITION** : Research Officer  
Mechanical Eng. & Automotive Testing Unit

**WORK EXPERIENCE** : ● Involved in the testing of mechanical product  
and preparation of report to confirm the  
compliance of the product to the Malaysian  
Standard or any International Standard

**PROJECT** : ● A research on the performance of a natural gas-  
fired pulsed combustor (M.Sc.)  
● Combustion modelling of pentane in a  
combustor by using FLUENT package (M.Sc.)  
● A review on Municipal waste incinerator (M.Sc.)  
● Design of a plant for a production of 40,000  
tonnes per annum of ethanol (B.Eng)

**CURRENT WORK** : SIRIM-DANCED project on the Promotion of Cleaner  
Technology in the Malaysian Industry

**SPECIALIZATION** : ● Energy and environmental audit

**NAME** : MOHAMAD FADZIL ADNAN @ NAN

**POSITION** : Researcher,  
Energy Management Group  
Environmental Technology Centre

**QUALIFICATION** : B.Sc (Hons), Chemical Process Eng. and Fuel  
Technology, University of Sheffield, Sheffield, U.K.  
  
Msc, Combustion Science and Pollution Control  
University of Sheffield, Sheffield, U.K.

**WORK EXPERIENCE** : ● Participate in AUSAID AAFCP III Energy from  
Biomass Residues Project  
: ● Involved in organising the Conference on  
Environmental Technology and Business  
Opportunities, Glenmarie, Shah Alam, Selangor  
● Evaluation of cogeneration systems  
● Participated in Cleaner Technology under  
DANCED Programme

**SPECIALIZATION** : ● Energy and environmental audit  
● Co-generation  
● Engineering design



**NAME** : LIM PAIK KOOI

**POSITION** : Researcher,  
Environmental Technology Centre

**WORK EXPERIENCE** :

- **Electronical/Electronics Testing Unit**
  - Safety and performance testing of domestic and industrial appliances and accessories.
- **Printing and Publication Unit**
  - Draughting of diagrams for Malaysian Standards and Publications
- **In-plant training in Power**
  - Toshiba Corporation, Nagoya
- **Projects involved in:**
  - EC-ASEAN COGEN Programme
  - Asian Development Bank Energy Conservation Programme in Malaysia
  - SIRIM-DANCED Cleaner Technology Project

付録8. マレーシアの製造業リスト

8-1. 鉄鋼業

Steel Works List -1/13 from Iron and Steel Works of the World --'96"

- =====
1. Company : Amalgamated Industrial Steel Bhd  
 Head office : Jalan Utas, Section 15, 40000 Shah Alam, Selangor.  
 Postal address :  
 Telephone no : 03-5591616 ~9 ; Fax no: 03-5590969  
 Established : 1969.  
 Capital :  
 No. of employees :  
 Annual capacity : 45,000 tonnes approx.  
 Works : Jalan Utas, Section 15, 40000 Shah Alam.  
 Facilities : Tube and pipe mills Welded  
 Products : Carbon steel:  
 BRW for round(1/2~6"), square(1/2~6" x 6"),  
 Rectangular(3/4 x 1-1/2" ~4 x 8") tubes  
 Stainless steel:  
 longitudinal-weld tubes and pipes
- Additional information:
- 
2. Company : Amalgamated Steel Mills Bhd - see Amsteel Corp Bhd  
 Head office :  
 Postal address :  
 Telephone no :  
 Established :  
 Capital :  
 No. of employees :  
 Annual capacity :  
 Works :  
 Facilities :  
 Products :  
 Additional information:
- 
3. Company : Amsteel Corp Bhdn  
 Head office : 4th & 5th floors, Wisma SPS, 32 Jln Imbi, Kuala Lumpur 55100.  
 Postal address :  
 Telephone no : 03-2412155, 03-2413166; Fax no: 03-2411036  
 Established : 1976  
 Capital : M\$ 500,000,000. (authorised)  
 No. of employees : 960  
 Annual capacity : Raw steel 750,000; Finished steel 850,000 tonnes  
 Works : Lot 6, Solok Waja 2, Bukit Raja Industrial Estate, 41050 Klang, Selangor.  
 Facilities : One 85-tonne 55MVA electric arc furnace  
 One 85-tonne 33MVA ladle furnace(refining plant)  
 Continuous casting machines One 6-strand Danielli  
 billet(100-160mm sq);

Steel Works List -2/13 from "Iron and Steel Works of the World--'96"

(3. Company) :Amsteel Corp Bhd  
 (Facilities) :Rolling mills bar with 3-high reversing roughing stand, three cross-country intermediate stands, 5-stand tandem train and 6-stand, horizontal/vertical finishing block (9-40mm dia) (250,000 tonnes); bar (1992) (300,000 tonnes); continuous wire rod with 10-stand finishing block (5.6-32mm dia), (coil weight 1,500kg) (300,000 tonnes).  
 Products :Scrap baling press and shear.  
 :Carbon steel; wire rod (low carbon) 5.5-32mm; reinforcing bars (high-tensile deformed) 9.0-40mm; round bars (mild steel) 9-40mm; flats 4.5/6/9/12mm thick, 25/32/38/50/65/75mm wide.  
 Additional information: Modernisation/expansion plans: Upgrading of wire rod mill, involving increase in finishing speed to 94m/sec. to be completed by end-1994.

4. Company :Amsteel Mills Sdn Bhd-HBI Operation  
 Head office :Wisma SPS, 32 Jalan Imbi, 55100 Kuala Lumpur.  
 Postal address :Lot 1, Jalan Waja, Bukit Raja Industrial Estate, 41050 Klang, Selangor.  
 Telephone no :03-3412322, 03-3412323; Fax no: 03-3412354  
 Established :1980.  
 Capital :  
 No. of employees :203  
 Annual capacity :660,000 tonnes  
 Works :Ranca-Ranca Industrial Estate, Locked Bag 11, 87009 Labuan Sabah.  
 Facilities :Direct reduction plant  
 Products :Direct-reduced iron (hot briquetted)  
 Additional information: The company was formerly owned by the state government and was privatised in 1992. The unit was known as Sabah Gas Industries Sdn Bhd.

5. Company :Anshin Steel Industries Sdn Bhd  
 Head office :Jalan Gergaji 15/14, Shah Alam, Selangor 40000.  
 Postal address :  
 Telephone no :03-5502888; Fax no: 03-5508376  
 Established :1983  
 Capital :M\$ 22,000,000  
 No. of employees :Works-180, Office-50  
 Annual capacity :Finished steel:170,000 tonnes  
 Works :Jalan Gergaji 15/14, Shah Alam, Selangor 40000  
 Facilities :Rolling mills 7-stand 3-high section (annual capacity 50,000 tonnes, 14-stand bar (120,000 tonnes)

Steel Works List -3/13 from "Iron and Steel Works of the World--'96"

(5. Company) :Anshin Steel Industries Sdn Bhd  
 (Facilities) :Foundry for grey iron, SG iron and alloy cast iron.  
 Products :Carbon steel :Reinforcing bars(deformed)(10-32mm)  
 (output 120,000tonnes), Round bars 42-65mm(5,000  
 tonnes), Square bars 32, 38, 44, 50mm(5,000tonnes),  
 Flats 125 x 25-50 x 9mm(20,000tonnes), Light angles  
 75 x 9-50 x 6mm(30,000tonnes)

Additional information:

6. Company :Antars Steel Mills Sdn Bhd  
 Head office :40A Pandan Jaya, Kuala Lumpur.  
 Postal address :  
 Telephone no : ;Fax no: 03-9850195  
 Established :1979.  
 Capital :  
 No. of employees :  
 Annual capacity :500,000tonnes  
 Works :81700 Pasir Gudang  
 Facilities :Steelmaking plant, Rolling mills two light section  
 one 8-stand for angles up to 50mm(20,000tonnes),  
 and one 2-stand for 65mm angles; two bar one 12-  
 stand (9-12mm)(10,000tonnes), and one 8-stand(16-  
 25mm)(100,000 tonnes).  
 Products :Carbon steel :Reinforcing bars 9-40mm; round bars  
 9-25mm; flats 32 x 9, 38 x 6, 38 x 9, 50 x 6mm;  
 light angles 25 x 2.8mm to 50 x 6.0mm;  
 medium angles 60 x 5mm to 75 x 6mm.  
 Additional information: Moderisation/expansion plans: Medium section mill to  
 produce angles and channels up to 120mm and rounds  
 up to 75mm(200,000 ~250,000tonnes/year)-1995.

7. Company :Asjana Sdn Bhd  
 Head office :Lot 5, Solok Waja 3, Bukit Raja Industrial Estate,  
 41050 Klang, Selanger.  
 Postal address :  
 Telephone no :03-3414633 ;Fax no: 03-3414685  
 Established :1966  
 Capital :M\$ 8,000,000  
 No. of employees :180  
 Annual capacity :30,000 tonnes  
 Works :Lot 5, Solok Waja 3, Bukit Raja Industrial Estate,  
 41050 Klang, Selangor  
 Facilities :Tube and pipe mills Welded: Spiral and longitudinal.  
 Products :Carbon steel; Pipe piling; longitudinal-weld tubes  
 and pipe accessories water supply.

Steel Works List -4/13 from "Iron and Steel Works of the World--'96"

8. Company :Boon & Cheah Steel Pipes Sdn Bhd  
 Head office :398 Medan Imbi, Kuala Lumpur 55100  
 Postal address :  
 Telephone no : ;Fax no: 03-2418496  
 Established :  
 Capital :  
 No. of employees :  
 Annual capacity :  
 Works :Ipoh, Perak.  
 Facilities :Tube and pipe mills welded.  
 Products :Carbon steel ;longitudinal-weld tubes and pipes.  
 Additional information:

9. Company :Choo Bee Metal Industries Bhd  
 Head office :44-48 Lebuhraya Bendahara. 31650 Ipoh, Perak.  
 Postal address :  
 Telephone no :05-508111 ;Fax no: 05-543073  
 Established :1971.  
 Capital, No. of employees, Annual capacity, Works :  
 Facilities :Tube and pipe mills Five Welded --TFM-65(1/2 ~ 2-3/8") (annual capacity 4,800 tonnes), TFM-55SP(1/2~1-1/4") (5,400 tonnes), TFM-45SP(1/2~7/8") (3,600 tonnes), TFM-100(2~6") (8,000 tonnes), TM-65(1/2 ~2") (10,800 tonnes).  
 Three slitting lines--one Takeshima(1.0-4.5MM)(coil weight 10 tonnes)(11,500tonnes), one Sonoda(0.4-1.2 mm)(coil weight 10 tonnes)(13,500 tonnes), one Loopco(1.2-8mm)(coil weight 20 tonnes)(15,000 tonnes);  
 Pipe galvanizing plant(1/2 ~6") (zinc bath 8 x 2 x 1.2m)(21,000 tonnes);  
 Loopco 20-tonne x 13 x 7,620mm cut-to-length line (1-13mm)(max coil weight 20 tonnes)(204,000 tonnes);  
 Lip-channel forming machine,model SF-460(200 x 75 x 20 x 4.5mm)(max coil weight 3.5 tonnes)(3,600 tonnes);  
 Lowa precision line SLR6012-2(0.38-2.74mm)(coil weight 10 tonnes)(12,200 tonnes);  
 two Tube threading machines-- one TH-55(1/2~2") (15,000 tonnes) and one TH-155(2-1/2~6") (21,000 tonnes);  
 two Tube swaging machines(5/8~2") (300 tonnes),one Hydraulic shearing line(thickness 3-16mm)(12,000 tonnes).

Steel Works List -5/13 from "Iron and Steel Works of the World--'96"

(9. Company) :Choo Bee Metal Industries Bhd  
 Products :Carbon steel:cold roll-formed sections; longitudinal-weld tubes and pipes;galvanized tubes and pipes and conduit; mild steel flats and plates.

Additional information:

10. Company :Dah Yung Steel (M) Sdn Bhd  
 Head office :19 Jalan Empat. Off Jalan Chan Sow Lin, Kuala Lumpur 55200.

Postal address :

Telephone no :03-2213166 ;Fax no: 03-2218006

Established :1964.

Capital :

No. of employees :

Annual capacity :Finished steel:40,000/50,000 tonnes.  
 Steel castings:1,100 tonnes.

Works :

Facilities :Steelmaking plant: one 10-tonne electric arc furnace (annual 40,000 tonnes); one 1-tonne VIP induction furnace(3,000 tonnes).  
 Rolling mills: one cross country 10-stand 14/12" bar (50,000 tonnes).

Products :Reinforcing bars; round bars; light angles.

Additional information:

11. Company :Dahong Steel Sdn Bhd  
 Head office :Lot 4-D, Kawasan Perindustrian Merlimau,Merlimau 77300,Melaka.

Postal address :

Telephone no :06-391982 ;Fax no: 06-391254

Established :1986.

Capital :

No. of employees :Works-- 100, Office-- 20

Annual capacity :Finished steel; 132,000 tonnes.

Works :

Facilities :Rolling mills :one bar with 2-stand 3-high 500mm roughing, 2-stand 300mm intermediate and 4-stand 3-high, 300mm finishing(annual capacity 132,000 tonnes).

Products :Carbon steel - reinforcing bars.

Additional information:

12. Company :Federal Iron Works Sdn Bhd(FIW)  
 Head office :14 Jalan Tandang,46050 Petaling Jaya, Selangor.  
 Postal address :

Steel Works List -6/13 from "Iron and Steel Works of the World--'96"

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 (12. Company) :Federal Iron Works Sdn Bhd(PIW)  
 Telephone no : ;Fax no: 03-7916721  
 Established :1959.  
 Capital :  
 No. of employees :  
 Annual capacity :  
 Works :14 Jalan Tandang, Petaling Jaya, Selangor.  
 Facilities :Coil coating lines;No 3: Three hot-dip galvanizing  
 -No 1 and 2(combined annual capacity 110,000 tonnes)  
 and No 3: Spangle-free line(200,000 tonnes);one  
 colour coating(80,000 tonnes).  
 Products :Carbon steel:hot-dip galvanized sheet/coil, colour-  
 coated sheet/coil, LPG cylinders.

Additional information:

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 13. Company :Gunawan Iron & Steel Sdn Bhd  
 Head office :Suite 27, 1A, 27th floor, Menara Haw Par, Jalan Sultan  
 Ismail, 50260 Kuala Lumpur.  
 Postal address :  
 Telephone no :03-2380245 ;Fax no: 03-2380246  
 Established :  
 Capital :  
 No. of employees :  
 Annual capacity :  
 Works :Kmaman, Trengganu.  
 Facilities :Rolling mills :one heavy plate (product thickness  
 6-25mm)(under construction).  
 Products :  
 Additional information:The company also operates a plate mill in Indonesia.  
 Gunawan plans to build an integrated steelworks at  
 Kemaman and has been in negotiation with British  
 Steel to buy the latter's Ravenscraig works for  
 relocation to Malaysia.

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 14. Company :John Lysaght(Sabah) Sdn Bhd  
 Head office :Likas Industrial Estate, 5-1/2 miles on Tuaran Road,  
 Kota Kinabalu.  
 Postal address :  
 Telephone no : ;Fax no:088-421178  
 Established :  
 Capital :  
 No. of employees :  
 Annual capacity :  
 Works :Likas Industrial Estate, Kota Kinabalu.  
 Facilities :Cold roll-forming facilities

Steel Works List -7/13 from "Iron and Steel Works of the World--'96"

(14. Company)	: John Lysaght(Sabah) Sdn Bhd
Products	: Carbon steel: cold roll-formed sections.
Additional information:	
15. Company	: Malayawata Steel Bhd
Head office	: PO Box 60, 12700 Butterworth, Penang.
Postal address	:
Telephone no	: 04-307144 ; Fax no: 04-308863
Established	: 1961.
Capital	: M\$134,400,000.
No. of employees	: Works-- 1,334, Office-- 135.
Subsidiaries	: Malayawata Charcoal Sdn Bhd(charcoal production); Malaysian Steel Corp Sdn Bhd; Empresa Sdn Bhd(palm oil investment)
Annual capacity	: Pig Iron: 158,000 tonnes. Raw steel: 184,000 tonnes. Finished steel: 412,000 tonnes.
Works	: Prai, Province Wellesley
Facilities	: Sinter plant one 18sq m strand Dwight Loyd(annual capacity 95,000 tonnes). Blast furnaces two- one 3.7m hearth dia 204 cu m, (96,000 tonnes). and one 3.4m hearth dia 175 cu m, (62,000 tonnes). Steelmaking plant one 15-tonnes top blowing basic oxygen converter(160,000 tonnes); one 10 tonne electric arc furnace(24,000 tonnes). Continuous casting machines one 2-strand Mitsubishi/Olsson billet(100 x 100mm)(90,000 tonnes). Rolling mills one 18-stand 32mm dia semi-continuous bar incorporating conventional wire rod train(180,000 tonnes); one 21-stand 32mm dia continuous tandem bar/wire rod incorporating Morgardshammar 5.5-16m dia wire rod block and 20-25mm dia heavy rod line(420,000 tonnes).
Products	: Carbon steel --wire rod 5.5-25mm dia(Fiscal year 1993: 24,700 tonnes); reinforcing bars 8-40mm dia(262,400 tonnes); round bars 8-25mm dia(51,900 tonnes); flats 4 x 12mm to 12 x 100mm(2,600 tonnes); light angles 38 x 38 x 4mm to 65 x 65 x 6mm(10,800 tonnes).
Additional information:	: Modernisation/expansion plans: No. 2 steel plant comprising 80-tonne DC arc furnace and 5-strand continuous caster which will start producing 450,000 tonnes/year of billet from 1995.



Steel Works List -8/13 from "Iron and Steel Works of the World--'96"

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16. Company :Maruichi Malaysia Steel Tube Bhd  
 Head office :Lot 53, Persiaran Selangor, Seksyen 15, Shah Alam, Selangor.  
 Postal address :PO Box 7018, 40903 Shah Alam.  
 Telephone no :03-5592455 ;Fax no: 03-5592033  
 Established :1969.  
 Capital :M\$100,000,000  
 No. of employees :380  
 Subsidiaries :Cold Rolling Malaysia Industry Sdn Bhd(cold rolling of coil);  
 Tokyo Steel Wire Bhd (steel wire drawing);  
 Annual capacity :Pipes:cold roll-formed shapes and sections: 180,000 tonnes  
 Works :Lot 53, Persiaran Selangor, Seksyen 15, Shah Alam, Selangor  
 Facilities :Tube and pipe mills welded- twelve ERW 9-400mm(annual capacity 144,000 tonnes).  
 one hot-dip galvanising plant(24,000 tonnes);  
 five cold forming lines for shapes and sections up to 250mm(36,000 tonnes).  
 Works :Lot 717, Jalan Sungei Rasa, Klang.  
 Facilities :Rolling mills: one 6-high Hitachi HC cold reduction (1990)(annual 150,000 tonnes).  
 Continuous pickling line.  
 Products :Carbon steel: cold roll-formed sections; cold rolled uncoated sheet/coil; longitudinal-weld tubes and pipes; galvanized tubes and pipes; hollow sections.  
 Additional information:Modernisation/expansion plans: Additional pipe mill and slitler. raising capacity to 200,000 tonnes/year --end-1994. increase in pickling capacity to 240,000 tonnes/year.

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17. Company :Nusantra Steel Corp Sdn Bhd  
 Head office :11th floor, Menara Aetna Universal, 84 Jalan Raja Chulan, 50200 Kuala Lumpur.  
 Postal address :  
 Telephone no :03-2612388;Fax no: 03-2615092  
 Established :  
 Capital :  
 No. of employees :  
 Annual capacity :  
 Works :Pulau Indah(proposed)  
 Facilities :Steelmaking plant; Continuous casting machine -slab; Rolling mills -wide hot strip(1997).  
 Products :  
 Additional information:

Steel Works List -9/13 from "Iron and Steel Works of the World--'96"

18. Company :Oriental Sttl Industries Sdn Bhd  
 Head office :Plot 233/234. Lorong Perusahaan Lapan, Prailand Est.  
 Prai 13600.  
 Postal address :  
 Telephone no :04-307912 ;Fax no: 04-391315  
 Established :1976.  
 Capital :M\$2,300,000.  
 No. of employees :Works - 8, Office - 5.  
 Annual capacity :3,000 tonnes.  
 Works :  
 Facilities :Bright bar plant.  
 Products :Carbon steel: bright(cold finished) bars(round).  
 Additional information:

19. Company :Ornasteel Enterprise Corp(M) Sdn Bhd  
 Head office :Lot 840-1887. Ayer Keroh Industrial Estate, 75450  
 Ayer Keroh, Malacca.  
 Postal address :  
 Telephone no :06-329990 ;Fax no: 06-325311, 06-329528  
 Established :  
 Ownership :Foreign Capital Taiwan 49%  
 Capital :  
 No. of employees :  
 Annual capacity :  
 Works :  
 Facilities :Roiling mills: two reduction(144,000 tonnes each).  
 Tube and pipe mills: one welded(annual capacity  
 72,000 tonnes).  
 Products :Carbon steel: cold rolled uncoated sheet/coil;  
 longitudinal-weld tubes and pipes.  
 Additional information:

20. Company :Persahaan Sadur Timah Malaysia (Perstima)Bhd  
 Head office :Plo 255, Jalan Timah Tiga, Pasir Gudang, 81707 Johor.  
 Postal address :  
 Telephone no :07-2512001 ~7 ;Fax no: 07-2514618  
 Established :  
 Capital :M\$200,000,000.  
 No. of employees :factory --265, office --51  
 Annual capacity :Tinplate:240,000 tonnes.  
 Works :  
 Facilities :Coil coating lines: two 457,988mm halogen continuous  
 electrolytic tinning (annual capacity 240,000 tonnes).  
 Products :Carbon steel:electrolytic single-reduced tinplate;  
 electrolytic double-reduced tinplate.

Steel Works List -10/13 from "Iron and Steel Works of the World--96 "

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- (20. Company) :Persahaan Sadur Timah Malaysia (Perstima)8hd  
 Additional information: Tin-free steel (ECCS) could be produced with minor modifications to the second coating line.
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21. Company :Perwaja Steel Sdn Bhd  
 Head office :13th floor, UBN Tower, 10 JI P. Ramlee, 50250 Kuala Lumpur.  
 Postal address :  
 Telephone no :03-2320366; Fax no: 03-2322102  
 Established :1982.  
 Ownership :State-owned  
 Capital :  
 No. of employees :  
 Subsidiaries :Perjawa Flat Products Sdn Bhd;  
 Perjawa Rolling Mill Development.  
 Annual capacity :  
 Works :Kemaman Plant: PO Box 61, 24007 Kemaman, Trengganu.  
 Facilities :Direct reduction plant: one HYL III (converted from Nippon Steel process) (1994) (annual capacity 1,200,000 tonnes combined).  
 Continuous casting machines: two 4-strand MC-5 billet (100 and 120mm sq) (559,000 tonnes);  
 one 6-strand concast billet for special steels.  
 Works :Gurun Plant, Kawzaar, Penindustian Gurun: PO Box 25, Bedong 08100 Kedah.  
 Facilities :Steelmaking plant: two 73-tonne NKK DC electric arc furnaces (1996) (combined annual capacity 760,000 tonnes).  
 Continuous casting machines: one 4-strand Mitsubishi bloom (1996).  
 Rolling mills: one Kawasaki Heavy Industries medium section (1996); one 2-strand Danieli bar/wire rod mill (1993) (450,000 tonnes).  
 Products :Carbon steel: billets 100 and 120mm sq.  
 Additional information: Modernisation/expansion plans: New direct reduction plant and rehabilitation of former Nippon Steel direct reduction plant. Increase in raw steel capacity to 1,200,000 tonnes/year of flat products envisaged by 1996.
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22. Company :Sabah Gas Industries Sdn Bhd - see Amsteel Mills Sdn Bhd - HBI Operation  
 Head office :  
 Postal address :  
 Telephone no :

Steel Works List -11/13 from Iron and Steel Works of the World--'96'

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- (22. Company) :Sabah Gas Industries Sdn Bhd - see Amsteel Mills  
Sdn Bhd - HBI Operation
- Established :  
Capital :  
No. of employees :  
Annual capacity :  
Works :  
Facilities :  
Products :  
Additional information:
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23. Company :Sibu Steel (S) Sdn Bhd  
Head office :11 Raminway, 2nd floor, Sibu Sarawak 96000.  
Postal address :PO Box 58, 96007 Sibu, Sarawak.  
Telephone no :084-333111; Fax no: 084-332801  
Established :1982.  
Capital :M\$2,495,000,000  
No. of employees :works -- 25, office -- 10  
Annual capacity :Mild steel and high tensile steel: 24,000 tonnes.  
Works :  
Facilities :one bar.  
Products :Carbon steel: round bars 12, 14, 16, 20, 25mm(1993  
output 23,000 tonnes).  
Additional information:
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24. Company :Southern Pipe Industry(Malaysia) Sdn Bhd  
Head office :4457 Jln Limbungan, Mk 15, Chain Ferry Road, 12100  
Butterworth, Province.  
Postal address :  
Telephone no :04-317393 ;Fax no: 04-319435  
Established :1967.  
Ownership :(Foreign capital Marubeni Corp. 30%)  
Capital :  
No. of employees :  
Annual capacity :  
Works :  
Facilities :Tube and pipe mills welded.  
Products :Carbon steel: longitudinal-weld tubes and pipes;  
Additional information:
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25. Company :Southern Steel Bhd  
Head office :Lot 388, Lorong Perusahaan 12, Prai Industrial Estate,  
13600 Prai, Pulau Pinang.  
Postal address :PO Box 138, 10710 Penang.

Steel Works List -12/13 from "Iron and Steel Works of the World--'96"

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25. Company :Southern Steel Bhd  
 Telephone no :04-306540 ;Fax no: 04-308060  
 Established :1963.  
 Capital :  
 No. of employees :  
 Subsidiaries :Southern Steel Trading Sdn Bhd;  
 Annual capacity :  
 Works :Lot 388, Lorong Perusahaan 12, Prai Industrial Estate,  
 13600 Prai, Pulau Pinang.  
 Facilities :Steelmaking plant: one 70 tonnes electric arc fur-  
 nace(300,000 tonnes);  
 Continuous casting machines: one 4-strand billet(  
 100 - 160mm sq).  
 Rolling mills: two bar/wire rod includeing 18/26-  
 stand bar/wire rod(single strand 16-40mm dia, slit  
 rolling 9 - 12mm dia)(COIL WEIGHT 1,300kg).  
 Products :Carbon steel: wire rod.  
 Additional information:

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26. Company :United Malaysian Steel Mills Bhd  
 Head office :PO Box 1025 46860 Petaling Jaya, Selangor.  
 Postal address :  
 Telephone no :  
 Established :  
 Capital :  
 No. of employees :  
 Annual capacity :  
 Works :  
 Facilities :Steelmaking plant: Electric arc;  
 Rolling mills bar.  
 Products :Carbon steel: reinforcing bars.  
 Additional information:

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27. Company :Yung Kong Galvanising Industries Bhd  
 Head office :169 Padungan Road, 93100 Kuching, Sarawak.  
 Postal address :  
 Telephone no :082-338819;Fax no: 082-338813  
 Established :1977.  
 Capital :M\$3,300,000.  
 No. of employees :works -- 60, office -- 8.  
 Annual capacity :Finished steel: 20,000 tonnes.  
 Works :  
 Facilities :Coil coating lines 3" and "4 Japanese hot-dip  
 galvanizing(annual capacity 20,000 tonnes).

Steel Works List -13/13 from "Iron and Steel Works of the World--'96"

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(27. Company)

:Yung Kong Galvanising Industries Bhd

Products

:Carbon steel: galvanized corrugated sheet;  
plain galvanized wire.

Additional information: Modernisation/expansion plans: Production of colour-coated galvanized sheets is at the planning stage.