

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)  
MINISTRY OF LOCAL GOVERNMENT AND PUBLIC UTILITIES  
THE REPUBLIC OF MAURITIUS

A STUDY  
ON  
LONG TERM  
NATIONAL ENERGY PLAN  
IN  
THE REPUBLIC OF MAURITIUS  
ENERGY DATABASE SYSTEM  
OPERATION MANUAL

JUNE 1997

JICA LIBRARY



J 1136437 (9)

UNICO INTERNATIONAL CORPORATION  
ELECTRIC POWER DEVELOPMENT CO., LTD.

TOKYO, JAPAN

MPN
JR
97-131







JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

**A STUDY  
ON  
LONG TERM  
NATIONAL ENERGY PLAN  
IN  
THE REPUBLIC OF MAURITIUS**

**ENERGY DATABASE SYSTEM  
OPERATION MANUAL**

JUNE 1997

UNICO INTERNATIONAL CORPORATION  
ELECTRIC POWER DEVELOPMENT CO., LTD.

TOKYO, JAPAN



1136437 [9]

---

**ACRONYMS in the Energy Database Operation Manual**

---

CPI	Consumer Price Index
CPU	Central Processing Unit
CSO	Central Statistics Office
DOS	Disc Operating Systems
GDE	Gross Domestic Expenditure
GDP	Gross Domestic Product
GUI	Graphic User Interface
IBM	International Business Machines Corporation
MB	Megabyte
MS	Micorsoft Corporation
PROA	Macro Program Code " A "
PROE	Macro Program Code " E "
REGE	Regression of Energy
REGM	Regression of Macro Economy
TOE	Ton Oil Equivalent
UPS	Un-hazardous Power Supply

---





# Table of Contents

## ACRONYMS in the Energy Database Operation Manual

Chapter 1. Introduction

Chapter 2. Systems Configuration of Hardware

2.1 Systems Configuration of Hardware----- 2-1

2.2 Physical and Logical Interface Connection  
of the Systems -----2-3

Chapter 3. Structure of Software

Chapter 4. Structure and Organization of Energy Database Files

4.1 Desktop File and Network Neighborhood File ----- 4- 2

4.2 Main\_Menu.XLS File ----- 4- 3

4.3 Energy\_Case\_01.XLS File ----- 4- 5

4.4 Energy\_Case\_02.XLS File ----- 4-17

4.5 Energy\_Case\_03.XLS File ----- 4-23

4.6 REGM\_Macro.XLS File ----- 4-26

4.7 REGE\_Macro.XLS File ----- 4-43

4.8 Conversion\_Factor.XLS File ----- 4-68

4.9 Abbreviation\_List.XLS File ----- 4-71

4.10 Base\_Case.XLS File ----- 4-74

4.11	Check_Outcome.XLS File -----	4-80
4.12	Case_Simulationsl.XLS File -----	4-98
4.13	Outcome_Simulations.XLS File -----	4-101
4.14	Balance_Table_1995.XLS File -----	4-121
4.15	Balance_Table_2000.XLS File -----	4-124
4.16	Balance_Table_2010.XLS File -----	4-131
4.17	Balance_Table_2025.XLS File -----	4-134
4.18	Energy_Demand_Forecast.XLS File -----	4-142
4.19	Graph1.XLS File-----	4-145
4.20	Structure of File Linkage -----	4-162

## Chapter 5 Booting and Shut-down of the Systems

5.1	Booting and Shut-down of Hardware -----	5-1
5.2	Starting and Close-down of Software -----	5-2

## Chapte 6 Revision and Up-date of Files

6.1	Revision of Files -----	6-1
6.2	Up-date of Files -----	6-4

Appendix 1.	Abbreviations in the Database
Appendix 2.	Contents of the Database
Appendix 3.	Energy Database and Help Sheet

## **Chapter 1. Introduction**



# 1. Introduction

This manual has been developed in the Ministry of Local Government and Public Utilities of the Republic of Mauritius. It was created for the supervisor involved in operating the established energy database system, the data analysis supervisor, and system development supervisor. These supervisors are defined as follows.

**Operation Supervisor :** This refers to the person whose main duties are the long-term management, operation, and maintenance of the hardware which makes up the entire system, including personal computers, printers, and unhazardous power supplies of which installed in the Ministry, as well as the software installed on this system. It is assumed that this supervisor can operate all hardware making up the system from booting to shut-down, and that they are familiar with operating all installed application software ( particularly Windows-95 and MS-Excel ).

**Data Analysis Supervisor :** This refers to the person who is expected to extract specific types of results from combining data on the system using macro-economic data stored on the system and databases related to energy demand forecasting and applying data analysis tools to current data, forecast data, and data from regression analysis. Although this person is not required to possess knowledge of hardware throughout the system, it is desirable that he or she has at least preliminary knowledge of how to operate the software and has 3 months experience operating the system. The data analysis supervisor should receive intensive 2-week training unless the candidates of the supervisor has no experience, on the operation of the Windows-95 software environment and use of Microsoft Excel.

**Systems Development Supervisor :** This personnel bears responsibility for adding new features and planning system expansion after initial development of the system is complete and the system begins operation. Note however that the personnel does not necessarily have to be an employee of the Ministry, but may work for an external system development company or be a systems engineer or a

maintenance personnel of computer sales representative. It is therefore most desirable that the system development supervisor be a system engineer from the retail computer store from which all hardware and software components of the system are purchased.

The above supervisors do not need to be the same person. It is however recommended that the data analysis supervisor be the operation supervisor or system development supervisor in order to ensure proper system operation especially from the standpoint of protecting the system and databases stored on it rather than using someone who is not experienced in using Windows-95 or MS-Excel.

This Energy Database System Operation Manual describes how to operate the databases stored on this system. It is not intended to describe the operation of computer software installed on the system such as MS-Windows or MS-Excel. Operation manuals for such software have already been received by the Ministry from the retail outlet supplying the personal computers and their peripheral equipment at the time the system was purchased. Since it is also possible to purchase more detailed operation manuals regarding these software products at general bookstores in Port Louise, it is recommended that the purchase of one of these books in any case where the person responsible for operating the above software feels that the supplied operation manual is insufficient.

It is also possible to learn how to operate such software using on-line help displayed on the computer screen during software operation. Regardless of the learning method, the operation manuals for these software products are organized to be able to sufficiently resolve any problems which may be encountered during their basic or applied operation of the total system.

This manual is therefore created for personnel operating this database who have at least 3 months experience operating MS-Windows and MS-Excel.

## **Chapter 2. Systems Configuration of Hardware**





## 2. Systems Configuration of Hardware

### 2.1 Systems Configuration

Systems for energy database are configured from the following hardware of which configurations is described in Table 2-1 and their physical connections are shown in Figure 2-1.

#### Unit 1

- CPU : Central Processing Unit (1 Unit)

Manufacturer : Acer

Model : AcerMate 800

Processing Speed : 100 MHZ

- Monitor (1 Unit)

Manufacturer : Acer

Model : AcerView 33D SVGA (Color)

- Printer (1 Unit)

Manufacturer : IBM

Model : LexMark Optra R

- UPS ; Un-hazardous Power Supply (1 Unit)

Manufacturer : ARES

Model : Ares

- Other peripheral equipment

Keyboard (1 Unit)  
Mouse (1 Unit)  
Connection cable (1 full set)

## Unit 2

- CPU : Central Processing Unit (1 Unit)

Manufacturer : Acer  
Model : AcerMate 920  
Processing Speed : 120 MHZ

- Monitor (1 Unit)

Manufacturer : Acer  
Model : AcerView 33D SVGA (Color)

- Printer (1 Unit)

Manufacturer : IBM  
Model : LexMark Optra R

- UPS : Un-hazardous Power Supply (1 Unit)

Manufacturer : ARES  
Model : Ares

- Other peripheral equipment

Keyboard (1 Unit)  
Mouse (1 Unit)  
Connection cable (1 full set)

Of these hardware systems, Unit 1 shall be the master system designated as a actual operating machine in occasion of database operation within the Ministry and for a development platform during development of the energy database system and expansion for the future. Basically, Units 1 and 2 will have identical hardware configurations and software file systems. However, it is recommended that Unit 1 be used as the master system even after development of the database system is complete.

From the perspective of protecting the overall system, installed software, and the database system developed, this recommendation is designed to ensure that the entire system may be restored quickly in case of loss of data due to an operational error by starting up the master system.

## **2.2 Physical and Logical Interface Connection of the Systems**

The physical connections of this system are as already shown in Figure 2-1, given in the last section.

Table 2-2 shows the types of software installed on the hard disk of each unit, and Figure 2-2 describes the list of software installed and the user area of each file, and the sizes of associated files. Also the selection criteria of these software are roughly indicated in the Table 2-2. As described in Table 2-2, following pre-conditions are set prior to the selection of the software installed in the systems;

It should be a general purpose use of application software, however it is too much complicated in structure and formation if used proprietary developed software in the Ministry. Proprietary software is usually much complicated to run for beginners of the computer, and for maintenance it will be overloaded to even routine operators and for on-going maintenance.

It should be established when configuring and building-up databases in easy to transfer formation. Since spread-sheet application software packages, which are most widely used among the personal computer users in the world, are relatively easy to build-up databases, and can be transferred in easy way to those who inherit the total system.

It should be managed, supported and maintained without any extra effort from routine maintenance work. Normally, software packages loaded in the personal computers are well supported by the software dealers by on-call support and management systems.

The names of each software installed on hardware and the file configuration associated with each are given below.

#### (1) Basic Software ( Operating Systems )

The world's de facto standard in operating systems, the emulation of Microsoft DOS Version 6.0 provided under Microsoft's Windows-95 will be used.

#### (2) Application Software

The systems are equipped with MS-Excel, MS-Word, and MS-Access, the most popularly used applications software for personal computers for word processing and spread sheets in the world. MS-Excel is used to configure and operate the energy database itself, while MS-Word is used to create documents related to system operation. Furthermore, Visual Basic is additionally installed as the application development language in case of future system expansion into the current system.

It is estimated that the amount of hard disk taken up by basic software and application software will be about 300 MB in each system, Unit 1 and Unit 2.

#### (3) Database Area

The database area will take up about 300 MB in the hard disk of each Unit 1 and Unit 2. As the main component of the energy database system, it stores nearly all essential data. The master table file consists of 16 individual files. ( The detailed configuration of each file is described in Chapter 4. )

An operation manual ( this document ) describing the operation of the energy database system will be stored in the documentation file in MS-Word. Here files related to database operation and management shared with the database system can be opened. A

special backup file area is set aside for storing backups of all files in the master table file in each system in each system, Unit 1 and Unit 2 computer.

A manager's security file already set up to provide security functions which prohibit unauthorized system access to anyone other than users involved in operation of the system so as to protect basic software, application software, and database files contained on the each system. This provision allows for greater protection of the system.

#### (4) User Interface Area

This area contains functions for accessing files on the existing system and the operator's security file. The former can be used to access and utilize applications such as Excel and Word on one or both of the personal computers for work other than related to the energy database system. The latter is an access file provided at the Windows and application level for overall system security.

It is expected that files installed and stored on the entire system (both Units 1 and 2) will total close to 600 MB.

An Ethernet cables are used to maintain a physical tandem connection between the two systems, while a local peer-to-peer logical connection method are used when transferring all files created in both Unit. However, since Unit 1 is set as a development and accessing machine, it is highly recommended to transfer all accessing files from Unit 1 to Unit 2 via physically connected Ethernet cables.

Figure 2-3 shows the logical connection between Unit 1 and Unit 2.

**Table 2-1 List of Computer Hardware Systems**

Unit 1	
A. Personal Computer	Central Processing Unit: AcerMate 800 Display monitor: AcerView 33D SVGA
B. Printer:	LexMark Optra R
C. Un-hazardous Power Supply(UPS):	Ares
Unit 2	
A. Personal Computer	Central Processing Unit: AcerMate 920 Display monitor: AcerView 33D SVGA
B. Printer:	LexMark Optra R
C. Un-hazardous Power Supply(UPS):	Ares

Figure 2-1 Structure of Hardware Systems

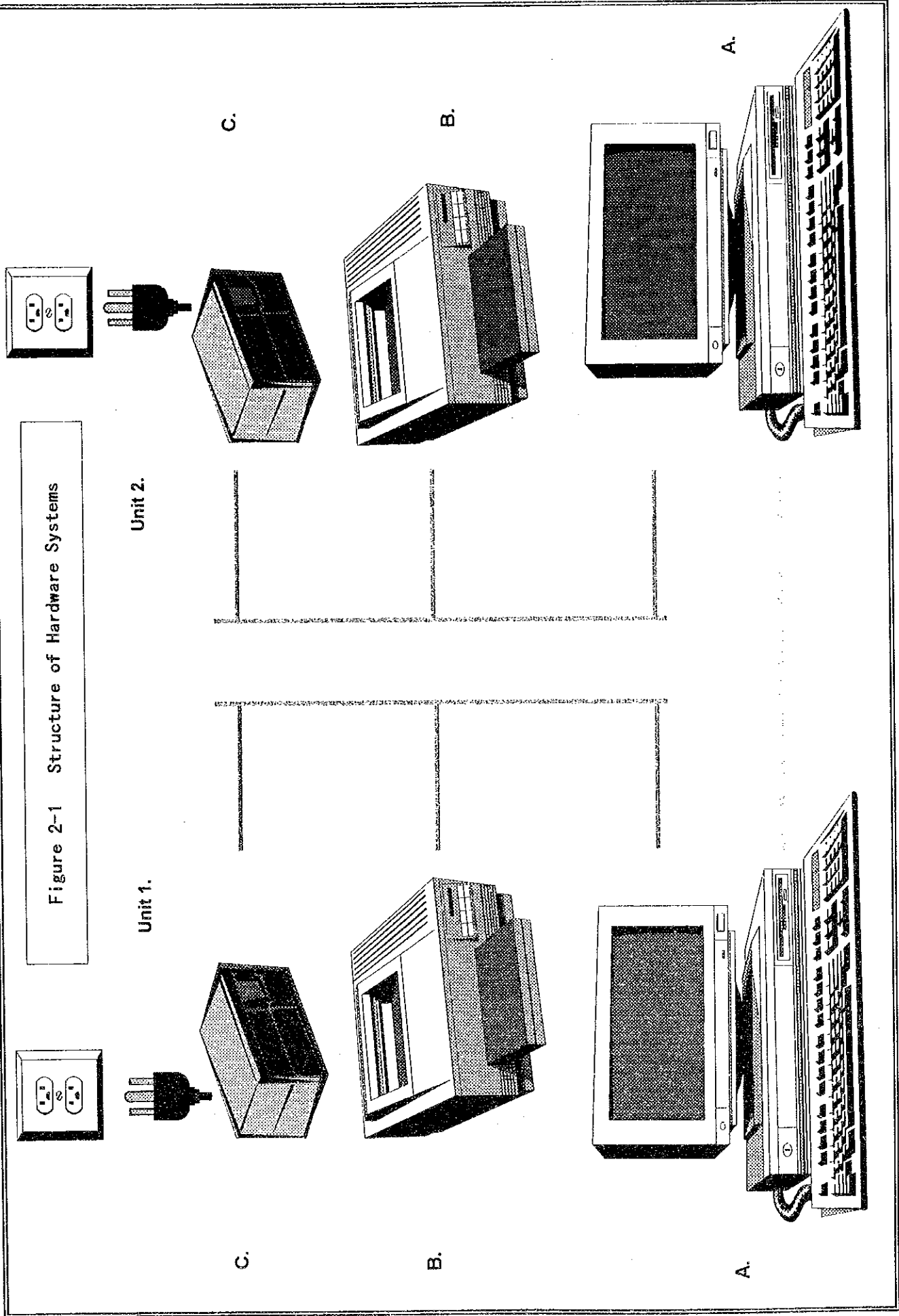
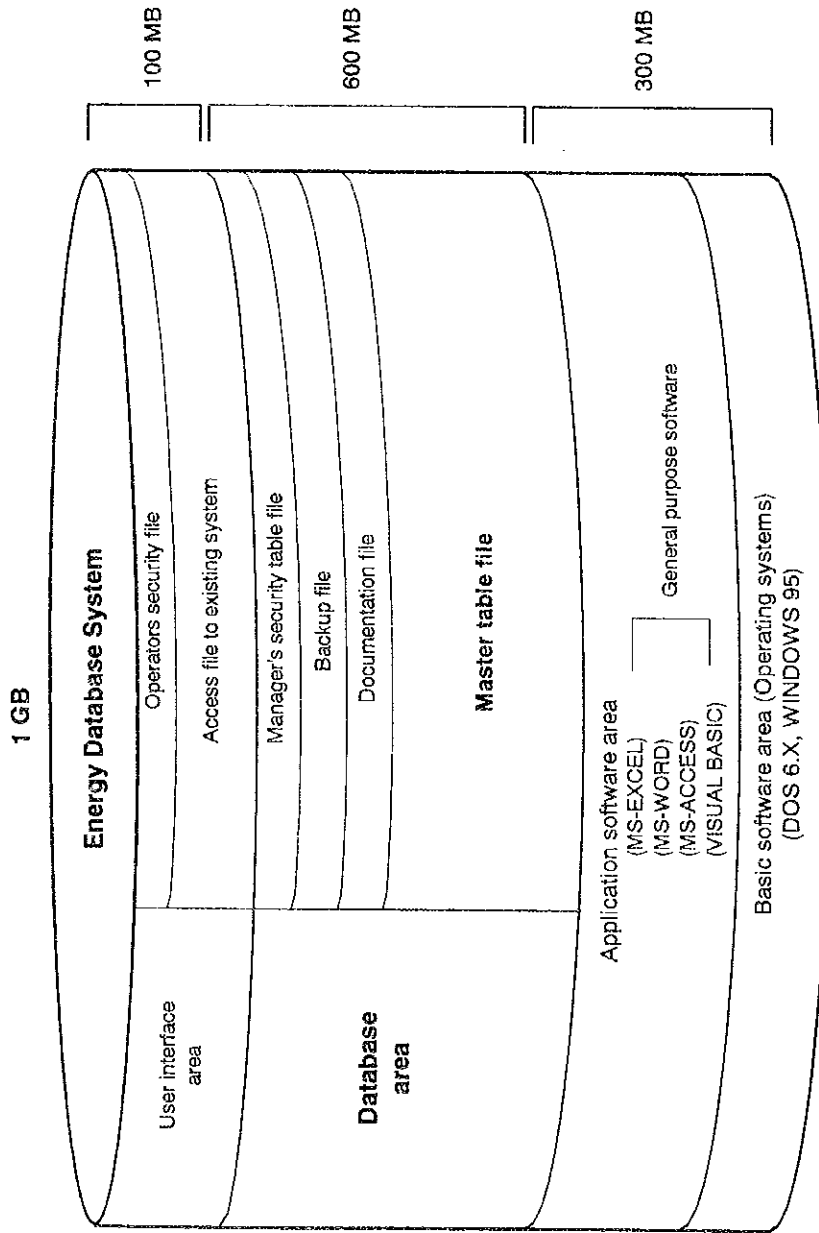


Figure 2-2 List of Installed Software and Size of Files





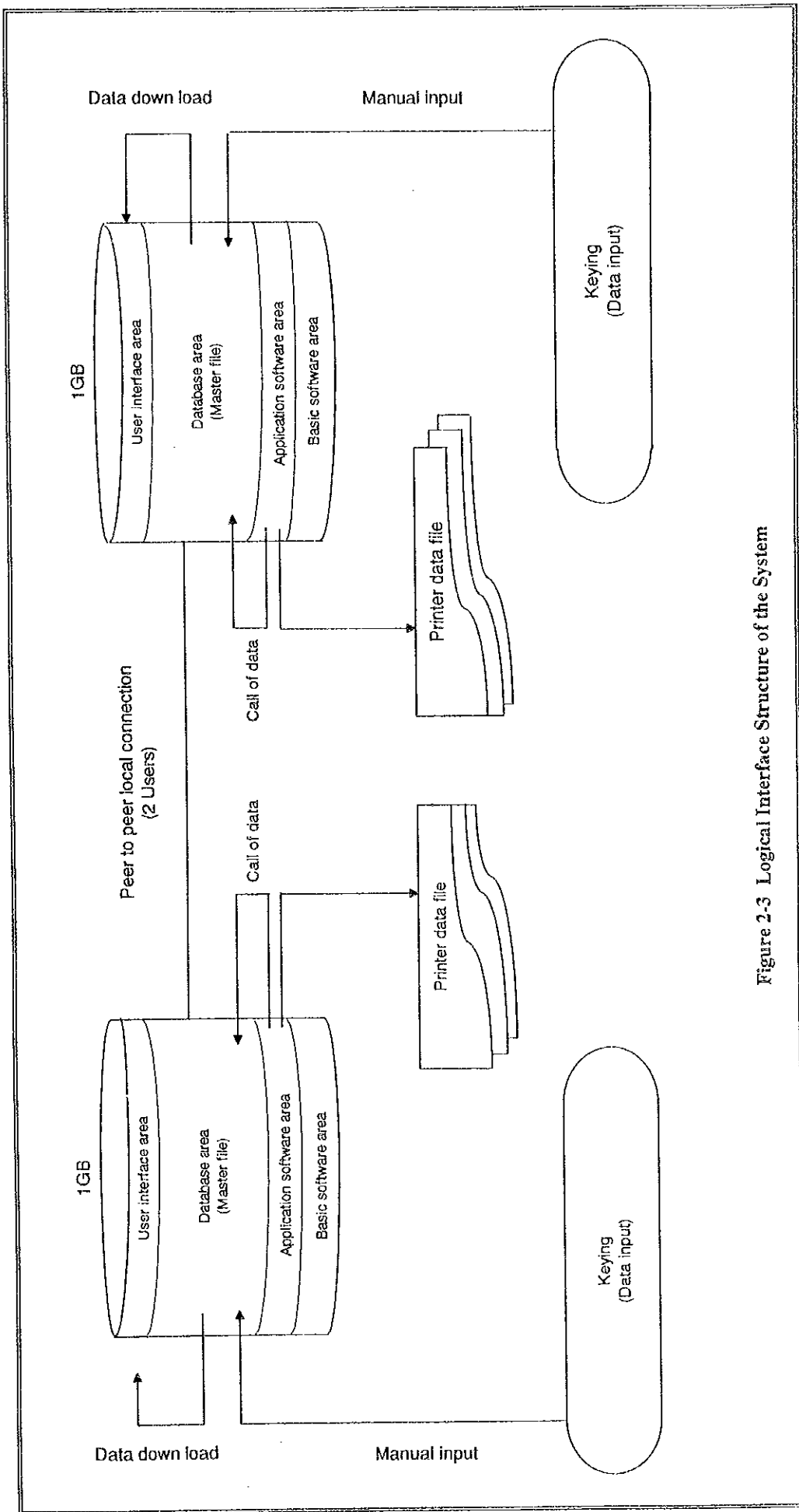


Figure 2-3 Logical Interface Structure of the System



## **Chapter 3. Structure of Software**



### 3. Structure of Software

Following applications software are installed in two computer hardware units ( Unit 1 and Unit 2 ) and are operable simultaneously. Among these software packages, all databases including macro-economy, energy and basic data which used for data analysis are stored in MS-Excel.

- Operating System ( basic software)

Microsoft Windows 95

- Application Software

Microsoft Office Professional --- Integrated business software package including;

- MS-EXCEL 95 for spread sheet

- MS-WORD 95 for word processing

- MS-ACCESS 95 for relational database systems

- MS-Visual Basic Professional Version 4.0 for program development

Statistical Software : Custom-made of software by adding calculation function such as Darbin-Watson to regression analysis of Excel, and works as add-in software to Excel.

Of the software applications listed above, Excel is used for storing the master file of the energy data base system. MS-Word is installed for use as documentation software. MS-Word can be used whenever the need for documenting something arises during the

operation of the energy database, e.g., if it becomes necessary to create a document regarding results of data analysis. In addition, since this operation manual is accessible by Word, it can be used while working with the database during actual operation.

Although MS-Access, relational database software, is stored on the system, it is not actually in use in current systems environment. However, it may be used in the future if the Ministry plans on expanding the energy database or if the need ever arises to utilize some data out of the energy database in conjunction with a database from another field.

Visual Basic is also installed on the system for use as a software development language. Visual Basic is already currently used to link some files within the energy database system as a tool of linkage system of all files stored in the system. However, similarly to the provision of Access, this piece of software is provided primarily to aid in the integration of applications and files which may arise in the future when expanding the system.

This operation manual does not include any descriptions of how to use Access or Visual Basic. As explained, both applications are provided for possible system expansion by the Ministry in the future. We therefore recommend that if these pieces of software are used that the user refer to the operation manuals supplied in the related software package or request the aid of a system developer.

Table 3-1 gives a list of installed software.

**Table 3-1 Layer Structure of Energy Database**

<b>Basic software</b>	<b>MS-windows 95</b>
<b>Application software</b>	<b>MS-OFFICE PROFESSIONAL</b>
	Integrated software packages including,
	<b>MS-EXCEL:</b>
	Spread sheet
	<b>MS-WORD:</b>
	Word processing
	<b>MS-ACCESS:</b>
	Relational database management
	<b>MS-VISUAL BASIC PROFESSIONAL:</b>
	Program development for enhancement
	<b>Statistical software:</b>
	Custom-made application program
<b>Selection criteria of software</b>	
	1. General purpose use
	2. Easy to operation
	3. Powerful functions of software
	4. Easy-to-transfer
	5. No extra effort on ordinary software operation

## **Chapter 4. Structure and Organization of Energy Database Files**



## 4. Structure and Organization of Energy Database Files

Table 4-1 lists the organization of the files making up the energy database.

Each of these files can be classified as follows in terms of its structure and function.

**Independent files** -- This file type has an independent format and cannot be linked with other files in terms of transferring text, numeric values, or formulas.

**Linked files** -- This file type can be linked to other files thus allowing the transfer of text, numeric values, and formulas.

**Special function files** -- This file type is used to utilize, operate, and manage all other files in the energy database.

The energy database is made up of a total of 17 files. Of these files the most important is the master file, **Energy\_Case\_01.XLS**, which represents the nucleus of the energy database. In addition to independently configuring the energy database, this file has file transfer capabilities including those for transferring text, data, and formulas to other files. For example, if any change or addition is made to data in **Energy\_Case\_01.XLS**, that change or addition will automatically be made to the other 16 files in the database by means of an automatic transfer function.

The rest of the files making up the energy database are sub-files derived from the **Energy\_Case\_01.XLS** master file, or program files used to link other files. Examples of sub-files derived from **Energy\_Case\_01.XLS** include **REGM\_MACRO.XLS** and **REGE\_MACRO.XLS** which are generated by transferring either part or all of the data in **Energy\_Case\_01.XLS**. These sub-files can be linked. In the case of files of this type, any time data within **Energy\_Case\_01.XLS** is changed, a program command will be written to cells within these sub-files in order to automatically update the data within them.

In addition to the above files, there is one special function file which contains programs for linking other files, namely **Main\_Menu.XLS**. It is used to call up any of the 17 files in the system, including itself. Selection of files is made through the use of a menu. Note that the file **Main\_Menu.XLS** is a special function file which possesses no ability to function beyond the scope of the energy database. Of the 17 files in the database **Main\_Menu.XLS** is the only one which includes link programs for calling up other files.

Finally, there are two completely independent files among the 17 files in the database which cannot be linked. These are **Abbreviations\_List.XLS** and **Energy\_Demand\_Forecast.XLS**. The file **Abbreviations\_List.XLS** lists about 380 abbreviations included in the energy database as character variables. The file **Energy\_Demand\_Forecast.XLS** contains the numeric data (rounded up) used in the energy database to represent future demand forecast which is included in **Energy\_Case\_01.XLS**. These files have been configured as independent files because not only would it be difficult to link either of them to **Energy\_Case\_01.XLS** and other files, but if they were linked even temporarily maintenance of them would be complicated.

The sections below describe the structure of file data and contents contained in these files and include file screens giving users clear views for each. These file screens shown in the following pages where explanations are made.

## 4.1 Desktop File and Network Neighborhood File

### (1) Desktop File

The Windows-95 root directory not only includes the energy database, but also all of the other program files installed under Windows-95. Windows-95 has been set so that all system files which functions as a system management, application program files which include business application programs such as MS-Office Professionals and user files

including Energy Database systems and Operation Manual are created in the Desktop directory immediately under the root directory. Since this is set as a default value, do not change this setting unless you have a particular reason for doing so.

## **(2) Network Neighborhood File**

When multiple computers are connected, it is necessary to first store files to be transferred between them in this directory. Since this is also set by default under the Windows-95 environment, do not change this setting unless the operators have a particular reason for doing so. Since this energy database operates with two networked computers running, all 17 files of the energy database are stored in this directory immediately under the root directory.

## **4.2 Main\_Menu.XLS File**

The **Main\_Menu.XLS** file is a special function file created for smoothly using, operating, and managing the energy database. This is a program file which allows the 17 files included in the database to be selected from a menu using the mouse ( Menu-Driven operation method ). As shown in Figure 4-1, this file consists of the following two sheets.

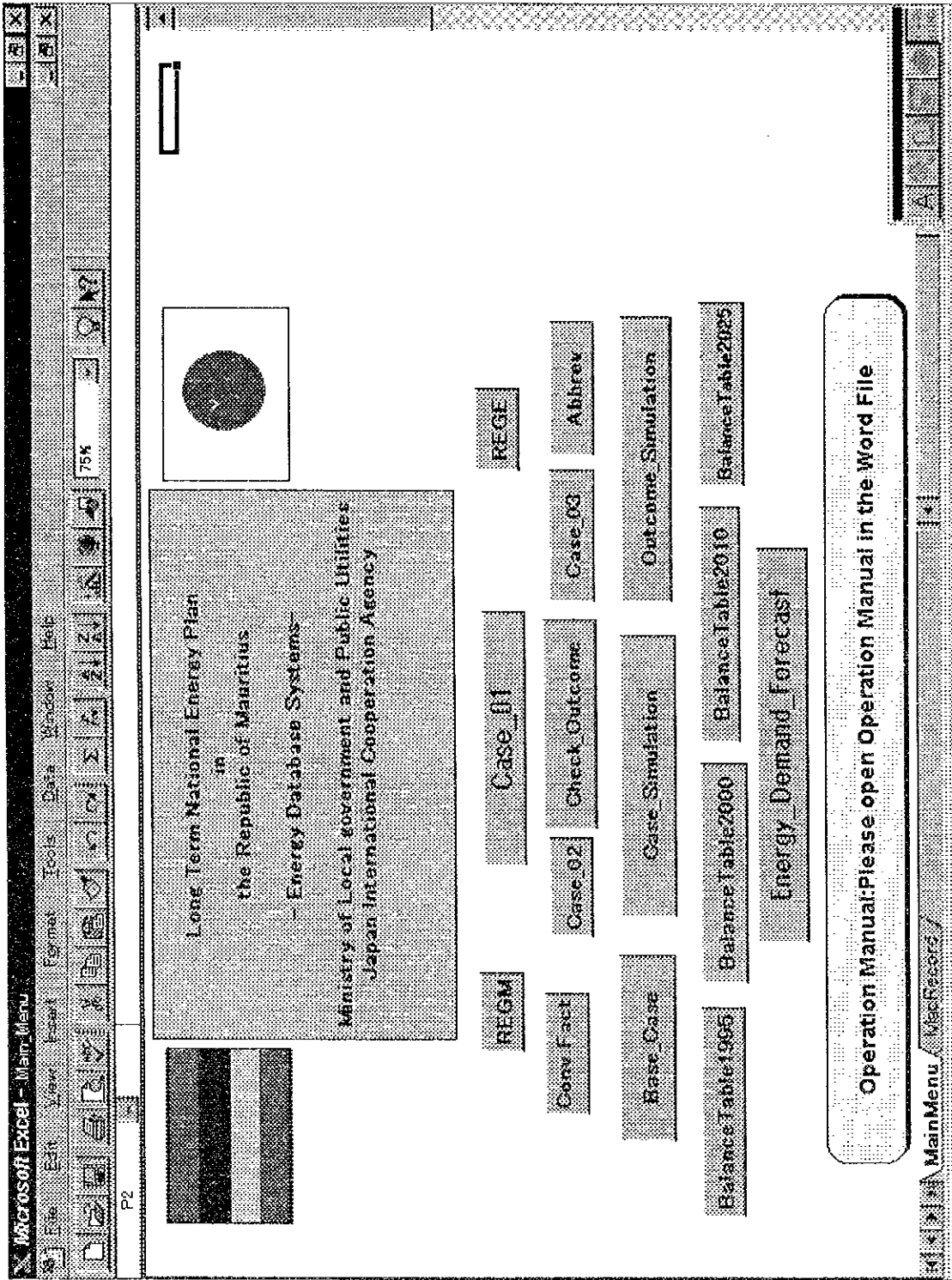
### **(1) MainMenu**

#### **( Refer to Screen 001)**

The first sheet is **MainMenu**. This is the main screen for the program file. From this screen the operator is able to call up any of the 17 files stored in the energy database, including this file itself. This is done by pointing the mouse cursor at the command button for the file the operators wish to call up and clicking the left mouse button.

Note, however, that of the files displayed on this screen, the file " **Operation Manual** "

Screen 001



MainMenu

cannot be called up. This is due to the fact that while the other files are configured for use

by Excel, " **Operation Manual** " alone has been created using a combination of Excel and Word and the size of this file is over 100 megabytes because it includes graphics output file to represent screen samples it includes.

(2) MacRecord

( Refer to Screen 002 )

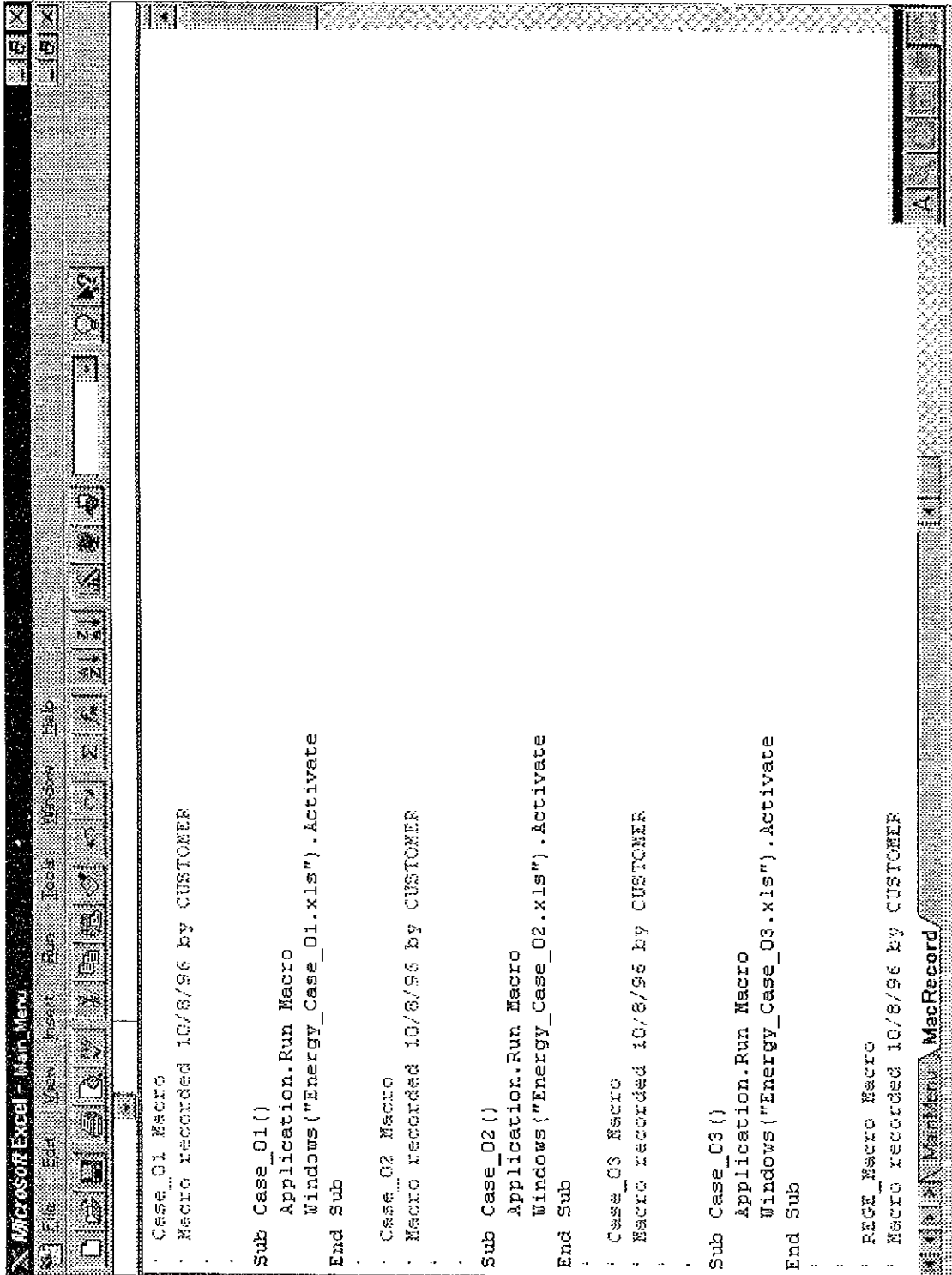
The second sheet in this file is **MacRecord**. This screen gives the code for the macro program used to call up the files displayed on the **MainMenu** sheet. This macro program must be rewritten if the user wishes to create a macro program which can call up other screens. Do not change this sheet in any way if the operator wish to maintain this program in its present form.

### 4.3 Energy\_Case\_01.XLS File

**Energy\_Case\_01.XLS** is an independent file. Although other files are able to link with this file, this file can be linked from other files.

As previously described, **Energy\_Case\_01.XLS** is the master file of the energy database system. Although it includes a total of nine sheets, the main sheet is the first one -- **the EnergyModel** sheet. The others are five supplementary data sheets for creating the EnergyModel sheet and a supplementary sheet for calling up the **Main\_Menu.XLS** file. Figure 4-2 shows the structure of these nine sheets. Summaries of the data contained in each sheet are given below.

Screen 002



(1) EnergyModel

( Refer to Screen 003 )

This is a database sheet used to keep energy data including historical macro-economic data, energy demand and supply data, and forecast data derived from these data. Values are based on actual values from 1985 through 1995 together with macro-economic data and historical energy demand data which forecast data through the year 2025 is included.

A description of data contained in each cell of this file will be given below in order of row and column. Column A is the item number in ascending order for all data items. Although each data item appears to merely be given a number from 1 through 381, the cell actually contains an expression that adds 1 to the previous cell. (For example, the expression for cell A5 is A4+1.) This is done to facilitate numbering of cells by using a preset expression that eliminates the need to renumber each cell from the beginning whenever a data item is added to an existing database in the future.

The E ( External ) and I ( Internal ) indicator used in column B has been established to identify which variables used in making energy demand forecasts are external and which are internal. For example, in the case of data item D3, " Population ", is classified as an external variable, while data item D4, " Independent Household ", is classified as an internal variable.

Column C is a contents of data item. In general, data items can be classified into two types: the first is numeric data representing macro-economic data, while the second is numeric data related to energy demand. Note that the contents of data item used in whole energy database are listed in the last portion of this manual as an Appendix for accessing data items.

Column D represents the unit used in Column C. For example, the unit for " Population " in cell D3 is 1000's of people, while the unit for " **Independent Household** " in D4 is

Microsoft Excel - Energy_Case_01		1985	
A	B	C	D
1			
2	Social statistics		
3	E Population ( Middle of Years)		1000 Persons POP
4	I Independent Households		1000 families HOH
5			
6	Labor Forces		
7	E Agriculture, Hunting, Forestry, Mining, and Quarrying	Person	LABPRI
8	E Manufacturing	Person	LABMAN
9	E Sugar	Person	LABSUG
10	E EPZ	Person	LABEPZ
11	E Domestic Manufacturing	Person	LABDOM
12	E Electricity, Gas, and Water	Person	LABLEL
13	E Construction	Person	LABCON
14	E Wholesale, Retail, Restaurants, and Hotels	Person	LABCOM
15	E Transportation, Storage, and Communication	Person	LABTRA
16	E Banking, Insurance, Real Estate, Business service	Person	LABBAN
17	E Other service	Person	LABSER
18	I Total Labor Force	Person	LABTOT
19	I Labor Force in Population	%	LABSHA
20			
21	GDP at current Price		
22	I Agriculture, Hunting, Forestry, Mining, and Quarrying	Rs Million	NVAPRI



1000's of homes.

Column E represents character variables used in the database. This is represented by at least 3 but no more than 6 characters. There are approximately a total of 400 character variables provided. A file ( file name: **Abbreviations\_List.XLS** ) containing text describing the meaning of each of these character variables has been specially set up within the energy database.

List of all abbreviations are also provided in separate form listed in the last portion of of this operation manual as an Appendix, and can be retrieved as an on-line access method . If the operator wish to find the meaning of one of these character variables during database operations, such as when opening another file, the operator is able to easily access this file by returning to the main menu screen (file name: **Main\_Menu.XLS**) and clicking on **Abbreviations\_List.XLS**.

The following contains the data contained in each row.

- 1) Column F through P: Actual data containing macro-economic and energy demand and supply data from 1985 through 1995 for each data item. These are mostly obtained from CSO and tabulated by the Study Team members with cooperation of the Ministry.
- 2) Column Q: The average growth rate for each data item from 1985 through 1995 are shown.
- 3) Column R: Preliminary forecast values for the average growth rate for each data item for 1995 through 2000 starting from column S is shown in this column. This preliminary value can be set freely by the user whatever the growth rate he wishes to input for modeling purposes.
- 4) Column S through X: Forecast values for each data item from 1995 through 2000.
- 5) Column Y: The average growth rate for each data item from 1995 through 2000.

- 6) Column Z: Preliminary forecast values for the average growth rate for each data item for 2001 through 2010 starting from columns AA continuing through AK are shown in these column. This preliminary value can be set freely by the user whatever the growth rate he wishes to input for modeling purposes.
- 7) Column AL: The average growth rate for each data item from 2001 through 2005.
- 8) Column AM: Preliminary forecast values for the average growth rate for each data item for 2010 through 2025 starting from columns AN continuing through BC. This preliminary value can be set freely by the user whatever growth rate he wishes to input for modeling purposes.
- 9) Column AN through BC: Forecast values for each data item from 2010 through 2025.
- 10) Column BD: The average growth rate for each data item from 2010 through 2025.
- 11) Column BE: The average growth rate for each data item from 1985 through 1995 are shown as a summary.
- 12) Column BE: The average growth rate for each data item from 1995 through 2000 are shown as a summary.
- 13) Column BG: The average growth rate for each data item from 2000 through 2010 are shown as a summary.
- 14) Column BH: The average growth rate for each data item from 2010 through 2025 are shown as a summary.
- 15) Column BI: The average growth rate for each data item from 1995 through 2025 are shown as a summary.
- 16) From row 1 through 122 : Data items concerning major macro-economic activities which are considered to give a great impact energy demand and supply forecast are

shown.

- 17) From row 127 through 139 represent conversion factors, that all energy sources can be transferred to TOE based data.
- 18) From row 141 to 358 represent all energy demand and supply data.
- 19) Row 360 to 381 : Both CO<sub>2</sub> coefficients and CO<sub>2</sub> generated data which are originated from various energy sources are shown.

Print-outs of this sheet containing all database items and data comprising in numeric forms, which is consisting from approximately 30 pages, is attached as an appendix in separate form from this operation manual.

## (2) Helpsheet

( Refer to Screen 004 )

Into this sheet are inserted those forecast data items which are included in the **EnergyModel** sheet that are not actual data. In other words, it includes demand forecast calculation formulas and the foundations for these formulas found in all those cells other than for 1985 through 1995. Note, however, that although actual calculation formulas are displayed for the forecast data item in cells on the **EnergyModel** sheet, both the character variables and mathematical formulas are displayed for the **Helpsheet**.

Print-outs of this sheet containing all database items and data comprising in numeric forms, which is consisting from approximately 20 pages, is attached as an appendix in separate form from this operation manual.

## (3) Subsector, Energyprices, GDP, Home.App.

( Refer to Screen 005, Screen 006, Screen 007, and Screen 008 )

Screen 004

Microsoft Excel - Energy Case 01			
File Edit View Insert Format Tools Data Window Help			
Population(POP)/Average family members(6.0)			
A	B	C	D
		Categories	Values
1		Social statistics	
2		Population (Middle of Years)	POP Actual
3		Independent Households	HOH Population(POP)/Average family
4			
5		Labor Forces	
6			
7		Agriculture, Hunting, Forestry, Mining, and Quarrying	LABPRI Actual
8		Manufacturing	LABSUG + LABEPZ + LABDON
9		Sugar	LABSUG Actual
10		EPZ	LABEPZ Actual
11		Domestic Manufacturing	LABDOM Actual
12		Electricity, Gas, and Water	LABELE Actual
13		Construction	LABCON Actual
14		Wholesale Retail Restaurants and Hotels	LABCOM Actual
15		Transport, Storage, and Communication	LABTRA Actual
16		Banking, Insurance, Real Estate, Business service	LABBAN Actual
17		Other service	LABSER Actual
18		Total Labor Force	LABTOT Total of the above items
19		Labor Force in Population	LABSHA Total Labour Force divided by F
20			
21		GDP at current Price	
22		Agriculture, Hunting, Forestry, Mining, and Quarrying	NVAPRI Actuals
23		Manufacturing	NVAMAN NVASUG + NVAEPZ + NVADO
24		Sugar	NVASUG Actuals

HelpSheet



Screen 006

Microsoft Excel - Energy Case 01												
File Edit View Insert Format Tools Data Window Help												
[Icons] [Icons] [Icons] [Icons] [Icons] [Icons] [Icons] [Icons] [Icons] [Icons] [Icons] [Icons]												
AI												
	A	B	C	D	E	F	G	H	I	J		
1												
2	Gasoline Prices	1985	1986	1987	1988	1989	1990	1991	1992			
3	CIF price	3.50	1.61	1.91	1.71	2.29	3.05	2.91	2.59			
4	Import Taxes											
5	STC Margin											
6	Marketing Expenses											
7	Profit											
8	Miscellan											
9	Wholesale Price	7.87	7.43	7.43	7.43	7.43	7.43	9.12	9.12			
10	Retail Margin											
11	Retail Price	8.11	7.66	7.66	7.66	7.66	7.66	9.39	9.39			
12												
13	Gasoline Prices	1995	1996	1997	1998	1999	2000	2001	2002			
14	CIF price	3.82	1.46	1.68	1.67	2.25	2.77	3.08	2.64			
15	Import Taxes											
16	STC Margin											
17	Marketing Expenses											
18	Profit											
19	Miscellan											
20	Wholesale Price	4.64	4.31	4.31	4.31	4.31	4.31	5.18	5.18			
21	Retail Margin											
22	Retail Price	4.85	4.51	4.51	4.51	4.51	4.51	5.41	5.41			
23												
24	Gasoline Prices	1995	1996	1997	1998	1999	2000	2001	2002			
25	CIF price	3.47	1.80	1.80	1.77	2.39	3.49					
26	Energy Prices / Subsector	EnergyPrices / Home Ap										

EnergyPrices

Microsoft Excel - Energy Case 01					
File Edit View Format Tools Data Window Help					
120%					
A	B	C	D	E	F
1					
2	<b>Electrical Home Appliances</b>				
3		1985	1986		1987
4	TV Licensed (140w, 6h)	126,955	129,419		131,978
5	Light (8set/family, 40w, 3.5h)	1,320,000	1,320,000		1,333,333
6	Washing Machines (1set/family, 150w, 0.5h)	44,550	52,800		61,667
7	Refrigerators & Freezers (120w, 8h)	44,550	52,800		61,667
8	Water heaters(1set/family, 4000w, 1h)	44,550	52,800		61,667
9	Kettle(1set/family, 2000w, 0.5h)	44,550	52,800		61,667
10	Iron(1set/family, 2000w, 0.5h)	44,550	52,800		61,667
11	Rice cooker(1set/family, 1000w, 0.5h)	44,550	52,800		61,667
12	Electricity Consumption (PHY)	91,560	100,939		111,279
13	Prevailing Rate of TV (%)	77	78		79
14	Prevailing Rate of Refrigerators (%)	27	32		37
15					
16					
17					
18					
19					
20					
21					
Home App. / GDP / Mch / X					

	A	B	C
1	GDP at current Price		1985
2			2143
3	Agriculture, Hunting, Forestry, Mining, and Quarrying	Rs Million	2864
4	Manufacturing	Rs Million	438
5	Sugar	Rs Million	1333
6	EPZ	Rs Million	1093
7	Domestic Manufacturing	Rs Million	397
8	Electricity, Gas, and Water	Rs Million	775
9	Construction	Rs Million	1834
10	Wholesale, Retail, Restaurants, and Hotels	Rs Million	1510
11	Transportation, Storage, and Communication	Rs Million	4357
12	Services(Finance, Insurance, Real Estate, Business, Government, and Others)	Rs Million	2738
13	Net Indirect Taxes	Rs Million	16618
14	GDP at Current Price		
15			
16	GDP Deflator	1990=100	68
17			
18	GDP at Constant Price (1990)		
19			1985
20	Agriculture, Hunting, Forestry, Mining, and Quarrying	Rs Million	3927
21	Manufacturing	Rs Million	4630
22	Sugar	Rs Million	754
23	EPZ	Rs Million	1902
24	Domestic Manufacturing	Rs Million	1974
25	Electricity, Gas, and Water	Rs Million	

GDP



Each of these files is a supplemental sheet for calculations used when creating the **EnergyModel** sheet for the **Energy\_Case\_01.XLS** file described previously. Calculation results on these sheets are already reflected on the **Energy\_Case\_01.XLS** file. Data values included on these sheets are not directly used by the energy database. They are, however, saved as sheets so that they may be used by the Ministry as data independent from the energy database.

(4) MacRecord

( Refer to Screen 009 )

The **MacRecord** sheet is a screen containing the macro program code for calling up all files. In other words, in order to call up another file from the **Energy\_Case\_01.XLS** file currently open, you first return to **Main\_Menu.XLS** and then select any one of the files from the menu screen. This macro program must be rewritten if the user wishes to create a macro program which can call up other screens. Do not change this sheet in any way if the operator wish to maintain this program in its present form.

#### 4.4 Energy\_Case\_02.XLS File

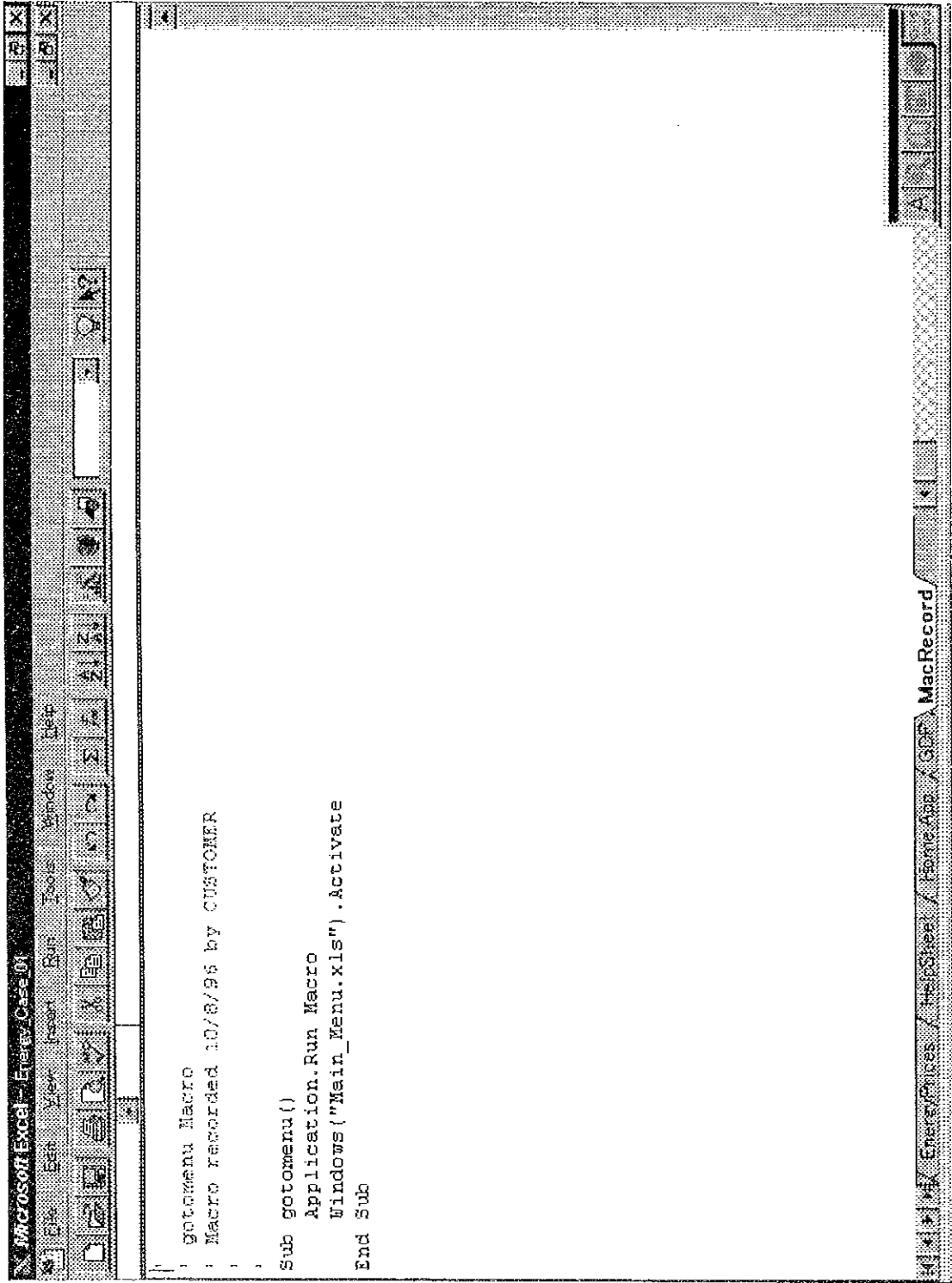
This file is basically a link file consisting of the same file format and structure as **Energy\_Case\_01.XLS**. However, it does not include individual sheets such as **Subsector**, **Energyprices**, **GDP**, and **Home.App.** as does **Energy\_Case\_01.XLS**.

Figure 4-3 shows the structure of these sheets. Summaries of the data contained in each sheet are given below.

(1) EnergyModel

( Refer to Screen 010 )

Screen 009



Screen 010

Microsoft Excel - Energy_Case_02				
File Edit View Insert Format Tools Data Window Help				
A1				
A	B	C	D	E
1		GoToMenu		
2		Social statistics		
3	E	Population ( Middle of Years)	1000 Persons	POP
4	I	Independent Households	1000 families	HOH
5				
6		Labor Forces		
7	E	Agriculture, Hunting, Forestry, Mining, and Quarrying	Person	LABPRI
8	E	Manufacturing	Person	LABMAN
9	E	Sugar	Person	LABSUG
10	E	EPZ	Person	LABEPZ
11	E	Domestic Manufacturing	Person	LABDOM
12	E	Electricity, Gas, and Water	Person	LABELE
13	E	Construction	Person	LABCON
14	E	Wholesale, Retail, Restaurants, and Hotels	Person	LABCOM
15	E	Transportation, Storage, and Communication	Person	LABTRA
16	E	Banking, Insurance, Real Estate, Business service	Person	LABBAN
17	E	Other service	Person	LABSER
18	I	Total Labor Force	Person	LABTOT
19	I	Labor Force in Population	%	LABSHA
20				

This file is basically a link file consisting of the same file format and structure as **Energy\_Case\_01.XLS** file.

This sheet contains a database which stores energy data items such as actual macro-economic data and historical energy demand data which are necessary for making forecasts about the future. It contains forecast values for years through 2025 as determined under the assumption of higher growth and as based on actual macro-economic data and historical energy demand from 1985 to 1995.

The data contents contained in this file by cell, in both row order and column order, are the same as in **Energy\_Case\_01.XLS**.

(2) Helpsheet

( Refer to Screen 011 )

Into this sheet are inserted those forecast data items which are included in the **EnergyModel** sheet that are not actual data. In other words, it includes demand forecast calculation formulas and the foundations for these formulas found in all those cells other than for 1985 through 1995. Note, however, that although actual calculation formulas are displayed for the forecast data item in cells on the **EnergyModel** sheet, both the character variables and mathematical formulas are displayed for the **Helpsheet**.

(3) MacRecord

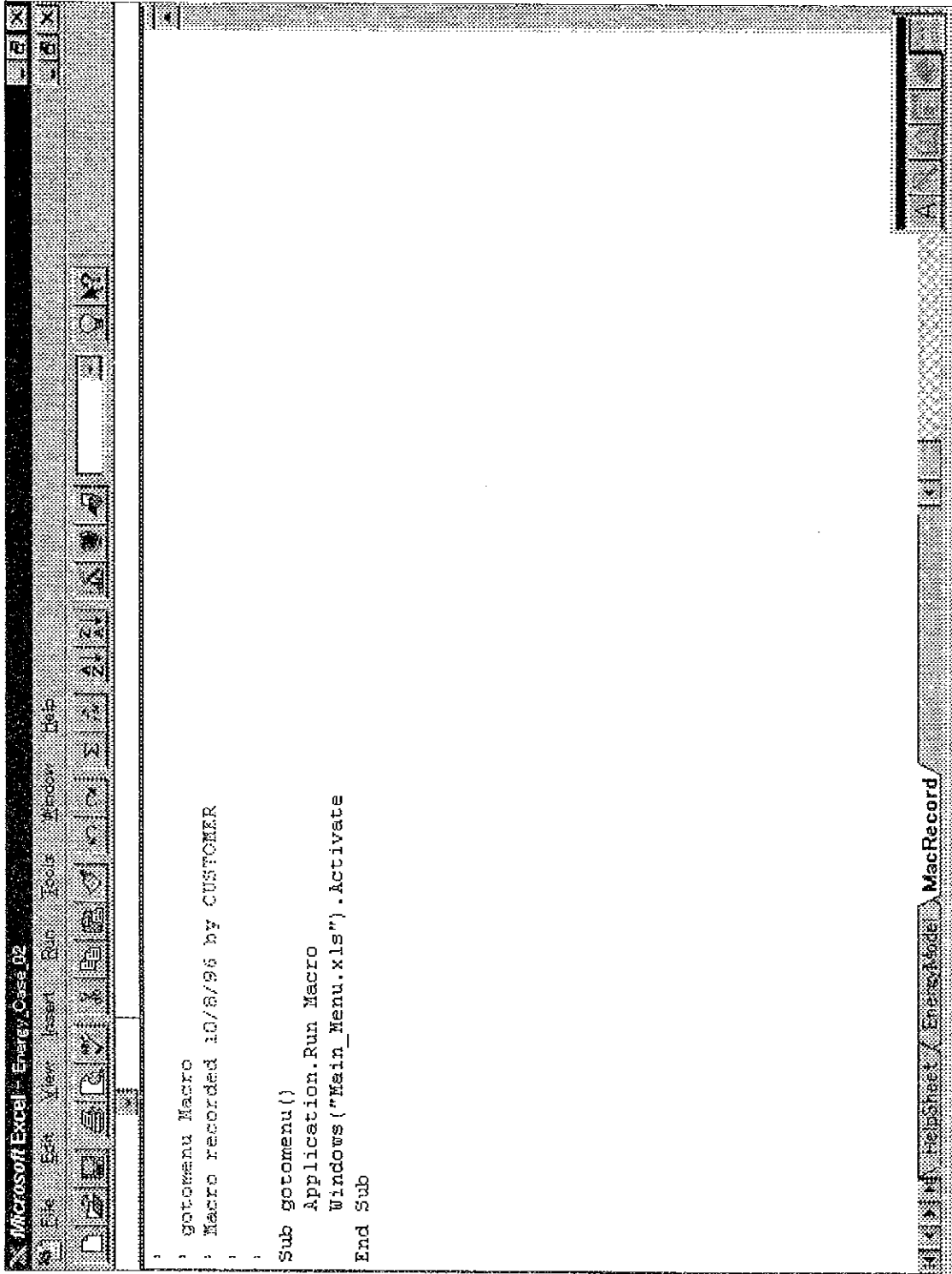
( Refer to Screen 012 )

The **MacRecord** sheet is a screen containing the macro program code for calling up all files. In other words, in order to call up another file from the **Energy\_Case\_02.XLS** file currently open, you first return to **Main\_Menu.XLS** and then select any one of the files from the menu screen. This macro program must be rewritten if the user wishes to create a macro program which can call up other screens. Do not change this sheet in any way if you wish to maintain this program in its present form.

Screen 011

Row	Column A	Column B	Column C	Column D	Column E
1				Variables	1995 - 1999 Actuals
2			Social statistics		
3	E		Population (Middle of Years)	POP	Actual
4	L		Independent Households	HCH	Population(POP)/Average family mem
5					
6			Labor Forces		
7	E		Agriculture, Hunting, Forestry, Mining, and Quarrying	LABPRI	Actual
8	E		Manufacturing	LABMAN	LABSUG + LABEPZ + LABDOM
9	E		Sugar	LABSUG	Actual
10	E		EPZ	LABEPZ	Actual
11	E		Domestic Manufacturing	LABDOM	Actual
12	E		Electricity, Gas, and Water	LABLE	Actual
13	E		Construction	LABCON	Actual
14	E		Wholesale Retail, Restaurants, and Hotels	LABCOM	Actual
15	E		Transport, Storage, and Communication	LABTRA	Actual
16	E		Banking, Insurance, Real Estate, Business service	LABBAN	Actual
17	E		Other service	LABSER	Actual
18	E		Total Labor Force	LABTOT	Total of the above items
19	E		Labor Force in Population	LABSHA	Total Labor Force divided by popul
20					
21			GDP at current Price		
22			Agriculture, Hunting, Forestry, Mining, and Quarrying	NVAPRI	Actuals
23			Manufacturing	NVAMAN	NVASUG + NVAEPZ + NVADOM
24			Sugar	NVASUG	Actuals
25			EPZ	NVAEPZ	Actuals
26			Domestic Manufacturing	NVADOM	Actuals
27			Electricity, Gas, and Water	NVAELE	Actuals
28			Construction	NVACON	Actuals
29			HelpSheet / Forecast / MiscRecord /		

Screen 012



MacRecord