by a DATA STATEMENT. A special code is entered into the places corresponding to the codes of rows of the previous year's total and growth rate.

IOC = 2

This indicates an annual report for a fiscal year; and monthly values from April to March, yearly total, previous fiscal year's total, and growth rate are set to the COL in the same manner as in the case of IOC = 1.

IOC = 3

This indicates a five year report, both on a calendar and fiscal year basis. The COL is constructed based on years specified in the ADDITIONAL INFORMATION of the edition indicating data.

IOC = 4

This indicates a report concerning supply of crude oil to oil refineries, through-put of crude oil at refineries, etc. The COL is constructed based on codes and actual names (CRF) of refineries as defined by a DATA STATEMENT. To verify the definition, the codes of the COMMON /REF/ which were read from the CODE, SYMBOL VS. NAME FILE and the CRF are compared.

Refinary

/REF/ REF (4, 100), MREF, REFL

1. Code No.
2. Name of refinery
3. Same as above
4. Same as above

Oil refineries are categorized into two groups: the 8 Indonesian refineries located in Indonesia; and the 4 refineries on commission located in Singapore, etc. Information necessary for calculating each subtotal of the groups is stored in the COL.

Fig. 32

Refinery Products Indonesian Refinery			CY1979				In M. BBL, 10E3 MT	(subtotal)
P. Brandan	Dumi	Sei. Pakning	Sei. Serong	Plaju	Balikpapan	Cilacap	Wonokromo	Indonesia
157	2463	834	1546	1551	1239	2022	19	9831
0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0
53	132	0	403	0	178	275	1	1042

	C. P. DEAL			(subtotal)	(Total)
Air Chawan	Jurong	Bukom	P. Merlimau	C.P. Deal	Total
445	1156	2238	0	3839	13670
0	0	0	0	0	0
0	0	34	0	34	34
49	130	310	0	489	1531

IOC = 5

This indicates a report concerning foreign countries which export and/or import crude oil or products. The COL is constructed based on the COMMON /FCT/ which is read in from the CODE, SYMBOL VS. NAME FILE.

Foreign country
/FCT/ FCT (4,50), MFCT, FCTL

1. Code No.
2. Name of foreign country
3. Same as above
4. Same as above

IOC = 6

This indicates an annual report for a calendar year, similar to the case of IOC = 1, with the exception that the previous year's total and growth rate are not considered here.

IOC = 7

This indicates an annual report for a fiscal year. This is similar to the case of IOC = 6.

IOC = 8

This indicates a report in which fuel oil (BBM) appears in a row. The COL is constructed using the CPP (only the BBM part) in which codes of petroleum products, etc, are stored, and which was used for the construction of the ROW.

IOC = 9

This indicates a report in which marketing region of the PERTAMINA appears in a row.

The COL is constructed based on the COMMON /MAR/ read in from the CODE, SYMBOL VS. NAME FILE.

Marketing region
/MAR/ MAR (4,20), MMAR, MARL

1. Code No.
2. Name of marketing region
3. Same as above
4. Same as above

IOC = 10
This indicates a report concerning transformation of natural gas in the gas plants to LNG, LPG, etc. The COL is constructed based on the COMMON/ REF/.

IOC = 11
This indicates a comprehensive report concerning production, transformation, consumption, etc. of natural gas. The COL is constructed based on the CGAS in which these items are defined.

– Subroutine MATRIX

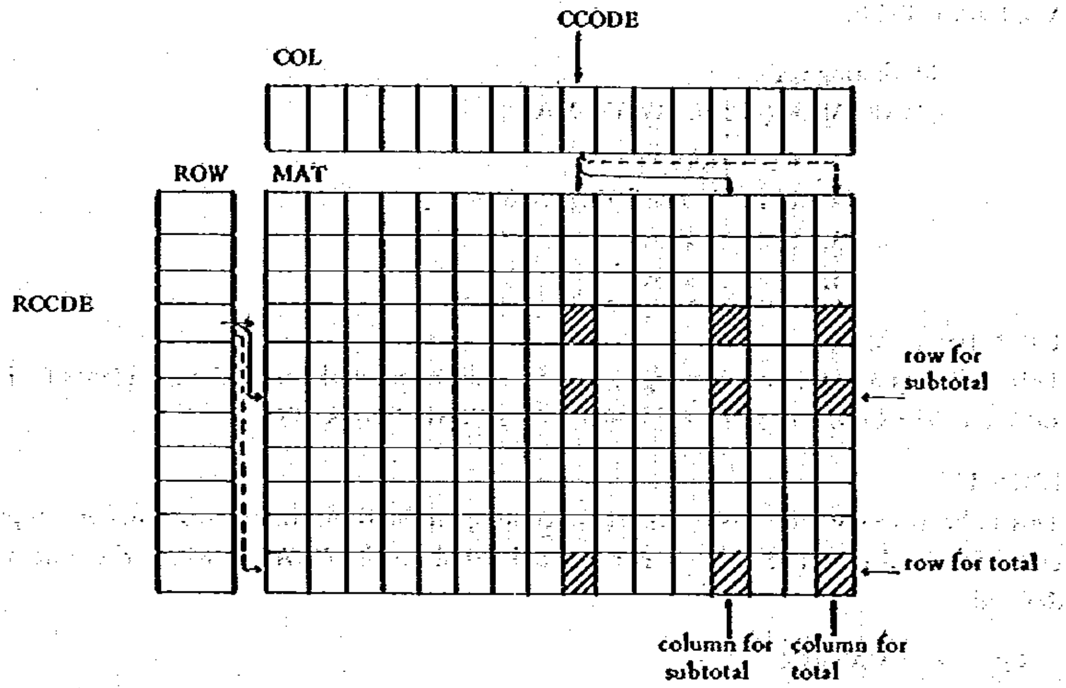
This subroutine scans the FPTBL (File Position Table; refer to Fig. 26) to find an input file specified by the edition directing data. It then reads in the appropriate record in the INTERMEDIATE FILE. The group of record numbers of the ELEMENT FILE is processed record by record.

The corresponding record (EFP) of the ELEMENT FILE is read into the ELMFIL (Refer to Fig. 3 for the ELMFIL's structure). Since the contents of the rows and columns differ depending on the type of reports, the information to be taken from the ELMFIL (Code and Symbol) is determined by the IOR and IOC fixed by the subroutine FRAME. Information extracted via the NAME ENTRY TABLE is set to the RCODE and CCODE. However, since the Code or Symbol is already stored in the ROW and COL, numbers of the row and column are obtained by comparing RCODE and ROW, and CCODE and COL.

Conversion of values are performed using the unit (PUNIT) and scaling factor (PSCL) of the report determined by the subroutine FRAME, and the unit (DUNIT) and scaling factor (DSCL) of the original data.

Converted values are entered into the obtained rows and columns of the matrix (MAT). At the same time, subtotals and the totals which are stored in the appropriate ROW and COL are entered (shaded areas in Fig. 33).

Fig. 33



– Subroutine REDUCE

This subroutine reduces the rows and/or columns when the option RED, concerning reduction of the matrix obtained from the subroutine FRAME, is specified. This is done by checking the column (row) of the total. If the column is 0, it is removed; otherwise it is left. If there is no column for the total, reduction is determined by a sum of the subtotals.

– Subroutine REPORT

This subroutine prints out a report indicated by the title no. (IOT), actual names of the ROW and COL, the MAT, and the category no. of the printing format (FMT).

The subroutine TOP is then initiated to print a title.

– Subroutine YDATA

This subroutine constructs yearly-based data from monthly-based original data. Since this function has not fully been established, its details are not discussed here.

(5) Printing of the Information File

– Subroutine WLIST

This subroutine prints out original data stored in the ELEMENT FILE. A partial printing of the FILE is possible by specifying a record number.

(6) Others

– Subroutine INITIL

This subroutine initiates the subroutine STRTBL to read in the data of the CODE, SYMBOL VS. NAME FILE (Refer to Fig. 9 and enter them into a prescribed table. The subroutine INITIL initializes the following four counters to 0.

- – NAME ENTRY TABLE (NTL)
- – ELEMENT FILE (EFL)
- – UNIT TABLE (UTL)
- – COMMENT FILE (COML)

The following three tables are also initialized to 0.

- – HEAD and TAIL POINTER's of the MASTER TABLE
- – NAME ENTRY TABLE
- – UNIT TABLE

– Subroutine RESTOR

Similar to the subroutine INITIL, this subroutine initiates the subroutine STRTBL. The RESTOR reads in the information of the above four counters and three tables from the SAVE FILE.

– Subroutine SAVE

This subroutine writes the previously mentioned four counters and three tables into the SAVE FILE.

– Subroutine STRTBL

This subroutine reads in data from the CODE, SYMBOL VS. NAME FILE, and stores them into the COMMON block which is being used for edition of retrieved data.

– Subroutine DLIST

This subroutine prints out the contents of tables which are used to examine the EDB system.

– Subroutine ELIST and EDUMP

These subroutines print out the LINK ADDRESSes of the ELEMENT FILE record by record, which are used to examine the EDB system.

– Function SNEG

A half word in the ELEMENT FILE is assigned to a scaling factor of the original data (Refer to Fig. 3). If the scaling factor is negative, a sign bit must be attached. This SNEG handles this process.

(Reference)

PROGRAM STRUCTURE

```
             ┌─INITIL─STRTBL─TABLE
             ├─RESTOR─STRTBL─TABLE
             ├─SAVE
MAIN PROGRAM─┼─ADATAI─┬─HEAD
             │        ├─CRNAME─┬─SHIFT
             │        │        └─MASKF
             │        └─ADD────┬─CHAIN──┬─PACK───┬─SHIFT
             │                 │        │        └─MASKF
             │                 │        └─PICKUP─┬─SHIFT
             │                 │                 └─MASKF
             │                 └─PICKUP─┬─SHIFT
             │                          └─MASKF
             ├─CDATAI─┬─HEAD
             │        ├─CRNAME─┬─SHIFT
             │        │        └─MASKF
             │        ├─DELETE─┬─PACK──────────┬─SHIFT
             │        │        │               └─MASKF
             │        │        └─PICKUP───────────────┬─SHIFT
             │        │                               └─MASKF     DATA UPDATION
             │        └─ADD────┬─CHAIN──┬─PACK───┬─SHIFT
             │                 │        │        └─MASKF
             │                 │        └─PICKUP─┬─SHIFT
             │                 │                 └─MASKF
             │                 └─PICKUP─┬─SHIFT
             │                          └─MASKF
             ├─DDATAI─┬─HEAD
             │        └─DELETE─┬─PACK───┬─SHIFT
             │                 │        └─MASKF
             │                 └─PICKUP─┬─SHIFT
             │                          └─MASKF
             │  - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
             ├─RDATAI─┬─DECI
             │        ├─HEAD
             │        ├─AGFILE──PICKUP─┬─SHIFT
             │        │                └─MASKF                    DATA RETRIEVAL
             │        ├─STEPM───┬─SHIFT
             │        │         ├─MASKF
             │        │         └─DECI
             │        ├─REORDR
             │        ├─MSTEP
             │        ├─LOGOPE
             │        ├─LIST────┬─PICKUP─┬─SHIFT
             │        │         │        └─MASKF
             │        │         ├─B2CHK──┬─SHIFT
             │        │         │        └─MASKF
             │        │         └─HEAD
             │        └─SFILE
             └─────────────────────SNEG─MASKF
```

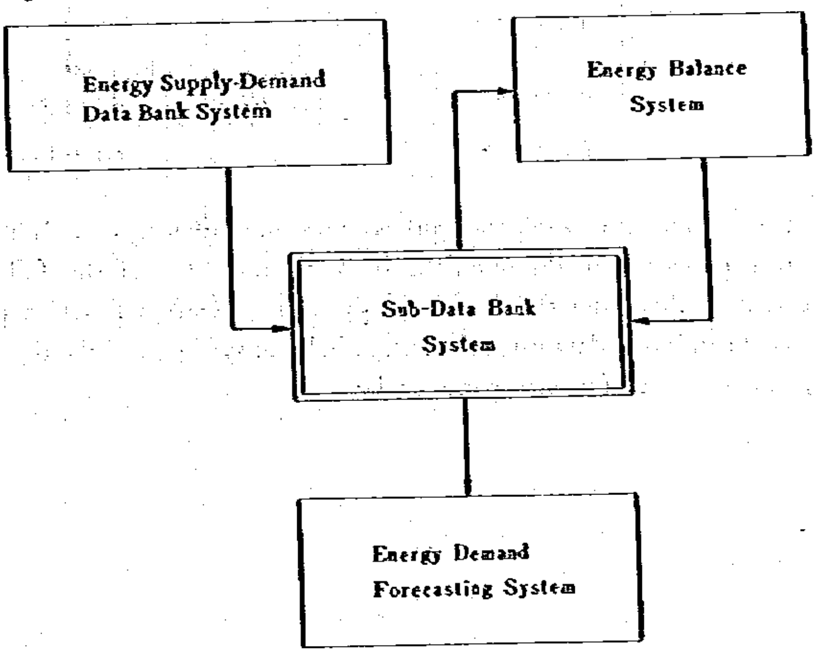
```
|
|-ODATAI-+-HEAD
|        |-DEC1
|        |-DEC4----+-SHIFT
|        |         L-MASKF
|        |-CMAT
|        |-FRAME
|        |-RAC ----+-EXC
|        |         L-WRONG
|        |-MATRIX-+-PICKUP-+-SHIFT
|        |        |        L-MASKF
|        |        |-CUTSYM-+-SHIFT
|        |        |        L-MASKF
|        |        L-ENC4 --+-SHIFT
|        |                 L-MASKF          DATA OUTPUT
|        |                              - - - - - - - - - - - - - -
|        |-REDUCE
|        |-REPORT -TOP
|        L-YDATA
|-WLIST--+-PICKUP-+-SHIFT
|        |        L-MASKF                   LIST OPTION
|        |-B2CHK--+-SHIFT
|        |        L-MASKF
|        L-HEAD
|                                       - - - - - - - - - - - - - -
|-BLOCK DATA
|
|-DLIST                                     for program debugging
|
L-ELIST--EDUMP----PICKUP-+-SHIFT
                         L-MASKF
```

USER'S MANUAL OF SUB-DATA BANK SYSTEM

USER'S MANUAL OF SUB-DATA BANK SYSTEM

Energy Supply-Demand Data Bank System (EDBS) is used to conduct production analysis for any individual category, that is, type of crude oil and for any oil field, analysis of natural gas conversion process, etc. since the system handles extremely detailed monthly data. On the other hand, the energy balance system and the energy demand forecasting system are used for comparatively macro-oriented analysis. The macro-level data bank system was developed to fill the gap between EDBS and the other two systems.

Fig. 1 Sub-Data Bank System and its Relationship to Other Systems

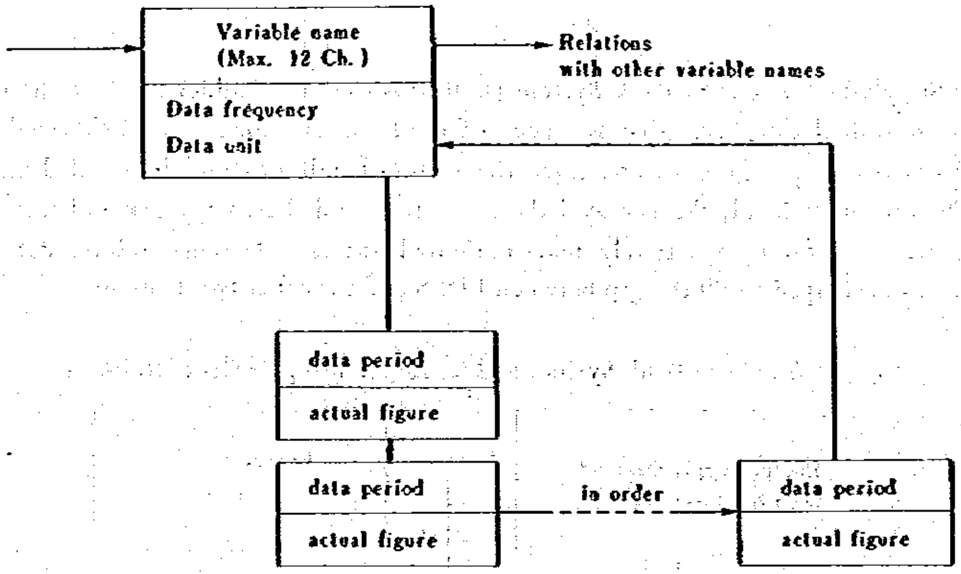


1. Outline of the Sub-Data Bank System

Data handled by the sub-data bank system is designed in such a way as to facilitate data handling on the time series basis, since it is basically used in the macro level by the energy balance table and the energy demand forecasting model. In other words, a variable name is given to one time-series data, and the data is handled with this variable name. Types of data period catalogued in the sub-data bank include quarter, calendar year, and fiscal year. The filing method employed in the sub-data bank system is much simpler than that used in EDBS. Detailed description of the filing method will be found in the section 2. As shown in Fig. 2, time series data for one variable is structured with chains.

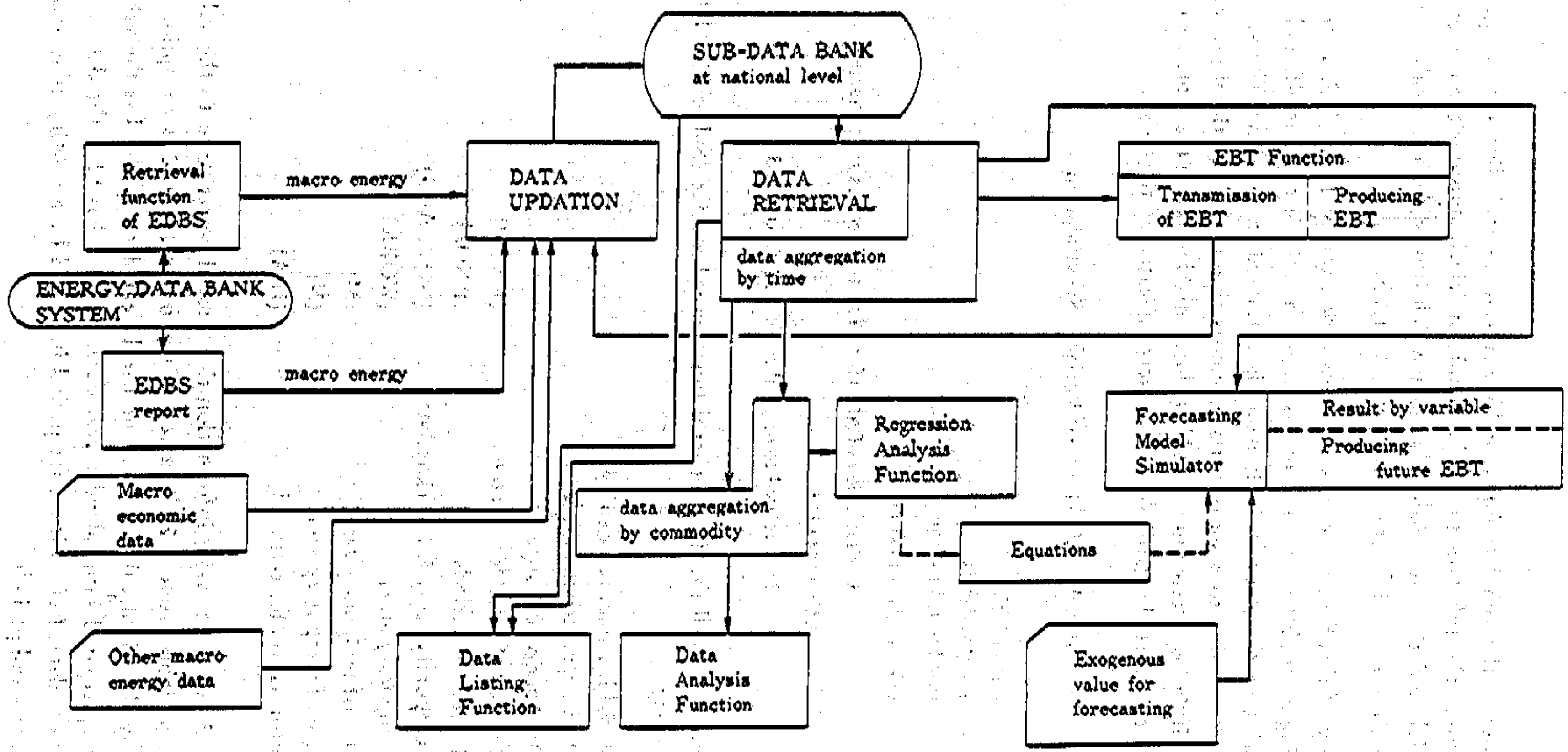
(2)

Fig. 2 Outline of the Filing Method Employed in the Sub-Data Bank System



The relationship between the sub-data bank system and other system is illustrated in Fig. 3. Data is catalogued in the sub-data bank through one of the following three methods. The first method uses the macro energy data generation function provided by EDBS. The second catalogues data using the energy balance system, and the third catalogues data manually as in the case of macro economic data.

Fig. 3 Sub-Data Bank System Flow



(4)

Connection between the sub-data bank and other systems including the energy balance system which uses the sub-data bank, the simulator which activates the energy demand forecasting model, and the data analysis system which is used for the analysis of macro data is made the data retrieval function, as shown in Fig. 3.

The retrieval key of this function consists of a variable name and a period. There are two methods of giving a variable name. The one is to give a variable name itself, and naturally data corresponding to the given variable name is extracted in this case. The second is to extract data corresponding to a set of variable names through one retrieval procedure. As shown in Fig. 4, if "*" is inserted in a variable name, variables having the same set of characters beside "*" are extracted regardless of characters indicated by the "*'s".

Fig. 4 Variation of Variable Specification

Retrieval for – one variable
– set of variables
(used to reduce computing time)
ex) CADO********
Consumption of ADO for all sectors sectors are extracted
*OCR********
Data related to original crude oil are extracted

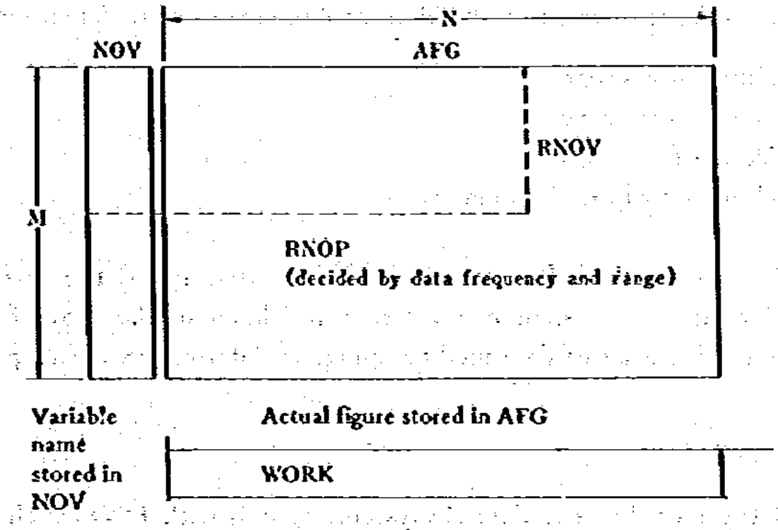
Information required to call the data retrieval function subroutine (Subroutine RETRVL) includes the following.

1. Variable name: refer to Fig. 4
2. Data aggregation: 'C', 'F'
3. Data period of range
4. Number of variables extracted (RNOV)
5. Number of periods (RNOP)
6. Temporary array for retrieved data (NOV, AFG)
7. Temporary array (WORK)
8. Size of temporary array (M)
9. Size of temporary array (N)
10. Information for retrieval (IFA)

Items 1 through 3 comprise major information that should be set prior to the subroutine call. Item 1 is a variable name (12 characters at maximum). Item 2 is an option used to aggregate quarterly data into calendar year or fiscal year data. If this has the value "C", quarterly data is aggregated into calendar year data, and if it has "F", the data are aggregated into fiscal year data. Item 3 is a data period indicated by a starting time and an end time in terms of years and periods.

On the other hand, items 4 through 10 include information determined by the retrieval function subroutine and arrays required by the subroutine for data retrieval. Item 4 indicates the number of variables extracted, and item 5 is the number of periods. Item 6 is the array in which extracted data is stored, and retrieval information is set as is shown in Fig. 5.

Fig. 5 Array in which Extracted Information Stored



Item 7 in a temporary array, and the length of data to be stored here must be N. Items 8 and 9 specify the sizes of the arrays, NOV, AFG, and WORK. Item 10 is a sign indicating whether or not retrieval is completed, or if some trouble has occured.

IFA = 0	Completed	
= 1	RNOV > M	Insufficient array sizes
= 2	RNOP > N	
= 3	There were data not included in the specified period	
= 4	Specified variable name could not be found	

An example is shown in Fig. 6.

Fig. 6 Example of Using the Retrieval Function

example

```
      DIMENSION    NOV (3,100), AFG (100, 20), WORK (20)
      :
      CALL RETRVL ('CADO********',  C  , 1975, 1, 1979, 4, RNOV,
                   RNOP, NOV, AFG, WORK, 100, 20, IFA)
      IF ( IFA.EQ.0 ) GO TO 1
      WRITE (6, 2)
    2 FORMAT (10X, 'ARRAY SIZE IS NOT ENOUGH')
      STOP
      :
```

2. Outline of the Sub-Data Bank System and its Utilization

The sub-data bank system (hereinafter referred to as SDBS) employs the concept behind the energy supply-demand data bank system, stores macro energy data and general macro economic data, and provides the function maintaining the data bank.

2-1 Creation and Updating of Information Files

SDBS provides the following four functions used to create and update information files.

- o Addition of new data
- o Changes in existing data
- o Deletion of existing data
- o Modification of existing data names

Data required to use these functions is divided into two types. The first type is directive data that indicates the system pertaining to whichever of the above functions is to be used. The second is a set of data used to update an information file as specified by a given function.

(1) Directive data

The first 4 types of directive data always corresponds with EOD which indicates an end of the directive data set.

Format

1	2	3	4	5			
A	D	D		*			Addition of new data
C	N	G					Changes in existing data
D	E	L					Deletion of existing data
V	N	M					Modification of existing data names
E	O	D					End of data

* Indicates the format of data set used to update the information file for the directive data (ADD).

* = 1: Type 1 of the input data format.
This is the data format created by the energy demand-supply data bank system.

* = 2: Type 2 of the input data format.
This is the data format created manually, such as that of general macro economic data.

(2) Updating data of the information file

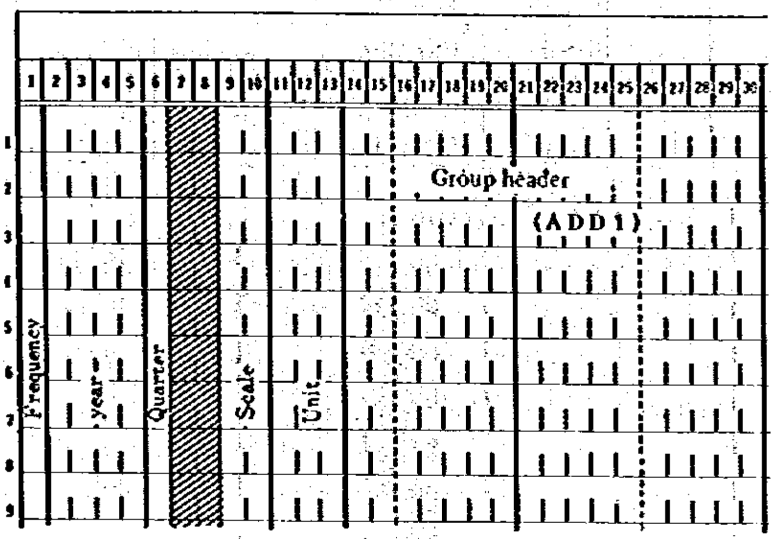
Since data format varies from function to function, preparation of updating data for each function will be expounded below.

(2)-1 Addition of new data (ADD *)

Data set corresponding to this directive data has two types of data format.

1) Data created by the energy supply-demand data bank system (* = 1: ADD 1)

Data having this input format is divided into several data groups, and each data group consists of a group header, data to be added to the information file, and a group end (END) comprising pair with the group header.

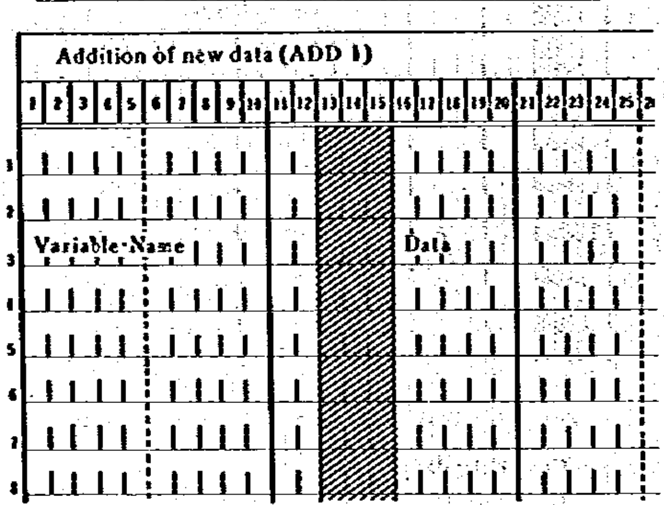


- o Frequency — C: Calendar year; F: Fiscal year; Q: Quarter
- o Year
- o Quarter — Specify and one of 1 through 4 quarters if it is quarterly data.
- o Scale — This is a scaling factor for data to be added (in the column of Data) and expressed in exponents of 10.
- o Unit — This is a unit of the values of added data and of those listed in Table 1.

(8)

Table 1 Unit

No.	Code	
1	BBL	Barrel
2	KL	Kilolitres
3	M3	Cubic metre (m^3)
4	MCF	10^3 Cubic feets
5	MT	Metric tons
6	BTU	British thermal units
7	KWH	Kilowatt hours
8	US$	US Dollar
9	RP	Rupia
10	TCE	Ton coal equivalent

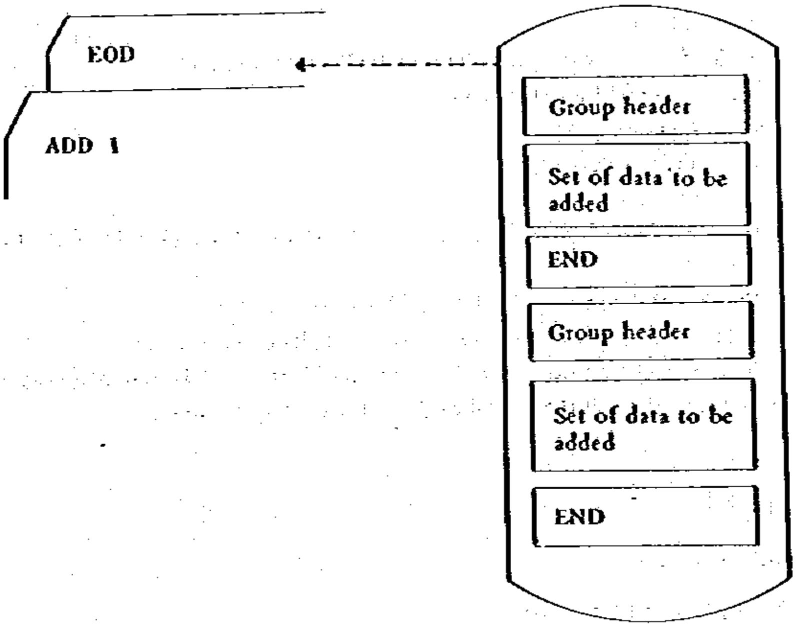


o Variable Name Name of data to be added

o Data Value of data to be added

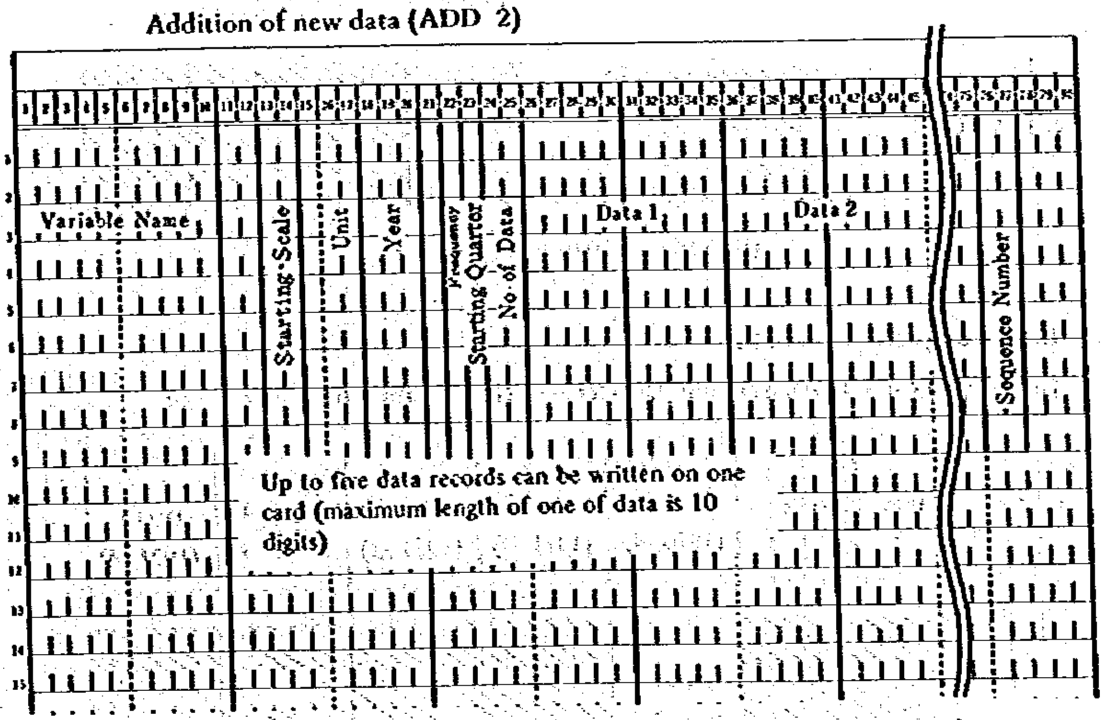
Example of data configuration having the ADD 1 format

In this case, the data configuration consists of only the directive data. The set of data to be added to the information file is read in from the file created by EDBS.



2) Data created manually (* = 2: ADD 2)

Addition of new data (ADD 2)



The above format is also used to change existing data using the directive data, CNG.

(10)

- o Variable Name — Name of data to be added
- o Scale — Scaling factor
- o Unit — Unit of the value of data to be added. (Refer to Table 1)
- o Starting Year — Year of the first data (Data 1)
- o Frequency — C: Calendar year
  F: Fiscal year
  Q: Quarter
- o Starting Quarter — In case of quarterly data, specify the quarterly period (1 ~ 4) of the first data.
- o No of Data — Number of data to be added under this variable name
- o Data — Values of data to be added. (at maximum 5 data on one card)
  * When more than 5 data are to be added under the same variable name, it is only necessary to specify the variable name and data on the second card and the consequent ones.
- o Sequence Number

Examples of data preparation

o In case of yearly data (C or F)

[Starting Year = 1970, No of Data = 6]

1.	ABC	1970		C		6	Data 1 (1970)	Data 2 (1971)	Data 3 (1972)	Data 4 (1973)	Data 5 (1974)

2.	ABC		Data 6 (1975)				

(Data from 1970 to 1975 is added.)

o In case of quarterly data (Q)

[Starting Year = 1970, Starting Quarter = 4, No of Data = 6]

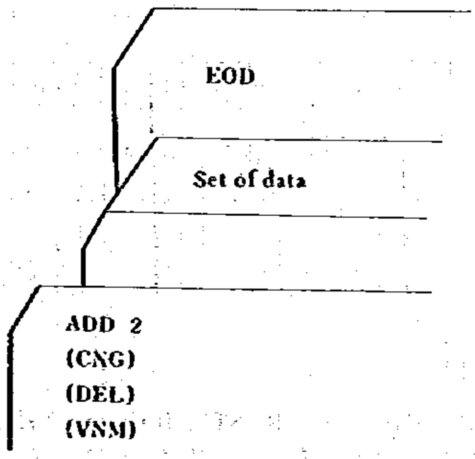
1	ABC	1970		Q	4	6	Data 1 (1970-4)	Data 2 (1971-1)	Data 3 (1971-2)	Data 4 (1971-3)	Data 5 (1971-4)

2	ABC		Data 6 (1972-1)				

(Data from the 4th quarter of 1970 to the 1st quarter of 1972)

Example of data configuration for the case of ADD 2

Fig. 7 Example of General Data Configuration (excluding ADD 1)



(2)-2 Changes in existing data (CNG)

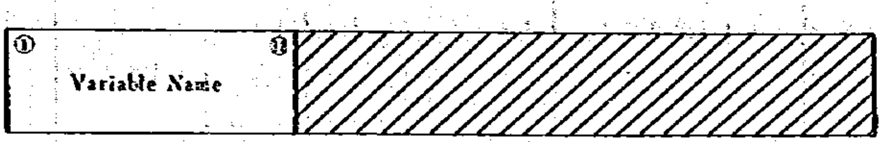
SDBS replaces existing data with modification data if they have the same variable name, year, and period. This can be confirmed using the INDEX TABLE and the data file.

When no corresponding data exists, an appropriate warning message is output and then the next data is processed.

The input format for CNG is the same as that of ADD 2.

(2)-3 Deletion of existing data

Any existing data can be deleted by giving its variable name.



(2)-4 Modification of the variable name of existing data

The variable name of existing data can be modified by giving the name of the existing data and a new variable name.

2-2 Printing of Information File

Contents of the information file under preservation are printed.

	1–5	6–10	11–15	16–20	21–26
1	REST	(Refer to 2-3)			
2	LST				
3					
4					

2-3 Data Deck Configuration

A data deck must start with "INIT" or "REST". If there is "INIT" at the beginning of a data deck, the system is initialized by clearing all the tables, files, and counters before its start. If there is "REST," the system is restarted using all the previous information.

Table 2 Example of Data Deck Configuration

	1–5	6–10	11–15	16–20	21–25	26–30	31–35	36–40
1	INIT	or (REST)						
2	ADD 1	or (ADD 2)	(CNG)	(DEL)	(VNM)	(LST)		
3	(Set of data)							
4	EOD							
5								
6								
7								

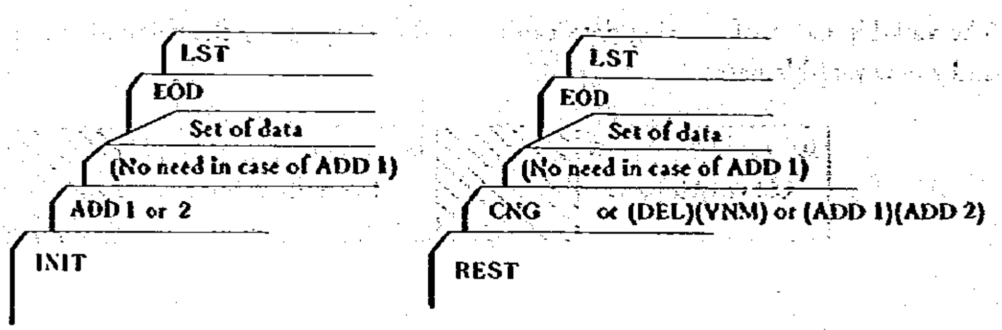


Table 3 Example of Information File Printing

HAL. : 1

REPORT : S0501

IMAGE DATA
INDONESIAN ENERGY SUB DATA BANK

	VAR. NAME	SCL	UNIT	FIRST DATA	LAST DATA	YEAR	CFQ	LA BEF	LA AFT	VALUE
1	CIMP2	0	BBL	1	9	1971	0	0	2	611.
						1972	0	1	3	862.
						1973	0	2	4	1316.
						1974	0	3	5	2294.
						1975	0	4	6	2778.
						1976	0	5	7	3222.
						1977	0	6	8	3817.
						1978	0	7	9	4559.
						1979	0	8	0	7082.
2	CIMP2	0	BBL	10	18	1971	1	0	11	611.
						1971	2	10	12	862.
						1971	3	11	13	1316.
						1971	4	12	14	2294.
						1972	1	13	15	2778.
						1972	2	14	16	3222.
						1972	3	15	17	3817.
						1972	4	16	18	4559.
						1973	1	17	0	7082.

o VAR-NAME Variable Name o SCL Scaling factor for the data o UNIT Unit of the data
o FIRST DATA Header address of the data file o LAST DATA Tail address of the data file
o YEAR Year o CFQ Period o LA BEF Link address (Before) of the data file
o LA AFT Link address (After) of the data file o VALUE Value of the data

2-4 Error Messages

No.	Error message	Cause of the error	Next step to be taken	Output subroutine
1	*** ERROR *** PLEASE CHECK 1st DATA INIT OR REST	Neither "INIT" nor "REST" is found in the 1st data card	stop	Main
2	*** PREPARE ADD OR CNG OR DEL, SECOND CARD *** ERROR CONTROL DATA ***	The 2nd data card is not directive data	stop	Main
3	*** ERROR *** NO TYPE IN CONTROL DATA ADD ***	The type of directive ADD is neither 1 nor 2	stop	XADD
4	*** ERROR FOR END CONTROL DATA NODATA EOD	There is no EOD data	stop	XADD
5	WRONG VAR NAME IN THIS CARDS	There is no given variable name in the INDEX TABLE	stop	XADD
6	*** DATA CARD TYPE 2 CONTAIN NUMBER OF DATA GT 80	The number of data exceeds 80	stop	XADD
7	*** EXCEEDED NETOS, SYSTEM MODIFICATION NEEDED ***	The number of variables exceeds the maximum length of the INDEX TABLE	stop	XCHAIN
8	*** ERROR *** UNIT IN NETOS (a) UNIT (b)	Conversion to the unit used by the INDEX TABLE is not possible a: Unit of the INDEX TABLE b: Unit of the input data	stop	XKONVR
9	WRONG VAR NAME IN THIS CARD	Variable name is not the same as that the previous card	stop	XCNG
10	DATA IN NETOS NOT YET PREPARED	There is no INDEX TABLE created	stop	XCNG
11	*** ERROR *** COULD NOT FOUND VAR NAME IN NETOS	A given variable name can not be found in the INDEX TABLE	stop	XCNG
12	*** DATA CARD MANUALS FOR CHANGING DATA IN SUB DATA BANK *** *** ARE TOO MANY *** CHCK IT ***	The number of data under the same variable exceeds 80	stop	XCNG
13	COULD NOT FOUND THE VARIABLE NAME (a) IN NETOS	A variable name to be deleted cannot be found in the INDEX TABLE	skip	XDEL
14	NAME NOT FOUND	A variable name to be modified cannot be found in the INDEX TABLE	skip	CNGNAM

3. Data Processing Method

Since SDBS employs the concept used by EDBS, it creates the information file under the list structure. Therefore, SDBS uses a table which controls raw data as well as a file in which the raw data is placed.

The concept of the data structure employed by SDBS will be described below based on the table and the file.

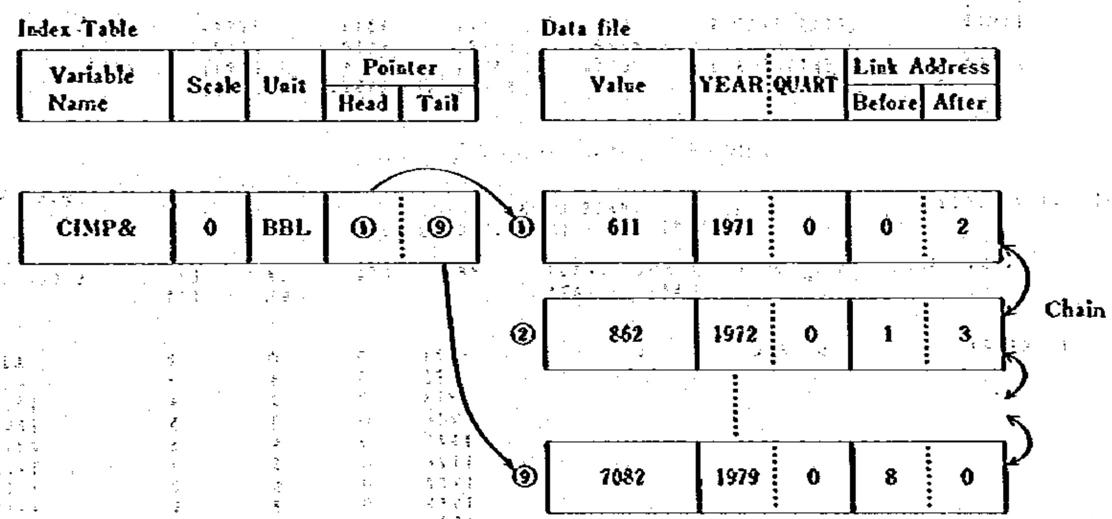
3-1 INDEX TABLE

This table corresponds to the Name Entry Table in EDBS, and consists of the following five elements.

- o Variable name
- o Scale
- o Unit
- o Head pointer of the data file
- o Tail pointer of the data file

All the names used in raw data are catalogued in this table. The scale and unit indicate the common scaling factor and data unit of the variable respectively. All the data to be added must have the scale and the unit specified here before being stored in the DATA FILE.

Fig. 8 INDEX TABLE and DATA FILE



(The example, "CIMP&" data, which was used in Table 2 is also used here.)

The header and tail pointers in the INDEX TABLE are used to manage all of the related raw data in the DATA FILE. Relationships among raw data are maintained in the DATA FILE by means of link addresses.

3-2 DATA FILE

This file corresponds to the element file in EDBS and all of the raw data are maintained in this file. One item of raw data corresponds to one record in the file.

The record format of this file consists of file elements as shown below.

1	2		3	
			Link Address	
Value	Year	Quarter	Before	Next

- o Value — Value of the data
- o Year — Year of the data
- o Quarter — Period of the data (in case of quarterly data)
- o Link Address (Before) — (Links between raw data)
- o Link Address (After) — (Links between raw data)

The relationship between the INDEX TABLE and the DATA FILE will be illustrated below taking the example of creating a new information file.

Table 4 Input Data (New Creating)

```
INIT
ADD 2
CINPE       Q88L197100 9     611.      862.      1316.     2291.     2778.
                             3222.     3817.     4559.     7082.
QINPE       Q88L197101 9     611.      862.      1316.     2291.     2778.
                             3222.     3817.     4559.     7032.
EOD
```

Table 5. Information File

REPORT I 50501 — IMAGE DATA — INDONESIAN ENERGY SUB DATA BANK — HAL. 5

	VAR. NAME	SCL	UNIT	FIRST DATA	LAST DATA	YEAR	CFO	LA BEF	LA AFT	VALUE
1	CINPE	0	ABL	1	9	1971	0	0	2	611.
						1972	0	1	3	862.
						1973	0	2	4	1316.
						1974	0	3	5	2291.
						1975	0	4	6	2778.
						1976	0	5	7	3222.
						1977	0	6	8	3817.
						1978	0	7	9	4559.
						1979	0	8	0	7082.
2	QINPE	0	BBL	10	18	1971	1	0	11	611.
						1971	2	10	12	862.
						1971	3	11	13	1316.
						1971	4	12	14	2291.
						1972	1	13	15	2778.
						1972	2	14	16	3222.
						1972	3	15	17	3817.
						1972	4	16	18	4559.
						1973	1	17	0	7092.

Let us consider the case where the data shown in Table 4 is input to create the file shown in Table 5 (b).

With the "INIT" card, the INDEX TABLE, the DATA FILE and all counters are initialized and then the system starts. The "ADD 2" card indicates that new data is added under the data format of type 2 (manually created data).

Table 6 Contents of the Input Data

Variable Name	Unit	Scale	Data period type	Period
CIMP&	BBL	0	Calender year	1971 ~ 1979
QIMP&	BBL	0	Quarter	1971 1st quarter ~ 1973 1st quarter

Change of Index Table

LENT.	Variable Name	Scale	Unit	Head	Taile
1	CIMP&	0	BBL	0	0
	CIMP&	0	BBL	1	1
	CIMP&	0	BBL	1	2
	CIMP&	0	BBL	1	3
	CIMP&	0	BBL	1	4
	CIMP&	0	BBL	1	5
	CIMP&	0	BBL	1	6
	CIMP&	0	BBL	1	7
	CIMP&	0	BBL	1	8
1	CIMP&	0	BBL	1	9

Changes of Data File

	Link address of (NR) record		The last link address	
	Before	After	Before	After
NR	0	0	0	0
1	0	0	0	2
2	1	0	1	3
3	2	0	2	4
4	3	0	3	5
5	4	0	4	6
6	5	0	5	7
7	6	0	6	8
8	7	0	7	9
9	8	0	8	0

Table 6 shows the changes in DATA FILE's link addresses made at the time when the input data "CIMP&" is 8 be catalogued in the INDEX TABLE and the DATA FILE.

Firstly, the variable name "CIMP&", the scale "0", and the unit "BBL" are catalogued at the position of ("LENT" = 1).

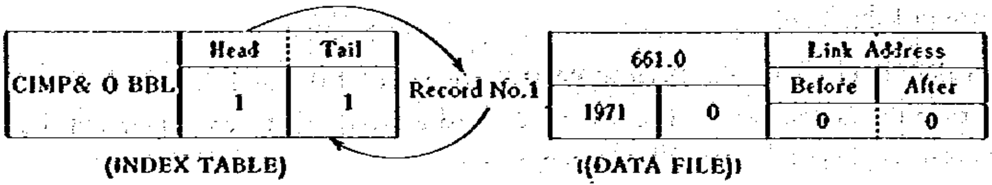
(LNET = 1): Indicates the first data in the input data "INIT."
LNET: Number of variables catalogued in the INDEX TABLE.
NR: The final record number of data catalogued in the DATA FILE.

(1) 1971 data (NR = 1)

The record position in which new data is to be recorded is obtained using NR = NR + 1 (Initial value of NR is 0, so it will become NR = 1.)

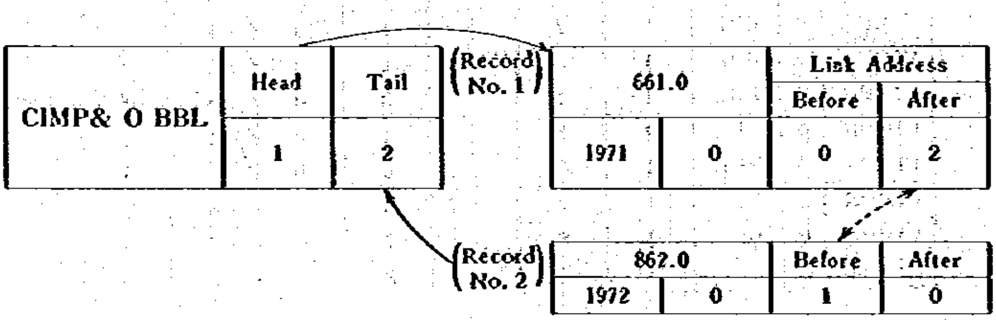
Since the link address points the first data of the variable "CIMP&", the values of BEFORE and AFTER are 0's. The data value, year, period, and the link address are recorded in the NR (=1) record of the DATA FILE.

Next, the head and tail pointers of the INDEX TABLE are set to the record position (NR = 1) in the DATA FILE.



(2) 1972 data (NR = 2)

The tail pointer of "CIMP&" is changed to NR = NR + 1 (NR = 2) using the INDEX TABLE. Next, due to the addition of the 1972 data, the AFTER of the link address of the 1971 data (The record position indicated by the HEAD pointer (=1) of "CIMP&".) is changed to the record position of the 1972 data (NR (=2)). On the other hand, BEFORE of the link address of the 1972 data is set to the record position of the 1971 data (=1), and then the data value, year, period and the link address are recorded in the record of NR (=2) in the DATA FILE. In this way, the relationship between the 1971 data and the 1972 data of "CIMP&" is maintained.



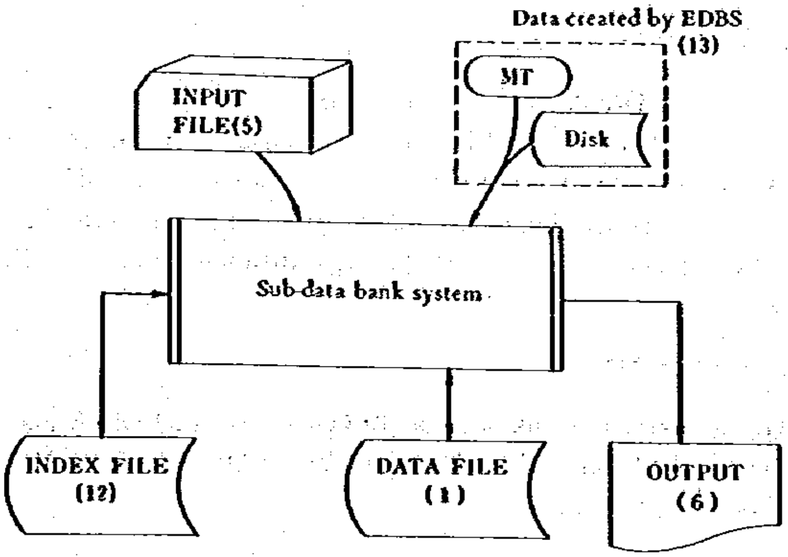
Data from 1973 to 1979 is processed in the same manner as the above (1) and (2). Table 5 shows the output of the above process for the input data of Table 6.

3-3 Functions and processing method of the Sub-Data Bank System

As mentioned in the sections of 2-1 and 2-2 which describe creation and updating of the information file and printing of the file, respectively, SDBS provides the following five functions. This section describes the data processing methods for each of the five functions for the purpose of facilitating program maintenance.

- o Addition of new data
- o Changes in existing data
- o Deletion of existing data
- o Modification of existing data name
- o Printing of information file

Fig. 8 Conceptual Flow of the Sub-Data Bank System



(1) Main program

For the execution of SDBS, the beginning of the input data must be either "INIT" or "REST" regardless of the functions to be used.. If it is "INIT," the INDEX TABLE, DATA FILE, and all the counters are initialized. If it is "REST", the final information of the previous execution is read in from the INDEX FILE (Refer to the conceptual flow of the sub-data bank system in Table 7. and then SDBS is restarted retaining the old information.

Card image	Subroutine name
'INIT'	XINIT
'REST'	XREST

Directive data is required, as mentioned in the section 2, to use any one of the functions of SDBS. For each directive data, a corresponding subroutine is called.

Table 7 Functions and Corresponding Subroutines

No.		Function	Subrouting name
1	Updating of the information file	Addition	XADD
2		Change	XCNG
3		Deletion	XDEL
4		Name modification	CNGNAM
5	Printing of the information file		XLIST

(2) Addition of information file

o Subroutine XADD

One record in the DATA FILE is allotted for one item of raw data. Therefore, the record counter of the DATA FILE, NR is incremented by 1 whenever an additional raw data record is processed. On the other hand, if the raw data to be added is a new variable, its variable name is catalogued in the INDEX TABLE and concurrently the counter, LNET (the number of variables catalogued in the INDEX TABLE), is incremented by 1.

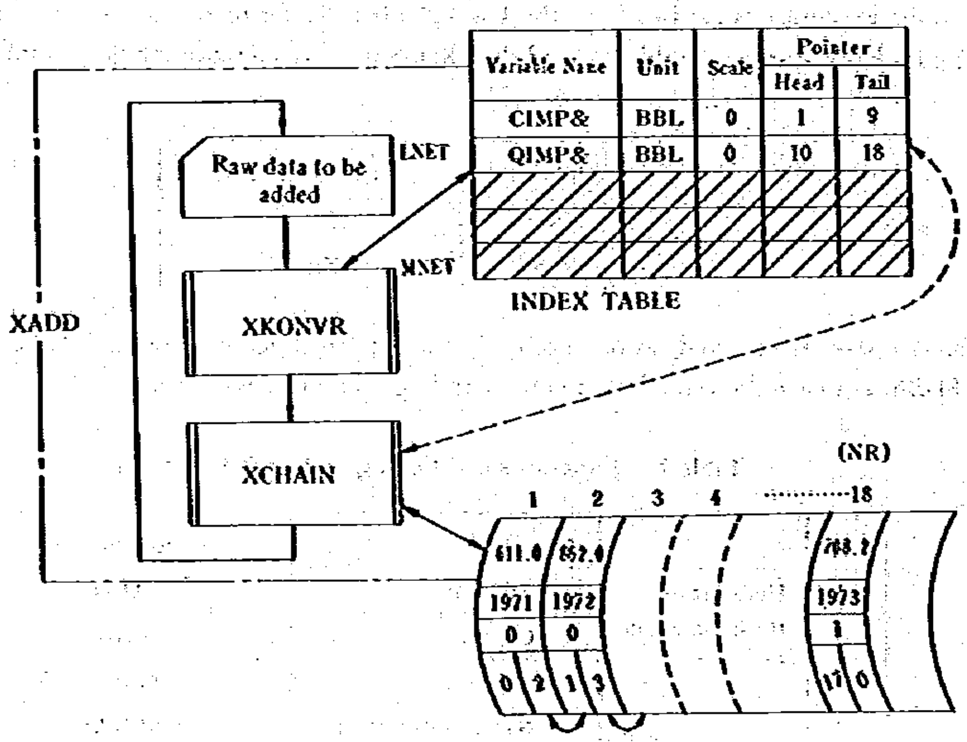
o Subroutine XCHAIN

This subroutine sets the link address (BEFORE, AFTER) which maintains relationships among same variable, as well as the HEAD and TAIL pointers of the INDEX TABLE as described in the section 2-3 .

o Subroutine XKONVR

This subroutine performs conversion of the scale and the unit of the raw data to be added to those catalogued in the INDEX TABLE, when raw data of a variable already catalogued is added.

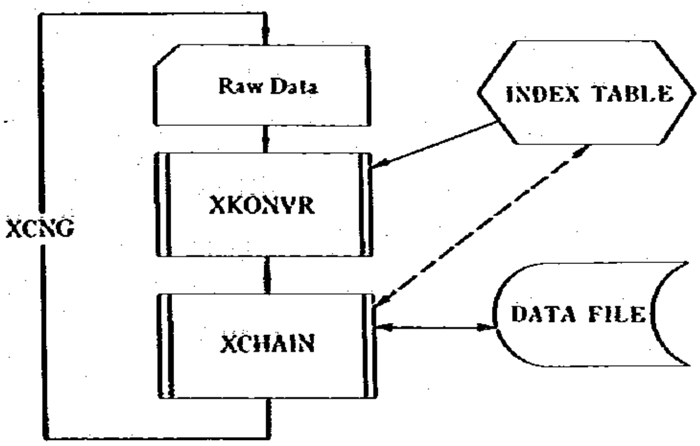
Fig. 9 Relationships between Program and the Information File



(3) Modification of the information file

o Subroutine XCNG

This subroutine searches a variable name of the raw data to be changed in making reference to the INDEX TABLE, reads in DATA FILE using the HEAD and TAIL pointers of the variable name, and then replaces the data value which has the same year and period as the raw data with new data. The process taken by this subroutine is almost the same as that of the subroutine XADD.



(4) Deletion of information file

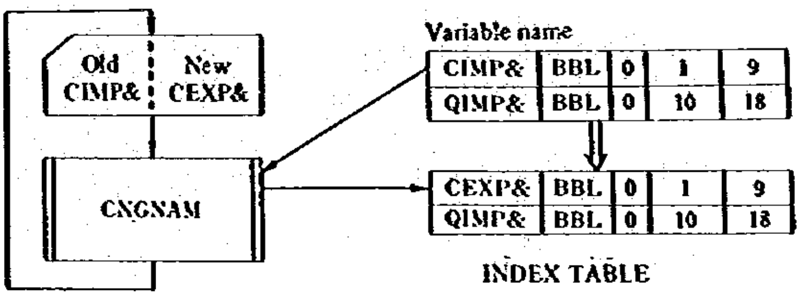
o Subroutine XDEL

This subroutine reads in data of the variable name to be deleted and clears the variable name to be deleted in the INDEX TABLE.

(5) Modification of variable name in the information file

o Subroutine CNGNAM

This subroutine changes a variable name catalogued in the INDEX TABLE to a different name. The subroutine reads in both existing and new variable names, and changes the name in the position that coincides with the catalogued name to the new variable name.



(6) Printing of the information file

o Subroutine XLIST

This subroutine prints out the contents of the information file. As for the output format, refer to the section 2-2: Printing of the information file.

GENERAL MANUAL OF ENERGY BALANCE TABLE I

CONFIGURATION OF ENERGY BALANCE TABLE

GENERAL MANUAL ENERGY BALANCE TABLE I

– CONFIGURATION OF ENERGY BALANCE TABLE –

1. Concept of Energy Balance Table

Now that no one can deny a fact that quantities of energy resources are limited, how efficiently use the limited energy is becoming a common subject to all the nations in the world.

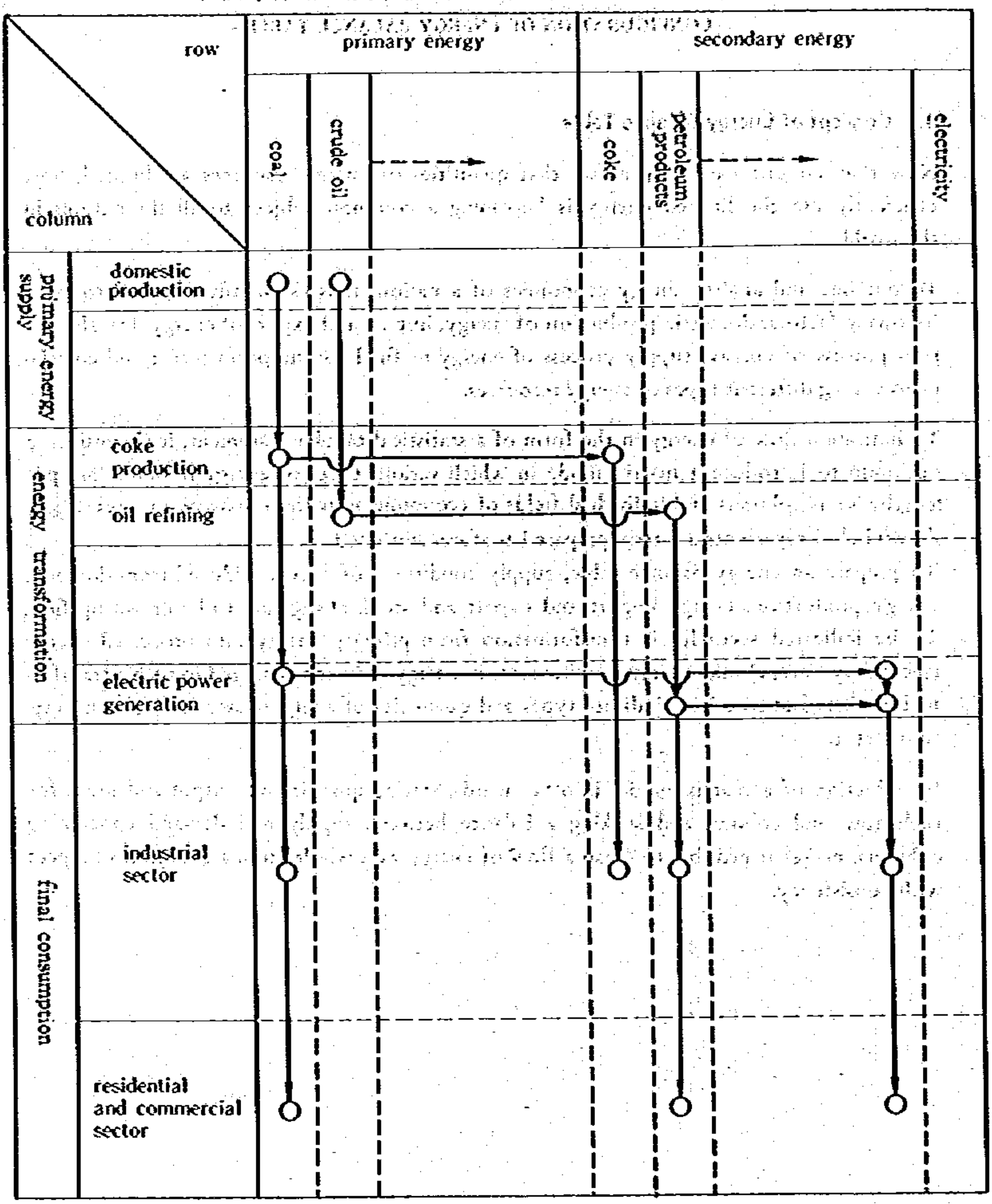
To out line and analize energy economics of a nation, it is essentially required to grasp following factors; domestic production of energy, import and export of energy, transformation process of energy, supply process of energy to final consumption sector and correlations among different types of energy resources.

To indicate a flow of energy in the form of a statistical tabular statement, it is considered optimum to introduce a matrix mode in which various types of energy resources are put lengthwise as columns and individual fields of economic activities crosswise as rows. Fig. 1 shown below represents a matrix prepared as aforementioned.
To prepare an energy balance table, supply conditions of energy deduced from domestic energy production, energy import and export and stock change are to be drawn up first. To be indicated secondly is transformation from primary energy into processed energy (secondary energy) and energy requirements in energy industries engaged in such a transformation. The last step is to indicate types and quantities of energies used in final consumption sector.

Introduction of a matrix mode, in other words, stating quantitative output and input for each row and column and striking a balance between supply and demand concerning columns, makes it possible to grasp a flow of energy as a whole from a quantitative aspect with consistency.

(2)

Fig. 1 Schematization of Concept of Energy Balance Table



2. Configuration and Coding of Energy Balance Table

As shown in section 1, in a energy balance table, supply sources of primary energies, industries carrying out energy transformation and end consumers are put in rows and individual energy resources in columns. To make an analysis and map out policies, it is desirable that these items are subdivided as much as possible although accuracy of statistics on energy resources to be used as basic data is essential. Discussed in this section is configuration of rows and columns of an energy balance table prepared for Indonesia.

To compute an energy balance table with a computer by recalling basic statistics on energy stored in an energy supply-demand data bank, it is indispensable to decide codes which represent individual rows and columns of the energy balance table and establish display formats of energy basic statistics and energy balance expression. Discussed below are coding of rows and columns.

2-1. Configuration and Coding of Rows

Table 1 shows configuration of rows which represent individual fields of economic activities.

Fields of economic activities are roughly classified into four groups; primary energy supply, energy transformation, energy industires' own-use and final consumption.

The primary energy supply sector consists of domestic production, imports, exports, bunkers, stock change and the total. Because rows constituting this sector represent a concept which takes a very important position in the energy supply-demand data bank, each row is established as an independent category, and a character codes are given as follows; P (domestic production), I (imports), E (exports), B (bunkers), U (stock change) and W (stock). Meantime, bunkers, which are counted as an international uplift in the transportation sector, are not included in the total of this sector.

In the energy transformation sector, processes to transform primary energies into secondary energies are displayed in terms of input of primary energies and output of processed energies. Accordingly, a-character code "T" is newly set to indicate a category of raw material input. As to a category of processed energy output, the a-charactor code "P" set in the energy transformation sector is applied. Components of the energy transformation sector are; petroleum refining, NGL (LNG, condensed natural gas, LPG) production, fuel alcohol (fuel ethanol, fuel methanol) production, petrochemical LPG, public utilities' electric power generation, pumped hydroelectric power generation, private electric power generation (auto-generation), town gas production, coke production, briquet/oval briquet production and the total. As indicated in Table 1, each component is given three-letter code.

In accordance with a concept adopted in an energy balance tabular statement prepared by OECD, energy industries' own-use is separated from final consumption. This is based on a

Table 1 Configuration and Codes of Rows of Energy Balance Table

Row No.	Coding Symbol	Title
(1) Primary Energy Supply Sector		
R01	P	Domestic production
R02	I	Import
R03	E	Export
R04	B	(International uplift)
R05	W	Stock change
R06		Primary Energy Supply Sector Total EBR06 = EBR01 + EBR02 + EBR03 + EBR05
(2) Energy Transformation Sector (category T: input, P: output)		
R07	REF	Oil refining
R08	NGL	NGL (LNG, condensed natural gas and field LPG) production
R09	MOH EOH	Fuel alcohol production
R10	PLG	Petrochemical LPG production
R11	PUB	Public utilities' electric power generation
R12	PUP	Pump-up hydroelectric power generation
R13	AUT	Private electric power generation (Auto generation)
R14	TWG	Town gas production
R15	COK	Coke
R16	BPQ	Briquet
R17		Energy Transformation Sector Total EBR17 = EBR07 + EBR08 + EBR09 + EBR10 + EBR11 + EBR12 + EBR13 + EBR14 + EBR15 + EBR16
(3) Energy Industry Own-use Sector (Category H: own-use, L: loss)		
R18	CRF	Crude oil field
R19	NGF	Natural gas field
R20	REF	Refinery
R21	NGL	NGL plant
R22	MOH EOH	Fuel alcohol plant
R23	PUB	Public utility
R24	TWG	Town gas plant
R25	COK	Coke plant
R26	BRQ	Briquet producer
R27	CMN	Coal mine
R28	FAL	Flare and losses
R29		Energy Industry Own-use Sector Total EBR29 = EBR18 + EBR19 + EBR20 + EBR21 + EBR22 + EBR23 + EBR24 + EBR25 + EBR26 + EBR27 + EBR28
R30		Statistical difference EBR30 = EBR31 − (EBR06 + EBR17 + EBR29)

Row No.	Coding Symbol	Title
(4)		Final Energy Consumption Sector (Category C: Final consumption, A: Auto generation)
R31		Final consumption EBR31 = EBR33 + EBR49 + EBR52 + EBR58 + EBR59 + EBR60
R32		Final energy consumption EBR32 = EBR31 – EBR59 – EBR60
R33	TIN	Industry (Total) EBR33 = EBR34 + EBR35 + EBR36 + EBR37 + EBR38
R34	AGR FRT	Agriculture and Forestry
R35	FIS	Fishery
R36	MIN	Mining (excluding energy sector)
R37	CON	Construction
R38		Manufacturing (Total) EBR38 = EBR39 + EBR40 + EBR41 + EBR42 + EBR43 + EBR44 + EBR45 + EBR46 + EBR47 + EBR48
R39	FOD	Foods
R40	TXT	Textile
R41	RUB	Rubber
R42	PAP	Paper and pulp
R43	FCH	Chemistry (Fuel use in Chemistry)
R44	CAC	Ceramics and cements
R45	IAS	Iron and steel
R46	NFM	Non-ferrous metals
R47	MAC	Metal fabrication and machinery
R48	SWO	Small wares and others
R49	RAC	Residential and Commercial (Total) EBR49 = EBR50 + EBR51
R50	RES	Residential
R51	COM	Commercial
R52	TOR	Transportation (Total) EBR52 = EBR53 + EBR54 + EBR55 + EBR56 + EBR57
R53	AIR	Air transportation
R54	ROD	Road transportation
R55	RLW	Railways
R56	NAV	Internal navigation (including river)
R57	IUL	International uplift
R58	GAF	Others (Government (GOV), Forces (FOR), etc.)
R59	RCH	Raw material consumption in chemical industry
R60	NEN (others)	Other non-energy consumption (Asphalts, Waxes, Lubricants, Solvents and Grease)
R61	TCH	Final consumption in chemical industry TCH = FCH + RCH

theory that it is better to regard own-use by energy industries as a loss because energies in question are primarily used as fuels to transform primary energies into processed energies. Also established in this sector is a column of loss, in which losses such as electric power transmission loss and flares of natural gas are stated. Set as categories, own-use consumption and loss are given a-character codes "H" and "L", respectively. Components of the own-use sector are; oil fields, gas fields, refineries, NGL plants, fuel alcohol plants, public utilities, town gas plants, coking plants, briquet/oval briquet producer and coal mines. Their three-character codes are shown in Table 1.

The final consumption sector represents end consumers of energies. A-character code "C" is used to indicate a category of final consumption. The final consumption sector is subdivided into industrial, residential and commercial, transportation, public institution, chemical industry's material consumption and other non-fuel consumption sectors. The first four sectors aforementioned represent energy consumption as fuels which are summed up as sums-total of final energy consumption. The last two sectors, which represent energy consumption in any forms other than fuels, are added to final energy consumption and summed up as sums-total of final consumption.

The industrial sector consists of agriculture/forestry, fishery, mining, construction and manufacturing. Manufacturing is further divided into foodstuffs, textiles, rubber, paper/pulp, chemical industry, ceramics/cements, iron/steel, non-ferrous metals, metallic products/machines and other manufacturing. The residential and commercial sector is devided into two; residential and commercial sectors. Components of the transportation sector are; aviation, road, railway, navigation and international uplifts. Codes for these components are three-character, which are presented in Table 1.

In addition to the above, the remainder between sums-total of the three sectors (primary energy supply, energy transformation and energy industries' own-use) and final consumption is presented as a statistical difference.

Meantime, to mark off fuel consumption in private electric power generation from fuel consumption in individual industries, the energy balance tabular statement also include categories of A (private electric power generation) and F (conversion factor), the latter to indicate thermal conversion coefficient.

2-2. Configuration and Coding of Columns

Table 2 shows configuration of columns which represent individual types of energy resources.

Table 2 Configuration and Codes of Columns of Energy Balance Table

Column No.	Coding Symbol	Used Unit	Title
C01	TCO	T	Total of coal EBC01 = EBC02 + EBC03 + EBC04 + EBC05
C02	CCO	T	Coking coal
C03	SCO	T	Steam coal
C04	ACO	T	Anthracite
C05	LCO	T	Lignite
C06	TCR	BBL	Total of crude oil EBC06 = EBC07 + EBC08
C07	OCR	BBL	Original crude oil
C08	RCR	BBL	Reduced crude oil
C09	PET	KL	Petroleum products EBC09 = EBC10 + EBC21 + EBC22 + EBC23 + EBC24 + EBC25 + EBC26 + EBC27 + EBC28
C10	BBM	KL	Total of domestic fuel oil EBC10 = EBC11 + EBC15 + EBC16 + EBC17 + EBC20
C11	TGS	KL	Total of gasoline EBC11 = EBC12 + EBC13 + EBC14
C12	AGS	KL	Aviation gasoline
C13	SGS	KL	Super gasoline
C14	PGS	KL	Premium gasoline
C15	JET	KL	Jet fuel
C16	KER	KL	Kerosene
C17	TDO	KL	Total of diesel oil EBC17 = EBC18 + EBC19
C18	ADO	KL	Automotive diesel oil
C19	IDO	KL	Industrial diesel oil
C20	HFO	KL	Heavy fuel oil
C21	NAP	BBL	Naphtha
C22	LSR	BBL	Low sulfur waxy residue
C23	LUB	BBL	Lubricants
C24	SOL	BBL	Solvents
C25	ASP GRE WAX	BBL	Others (Asphalts + Grease + Waxes)
C26	PCK	BBL	Petroleum coke
C27	RFG	BBL	Refinery gas
C28	LPG	BBL	LPG
C29	TNG	MCF	natural gas
C30	NGL	BBL	NGL (Condensed natural gas)
C31	LNG	CM	LNG

Column No.	Coding Symbol	Used Unit	Title
C32	MOH	MT	Methanol
C33	TWG	CM	Town gas
C34	COK	MT	Coke
C35	CKG	CM	Coke oven gas
C36	BFG	CM	Blast furnace gas
C37	BRQ	T	Briquet
C38	WOD	CM	Wood
C39	CHR	T	Charcoal
C40	EOH	T	Fuel ethanol from biomass
C41	AGW	CM	Agricultural wastes
C42	TEL	KWH	Total of electricity EBC42 = EBC43 + EBC49
C43	PEL	KWH	Total of Public utility
C44	TPE	KWH	PUB by thermal generation
C45	HPE	KWH	PUB by hydro-generation
C46	PPE	KWH	PUB by pump-up hydro-generation
C47	NPE	KWH	PUB by nuclear generation
C48	GPE	KWH	PUB by geothermal (and other generation)
C49	TOE	KWH	Total of auto-generation
C50	TAE	KWH	Auto by thermal generation
C51	HAE	KWH	Auto by hydro-generation
C52	OAE	KWH	Auto by other generation
C53		Total	

Energy resources are roughly classified into coal, crude oil, petroluem products, other types of energies and electricity.

The coal part consists of coal total, coking coal, steam coal, anthracite and lignite. Codes representing individual energy resources are three-letter, which are shown in Table 2. While coking coal and steam coal are further divided into domestic coal and imported coal when an energy balance tabular statement is to be prepared for Japan, such a subdivision is considered unnecessary judging from current status of Indonesia.

The crude oil part is composed of crude oil total, crude oil and reduced crude. While Indonesia imports two types of heavy crude oil, asphalt base and lubricant base, which are purified at refineries, reduced crude is a general term given to these two types of heavy crude oil.

The petroleum products part takes the most important position in the energy balance tabular statement. Components of the category include; aviation gasoline, super gasoline, premium gasoline, jet fuel oil, kerosene, automotive diesel oil, industrial diesel oil, heavy fuel oil, naphtha, low-sulfur residual oil, lubricant oil, solvent, other petroleum products (asphalt, grease, wax), petroleum coke, refinery gas and LPG. Subtotals are presented concerning gasoline and diesel oil, respectively, and items ranging from gasoline to heavy fuel oil are summed up as fuel oil total. Sums total of petroleum products is then found by adding items ranging from naphtha to LPG to the fuel oil total. Three-character codes given to these energy items are shown in Table 2.

A notable feature of the energy balance tabular statement prepared for Indonesia is that fuel consumption attendant upon petroleum products and raw material consumption by the chemical industry are clearly marked off. Although naphtha is included in fuel oil total when an energy balance tabular statement is to be prepared for Japan, it is not in preparing one for Indonesia. Further, chemical industry's raw material consumption is specifically established as the 59th row in the Indonesian energy balance tabular statement.

The part of other types of energies consists of natural gas, NGL (condensed natural gas), LNG, fuel methanol, town gas, coke, coke-oven gas, blast furnace gas, briquet/oval briquet, firewood, charcoal, fuel ethanol and agricultural waste (see Table 2 for their three-character codes). As each of them is processed as an independent column, no presentation of subtotal similar to fuel oil total and petroleum products total is made.

Components of the electric power category are;electricity total, public utilities total, thermal power generation, hydroelectric power generation, pumped hydroelectric power generation, nuclear power generation, geothermal and other types power generation, private power generation total, private thermal power generation, private hydroelectric power generation and other types of private power generation. In case of electric power, it is possible to obtain basic statistics on supply by power generation source, such as thermal power generation and hydroelectric power genetation, while it is impossible to obtain such statistics on consumption because electric power generated by individual sources is mixed up at the level of public utilities and there is no means to collect separate data. This time, concerning the first point, a breakdown list to indicate supply sources of power generation to public utilities is presented at columns 44–48 and that to private electric power generation at columns 50–52, and their sums are stated at columns of public utilities (column 43) and private electric power generation (column 49), respectively. As to consumption, it is stated in the lump at columns of public utiliteis and private power generation striking a balance between demand and supply. The processing mentioned above enables readers of the energy balance tabular statement easily to read out efficiency of thermal power generation. On the other hand, however, a demerit is caused, that is, balance of items presented lengthwise and crosswise in the energy transformation and energy industries' own-use sector can not be expressed by sums gained from simple calculation.

2-3 Improvement of Row Configuration

The energy balance table prepared in the fiscal 1979 energy supply-demand data bank project, has a short coming in its row configuration. That is, a breakdown list of power supply sources incorporated with the columns of public utility and auto-generation makes it impossible to strike a balance between columns and rows. To improve this disadvantage, a processing method adopted in an energy balance table of OECD type was employed to prepare the fiscal 1980 version. In the concrete terms, the amounts of primary energies supplied by hydroelectric, nuclear and geothermal power generation were put in the columns of public utility and auto-generation, and the row of thermal power generation was deleted. On the right of these columns stating supply amounts by supply sources, two columns, one stating total output and consumption in the category of public utility and the other stating those in the category of auto-generation, were newly provided.

As the result of the preceding improvement, the row configuration of the category of electric power was modified as shown in Table 3.

Table 3 Improved Row Configuration in the Category of Electric Power

Row No.	Code	Item
C42	HPE	Hydro Generation in Public Utility
C43	HAE	Hydro Auto-Generation
C44	NPE	Nuclear Generation in Public Utility
C45	GPE	Geothermal Generation in Public Utility
C46	GAE	Geothermal Auto-Generation
C47	OPE	Other Generation in Public Utility
C48	OAE	Other Auto-Generation
C49		Electricity Total EBC49 = EBC50 + EBC51
C50	PEL	Total of Public Utility
C51	AEL	Total of Auto-Generation
C52		Grand Total EBC52 = EBC01 + EBC06 + EBC09 + EBC29 + EBC30 + EBC31 + EBC32 + EBC33 + EBC34 + EBC35 + EBC36 + EBC37 + EBC38 + EBC39 + EBC40 + EBC41 + EBC42 + EBC43 + EBC44 + EBC45 + EBC46 + EBC47 + EBC48 + EBC49

2-4 Configuration of Rows and Columns of Commodity Balance Table

The commodity balance table, whereby data on individual types of energy are shown in units peculiar to respective types of energy, is as important as the energy balance table employing a common unit. One of the method to calculate data contained in the commodity balance table is to work out directly based on the basic energy statistics. On the other hand, to calculate data contained in the energy balance table, subtraction is made when the basic energy statistics are absent, or calculations are made directly based on available data in such a category as auto-generation of which basic statistics deal with only input energy amount. With due regard to these points, the fiscal 1980 data bank system employed the following method; numerical values shown in the energy balance table are adjusted with appropriate heat quantity scale factors, and the data to be put in the commodity balance table are obtained by this operation.

The configuration of rows and columns of the commodity balance table is exactly the same as that of the energy balance table, except that the field for the total of petroleum products and for the grand total are left blank. This is because data on different petroleum products are shown in different units, such as kℓ, BBL and cf, and adding up the data requires complicated procedures.

Table 4 shows units and codes employed for individual types of energy.

Table 4 Units and Codes Employed in Commodity Balance Table

Row No.	Item	Unit	Code
C01	Coal/Total	t	TON
C02	Coking Coal	t	TON
C03	Steam Coal	t	TON
C04	Anthracite	t	TON
C05	Lignite	t	TON
C06	Crude Oil/Total	10^3BBL	MBBL
C07	Crude Oil	10^3BBL	MBBL
C08	Reduced Crude Oil	10^3BBL	MBBL
C09	Petroleum Products/Total	(BLANK)	
C10	Fuel Oil/Total	10^3KL	MKL
C11	Gasoline/Total	10^3KL	MKL
C12	Aviation Gasoline	10^3KL	MKL
C13	Super Gasoline	10^3KL	MKL
C14	Premium Gasoline	10^3KL	MKL
C15	Jet Fuel	10^3KL	MKL
C16	Kerosene	10^3KL	MKL
C17	Diesel Oil/Total	10^3KL	MKL
C18	Automotive Diesel Oil	10^3KL	MKL
C19	Industrial Diesel Oil	10^3KL	MKL
C20	Heavy Fuel Oil	10^3KL	MKL
C21	Naphtha	10^3BBL	MBBL

(12)

Row No.	Item	Unit	Code
C22	Low-Sulfur Waxy Residue	10^3 BBL	MBBL
C23	Lubricants	10^3 BBL	MBBL
C24	Solvents	10^3 BBL	MBBL
C25	Other Petroleum Products – Asphalt, Grease, Waxes –	10^3 BBL	MBBL
C26	Petroleum Coke	10^3 BBL	MBBL
C27	Refinary Gas	10^3 cf	MCF
C28	LPG	10^3 BBL	MBBL
C29	Natural Gas	10^3 cf	MCF
C30	NGL (Condensed Natural Gas)	10^3 BBL	MBBL
C31	LNG	10^3 m^3	MM3
C32	Methanol	t	TON
C33	Town Gas	10^3 m^3	MM3
C34	Coke	t	TON
C35	Coke Oven Gas	10^3 m^3	MM3
C36	Blast Furnace Gas	10^3 m^3	MM3
C37	Briquet	t	TON
C38	Wood	10^3 m^3	MM3
C39	Charcoal	t	TON
C40	Fuel Ethanol (from Biomass)	t	TON
C41	Agricultural Wastes	10^3 m^3	MM3
C42	Hydro Generation/Public Utility	10^6 Kwh	GWH
C43	Hydro Auto Generation	10^6 Kwh	GWH
C44	Nuclear Generation/Public Utility	10^6 Kwh	GWH
C45	Geothermal Generation/Public Utility	10^6 Kwh	GWH
C46	Geothermal Auto-Generation	10^6 Kwh	GWH
C47	Hydro Generation	10^6 Kwh	GWH
C48	Other Auto-Generation	10^6 Kwh	GWH
C49	Electricity/Total	10^6 Kwh	GWH
C50	Public Utility/Total	10^6 Kwh	GWH
C51	Auto-Generation/Total	10^6 Kwh	GWH
C52	Grand Total	(BLANK)	

2-5. Configuration of Rows and Columns of Concise Energy Balance Table

Because Indonesia does not yet have comprehensive statistics on macro-economics, it is not possible to use a detailed energy balance table for preparing an energy supply-demand forecast model. To implement the data bank system in fiscal 1979, the energy supply-demand forecast model was prepared based on a concise energy balance table which was prepared by manually calculating the data contained in a detailed energy balance table. In fiscal 1980, the calculation system having been introduced into the detailed energy balance table was improved to have a function to calculate data for the preparation of a concise energy balance table. Thus, basic data required for the preparation of an energy supply-demand forecast model were automatically provided by a computer.

According to the improvement, the configuration of rows and columns of the concise energy balance table was modified as shown in Table 5 and 6. Numerical values shown in the concise energy balance table are obtained by summing-up those shown in the rows or columns of the detailed energy balance table. Also shown in Tables 5 and 6 are equations used for summing-up numerical values shown in the rows and columns.

Table 5 Column Configuration of Concise Energy Balance Table

Column No.	Item	Equation
R01	Domestic production	CTR01 = EBR01
R02	Import	CTR02 = EBR02
R03	Export	CTR03 = EBR03
R04	Bunker	CTR04 = EBR04
R05	Stock Change	CTR05 = EBR05
R06	Primary Energy Supply/Total	CTR06 = EBR06
R07	Oil Refining	CTR07 = EBR07
R08	Production of LNG, LPG, CON and alcohol	CTR08 = EBR09 + EBR10
R09	Power Generation	CTR09 = EBR11 + EBR12 + EBR13
R10	Production of Town Gas	CTR10 = EBR14 + EBR15 + EBR16
R11	Energy Industries' Own-Use	CTR11 = EBR18 + EBR19 + EBR20 + EBR21 + EBR22 + EBR23 + EBR24 + EBR25 + EBR26 + EBR27
R12	Loss	CTR12 = EBR28
R13	Statistical Difference	CTR13 = EBR30
R14	Final Consumption/Total	CTR14 = EBR31
R15	Final Energy Consumption	CTR15 = EBR32
R16	Industrial Sector	CTR16 = EBR33
R17	Residential & Commercial Sector	CTR17 = EBR49
R18	Transportation Sector	CTR18 = EBR52
R19	Government Sector	CTR19 = EBR58
R20	Non-Energy Consumption	CTR20 = EBR59 + EBR60

Table 6 Row Configuration of Concise Energy Balance Table

Row No.	Item	Equation
C01	Solid Fuel	CTC01 = EBC01 + EBC34 + EBC37
C02	Crude Oil	CTC02 = EBC06
C03	Petroleum Products/Total	CTC03 = EBC09
C04	Fuel Oil/Total	CTC04 = EBC10
C05	Gasoline	CTC05 = EBC11
C06	Jet Fuel	CTC06 = EBC15
C07	Kerosene	CTC07 = EBC16
C08	Automotive Diesel Oil	CTC08 = EBC18
C09	Industrial Diesel Oil	CTC09 = EBC19
C10	Heavy Fuel Oil	CTC10 = EBC20
C11	Naphtha	CTC11 = EBC21
C12	LPG	CTC12 = EBC28
C13	Other Petroleum Products	CTC13 = EBC22 + EBC23 + EBC24 + EBC25 + EBC26 + EBC27
C14	Natural Gas	CTC14 = EBC29
C15	NGL (Condensed Natural Gas)	CTC15 = EBC30
C16	LNG	CTC16 = EBC31
C17	Methanol	CTC17 = EBC32
C18	Town Gas	CTC18 = EBC33
C19	Other Gas	CTC19 = EBC35 + EBC36
C20	Hydro Generation	CTC20 = EBC42 + EBC43
C21	Geothermal Generation	CTC21 = EBC45 + EBC46
C22	Nuclear Generation	CTC22 = EBC44
C23	Other Generation	CTC23 = EBC47 + EBC48
C24	Electricity	CTC24 = EBC49
C25	Commercial Energy/Total	CTC25 = CTC01 + CTC02 + CTC03 + CTC14 + CTC15 + CTC16 + CTC17 + CTC18 + CTC19 + CTC20 + CTC21 + CTC22 + CTC23 + CTC24
C26	Non-Commercial Energy	CTC26 = EBC38 + EBC39 + EBC40 + EBC41
C27	Grand Total	CTC27 = CTC25 + CTC26

GENERAL MANUAL OF ENERGY BALANCE TABLE II

BASIC ENERGY STATISTICS

GENERAL MANUAL OF ENERGY BALANCE TABLE II
– BASIC ENERGY STATISTICS –

It is basic statistics on individual energy resources that form the basis of an energy balance table. Discussed in this manual is basic statistics on energy which were collected this time to prepare the energy balance table. Some data which were not available were calculated on a resonable supposition which could make supply and demand well balanced, of which process is also discussed in this manual.

In the collected statistics, units peculiar to individual energy resources are used, which means a principal table which forms the base of the energy balance table contains a variety of units. Accordingly, it is not possible during this stage to carry out addition and substraction of values among different types of energy resources expressed with different units nor to calculate total energy demand of nation. One of the purposes of an energy balance table is to establish a unit common to all the types of energy resources which enables us to carry out addition and substraction of values among different types of energy resources, calculate total energy demand and indicate quantitative variation among alternative energies in the table to some extent. While there are various kinds of units, such as price, thermal quantity, horsepower and Kwh, which can be adopted as a common unit, thermal quantity is usually adopted because it is most popular to use energy in the form of heat. Scale factors used for calculating thermal quantity shown in the energy balance table are also discussed in this manual.

1. Basic Statistics by Type of Energy

When establishment of an energy supply-demand data bank, a part of this project, is completed and all the basic data are compiled in a computer file, it becomes possible to recall basic statistics by type of energy and by period, such as monthly basis, quarterly basis, annual basis and fiscal year basis. For calculating data shown in the energy balance table prepared this time, however, it was not possible to use the data bank because establishment of the bank was carried out in parallel with preparation of the energy balance table and all the basic statistics were not input in the bank. Accordingly, basic statistics by type of energy were obtained from various materials prepared by the Ministry of Mining and Energy for the 1969–1979 period on annual basis.

Prior to presenting a list of basic statistics by type of energy, it will be worthy to explain codes of items of basic statistics by type of energy. A code of an item consists of a-character code representing a category which was explained in GENERAL MANUAL OF ENERGY BALANCE TABLE I and combination of three-character codes representing energy activity sector or type of energy. In other words, general form to express an item code is as follows:

A-character code	Three-character code	Three-character code
representing a category	representing type of energy	representing an economic activity sector

Examples of item codes are shown in Table 1 by group.

Table 1 Item Codes of Basic Statistics by Type of Energy (Examples)

Code	Item
Primary energy supply sector	
POCR	Crude oil, domestic production
ICCO	Coking coal, import
FLNG	LNG, export
WPGS	Premium gasoline, stock
BJET	Jet fuel, bunker
Energy transformation sector	
TOCR&REF	Crude oil, refinery processing
PKER&REF	Kerosene, production in refinery
TADO&PUB	Automotive Diesel Oil for power generation
PLNG&NGL	LNG, NGL plant production
Energy industry own-use sector	
HSCO&CMN	Steam coal, own-use in coal mines
HHFO&REF	Heavy oil, own-use in refinery
HOCR&CRF	Crude oil, own-use in crude oil field
LTNG	Natural gas, flare and loss
Final consumption sector	
CSCO&MIN	Steam coal, final consumption in mining
CAGS&AIR	Aviation gasoline, final consumption in air transportation
CAGW&RAC	Agricultural wastes, final consumption in residential and commercial sector
AADO&IAS	Automotive diesel oil, auto generation in iron and steel

In the following pages, basic statistics by type of energy are listed. Codes explained above are used for indicating items of individual statistics. Data are shown by type of energy and notes attached to each table are to explain values obtained from calculations and point out difficulties related to each type of energy.

(1) Coking coal

Unit : Ton

Item \ Year	69	70	71	72	73	74	75	76	77	78	79
ICCO	0.0	0.0	0.0	11885.0	2590.0	983.0	5731.0	1137.0	0.0	0.0	0.0
WCCO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TCCO & TWG	0.0	0.0	0.0	11885.0	2590.0	983.0	5731.0	1137.0	0.0	0.0	0.0
TCCO&COK	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LCCO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Up to now, no coking coal has been produced. Town gas production from import coking coal, which had been conducted during a few years in the past, is now discontinued. Because a town gas production plant is now under construction. Which is scheduled to complete in fiscal 1983, import of coking coal is considered to be resumed in the future.

(2) Steam coal

Unit: Ton

Item \ Year	69	70	71	72	73	74	75
PSCO	NA	NA	198256.0	179240.0	145470.0	148725.0	198963.0
ESCO	NA	NA	0.0	0.0	0.0	0.0	0.0
WSCO	NA	NA	51277.0	35536.0	1739.0	9210.0	12312.0
TSCO&PUB	NA	NA	0.0	0.0	0.0	0.0	0.0
TSCO&AUT	NA	NA	71636.0	73986.0	48195.0	60249.0	83963.0
TSCO&TWG	NA	NA	0.0	0.0	0.0	0.0	0.0
TSCO&BRQ	NA	NA	0.0	0.0	0.0	0.0	0.0
HSCO&CMN	NA	NA	24618.0	13541.0	13678.0	10820.0	7846.0
LSCO	NA	NA	0.0	0.0	0.0	0.0	0.0
CSCO&MIN	NA	NA	0.0	0.0	0.0	0.0	0.0
CSCO&CAC	NA	NA	49071.0	50383.0	40186.0	39899.0	43840.0
CSCO&SWO	NA	NA	4351.0	4718.0	5021.0	5431.0	5283.0
CSCO&RLW	NA	NA	483545.0	30048.0	39384.0	34523.0	50920.0

Item \ Year	76	77	78	79
PSCO	164582.0	198089.0	213601.0	0.0
ESCO	0.0	7664.0	3330.0	45828.0
WSCO	15152.0	18054.0	44369.0	29851.0
TSCO&PUB	0.0	0.0	0.0	0.0
TSCO&AUT	77067.0	83336.0	82781.0	61802.0
TSCO&TWG	0.0	0.0	0.0	0.0
TSCO&BRQ	0.0	0.0	0.0	0.0
HSCO&CMN	2840.0	5261.0	8220.0	360.0
LSCO	0.0	0.0	0.0	16310.0
CSCO&MIN	0.0	0.0	0.0	12550.0
CSCO&CAC	32059.0	50261.0	47219.0	56896.0
CSCO&SWO	5295.0	5481.0	7016.0	9112.0
CSCO&RLW	43257.0	43053.0	30748.0	26125.0

(4)

Steam coal is now produced at two coal mines, Bukit Asam and Ombilin. As to statistics referred to for preparing the above, data have been accumulated at the two mines since prewar days, while it was not until 1971 when data on the nation as whole were first collected on an annual basis. Data which were not available and shown in the table as NA without notes are assumed "0". Data collected in older years do not always assure a good balance and tend to have greater statistical differences.

(3) Anthracite

Union: Ton

Item \ Year	69	70	71	72	73	74	75
PACO	NA	NA	NA	NA	3356.0	7424.0	7427.0
EACO	NA	NA	NA	0.0	0.0	0.0	0.0
WACO	NA	NA	1963.0[1]	458.0	548.0	902.0	1243.0
HACO&CMN	NA	NA	NA	0.0	0.0	0.0	0.0
LACO	NA	NA	NA	0.0	0.0	0.0	0.0
CACO&MIN	NA	NA	NA	0.0	0.0	0.0	0.0
CACO&NFM	NA	NA	NA	0.0	0.0	0.0	0.0
CACO&NEN	NA	NA	NA	1505.0	2360.0	5966.0	5891.0
	76	77	78	79			
PACO	18328.0	32538.0	50580.0	63681.0			
EACO	7003.0	15514.0	22119.0	8152.0			
WACO	2223.0	11493.0	26392.0	104754.0			
HACO&CMN	0.0	0.0	0.0	0.0			
LACO	0.0	0.0	0.0	0.0			
CACO&MIN	0.0	0.0	0.0	0.0			
CACO&NFM	0.0	0.0	0.0	0.0			
CACO&NE	10055.0	16412.0	22241.0	25677.0			

While data on stock and final consumption of anthracite have been being obtained since 1972, data on domestic consumption was first collected in 1973. Regarding 1972 when no domestic production was conducted and big umbalance between final consumption and stock was found, data were calculated back so as to make them well matched with the 1971 stock data.

(4) Lignite

While it was reported that lignite has been consumed by end users in industrial sector, statistics which could be referred to for preparing a table could not be obtained. However, expressions for calculation data are presented in the energy balance table so as to make it possible to calculate data when statistics are obtained in the future.

(5) Original Crude Oil

Unit: BBL

Item \ Year	69	70	71	72	73	74
POCR	270951236.0	311518340.0	325648507.0	395560338.0	488536230.0	501837000.0
IOCR	0.0	0.0	0.0	0.0	0.0	0.0
EOCR	188817000.0	228268000.0	239584600.0	290908000.0	369543000.0	378905000.0
WOCR	NA	NA	NA	NA	NA	7923000.0
TOCR&REF	75703413.0	80483404.0	90200000.0	100412000.0	118655000.0	119037000.0
HOCR&CRF	NA	NA	NA	NA	NA	2518000.0
HOCR&REF	NA	NA	NA	NA	NA	NA
LOCR	NA	NA	NA	NA	NA	NA

Item \ Year	75	76	77	78	79
POCR	476855000.0	550318000.0	615122000.0	596698000.0	559274000.0
IOCR	0.0	7737000.0	29622000.0	31059000.0	30478617.0
EOCR	363069000.0	449471000.0	485287000.0	461918000.0	394379692.0
WOCR	9674000.0	11239000.0	9304000.0	12065000.0	6943.0
TOCR&REF	107765000.0	109470000.0	151363000.0	159798000.0	182444320.0
HOCR&CRF	2522000.0	3212000.0	2114000.0	1257000.0	1299817.0
HOCR&REF	NA	NA	NA	NA	3598024.0
LOCR	NA	NA	NA	NA	261594.0

Difficulties related to original crude oil are absence of data on stock and own-use in crude oil fields over the period before 1974 and absence of data on own-use in refineries over all the periods up to now. However, generally speaking, quality of data which are available is very good having only small statistical difference.

(6) Reduced Crude Oil

Unit: BBL

Item \ Year	69	70	71	72	73	74
IABS	186106.0	2336751.0	2464000.0	658800.0	949700.0	803000.0
WABS	0.0	2021409.0*	1687759.0*	1228113.0*	342000.0*	166000.0*
TABS&REF	186106.0*	315342.0*	2797650.0	1118446.0	1835813.0	979000.0
LABS	NA	NA	NA	NA	NA	NA
ILBS	31309.0	26228.0	65000.0	59000.0	28600.0	61000.0
WLBS&REF	0.0	0.0	26854.0*	40614.0*	20000.0*	30000.0*
TLBS&REF	31309.0*	26228.0*	16379.0*	45240.0	49214.0	51000.0
LLBS	NA	NA	NA	NA	NA	NA

Item \ Year	75	76	77	78	79
IABS	509000.0	225000.0	133000.0	0.0	0.0
WABS	200000.0*	81000.0*	0.0	0.0	0.0
TABS&REF	475000.0	344000.0	214000.0	0.0	0.0
LABS	NA	NA	NA	NA	NA
ILBS	31000.0	35000.0	0.0	0.0	909411.0
TLBS&REF	19000.0*	31000.0*	6000.0*	0.0	0.0
TLBS	42000.0	23000.0	25000.0	6000.0	0.0
LLBS	NA	NA	NA	NA	NA

(6)

Indonesia has been importing two types of heavy oil, asphalt base and lubricant base, which are processed in refineries. Reduced crude oil is a general term given to these two types of heavy oil. As to statistics on them which can be referred to for preparing a table, no data on stock is available and it was in 1971 when data on processed quantity in refineries were first obtained. Because there is a big umbalance between imported quantity and refineries' processed quantity, data were calculated back this time so as to make them well matched with stock. Concerning the 1971 and preceding period, stock was calculated back in a manner not producing a contradiction with data over the 1972 and following period. Also, processed quantity in refineries was calculated based on stock data gained in the manner aforementioned to which data on import were added. Thus, principal statistics on reduced crude are very poor and we could not help taking supposition in various aspects. However, because absolute quantity of reduced crude oil is so small that no significant effect is considered to be given to the energy balance table as a whole.

(7) Aviation Gasoline

Unit: kl

Item \ Year	69	70	71	72	73	74	75
IAGS	0.0	0.0	1097.0	0.0	0.0	0.0	0.0
EAGS	0.0	4770.0	2067.0	0.0	0.0	0.0	0.0
BAGS	0.0	0.0	0.0	0.0	0.0	1951.0	2209.0
WAGS	0.0	0.0	0.0	0.0	0.0	0.0	6613.0
PAGS&REF	32885.0	27292.0	32184.0	20316.0	5167.0	23689.0	28522.0
HAGS&CRF	0.0	0.0	0.0	0.0	0.0	0.0	0.0
HAGS&REF	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LAGS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GAGS&AGR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CAGS&FRT	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	76	77	78	79			
IAGS	0.0	0.0	0.0	0.0			
EAGS	0.0	3545.0	0.0	6636.0			
BAGS	1322.0	1605.0	1065.0	6636.0			
WAGS	2012.0	4125.0	3639.0	3012.2			
PAGS&REF	20732.0	17997.0	22608.0	24578.7			
HAGS&CRF	0.0	0.0	0.0	976.0			
HAGS&REF	0.0	0.0	0.0	0.0			
LAGS	0.0	0.0	0.0	0.0			
CAGS&AGR	26.0	33.0	175.0	43.0			
CAGS&FRT	0.0	0.0	0.0	334.0			

To start with, it will be worthy to point out problems related to principal statistics on almost all the types of petroleum products; the first problem is that statistics on stock are available only for the 1975 and following period. The second problem is absence of data on energy industries' own-use for all the periods. Accordingly, as to petroleum products of which stock data for 1974 are not available, stock variables of 1974 are assumed "0".

Unit: kl

Item \ Year	69	70	71	72	73	74	75	76	77	78	79
CAGS&MIN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	141.0	12.0	10.0	21.0
CAGS&MAC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0
CAGS&SWO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	150.0
CAGS&AIR	28680.0	21975.0	20662.0	18700.0	3100.0	14289.0	13252.0	11428.0	11123.0	10869.0	11631.0
CAGS&IUL	0.0	0.0	0.0	0.0	0.0	1951.0	2209.0	1322.0	1605.0	1065.0	1427.0
CAGS&GAF	0.0	0.0	0.0	0.0	0.0	5853.0	6606.0	8297.0	7569.0	9387.0	7001.0

1979: CAGS&CON 12.0

Problem aforementioned are presented in the form of statistical difference in the energy balance table.

Since 1974, it has become possible to obtain detailed statistics by type of industry on petroleum products except diesel oil and heavy fuel oil. As to aviation gasoline, it is found that all the industries are using it for transport by aircrafts. Accordingly, in the energy balance table, consumption of aviation gasoline by type of industry was added to GAGS&TIN, an intermediate variable, of which resultant figure was then added to CAGS&AIR to complete calculation.

(8) Super Gasoline

Unit: kl

Item \ Year	69	70	71	72	73	74	75
ISGS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WSGS	0.0	0.0	0.0	0.0	0.0	0.0	6604.0
PSGS&REF	835.0	7321.0	18473.0	32876.0	60817.0	73287.0	100516.0
HSGS&REF	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LSGS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CSGS&MIN	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CSGS&FOD	0.0	0.0	0.0	0.0	0.0	363.0	445.0
CSGS&FCH	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CSGS&MAC	0.0	0.0	0.0	0.0	0.0	122.0	115.0
CSGS&SWO	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CSGS&ROD	840.0	7273.0	16203.0	31989.0	57068.0	78179.0	104237.0
CSGS&GAF	0.0	0.0	0.0	0.0	920.0	140.0	135.0

Item	76	77	78	79			
ISGS	0.0	0.0	0.0	0.0			
WSGS	5647.0	6014.0	9206.0	0.0			
PSGS&REF	111681.0	113864.0	111611.0	106334.0			
HSGS&REF	0.0	0.0	0.0	0.0			
LSGS	0.0	0.0	0.0	0.0			
CSGS&MIN	3300.0	4333.0	2100.0	1070.0			
CSGS&FOD	374.0	175.0	197.0	195.0			
CSGS&FCH	160.0	220.0	290.0	340.0			
CSGS&MAC	560.0	463.0	183.0	93.0			
CSGS&SWO	0.0	0.0	0.0	656.0			
CSGS&ROD	107954.0	107391.0	113166.0	96010.0			
CSGS&GAF	1079.0	1273.0	1229.0	1019.0			

1979: HSGS&CRF 47.0
CSGS&CON 7.0

As to final consumption of super gasoline by type of industry, it is found that all the industries are using it for road transportation. Accordingly, in the energy balance table, consumption of super gasoline by type of industry was added to CSGS&TIN, an intermediate variable, of which resultant figure was then added to CSGS&ROD to complete calculation. While data on final consumption of super gasoline and premium gasoline are available separately, data on their stocks and processed quantities in refineries are mixed up. Accordingly, separate data on stock quantities and processed quantities of super gasoline and premium gasoline were obtained by summing up final consumption of each product and proportionally allotting the resultant values to the mixed data.

As to premium gasoline, final consumption by type of industry was also processed by finding values of CPGS&TIN, an intermediate variable, which were then added to CPGS&ROD.

(9) Premium Gasoline

Unit: kl

Item \ Year	69	70	71	72	73	74	75
IPCS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
EPGS	255812.0	356451.0	47076.0	0.0	0.0	433878.0	604472.0
WPGS	0.0	0.0	0.0	0.0	0.0	0.0	144504.0
PPGS&REF	1703534.0	1913426.0	1966296.0	1761151.0	1980112.0	1954605.0	2199536.0
HPGS&CRF	0.0	0.0	0.0	0.0	0.0	0.0	0.0
HPGS&REF	0.0	0.0	0.0	0.0	0.0	0.0	0.0
HPGS&PUB	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LPGS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CPGS&AGR	0.0	0.0	0.0	0.0	0.0	16658.0	18168.0
CPGS&FRT	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CPGS&MIN	0.0	0.0	0.0	0.0	0.0	6551.0	9084.0
CPGS&CON	0.0	0.0	0.0	0.0	0.0	4804.0	4542.0
CPGS&FOD	0.0	0.0	0.0	0.0	0.0	12181.0	15897.0
CPGS&TXT	0.0	0.0	0.0	0.0	0.0	433.0	625.0
CPGS&RUB	0.0	0.0	0.0	0.0	0.0	121.0	407.0
CPGS&PAP	0.0	0.0	0.0	0.0	0.0	836.0	936.0
CPGS&FCH	0.0	0.0	0.0	0.0	0.0	845.0	896.0
CPGS&CAC	0.0	0.0	0.0	0.0	0.0	801.0	1235.0
CPGS&NFM	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CPGS&MAC	0.0	0.0	0.0	0.0	0.0	329.0	483.0
CPGS&SWO	0.0	0.0	0.0	0.0	0.0	69.0	96.0
CPGS&ROD	1457449.0	1544326.0	1677573.0	1713637.0	1639719.0	1826648.0	1989217.0
CPGS&NAV	0.0	0.0	0.0	0.0	0.0	518.0	69.0
CPGS&GAF	0.0	0.0	0.0	0.0	248217.0	230956.0	254502.0

	76	77	78	79			
IPGS	300010.0	62164.0	2703.0	0.0			
EPGS	0.0	0.0	0.0	0.0			
WPGS	108149.0	146703.0	245549.0	171290.7			
PPGS&REF	2138953.0	2777651.0	2977049.0	3414647.0			
HPGS&CRF	0.0	0.0	0.0	11328.0			
HPGS&REF	0.0	0.0	0.0	147736.8			
HPGS&PUB	2147.0	2063.0	1091.0	0.0			
JPGS	0.0	0.0	0.0	0.0			
CPGS&AGR	21769.0	22515.0	21365.0	371.0			
CPGS&FRT	0.0	0.0	0.0	27934.0			
CPGS&MIN	9826.0	8854.0	8107.0	8898.0			
CPGS&CON	5758.0	6494.0	6843.0	6000.0			
CPGS&FOD	16647.0	16464.0	15450.0	13870.0			
CPGS&TXT	695.0	586.0	543.0	474.0			
CPGS&RUB	445.0	163.0	429.0	454.0			
CPGS&PAP	1024.0	1130.0	906.0	929.0			
CPGS&FCH	1003.0	1143.0	1837.0	999.0			
CPGS&CAC	1350.0	1803.0	2312.0	2176.0			
CPGS&NFM	0.0	0.0	0.0	0.0			
CPGS&MAC	528.0	445.0	871.0	646.0			
CPGS&SWO	105.0	94.0	91.0	2573.0			
CPGS&ROD	2173975.0	2468846.0	2840172.0	3116120.0			
CPGS&NAV	0.0	701.0	57.0	13.0			
CPGS&GAF	1024.0	248190.0	226127.0	210741.0			

1979: CPGS&IAS 162.0

(10) Jet Fuel

Unit: kl

Item \ Year	69	70	71	72	73	74	75
IJET	0.0	0.0	0.0	11034.0	121928.0	160737.0	353430.0
EJET	231486.0	24166.0	0.0	0.0	0.0	0.0	0.0
BJET	0.0	0.0	0.0	0.0	0.0	86074.0	102583.0
WJET	0.0	0.0	0.0	0.0	0.0	0.0	4389.0
PJET&REF	282408.0	145841.0	163787.0	187786.0	152618.0	216065.0	75837.0
HJET&CRF	0.0	0.0	0.0	0.0	0.0	0.0	0.0
HJET&REF	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LJET	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CJET&AGR	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CJET&FRT	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CJET&MIN	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CJET&CON	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CJET&SWO	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CJET&AIR	75458.0	108450.0	145698.0	190743.0	263700.0	231360.0	287018.0
CJET&IUL	0.0	0.0	0.0	0.0	0.0	86074.0	102583.0
CJET&GAF	0.0	0.0	0.0	0.0	0.0	24267.0	20409.0

Item	76	77	78	79			
IJET	416072.0	476964.0	493976.0	269610.0			
EJET	0.0	0.0	0.0	145302.0			
BJET	107067.0	116713.0	153466.0	145842.0			
WJET	9066.0	30831.0	18738.0	34471.0			
PJET&REF	54692.0	9380.0	18602.0	174290.0			
HJET&CRF	0.0	0.0	0.0	11885.0			
HJET&REF	0.0	0.0	0.0	45005.0			
LJET	0.0	0.0	0.0	0.0			
CJET&AGR	0.0	4.0	21.0	61.0			
CJET&FRT	0.0	0.0	0.0	10.0			
CJET&MIN	1214.0	287.0	284.0	0.0			
CJET&CON	0.0	57.0	10.0	0.0			
CJET&SWO	0.0	0.0	0.0	170.0			
CJET&AIR	299563.0	313714.0	358650.0	390458.0			
CJET&IUL	107067.0	116713.0	153466.0	145842.0			
CJET&GAF	21302.0	331777.0	40849.0	29337.0			

1979: CJET&FOD 10.0

Like data on aviation gasoline, data on jet fuel were processed by summing up final consumption by type of industry to find value of CJET&TIN, an intermediate variable, which was then added to CJET&AIR.

(11) Kerosene

Unit: kl

Item \ Year	69	70	71	72	73	74	75
IKER	0.0	0.0	822524.0	394608.0	309550.0	895261.0	989700.0
WKER	0.0	0.0	0.0	0.0	0.0	0.0	160143.0
PKER&REF	2252277.0	2362940.3	2361999.0	2437010.0	3099550.0	3357032.0	3368479.0
TKER&TWG	0.0	0.0	0.0	0.0	0.0	0.0	0.0
HKER&CRF	0.0	0.0	0.0	0.0	0.0	0.0	0.0
HKER&REF	0.0	0.0	0.0	0.0	0.0	0.0	0.0
HKER&TWG	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LKER	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CKER&MIN	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CKER&SWO	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CKER&RAC	2713023.0	2728250.0	3023821.0	3290580.0	3685213.0	4206383.0	4766092.0
CKER&GAF	0.0	0.0	0.0	0.0	0.0	52081.0	52189.0

	76	77	78	79
IKER	2326630.0	790011.0	695255.0	903095.0
WKER	137103.0	288446.0	354020.0	224190.3
PKER&REF	317403.60	4828307.0	4751674.0	5535452.9
TKER&TWG	0.0	0.0	0.0	0.0
HKER&CRF	0.0	0.0	0.0	92.0
HKER&REF	0.0	0.0	0.0	9011.7
HKER&TWG	0.0	0.0	0.0	0.0
LKER	0.0	0.0	0.0	0.0
CKER&MIN	100.0	0.0	0.0	0.0
CKER&SWO	0.0	3.0	2.0	0.0
CKER&RAC	5221208.0	5790109.0	6491483.0	7164054.0
CKER&GAF	64553.0	76852.0	71082.0	70969.0

Kerosene is used only for lighting. Accordingly, in the energy balance table, final consumption of sectors other than the residential and commercial sector were summed up, of which resultant figure was added to CKER&RAC. Only point that data processing of kerosene differs from those of other types of petroleum products is that CKER&GAF was also added to consumption by type of industry. This is because a military use was separately presented in cases of other types of petroleum products. While a big unbalance between supply and demand of kerosene is noted, this is because of absence of statistics on transactions with refineries in Singapore by which naphtha or heavy fuel oil which are not distributed on a commercial basis are bartered away for kerosene. While it is mentioned later, statistical differences caused by the same reason are also incurred in data processing of naphtha and heavy fuel oil. To eliminate such a problem, it is most desirable to classify data on such transactions into "export of naphtha or heavy fuel oil to Singapore" or "import of kerosene from Singapore" in the future.

(12) Automotive Diesel Oil

Unit: kl

Item \ Year	69	70	71	72	73	74
IADO	0.0	0.0	7504.0	0.0	245732.0	339280.0
EADO	151039.0	32434.0	0.0	0.0	0.0	0.0
BADO	0.0	10299.0	3814.0	0.0	0.0	456.0
WADO	0.0	0.0	0.0	0.0	0.0	0.0
PADO&REF	968642.0	962490.0	1153600.0	1275379.0	1723278.0	2147928.0
TADO&PUB	133551.0	167074.0	164043.0	147616.0	197573.0	219582.0
TADO&TWG	557.0	697.0	684.0	616.0	824.0	916.0
HADO&CRF	0.0	0.0	0.0	0.0	0.0	0.0
HADO&REF	0.0	0.0	0.0	0.0	0.0	0.0
HADO&PUB	0.0	0.0	0.0	0.0	0.0	0.0
HADO&TWG	0.0	0.0	0.0	0.0	0.0	0.0
LADO	0.0	0.0	0.0	0.0	0.0	0.0
CADO&AGR	37049.0	45446.0	50967.0	47743.0*	63900.0	133815.0
CADO&FRT	0.0	0.0	0.0	18739.0*	25081.0	0.0
CADO&FIS	0.0	0.0	0.0	0.0	0.0	0.0
CADO&MIN	58395.0	70129.0	73026.0	80365.0*	107563.0	119768.0
CADO&CON	0.0	0.0	0.0	0.0	0.0	0.0
CADO&FOD	28935.0	32871.0	44330.0	68322.0*	91444.0	69588.0
CADO&TXT	26141.0	39961.0	53149.0	73219.0*	97998.0	126763.0
CADO&RUB	13955.0	29026.0	39828.0	49305.0*	65991.0	66526.0
CADO&PAP	3914.0	4220.0	6330.0	12414.0*	16615.0	18335.0
CADO&FCH	0.0	0.0	0.0	10342.0*	13842.0	24298.0
CADO&CAC	9873.0	12597.0	15611.0	15157.0*	20287.0	28927.0
CADO&IAS	0.0	0.0	0.0	6777.0*	9071.0	9494.0
CADO&NFM	0.0	0.0	0.0	0.0	0.0	0.0
CADO&MAC	0.0	0.0	0.0	0.0	0.0	0.0
CADO&SWO	138460.0	249398.0	339153.0	327065.0*	437754.0	0.0
CADO&AIR	0.0	0.0	0.0	0.0	0.0	0.0
CADO&ROD	22674.0	20842.0	38241.0	253858.0*	339771.0	970113.0
CADO&RLW	35612.0	38299.0	38276.0	33195.0*	44429.0	39761.0
CADO&NAV	32018.0	36429.0	85568.0	164164.0*	219722.0	222760.0
CADO&IUL	8393.0	10299.0	3814.0	0.0	0.0	456.0
CADO&GAF	173181.0	140276.0	146175.0	126329.0*	169082.0	146090.0

(continued)

Unit: kl

Item \ Year	75	76	77	78	79
IADO	700501.0	1854344.0	140947.0	1500688.0	1176858.3
EADO	0.0	0.0	0.0	0.0	71834.0
BADO	5470.0	10305.0	11456.0	9238.0	7614.0
WADO	144614.0	212670.0	246784.0	435577.0	192962.9
PADO&REF	2231397.0	2022963.0	3161476.0	3620952.0	4283747.0
TADO&PUB	293880.0	499547.0	660506.0	824699.0	712912.0
TADO&TWG	1016.0	1245.0	3800.0	5002.0	6117.0
HADO&CRF	0.0	0.0	0.0	0.0	219041.0
HADO&REF	0.0	0.0	0.0	0.0	139909.4
HADO&PUB	0.0	0.0	0.0	0.0	0.0
HADO&TWG	0.0	0.0	0.0	0.0	0.0
LADO	0.0	0.0	0.0	0.0	0.0
CADO&AGR	150481.0	414027.0	436824.0	530387.0	30076.0
CADO&FRT	0.0	0.0	0.0	0.0	597125.0
CADO&FIS	0.0	0.0	0.0	0.0	0.0
CADO&MIN	126167.0	138908.0	156295.0	155954.0	169393.0
CADO&CON	0.0	91834.0	115485.0	137790.0	129733.0
CADO&FOD	84314.0	192033.0	224899.0	284761.0	311503.0
CADO&TXT	183592.0	263230.0	341709.0	425209.0	484035.0
CADO&RUB	72218.0	90369.0	102287.0	119366.0	133032.0
CADO&PAP	16742.0	19475.0	29540.0	54321.0	52868.0
CADO&FCH	34413.0	48359.0	74398.0	118436.0	155868.0
CADO&CAC	39769.0	92015.0	111302.0	151741.0	76338.0
CADO&IAS	24945.0	51801.0	70254.0	81654.0	78212.0
CADO&NFM	0.0	18257.0	16407.0	11322.0	11392.0
CADO&MAC	0.0	21494.0	24922.0	36098.0	39847.0
CADO&SWO	0.0	24018.0	28405.0	19703.0	232646.0
CADO&AIR	0.0	3335.0	2076.0	2085.0	2099.0
CADO&ROD	1318793.0	1042519.0	1214787.0	1321068.0	1544006.0
CADO&RLW	39708.0	42527.0	45410.0	57594.0	65021.0
CADO&NAV	215260.0	269505.0	253904.0	266118.0	299406.0
CADO&IUL	5470.0	10305.0	11456.0	9238.0	7614.0
CADO&GAF	181725.0	388121.0	379125.0	389652.0	203955.0

(13) Industrial Diesel Oil

Unit: kl

Item \ Year	69	70	71	72	73	74
IIDO	0.0	0.0	0.0	0.0	0.0	0.0
EIDO	1956.0	0.0	0.0	0.0	0.0	0.0
BIDO	17749.0	28949.0	51800.0	0.0	0.0	27702.0
WIDO	0.0	0.0	0.0	0.0	0.0	0.0
PIDO&REF	362213.0	472136.0	494181.0	771932.0	646276.0	720057.0
TIDO&PUB	18587.0	18314.0	28915.0	40002.0	48601.0	52674.0
TIDO&TWG	5686.0	5602.0	8844.0	12236.0	14866.0	16112.0
HIDO&CRF	0.0	0.0	0.0	0.0	0.0	0.0
HIDO&REF	0.0	0.0	0.0	0.0	0.0	0.0
HIDO&PUB	0.0	0.0	0.0	0.0	0.0	0.0
HIDO&TWG	0.0	0.0	0.0	0.0	0.0	0.0
LIDO	0.0	0.0	0.0	0.0	0.0	0.0
CIDO&AGR	13156.0	17154.0	19706.0	15900.0*	19319.0	24397.0
CIDO&FRT	0.0	0.0	0.0	184.0*	224.0	0.0
CIDO&MIN	68763.0	75080.0	81571.0	77526.0*	94191.0	91222.0
CIDO&CON	0.0	0.0	0.0	0.0*	0.0	5004.0
CIDO&FOD	10790.0	6708.0	15660.0	18236.0*	22153.0	35013.0
CIDO&TXT	2836.0	6967.0	23535.0	54050.0*	65670.0	115687.0
CIDO&RUB	12788.0	19989.0	17783.0	23105.0*	28071.0	27698.0
CIDO&PAP	5642.0	4456.0	8210.0	6468.0*	7858.0	9276.0
CIDO&FCH	0.0	0.0	0.0	397.0*	482.0	2880.0
CIDO&CAC	23559.0	22169.0	30081.0	50570.0*	61441.0	74545.0
CIDO&IAS	0.0	0.0	0.0	663.0*	805.0	19945.0
CIDO&MAC	0.0	0.0	0.0	0.0*	0.0	2028.0
CIDO&SWO	57499.0	117722.0	96594.0	63350.0*	76967.0	3077.0
CIDO&ROD	0.0	0.0	0.0	0.0*	0.0	10345.0
CIDO&RLW	1579.0	2116.0	1400.0	1054.0*	1280.0	1095.0
CIDO&NAV	68003.0	53022.0	39101.0	44760.0	54383.0	46601.0
CIDO&IUL	17749.0	28949.0	51800.0	0.0	0.0	27702.0
CIDO&GAF	6768.0	2853.0	4494.0	17015.0	20672.0	9174.0

1979: CIDO&NFM 3148.0

(continued)

Unit: kl

Item \ Year	75	76	77	78	79	
HDO	0.0	147064.0	182200.0	0.0	40832.7	
EIDO	0.0	0.0	0.0	0.0	39423.0	
BIDO	27973.0	57881.0	50423.0	41278.0	39368.0	
WIDO	42390.0	40573.0	62907.0	34441.0	42949.4	
PIDO&REF	762029.0	783334.0	872367.0	1140580.0	1066507.4	
TIDO&PUB	49106.0	47835.0	44093.0	36381.0	28852.0	
TIDO&TWG	14201.0	14012.0	11676.0	13205.0	13625.0	
HIDO&CRF	0.0	0.0	0.0	0.0	14692.0	
HIDO&REF	0.0	0.0	0.0	0.0	100364.9	
HIDO&PUB	0.0	0.0	0.0	0.0	0.0	
HIDO&TWG	0.0	0.0	0.0	0.0	0.0	
LIDO	0.0	0.0	0.0	0.0	0.0	
CIDO&AGR	21611.0	27069.0	26258.0	35096.0	38.0	
CIDO&FRT	0.0	0.0	0.0	0.0	38402.0	
CIDO&MIN	75905.0	12451.0	86911.0	58067.0	71257.0	
CIDO&CON	5903.0	6268.0	10391.0	7148.0	9994.0	
CIDO&FOD	67894.0	71804.0	90591.0	114200.0	145172.0	
CIDO&TXT	153679.0	164979.0	185760.0	206132.0	202410.0	
CIDO&RUB	32255.0	27489.0	25699.0	26090.0	24418.0	
CIDO&PAP	12810.0	15983.0	20514.0	31888.0	37283.0	
CIDO&FCH	6065.0	12205.0	13418.0	17374.0	37995.0	
CIDO&CAC	109950.0	210790.0	279479.0	309305.0	270753.0	
CIDO&IAS	23098.0	37983.0	42759.0	55840.0	52224.0	
CIDO&MAC	1994.0	2352.0	2299.0	2214.0	2985.0	
CIDO&SWO	3905.0	3543.0	7864.0	11776.0	133401.0	
CIDO&ROD	1265.0	2928.0	2189.0	2160.0	3581.0	
CIDO&RLW	64432.0	59495.0	56118.0	70315.0	74286.0	
CIDO&NAV	64432.0	59495.0	56118.0	70315.0	74286.0	
CIDO&IUL	27973.0	57881.0	50423.0	41278.0	39368.0	
CIDO&GAF	11527.0	14841.0	29788.0	40044.0	17991.0	

(14) Heavy Fuel Oil

Unit: kl

Item \ Year	69	70	71	72	73	74
IHFO	0.0	0.0	179974.0	986839.0	1162965.0	665524.0
EHFO	941209.0	1376041.0	836992.0	558493.0	49334.0	0.0
BHFO	185355.0	287328.0	185184.0	155098.0	175000.0	215439.0
WHFO	0.0	0.0	0.0	0.0	0.0	0.0
PHFO&PEF	2055081.0	2444411.0	2241623.0	1431164.0	539602.0	1283987.0
THFO&PUB	68216.0	85204.0	108870.0	71858.0	81079.0	67314.0
THFO&TWG	0.0	0.0	0.0	0.0	0.0	0.0
HHFO&CRF	0.0	0.0	0.0	0.0	0.0	0.0
HHFO&REF	0.0	0.0	0.0	0.0	0.0	0.0
HHFO&PUB	0.0	0.0	0.0	0.0	0.0	0.0
LHFO	0.0	0.0	0.0	0.0	0.0	0.0
CHFO&AGR	4843.0	11750.0	19066.0	16232.0*	18315.0	24560.0
CHFO&FRT	0.0	0.0	0.0	0.0*	0.0	0.0
CHFO&MIN	199.0	399.0	34.0	2646.0*	2985.0	41578.0
CHFO&CON	0.0	0.0	0.0	0.0*	0.0	0.0
CHFO&FOD	85533.0	68476.0	83251.0	80318.0*	90624.0	103713.0
CHFO&TXT	4860.0	7760.0	13751.0	29297.0*	33056.0	41435.0
CHFO&PUB	6221.0	7693.0	8548.0	13096.0*	14776.0	15157.0
CHFO&PAP	10409.0	15089.0	19167.0	24856.0*	28046.0	27128.0
CHFO&FCH	20000.0	10000.0	30000.0	61972.0*	69924.0	109965.0
CHFO&CAC	80309.0	89580.0	107337.0	180482.0*	203641.0	232540.0
CHFO&IAS	0.0	0.0	0.0	5382.0*	6073.0	7986.0
CHFO&NFM	0.0	0.0	0.0	0.0*	0.0	0.0
CHFO&MAC	0.0	0.0	0.0	0.0*	0.0	0.0
CHFO&SWO	27292.0	71801.0	57273.0	55070.0*	62136.0	0.0
CHFO&ROD	0.0	0.0	0.0	0.0	0.0	0.0
CHFO&RLW	133212.0	121049.0	126616.0	106854.0*	120565.0	91862.0
CHFO&NAV	101771.0	100453.0	74248.0	7689.0*	8676.0	8942.0
CHFO&IUL	185355.0	287328.0	185184.0	155098.0*	175000.0	215439.0
CHFO&GAF	43984.0	21732.0	31269.0	44388.0*	50084.0	39063.0

(continued)

Unit: kl

Item \ Year	75	76	77	78	79
IHFO	25438.0	0.0	0.0	0.0	0.0
EHFO	0.0	56123.0	658846.0	290471.0	213061.0
BHFO	165462.0	142573.0	238710.0	237996.0	160050.0
WHFO	261097.0	356041.0	252578.0	387749.0	307256.0
PHFO&PEF	1133425.0	1870017.0	2654623.0	3433028.0	2238798.0
THFO&PUB	244444.0	305956.0	330889.0	450351.0	766423.0
THFO&TWG	0.0	0.0	1714.0	0.0	8.0
HHFO&CRF	0.0	0.0	0.0	0.0	6040.0
HHFO&REF	0.0	0.0	0.0	0.0	572022.7
HHFO&PUB	0.0	0.0	0.0	0.0	0.0
LHFO	0.0	0.0	0.0	0.0	0.0
CHFO&AGR	23149.0	21995.0	17973.0	5718.0	0.0
CHFO&FRT	0.0	0.0	0.0	0.0	8223.0
CHFO&MIN	514.0	38601.0	48369.0	45320.0	59468.0
CHFO&CON	0.0	1693.0	3213.0	583.0	112.0
CHFO&FOD	102423.0	132306.0	149789.0	185435.0	160661.0
CHFO&TXT	51620.0	56854.0	57029.0	53887.0	55472.0
CHFO&PUB	8472.0	9381.0	9321.0	9589.0	10881.0
CHFO&PAP	29261.0	28395.0	35706.0	43066.0	50055.0
CHFO&FCH	104214.0	98026.0	112522.0	137556.0	133237.0
CHFO&CAC	248018.0	280672.0	332748.0	398958.0	446550.0
CHPO&IAS	13447.0	23676.0	25809.0	76172.0	93125.0
CHFO&NFM	0.0	18036.0	5977.0	870.0	0.0
CHFO&MAC	0.0	36.0	106.0	1512.0	634.0
CHFO&SWO	0.0	2976.0	6084.0	1222.0	58029.0
CHFO&ROD	0.0	0.0	0.0	0.0	0.0
CHFO&RLW	76404.0	77836.0	57553.0	50196.0	36365.0
CHFO&NAV	1574.0	19261.0	44381.0	19776.0	19027.0
CHFO&IUL	165462.0	142573.0	238710.0	237996.0	160050.0
CHFO&GAF	50500.0	48042.0	35247.0	38915.0	39584.0

As to automotive diesel oil, industrial diesel oil and heavy fuel oil, detailed data by type of industry are available. Because methods to collect statistics were changed in 1972, 1974 and 1976, a few discontinuous changes are noted when data collected by individual methods are arranged from older to latest ones. As to final consumption in 1972 of these three types of petroleum products, collected data represent the sums-total and breakdowns are not available. Therefore, breakdown of 1972 was deduced by proportionately allotting the actual values of the 1973 breakdown to the 1972 sums-total because the same data collection method was adopted for 1972 and 1973.

(15) Naphtha

Unit: BBL

Item \ Year	69	70	71	72	73	74
ENAP	NA	NA	NA	NA	NA	0.0
WNAP	NA	NA	NA	NA	NA	NA
PNAP&REF	NA	NA	NA	1899668.0	1061172.0	4420000.0
TNAP&EMA	0.0	0.0	0.0	0.0	0.0	0.0
HNAP&REF	NA	NA	NA	NA	NA	NA
HNAP&EMP	0.0	0.0	0.0	0.0	0.0	0.0
LNAP	NA	NA	NA	NA	NA	NA
CNAP&FCH	NA	NA	NA	NA	NA	NA
CNAP&RCH	NA	NA	NA	NA	NA	NA

	75	76	77	78	79	
ENAP	3801500.0	442000.0	4863000.0	1509000.0	11643687.0	
WNAP	242500.0	1429785.0	716494.0	506515.0	227657.0	
PNAP&REF	4285000.0	1500000.0	52798000.0	5781000.0	6385280.0	
TNAP&EMA	0.0	0.0	0.0	0.0	0.0	
HNAP&REF	NA	NA	NA	NA	NA	
HNAP&EMP	0.0	0.0	0.0	0.0	0.0	
LNAP	NA	NA	NA	NA	NA	
CNAP&FCH	NA	NA	NA	NA	NA	
CNAP&RCH	NA	NA	NA	NA	NA	

Compared with the eight types of petroleum products aforementioned, collection and classification of principal statistics on naphtha and petroleum products following are unsatisfactory. Although refined products are exported, naphtha is not shipped to domestic market. While a big unbalance between supply and demand is noted, this is because, as pointed out in section of kerosene, naphtha is shipped to refineries in Singapore to obtain kerosene for which domestic demand is growing.

(16) Low Sulfur Waxy Residue

Unit: BBL

Item \ Year	69	70	71	72	73	74
ELSR	21781000.0	23254000.0	27454000.0	39507900.0	5380500.0	41303000.0
WLSR	NA	NA	NA	NA	NA	NA
PLSR&REF	16960421.0	23802692.0	26740054.0	3965723.0	53404068.0	43822000.0
HLSR&REF	NA	NA	NA	NA	NA	NA
LLSR	NA	NA	NA	NA	NA	NA
	75	76	77	78	79	
ELSR	32614000.0	35223000.0	42023000.0	36291000.0	48854564.0	
WLSR	3285369.0	3970906.0	2682323.0	2700759.0	1618125.0	
PLSR&REF	3276000.0	35695000.0	42057000.0	39578000.0	55204022.0	
HLSR&REF	NA	NA	NA	NA	8721.0	
LLSR	NA	NA	NA	NA	NA	

All the low-sulfur waxy residue is exported and none is shipped to domestic market.

(17) Lubricants

Unit: BBL

Item \ Year	69	70	71	72	73	74
ILUB	NA	NA	NA	42165.0	47025.0	75246.0
WLUB	NA	NA	NA	NA	NA	NA
PLUB&REF	20515.0	17135.0	12662.0	31199.0	32321.0	29000.0
HLUB&REF	NA	NA	NA	NA	NA	NA
LLUB	NA	NA	NA	NA	NA	NA
CLUB&NEN	20515.0*	17135.0*	12662.0*	73364.0*	79346.0*	104246.0*
	75	76	77	78	79	
ILUB	66515.0	40091.0	34690.0	43532.0	0.0	
WLUB	5673.0	3429.0	1235.0	85646.0	57471.0	
PLUB&REF	31000.0	14000.0	26000.0	168000.0	544014.0	
HLUB&REF	NA	NA	NA	NA	NA	
LLUB	NA	NA	NA	NA	NA	
CLUB&NEN	97515.0*	56335.0*	62884.0*	127121.0*	572189.0	

(18) Solvents

Unit: BBL

Item \ Year	69	70	71	72	73	74
ISOL	0.0	0.0	0.0	1437.0	10707.0	23009.0
ESOL	46000.0	39000.0	0.0	0.0	0.0	0.0
WSOL	NA	NA	NA	NA	NA	NA
PSOL&REF	200211.0	199065.0	79256.0	145252.0	179735.0	155000.0
HSOL&REF	NA	NA	NA	NA	NA	NA
LSOL	NA	NA	NA	NA	NA	NA
CSOL&NEN	154211.0*	160065.0*	79256.0*	146689.0*	190442.0*	178009.0*

	75	76	77	78	79	
ISOL	38453.0	15139.0	10770.0	8196.0	0.0	
ESOL	0.0	0.0	0.0	0.0	0.0	
WSOL	74406.0	85875.0	134693.0	107131.0	85530.0	
PSOL&REF	148000.0	161000.0	209000.0	180000.0	118666.0	
HSOL&REF	NA	NA	NA	NA	NA	
LSOL	NA	NA	NA	NA	NA	
CSOL&NEN	186453.0*	164670.0*	15948.3.0*	215758.0*	140267.0*	

(19) Other Petroleum Products —Asphalts, Grease, Waxes—

Unit: BBL

Item \ Year	69	70	71	72	73	74
IASP	0.0	0.0	0.0	155324.4	64812.0	249587.0
EASP	0.0	0.0	0.0	0.0	0.0	0.0
WASP	NA	NA	NA	NA	NA	NA
PASP&REF	213197.0	297127.0	313962.0	432599.0	499836.0	655000.0
HASP&REF.	NA	NA	NA	NA	NA	NA
LASP	NA	NA	NA	NA	NA	NA
CASP&NEN	213197.0*	297127.0*	313962.0*	587923.4*	564648.0*	904587.0*
IGRE	0.0	0.0	0.0	12491.0	6408.0	7894.0
EGRE	0.0	0.0	0.0	0.0	0.0	0.0
WGRE	0.0	0.0	0.0	NA	NA	NA
PGRE&REF	0.0	0.0	0.0	0.0	0.0	0.0
HGRE&REF	0.0	0.0	0.0	0.0	0.0	0.0
LGRE	NA	NA	NA	NA	NA	NA
CGRE&NEN	0.0	0.0	0.0	12491.0*	6408.0*	7894.0*
IWAX	0.0	0.0	0.0	0.0	0.0	0.0
EWAX	427000.0	455000.0	519100.0	490400.0	639600.0	723000.0
WWAX	NA	NA	NA	NA	NA	NA
PWAX&REF	508118.0	522501.0	635060.0	56917.0	759692.0	787000.0
HWAX&REF	NA	NA	NA	NA	NA	NA
LWAX	NA	NA	NA	NA	NA	NA
CWAX&NEN	81118.0*	67501.0*	115960.0*	77517.0*	120092.0*	64000.0*

Item	75	76	77	78	79
IASP	220962.0	200184.0	156918.0	328190.0	320.0
EASP	0.0	0.0	0.0	0.0	0.0
WASP	63701.0	41315.0	94031.0	42448.0	62257.0
PASP&REF	326000.0	283000.0	502000.0	1085000.0	1194098.0
HASP&REF	NA	NA	NA	NA	NA
LASP	NA	NA	NA	NA	NA
CASP&NEN	546962.0*	505570.0*	606202.0*	1464773.0*	1174289.0
IGRE	24977.0	7194.0	5255.0	10693.0	0.0
EGRE	0.0	0.0	0.0	0.0	0.0
WGRE	NA	NA	NA	NA	NA
PGRE&REF	0.0	0.0	0.0	0.0	0.0
HGRE&REF	0.0	0.0	0.0	0.0	0.0
LGRE	NA	NA	NA	NA	NA
CGRE&NEN	24977.0*	7194.0*	5255.0*	10693.0*	0.0
IWAX	0.0	0.0	0.0	0.0	0.0
EWAX	180000.0	255000.0	219000.0	217000.0	207946.0
WWAX	93589.0	59662.0	39811.0	39333.0	23867.0
PWAX&REF	283000.0	266000.0	325000.0	321000.0	335778.0
HWAX&REF	NA	NA	NA	NA	NA
LWAX	NA	NA	NA	NA	NA
CWAX&NEN	103000.0*	44927.0*	125851.0*	104478.0*	353157.0

(20) Petroleum Coke

Unit: BBl

Item \ Year	69	70	71	72	73	74
WPCK	NA	NA	NA	NA	NA	NA
PPCK&REF	NA	218229.0	187560.0	196165.0	169125.0	157000.0
HPCK&REF	NA	NA	NA	NA	NA	NA
LPCK	NA	NA	NA	NA	NA	NA
CPCK&NFM	NA	NA	NA	NA	NA	NA
CPCK&NEN	NA	218229.0*	187560.0*	196165.0*	169125.0*	157000.0*
	75	76	77	78	79	
WPCK	NA	NA	NA	NA	NA	
PPCK&REF	201000.0	157000.0	190000.0	211000.0	190864.0	
HPCK&REF	NA	NA	NA	NA	190864.0*	
LPCK	NA	NA	NA	NA	NA	
CPCK&NFM	NA	NA	NA	NA	NA	
CPCK&NEN	201000.0*	157000.0*	190000.0*	211000.0*	0.0	

As to lubricants, solvents, other petroleum products including asphalt, grease and waxes and petroleum coke, statistics on imported quantities, exported quantities, stock quantities and processed quantities in refineries are available depending on year, while no data on final consumption is available. To prepare the energy balance table, all the supplies of these products were assumed that they were consumed by end users for purposes other than energy (non-energy consumption).

(21) Refinery Gas

Unit: BBL

Item \ Year	69	70	71	72	73	74
PRFG&REF	NA	1045000.0	857200.0	585700.0	1356800.0	1332400.0
HRFG&REF	NA	1045000.0*	857200.0*	585700.0*	1356800.0*	1332400.0*
LRFG	NA	NA	NA	NA	NA	NA
	75	76	77	78	79	
PRFG&REF	871100.0	519800.0	1278200.0	1535200.0	1914369.3	
HRFG&REF	871100.0*	519800.0*	1278200.0*	1535200.0*	1685824.7*	
LRFG	NA	NA	NA	NA	154795.0	

As to refinery gas, only statistics on production are available. To prepare the energy balance table, it was assumed that all the refinery gas produced was internally consumed by refineries.

(22) LPG

Unit: BBL

Item \ Year	69	70	71	72	73	74	75
ILPG	0.0	0.0	0.0	0.0	0.0	0.0	0.0
ELPG	115000.0	76293.0	58500.0	27700.0	3500.0	33200.0	41700.0
WLPG	NA	NA	NA	NA	NA	NA	218.0
PLPG&REF	131118.0	74000.0	81400.0	70999.0	104382.0	221700.0	349400.0
PLPG&NGL	0.0	9542.0*	0.0	0.0	0.0	31142.0*	24109.0*
HLPG&REF	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LLPG	NA	NA	NA	NA	NA	NA	NA
CLPG&TIN	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CLPG&FIS	NA	NA	NA	NA	NA	NA	NA
CLPG&SWO	NA	NA	NA	NA	NA	NA	NA
CLPG&RAC	2246.0	7249.0	19418.0	43299.0	100882.0	219642.0	331809.0
CLPG&ROD	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CLPG&RCH	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	76	77	78	79			
ILPG	0.0	78000.0	31000.0	0.0			
ELPG	0.0	3323000.0	4579000.0	4799277.8			
WLPG	9976.0	7716.0	5788.0	9585.0			
PLPG&REF	285600.0	372200.0	404600.0	460003.0			
PLPG&NGL	131864.0*	3315088.0*	4699259.0*	4917382.0			
HLPG&REF	0.0	0.0	0.0	386.0			
LLPG	NA	NA	NA	NA			
CLPG&TIN	0.0	0.0	0.0	225779.0			
CLPG&FIS	NA	NA	NA	NA			
CLPG&SWO	NA	NA	NA	NA			
CLPG&RAC	407706.0	444548.0	557787.0	348262.0			
CLPG&ROD	0.0	0.0	0.0	0.0			
CLPG&RCH	0.0	0.0	0.0	0.0			

While only total final consumption of LPG is grasped, the majority is considered to be consumed in the residential sector, and it was assumed, to prepare the tabular statement, that all were consumed in the residential sector. The most critical problem related to statistics on LPG is that no statistics other than LPG production is available concerning NGL plants. As a result, when it was found that supplies ran short in preparing the energy balance table, production at NGL plants was calculated back so as to make demand and supply well balanced.

Meantime, it should be noted that LPG produced at NGL plants was added to the sums-total of petroleum products.

(23) Natural Gas

Unit: $10^3 f^3$

Item \ Year	69	70	71	72	73	74
PTNG	104871970.0	108561315.0	121162641.0	150766952.0	186136817.0	191979000.0
TTNG&NGL	0.0	2383420.0	4314105.0	6687700.0	7201500.0	7108000.0
TTNG&EMA	0.0	0.0	0.0	0.0	0.0	0.0
TTNG&PUB	0.0	0.0	0.0	0.0	0.0	0.0
TTNG&TWG	NA	NA	NA	NA	NA	NA
HTNG&NGF	NA	35531602.0	34685180.0	30854000.0	39346800.0	49790000.0
HTNG&REF	NA	1667594.0	1212239.0	1023600.0	1695600.0	5800000.0
HTNG&NGL	0.0	NA	NA	NA	NA	NA
HTNG&EMP	0.0	0.0	0.0	0.0	0.0	0.0
HTNG&PUB	0.0	0.0	0.0	0.0	0.0	0.0
HTNG&TWG	NA	NA	NA	NA	NA	NA
LTNG	51169137.0	64140294.0	76745612.0	102918800.0	132840700.0	119838000.0
CTNG&FCH	1049416.0	2403423.0	2094121.0	4409000.0	4409000.0	4409000.0
CTNG&CAC	0.0	0.0	0.0	0.0	0.0	605726.0
CTNG&SWO	0.0	0.0	0.0	0.0	0.0	0.0
CTNG&RAC	0.0	0.0	0.0	0.0	0.0	19128.0
CTNG&RCH	1049416.0	2403423.0	2094121.0	4409000.0	4409000.0	4409000.0

Item	75	76	77	78	79
PTNG	211531000.0	304336000.0	517490000.0	800174000.0	999674000.0
TTNG&NGL	5108000.0	35287000.0	132322000.0	313680000.0	392336605.0
TTNG&EMA	0.0	0.0	0.0	0.0	0.0
TTNG&PUB	0.0	0.0	0.0	0.0	0.0
TTNG&TWG	NA	NA	NA	NA	NA
HTNG&NGF	56878000.0	69232000.0	107162000.0	217803000.0	253008000.0
HTNG&REF	6389000.0	6279000.0	6169000.0	6453000.0	8920212.0
HTNG&NGL	NA	NA	NA	NA	NA
HTNG&EMP	0.0	0.0	0.0	0.0	0.0
HTNG&PUB	0.0	0.0	0.0	0.0	0.0
HTNG&TWG	NA	NA	NA	NA	403000.0
LTNG	128815000.0	177900000.0	234584000.0	203541000.0	223370000.0
CTNG&FCH	6554000.0	7132000.0	17874000.0	28591000.0	26735720.0
CTNG&CAC	1194912.0	133206.0	1458841.0	1469074.0	5073552.0
CTNG&SWO	0.0	0.0	0.0	0.0	0.0
CTNG&RAC	37734.0	42065.0	46069.0	46392.0	0.0
CTNG&RCH	6654000.0	7132000.0	17874000.0	28591000.0	35182806.0

Statistics on natural gas are well collected and classified. It is noted, however, that supply and demand in 1969 is not balanced well.

(24) NGL

Unit: BBL

Item \ Year	77	78	79
ECON	1150000.0*	10128000.0*	16390300.0
PCON&NGL	1150000.0	10128000.0	28043523.0
TCON&EMA	0.0	0.0	0.0

(25) LNG

Unit: m^3

Item \ Year	77	78	79
ELNG	1339698.0	8170043.0	13850082.0
PLNG&NGL	1726956.0	8206635.0	13921913.0

It was not until 1977 when a full-scale operation of NGL plants started. Also, it should be noted that a large quantity of LPG, NGL (natural gas enriched liquid) and LNG now comes from NGL plants. Although data on NGL export are available, figures differ considerably from those of production data. Accordingly, to prepare the energy balance table, it was assumed that all of NGL produced was exported.

(26) Methanol

It is not conducted at all to produce methanol for fuel production from natural gas nor coal. However, alcohol for fuel production is now given growing attentions in Southeast Asian countries as one of potential alternative energy sources. The row of methanol was prepared anticipating that production and consumption of methanol for fuel production will be realized near future.

(27) Town Gas

Unit: $10^3 m^3$

Item \ Year	69	70	71	72	73	74	75
PTWG&TWG	34111.0	29938.0	32527.0	38682.0	38037.0	38825.0	35432.0
HTWG&TWG	NA	NA	NA	NA	NA	NA	NA
LTWG	8495.0*	5706.0*	5939.0*	8945.0*	10113.0*	11562.0*	11546.0*
CTWG&CAC	NA	NA	NA	NA	NA	NA	NA
CTWG&RAC	25616.0	24232.0	26588.0	29032.0	28569.0	27263.0	23886.0
	76	77	78	79			
PTWG&TWG	35557.0	35156.0	36252.0	75185.0			
HTWG&TWG	NA	NA	NA	0.4			
LTWG	13647.0*	12937.0*	11702.0*	8440.6*			
CTWG&CAC	NA	NA	NA	NA			
CTWG&RAC	21910.0	22219.0	24550.0	66744.0			

In case of town gas, difference between production and consumption is considered to represent losses incurred in the process of distribution rather than statistical differences. Accordingly, the difference between production and consumption was processed as loss to calculate LTWG. Besides, while natural gas diluted with air is used in the residential and commercial sector, statistics on town gas after dilution is not available although there are data on natural gas input. Therefore, the input quantity was included in CTNG&RAC which represents final consumption of natural gas in the residential and commercial sector.

(28) Coke

(29) Coke Oven Gas

(30) Blast Furnace Gas

Up to now, no steelworks, town gas plants which use coal as a raw material nor industry specializing in coke production is established. As a matter of course, no coke, coke oven gas nor blast furnace gas is produced. Coke will be produced from coking coal as a by-product when construction of a town gas plant completes in 1983 as scheduled.

(31) Briquet

So far, no production of briquet has been carried out in Indonesia.

(32) Wood

Unit: m^3

Item \ Year	69	70	71	72	73	74
PWOD	39672362.0	43051761.0	49409127.0	53421331.0	59157353.0	64658729.0
WWOD	NA	NA	NA	NA	NA	NA
CWOD&AGR	21592236.0*	22753611.0*	24379633.0*	23016561.0*	27579855.0*	26205844.0*
CWOD&FRT	NA	NA	NA	NA	NA	NA
CWOD&CAC	3225294.0	3180200.0	3874962.0	4910318.0	4175959.0	5583983.0
CWOD&RAC	14659516.0	16973498.0	21049439.0	23016561.0	27387588.0	32840275.0
CWOD&RLW	165314.0	144450.0	105093.0	48264.0	13950.0	28625.0

	75	76	77	78	79	
PWOD	49601205.0	53741173.0	56308213.0	58873882.0	61937182.0	
WWOD	NA	NA	NA	NA	NA	
CWOD&AGR	13730195.0*	11646610.0*	8307142.0*	4270266.0*	0.0	
CWOD&FRT	NA	NA	NA	NA	NA	
CWOD&CAC	4545287.0	4590081.0	4842050.0	5097434.0	5367648.0	
CWOD&RAC	31212421.0	37411331.0	43065869.0	49413039.0	56476534.0	
CWOD&RLW	113300.0	93148.0	93148.0	93148.0	93000.0	

(33) Agricultural Wastes

Unit: m^3

Item \ Year	69	70	71	72	73	74
PAGW	85354839.0	91032258.0	90000000.0	84354839.0	98887097.0	94758064.0
CAGW&AGR	46649950.0*	48274119.0*	44502786.0*	36377116.0*	46113203.0*	38421956.0*
CAGW&FRT	NA	NA	NA	NA	NA	NA
CAGW&CAC	6968236.0	6747121.0	7073389.0	7760639.0	6982156.0	8187012.0
CAGW&RAC	31736647.0	36011016.0	38423823.0	40217081.0	45791735.0	48149092.0
	75	76	77	78	79	
PAGW	91790322.0	88322580.0	84806452.0	81290323.0	78226780.0	
CAGW&AGR	25466808.0*	19174212.0*	12532214.0*	5905514.0*	5731220.0	
CAGW&FRT	NA	NA	NA	NA	NA	
CAGW&CAC	8430612.0	7556807.0	7304752.0	7049448.0	6779350.0	
CAGW&RAC	57892896.0	61591554.0	64969480.0	68335344.0	65716210.0	

Wood and agricultural wastes such as bagasse are major energy sources in Indonesia and account for more than one half in total energy consumption of the nation. Despite their importance, statistics on these products are not yet collected well.

(34) Charcoal

No statistics on charcoal is available. However, differing from firewood and agricultural wastes including bagasse, quantity of charcoal produced, if any, is considered very limited and will not give any significant effects to the energy balance table.

(35) Ethanol for Fuel Production

At present, it is not conducted to produce ethanol for fuel production from biomass. However, ethanol for fuel production which is produced from biomass is given growing attentions as one of potential alternative energy sources. The row of ethanol, just like the case of methanol, was prepared anticipating that production and consumption of alcohol for fuel production will be started in the future.

(36) Electric Power

Unit: Mwh

Item \ Year	69	70	71	72	73	74
TIPE&PUB	686447.0	838585.0	928889.0	1226159.0	1385006.0	1453908.0
PHPE	1168750.0	1225118.0	1409976.0	1292860.0	1573736.0	1828604.0
THPE&PUB	1168750.0	1225118.0	1409976.0	1292860.0	1573736.0	1828604.0
PNPE	0.0	0.0	0.0	0.0	0.0	0.0
TNPE&PUB	0.0	0.0	0.0	0.0	0.0	0.0
PGPE	0.0	0.0	0.0	0.0	0.0	0.0
TGPE&PUB	0.0	0.0	0.0	0.0	0.0	0.0
PHAE	NA	NA	NA	NA	NA	NA
THAE&AUT	NA	NA	NA	NA	NA	NA
POAE	0.0	0.0	0.0	0.0	0.0	0.0
TOAE&AUT	0.0	0.0	0.0	0.0	0.0	0.0
HPEL&PUB	NA	50009.0	63569.0	74134.0	85042.0	94133.0
CPEL&TIN	269300.0	290700.0	306500.0	312473.0	534773.0	715317.0
CPEL&RAC	953800.0	1021400.0	1148100.0	1229922.0	1346259.0	1429117.0
CPEL&GAF	230900.0	276900.0	331400.0	350215.0	293713.0	231598.0

	75	76	77	78	79	
TIPE&PUB	1796732.0	2335446.0	29445904.0	3150000.0	0.0	
PHPE	1985434.0	1824602.0	1861236.0	2417000.0	0.0	
THPE&PUB	1985434.0	1824602.0	1861236.0	2417000.0	0.0	
PNPE	0.0	0.0	0.0	0.0	0.0	
TNPE&PUB	0.0	0.0	0.0	0.0	0.0	
PGPE	0.0	0.0	0.0	0.0	0.0	
TGPE&PUB	0.0	0.0	0.0	0.0	0.0	
PHAE	NA	NA	NA	412000.0	NA	
THAE&AUT	NA	NA	NA	412000.0	NA	
POAE	0.0	0.0	0.0	0.0	0.0	
TOAE&AUT	0.0	0.0	0.0	0.0	0.0	
HPEL&PUB	105567.0	113725.0	137341.0	154000.0	154000.0	
CPEL&TIN	880214.0	978493.0	1141670.0	1319000.0	1793275.0	
CPEL&RAC	1664027.0	1822328.0	2045798.0	2458000.0	2920813.0	
CPEL&GAF	259372.0	280996.0	313675.0	379000.0	365196.0	

1979: PHPE&PUB 3028024.0
PHAE&AUT 412000.0
PPEL&PUB 5880551.0

Statistics on electric power are not collected well, either. Although statistics on generated electric power are available for almost all the types of power generation sources, statistics on final consumption are poor. That is, while final consumption is grasped by sector, such as industrial sector, civil sector and public institutions sector, the sums-total of each sector is not detailed. Though Ministry of Mining and Energy failed to obtain breakdown of each category, it may be possible to learn such data from Electric Power Board. Even if it is not possible at present, collection of such statistics is considered to be carried out without much difficulties sooner or later. If a difficulty related to statistics on electric power should be discussed, it is extremely difficult to obtain statistics on private electric power generation by type of industry. It would be most desirable if data on private electric power generation by type of industry and fuel consumption by type of industry would be collected. To prepare energy balance table this time, data on fuel consumption by type of industry were used as principal statistics so that private electric power generation could be processed as properly as possible. Due to absence of principal statistics, however, light oil for automobiles consumed in each industry was regarded as fuel consumption and it was assumed that a 45% of such fuel consumption was used for private electric power generation in each industry.

2. Thermal Quantity Scale Factor

As mentioned before, one of the purposes of an energy balance table is to present data under a common unit so that various macro-analysis can be made. Because the subjects are energies, it is desirable to adopt a unit of thermal quantity, such as calorie and joule. Apart from such a viewpoint, it has been usual to adopt a unit of thermal quantity as a common unit because it is most popular to use energy as sources of heat. For examples, expressions such as "tons in terms of coal equivalent" and "tons in terms of oil equivalent" should be more clearly defined based on thermal quantity.

Now, combustion heat is usually adopted as a thermal quantity scale factor to convert values of different energy resources presented with different units into values to be presented in the form of thermal quantity, the common unit. It should be noted, however, combustion heat varies depending on production place and properties of products even among a type of energy. Accordingly, to obtain an exact value, it is required to obtain combustion heat and quantity of products by place of production and properties, which are summed up to gain total quantity of a type of energy. Such an operation requires a considerable labor and time and is virtually impractical.

The secondly derirable measure is to prepare average values of combustion heat by type of energy resource based on a certain method which can be accepted as a standard. To practice such a measure, it is required to establish a standard method to measure combustion heat, continue to take samples of products of various origins and properties and measure combustion heat of the samples to collect data of numerical values which enable us to obtain average values of combustion heat of individual energy resources.

Table 1 Thermal Quantity Scale Factors

Column No.	Name	Specific Unit	10^{11} Kcal/ Specific Unit	10^3 TEC/ Specific Unit	10^3 TOE/ Specific Unit	Reference	Remarks
C02	FCCO	Ton	0.00070000	0.00100000	0.00070090	1	
C03	FSCO	Ton	0.00070000	0.00100000	0.00700000	1	Ombilin
			0.00060795	0.00086850	0.00050795	1	Bukit Asam
							(year)
			0.00064960	0.00092800	0.00064960		1971
			0.00065310	0.00093300	0.00055310		1972
			0.00065968	0.00094240	0.00065968		1973
			0.00055667	0.00093810	0.00065667		1974 Weighted aver-
			0.00054309	0.00091870	0.00064309		1975 age by output
			0.00064155	0.00091650	0.00064155		1976
			0.00064554	0.00092220	0.00064554		1977
			0.00064547	0.00092210	0.00064547		1978
C04	FACO	Ton	0.00084600	0.00120850	0.00084600	1	
C05	FLCO	Ton	0.00038900	0.00055571	0.00038900	2	
C07	FOCR	BBL	0.00014030	0.00020040	0.00014030	1	
C08	FABS	BBL	0.00015768	0.00022526	0.00015768	3	
	FLBS	BBL	0.00015768	0.00022526	0.00015768	3	
C12	FAGS	kl	0.00050566	0.00115523	0.00080866	3	
C13	FSGS	kl	0.00054242	0.00120345	0.00084242	3	
C14	FPGS	kl	0.00084242	0.00120346	0.00084242	3	
C15	FJET	kl	0.00092451	0.00132072	0.00092451	3	
C16	FKER	kl	0.00090399	0.00129140	0.00090399	3	
C18	FADO	kl	0.00094395	0.00134849	0.00094395	3	
C19	FIDO	kl	0.00094395	0.00134849	0.00094395	3	
C20	FHFO	kl	0.00099147	0.00141638	0.00099147	3	
C21	FNAP	BBL	0.00013392	0.00019132	0.00013392	3	
C22	FLSR	BBL	0.00015768	0.00022526	0.00015768	3	
C23	FLUB	BBL	0.00015012	0.00021446	0.00015012	3	
C24	FSOL	BBL	0.00013392	0.00019132	0.00013392	3	
C25	FASP	BBL	0.00013716	0.00019595	0.00013716	3	
	FGRE	BBL	0.00013716	0.00019595	0.00013716	3	
	FWAX	BBL	0.00013716	0.00019595	0.00013716	3	
C26	FFCK	BBL	0.00019225	0.00027464	0.00019225	3	
C27	FRFG	10^3m^3	0.00004187	0.00005982	0.00004187	3	
		BBL	0.00023469	0.00033527	0.00023469	3	
C28	FLPG	BBL	0.00010014	0.00014349	0.00010014	3	
C29	FING	10^3f^3	0.00002639	0.00003790	0.00002639	1	
C30	FCON	BBL	0.00013392	0.00019132	0.00013392	3	
C31	FLNG	MMBTU	0.00002520	0.00003600	0.00002520	3	49.163124MMBTU/ TON, Specific gravity 0.52
		m^3	0.00064423	0.00092033	0.00064423	4	
C32	FMOA	Ton	0.00048000	0.00068571	0.00048000	5	
C33	FTWG	10^3m^3	0.00045361	0.00064802	0.00045361	3	
C34	FCOK	Ton	0.00070202	0.00100289	0.00070202	3	
C35	FCKG	10^3m^3	0.00043201	0.00061716	0.00043201	2	
C36	FBFG	10^3m^3	0.00006400	0.00009143	0.00006400	2	
C37	FERQ	Ton	0.00051841	0.00075059	0.00051841	3	
C38	FWOD	m^3	0.00027250	0.00038971	0.00027280	6	4400kcal/kg, Specific gravity 0.62
C39	FCHR	Ton	0.00070000	0.00100000	0.00070000	3	
C40	FEFA	Ton	0.00064000	0.00091429	0.00064000	5	
C41	FAGW	m^3	0.00014250	0.00020357	0.00014250	6	2500–3200kcal/kg, Specific gravity 0.50
	FELO	Mwh	0.00008600	0.00012286	0.00008600	1	
	FELI	Mwh	0.00030710	0.00043871	0.00030710	3	

In this light, data which enable us to obtain average values of combustion heat are not available in Indonesia at present. Moreover, it seems that a system which permits us to conduct experiments to obtain average values of combustion heat is not yet established, either. To prepare the energy balance table this time, a thermal quantity scale factor used in "Energy Data on Developing Countries Vol. II" prepared by OECD was referred to except a few cases.

While tons coal equivalent is used as a common unit of thermal quantity, 1 TCE (tons coal equivalent) is defined as 7×10^6 Kcal. This is because of a strong request made by Indonesia, who considers to give a priority to coal in future energy policies of the nation. Listed in Table 1 are thermal quantity scale factors. In addition to tons coal equivalent, indicated are thermal quantity scale factors for cases of kilocalorie and OECD's tons oil equivalent (1 TOE 10^7 Kcal).

Meantime, to set codes of thermal quantity scale factors for individual energy resources, a-letter code "F" representing thermal quantity factor is combined with three-letter codes representing individual energy resources (ex. FSCO; steam coal thermal quantity scale factor, FOCR; crude oil thermal quantity scale factor). As to thermal quantity scale factor of electric power, thermal quantity generated from 1 Kwh of electric power (FELO) was assumed as 860 Kcal and thermal quantity required for generating 1 Kwh of electric power (FELI) as 3071 Kcal based on power generation efficiency in developing countries, 28% which was announced by OECD.

It is defined that 1 TCE (tons coal equivalent) 7×10^6 Kcal (Source 1) and 1 TOE (tons oil equivalent) 10^7 Kcal (Source 3).

Reference

1. "Indonesian Energy Demand and Supply Forecast, REPELITA III," the Ministry of Mining and Energy of Indonesia, 1978.
2. "Study for Systematic Arrangement of Energy Statistics," The Institute of Energy Economics, Japan, 1978.
3. "Data on Energy of Developing Countries," Organization for Economic Cooperation and Development, 1979.
4. "Dictionary of Petroleum," The Institute of Energy Economics, Japan, 1979.
5. Survey results conducted by The Institute of Energy Economics, Japan.
6. Survey results conducted by the Ministry of Mining and Energy of Indonesia.

GENERAL MANUAL OF ENERGY BALANCE TABLE III

EQUATION SYSTEM

GENERAL MANUAL OF ENERGY BALANCE TABLE III
– EQUATION SYSTEM –

Explained in this manual is the equation system of energy balances which is constructed on the basis of basic energy statistics and of future program. To express the equations simply, it is necessary to make codes of numerical values used in the calculation. The codes of basic statistics on individual energy resources and thermal quantity scale factor are mentioned in GENERAL MANUAL OF ENERGY BALANCE TABLE II.

1. Preparing Method of Energy Balance Equations

The codes used for values in energy balance table are expressed as follows:

EBC**R** (EB: Energy Balances, C: Column, R: Row,
**: number of column or row)

We have constructed this equation system of energy balances, taking into consideration the future program as much as possible, but it might become necessary to revise some of the equations in the course of time. In order to prepare for such revisions, the preparing method of energy balance equations is explained below, taking steam coal as an example.

In the case of steam coal, there are domestic production (PSCO), export (ESCO) and stock (WSCO) as basic statistics in the primary energy supply sector. Using these statistics and thermal quantity scale factor (FSCO), the primary energy supply sector is expressed by the following equations:

Domestic Production
EBC03R01 = PSCO*FSCO

Export
EBC03R03 = –ESCO*FSCO

Stock Change
EBC03R05 = (WSCO (–1)–WSCO)*FSCO

Total of this sector is:

Total of Primary Energy Supply
EBC03R06 = EBC03R01 + EBC03R03 + EBC03R05

The data in the basic energy statistics are all positive values. In equations, however, the input into the country, that is, domestic production and import, has the positive (+) sign, while the output from the country, that is, export and bunker has the negative (–) sign. Stock change is the difference between the previous and present terms and is expressed by the equation shown above. It is, therefore, possible for stock change to have either posi-