ORNL

National Science Foundation

Environmental Program

CENTRAL RESEARCH LIBRARY

ORNL-NSF-EP-58

OAK RIDGE NATIONAL LABORATORY LIBRARIES

3 4456 0566285 0

cy. 1

The ENERGY COST of GOODS and SERVICES

Robert A. Herendeen

OAK RIDGE NATIONAL LABORATORY
CENTRAL RESEARCH LIBRARY
DOCUMENT COLLECTION
LIBRARY LOAN COPY
DO NOT TRANSFER TO ANOTHER PERSON
If you wish someone else to see this document, send in name with document and the library will arrange a loan.

UCN-7969
(3 3-67)

OAK RIDGE NATIONAL LABORATORY
OPERATED BY UNION CARBIDE CORPORATION • FOR THE U.S. ATOMIC ENERGY COMMISSION

This report was prepared as an account of work sponsored by the United States Government. Neither the United States nor the United States Atomic Energy Commission, nor any of their employees, nor any of their contractors, subcontractors, or their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness or usefulness of any information, apparatus, product or process disclosed, or represents that its use would not infringe privately owned rights.

ORNL-NSF-EP-58

THE ENERGY COST OF GOODS AND SERVICES

Robert A. Herendeen

ORNL-NSF Environmental Program

Work supported by the National Science Foundation
Interagency Agreement No. AEC 40-237-70 and NSF AG 398

OCTOBER 1973

OAK RIDGE NATIONAL LABORATORY
Oak Ridge, Tennessee 37830
Operated by
UNION CARBIDE CORPORATION
for the
U.S. ATOMIC ENERGY COMMISSION
Contract No. W-7405-eng-26

ACKNOWLEDGEMENTS

The majority of this work was performed while the author was a staff member of the ORNL-NSF Environmental Program at the Oak Ridge National Laboratory. Additional work was performed at the Center for Advanced Computation, University of Illinois. It is a pleasure to acknowledge the valuable programming aid of John Carpenter of the ORNL Mathematics Division, and review comments from Eric Hirst of ORNL, William Rearden of Battelle Northwest Laboratories, and Albert Walderhaug, Bureau of Economic Analysis, U. S. Department of Commerce.

Robert A. Herendeen*

*Present address: Center for Advanced Computation, University of Illinois, Urbana, Illinois 61801.

CONTENTS

		Page
I.	Introduction	1
	A. Motivation	1
	B. Statement of the Problem	2
	C. Methodology	3
II.	Input-Output Theory	4
	A. Direct and Total Requirements	4
	B. Obtaining the Total Energy Coefficient	7
	C. A Constraint: Does This Approach Violate Energy Conservation?	10
	D. Limitations of I/O Analysis	13
III.	Allocating Energies	15
IV.	Results	16
	A. Inverse Prices (Table 4)	16
	B. Total Energy Coefficients and Related Results (Tables 5 and 6)	17
	1) Explanation	17
	2) Example of Use for I/O Sector 31/01, Refined Petroleum	21
	C. Total Energy Requirement Broken Down by Intermediate Sector; 3 Examples	23
	D. Do the Results Represent an Improvement?	23
V.	Time Variation of Coefficients	24
VI.	Three Further Examples of Application	26
	A. Energy Impact of the Private Automobile, 1963	26
	1) A Semantic Difficulty: How to Ask the Question	26
	2) Details of the Computation	27

Page

B. Energy - Efficiency of Energy Sectors 30

C. Appliance Use: An Electric Mixer 30

Appendices

A. Correcting for Transfers 32

B. Energy Allocation: Details 34

References 114

TABLES

Table 1. U.S. primary energy use by consuming sectors, 1950-70 . . 42

Table 2. Listing of 1963 Input-Output sectors 44

Table 3. Energy allocation and pricing, 1963, by type. 55

Table 4. Detailed energy inverse pricing, 1963 60

Table 5. Direct and total energy coefficients, by type, 1963 . . . 67

Table 6. The Matrix $\underline{\underline{S}}$, which accounts for energy sold directly to final demand 104

Table 7. Breakdown of total energy requirements by intermediate sector for 3 selected products 105

Table 8. Definition of I/O sectors used in Table 7 108

Table 9. Comparison of dollar and electrical energy Input-Output coefficients for selected sectors 109

Table 10. Energy Use vs. GNP, 1960-70 110

Table 11. Energy Impact of the Automobile, 1963 112

Table 12. Inverse energy efficiency (I.E.E.) of the energy producing sectors, 1963 113

FIGURES

Figure 1. Primary Energy Use/GNP for the U.S., 1960-70 25

Figure 2. U.S. Oil and Gas Energy Balance, 1963 37

ABSTRACT

The 1963 Input-Output Table (U.S. Department of Commerce) has been converted to energy terms. The results facilitate calculation of the total energy cost of many consumer goods and services. Total energy cost denotes all energy inputs in the manufacture/sales chain, including extraction of raw materials, primary processing, transportation, intermediate and final fabrication, and final marketing activities. A 362 sector breakdown has been used, and 5 energy sectors are included (coal, crude oil and gas extraction, refined petroleum, electricity, and gas sales).

Results are in the form of coefficients which transform dollar expenditures in the 362 sectors into energy impact. The methodology of the conversion is described in detail; basically it involves combining detailed energy pricing data with existing dollar sales data. Potential shortcomings are discussed; many are inherent to the input-output approach itself.

It is hoped that the results will be useful in many applications. Four are presented here: 1) A method to obtain a detailed breakdown of the energy to make a product; e.g., the energy needed to make the glass, steel, rubber, etc., contained in an automobile. 2) A calculation of the total energy impact of the private auto in 1963, in which the many auto-associated expenditures are assigned an appropriate energy cost. 3) A calculation of the energy-efficiency of the energy sectors in providing energy to final demand. 4) A calculation of the energy cost of a kitchen electric mixer.

I. INTRODUCTION

A. Motivation

We are compounded of dust and the light of a star.

- Loren Eiseley

There's a bit of strip-mined coal in every shirt.

- Anon.

Per capita, Americans consume 320 million Btu of energy annually, the equivalent of 12 tons of coal, which is 40% ahead of the closest competition, Canada.[1] The present rate of growth in U.S. energy use (about 4.8% per year for 1965-70*) has been criticized (by some individuals) as excessive in light of 1) apparent finiteness of energy supplies and 2) environmental damage associated with energy production and use. One is led to ask why U.S. energy use is so high, and how it reflects individual consumption levels.

The purpose of this work is to quantify, at the consumer level, the total energy demand resulting from the production and marketing of various specific goods and services. This contrasts with the energy necessary to operate products. The reason for investigating the indirect aspect of energy demand is that the direct personal use of energy amounts to only a little over one-third of America's total. (Of this, roughly two-thirds is used in residences and one-third fuels the private automobile.) The remaining two-thirds is used by industry, commerce and government and thus indirectly by citizens who consume their outputs. Table 1 details this breakdown over the last two decades.

---

*In 1970, 3.8%; in 1971, 2.3%, in 1972, 4.9%.[2]

B. Statement of the Problem

The total energy demand attributable to a product is the sum of the total manufacturing energy (including all steps from extraction of raw materials to the final fabrication), the energy needed to deliver it to final market, to operate it, and that energy needed to support maintenance activities (including eventual disposal). All of these components must be normalized to the same time period for comparison.

If one knew these data for the whole spectrum of consumer products,* he could use them as follows.

First, by combining the results with sales data, one can obtain the relative percentages of America's energy output used to produce various goods, and the relative contributions of maintenance of present stock, and of growth. For example, how much of our energy went to the manufacture and sale of automobiles: how much of this was to replace old cars, how much to increase the total stock?

Second, supposing the coefficients to be constant over time, or at least predictable, one can predict the energy requirements of certain consumption futures, e.g., 1.3 color TV sets per family by 1980.

Third, by comparing the relative magnitudes of the manufacture/sales, operation, and maintenance energies, one can determine which products are

---

*Rough approximations are easily obtained. For example, in 1963 about 2/3 of America's electrical energy output of 917×10^9 KW hr. went to non-residential use, and the GNP was $\$590 \times 10^9$. The average value for the manufacture/sales and maintenance of products for electricity was thus $\simeq \frac{2/3\ (916 \times 10^9)}{590 \times 10^9} \simeq 1$ KW hr (= 3413 Btu) per dollar of final market value. Likewise, for total primary energy the figure is ≃50,000 Btu per dollar.

Third, by comparing the relative magnitudes of the manufacture/sales, operation, and maintenance energies, one can determine which products are relatively energy intensive in their manufacture, i.e., require much more energy to make them than to operate them over their lifetimes. These products would be the most likely candidates for lifetime-prolonging to save energy.

Fourth, one can quantify the energy impact of his personal level of consumption. This has inherent educational value.

C. Methodology

The main objective of the present work is determination of the manufacture/sales energies (and to a lesser extent the maintenance energies) over a wide range of products for five energies: coal, crude oil and gas (extraction), refined petroleum, electricity, and gas (sales). Input-Output analysis is used for two basic reasons: 1) There is a large body of data already available, and 2) The conceptual basis allows easy calculation of the energy needed for all steps along a manufacturing-sales chain. This is very important, since typically the total energy far exceeds that used in the last step. For example, results of this work indicate that the auto industry itself uses only about 7% of the energy needed to make a car.

Input-Output (I/O) analysis[7] allows predictions of the industrial repercussions of changes in consumer demand. Suppose that the economy is divided into sectors (on the basis of their products); suppose also that we know the dollar value of each sector's yearly sales to every other, and to final demand. Assuming that the input requirements of every industry are related linearly to its output (in dollar terms), knowledge of these

sales completely specifies the change of output of one sector required by a change in final demand of another. All the intricate interdependencies are accounted for.

The collection of data is a forbidding task. Various government agencies, notably the Bureau of Economic Analysis (BEA, formerly the Office of Business Economics) of the U.S. Department of Commerce, are doing so on a continuing basis. The results have been published, though necessarily delayed. Data for 1963 became available in 1969;[5] those for 1967 are now expected in winter 1973. Other compilations, based at least in part on the BEA work, have also been published.[8]

The level of disaggregation (i.e., of detail) of approach is a prime consideration. In I/O work before 1963, the economy was broken down into about 80 sectors. In the 1963 study, 367 sectors were used. These are listed in Table 2.

The task here is to convert the 1963 I/O results, which are in terms of dollar sales, to energy terms. The method is described in Section II.

II. INPUT-OUTPUT THEORY

Section A is a simple introduction to I/O. Sections B, C, and D deal with conversion to energy terms.

A. Direct and Total Requirements

The basic data for I/O analysis are dollar sales per year measured in producers' prices. All quantities will be in these units unless otherwise stated.

Let X_i = total output (i.e., sales) of sector i. $X_i = \sum_{j=1}^{n} X_{ij} + Y_i$, where X_{ij} is an intermediate output (interindustry sale) from i to j, and Y_i is the final demand (sales) of i. The sum runs over all industrial and commercial sectors. $\sum_{j=1}^{n} X_{ji}$ is the sum of all purchases by i, and $X_i - \sum_{j=1}^{n} X_{ji}$ is the value added (wages, depreciation, profits, etc.).

I/O theory now assumes that the inputs of a sector are linearly related to the output. Thus $\frac{X_{ij}}{X_j} = A_{ij}$ (A_{ij} is a dimensionless constant), and

$$X_i = \sum_{j=1}^{n} A_{ij} X_j + Y_i,$$

or, in matrix form

$$\underline{X} = \underline{\underline{A}}\ \underline{X} + \underline{Y}\ .$$

This may be inverted:

$$\underline{X} = (\underline{\underline{I}} - \underline{\underline{A}})^{-1}\ \underline{Y}$$

Three "tables" (matrices) are commonly used in I/O work:[5]

1. $\underline{\underline{X}}$ is the <u>transactions</u> table (of dollar flows) for a year. In addition to the X_{ij}, the final demands and total outputs are also tabulated. All are empirical quantities.

2. $\underline{\underline{A}}$ is the table of <u>direct</u> coefficients. The entries are computed from $A_{ij} = X_{ij}/X_j$. A_{ij} is the dollar transaction from i to j required for j to produce a dollar's worth of total output.

3. $(\underline{\underline{I}} - \underline{\underline{A}})^{-1}$ is the table of <u>total</u> (<u>direct plus indirect</u>) requirements. $(\underline{\underline{I}} - \underline{\underline{A}})^{-1}_{ij}$ is the total dollar output of i required for the economy to deliver a dollar's worth of j to final demand.*

Assuming linearity, and, in addition, time invariance of the A_{ij}, one may use the total coefficients to predict the total outputs required to supply an arbitrary final demand vector. This is the whole intent of my use of I/O.

As an example, consider the transaction table for a 3 sector economy:

	Crude Oil	Refined Pet	Cars	TFD	TO
Crude oil	0	10	0	0	10
Refined pet	5	5	5	25	40
Cars	0	0	0	20	20

where TFD = total final demand, TO = total output.

$$\underline{\underline{A}} = \begin{pmatrix} 0 & 1/4 & 0 \\ 1/2 & 1/8 & 1/4 \\ 0 & 0 & 0 \end{pmatrix}, \text{ and}$$

$$(\underline{\underline{I}} - \underline{\underline{A}})^{-1} = \begin{pmatrix} 7/6 & 1/3 & 1/12 \\ 2/3 & 4/3 & 1/3 \\ 0 & 0 & 1 \end{pmatrix}.$$

---

*$(\underline{\underline{I}} - \underline{\underline{A}})^{-1}$ is defined in terms of final demand, while $\underline{\underline{A}}$ is defined in terms of total output. However, it is rigorously true that $(\underline{\underline{I}} - \underline{\underline{A}})^{-1}_{ij} \geq \underline{\underline{A}}_{ij}$.

One may verify that

$$\begin{pmatrix} 10 \\ 40 \\ 20 \end{pmatrix} = (\underline{\underline{I}} - \underline{\underline{A}})^{-1} \begin{pmatrix} 0 \\ 25 \\ 20 \end{pmatrix}$$

Note that \$1 of TFD for a car requires \$0.083 output from crude, \$0.33 from refined, and \$1 from cars.

B. Obtaining the Total Energy Coefficient*

All the work mentioned so far in this section has been done elsewhere. $(\underline{\underline{I}} - \underline{\underline{A}})^{-1}$ for a 367 sector economy for 1963 has been published.[5] Converting the total coefficients for the energy-producing sectors to energy terms would be easy if every sector paid the same price for energy, but they do not. E.g., the average commercial price for electricity in 1963 was 2.29 cents/kWhr., while industrial customers averaged 0.90 cents/kWhr., and the primary aluminum industry paid 0.33 cents/kWhr. What follows is a technique which takes these differences into account.

Let $E_i = \sum_{k=1}^{n} E_{ik} + \frac{1}{p_i} Y_i$

where

E_i = total energy output of energy-producing sector i (in Btu)

E_{ik} = energy supplied from i to k (in Btu)

p_i = price of energy i sold to final demand (in \$/Btu).

$$E_{ik} = \frac{1}{p_{ik}} A_{ik} X_k$$

---

*W. A. Reardon of Battelle Northwest Laboratories has done this for a 35-sector economy.[10]

where

p_{ik} = price of energy i sold to k.*

But since $X_k = \sum_{j=1}^{n} (\underline{\underline{I}} - \underline{\underline{A}})^{-1}_{kj} Y_j$,

$$E_i = \sum_{k=1}^{n} \sum_{j=1}^{n} \frac{1}{p_{ik}} A_{ik} (\underline{\underline{I}} - \underline{\underline{A}})^{-1}_{kj} Y_j + \frac{1}{p_i} Y_i$$

Define: a) $R_{ik} = \frac{1}{p_{ik}} A_{ik}$. i runs over the energy sectors; thus $\underline{\underline{R}}$ is not square.

b) $S_{ik} = \begin{cases} \frac{1}{p_i}, & i = k = \text{energy sector} \\ 0, & \text{otherwise} \end{cases}$

$\underline{\underline{S}}$ accounts for the energy supplied directly to final demand.

$\underline{\underline{S}}$ also is not square.

Then

$$\underline{E} = [\underline{\underline{R}} (\underline{\underline{I}} - \underline{\underline{A}})^{-1} + \underline{\underline{S}}] \underline{Y}$$

or

$$\underline{E} = \underline{\underline{e}} \underline{Y}$$

The total energy coefficients e_{ij} gives the total output of energy sector i required for the economy to deliver a dollar's worth of product j to final demand. The energy coefficients are thus a transformation from dollars to Btus.

In words: Using the total dollar coefficient $(\underline{\underline{I}} - \underline{\underline{A}})^{-1}$, we can calculate the dollar demand on each of the various sectors resulting from a

---

*Often the price, p_{ix}, is inferred from E_{ik}. p_{ix} does <u>not</u> always equal the actual price of energy. See Section III.

dollar's final demand of sector j. We then use the direct coefficient (and price) to determine the energy used by each sector to meet that requirement for its output. Summing gives the total energy requirement; this is equivalent to matrix multiplication.

Returning to the example, let a set of energy flows be included:

	Crude	Refined	Cars	TFD	TO
Crude	0	10(40)	0	0	10(40)
Refined	5(5)	5(5)	5(5)	25(25)	40(40)
Cars	0	0	0	20	20

The figures in parenthesis represent Btu, the others, dollar flows, as before. Thus crude sells all its output at $0.25/Btu; while refined sells to all of its customers at a single price, $1/Btu.* Refining is assumed to be 100% energy-efficient.

$$\underline{\underline{R}} = \begin{pmatrix} 0 & 1 & 1 \\ 1/2 & 1/8 & 1/4 \end{pmatrix}, \quad \underline{\underline{S}} = \begin{pmatrix} 0 & 0 & 0 \\ 0 & 1 & 0 \end{pmatrix},$$

$$\underline{\underline{e}} = \left[\begin{pmatrix} 2/3 & 4/3 & 1/3 \\ 1/3 & 1/3 & 1/3 \end{pmatrix} + \begin{pmatrix} 0 & 0 & 0 \\ 0 & 1 & 0 \end{pmatrix}\right]$$

$1 final demand for cars requires crude to produce 1/3 Btu, and refined to produce 1/3 Btu.

Some additional information can be obtained from this approach. Consider an automobile. How much of the total energy of type i necessary to deliver

---

*Note that these are hypothetical prices, for illustrative use only.

it to final demand went directly to the assembly line? How much to the steel mill? The glass works? The individual terms in the matrix product $\underline{\underline{R}}(\underline{\underline{I}} - \underline{\underline{A}})^{-1}$ give this.

$$R_{ik} \; (\underline{\underline{I}} - \underline{\underline{A}})^{-1}_{kj} \tag{1}$$

is the energy i supplied to sector k in order for the economy to supply a dollar's worth of j to final demand. In the example, we would have

$$\underline{\underline{e}} = \left[\begin{pmatrix} 2/3 & 4/3 & 1/3 \\ \left(\frac{7}{12} + \frac{1}{12}\right) & \left(\frac{1}{6} + \frac{1}{6}\right) & \left(\frac{1}{24} + \frac{1}{24} + \frac{1}{4}\right) \end{pmatrix} + \begin{pmatrix} 0 & 0 & 0 \\ 0 & 1 & 0 \end{pmatrix} \right] .$$

Of the total $\frac{1}{3}$ Btu required from refined for every \$1 TFD (car),* $\frac{1}{24}$ Btu is supplied to crude, $\frac{1}{24}$ to itself and $\frac{1}{4}$ to cars.

C. A Constraint: Does This Approach Violate Energy Conservation?

In the example, the primary energy sector "crude petroleum" supplies all of its output to the secondary energy sector "refined petroleum" with no losses. One expects that the total Btu of crude per \$1 TFD (car) should be equal to the Btu of refined per \$1 TFD (car), and this is true.

However, it is possible to restate the problem in such a way that this "energy conservation law" is violated, yet the economy is reasonable. As a result, when dealing with primary and secondary energy sectors, one must explicitly include an energy conservation constraint.

To demonstrate the violation, let's change the refined petroleum energy row in the example.

---

*From now on I adopt this shorthand: \$1 TFD (car) should be read as "dollar's worth of car supplied to final demand."

	Crude	Refined	Cars	TFD	TO
Crude	0	10(40)	0	0	10(40)
Refined	5(5)	5(5)	5(10)	25(20)	40(40)
Cars	0	0	0	20	20

This just represents a different pricing scheme for refined petroleum; the system is economically possible. But now

$$\underline{\underline{e}} = \left[\begin{pmatrix} 2/3 & 4/3 & 1/3 \\ 2/3 & 1/3 & 7/12 \end{pmatrix} + \begin{pmatrix} 0 & 0 & 0 \\ 0 & 4/5 & 0 \end{pmatrix}\right].$$

$1 TFD (car) requires 1/3 Btu of crude, but 7/12 Btu of refined! The problem is that we used energy prices to allocate refined petroleum, but we had no way of reflecting this back to crude. Following is a scheme to do this.

First, calculate $\underline{\underline{e}}$ (r), which is obtained as before except that the energy flow from primary to secondary energy sectors is set equal to zero ("r" is for "reduced"). In the example,

$$\underline{\underline{R}}\ (r) = \begin{pmatrix} 0 & 0 & 0 \\ 1/2 & 1/8 & 1/2 \end{pmatrix} \text{and}$$

$$\underline{\underline{e}}\ (r) = \left[\begin{pmatrix} 0 & 0 & 0 \\ 2/3 & 1/3 & 7/12 \end{pmatrix} + \begin{pmatrix} 0 & 0 & 0 \\ 0 & 4/5 & 0 \end{pmatrix}\right]$$

Second, obtain new total energy coefficients for crude by

$$T_{ij} = e_{ij}\ (r) + \frac{E_{12}}{E_2}\, e_{ij}(r)$$

where E_{12} is the energy flow from crude to refined and E_2 is the total refined energy output. Here, $E_{12}/E_2 = 1$, and

$$\underline{\underline{T}} = \left[\begin{pmatrix} 2/3 & 1/3 & 7/12 \\ & & \\ 2/3 & 1/3 & 7/12 \end{pmatrix} + \begin{pmatrix} 0 & 4/5 & 0 \\ & & \\ 0 & 4/5 & 0 \end{pmatrix}\right]$$

$\underline{\underline{T}}$ is the (final) total energy matrix. Note that now the crude associated with refined sales to final demand has been reallocated to final demand itself.

In the BEA I/O matrix, there are five energy sectors:

Index	I/O Sector	Title
1	7.00	Coal
2	8.00	Crude oil and gas extraction
3	31.01	Refined petroleum
4	68.01	Electric utilities
5	68.02	Gas utilities

$\underline{\underline{e}}$ (r) is obtained with the following energy flows set equal to 0:

1 → 4 coal → electrical utilities

2 → 3 crude oil and gas → refined petroleum

2 → 5 crude oil and gas → gas utilities

3 → 4 refined petroleum → electric utilities

5 → 4 gas utilities → electric utilities

By the same reasons as above*

$$T_{ij} = \sum_k C_{ik}\, e_{kj}\,(r), \text{ or } \underline{\underline{T}} = \underline{\underline{C}}[\underline{\underline{R}}(r)(\underline{\underline{I}} - \underline{\underline{A}})^{-1} + \underline{\underline{S}}] \qquad (2)$$

---

*This is still an approximation, as I have not accounted for electricity used by refineries, etc. These energy flows are small compared with those included in Eq. (2).

where

$$C_{ii} = 1,\ i = 1, 2 \ldots 5$$

$$C_{14} = E_{14}/E_4$$

$$C_{23} = C_{23}/E_3$$

$$C_{24} = (E_{23}/E_3)(E_{34}/E_4) + (E_{25}/E_5)(E_{54}/E_4)$$

$$C_{25} = E_{25}/E_5$$

$$C_{34} = E_{34}/E_4$$

$$C_{54} = E_{54}/E_4$$

D. Limitations of I/O Analysis

Certain limitations on the usefulness of the technique are discussed in Section IV, but there are several which should be mentioned here. Most of these result from conventions made in constructing the BEA I/O tables; BEA was not thinking in terms of energy!

First, I/O is basically empirical, and depends on the accuracy of its component data. The data are subject to inaccuracies from 1) lack of complete coverage of an industry, 2) restriction of information for proprietary reasons, and 3) use of different time periods for different kinds of data. Errors in $\underline{\underline{A}}$ may generate disproportionate errors in $(\underline{\underline{I}} - \underline{\underline{A}})^{-1}$. The question of accuracy will be treated in a subsequent publication.

Second, there is the problem of transfers. BEA's I/O sector definition is based on the establishment, rather than activity. For example, if those establishments which produce primary aluminum also produce aluminum castings (amounting to less than 50% of total sales), the primary aluminum sector is credited with their complete output. The secondary output is transferred to the aluminum castings sector, i.e., treated as a sale. The corresponding

inputs are not transferred. This means that the dollar output corresponding to production of these aluminum castings has been counted twice, but the energy only once. The fraction transferred varies from sector to sector, so that the R_{ij} require a correction. This has been done; see Appendix A.

Third, there is the question of linearity. Would the auto industry really require twice as much electricity to double its output? For this paper I will assume so, but the question is really unanswered.

Fourth, a problem arises in capital goods; these are not considered part of the interindustry transactions but are listed as sales to final demand. Conceptually, I would consider the energy to make a steel forming press owned by Ford to be as much a contribution to my car as that used to make the steel, but this is not the way BEA looks at it. This leads to an underestimate of total energy coefficient. Since capital formation expenditure was about one-sixth of the GNP in 1963, this is a significant effect. This will be the subject of further study.

Fifth, final demand is measured in producers' prices. While results of this work can be applied to determine the energy required by sales, transportation, etc. (as is done for the automobile in Section VI), they would be much more useful to consumers if already converted to purchasers' prices. This problem will also be treated in a subsequent paper.

Sixth, there is the question of time variation. How constant are the coefficients; is it possible to quantify their loss of reliability with time? This is probably the most serious weakness of the I/O approach. It is discussed briefly in Section V, but more detailed work is needed.

III. ALLOCATING ENERGIES

In theory, obtaining the price (in producers' terms) of energy as supplied to the sectors is equivalent to obtaining the energies, if the I/O dollar flows (X_{ij}) are correct. If the X_{ij} are inaccurate, obtaining the energy flows is even more important. In fact, even if the X_{ij} from energy sectors are completely incorrect, the total energy matrix can be determined, assuming that the rest of the X_{ij} are correct.

Whenever possible I have used basic energy data, that is, E_{ij}. The inverse price, $\frac{1}{p_{ik}}$, has then been calculated by dividing X_{ik}. This apparently represents some wasted effort, since by multiplying $\frac{1}{p_{ik}}$ by A_{ik} effectively cancel out the X_{ik}. Also, the inverse price so obtained is actually an <u>implied</u> one, and does not correspond exactly to actual market prices. I have used this approach because it offers, at least approximately, a graphic demonstration of the sector-to-sector variation in energy pricing.

Data on energy supplied to industry[11] (I/O sectors 13.01-64.12) and mining[12] (sectors 5.00-10.00) are tabulated at 5 year intervals (more often at a lower level of disaggregation) by the Bureau of the Census. (Refined petroleum products are not well covered, however.) Their data is easily converted to the I/O format; hence, they are a prime source. They cover about 300 of the 362 sectors, accounting for over half of the non-residential energy use in 1963. The Census of Manufactures includes the use of fuel materials for non-fuel purposes, such as coal for coke in steel making and petrochemical feedstocks.

The remaining 60-odd sectors, including agriculture, construction, transportation other than private car, service industries, communication--the

commercial sectors--are generally not as well documented. Detailed data are available for only a few, notably transportation. Most must be treated by approximations and ad hoc proration schemes.

Appendix B contains the details of my attempts to allocate energies for 1963. The final result is the detailed inverse price data in Table 4. For illustration, a partial breakdown is included in Table 3.

IV. RESULTS

Results for conversion of the 1963 I/O table to energy terms are presented in the computer printouts of Tables 4 and 5. Before discussing them, let me again caution about the limitations to their use. Besides these mentioned in Section II.D, there are two others: first, nuances from my personal approach to computation (e.g., the primary/secondary energy breakdown in Section II.C or the treatment of hydropower below); and second, the conceptual difficulties inherent in trying to withdraw physical data from a table built on economists' definitions and conventions. These are extremely important, and reference must be made to the literature of I/O,[7,9] and that supplementary to the published I/O table.[5] Some of these problems are illustrated in Section VI, in which the total energy coefficients are used to determine the energy impact of automobiles.

A. Table 4 lists the implied inverse prices (INVPRI) of the five kinds of energy as supplied to the consuming sectors. The five rows are the I/O sectors (with the decimal point omitted) for coal, crude oil and gas extraction, refined petroleum, electric utilities, and gas utilities. The columns correspond to the 362 energy consuming sectors of the economy;

see Table 2. The data result from the detailed energy allocation in Appendix B units are 10^6 Btu/\$ (1963). As noted in Appendix B, comparison of prices, especially for the energy sectors' self-use, must be done carefully. Five entries are listed in parentheses; they are for sales from primary to secondary energy sectors, and receive special treatment in computation, as explained in Section II.C.

B. Table 5 lists the total energy coefficients and auxiliary results. Interpretation is complicated by the fact that the computer printout terminology is not the same as the notation of Section II, to which the reader should refer. Section IV.B 1) defines and explains the terms, while Section IV.B 2) illustrates them for a specific sector, refined petroleum.

1) Explanation for interpreting Table 5. Recall from Section II that $\underline{E} = \underline{\underline{T}}\underline{Y}$, where $\underline{\underline{T}} = \underline{\underline{C}}[\underline{\underline{R}}(r)\ (\underline{\underline{I}} - \underline{\underline{A}})^{-1} + \underline{\underline{S}}]\ \underline{Y}$

a) $(\text{DIRBTU})_{ij}$ is identically equal to R_{ij}, i.e., the energy of type i supplied to sector j per dollar of j's output. The units are 10^6 Btu/\$ (1963). Figures in parenthesis represent energy flows from primary to secondary sectors, which are explicitly treated in Section II.C. Values shown have been corrected for transfers; see Appendix A.

b) $(\text{INVBTU})_{ij} = [\underline{\underline{C}}\ \underline{\underline{R}}(r)\ (\underline{\underline{I}} - \underline{\underline{A}})^{-1}]_{ij}$. This is the energy of type i supplied to all sectors (<u>except</u> final demand) per \$1 TFD (j). If j is an energy sector, one must also take account of the energy delivered directly to final demand as well by

$$T_{ij} = (\text{INVBTU})_{ij} + (\underline{\underline{C}}\ \underline{\underline{S}})_{ij}$$

I have purposely kept this last term separate; it is listed in Table 6. Units for both Tables 5 and 6 are 10^6 Btu/$ (1963). The interpretation when j is an energy sector is that the second term is the actual energy delivered to final demand, and the first term is the energy consumed in the economy per $1 TFD (j).

c) $(TOINBP)_j$ is the total primary energy required per $1 FTD (j). The units are 10^6 Btu/$ (1963). It is obtained by summing the coal and crude oil and gas required per $1 TFD (j), plus a fossil fuel equivalent for hydro and nuclear power (which produced 18.1% and 0.3% of America's electricity, respectively, in 1963). This follows the usual convention of converting of the current efficiency of fossil fuel electric plants. The final expression is then

$$(TOINBP)_j = (INVBTU)_{ij} + (INVBTU)_{2j} + 0.5948\ (INVBTU)_{4j}{}^*$$

Again, for j = energy sector, one must refer also to Table 6 for the energy delivered directly to final demand.

d) $(TOINBU)_j = (INVBTU)_{ij} + (INVBTU)_{2j} - 1.636\ (INVBTU)_{4j}$. This is the total primary energy minus that rejected in

---

*Details of the calculation: From Table 3, 5490 x 10^{12} Btu (coal), 543 x 10^{12} Btu (refined petroleum), and 2220 x 10^{12} Btu (gas) were burned in power plants. 3.128 x 10^{15} Btu (916.8 x 10^9 KW hr. x 3413 Btu/KW hr.) of electricity was produced, but 18.4% was hydro or nuclear. Thus, the fossil fuel heat rate was (8.253 x 10^{15})/[(916.8 x 10^9) (1 - .184)] = 11032 Btu/KW hr., or 3.2323 Btu/Btu. Since 18.4% of electricity was from hydro or nuclear, the fossil fuel factor is (3.2323) (.184) = 0.5948 Btu/Btu. EEI's figure for fossil plants in 1963 is 10,438 Btu/KW hr.[4] The discrepancy with my value of 11,032 is probably due to my assumed heat value for coal burned in power plants. I used an average value for all coal used in the U.S. My main source of conversion factors is ref. 10.

fossil fuel electric plants. Units are 10^6 Btu/$ (1963). Roughly speaking, this is the energy that would be required if the economy could substitute other energies for electricity. Again, for j = energy sector, an additional term from Table 6 is needed.

e) The entries in Table 5 after (TOINBU) are actually applications of the use of the coefficients for 1963. For example, $(PCGDOB)_{ij}$ is the fraction of the U.S. total output of energy i that was required to satisfy the 1963 total final demand for j. (See sections i), j), k) below). Thus

$$(PCGDOB)_{ij} = (INVBTU)_{ij}\ (TFDDOL)_j/(GDOBTU)_i$$

Again, an additional term from Table 6 would be needed if j = energy sector.

f) $(TOPCGP)_j$ is the fraction of the total primary energy necessitated by 1963's final demand for j; as in Section IV.B 1)c) it requires a sum over coal, crude and gas, and hydro and nuclear power. Thus

$$(TOPCGP)_j = \frac{\sum_{i=1}^{2} (PCGDOB)_{ij}\ (GDOBTU)_i + 0.5948\ (PCGDOB)_{4j}\ (GDOBTU)_4}{\sum_{i=1}^{2} (GDOBTU)_i + 0.5948\ (GDOBTU)_4}$$

Again, if j = energy sector, an additional term from Table 6 would be needed.

g) $(TOTPCU)_j$ is defined analogously; it is the total primary energy minus the energy rejected in power plants. Its expression is the same as for $(TOPCGP)_j$, except that 0.5948

is replaced with -1.636. Again, if j = energy sector, an additional term from Table 6 is needed.

h) $(PCGTOT)_i$ is a control total that allows a check of the Input-Output approach. One would like to know if the product of the total energy coefficients and the U.S. final demands for 1963 really gives the total energy consumed; i.e., does energy in = energy out for our model? Thus

$$(PCGTOT)_i = \frac{\sum_{j=1}^{n} (INVBTU)_{ij} \; (TFDDOL)_j}{(GDOBTU)_i}$$

is the fraction of the total U.S. budget of energy i that was consumed in all sectors <u>except</u> final demand to satisfy 1963's final demands. These results are printed on the first page of Table 5, and they all are less than one because of the energy sold to final demand. Using Table 6, we can add this latter energy:

Sector (i)	$(PCGTOT)_i$	$(CSY)_i/(GDOBTU)_i$	(SUM)i
7.00	0.6847	0.3129	0.9976
8.00	0.5806	0.4170	0.9976
31.01	0.5047	0.4917	0.9964
68.01	0.6738	0.3241	0.9979
68.02	0.6605	0.3391	0.9996

The sum in the last column should equal unity for a perfect energy balance. The agreement is to within 0.4% for all sectors, which I consider good.

i) $(GDOBTU)_i$ = total energy output of energy sector i. Units are 10^9 Btu. This was called E_i in Section II.

j) $(GDODOL)_j$ = total output* of sector j. Units are $\$10^3$ (1963). This was called X_j in Section III.

k) $(TFDDOL)_j$ = total final demand of sector j. Units are $\$10^3$ (1963). This was called Y_j in Section II.

2. Example: use of Tables 5 and 6 for I/O sector 31.01, refined petroleum. I have purposely chosen an energy sector, which is more complex than a non-energy sector. The subsection headings below correspond to those in Section IV.B. 1), in the same order.

a) Sector 31.01 received 9.12×10^2 Btu of coal, 2.018×10^6 Btu of crude, 6.89×10^4 Btu of refined petroleum, 1.78×10^3 Btu of electricity, and 3.45×10^4 Btu of gas per dollar of its output.

b) \$1 TFD (31.01) required 1.37×10^4 Btu of coal, 1.80×10^5 Btu of crude, etc., to be "supplied" to all sectors except final demand. In addition, from Table 6 the dollar's worth of petroleum delivered to final demand had an energy content of 1.060×10^6 Btu, and this implies an allocation of 0.9498×10^6 Btu of crude to final demand. The crude is less than the refined because of the import of refined, which is not accounted for in Table 6.*

c) 1.967×10^5 Btu plus 9.498×10^5 Btu of primary energy was required to provide \$1 TFD (31.01). The first term is from Table 5 (i.e., $(TOINBP)_{31.01}$), and the second, from Table 6, is the crude allocated to final demand corresponding to the sale of refined petroleum.

---

*Imports complicate the meaning of primary energy, since the technology that produced imported refined petroleum lies outside the U.S., and is not included in the I/O table.

d) When corrected for the losses in electric power generation, the first term in c) becomes 1.887×10^5 Btu. The second is unchanged.

e) In order for the economy to deliver 1963's final demand of refined petroleum ($\$10.09 \times 10^9$), the five energy sectors were required to supply 1.11, 5.30, 3.93, 1.56, and 4.87%, respectively, of their total energy output to the sectors other than final demand. (These figures are read directly from Table 5.) The final demand term adds energy to the crude and refined sectors, so that the figures for these become 33.3 and 52.3%, respectively. These must be calculated from results in Tables 5 and 6. E.g., for refined petroleum, the total energy demanded is

$$[(\mathrm{INVBTU})_{31.01,31.01} + (\underline{\underline{\mathrm{CS}}})_{31.01,31.01}]\ (\mathrm{TFDDOL})_{31.01}$$

$$= (8.605 \times 10^4 + 1.060 \times 10^6)\ \frac{\mathrm{Btu}}{\$}\ (\$1.009 \times 10^{10})$$

$= 11.56 \times 10^{15}$ Btu, which is 52.3% of the total refined petroleum energy output, 22.1×10^{15} Btu.

f) The 1963 final demand for refined petroleum required 4.03% of the nation's primary energy to be supplied to the sectors other than final demand. (TOINBP, from Table 5.) When the final demand energy is accounted for, the figure becomes 23.82%. This is calculated from Tables 5 and 6 by primary energy required =

$$((\mathrm{TOINBP})_{31.01} + (\underline{\underline{\mathrm{CS}}})_{8.00,31.01})\ (\mathrm{TFDDOL})_{31.01}$$

$$= (1.967 \times 10^5 + 9.498 \times 10^5)\ \frac{\mathrm{Btu}}{\$}\ (\$1.009 \times 10^{10})$$

$= 11.57 \times 10^{15}$ Btu. The total primary energy of the

U.S. (defined consistently with the discussion in Section IV.B. 1) c)), is $12.48 \times 10^{15} + 34.23 \times 10^{15} + (0.5947)(3.128 \times 10^{15}) = 48.57 \times 10^{15}$ Btu (The (GDOBTU)'s are from Table 5 also.) 11.57/48.57 = 23.82%.

C. Table 7 illustrates a breakdown of total energy requirements by intermediate sector, as discussed in Section II.B, eq. (4). Of the total energy of type i required by $1 TFD (j), some fraction was supplied to intermediate sector s. $(PCINVB)_{isj}$ gives that fraction.

For simplicity I have aggregated the 362 sectors into 28, as tabulated in Table 8. I have omitted some sectors, so the column totals are less than 1. Three sectors are shown: Apparel (18.04), household refrigerators (54.02), and motor vehicles (59.03).

Without going into detail, let me point out that a quick glance at Table 7 shows that the results seem to conform with intuition. For example, 41% of the total energy to produce motor vehicles or parts is used directly by the primary metals industry. For household refrigerators and freezers, this primary metals fraction is 28%, and for apparel, only 2.4%. The chemicals fraction shows the opposite trend: 9.5% for motor vehicles, 17.7% for refrigerators, and 27.8% for apparel. This would seem to reflect the use of plastic parts in refrigerators, and the use of synthetic fabrics in apparel.

D. Do the results represent an improvement?

Use of detailed energy pricing data theoretically yields total energy coefficients which contain more information than the coefficients of $(\underline{\underline{1}} - \underline{\underline{A}})^{-1}$. But do they? An indicator, admittedly imperfect, of

whether this is true, is Table 9, in which the variability of T and $(\underline{\underline{1}} - \underline{\underline{A}})^{-1}$ for electricity is compared for six different sectors. The variation of $(\underline{\underline{1}} - \underline{\underline{A}})^{-1}$ over these sectors is 31%; for T, it is 112%. I feel the additional "spread" obtained justifies the method.

V. TIME VARIATION OF COEFFICIENTS

The implied intent of this work is usefulness in projecting, so this question is extremely important. The subject has a fairly extensive literature, but projections have not been made at the 360 level of detail. All I offer here is the roughest attempt to make the 1963 total energy coefficients usable for 1960 and 1970. It takes no account of the differences in time variation between coefficients, and is thus severely limited.

Figure 1 shows the energy intensiveness (energy use/GNP) of the U.S. economy over the past decade. In terms of constant dollars, energy intensiveness has increased since 1966 after decreasing from 1960. On the other hand, this ratio, as measured in current dollars, has decreased steadily throughout the period, with a possible leveling off in 1969-70. In this decade, energy intensiveness in current dollars has decreased by 20%.

I suggest that energy intensity, in current dollars, is a reasonable first-order scale factor to use with the total energy coefficients. (The sum of the final demands is the GNP.) This approach can be applied to each of the energy types individually, as in Table 10. Note that in terms of current dollars, energy intensiveness for coal and refined petroleum has dropped significantly, while there has been a minor decrease for gas, and a minor increase for electricity. This reflects the relative increase in use of the latter two.

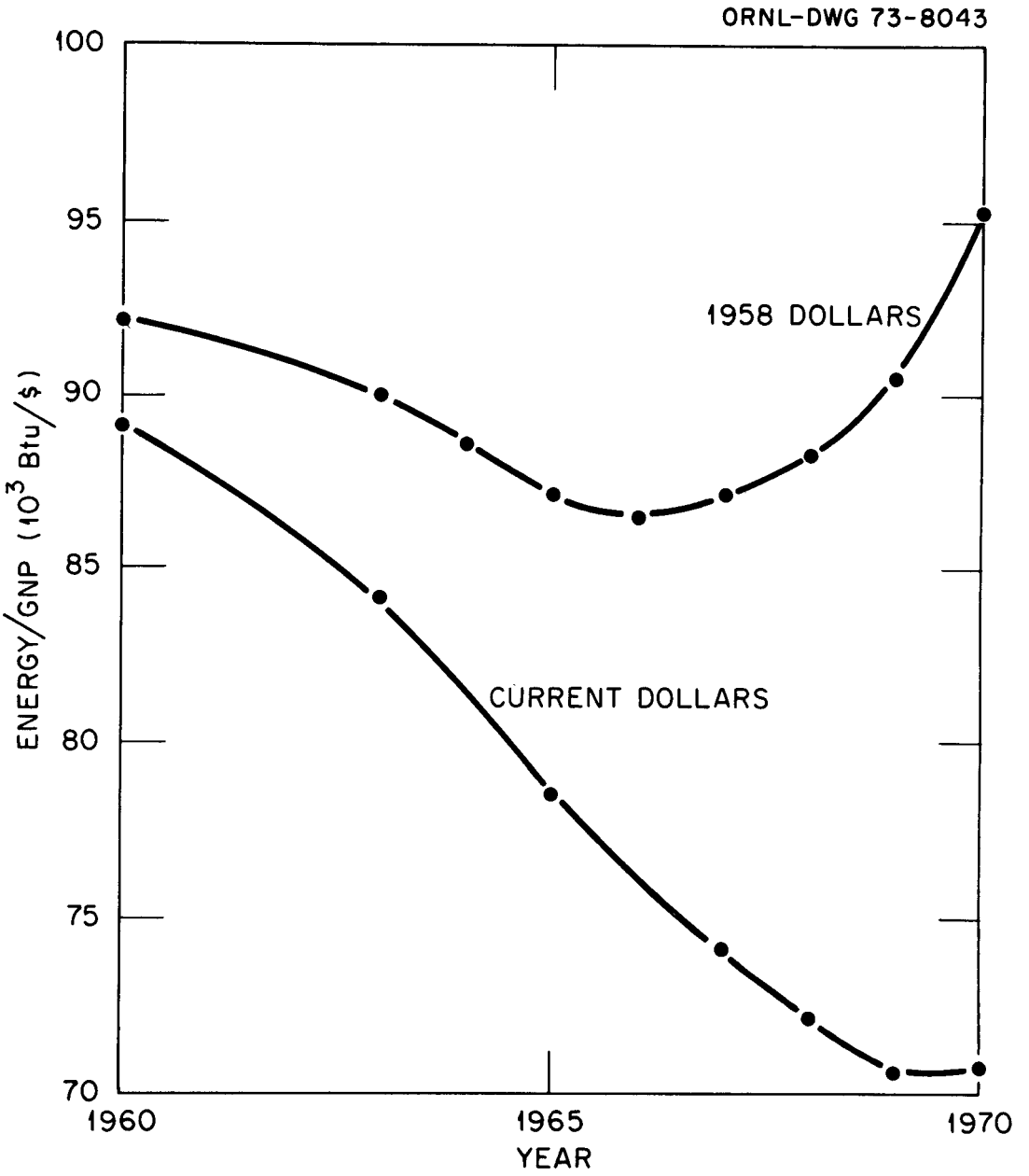

Fig. 1. Primary Energy Use/GNP for the U.S., 1960-70.

VI. THREE FURTHER EXAMPLES OF APPLICATION

The results of this work hopefully can be applied in many ways such as those suggested in Section I.A. Sections IV.B.2. and IV.C. have illustrated some applications. In this section are three more: the energy impact of the private automobiles in America, 1963; the energy efficiency of the energy sectors; and the energy cost of a small appliance, the electric mixer.

A. Energy Impact of the Private Automobile, 1963

1. A semantic difficulty: how to ask the question.

Besides all the reservations about using the coefficients T_{ij} mentioned already, there is still a semantic problem over this question: "What is the total energy required to produce cars?" Within the framework of the I/O approach, the question isn't specific enough. The problem is clearer when we ask the more restrictive question: "What fraction of America's energy budget is required to produce cars?"

The latter question introduces a constraint, that the total energy so allocated will sum to the economy's energy input. With this constraint, there are two ways to ask:

a) Question: What total energy is needed to produce product j, without regard to whether it is sold to other sectors or final demand?

Answer:

$$\underline{E} = \left(\frac{\partial \underline{E}}{\partial \underline{X}}\right)_j X_j = [\underline{\underline{T}}\ (I - A)]_j X_j = \{\underline{\underline{C}}\ [\underline{\underline{R}}(r) + \underline{\underline{S}}\ (\underline{\underline{I}} - \underline{\underline{A}})]\}_j X_j$$

b) Question: What total energy is necessary to deliver product j to final demand?

Answer:

$$\underline{E} = \frac{\partial \underline{E}}{\partial \underline{Y}}_j Y_j = [\underline{\underline{T}}]_j Y_j = \{\underline{\underline{C}} [R(r) (I - A)^{-1} + S]\}_j Y_j$$

a) gives the direct energy use by sector j only (plus a correction which is zero unless j is an energy sector), while b) includes energies supplied to all sectors to deliver product j to final demand.

Without the constraint, question a) can be answered by saying that the total energy to produce X_j is $\underline{E} = [\underline{\underline{T}}]_j X_j$, subject to a disclaimer: "Production of X dollar's worth of j required total energy given by $[\underline{\underline{T}}] X_j$, but some of j's output was shipped to other sectors as factors of their production, and would not have been produced were there not final demands for products other than j. This energy is counted again as contributing to their output. Hence allocating energy on this basis yields a total which exceeds the energy input of the economy."

For the case of the private auto, all associated expenditures are by definition personal consumption; i.e., a component of final demand, and use of $\underline{E} = \underline{\underline{T}}\ \underline{Y}$ is appropriate.

2. Details of the computation*

The method involves multiplying the appropriate total energy coefficients times the corresponding final demand expenditures

---

*The analysis parallels that of Ref. 16. Results shown here are for 1963, while in Ref. 16 the method was extended to 1970.

associated with the private auto. (These will include purchase and final costs, maintenance and repair, parking, garaging, the cost of building roads, and so on.) Refer to Table 11.

a) Fuel. From Ref. 3, p. 307, there were 68.8 x 10^6 private cars registered, each using (Ref. 3, p. 322) 655 gallons of gasoline for the year. This gives a fuel energy of 5.86 x 10^{15} Btu. Some 20% additional primary energy was required in order for this energy to be shipped to final demand; see Table 12. This requires an additional 1.22 x 10^{15} Btu.*

   Energy is used in the retailing of gasoline. From Ref. 3, pages 458-59, the retail markup is approximately $.09/gallon, for a total markup of $4.05 x 10^9. This is assigned an energy coefficient from I/O sector 69.02, retail trade, of 32,700 Btu/$ (i.e., (TOINBP)), yielding a retailing energy of 0.13 x 10^{15} Btu. This assumes that gasoline retailing activities are as energy intensive as the average.

b) Manufacturing and sales of the car itself. In 1963, 7.64 x 10^6 autos were produced domestically with a producer's value of $14.427 x 10^9, or $1890/car. The appropriate I/O sector is 59.03, motor vehicles and parts, with (TOINBP) = 70,000 Btu/$. The total energy is 1.01 x 10^{15} Btu, or 132 x 10^6 Btu/car, which agrees remarkably well with the value (for 1967) obtained by Berry and Fels,[17] 126 x 10^6 Btu/car. Given the inaccuracies in the I/O approach, this agreement should be considered fortuitous.

---

*Btu figures are rounded to nearest 10 x 10^{12} Btu.

In 1963, 8.05 x 10^6 cars (including inputs) were sold by retail dealers at a total markup of \$10.67 x 10^9 (Ref. 14, p. 536). Again using the retail trade coefficient, I obtain 0.35 x 10^{15} Btu for the retailing energy.

c) Tires. The same approach is used. From Ref. 14, p. 537, an average car required \$20 worth of new tires in 1963. I assume that 60% of this is the producer's price, and use the I/O coefficient for sector 32.01, 99,100 Btu/\$. With 68.8 x 10^6 cars registered, this gives a tire manufacturing energy of 0.08 x 10^{15} Btu. I assume the other 40% is attributable to retail trade, for a retailing energy of 0.02 x 10^{15} Btu.

d) Oil. From Ref. 14, p. 537, the oil/gasoline ratio is 1/128 on a Btu basis. This factor was used.

e) Others (auto repair, maintenance, parking and garaging, insurance). For these, producers' and purchasers' prices are the same, so the expenditure figures can be applied directly to the appropriate I/O coefficients. Auto repair and maintenance is aggregated with parking and garaging in the I/O table; hence they share the same coefficient.

f) Taxes. From Ref. 3, pages 458-59, the tax on a gallon of gas was approximately \$.11 for a total revenue of \$4.96 x 10^9. I assumed this was all spent for road construction, I/O sector 11.04, which has an energy coefficient of 98,500 Btu/\$, yielding a road construction energy of 0.58 x 10^{15} Btu.

The results in Table 12 show that in 1963, the U.S. auto fleet required 10.24 x 10^{15} Btu, or 20.5% of the nation's energy

budget. Three-fifths of this energy use was in the form of direct fuel consumption, while two-fifths was needed to supply the indirect needs of the automobile transportation system.

B. Energy Efficiency of the Energy Sectors, 1963

Here we use the results of Tables 5 and 6 to determine the total primary energy needed to deliver 1 Btu of energy of type j to final demand. This is given by

$$[(TOINBP)_j + (\underline{\underline{CS}})_{1j} + (\underline{\underline{CS}})_{2j} + 0.5948\ (\underline{\underline{CS}})_{4j}]/(\underline{\underline{CS}})_{jj}$$

We have already calculated part of this for refined petroelum in Section IV.B. 2) f). The complete figure is $(1.9666 \times 10^5 + 9.498 \times 10^5)/1.060 = 1.082$ Btu/Btu. This does not, however, take into account the fact that 10.4% of America's refined petroleum was imported in 1963. The actual primary energy required, if all the refined petroleum had been produced domestically, would have been 1.082/0.896 = 1.208 Btu/Btu. Table 12 lists the results for all the energy sectors. Note that the efficiency of the electrical sector by this calculation is only 25.8%.

C. Appliance Use: An Electric Mixer

This simple application is meant to suggest others in terms of consumer choices. A typical electric mixer uses about 100 watts and is operated (say) 15 minutes a week; during the year it consumes 1.3 KW hr. of electrical energy. From Table 12, this requires $1.3 \times \frac{1}{.258} \times 3413 = 17{,}200$ Btu of primary energy. In 1963, an average mixer cost $20 (purchaser's price).[18] Ideally, we should break this down into producer's price and markup and apply the appropriate I/O coefficients. For simplicity, I'll assume that the markup was 40% of purchaser's price and that all of it is allocable to

retail trade (I/O sector 69.02). Electric mixers belong in sector 54.04, electric housewares and fans. Then the capital energy cost is given by

$$[0.6\ (\mathrm{TOINBP})_{54.04} + 0.4\ (\mathrm{TOINBP})_{69.02}]\ \frac{\mathrm{Btu}}{\$}\ (\$20)$$

$$= [0.6\ (74{,}100) + 0.4\ (32{,}700)]\ (20)$$

$$= 1.15 \times 10^6\ \mathrm{Btu}.$$

Assuming that the device is maintenance- and repair-free till its demise, 15 years hence, and that its disposal is energy free, the yearly average capital energy cost is one-fifteenth of this, or 76,700 Btu. Thus, to operate the mixer takes 76,700 + 17,200 = 93,900 Btu/year, of which only 18% is operating energy.

Since I estimated the usage rate, the figures here are not final; they are presented only to illustrate the approach.

APPENDIX A.

Correcting for Transfers

Because BEA's I/O table is based on the establishment, part of the output of many sectors is counted as the output of another. However, the corresponding inputs are not transferred.[7] For most of the industrial sectors, I obtained energy data from the Census of Manufacturers; BEA obtained their initial dollar data from the same source. I used the energy inputs as published, but BEA further manipulated the dollar flows with transfers, at least partially double counting. As a result, the inverse prices would tend to be incorrect; some greater than, some less than their "correct" values.

To compensate for this fully, one would have to know the exact amount of energy used in manufacturing secondary products (e.g., aluminum castings produced at a primary aluminum smelter). This is practically impossible, so I'll use the following proration scheme:

The actual "in-house" output of sector j is $X_j - \sum_k t_{kj}$, where the sum is over all transfers into j. This suggests that the correct energy of type i to associate with the output of j (including transfers) should be

$$E_{ij} = E_{ij}\, g_j / \langle g_j \rangle_i$$

$$\text{where } g_j = \left[1 - \frac{\sum_k t_{kj}}{X_j} \right]^{-1} .$$

g_j can be calculated from data in the I/O table,[5] and $\langle g_j \rangle_i$ is the computer average value of g_j such that the total amount of energy type i used by all of the affected sectors is unchanged. The correction has been applied for coal, electricity, and gas to sectors 5.00-10.00 (mining) and 13.00-64.12

(manufacturing) with a few exceptions, and the results are incorporated in Table 5. That is, the values of $\underline{\underline{R}}$ (DIRBTU) in Table 5 are computed from the inverse prices of Table IV and the appropriate normalized tranfer factors. The average value of $|g_j/\langle g_j\rangle_i - 1|$ is approximately 0.1. I have not included transfer factors in this report. They are available on request.

BEA does not use this transfer procedure for the trade, construction, and service sectors;[5] hence no correction is needed. Since the refined petroleum energy data is already compatible with I/O classification,[25] no correction is necessary for this energy.

APPENDIX B.

Energy Allocation: Details

Here I discuss energy allocation for each of the sectors. I will treat electric utilities first, since it seemed to be the easiest to handle.

1. 68.01 (E.ectric utilities). By definition, electric utilities sell directly to their customers; hence, there is no difference between producers and purchasers' prices. Edison Electric Institute[4] is a prime data source. Many industries produce some of their own electricity; some of these also sell a portion of this. Industrial production of electricity amounted to 10% of the nation's total in 1963, but most of it was consumed in-house; only 2/3 of one percent of the total was generated and sold by industry. I ignored this small factor.

Even after accounting for transfers, I found a discrepancy between BEA's and EEI's estimate of total output (dollars). BEA's was greater by 12.6%. This is at least partly due to taxes (which are considered a part of producers' prices by BEA). Since I do accept EEI's energy data, I must scale up the EEI price data for agreement.

a. Sectors 1-2 (Agriculture). Data scanty; everything is an estimate. For constructing all the energy outputs to agriculture, BEA relies on dollar data from USDA. Most likely the I/O dollar flow is underestimated since it assumes only 24% of farm-used electricity goes to non-residential farm functions.[19] A more likely figure for 1963 is 47%.[20] This is gotten by subtracting the EEI average residential figure from an average farm (total use) figure from the Crop Reporting Board of USDA.[21] I used the latter source for the energy flow.

b. Sectors 5-10, 13-64 (mining, industry). Census of Mineral Industries, 1963; Census of Manufactures, 1963, for energy data. One exception is sector 31.01 (ref. 3, p. 437) I/O dollar flows.

c. Sectors 65.01, 79.01 (Rail transportation). Some local rail use is charged by BEA to local government (79.01); other to 65.01. EEI includes both in its category "railroads."[22] The American Transit Association, in its Transportation Fact Book (1970-71), Table 10, includes only metropolitan transit (no commuter railroads).[23] Thus the energy flow from ATA was allocated to 79.01, and the difference between EEI's figure and this, to 65.01. I/O dollar flows.

d. Sectors 68.01, 78.02, 79.02 (electric utilities). In BEA's accounting, all output of 78.02 and 79.02 (federal, state, and local electric utilities) is transferred to 68.01. I assume that the dollar flows from 68.01 to 68.02, 79.02 have no associated energy flow. For "self-use," I used EEI figures on transmission losses and company use. Since the I/O dollar flow for 68.01 to itself has mainly to do with interdepartmental, inter-utility sales, the inverse price here has little significance for comparison with that of other sectors.

e. Sectors 78.01, .04, 79.03, 98.70, .80, and .90 (Federal, State, local government enterprises). These were picked judgmentally in an attempt to match "other public authorities" and "street and highway lighting" as defined by EEI.[24] In this case the EEI price (adjusted up as per above) was used with the I/O dollar flows to obtain energy flows. The individual sector allocation was thus proportional to I/O dollar flows.

f. Sectors 69.02, 70, 71, 72.02, .03, 75, 76, 77.01, 77.05 (Commercial). I judged these sectors to be "commercial," and applied the adjusted EEI price to the I/O dollar flows.

g. Sector 96.60 (personal consumption expenditures). BEA estimated how much residential electricity was used in apartments (and hence recorded as commercial). I applied this correction to EEI's residential energy, then used the I/O dollar flow.

h. Sectors 3-4, 11-12, 65.02-67, 68.02-69.01, 72.01, 97,10, .20, 98.60. This is a catchall category, mostly commercial, but containing potentially large users who might get industrial rates. The energy is the residual from above; I/O dollar flow.

2. 8.00 (Crude oil and gas extraction). This sector supplies almost all of its output to petroleum refineries (31.01) and gas utilities (68.02). It should be considered simultaneously with these sectors; see Figure 2.

a. Sector 8.00 (Crude oil and gas). Self use energy figures are from Census of Manufactures, 1963. Over 99% of this is from the gas used or wasted in extracting gas and oil. Probably a rather inexact figure. I/O dollar flow.

b. Sector 27.04 (Misc. chemical products). The gas burned by carbon black plants is included here. For this process gas is considered a raw material and this energy (Census of Manufactures, 1963, Table 7A), must be added to that used for heat and power.* Considering this gas to be supplied by 8.00 rather than 68.02 is a BEA convention. Actually, energy data for "heat and power" was for 1962. To update to 1963, I prorated on the basis of total dollars spent for all fuels by each sector. (Dollar data for both years is in the Census of Manufactures, 1963.)

c. Sector 31.01 (Petroleum refining). Bureau of Mines figures.[15]

---

*Fuels used as raw materials have been included in all energy flow data in this report.

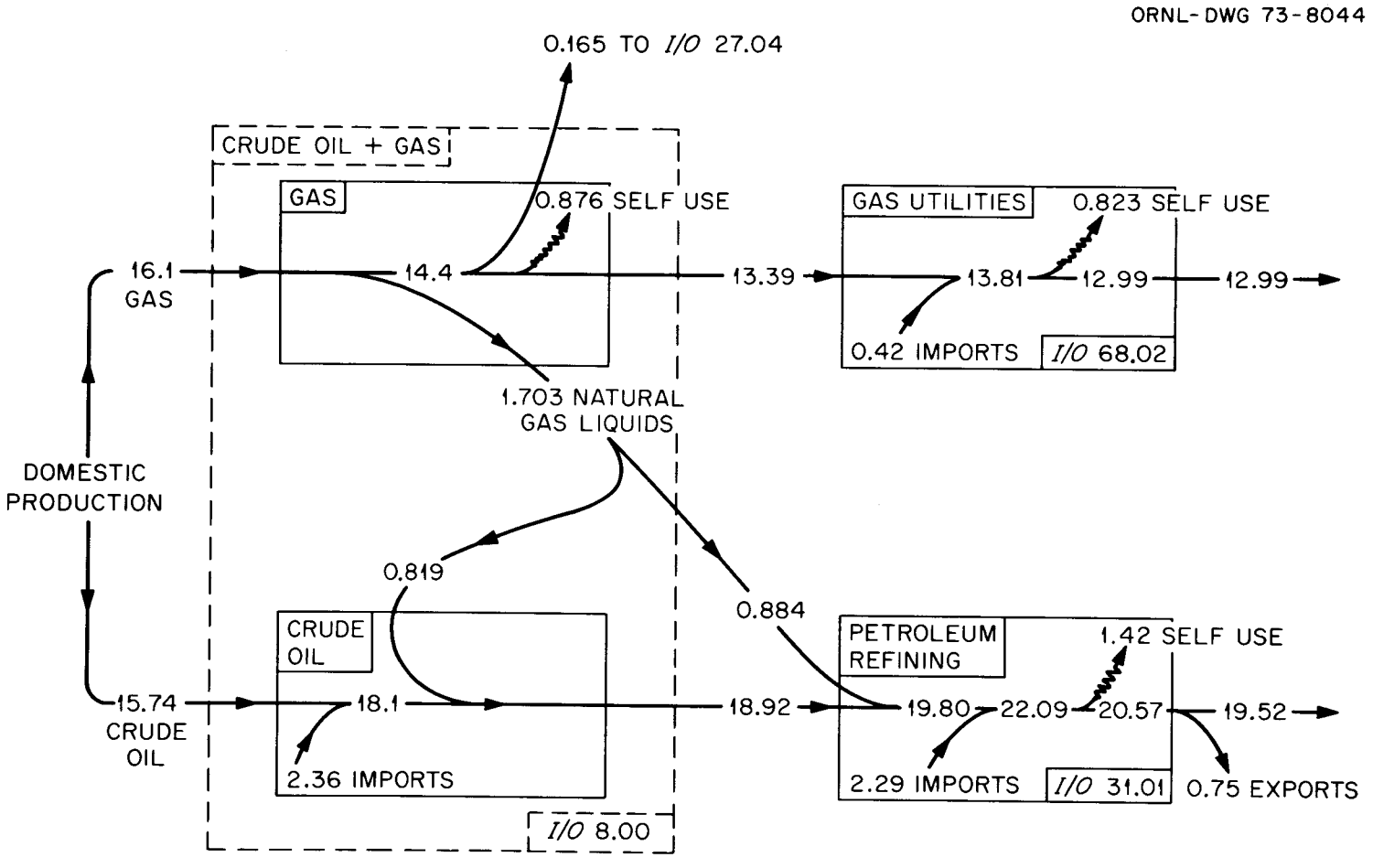

Fig. 2. U.S. Oil and Gas Energy Balance, 1963.

Notes for Figure 2

Most figures are from Bureau of Mines.[15] Self-use figures are detailed in text. Note that some natural gas liquids are transferred to the input to 31.01, while others are used for blending (after refining) or are transferred directly to 31.01's output. Exports from 8.00 and 68.02 are negligible. Exports from 31.01 are from ref. 25; these are larger than from ref. 15.

d. Sector 68.02 (Gas utilities). Bureau of Mines figures.[15]

Several other sectors have non-zero dollar flows, but I believe these represent zero energy flow; e.g., I/O sector 71 (real estate), which represents leasing fees.

3. 31.01 (Petroleum refining). Census of Manufacturers data is too aggregated (over various fuel products) to be of great use. For example, in the 1963 publication there is a category "other fuels" which includes gasoline, LPG, wood, and purchased steam, and which is tabulated in dollar sales only, not in energy. The prime source for energy data is a study completed for the Office of Emergency Preparedness by Jack Faucett Associates.[25] This breaks refined petroleum products into 14 categories and allocates each separately. Their method generally uses proration (based on motor vehicles, etc.) but much additional input. They often incorporate BEA's schemes used in preparing the I/O table.* While these approaches seem inherently less accurate than empirical data, there seems to be no better source available.

I have used Faucett's results almost exclusively. In a few cases, listed below, I felt that my own figures were better. I used them, and adjusted the remainder accordingly.

a. Sector 31.01 (Refined petroleum). Self-use data from ref. 3, p. 437.

b. Sector 65.03 (Motor freight). Faucett's energy flow is over 30% lower than mine, which are from Mooz.[26] Hirst's figure[6] was in-between. Hence, I used the former.

---

*I have prepared a more detailed documentation of BEA's construction of the energy rows. It is available on request.

c. Sector 65.04 (Water transport). Over 80% of the fuel for this sector is residual oil. On this Faucett did not use fundamental shipping data, while Mooz did. I used the latter.

d. Sector 68.01 (Electric utilities). EEI data here is accepted as the most accurate, so I used it. Faucett's was 15% higher.

4. 68.02 (Gas utilities). A basic source is the American Gas Association, notably their yearly publication, Gas Facts. However, they do not collect intrastate data and hence their numbers are underestimates.

a. Sectors 5-10 (Mining). Census of Mineral Industries, 1963, for energy flows. I/O dollar flows.

b. Sectors 13-64 (Industry). Census of Manufactures, 1963. This contains 1962 data, which was prorated to 1963, as described in Section 2. of this appendix. One exception is 31.01 (ref. 3, p. 437). I/O dollar flows.

c. Sector 65.06 (Pipeline transport). Bureau of Mines.[27] I/O dollar flow.

d. Sector 68.01 (Electric utilities). EEI figures for BTU, I/O dollar flow. I have juggled a bit here. First, I've allocated all the gas burned for electricity production to 68.01. In the I/O table some is allocated to 68.02, 79.02. Since their output is totally transferred to 68.01, it is permissible to transfer the energy input also. Then the dollar flows from 68.02 to 78.02, 79.02, have zero associated energy flow. Second, by doing this, I've assigned zero energy flow with the $50 million flow from 8.00 to 68.01.

e. Sector 68.02 (Gas utilities). Self-use was obtained from a computation suggested by J. Diehl, American Gas Association. I/O dollar flow.

f. Sector 96.60 (PCE). BEA accepted Gas Facts[28] residential energy data (but not the industrial or commercial); I did too. I/O dollar flows.

g. (Others) Residual energy, I/O dollar flows.

5. 7.00 (Coal).

a. Sectors 5-10 (Mining). Census of Mineral Industries, 1963, for energies. For 7.00, additional "unaccounted for" coal was listed by ref. 15. There is a large self dollar flow from resales; hence the self use inverse price seems very low.

b. Sectors 13-64 (Industry). Census of Manufactures, 1963. 1962 data updated to 1963, as for gas. A somewhat involved method was used to obtain the coal used to make coke for steelmaking; this accounts for roughly 40% of the industrial coal. One exception: 31.01 (ref. 3, p. 437). I/O dollar flows.

c. Sector 65.01 (Rail transportation). Energy from Mooz,[26] I/O dollar flow. Coal used by railroads was small in 1963 and is much smaller now. now.

d. Sector 65.04 (Water transportation). Energy from Minerals Yearbook, 1965; I/O dollar flow.

e. Sector 68.01 (Electric utilities). EEI energy data, I/O dollar flow.

f. Sectors 1-2, 68.02, 68.03, 96.60 (PCE), 97, 98. Energy as residual, I/O dollar flows.

g. (All other sectors). Energy flow = 0.

Table 1. U.S. primary energy use by consuming sectors, 1950-70

	Percent					Total output[a] (10^{15} Btu)
	Residential	Private Auto	Commercial	Industrial	Other	
Coal						
1950	38.5	---	5.6	55.3	0.6	12.9
1960	22.0	---	7.4	67.7	2.9	10.1
1970	21.2	---	13.4	63.2	2.2	12.7
Refined petroleum						
1950	13.0	26.8	35.3	22.0	2.9	13.5
1960	12.6	28.2	34.2	19.2	5.8	20.1
1970	13.7	30.7	34.4	20.3	0.9	29.6
Gas						
1950	35.7	---	11.9	49.1	3.3	6.2
1960	38.4	---	12.3	43.8	5.5	12.5
1970	37.2	---	16.3	42.1	4.4	22.0
Hydropower						
1950	25.0	---	18.4	50.3	6.3	1.55
1960	28.7	---	16.8	50.2	4.3	1.74
1970	32.2	---	22.5	41.1	5.2	2.60
Nuclear						
1950	---	---	---	---	---	---
1960	28.7	---	16.8	50.2	4.3	0.015
1970	32.2	---	22.5	41.1	5.2	0.229
Total primary energy						
1950	27.3	10.6	19.0	40.6	2.3	34.2
				62.1		
1960	22.6	12.7	21.2	38.3	5.2	44.5
				64.6		
1970	23.6	13.6	24.0	36.4	2.4	67.1
				63.0		

Notes for Table 1

Coal:

1. Sources: Bureau of Mines. Their data are summarized in ref. 3, page 443. See also ref. 2.
2. Coal used for electricity production was allocated according to Edison Electric Institute data (ref. 4). These same figures are used for hydropower and nuclear in the table.
3. Residential and commercial use are allocated according to the 1963 Input-Output dollar transactions (ref. 5).

Refined Petroleum:

1. Sources: Same as for coal. Transportation energy is allocated to private auto and commercial use based in data from Hirst (ref. 6).
2. Other notes same as for coal.

Gas:

Same as for coal.

Hydropower and nuclear:

1. Sources: Refs. 3 and 4.
2. This follows the usual convention, which assigns a primary energy equivalent equal to that needed if the electricity were generated in fossil fuel plants with the current thermal efficiency.

(a) Total output figures do not include exports.

Note: For Table 2, note that two footnotes were typed at end of the table.

Table 2. Industry Classification of the 1963 Input-Output Tables

The underlined titles represent the groupings of industries used for the summary version of the 1963 tables and were also used in the 1958 and 1961 input-output tables prepared by the Office of Business Economics.

	Industry number and title	Related SIC codes (1957 edition)
AGRICULTURAL, FORESTRY & FISHERIES		
	1 Livestock & livestock products	
1.01	Dairy farm products	0132, pt. 014, pt. 02
1.02	Poultry & eggs	0133, pt. 014, pt. 02
1.03	Meat, animals & miscellaneous livestock products	0139, pt. 014, 0193, pt. 0729, pt. 02
	2 Other agricultural products	
2.01	Cotton	0112, pt. 014, pt. 02
2.02	Food feed grains & grass seeds	0113, pt. 0119, pt. 014, pt. 02
2.03	Tobacco	pt. 0119, pt. 014, pt. 02
2.04	Fruits & tree nuts	0122, pt. 014, pt. 02
2.05	Vegetables, sugar & miscellaneous crops	0123, pt. 0119, pt. 014, pt. 02
2.06	Oil bearing crops	pt. 0119, pt. 014, pt. 02
2.07	Forest, greenhouse & nursery products	0192, pt. 014, pt. 02
	3 Forestry & fishery products	
3.00	Forestry & fishery products	074, 081, 082, 084, 086, 091
	4 Agricultural, forestry & fishery services	
4.00	Agricultural, forestry & fishery services	071, 0723, 073, pt. 0729, 085, 098
MINING		
	5 Iron & ferroalloy ores mining	
5.00	Iron & ferroalloy ores mining	1011, 106
	6 Nonferrous metal ores mining	
6.01	Copper ore mining	102
6.02	Nonferrous metal ores mining, except copper	103, 104, 105, 108, 109
	7 Coal mining	
7.00	Coal mining	11, 12
	8 Crude petroleum & natural gas	
8.00	Crude petroleum & natural gas	1311, 1321
	9 Stone & clay mining & quarrying	
9.00	Stone & clay mining & quarrying	141, 142, 144, 145, 148, 149
	10 Chemicals & fertilizer mineral mining	
10.00	Chemical & fertilizer mineral mining	147
CONSTRUCTION		
	11 New construction	
11.01	New construction, residential buildings (nonfarm)	pt. 15, pt. 16, pt. 17, pt. 6561

Table 2 continued

Industry number and title		Related SIC codes (1957 edition)
11.02	New construction, nonresidential buildings	pt. 15, pt. 17
11.03	New construction, public utilities	pt. 15, pt. 16, pt. 17
11.04	New construction, highways	pt. 16, pt. 17
11.05	New construction, all other	pt. 15, pt. 16, pt. 17, 138
	12 Maintenance & repair construction	
12.01	Maintenance & repair construction, residential buildings (nonfarm)	pt. 15, pt. 17
12.02	Maintenance & repair construction, all other	pt. 15, pt. 16, pt. 17
MANUFACTURING		
	13 Ordnance & accessories	
13.01	Complete guided missiles	1925
13.02	Ammunition, except for small arms, n.e.c.	1929
13.03	Tanks & tank components	1931
13.04	Sighting & fire control equipment	1941
13.05	Small arms	1951
13.06	Small arms ammunition	1961
13.07	Other ordnance & accessories	1911, 1999
	14 Food & kindred products	
14.01	Meat products	201
14.02	Creamery butter	2021
14.03	Cheese, natural & processed	2022
14.04	Condensed & evaporated milk	2023
14.05	Ice cream & frozen desserts	2024
14.06	Fluid milk	2026
14.07	Canned & cured sea foods	2031
14.08	Canned specialties	2032
14.09	Canned fruits & vegetables	2033
14.10	Dehydrated food products	2034
14.11	Pickles, sauces & salad dressings	2035
14.12	Fresh or frozen packaged fish	2036
14.13	Frozen fruits & vegetables	2037
14.14	Flour & cereal preparations	2041, 2043, 2045
14.15	Prepared feeds for animals & fowls	2042
14.16	Rice milling	2044
14.17	Wet corn milling	2046
14.18	Bakery products	205
14.19	Sugar	206
14.20	Confectionery & related products	207
14.21	Alcoholic beverages	2082-5
14.22	Bottled & canned soft drinks	2086
14.23	Flavoring extracts & sirups, n.e.c.	2087
14.24	Cottonseed oil mills	2091
14.25	Soybean oil mills	2092
14.26	Vegetable oil mills, n.e.c.	2093
14.27	Animal & marine fats & oils	2094
14.28	Roasted coffee	2095
14.29	Shortening & cooking oils	2096
14.30	Manufactured ice	2097
14.31	Macaroni & spaghetti	2098
14.32	Food preparations, n.e.c.	2099

Table 2 continued

	Industry number and title	Related SIC codes (1957 edition)
	15 Tobacco manufactures	
15.01	Cigarettes, cigars, etc.	2111, 2121, 2131
15.02	Tobacco stemming & redrying	2141
	16 Broad & narrow fabrics, yarn & thread mills	
16.01	Broadwoven fabric mills & fabric finishing plants	2211, 2221, 2231, 2261, 2262
16.02	Narrow fabric mills	2241
16.03	Yarn mills & finishing of textiles, n.e.c.	2269, 2281-3
16.04	Thread mills	2284
	17 Miscellaneous textile goods & floor coverings	
17.01	Floor coverings	227
17.02	Felt goods, n.e.c.	2291
17.03	Lace goods	2292
17.04	Paddings & upholstery fillings	2293
17.05	Processed textile waste	2294
17.06	Coated fabrics, not rubberized	2295
17.07	Tire cord & fabric	2296
17.08	Scouring & combing plants	2297
17.09	Cordage & twine	2298
17.10	Textile goods, n.e.c.	2299
	18 Apparel	
18.01	Hosiery	2251, 2252
18.02	Knit apparel mills	2253, 2254, 2259
18.03	Knit fabric mills	2256
18.04	Apparel made from purchased materials	23 (exc. 239), 3992
	19 Miscellaneous fabricated textile products	
19.01	Curtains & draperies	2391
19.02	Housefurnishings, n.e.c.	2392
19.03	Fabricated textile products, n.e.c.	2393-9
	20 Lumber & wood products, except containers	
20.01	Logging camps & logging contractors	2411
20.02	Sawmills & planing mills, general	2421
20.03	Hardwood dimension & flooring	2426
20.04	Special product sawmills, n.e.c.	2429
20.05	Millwork	2431
20.06	Veneer & plywood	2432
20.07	Prefabricated wood structures	2433
20.08	Wood preserving	2491
20.09	Wood products, n.e.c.	2499
	21 Wooden containers	
21.00	Wooden containers	244
	22 Household furniture	
22.01	Wood household furniture	2511, 2519
22.02	Upholstered household furniture	2512
22.03	Metal household furniture	2514
22.04	Mattresses & bedsprings	2515
	23 Other furniture & fixtures	
23.01	Wood office furniture	2521
23.02	Metal office furniture	2522
23.03	Public building furniture	2531
23.04	Wood partitions & fixtures	2541
23.05	Metal partitions & fixtures	2542
23.06	Venetian blinds & shades	2591
23.07	Furniture & fixtures, n.e.c.	2599

Table 2 continued

	Industry number and title	Related SIC codes (1957 edition)
	24 Paper & allied products except containers & boxes	
24.01	Pulp mills	2611
24.02	Paper mills, except building paper	2621
24.03	Paperboard mills	2631
24.04	Envelopes	2642
24.05	Sanitary paper products	2647
24.06	Wallpaper & building paper & board mills	2644, 2661
24.07	Converted paper, products n.e.c. except containers & boxes	2641, 2643, 2645, 2646, 2649
	25 Paperboard containers & boxes	
25.00	Paperboard containers & boxes	265
	26 Printing & publishing	
26.01	Newspapers	2711
26.02	Periodicals	2721
26.03	Book printing & publishing	273
26.04	Miscellaneous publishing	2741
26.05	Commercial printing	2751, 2752
26.06	Manifold business forms, blankbooks & binders	2761, 2782
26.07	Greeting card publishing	2771
26.08	Miscellaneous printing services	2753, 2789, 279
	27 Chemicals & selected chemical products	
27.01	Industrial inorganic & organic chemicals	281 except 28195
27.02	Fertilizers	2871, 2872
27.03	Agricultural chemicals, n.e.c.	2879
27.04	Miscellaneous chemical products	2861, 289
	28 Plastics & synthetic materials	
28.01	Plastics materials & resins	2821
28.02	Synthetic rubber	2822
28.03	Cellulosic man-made fibers	2823
28.04	Organic fibers, noncellulosic	2824
	29 Drugs, cleaning & toilet preparations	
29.01	Drugs	283
29.02	Cleaning preparations	284 except 2844
29.03	Toilet preparations	2844
	30 Paints & allied products	
30.00	Paints & allied products	2851
	31 Petroleum refining & related industries	
31.01	Petroleum refining & related products	2911, 299
31.02	Paving mixtures & blocks	2951
31.03	Asphalt felts & coatings	2952
	32 Rubber & miscellaneous plastics products	
32.01	Tires & inner tubes	3011
32.02	Rubber footwear	3021
32.03	Reclaimed rubber & miscellaneous rubber products, n.e.c.	3031, 3069
32.04	Miscellaneous plastics products	3079
	33 Leather tanning & industrial leather products	
33.00	Leather tanning & industrial leather products	3111, 3121

Table 2 continued

	Industry number and title	Related SIC codes (1957 edition)
	34 Footwear & other leather products	
34.01	Footwear cut stock	3131
34.02	Footwear except rubber	314
34.03	Other leather products	3151, 3161, 317, 3199
	35 Glass & glass products	
35.01	Glass & glass products except containers	3211, 3229, 3231
35.02	Glass containers	3221
	36 Stone & clay products	
36.01	Cement, hydraulic	3241
36.02	Brick & structural clay tile	3251
36.03	Ceramic wall & floor tile	3253
36.04	Clay refractories	3255
36.05	Structural clay products, n.e.c.	3259
36.06	Vitreous plumbing fixtures	3261
36.07	Food utensils, pottery	3262, 3263
36.08	Porcelain electrical supplies	3264
36.09	Pottery products, n.e.c.	3269
36.10	Concrete block & brick	3271
36.11	Concrete products, n.e.c.	3272
36.12	Ready-mixed concrete	3273
36.13	Lime	3274
36.14	Gypsum products	3275
36.15	Cut stone & stone products	3281
36.16	Abrasive products	3291
36.17	Asbestos products	3292
36.18	Gaskets & insulations	3293
36.19	Minerals, ground or treated	3295
36.20	Mineral wool	3296
36.21	Nonclay refractories	3297
36.22	Nonmetallic mineral products, n.e.c.	3299
	37 Primary iron & steel manufacturing	
37.01	Blast furnace & basic steel products	331
37.02	Iron & steel foundries	332
37.03	Iron & steel forgings	3391
37.04	Primary metal products n.e.c.	3399
	38 Primary nonferrous metals manufacturing	
38.01	Primary copper	3331
38.02	Primary lead	3332
38.03	Primary zinc	3333
38.04	Primary aluminum	3334, 28195
38.05	Primary nonferrous metals, n.e.c.	3339
38.06	Secondary nonferrous metals	3341
38.07	Copper rolling & drawing	3351
38.08	Aluminum rolling & drawing	3352
38.09	Nonferrous rolling & drawing, n.e.c.	3356
38.10	Nonferrous wire drawing & insulating	3357
38.11	Aluminum castings	3361
38.12	Brass, bronze & copper castings	3362
38.13	Nonferrous castings, n.e.c.	3369
38.14	Nonferrous forgings	3392
	39 Metal containers	
39.01	Metal cans	3411
39.02	Metal barrels, drums & pails	3491

Table 2 continued

Industry number and title		Related SIC codes (1957 edition)
	40 Heating, plumbing & fabricated structural metal products	
40.01	Metal sanitary ware	3431
40.02	Plumbing fittings & brass goods	3432
40.03	Heating equipment except electric	3433
40.04	Fabricated structural steel	3441
40.05	Metal doors, sash & trim	3442
40.06	Fabricated plate work (boiler shops)	3443
40.07	Sheet metal work	3444
40.08	Architectural metal work	3446
40.09	Miscellaneous metal work	3449
	41 Screw machine products, bolts, nuts, etc. & metal stampings	
41.01	Screw machine products & bolts, nuts, rivets & washers	345
41.02	Metal stampings	3461
	42 Other fabricated metal products	
42.01	Cutlery	3421
42.02	Hand & edge tools including saws	3423, 3425
42.03	Hardware, n.e.c.	3429
42.04	Coating, engraving & allied services	3471, 3479
42.05	Miscellaneous fabricated wire products	3481
42.06	Safes & vaults	3492
42.07	Steel springs	3493
42.08	Pipe, valves & pipe fittings	3494, 3498
42.09	Collapsible tubes	3496
42.10	Metal foil & leaf	3497
42.11	Fabricated metal products, n.e.c.	3499
	43 Engines & turbines	
43.01	Steam engines & turbines	3511
43.02	Internal combustion engines, n.e.c.	3519
	44 Farm machinery	
44.00	Farm machinery	3522
	45 Construction, mining, oil field machinery, equipment	
45.01	Construction machinery	3531
45.02	Mining machinery	3532
45.03	Oil field machinery	3533
	46 Materials handling machinery & equipment	
46.01	Elevators & moving stairways	3534
46.02	Conveyors & conveying equipment	3535
46.03	Hoists, cranes & monorails	3536
46.04	Industrial trucks & tractors	3537
	47 Metalworking machinery & equipment	
47.01	Machine tools, metal cutting types	3541
47.02	Machine tools, metal forming types	3542
47.03	Special dies & tools & machine tool accessories	3544, 3545
47.04	Metalworking machinery, n.e.c.	3548
	48 Special industry machinery & equipment	
48.01	Food products machinery	3551
48.02	Textile machinery	3552
48.03	Woodworking machinery	3553
48.04	Paper industries machinery	3554
48.05	Printing trades machinery	3555
48.06	Special industry machinery, n.e.c.	3559

Table 2 continued

Industry number and title		Related SIC codes (1957 edition)
	49 General industrial machinery & equipment	
49.01	Pumps & compressors	3561
49.02	Ball & roller bearings	3562
49.03	Blowers & fans	3564
49.04	Industrial patterns	3565
49.05	Power transmission equipment	3566
49.06	Industrial furnaces & ovens	3567
49.07	General industrial machinery, n.e.c.	3569
	50 Machine shop products	
50.00	Machine shop products	359
	51 Office, computing & accounting machines	
51.01	Computing & related machines	3571
51.02	Typewriters	3572
51.03	Scales & balances	3576
51.04	Office machines, n.e.c.	3579
	52 Service industry machines	
52.01	Automatic merchandising machines	3581
52.02	Commercial laundry equipment	3582
52.03	Refrigeration machinery	3585
52.04	Measuring & dispensing pumps	3586
52.05	Service industry machines, n.e.c.	3589
	53 Electric transmission & distribution equipment & electrical industrial apparatus	
53.01	Electric measuring instruments	3611
53.02	Transformers	3612
53.03	Switchgear & switchboard apparatus	3613
53.04	Motors & generators	3621
53.05	Industrial controls	3622
53.06	Welding apparatus	3623
53.07	Carbon & graphite products	3624
53.08	Electrical industrial apparatus, n.e.c.	3629
	54 Household appliances	
54.01	Household cooking equipment	3631
54.02	Household refrigerators & freezers	3632
54.03	Household laundry equipment	3633
54.04	Electric housewares & fans	3634
54.05	Household vacuum cleaners	3635
54.06	Sewing machines	3636
54.07	Household appliances, n.e.c.	3639
	55 Electric lighting & wiring equipment	
55.01	Electric lamps	3641
55.02	Lighting fixtures	3642
55.03	Wiring devices	3643, 3644
	56 Radio, television & communication equipment	
56.01	Radio & TV receiving sets	3651
56.02	Phonograph records	3652
56.03	Telephone & telegraph apparatus	3661
56.04	Radio & TV communication equipment	3662
	57 Electronic components & accessories	
57.01	Electron tubes	3671, 3672, 3673
57.02	Semiconductors	3674
57.03	Electronic components, n.e.c.	3679

Table 2 continued

Industry number and title		Related SIC codes (1957 edition)
	58 Miscellaneous electrical machinery, equipment & supplies	
58.01	Storage batteries	3691
58.02	Primary batteries, wet & dry	3692
58.03	X-ray apparatus & tubes	3693
58.04	Engine electrical equipment	3694
58.05	Electrical equipment, n.e.c.	3699
	59 Motor vehicles & equipment	
59.01	Truck & bus bodies	3713
59.02	Truck trailers	3715
59.03	Motor vehicles & parts	3717
	60 Aircraft & parts	
60.01	Aircraft	3721
60.02	Aircraft engines & parts	3722
60.03	Aircraft propellers & parts	3723
60.04	Aircraft equipment, n.e.c.	3729
	61 Other transportation equipment	
61.01	Shipbuilding & repairing	3731
61.02	Boatbuilding & repairing	3732
61.03	Locomotives & parts	3741
61.04	Railroad & street cars	3742
61.05	Motorcycles, bicycles & parts	3751
61.06	Trailer coaches	3791
61.07	Transportation equipment, n.e.c.	3799
	62 Professional, scientific & controlling instruments & supplies	
62.01	Engineering & scientific instruments	3811
62.02	Mechanical measuring devices	3821
62.03	Automatic temperature controls	3822
62.04	Surgical & medical instruments	3841
62.05	Surgical appliances & supplies	3842
62.06	Dental equipment & supplies	3843
62.07	Watches, clocks & parts	387
	63 Optical, ophthalmic, & photographic equipment & supplies	
63.01	Optical instruments & lenses	3831
63.02	Ophthalmic goods	3851
63.03	Photographic equipment & supplies	3861
	64 Miscellaneous manufacturing	
64.01	Jewelry, including costume & silverware	391, 3961
64.02	Musical instruments & parts	3931
64.03	Games, toys, etc.	3941
64.04	Sporting & athletic goods, n.e.c.	3949
64.05	Pens, pencils, etc.	395
64.06	Artificial flowers	3962
64.07	Buttons, needles, pins & fasteners	3963, 3964
64.08	Brooms & brushes	3981
64.09	Hard surface floor covering	3982
64.10	Morticians goods	3988
64.11	Signs & advertising displays	3993
64.12	Miscellaneous manufactures, n.e.c.	3983, 3984, 3987, 3995, 3999

Table 2 continued

	Industry number and title	Related SIC codes (1957 edition)
TRANSPORTATION, COMMUNICATION, ELECTRIC, GAS, & SANITARY SERVICES		
	65 Transportation & warehousing	
65.01	Railroads & related services	40, 474
65.02	Local, suburban & interurban highway passenger transportation	41
65.03	Motor freight transportation & warehousing	42, 473
65.04	Water transportation	44
65.05	Air transportation	45
65.06	Pipe line transportation	46
65.07	Transportation services	47, except 473, 474
	66 Communications except radio & television broadcasting	
66.00	Communications, except radio & television	48, except 483
	67 Radio & TV broadcasting	
67.00	Radio & television broadcasting	483
	68 Electric, gas, water & sanitary services	
68.01	Electric utilities	491, pt. 493
68.02	Gas utilities	492, pt. 493
68.03	Water & sanitary services	494, 495, 496, 497, pt. 493
WHOLESALE & RETAIL TRADE		
	69 Wholesale & retail trade	
69.01	Wholesale trade	50 (except manufacturers' sales offices)
69.02	Retail trade	52, 53, 54, 55, 56, 57, 58, 59, 7396
FINANCE, INSURANCE & REAL ESTATE		
	70 Finance & insurance	
70.01	Banking	60
70.02	Credit agencies	61, 67
70.03	Security & commodity brokers	62
70.04	Insurance carriers	63
70.05	Insurance agents & brokers	64
	71 Real estate & rental	
71.01	Owner-occupied dwellings	NA
71.02	Real estate	65 (except pt. 6561), 66
SERVICES		
	72 Hotels & lodging places; personal & repair services, except automobile repair	
72.01	Hotels & lodging places	70
72.02	Personal & repair services, except auto repair, barber, & beauty shops	72 (except 723, 724), 76 (except 7694 & pt. 7699)
72.03	Barber & beauty shops	723, 724
	73 Business Services	
73.01	Miscellaneous business services	73 (except 731, 7396), 7694, pt. 7699
73.02	Advertising	731
73.03	Miscellaneous professional services	81, 89 (except 8921)

Table 2 continued

	Industry number and title	Related SIC codes (1957 edition)
	74 Research & development	
74.00	Eliminated as a separate industry in the 1963 study. Research & development performed for sale is distributed to the purchaser by each of the industries performing the research & development.	
	75 Automobile repair & services	
75.00	Automobile repair & services	75
	76 Amusements	
76.01	Motion pictures	78
76.02	Amusement & recreation services	79
	77 Medical, educational services & nonprofit organizations	
77.01	Doctors & dentists	801, 802, 803, 804
77.02	Hospitals	8061
77.03	Other medical & health services	0722, 807, 809
77.04	Educational services	82
77.05	Nonprofit organizations	84, 86, 8921
GOVERNMENT ENTERPRISES		
	78 Federal Government enterprises	
78.01	Post Office	
78.02	Federal electric utilities	
78.03	Commodity Credit Corporation	
78.04	Other Federal Government enterprises	
	79 State & local government enterprises	
79.01	Local government passenger transit	
79.02	State & local electric utilities	
79.03	Other state & local government enterprises	
IMPORTS		
	80 Gross imports of goods & services	
80.01	Directly allocated imports	
80.02	Transferred imports	
DUMMY INDUSTRIES		
	81 Business travel, entertainment & gifts	
81.00	Business travel, entertainment & gifts	
	82 Office supplies	
82.00	Office supplies	
	83 Scrap, used & secondhand goods	
83.00	Scrap, used & secondhand goods	
SPECIAL INDUSTRIES		
	84 Government industry	
84.00	Government industry	
	85 Rest of the world industry	
85.00	Rest of the world industry	
	86 Household industry	
86.00	Household industry	

Table 2 continued

	Industry number and title	Related SIC codes (1957 edition)
	87 Inventory valuation adjustment	
87.00	Inventory valuation adjustment	
88.00	Total intermediate output	
	Personal consumption expenditures	
96.60	Personal consumption expenditures	
	Gross private fixed capital formation	
96.70	Gross private fixed capital formation	
	Net inventory change	
96.80	Net inventory change	
	Net exports	
96.90	Net exports	
	Federal Government purchases	
97.10	Federal Government purchases, defense	
97.20	Federal Government purchases, other	
	State and local government purchases	
98.60	State and local government purchases, education	
98.70	State and local government purchases, health, welfare and sanitation	
98.80	State and local government purchases, safety	
98.90	State and local government purchases, other	
99.02	Total final demand	
99.03	Total output	
99.04	Transfers	
I	Total intermediate inputs	
V.A.	Value added	
T	Total inputs	
TR	Transfers	

Table 3A. Coal (7.00) pricing, 1963

Consuming sector	Btu (10^{12})	%Btu	Dollar flow ($\$10^6$)	Inverse price (10^6 Btu/$)
5-10, except 7.00 Mining	46	0.37	11.8	3.90
7.00 Self-use	102	0.82	410.3	0.249
13-64 Industry	460	36.89	883	5.213
65.01 Rail transport	40.1	0.32	5.5	7.29
65.04 Water transport	17.4	0.14	2.8	6.21
68.01 Electric utilities	5490.	43.99	628.5	8.735
1-2 Agriculture; 68.02 Gas utilities; 68.03 Water utilities; 96.60 PCE; 97, 98 Government — residual	863	6.92	228.4	3.78
All others except exports	0	0	160 [a]	0
96.60 Exports	1320	10.57	305.4	4.32
Totals	12,480	100.02	2636. [b]	
Total final demand	2,128	17.05	519.8	4.094

Table 3B. Crude oil and gas (8.00) pricing, 1963

Consuming sector	Btu (10^{12})	%Btu	Dollar flow ($\$10^6$)	Inverse price (10^6 Btu/$)
8.00 Self-use	876	2.56	296.5	2.95
27.04 Misc. chemicals	165	0.48	14.3	11.54
31.01 Petr. refining	19,800	57.84	9813.	2.018
68.02 Gas utilities	13,390	39.12	1898.	7.055
All others	0	0.	243 [a]	
Totals	34,230	100.00	12,265 [b]	
Total Final Demand	0	0	0	0
Exports are negligible				

Table 3C. Refined petroleum (31.01) pricing, 1963

Consuming sector	Btu (10^{12})	%Btu	Dollar flow ($\$10^6$)	Inverse price (10^6 Btu/$)
1-2 Agriculture	762	3.45	1124	0.678
5-10 Mining	134.5	0.61	147	0.415
13-64 Industry	2930	13.25	2883	1.016
31.01 Self-use	1420	6.43	1413	1.005
65.01 Rail transport	570	2.58	314.2	1.814
65.02 Local suburban, interurban passenger service	206	0.93	218.9	0.9411
65.03 Motor freight	827	3.74	471.9	1.752
65.04 Water transport	563	2.55	130.1	4.327
65.05 Air transport	560	2.53	386	1.451
65.06 Pipeline transport	0.5	---	20.6	0.024
65.07 Transportation services	12.5	0.06	1.788	6.99
68.01 Electric utilities	543	2.46	154	3.53
96.60 PCE	8513	38.51	8232	1.034
Others except exports	4315	19.51	4686	0.921
96.90 Exports	752	3.40	675.5	
Totals	22,100.	100.01	20,858.	
Total final demand	10,700.	48.4	10,090.	1.060

Table 3D. Electricity (68.01) pricing, 1963

Consuming sector	Kw hr. (10^9)	% Kw hr.	Dollar flow ($\$10^6$)	Price (¢/Kwhr)	Inverse price (10^6 Btu/$)
1-2 Agriculture	13.5	1.48	163.6	1.212	0.2816
5-10 Mining	22.19	2.42	261	1.176	0.2901
13-64 Industry	330.3	36.03	2787	0.844	0.4044
65.01 } Rail transport	2.03	0.51	27.9	1.374	0.2483
79.01 } Rail transport	2.64		34.5	1.307	0.2611
78.01, .04, 79.03, 98.70, .80, .90 } Federal, State, Local, Government	27.79	3.030	563	2.076	0.1685
68.01 Self-use	89.0	9.71	864	0.971	0.3514
78.02, 79.02 } Federal, State, local electric utilities	0	0	352 (a)		0
69.02, 70, 71, 72.02, .03, 73, 75, 76, 77.01, 77.05 } Commercial	98.67	10.76	2532	2.57	0.1329
96.60 PCE	251.36	27.42	6057	2.41	0.1416
3-4, 11-12, 65.02-67.00, 68.02-69.01, 72.01, 77.02, .03, .04, 97, 98.60 } Residual	79.4	8.66	1770	2.229	0.1531
Totals	916.8	100.00	15,412 (b)		
Total final demand	297.1	32.4	7066		0.1435

Exports are negligible

1 Kwhr = 3413 Btu

Table 3E. Gas (68.02) pricing, 1963

Consuming sector	Btu (10^{12} Btu)	% Btu	Dollar Flow ($\$10^6$)	Inverse price (10^6 Btu/\$)
5-10 Mining	235	1.70	83.3	2.82
13-64 Industry	4634	33.58	1624.	2.85
65.06 Pipeline transport	483	3.50	13.3	36.32
68.01 Electric utilities	2220	16.09	453.8	4.89
68.02 Self use	823	5.96	4119	0.200
96.60 PCE	3670	26.59	3799	0.966
78.02, 79.02	0	0	54 [a]	0
1-4, 11-12, 65.01-.05, .07, 66 67 68.03, 69-77, 78.01-.03, 79.01, .03, 97, 98 } Residual	1734	12.58	1146	1.513
Totals	13,800	100.00	11,292 [b]	
Total final demand	3960	28.69	3990	0.9925
Exports are negligible				

Table 4. Implied inverse prices (INVPRI) for energy as supplied by the five energy sectors (coal, crude oil and gas extraction, refined petroleum, electric utilities, gas utilities). Units are 10^6 Btu/$(1963). Figures in parentheses represent sales from primary to secondary energy producers, which are set equal to zero in computation (see Section II-C).

INVPRI MATRIX (5 BY 362)

		1	2	3	4	5	6	7	8	9	10
	CODE	101	102	103	201	202	203	204	205	206	207
1	700	3.7800E 00	3.7800E 00	3.7800E 00	3.7800E 00	3.7800E 00	3.7800E 00	3.7800E 00	3.7800E 00	3.7800E 00	3.7800E 00
2	800	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00
3	3101	6.4820E-01	6.4820E-01	6.4820E-01	6.8340E-01	6.8340E-01	6.8340E-01	6.8340E-01	6.8340E-01	6.8340E-01	6.8340E-01
4	6801	2.8160E-01	2.8160E-01	2.8160E-01	2.8160E-01	2.8160E-01	2.8160E-01	2.8160E-01	2.8160E-01	2.8160E-01	2.8160E-01
5	6802	1.5130E 00	1.5130E 00	1.5130E 00	1.5130E 00	1.5130E 00	1.5130E 00	1.5130E 00	1.5130E 00	1.5130E 00	1.5130E 00

INVPRI MATRIX (5 BY 362)

		11	12	13	14	15	16	17	18	19	20
	CODE	300	400	500	601	602	700	800	900	1000	1101
1	700	0.0000E 00	0.0000E 00	4.8970E 00	4.3880E 00	4.4900E 00	2.4860E-01	0.0000E 00	2.1884E 00	7.2700E 00	0.0000E 00
2	800	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	2.9540E 00	0.0000E 00	0.0000E 00	0.0000E 00
3	3101	7.8556E-02	2.1872E 00	1.7399E 00	1.1739E 00	1.0764E 00	7.9700E-01	5.1936E-01	1.0081E 00	2.1297E 00	2.9210E 00
4	6801	1.5200E-01	1.5200E-01	3.0580E-01	4.8970E-01	3.2200E-01	2.9220E-01	2.5380E-01	2.3170E-01	3.5360E-01	1.5310E-01
5	6802	1.5130E 00	1.5130E 00	3.3326E 00	3.9340E 00	3.1210E 00	2.1810E 00	2.2580E 00	2.9970E 00	4.0850E 00	1.5130E 00

INVPRI MATRIX (5 BY 362)

		21	22	23	24	25	26	27	28	29	30
	CODE	1102	1103	1104	1105	1201	1202	1301	1302	1303	1304
1	700	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	7.6226E 00	8.4607E 00	1.0359E 01	0.0000E 00
2	800	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00
3	3101	1.0951E 00	5.6389E-01	7.6010E-01	2.3493E-01	3.0636E 01	2.7400E 00	4.3175E-01	2.0428E-01	1.5072E-01	5.4187E-01
4	6801	1.5310E-01	1.5310E-01	1.5310E-01	1.5310E-01	1.5310E-01	1.5300E-01	3.4151E-01	3.4222E-01	3.4276E-01	3.4110E-01
5	6802	1.5130E 00	1.5130E 00	1.5130E 00	1.5130E 00	1.5130E 00	1.5130E 00	3.2565E 00	3.0290E-01	2.4517E-01	7.4567E-01

INVPRI MATRIX (5 BY 362)

		31	32	33	34	35	36	37	38	39	40
	CODE	1305	1306	1307	1401	1402	1403	1404	1405	1406	1407
1	700	6.6229E 00	8.7826E 00	7.5642E 00	5.8711E 00	4.6637E 00	3.7792E 00	4.8497E 00	9.3475E 00	5.4522E 00	2.8821E 00
2	800	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00
3	3101	1.1454E-01	1.7830E-01	2.0726E-01	1.2500E 00	9.1795E-01	1.1481E 00	1.4823E 00	6.7401E-01	6.6368E-01	1.0734E-01
4	6801	3.4420E-01	3.3381E-01	3.1383E-01	2.2582E-01	1.8562E-01	2.0908E-01	2.1218E-01	2.2090E-01	2.1170E-01	1.8226E-01
5	6802	3.5006E 00	2.3446E 00	3.0076E 00	2.6104E 00	2.4145E 00	2.0677E 00	2.5690E 00	1.6729E 00	2.1285E 00	1.9863E 00

INVPRI MATRIX (5 BY 362)

		41	42	43	44	45	46	47	48	49	50
	CODE	1408	1409	1410	1411	1412	1413	1414	1415	1416	1417
1	700	5.7304E 00	4.7503E 00	4.4728E 00	4.7509E 00	0.0000E 00	4.4544E 00	5.4401E 00	5.5657E 00	0.0000E 00	7.3394E 00
2	800	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00
3	3101	4.0371E 00	1.4228E 00	3.1859E-01	2.9328E-01	2.8709E-01	2.8134E 00	8.8947E-01	8.9801E-01	6.1294E-01	1.1183E 00
4	6801	2.7314E-01	2.0504E-01	2.5676E-01	2.2259E-01	1.9291E-01	2.7959E-01	3.0243E-01	1.8865E-01	2.6280E-01	3.1727E-01
5	6802	2.3693E 00	2.3188E 00	2.3466E 00	2.0309E 00	1.3408E 00	2.5521E 00	2.2921E 00	2.1058E 00	3.6210E 00	3.3683E 00

INVPRI MATRIX (5 BY 362)

		51	52	53	54	55	56	57	58	59	60
	CODE	1418	1419	1420	1421	1422	1423	1424	1425	1426	1427
1	700	2.6393E 00	6.0225E 00	4.8038E 00	6.5430E 00	3.1555E 00	0.0000E 00	0.0000E 00	6.1320E 00	4.4271E 00	5.0595E 00
2	800	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00
3	3101	6.4873E-01	2.4497E 00	1.1902E 00	1.8696E 00	7.9225E-01	7.4504E-01	7.7047E-01	1.8712E 00	2.6195E-01	3.0635E 00
4	6801	1.5711E-01	2.3514E-01	2.5737E-01	2.7467E-01	1.6738E-01	1.7509E-01	3.2068E-01	3.0763E-01	2.8904E-01	1.9206E-01
5	6802	1.2446E 00	3.1795E 00	1.9846E 00	2.4119E 00	1.5346E 00	1.5552E 00	2.8128E 00	2.7040E 00	2.4246E 00	2.9913E 00

Table 4 continued

INVPRI MATRIX (5 BY 362)

		61	62	63	64	65	66	67	68	69	70
	CODE	1428	1429	1430	1431	1432	1501	1502	1601	1602	1603
1	700	0.0000E 00	6.4362E 00	0.0000E 00	4.4147E 00	7.3140E 00	5.0830E 00	4.9692E 00	5.4429E 00	4.4736E 00	5.0017E 00
2	800	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00
3	3101	2.7386E-01	3.7842E 00	6.9768E-01	3.1409E-01	1.0995E 00	9.3656E-01	2.4875E 00	2.8797E 00	1.4891E-01	1.2458E 00
4	6801	2.6479E-01	3.3524E-01	2.2253E-01	2.2236E-01	2.0409E-01	3.1227E-01	2.1060E-01	4.0396E-01	2.0063E-01	3.8441E-01
5	6802	2.8784E 00	3.2134E 00	0.0000E 00	2.4431E 00	2.0594E 00	2.1950E 00	1.7283E 00	2.6946E 00	1.9659E 00	2.1514E 00

INVPRI MATRIX (5 BY 362)

		71	72	73	74	75	76	77	78	79	80
	CODE	1604	1701	1702	1703	1704	1705	1706	1707	1708	1709
1	700	6.2606E 00	5.7537E 00	5.6545E 00	0.0000E 00	5.3888E 00	0.0000E 00	5.3904E 00	5.0566E 00	0.0000E 00	6.9739E 00
2	800	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00
3	3101	2.3879E-01	1.4490E-01	7.0037E-02	1.1916E-01	2.0528E-01	1.4559E-01	2.5767E 00	9.9893E-01	1.3051E-01	2.9135E-01
4	6801	3.6239E-01	2.8495E-01	2.4262E-01	1.8168E-01	1.9566E-01	1.9724E-01	2.3715E-01	4.3906E-01	2.3762E-01	2.5922E-01
5	6802	2.3785E 00	1.9926E 00	2.0200E 00	0.0000E 00	1.6201E 00	0.0000E 00	1.7452E 00	2.0074E 00	2.9324E 00	2.3775E 00

INVPRI MATRIX (5 BY 362)

		81	82	83	84	85	86	87	88	89	90
	CODE	1710	1801	1802	1803	1804	1901	1902	1903	2001	2002
1	700	0.0000E 00	7.1008E 00	4.6007E 00	4.6910E 00	4.6799E 00	0.0000E 00	5.2115E 00	3.9803E 00	0.0000E 00	5.9318E 00
2	800	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00
3	3101	3.3194E-01	2.0240E 00	1.3501E 00	3.3535E 00	1.0723E 00	5.5686E-01	1.2666E 00	4.9158E-01	7.9226E-01	6.9284E-01
4	6801	2.6381E-01	2.8402E-01	2.1150E-01	2.5380E-01	1.8289E-01	1.9408E-01	1.9964E-01	2.0257E-01	1.3730E-01	2.5380E-01
5	6802	2.8421E 00	2.2227E 00	3.1983E 00	1.6351E 00	1.7201E 00	0.0000E 00	1.8567E 00	4.7260E-01	2.0190E 00	2.4560E 00

INVPRI MATRIX (5 BY 362)

		91	92	93	94	95	96	97	98	99	100
	CODE	2003	2004	2005	2006	2007	2008	2009	2100	2201	2202
1	700	5.3781E 00	0.0000E 00	4.4675E 00	5.3077E 00	4.4910E 00	5.8055E 00	0.0000E 00	4.1430E 00	5.5000E 00	5.3044E 00
2	800	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00
3	3101	8.1931E-01	4.2629E-01	4.8197E-01	1.6923E 00	4.1096E-01	2.9149E 00	1.4006E 00	5.0197E-01	2.9961E 00	4.6601E-01
4	6801	1.9191E-01	1.6301E-01	1.8818E-01	3.0085E-01	1.8889E-01	1.6520E-01	2.5506E-01	1.8919E-01	2.1444E-01	1.9143E-01
5	6802	2.1969E 00	0.0000E 00	1.8225E 00	2.3656E 00	1.5673E 00	2.9003E 00	2.0569E 00	2.5373E 00	2.1223E 00	2.0923E 00

INVPRI MATRIX (5 BY 362)

		101	102	103	104	105	106	107	108	109	110
	CODE	2203	2204	2301	2302	2303	2304	2305	2306	2307	2401
1	700	5.9182E 00	4.0045E 00	7.7824E 00	6.2195E 00	5.4045E 00	5.8519E 00	5.6680E 00	4.4807E 00	4.4253E 00	4.9785E 00
2	800	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00
3	3101	3.8330E-01	4.7381E-01	4.1106E-01	3.3803E-01	3.9418E-01	4.6065E-01	3.9770E-01	4.4981E-01	3.4505E-01	3.5816E 00
4	6801	2.0330E-01	1.8770E-01	1.9137E-01	2.3118E-01	1.9094E-01	1.6020E-01	1.9582E-01	2.5882E-01	2.6619E-01	6.7150E-01
5	6802	1.5886E 00	1.7872E 00	0.0000E 00	1.6193E 00	1.7146E 00	1.9293E 00	1.9271E 00	2.0031E 00	2.0793E 00	3.2128E 00

INVPRI MATRIX (5 BY 362)

		111	112	113	114	115	116	117	118	119	120
	CODE	2402	2403	2404	2405	2406	2407	2500	2601	2602	2603
1	700	5.2656E 00	5.5761E 00	0.0000E 00	7.5904E 00	1.5306E 01	4.0663E 00	5.2239E 00	0.0000E 00	4.3924E 00	5.6126E 00
2	800	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00
3	3101	3.0534E 00	2.6404E 00	3.8354E-01	5.0537E-01	1.4931E 00	4.6344E-01	2.7753E-01	6.3822E-01	5.5531E-01	7.6301E-01
4	6801	4.2060E-01	3.8991E-01	1.7773E-01	3.3313E-01	4.4810E-03	2.6274E-01	2.2882E-01	2.1567E-01	2.3820E-01	2.3410E-01
5	6802	3.5215E 00	3.7723E 00	1.4418E 00	1.9774E-01	1.0358E 01	1.9105E 00	2.0432E 00	1.8264E 00	1.7600E 00	1.9630E 00

Table 4 continued

INVPRI MATRIX (5 BY 362)

		121	122	123	124	125	126	127	128	129	130
	CODE	2604	2605	2606	2607	2608	2701	2702	2703	2704	2801
1	700	0.0000E 00	4.2412E 00	0.0000E 00	0.0000E 00	0.0000E 00	8.7800E 00	0.0000E 00	0.0000E 00	5.1339E 00	5.9696E 00
2	800	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	1.1544E 01	0.0000E 00
3	3101	5.2137E-01	4.4668E-01	8.3195E-01	5.2067E-01	3.3697E-01	4.1086E-01	5.4383E 00	4.7882E-01	1.2154E 00	1.6635E 00
4	6801	1.6145E-01	2.0756E-01	1.9762E-01	2.5754E-01	1.5728E-01	1.3034E 00	2.9658E-01	2.0474E-01	3.2630E-01	3.7517E-01
5	6802	1.7341E 00	1.6394E 00	7.0170E-01	1.8790E 00	0.0000E 00	3.1627E 00	2.6152E 00	3.9455E 00	1.7823E 01	3.0065E 00

INVPRI MATRIX (5 BY 362)

		131	132	133	134	135	136	137	138	139	140
	CODE	2802	2803	2804	2901	2902	2903	3000	3101	3102	3103
1	700	0.0000E 00	7.1584E 00	0.0000E 00	6.4167E 00	6.0319E 00	0.0000E 00	4.7599E 00	2.1900E 00	0.0000E 00	6.3569E 00
2	800	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	(2.0180E 00)	0.0000E 00	0.0000E 00
3	3101	1.1577E 00	9.0170E 00	9.6200E 00	7.2524E 00	1.3962E 00	1.2017E 01	5.6932E-01	1.0050E 00	1.4865E 00	1.9729E 00
4	6801	4.4481E-01	5.6119E-01	4.7052E-01	3.0331E-01	2.5108E-01	2.1580E-01	1.9260E-01	3.8998E-01	1.7363E-01	2.5952E-01
5	6802	3.1670E 00	3.2141E 00	3.0922E 00	2.2587E 00	2.6946E 00	1.4938E 00	1.6035E 00	3.2425E 00	2.0610E 00	2.8369E 00

INVPRI MATRIX (5 BY 362)

		141	142	143	144	145	146	147	148	149	150
	CODE	3201	3202	3203	3204	3300	3401	3402	3403	3501	3502
1	700	6.9621E 00	4.4757E 00	5.7569E 00	6.3766E 00	4.1901E 00	3.5828E 00	4.4914E 00	0.0000E 00	5.2143E 00	5.5930E 00
2	800	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00
3	3101	1.4393E 00	2.2167E 00	1.5031E 00	1.5771E 00	2.2690E 00	3.0564E-01	1.8234E 00	4.6755E-01	1.1925E 00	2.6337E 00
4	6801	3.6631E-01	3.0123E-01	2.8393E-01	2.3950E-01	1.7815E-01	1.7808E-01	1.9826E-01	1.8478E-01	3.6311E-01	3.8661E-01
5	6802	3.2460E 00	1.9909E 00	2.1335E 00	1.7787E 00	3.5174E 00	2.4855E 00	1.6434E 00	1.4428E-01	2.2936E 00	2.3815E 00

INVPRI MATRIX (5 BY 362)

		151	152	153	154	155	156	157	158	159	160
	CODE	3601	3602	3603	3604	3605	3606	3607	3608	3609	3610
1	700	3.2124E 00	0.0000E 00	0.0000E 00	0.0000E 00	6.3779E 00	5.0828E 00	0.0000E 00	5.1582E 00	0.0000E 00	0.0000E 00
2	800	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00
3	3101	2.3299E 00	1.3096E 00	8.9081E-01	6.2248E-01	4.5332E-01	7.6890E-01	7.5403E-01	1.8546E 00	4.6558E-01	1.5891E 00
4	6801	3.7105E-01	2.3735E-01	2.5111E-01	2.4456E-01	2.2747E-01	2.7395E-01	2.5199E-01	2.6657E-01	2.1140E-01	1.6781E-01
5	6802	3.5654E 00	2.6894E 00	2.0388E 00	2.2504E 00	2.5703E 00	2.1601E 00	1.7930E 00	1.7413E 00	1.6965E 00	2.2570E 00

INVPRI MATRIX (5 BY 362)

		161	162	163	164	165	166	167	168	169	170
	CODE	3611	3612	3613	3614	3615	3616	3617	3618	3619	3620
1	700	6.7073E 00	0.0000E 00	0.0000E 00	5.3216E 00	4.1915E 00	4.2007E 00	0.0000E 00	4.7490E 00	0.0000E 00	0.0000E 00
2	800	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00
3	3101	1.2509E 00	5.6178E-01	2.7047E 00	1.9350E 00	7.3548E-01	1.4631E 00	6.3846E-01	1.5953E 00	1.3226E 00	1.4332E 00
4	6801	1.8410E-01	1.6347E-01	2.9019E-01	2.9166E-01	2.2561E-01	3.6951E-01	2.9352E-01	2.3783E-01	2.6917E-01	3.7360E-01
5	6802	2.0137E 00	2.1501E 00	3.1432E 00	2.8344E 00	1.2458E 00	2.6284E 00	2.1822E 00	1.5575E 00	2.6132E 00	2.7114E 00

INVPRI MATRIX (5 BY 362)

		171	172	173	174	175	176	177	178	179	180
	CODE	3621	3622	3701	3702	3703	3704	3801	3802	3803	3804
1	700	0.0000E 00	0.0000E 00	5.1600E 00	1.6097E 01	6.1379E 00	0.0000E 00	7.0245E 00	0.0000E 00	7.0140E 00	0.0000E 00
2	800	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00
3	3101	8.7973E-01	7.5297E-01	2.5810E 00	8.4205E-01	1.2786E 00	2.6954E 00	1.7465E 00	6.0371E 00	8.4926E 00	2.7668E-01
4	6801	3.0018E-01	2.3342E-01	3.9925E-01	2.8110E-01	2.5197E-01	2.2600E-01	4.2175E-01	3.9687E-01	6.1045E-01	8.6991E-01
5	6802	2.0831E 00	2.0236E 00	2.7486E 00	1.8977E 00	1.9341E 00	1.9216E 00	3.3712E 00	2.9364E 00	4.5097E 00	3.7192E 00

Table 4 continued

INVPRI MATRIX (5 BY 362)

		181	182	183	184	185	186	187	188	189	190
	CODE	3805	3806	3807	3808	3809	3810	3811	3812	3813	3814
1	700	0.0000E 00	1.6531E 01	6.6981E 00	6.6071E 00	7.5660E 00	5.2481E 00	7.9457E 00	0.0000E 00	9.0361E 00	0.0000E 00
2	800	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00
3	3101	1.2587E 01	2.3064E 00	2.7394E 00	1.4776E 00	1.2910E 00	2.3448E 00	7.1279E-01	5.7189E-01	5.9014E-01	1.0943E 00
4	6801	7.3585E-01	2.6016E-01	3.0068E-01	4.3302E-01	3.6213E-01	2.8381E-01	3.1536E-01	2.0652E-01	2.1920E-01	3.3149E-01
5	6802	4.3840E 00	2.0869E 00	1.5959E 00	2.2388E 00	1.9038E 00	1.6616E 00	1.7535E 00	1.5469E 00	1.6407E 00	1.5576E 00

INVPRI MATRIX (5 BY 362)

		191	192	193	194	195	196	197	198	199	200
	CODE	3901	3902	4001	4002	4003	4004	4005	4006	4007	4008
1	700	6.1294E-01	0.0000E 00	8.4204E 00	0.0000E 00	6.7639E 00	6.9916E 00	6.7447E 00	7.0934E 00	5.2127E 00	0.0000E 00
2	800	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00
3	3101	1.4819E 00	1.3574E 00	2.3601E 00	9.6305E-01	9.3780E-01	9.7248E-01	6.9571E-01	1.2450E 00	2.3328E-01	1.3984E 00
4	6801	2.8484E-01	2.0705E-01	2.7356E-01	2.3594E-01	2.1138E-01	2.3962E-01	2.1611E-01	2.4454E-01	1.7649E-01	3.3686E 00
5	6802	2.0845E-01	1.5081E 00	1.8883E 00	1.7406E 00	1.5688E 00	1.7601E 00	1.8296E 00	1.9295E 00	1.8309E 00	1.5872E 00

INVPRI MATRIX (5 BY 362)

		201	202	203	204	205	206	207	208	209	210
	CODE	4009	4101	4102	4201	4202	4203	4204	4205	4206	4207
1	700	2.0643E 00	5.9557E 00	5.9071E 00	0.0000E 00	6.3669E 00	5.3568E 00	6.8644E 00	4.9124E 00	0.0000E 00	0.0000E 00
2	800	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00
3	3101	1.0202E 00	7.6867E-01	8.3760E-01	1.6633E 00	1.1618E 00	1.9845E 00	1.7464E 00	1.6826E 00	7.6400E-01	5.2899E-01
4	6801	1.8511E-01	2.1105E-01	2.2942E-01	2.6685E-01	2.1749E-01	2.6125E-01	1.9310E-01	2.0045E-01	2.3983E-01	2.3340E-01
5	6802	1.6231E-01	1.6097E 00	1.6255E 00	1.1192E 00	1.4801E 00	1.7812E 00	1.9151E 00	1.5884E 00	1.4707E 00	1.7173E 00

INVPRI MATRIX (5 BY 362)

		211	212	213	214	215	216	217	218	219	220
	CODE	4208	4209	4210	4211	4301	4302	4400	4501	4502	4503
1	700	7.9253E 00	0.0000E 00	0.0000E 00	4.8381E 00	4.8987E 00	5.7095E 00	7.6481E 00	6.3504E 00	5.3660E 00	0.0000E 00
2	800	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00
3	3101	3.2677E-01	2.6380E-01	3.9186E-01	3.6803E-01	1.6292E 00	1.4857E 00	7.4287E-01	9.5671E-01	2.9484E-01	3.3422E-01
4	6801	2.2290E-01	2.4335E-01	2.6798E-01	2.0888E-01	3.1933E-01	2.7750E-01	2.4074E-01	2.8867E-01	2.2710E-01	2.8805E-01
5	6802	1.9305E 00	1.2814E 00	0.0000E 00	1.4529E 00	1.3617E 00	1.6938E 00	2.4018E 00	1.9000E 00	2.1866E 00	3.3553E 00

INVPRI MATRIX (5 BY 362)

		221	222	223	224	225	226	227	228	229	230
	CODE	4601	4602	4603	4604	4701	4702	4703	4704	4801	4802
1	700	0.0000E 00	4.3719E 00	4.9279E 00	5.3194E 00	5.5196E 00	0.0000E 00	9.5653E-01	5.2849E 00	0.0000E 00	4.2334E 00
2	800	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00
3	3101	2.7966E-01	3.3288E-01	4.6313E-01	2.9825E-01	1.1615E 00	3.9684E-01	7.6230E-01	3.4986E-01	1.4829E-01	2.8066E-01
4	6801	2.1598E-01	2.0404E-01	2.3705E-01	2.6739E-01	2.1535E-01	2.4037E-01	2.0556E-01	2.3756E-01	2.0283E-01	2.2877E-01
5	6802	0.0000E 00	1.6068E 00	1.4347E 00	1.7073E 00	1.3774E 00	0.0000E 00	3.7840E-01	1.8603E 00	1.3682E 00	1.7005E 00

INVPRI MATRIX (5 BY 362)

		231	232	233	234	235	236	237	238	239	240
	CODE	4803	4804	4805	4806	4901	4902	4903	4904	4905	4906
1	700	0.0000E 00	0.0000E 00	0.0000E 00	6.7874E 00	6.6956E 00	7.8560E 00	0.0000E 00	0.0000E 00	6.2725E 00	0.0000E 00
2	800	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00
3	3101	1.2502E-01	7.6787E-02	9.3600E-02	6.1578E-01	3.7983E-01	6.3262E-01	1.1771E 00	4.0036E-01	3.1934E-01	2.4980E-01
4	6801	2.4638E-01	2.1797E-01	1.8796E-01	2.1138E-01	2.3474E-01	3.1217E-01	1.9870E-01	1.6543E-01	2.3684E-01	2.0187E-01
5	6802	1.6704E 00	1.4717E 00	1.4443E 00	1.6695E 00	1.7097E 00	1.6898E 00	1.4852E 00	1.4484E 00	1.5752E 00	1.3381E 00

Table 4 continued

INVPRI MATRIX (5 BY 362)

	241	242	243	244	245	246	247	248	249	250
CODE	4907	5000	5101	5102	5103	5104	5201	5202	5203	5204
1 700	0.0000E 00	6.0375E 00	5.1602E 00	0.0000E 00	0.0000E 00	5.3182E 00	4.1283E 00	5.7608E 00	0.0000E 00	0.0000E 00
2 800	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00
3 3101	5.4076E-01	8.5986E-01	1.1017E 00	2.7044E-01	2.0623E-01	2.2642E-01	2.8865E-01	8.0408E-02	6.0861E-01	9.5361E-02
4 6801	2.7449E-01	2.1370E-01	2.8512E-01	2.5660E-01	1.8981E-01	2.4104E-01	2.2784E-01	2.6200E-01	1.6280E-01	1.9735E-01
5 6802	1.5986E 00	1.7006E 00	1.9138E 00	1.8204E 00	1.3927E 00	1.6095E 00	1.6601E 00	2.0393E 00	0.0000E 00	1.9051E 00

INVPRI MATRIX (5 BY 362)

	251	252	253	254	255	256	257	258	259	260
CODE	5205	5301	5302	5303	5304	5305	5306	5307	5308	5401
1 700	4.4334E 00	0.0000E 00	5.7075E 00	5.6243E 00	5.6539E 00	0.0000E 00	5.2774E 00	6.1759E 00	0.0000E 00	6.0334E 00
2 800	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00
3 3101	2.2301E-01	2.4702E-01	5.8294E-02	2.4220E-01	7.1022E-01	2.0223E-01	1.4464E-01	1.5035E-01	1.3200E-01	2.6858E-01
4 6801	4.4268E-01	2.7770E-01	3.2924E-01	2.6431E-01	2.8775E-01	2.6936E-01	2.3325E-01	5.2950E-01	2.6216E-01	3.1753E-01
5 6802	1.3333E 00	1.6252E 00	1.9768E 00	1.5165E 00	1.7533E 00	1.6639E 00	1.6534E 00	2.0172E 00	1.8144E 00	1.8905E 00

INVPRI MATRIX (5 BY 362)

	261	262	263	264	265	266	267	268	269	270
CODE	5402	5403	5404	5405	5406	5407	5501	5502	5503	5601
1 700	6.4109E 00	6.2042E 00	0.0000E 00	0.0000E 00	0.0000E 00	7.6243E 00	0.0000E 00	6.3285E 00	3.4791E 00	6.1449E 00
2 800	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00
3 3101	1.2756E 00	2.0871E-01	1.6147E-01	1.9354E-01	4.3962E-02	2.6442E-01	2.8873E-01	1.0735E-01	7.9300E-01	2.7184E-01
4 6801	3.3125E-01	3.1495E-01	2.2551E-01	2.7200E-01	2.9613E-01	2.5585E-01	2.8542E-01	2.3782E-01	1.1083E-01	2.7949E-01
5 6802	1.8878E 00	2.0693E 00	1.6648E 00	1.8372E 00	0.0000E 00	1.9149E 00	1.6676E 00	1.6614E 00	1.2459E 00	0.0000E 00

INVPRI MATRIX (5 BY 362)

	271	272	273	274	275	276	277	278	279	280
CODE	5602	5603	5604	5701	5702	5703	5801	5802	5803	5804
1 700	0.0000E 00	5.9947E 00	4.3273E 00	0.0000E 00	6.1687E 00	5.9837E 00	5.8424E 00	4.2642E 00	0.0000E 00	5.7731E 00
2 800	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00
3 3101	1.3877E-01	1.3680E 00	9.5494E-01	9.3909E-01	2.0516E 00	1.0512E 00	3.3363E-01	4.4623E-01	2.3715E-01	3.4917E-01
4 6801	2.4402E-01	3.0822E-01	2.8372E-01	2.9605E-01	3.2562E-01	2.3443E-01	2.9088E-01	2.5293E-01	2.3935E-01	4.2181E-01
5 6802	2.0894E 00	2.3949E 00	1.2069E 00	1.6468E 00	1.7153E 00	1.7021E 00	1.9233E 00	1.6957E 00	1.2519E 00	1.8292E 00

INVPRI MATRIX (5 BY 362)

	281	282	283	284	285	286	287	288	289	290
CODE	5805	5901	5902	5903	6001	6002	6003	6004	6101	6102
1 700	0.0000E 00	4.7083E 00	4.8360E 00	5.4631E 00	5.6581E 00	5.8816E 00	0.0000E 00	5.9563E 00	4.6308E 00	7.5233E 00
2 800	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00
3 3101	2.7530E-01	6.6289E-01	9.3209E-01	8.6423E-01	4.9802E-01	4.4653E-01	4.2837E-01	1.0964E 00	1.1740E 00	7.8539E-01
4 6801	2.2300E-01	2.2750E-01	2.3622E-01	3.1851E-01	3.2693E-01	3.1138E-01	2.7877E-01	2.8391E-01	2.9698E-01	1.7478E-01
5 6802	1.8133E 00	1.6014E 00	1.8387E 00	1.9430E 00	2.6429E 00	1.8781E 00	0.0000E 00	0.0000E 00	1.2355E 00	1.7161E 00

INVPRI MATRIX (5 BY 362)

	291	292	293	294	295	296	297	298	299	300
CODE	6103	6104	6105	6106	6107	6201	6202	6203	6204	6205
1 700	7.4983E 00	5.2521E 00	0.0000E 00	0.0000E 00	0.0000E 00	7.5590E 00	4.0060E 00	0.0000E 00	0.0000E 00	5.3493E 00
2 800	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00
3 3101	6.9730E-01	9.6159E-01	1.8934E-01	3.0075E-01	2.0628E-01	1.6228E-01	4.0588E-01	1.8291E-01	3.3631E-01	3.3195E-01
4 6801	3.1748E-01	2.2399E-01	2.8977E-01	1.4444E-01	1.7552E-01	2.1828E-01	2.3021E-01	2.5254E-01	1.9094E-01	2.7535E-01
5 6802	1.4891E 00	1.7690E 00	1.8201E 00	1.8423E 00	1.4953E 00	2.7193E 00	1.7526E 00	1.7174E 00	1.5148E 00	0.0000E 00

Table 4 continued

INVPRI MATRIX (5 BY 362)

	301	302	303	304	305	306	307	308	309	310
CODE	6206	6207	6301	6302	6303	6401	6402	6403	6404	6405
1 700	0.0000E 00	5.9497E 00	0.0000E 00	0.0000E 00	4.9185E 00	4.0841E 00	5.1429E 00	2.8644E 00	4.6298E 00	4.1659E 00
2 800	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00
3 3101	2.9977E-01	2.4751E-01	3.0148E-01	2.7042E-01	4.3194E 00	2.9125E-01	3.5615E-01	5.3809E 00	3.4224E 00	4.0416E-01
4 6801	1.7576E-01	2.1575E-01	1.5194E-01	2.6648E-01	2.5834E-01	1.8914E-01	1.9222E-01	1.6768E-01	1.9583E-01	1.9253E-01
5 6802	1.1480E 00	1.5098E 00	3.4353E 00	2.4062E 00	1.6885E 00	1.0584E 00	1.8084E 00	1.1561E 00	1.5716E 00	1.6167E 00

INVPRI MATRIX (5 BY 362)

	311	312	313	314	315	316	317	318	319	320
CODE	6406	6407	6408	6409	6410	6411	6412	6501	6502	6503
1 700	0.0000E 00	0.0000E 00	4.3544E 00	5.5497E 00	5.0310E 00	0.0000E 00	3.7463E 00	7.2900E 00	0.0000E 00	0.0000E 00
2 800	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00
3 3101	3.0802E-01	2.2667E-01	3.4492E-01	2.4241E-01	4.3972E-01	3.1655E 00	6.8119E-01	1.8140E 00	9.4110E-01	1.7520E 00
4 6801	1.9593E-01	2.1395E-01	2.1265E-01	2.9398E-01	1.6756E-01	1.6678E-01	1.9160E-01	2.4830E-01	1.5310E-01	1.5310E-01
5 6802	0.0000E 00	1.8154E 00	1.5601E 00	1.7411E 00	1.9118E 00	1.5330E 00	1.2270E 00	1.5130E 00	1.5130E 00	1.5130E 00

INVPRI MATRIX (5 BY 362)

	321	322	323	324	325	326	327	328	329	330
CODE	6504	6505	6506	6507	6600	6700	6801	6802	6803	6901
1 700	6.2100E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	(8.7350E 00)	3.7800E 00	3.7800E 00	0.0000E 00
2 800	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	(7.0550E 00)	0.0000E 00	0.0000E 00
3 3101	4.3270E 00	1.4510E 00	2.4000E-02	6.9900E 00	8.5792E-01	2.4337E 00	(3.5300E-00)	1.1006E 00	2.5614E 00	6.1710E-01
4 6801	1.5310E-01	1.5310E-01	1.5310E-01	1.5310E-01	1.5310E-01	1.5310E-01	3.5140E-01	1.5310E-01	1.5310E-01	1.5310E-01
5 6802	1.5130E 00	1.5130E 00	3.6320E 01	1.5130E 00	1.5130E 00	1.5130E 00	(4.8900E-00)	2.0000E-01	1.5130E 00	1.5130E 00

INVPRI MATRIX (5 BY 362)

	331	332	333	334	335	336	337	338	339	340
CODE	6902	7001	7002	7003	7004	7005	7101	7102	7201	7202
1 700	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00
2 800	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00
3 3101	1.1705E 00	2.1985E 00	1.9938E 00	1.2918E 00	1.0700E 00	7.0546E-01	0.0000E 00	7.4910E-02	1.1665E 00	7.3950E-01
4 6801	1.3290E-01	1.3290E-01	1.3290E-01	1.3290E-01	1.3290E-01	1.3290E-01	1.3290E-01	1.3290E-01	1.5310E-01	1.3290E-01
5 6802	1.5130E 00	1.5130E 00	1.5130E 00	1.5130E 00	1.5130E 00	1.5130E 00	1.5130E 00	1.5130E 00	1.5130E 00	1.5130E 00

INVPRI MATRIX (5 BY 362)

	341	342	343	344	345	346	347	348	349	350
CODE	7203	7301	7302	7303	7500	7601	7602	7701	7702	7703
1 700	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00
2 800	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00
3 3101	2.5413E 00	9.4495E-01	1.2044E 00	9.8934E-01	4.5590E-01	9.9079E-01	9.5568E-01	1.3208E 00	2.3059E 00	1.8199E 00
4 6801	1.3290E-01	1.3290E-01	1.3290E-01	1.3290E-01	1.3290E-01	1.3290E-01	1.3290E-01	1.3290E-01	1.5310E-01	1.5310E-01
5 6802	1.5130E 00	1.5130E 00	1.5130E 00	1.5130E 00	1.5130E 00	1.5130E 00	1.5130E 00	1.5130E 00	1.5130E 00	1.5130E 00

INVPRI MATRIX (5 BY 362)

	351	352	353	354	355	356	357	358	359	360
CODE	7704	7705	7801	7802	7804	7901	7902	7903	8001	8002
1 700	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00
2 800	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00	0.0000E 00
3 3101	1.2076E 00	1.0078E 00	4.2353E-01	3.1878E-01	3.7587E-01	1.4208E 00	3.3344E 00	5.9037E-01	0.0000E 00	0.0000E 00
4 6801	1.5310E-01	1.3290E-01	1.6850E-01	0.0000E 00	1.6850E-01	2.6110E-01	0.0000E 00	1.6850E-01	0.0000E 00	0.0000E 00
5 6802	1.5130E 00	1.5130E 00	1.5130E 00	1.5130E 00	1.5130E 00	1.5130E 00	0.0000E 00	1.5130E 00	0.0000E 00	0.0000E 00

Table 4 continued

INVPRI MATRIX (5 BY 362)

	CODE	361 8100	362 8200
1	700	0.0000E 00	0.0000E 00
2	800	0.0000E 00	0.0000E 00
3	3101	0.0000E 00	0.0000E 00
4	6801	0.0000E 00	0.0000E 00
5	6802	0.0000E 00	0.0000E 00

Table 5. Direct and total energy coefficients (10^6 Btu/$) for the five energy sectors. Direct coefficients in parentheses represent sales from primary to secondary energy producers, which are set equal to zero in computation, as discussed in Section II-C. See Section IV-B for general discussion.

	1	2	3	4	5	6	7	8	9	10
CODE	101	102	103	201	202	203	204	205	206	207
DIRBTU										
1 700	0.0	5.7649E-03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.1822E-03
2 800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 3101	5.4684E-03	5.7924E-03	3.3146E-03	1.8564E-02	2.9741E-02	2.3157E-02	1.0508E-02	1.2514E-02	2.8766E-02	1.6197E-02
4 6801	1.5118E-03	8.3489E-04	6.6908E-04	2.0321E-03	5.6312E-04	9.3010E-04	1.0353E-03	7.7398E-04	9.0785E-04	5.2780E-04
5 6802	0.0	4.7125E-03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.8795E-03
INVBTU										
1 700	1.0907E-02	1.9801E-02	9.1905E-03	1.2581E-02	1.0002E-02	7.5577E-03	8.3242E-03	7.8468E-03	8.2492E-03	6.5271E-03
2 800	4.3341E-02	5.2928E-02	4.0432E-02	4.5329E-02	5.7264E-02	4.2939E-02	2.8694E-02	3.1180E-02	5.3155E-02	3.8232E-02
3 3101	3.3528E-02	3.4722E-02	3.1385E-02	3.3779E-02	4.6083E-02	3.5170E-02	2.0836E-02	2.3406E-02	4.4727E-02	2.4175E-02
4 6801	3.9420E-03	4.0809E-03	3.1841E-03	4.5632E-03	3.1094E-03	2.6919E-03	2.7807E-03	2.5884E-03	2.8771E-03	1.4662E-03
5 6802	1.1862E-02	2.0460E-02	1.0894E-02	1.3571E-02	1.3934E-02	9.8648E-03	9.1414E-03	9.2077E-03	1.1013E-02	1.5673E-02
TCINBU										
1	5.0152E-02	6.8490E-02	4.6315E-02	5.3171E-02	6.4035E-02	4.7700E-02	3.4130E-02	3.6338E-02	5.8415E-02	4.3236E-02
TCINBP										
1	5.6601E-02	7.5166E-02	5.1524E-02	6.0636E-02	6.9122E-02	5.2104E-02	3.8679E-02	4.0573E-02	6.3122E-02	4.5634E-02
PCGDOB										
1 700	1.6553E-04	2.3535E-03	3.8194E-04	8.7211E-04	1.2286E-03	1.5362E-04	7.0241E-04	1.0592E-03	3.7190E-04	2.1443E-04
2 800	2.3994E-04	2.2948E-03	6.1292E-04	1.1461E-03	2.5659E-03	3.1837E-04	8.8321E-04	1.5353E-03	8.7411E-04	4.5815E-04
3 3101	2.8749E-04	2.3317E-03	7.3691E-04	1.3229E-03	3.1983E-03	4.0390E-04	9.9333E-04	1.7851E-03	1.1392E-03	4.4872E-04
4 6801	2.3881E-04	1.9362E-03	5.2820E-04	1.2626E-03	1.5247E-03	2.1842E-04	9.3662E-04	1.3947E-03	5.1775E-04	1.9227E-04
5 6802	1.6289E-04	2.2004E-03	4.0962E-04	8.5117E-04	1.5487E-03	1.8143E-04	6.9793E-04	1.1246E-03	4.4921E-04	4.6587E-04
TOPCGU										
1	2.1774E-04	2.3565E-03	5.5402E-04	1.0496E-03	2.2926E-03	2.8122E-04	8.2237E-04	1.4097E-03	7.6721E-04	4.1771E-04
TOPCGP										
1	2.6014E-04	2.2702E-03	5.7854E-04	1.0802E-03	2.1721E-03	3.1234E-04	8.5133E-04	1.4025E-03	7.5958E-04	4.2645E-04
PCGTOT										
1 700	6.8473E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 800	5.8060E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 3101	5.0470E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4 6801	6.7375E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5 6802	6.6048E-01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GCOBTU										
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GDODOL										
1	5.7774E 06	3.7086E 06	1.7198E 07	3.0932E 06	1.3869E 07	1.4905E 06	2.0991E 06	3.2854E 06	2.2907E 06	1.1380E 06
TFDDOL										
1	1.8950E 05	1.4841E 06	5.1890E 05	8.6550E 05	1.5338E 06	2.5380E 05	1.0536E 06	1.6855E 06	5.6290E 05	4.1020E 05

Table 5 continued

CODE	11 300	12 400	13 500	14 601	15 602	16 700	17 800	18 900	19 1000	20 1101
DIRBTU										
1 700	0.0	0.0	2.6261E-02	4.9647E-03	3.3450E-03	3.5205E-02	0.0	5.1642E-03	6.9252E-03	0.0
2 800	0.0	0.0	0.0	0.0	0.0	0.0	7.1415E-02	0.0	0.0	0.0
3 3101	1.5388E-03	4.2574E-03	1.2825E-02	5.3607E-03	5.0067E-03	6.9169E-03	2.7186E-03	1.8281E-02	1.7522E-02	6.0062E-03
4 6801	1.3026E-05	6.4509E-05	5.9347E-03	1.0670E-02	6.1652E-03	5.9019E-03	1.6946E-03	5.0846E-03	8.1418E-03	3.8606E-04
5 6802	7.7163E-06	3.9338E-05	1.2989E-02	1.4161E-02	9.8760E-03	3.3963E-04	8.8188E-03	1.3549E-02	9.8283E-02	7.4349E-04
INVBTU										
1 700	6.5718E-03	1.2311E-02	4.6813E-02	4.6840E-02	2.6622E-02	6.3777E-02	7.2129E-03	2.6978E-02	3.2002E-02	1.8668E-02
2 800	2.1742E-02	3.5571E-02	5.4285E-02	6.1013E-02	4.1331E-02	3.0188E-02	9.9660E-02	6.2668E-02	1.4993E-01	3.9290E-02
3 3101	1.4910E-02	2.6078E-02	3.1065E-02	1.9517E-02	1.6803E-02	1.7489E-02	1.1455E-02	3.3650E-02	3.3010E-02	2.2683E-02
4 6801	1.8148E-03	2.6225E-03	7.9434E-03	1.6783E-02	9.3875E-03	8.9226E-03	2.8096E-03	7.6606E-03	1.0438E-02	3.8006E-03
5 6802	7.2657E-03	1.1224E-02	2.5785E-02	4.2813E-02	2.5882E-02	1.3217E-02	1.5869E-02	3.1127E-02	1.2100E-01	1.8552E-02
TCINBU										
1	2.6428E-02	4.5157E-02	9.2846E-02	9.0419E-02	5.8200E-02	8.4697E-02	1.0395E-01	8.1688E-02	1.7108E-01	5.4010E-02
TCINBP										
1	2.9397E-02	4.9448E-02	1.0584E-01	1.1788E-01	7.3558E-02	9.9294E-02	1.0855E-01	9.4221E-02	1.8816E-01	6.0227E-02
PCGDOB										
1 700	1.7911E-04	9.3669E-06	2.7070E-04	-1.0504E-05	5.1598E-04	2.6551E-03	1.5771E-05	5.6393E-05	2.2529E-04	4.0441E-02
2 800	2.1615E-04	9.8721E-06	1.1450E-04	-4.9909E-06	2.9220E-04	4.5842E-04	7.9483E-05	4.7784E-05	3.8500E-04	3.1048E-02
3 3101	2.2959E-04	1.1210E-05	1.0149E-04	-2.4727E-06	1.8399E-04	4.1135E-04	1.4150E-05	3.9741E-05	1.3129E-04	2.7762E-02
4 6801	1.9743E-04	7.9647E-06	1.8335E-04	-1.5023E-05	7.2627E-04	1.4827E-03	2.4521E-05	6.3920E-05	2.9333E-04	3.2865E-02
5 6802	1.7917E-04	7.7267E-06	1.3491E-04	-8.6867E-06	4.5387E-04	4.9784E-04	3.1394E-05	5.8870E-05	7.7070E-04	3.6363E-02
TCPCGU										
1	2.0733E-04	9.9551E-06	1.5291E-04	-5.4115E-06	3.0597E-04	9.9175E-04	6.7121E-05	4.8383E-05	3.4834E-04	3.3643E-02
TCPCGP										
1	2.4686E-04	5.7909E-05	1.9879E-04	4.2331E-05	3.8702E-04	1.0539E-03	1.0860E-04	9.6706E-05	3.7770E-04	3.2316E-02
PCGTOT										
1 700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 3101	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4 6801	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5 6802	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GDOBTU										
1	0.0	0.0	0.0	0.0	0.0	1.2486E 07	3.4230E 07	0.0	0.0	0.0
GDODOL										
1	1.7510E 06	1.7719E 06	1.4294E 06	6.9720E 05	8.2520E 05	2.6368E 06	1.2265E 07	2.0241E 06	6.9640E 05	2.7049E 07
TFDDOL										
1	3.4030E 05	9.5000E 03	7.2200E 04	-2.8000E 03	2.4200E 05	5.1980E 05	2.7300E 04	2.6100E 04	8.7900E 04	2.7049E 07

Table 5 continued

CODE	21 1102	22 1103	23 1104	24 1105	25 1201	26 1202	27 1301	28 1302	29 1303	30 1304
DIRBTU										
1 700	0.0	0.0	0.0	0.0	0.0	0.0	7.4003E-04	6.0230E-03	1.8038E-03	0.0
2 800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 3101	5.8783E-03	5.8873E-03	2.6241E-02	8.1151E-03	6.5867E-03	2.4151E-02	6.7707E-04	7.3904E-04	4.3289E-04	4.9906E-04
4 6801	3.5259E-04	2.0035E-04	1.6792E-04	2.0016E-04	4.4465E-04	4.6267E-04	8.7809E-04	1.8269E-03	8.7846E-04	1.1564E-03
5 6802	6.8372E-04	3.8914E-04	3.5949E-04	3.8854E-04	8.6634E-04	8.9343E-04	9.1462E-04	6.2383E-04	1.2322E-04	2.2344E-04
INVBTU										
1 700	2.2781E-02	2.9752E-02	2.8097E-02	2.4645E-02	1.4551E-02	1.2932E-02	1.1969E-02	3.5064E-02	4.1149E-02	1.3318E-02
2 800	4.1150E-02	4.3267E-02	6.8253E-02	4.4566E-02	4.0751E-02	5.2614E-02	1.7389E-02	3.0348E-02	4.3615E-02	2.0368E-02
3 3101	2.2987E-02	2.4174E-02	5.0658E-02	2.5260E-02	2.7964E-02	4.3500E-02	8.1956E-03	1.2020E-02	1.7986E-02	9.4831E-03
4 6801	4.0842E-03	4.2108E-03	3.6112E-03	3.4416E-03	3.3859E-03	2.6313E-03	3.7829E-03	7.4059E-03	9.0822E-03	4.2038E-03
5 6802	2.0043E-02	2.0985E-02	2.1070E-02	2.0154E-02	1.5083E-02	1.2821E-02	9.7846E-03	1.9305E-02	2.7132E-02	1.1663E-02
TCINBU										
1	5.9689E-02	6.8645E-02	9.2599E-02	6.5636E-02	5.1785E-02	6.2812E-02	2.5428E-02	5.7719E-02	7.5329E-02	2.9319E-02
TCINBP										
1	6.6371E-02	7.5534E-02	9.8507E-02	7.1266E-02	5.7324E-02	6.7117E-02	3.1617E-02	6.9835E-02	9.0188E-02	3.6197E-02
PCGOOB										
1 700	3.2048E-02	1.7083E-02	1.5619E-02	1.3412E-02	1.7597E-04	4.9433E-03	3.8173E-03	9.8991E-04	1.4244E-03	1.6938E-04
2 800	2.1116E-02	9.0618E-03	1.3840E-02	8.8467E-03	1.7977E-04	7.3361E-03	2.0231E-03	3.1252E-04	5.5070E-04	9.4492E-05
3 3101	1.8270E-02	7.8417E-03	1.5910E-02	7.7666E-03	1.9106E-04	9.3945E-03	1.4768E-03	1.9171E-04	3.5174E-04	6.8141E-05
4 6801	2.2934E-02	9.6506E-03	8.0133E-03	7.4762E-03	1.6345E-04	4.0150E-03	4.8160E-03	8.3458E-04	1.2549E-03	2.1342E-04
5 6802	2.5511E-02	1.0901E-02	1.0598E-02	9.9235E-03	1.6504E-04	4.4341E-03	2.8236E-03	4.9313E-04	8.4974E-04	1.3421E-04
TCPCGU										
1	2.4174E-02	1.1397E-02	1.5091E-02	1.0386E-02	1.8063E-04	7.0264E-03	2.2180E-03	4.5162E-04	7.2630E-04	1.0234E-04
TCPCGP										
1	2.3162E-02	1.0823E-02	1.3814E-02	9.7284E-03	2.2043E-04	6.4876E-03	2.4549E-03	5.2314E-04	8.0260E-04	1.5865E-04
PCGTOT										
1 700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 3101	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4 6801	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5 6802	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GCOBTU										
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GDODOL										
1	1.7565E 07	7.1690E 06	6.9410E 06	6.7950E 06	6.6150E 06	1.3179E 07	4.1978E 06	5.6530E 05	5.0350E 05	2.2800E 05
TFDDOL										
1	1.7565E 07	7.1690E 06	6.9410E 06	6.7950E 06	1.5100E 05	4.7728E 06	3.9823E 06	3.5250E 05	4.3220E 05	1.5880E 05

Table 5 continued

	CODE	31 1305	32 1306	33 1307	34 1401	35 1402	36 1403	37 1404	38 1405	39 1406	40 1407
DIRBTU											
1	700	5.3321E-03	7.4443E-03	2.8156E-03	1.1104E-03	5.1657E-03	2.2975E-03	1.2829E-02	4.9082E-04	1.1920E-03	2.0298E-04
2	800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	3101	4.6446E-04	4.3180E-04	8.1502E-04	1.2235E-03	3.2410E-03	2.9486E-03	2.3145E-03	2.9852E-03	4.4126E-03	3.7297E-04
4	6801	1.7169E-03	1.8124E-03	3.2751E-03	5.0282E-04	7.5047E-04	7.1370E-04	7.9047E-04	1.8504E-03	9.8765E-04	3.8395E-04
5	6802	8.1332E-03	5.6827E-03	3.2536E-03	2.2163E-03	9.0292E-03	3.0741E-03	7.8097E-03	1.6322E-03	2.9627E-03	8.4493E-04
INVBTU											
1	700	2.5221E-02	2.3859E-02	2.8506E-02	1.2913E-02	2.0304E-02	1.6242E-02	3.1725E-02	1.7785E-02	1.4602E-02	1.4735E-02
2	800	3.1541E-02	4.3658E-02	2.9304E-02	4.1842E-02	5.4183E-02	4.3385E-02	4.8561E-02	3.8467E-02	4.2934E-02	2.6154E-02
3	3101	1.1904E-02	1.4155E-02	1.1493E-02	2.9318E-02	3.2382E-02	2.8288E-02	2.7015E-02	2.3563E-02	2.8746E-02	1.6002E-02
4	6801	4.5230E-03	5.6207E-03	7.1922E-03	3.5319E-03	4.6496E-03	4.4328E-03	4.4675E-03	4.9103E-03	4.2470E-03	2.5984E-03
5	6802	2.0460E-02	2.7130E-02	1.8750E-02	1.4412E-02	2.4076E-02	1.7016E-02	2.3575E-02	1.6502E-02	1.6018E-02	1.0953E-02
TCINBU											
1		5.2064E-02	6.1678E-02	5.0340E-02	5.1086E-02	6.9658E-02	5.5023E-02	7.5645E-02	5.1151E-02	5.3125E-02	3.8189E-02
TCINBP											
1		5.9463E-02	7.0873E-02	6.2106E-02	5.6864E-02	7.7264E-02	6.2275E-02	8.2954E-02	5.9185E-02	6.0073E-02	4.2440E-02
PCGDOB											
1	700	3.2925E-04	3.7510E-04	8.4199E-04	1.4914E-02	1.2030E-03	1.0050E-03	1.5344E-03	1.6853E-03	6.2716E-03	4.2567E-04
2	800	1.5019E-04	2.5036E-04	3.1573E-04	1.7627E-02	1.1710E-03	9.7924E-04	8.5674E-04	1.3297E-03	6.7265E-03	2.7559E-04
3	3101	8.7798E-05	1.2573E-04	1.9179E-04	1.9130E-02	1.0840E-03	9.8895E-04	7.3821E-04	1.2615E-03	6.9755E-03	2.6117E-04
4	6801	2.3569E-04	3.5273E-04	8.4798E-04	1.6282E-02	1.0997E-03	1.0949E-03	8.6250E-04	1.8574E-03	7.2812E-03	2.9963E-04
5	6802	2.4166E-04	3.8592E-04	5.0108E-04	1.5060E-02	1.2907E-03	9.5265E-04	1.0317E-03	1.4148E-03	6.2248E-03	2.8629E-04
TCPCGU											
1		1.9342E-04	2.7521E-04	4.0821E-04	1.6978E-02	1.1894E-03	9.7275E-04	1.0594E-03	1.3715E-03	6.5217E-03	3.1768E-04
TCPCGP											
1		2.3898E-04	3.2134E-04	4.8739E-04	1.6300E-02	1.1828E-03	9.9676E-04	1.0465E-03	1.4185E-03	6.3955E-03	3.5211E-04
PCGTOT											
1	700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	3101	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	6801	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	6802	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GCOBTU											
1		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GDODOL											
1		1.8270E 05	2.1310E 05	4.2470E 05	1.8526E 07	1.1539E 06	1.2171E 06	1.2962E 06	1.3041E 06	7.4325E 06	4.3140E 05
TFDDOL											
1		1.6300E 05	1.9630E 05	3.6880E 05	1.4420E 07	7.3980E 05	7.7260E 05	6.0390E 05	1.1832E 06	5.3628E 06	3.6070E 05

Table 5 continued

CODE	41 1408	42 1409	43 1410	44 1411	45 1412	46 1413	47 1414	48 1415	49 1416	50 1417
DIRBTU										
1 700	7.0722E-03	2.2860E-03	9.4823E-04	8.2691E-04	0.0	1.7604E-04	1.5615E-03	4.2795E-04	0.0	5.9048E-02
2 800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 3101	5.1251E-03	3.2645E-03	2.5089E-04	3.5044E-04	3.8312E-04	5.4800E-03	8.5647E-04	1.4872E-03	4.4438E-04	1.9346E-03
4 6801	5.4133E-04	5.8255E-04	8.5220E-04	5.7414E-04	7.5495E-04	1.6454E-03	1.3201E-03	8.3374E-04	6.5607E-04	9.6817E-04
5 6802	3.1403E-03	6.0888E-03	1.3204E-02	1.8673E-03	5.7536E-04	5.4523E-03	1.3564E-03	3.4662E-03	2.3106E-03	1.3171E-02
INVBTU										
1 700	2.6583E-02	2.5065E-02	1.4757E-02	2.0871E-02	1.1503E-02	1.9917E-02	1.5879E-02	1.8378E-02	1.1157E-02	7.2232E-02
2 800	4.2288E-02	4.4937E-02	4.6490E-02	4.9546E-02	2.7155E-02	4.5300E-02	4.5828E-02	5.1587E-02	5.1133E-02	4.8476E-02
3 3101	2.3195E-02	2.2900E-02	1.8493E-02	2.3172E-02	1.7452E-02	2.4901E-02	3.2559E-02	3.2601E-02	3.8319E-02	2.5929E-02
4 6801	3.6059E-03	3.7630E-03	3.7584E-03	4.5066E-03	2.9517E-03	5.8137E-03	4.1208E-03	4.6238E-03	3.5548E-03	2.9166E-03
5 6802	2.1015E-02	2.3912E-02	2.9623E-02	2.8118E-02	1.0569E-02	2.2416E-02	1.5407E-02	2.1119E-02	1.5263E-02	2.4101E-02
TCINBU										
1	6.5125E-02	6.6093E-02	5.7342E-02	6.5735E-02	3.5591E-02	5.9177E-02	5.7426E-02	6.5161E-02	5.8598E-02	1.1768E-01
TCINBP										
1	7.1024E-02	7.2250E-02	6.3491E-02	7.3108E-02	4.0420E-02	6.8688E-02	6.4168E-02	7.2726E-02	6.4414E-02	1.2245E-01
PCGDOB										
1 700	1.9925E-03	4.9667E-03	3.0504E-04	9.5561E-04	3.3063E-04	2.2604E-03	1.8685E-03	8.7681E-04	2.8488E-04	1.8396E-04
2 800	1.1562E-03	3.2480E-03	3.5054E-04	8.2750E-04	2.8471E-04	1.8754E-03	1.9671E-03	8.9776E-04	4.7623E-04	4.5035E-05
3 3101	9.8227E-04	2.5637E-03	2.1598E-04	5.9943E-04	2.8342E-04	1.5967E-03	2.1647E-03	8.7875E-04	5.5277E-04	3.7310E-05
4 6801	1.0789E-03	2.9764E-03	3.1012E-04	8.2356E-04	3.3867E-04	2.6338E-03	1.9357E-03	8.8057E-04	3.6230E-04	2.9651E-05
5 6802	1.4252E-03	4.2870E-03	5.5404E-04	1.1648E-03	2.7487E-04	2.3018E-03	1.6404E-03	9.1164E-04	3.5259E-04	5.5537E-05
TOPCGU										
1	1.4167E-03	3.7973E-03	3.4186E-04	8.6643E-04	2.9186E-04	1.8977E-03	1.9414E-03	8.9358E-04	4.3281E-04	8.8627E-05
TCPCGP										
1	1.3752E-03	3.6134E-03	3.7392E-04	8.7715E-04	3.3411E-04	1.9508E-03	1.9147E-03	9.0640E-04	4.5729E-04	1.2755E-04
PCGTOT										
1 700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 3101	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4 6801	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5 6802	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GDOBTU										
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GCODOL										
1	1.2005E 06	2.9080E 06	4.7370E 05	7.6830E 05	3.8890E 05	1.6865E 06	3.3171E 06	4.4479E 06	4.2210E 05	6.7810E 05
TFDDOL										
1	9.3590E 05	2.4741E 06	2.5810E 05	5.7170E 05	3.5890E 05	1.4171E 06	1.4653E 06	5.9570E 05	3.1880E 05	3.1800E 04

Table 5 continued

CODE	51 1418	52 1419	53 1420	54 1421	55 1422	56 1423	57 1424	58 1425	59 1426	60 1427
DIRBTU										
1 700	1.9249E-04	1.4348E-02	2.4088E-03	4.5261E-03	1.5391E-04	0.0	0.0	7.7574E-03	1.2613E-03	1.0873E-02
2 800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 3101	5.1207E-03	5.4247E-03	2.2527E-03	3.2018E-03	4.1327E-03	2.7553E-03	6.8317E-04	1.8373E-03	2.9854E-04	1.0925E-02
4 6801	6.6956E-04	2.7215E-04	9.8526E-04	5.3415E-04	5.9781E-04	2.2252E-04	4.3174E-03	1.3762E-03	1.6100E-03	1.5125E-03
5 6802	4.3655E-03	2.0363E-02	1.6985E-03	3.2748E-03	1.5253E-03	3.0716E-04	8.8458E-03	6.8012E-03	6.2556E-03	1.6453E-02
INWBTU										
1 700	1.2470E-02	2.5441E-02	1.9884E-02	1.5879E-02	1.5442E-02	1.4850E-02	2.1696E-02	1.9239E-02	1.3002E-02	2.8762E-02
2 800	3.5951E-02	5.3121E-02	3.3034E-02	2.5827E-02	3.7804E-02	3.5397E-02	6.2171E-02	6.1241E-02	4.1746E-02	7.0698E-02
3 3101	2.0920E-02	2.0790E-02	1.7978E-02	1.3132E-02	1.8935E-02	1.8262E-02	3.4231E-02	4.4686E-02	2.6132E-02	3.5618E-02
4 6801	2.9690E-03	1.4873E-03	3.3348E-03	2.3165E-03	3.1889E-03	2.7071E-03	9.2885E-03	4.3621E-03	3.9412E-03	4.6293E-03
5 6802	1.6419E-02	3.4733E-02	1.6144E-02	1.3840E-02	2.0338E-02	1.8919E-02	3.0610E-02	1.9552E-02	1.7571E-02	3.7158E-02
TOINBU										
1	4.5336E-02	7.7017E-02	4.9454E-02	3.9300E-02	4.9933E-02	4.8435E-02	7.4218E-02	7.5948E-02	5.0654E-02	9.4651E-02
TCINBP										
1	5.0194E-02	7.9450E-02	5.4909E-02	4.3090E-02	5.5150E-02	5.2864E-02	8.9414E-02	8.3085E-02	5.7102E-02	1.0222E-01
PCGDOB										
1 700	5.6163E-03	2.0027E-03	2.9267E-03	7.0945E-03	2.5354E-03	3.2100E-04	1.1051E-04	3.2805E-04	-3.5404E-06	3.1375E-04
2 800	5.9064E-03	1.5253E-03	1.7736E-03	4.2091E-03	2.2641E-03	2.8699E-04	1.1551E-04	3.8090E-04	-4.1466E-06	2.8130E-04
3 3101	5.3235E-03	9.2462E-04	1.4951E-03	3.3148E-03	1.7565E-03	2.2303E-04	9.8511E-05	4.3048E-04	-4.0202E-06	2.1951E-04
4 6801	5.3379E-03	4.6736E-04	1.9593E-03	4.1313E-03	2.0900E-03	2.3358E-04	1.8886E-04	2.9689E-04	-4.2839E-06	2.0157E-04
5 6802	6.6908E-03	2.4738E-03	2.1499E-03	5.5947E-03	3.0214E-03	3.7001E-04	1.4107E-04	3.0163E-04	-4.3291E-06	3.6673E-04
TOPCGU										
1	5.8893E-03	1.7988E-03	2.0968E-03	5.0847E-03	2.3670E-03	3.0377E-04	1.0499E-04	3.7537E-04	-3.9477E-06	3.0085E-04
TOPCGP										
1	5.6533E-03	1.6379E-03	2.0503E-03	4.8373E-03	2.2953E-03	3.3324E-04	1.5833E-04	4.0122E-04	4.4715E-05	3.2737E-04
PCGTOT										
1 700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 3101	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4 6801	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5 6802	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GDOBTU										
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GDODOL										
1	6.0761E 06	3.2500E 06	2.2724E 06	6.8247E 06	2.2448E 06	8.7990E 05	5.6950E 05	1.4706E 06	3.2640E 05	7.2760E 05
TFDDOL										
1	5.6237E 06	9.8290E 05	1.8378E 06	5.5785E 06	2.0501E 06	2.6990E 05	6.3600E 04	2.1290E 05	-3.4000E 03	1.3620E 05

Table 5 continued

	61	62	63	64	65	66	67	68	69	70
CODE	1428	1429	1430	1431	1432	1501	1502	1601	1602	1603
DIRBTU										
1 700	0.0	5.9986E-03	0.0	2.2177E-03	2.7761E-03	1.2072E-03	9.2730E-04	5.7067E-03	7.5579E-04	1.8299E-03
2 800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 3101	4.2261E-04	6.2552E-03	3.0307E-03	5.6438E-04	1.9448E-03	2.2562E-04	8.4450E-04	4.7307E-03	3.6580E-04	1.8204E-03
4 6801	3.3044E-04	1.0146E-03	1.8437E-02	1.2455E-03	6.2741E-04	2.1536E-04	1.6437E-04	2.6685E-03	1.3057E-03	3.7021E-03
5 6802	1.8262E-03	8.6377E-03	0.0	2.8269E-03	4.9105E-03	2.5523E-04	2.0138E-04	3.2614E-03	1.3193E-03	1.1412E-03
INVBTU										
1 700	8.1099E-03	2.8310E-02	4.3211E-02	1.9580E-02	1.7122E-02	7.8600E-03	7.4327E-03	3.6305E-02	2.7453E-02	3.1571E-02
2 800	1.5343E-02	6.2589E-02	3.8163E-02	3.7942E-02	3.9566E-02	1.5943E-02	3.3376E-02	4.9757E-02	3.6357E-02	4.5955E-02
3 3101	8.2388E-03	3.5807E-02	1.6276E-02	2.1857E-02	1.9731E-02	1.0381E-02	2.7171E-02	2.6344E-02	1.7190E-02	2.4085E-02
4 6801	1.4853E-03	5.5424E-03	2.1992E-02	4.4365E-03	3.3669E-03	1.7256E-03	2.2465E-03	8.5311E-03	6.3495E-03	9.0899E-03
5 6802	7.7695E-03	2.9693E-02	2.3104E-02	1.7525E-02	2.1103E-02	6.2357E-03	7.8944E-03	2.5577E-02	2.0571E-02	2.3863E-02
TCINBU										
1	2.1910E-02	8.5141E-02	5.8529E-02	5.2913E-02	5.3190E-02	2.2015E-02	3.8475E-02	7.7199E-02	5.7215E-02	6.8083E-02
TCINBP										
1	2.4340E-02	9.4209E-02	9.4507E-02	6.0171E-02	5.8698E-02	2.4838E-02	4.2151E-02	9.1156E-02	6.7602E-02	8.2955E-02
PCGDCB										
1 700	1.0016E-03	1.7633E-03	1.3324E-04	3.0233E-04	2.4405E-03	3.1995E-03	2.3329E-04	2.5413E-03	8.2232E-05	1.2516E-04
2 800	6.9124E-04	1.4220E-03	4.2923E-05	2.1371E-04	2.0571E-03	2.3680E-03	3.8213E-04	1.2705E-03	3.9725E-05	6.6456E-05
3 3101	5.7489E-04	1.2600E-03	2.8353E-05	1.9068E-04	1.5889E-03	2.3875E-03	4.8182E-04	1.0419E-03	2.9090E-05	5.3945E-05
4 6801	7.3224E-04	1.3780E-03	2.7068E-04	2.7345E-04	1.9156E-03	2.8039E-03	2.8146E-04	2.3837E-03	7.5918E-05	1.4385E-04
5 6802	8.6821E-04	1.6734E-03	6.4457E-05	2.4484E-04	2.7215E-03	2.2966E-03	2.2419E-04	1.6198E-03	5.5751E-05	8.5595E-05
TCPCGU										
1	7.7936E-04	1.5299E-03	4.2014E-05	2.3296E-04	2.1896E-03	2.5639E-03	3.4984E-04	1.5149E-03	4.8031E-05	7.4556E-05
TCPCGP										
1	7.9297E-04	1.5036E-03	1.1303E-04	2.7681E-04	2.1251E-03	2.5392E-03	3.7773E-04	1.5967E-03	9.7668E-05	1.2753E-04
PCGTOT										
1 700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 3101	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4 6801	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5 6802	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GDOBTU										
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GDODOL										
1	1.8248E 06	1.4017E 06	1.1670E 05	2.2980E 05	2.1754E 06	5.2626E 06	2.1676E 06	1.0484E 07	3.7410E 05	2.3184E 06
TFDOOL										
1	1.5421E 06	7.7770E 05	3.8500E 04	1.9280E 05	1.7797E 06	5.0826E 06	3.9190E 05	8.7400E 05	3.7400E 04	4.9500E 04

Table 5 continued

CODE	71 1604	72 1701	73 1702	74 1703	75 1704	76 1705	77 1706	78 1707	79 1708	80 1709
DIRBTU										
1 700	9.4279E-03	3.2830E-03	2.4459E-03	0.0	5.2400E-03	0.0	2.4291E-03	5.6267E-04	0.0	3.4238E-03
2 800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 3101	5.2868E-04	2.5503E-04	3.7103E-04	4.5641E-04	3.9864E-04	3.5313E-04	7.9129E-03	3.5951E-04	2.2458E-04	2.1483E-03
4 6801	3.1654E-03	8.1807E-04	1.6927E-03	1.1517E-03	1.3388E-03	2.1004E-03	1.2037E-03	3.0855E-03	8.4654E-04	2.0834E-03
5 6802	1.4211E-03	3.0796E-03	3.7123E-03	0.0	2.1442E-03	0.0	3.0542E-03	1.3592E-03	1.7653E-03	1.4287E-03
INVBTU										
1 700	3.7353E-02	2.8969E-02	1.7976E-02	2.3917E-02	1.6175E-02	9.6259E-03	3.1929E-02	5.5800E-02	1.1256E-02	1.7411E-02
2 800	4.2987E-02	4.6157E-02	3.3762E-02	2.8130E-02	2.4297E-02	2.1456E-02	5.5297E-02	6.4932E-02	3.1121E-02	2.9717E-02
3 3101	2.1270E-02	2.2028E-02	1.8634E-02	1.4338E-02	1.3546E-02	1.5316E-02	3.0679E-02	2.8603E-02	2.0665E-02	1.7673E-02
4 6801	9.3712E-03	7.0583E-03	4.8839E-03	4.7316E-03	3.8939E-03	3.8945E-03	7.7430E-03	1.0594E-02	3.5569E-03	4.8249E-03
5 6802	2.3434E-02	2.5841E-02	1.6106E-02	1.4915E-02	1.1680E-02	7.3244E-03	2.7182E-02	3.9127E-02	1.1882E-02	1.3362E-02
TCINBU										
1	7.0606E-02	6.7793E-02	4.6665E-02	4.7132E-02	3.6427E-02	2.7036E-02	7.9182E-02	1.0973E-01	3.8682E-02	4.2116E-02
TCINBP										
1	8.5937E-02	7.9340E-02	5.4655E-02	5.4873E-02	4.2798E-02	3.3407E-02	9.1850E-02	1.2706E-01	4.4501E-02	5.0009E-02
PCGDOB										
1 700	8.6158E-05	2.3131E-03	8.7679E-05	2.9308E-05	2.9795E-06	2.3899E-06	5.2422E-05	1.9217E-05	3.7322E-05	1.6872E-05
2 800	3.6168E-05	1.3444E-03	6.0067E-05	1.2574E-05	1.6326E-06	1.9431E-06	3.3117E-05	8.1568E-06	3.7640E-05	1.0505E-05
3 3101	2.7718E-05	9.9377E-04	5.1348E-05	9.9265E-06	1.4097E-06	2.1484E-06	2.8458E-05	5.5653E-06	3.8712E-05	9.6760E-06
4 6801	8.6282E-05	2.2497E-03	9.5087E-05	2.3144E-05	2.8632E-06	3.8596E-06	5.0746E-05	1.4563E-05	4.7076E-05	1.8664E-05
5 6802	4.8905E-05	1.8669E-03	7.1076E-05	1.6536E-05	1.9467E-06	1.6453E-06	4.0379E-05	1.2192E-05	3.5647E-05	1.1716E-05
TCPCGU										
1	4.5008E-05	1.5238E-03	6.4047E-05	1.6296E-05	1.8855E-06	1.8415E-06	3.6743E-05	1.0688E-05	3.6383E-05	1.1412E-05
TOPCGP										
1	9.6171E-05	1.5902E-03	1.1340E-04	6.4937E-05	5.0463E-05	5.0530E-05	8.5352E-05	5.9232E-05	8.4657E-05	6.0284E-05
PCGTOT										
1 700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 3101	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4 6801	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5 6802	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GDOBTU										
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GDODOL										
1	2.1360E 05	1.1800E 06	1.4180E 05	6.6600E 04	1.7660E 05	1.1750E 05	5.0760E 05	4.0560E 05	4.4220E 05	2.2070E 05
TFDDOL										
1	2.8800E 04	9.9700E 05	6.0900E 04	1.5300E 04	2.3000E 03	3.1000E 03	2.0500E 04	4.3000E 03	4.1400E 04	1.2100E 04

Table 5 continued

CODE	81 1710	82 1801	83 1802	84 1803	85 1804	86 1901	87 1902	88 1903	89 2001	90 2002
DIRBTU										
1 700	0.0	2.8738E-03	8.9488E-04	1.5790E-03	1.8278E-04	0.0	8.2423E-04	3.5315E-04	0.0	4.9850E-04
2 800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 3101	1.8778E-04	4.6326E-03	1.6262E-03	8.5941E-03	7.0001E-04	3.6809E-04	6.1824E-04	3.5388E-04	4.9915E-03	4.2343E-03
4 6801	1.8680E-03	1.3487E-03	5.9079E-04	1.1283E-03	3.9066E-04	5.0702E-04	5.3489E-04	6.4878E-04	7.9354E-05	2.1576E-03
5 6802	2.3016E-03	2.3591E-03	2.1808E-03	1.0588E-03	3.0834E-04	0.0	7.4819E-04	1.9927E-04	1.3782E-03	3.0140E-03
INVBTU										
1 700	1.4614E-02	2.1132E-02	1.9220E-02	3.3132E-02	1.7111E-02	2.3361E-02	2.9800E-02	1.9505E-02	6.7168E-03	9.4781E-03
2 800	2.3925E-02	3.7307E-02	3.0876E-02	5.1408E-02	2.6210E-02	3.3003E-02	4.1871E-02	2.9509E-02	2.4206E-02	2.6217E-02
3 3101	1.2512E-02	1.9742E-02	1.5791E-02	2.9458E-02	1.4472E-02	1.8028E-02	2.2160E-02	1.5774E-02	1.6832E-02	1.6692E-02
4 6801	3.5258E-03	5.6390E-03	5.2054E-03	7.4844E-03	4.3443E-03	5.6970E-03	7.0328E-03	5.0564E-03	1.4817E-03	3.6230E-03
5 6802	1.1695E-02	1.9338E-02	1.6443E-02	2.4633E-02	1.2903E-02	1.6407E-02	2.1474E-02	1.4897E-02	8.3174E-03	1.0680E-02
TCINBU										
1	3.4876E-02	5.2581E-02	4.4689E-02	7.6765E-02	3.8808E-02	5.0446E-02	6.4365E-02	4.3762E-02	2.9384E-02	3.1932E-02
TCINBP										
1	4.0645E-02	6.1806E-02	5.3205E-02	8.9010E-02	4.5915E-02	5.9767E-02	7.5871E-02	5.2035E-02	3.1808E-02	3.7859E-02
PCGDOB										
1 700	4.6467E-05	1.3927E-03	1.7241E-05	5.0417E-05	1.8092E-02	4.8272E-04	2.5237E-03	4.9693E-04	7.0417E-05	8.4411E-05
2 800	2.7748E-05	8.9687E-04	1.0103E-05	2.8535E-05	1.0109E-02	2.4875E-04	1.2934E-03	2.7423E-04	9.2567E-05	8.5170E-05
3 3101	2.2476E-05	7.3511E-04	8.0029E-06	2.5326E-05	8.6455E-03	2.1046E-04	1.0603E-03	2.2705E-04	9.9658E-05	8.3989E-05
4 6801	4.4749E-05	1.4835E-03	1.8638E-05	4.5462E-05	1.8336E-02	4.6989E-04	2.3774E-03	5.1420E-04	6.2007E-05	1.2880E-04
5 6802	3.3644E-05	1.1531E-03	1.3345E-05	3.3915E-05	1.2344E-02	3.0675E-04	1.6454E-03	3.4339E-04	7.8894E-05	8.6057E-05
TCPCGU										
1	3.1275E-05	9.7354E-04	1.1195E-05	3.3021E-05	1.1493E-02	2.9177E-04	1.5293E-03	3.1155E-04	8.9678E-05	7.9576E-05
TCPCGP										
1	8.0039E-05	1.0384E-03	6.0095E-05	8.1608E-05	1.1820E-02	3.4785E-04	1.6084E-03	3.6947E-04	1.3186E-04	1.3025E-04
PCGTOT										
1 700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 3101	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4 6801	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5 6802	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GDOBTU										
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GDODOL										
1	4.4200E 05	1.0394E 06	1.4156E 06	8.7760E 05	1.5981E 07	3.2220E 05	1.2784E 06	1.6210E 06	2.4549E 06	3.5558E 06
TFDDOL										
1	3.9700E 04	8.2290E 05	1.1200E 04	1.9000E 04	1.3202E 07	2.5800E 05	1.0574E 06	3.1810E 05	1.3090E 05	1.1120E 05

Table 5 continued

CODE	91 2003	92 2004	93 2005	94 2006	95 2007	96 2008	97 2009	98 2100	99 2201	100 2202
DIRBTU										
1 700	9.4492E-04	0.0	5.8289E-04	1.5400E-03	7.3424E-04	8.0420E-03	0.0	2.4848E-04	3.2729E-03	7.5338E-04
2 800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 3101	2.4804E-03	7.4976E-04	5.5682E-04	2.0572E-03	5.6910E-04	8.1654E-03	4.4841E-03	9.3452E-04	3.4156E-03	8.7410E-04
4 6801	1.6036E-03	1.1141E-03	9.3273E-04	1.9954E-03	4.6605E-04	7.3252E-04	2.6036E-03	1.3166E-03	1.1682E-03	5.2187E-04
5 6802	2.0218E-03	0.0	8.1535E-04	3.9365E-03	1.1072E-03	1.8533E-02	3.8677E-03	1.6686E-03	5.9481E-04	5.2665E-04
INVBTU										
1 700	1.1245E-02	9.5329E-03	1.1915E-02	1.2472E-02	1.7077E-02	3.2277E-02	1.5535E-02	2.2939E-02	1.6187E-02	1.9204E-02
2 800	2.9111E-02	2.6212E-02	2.4257E-02	3.1996E-02	2.7840E-02	7.3873E-02	3.4372E-02	2.9428E-02	2.7904E-02	2.9558E-02
3 3101	1.6950E-02	1.8162E-02	1.3878E-02	1.7183E-02	1.5649E-02	3.0644E-02	1.8786E-02	1.6914E-02	1.6922E-02	1.6137E-02
4 6801	3.8922E-03	3.4542E-03	3.6842E-03	4.0171E-03	3.5927E-03	6.6798E-03	4.9711E-03	4.1459E-03	3.8879E-03	4.3195E-03
5 6802	1.2300E-02	9.2985E-03	1.1234E-02	1.4877E-02	1.3268E-02	4.6142E-02	1.6188E-02	1.3817E-02	1.2027E-02	1.4431E-02
TCINBU										
1	3.6312E-02	3.2156E-02	3.2345E-02	4.0295E-02	4.1185E-02	9.9211E-02	4.4743E-02	4.8060E-02	4.0052E-02	4.4275E-02
TCINBP										
1	4.2680E-02	3.7807E-02	3.8373E-02	4.6867E-02	4.7062E-02	1.1014E-01	5.2875E-02	5.4843E-02	4.6413E-02	5.1342E-02
PCGDOB										
1 700	5.2234E-06	4.5809E-07	1.1070E-05	2.2376E-05	7.2487E-06	7.7552E-06	2.6265E-04	1.3228E-05	1.7327E-03	1.3849E-03
2 800	4.9325E-06	4.5945E-07	8.2203E-06	2.0938E-05	4.3106E-06	6.4744E-06	2.1197E-04	6.1900E-06	1.0895E-03	7.7752E-04
3 3101	4.4485E-06	4.9307E-07	7.2843E-06	1.7416E-05	3.7529E-06	4.1598E-06	1.7944E-04	5.5104E-06	1.0234E-03	6.5745E-04
4 6801	7.2170E-06	6.6256E-07	1.3663E-05	2.8767E-05	6.0874E-06	6.4065E-06	3.3549E-04	9.5429E-06	1.6612E-03	1.2434E-03
5 6802	5.1695E-06	4.0428E-07	9.4430E-06	2.4148E-05	5.0955E-06	1.0031E-05	2.4763E-04	7.2088E-06	1.1648E-03	9.4159E-04
TOPCGU										
1	4.7388E-06	4.3406E-07	8.4061E-06	2.0406E-05	4.9739E-06	6.8672E-06	2.1199E-04	7.8899E-06	1.2122E-03	9.0250E-04
TOPCGP										
1	5.3364E-05	4.8988E-05	5.7183E-05	6.9049E-05	5.3447E-05	5.5101E-05	2.6539E-04	5.6307E-05	1.2614E-03	9.5225E-04
PCGTOT										
1 700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 3101	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4 6801	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5 6802	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GDOBTU										
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GDODOL										
1	4.2910E 05	2.2800E 05	1.2732E 06	1.6042E 06	4.0000E 05	2.5740E 05	9.7640E 05	4.1950E 05	1.9439E 06	1.0503E 06
TFDDOL										
1	5.8000E 03	6.0000E 02	1.1600E 04	2.2400E 04	5.3000E 03	3.0000E 03	2.1110E 05	7.2000E 03	1.3365E 06	9.0040E 05

Table 5 continued

CODE	101 2203	102 2204	103 2301	104 2302	105 2303	106 2304	107 2305	108 2306	109 2307	110 2401
DIRBTU										
1 700	9.0768E-04	2.1596E-04	7.2564E-03	2.8102E-03	2.6370E-03	6.8290E-04	1.1783E-03	7.5566E-04	2.5801E-03	2.0888E-02
2 800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 3101	6.0979E-04	6.2989E-04	5.7084E-04	6.7940E-04	6.6150E-04	7.6749E-04	7.5412E-04	7.1425E-04	5.0688E-04	2.5158E-02
4 6801	8.6248E-04	4.8550E-04	8.7006E-04	1.0907E-03	1.0283E-03	7.1025E-04	9.5101E-04	1.0390E-03	1.0852E-03	6.5855E-03
5 6802	1.9970E-03	1.1450E-03	0.0	3.8438E-03	2.0576E-03	1.8473E-03	3.2530E-03	1.7111E-03	1.5857E-03	4.1732E-02
INVBTU										
1 700	4.2395E-02	2.8534E-02	2.3797E-02	3.8538E-02	3.0568E-02	1.5794E-02	4.2724E-02	3.7672E-02	3.0678E-02	5.5413E-02
2 800	4.4469E-02	3.2199E-02	2.6208E-02	3.5993E-02	3.5415E-02	2.8131E-02	3.7597E-02	3.9751E-02	3.2492E-02	1.0593E-01
3 3101	1.8847E-02	1.6343E-02	1.4554E-02	1.5124E-02	1.6744E-02	1.3591E-02	1.5686E-02	1.7988E-02	1.5281E-02	4.4577E-02
4 6801	7.4826E-03	4.5627E-03	3.9175E-03	4.8735E-03	5.2471E-03	3.8254E-03	4.9734E-03	6.8093E-03	5.2445E-03	1.0535E-02
5 6802	2.7304E-02	1.7140E-02	1.2468E-02	2.2215E-02	1.9874E-02	1.5452E-02	2.3388E-02	2.3378E-02	1.8431E-02	6.6583E-02
TCINBU										
1	7.9091E-02	5.5993E-02	4.5935E-02	6.9468E-02	6.0532E-02	3.9951E-02	7.5154E-02	7.0349E-02	5.7722E-02	1.5040E-01
TCINBP										
1	9.1332E-02	6.3457E-02	5.2344E-02	7.7441E-02	6.9116E-02	4.6210E-02	8.3291E-02	8.1489E-02	6.6302E-02	1.6763E-01
PCGDOB										
1 700	1.4400E-03	1.3858E-03	1.9269E-04	1.0905E-03	5.0996E-04	3.4926E-04	1.0532E-03	4.7037E-04	3.3809E-04	8.2858E-04
2 800	5.5095E-04	5.7042E-04	7.7405E-05	3.7150E-04	2.1551E-04	2.2690E-04	3.3807E-04	1.8104E-04	1.3061E-04	5.7776E-04
3 3101	3.6168E-04	4.4843E-04	6.6579E-05	2.4178E-04	1.5782E-04	1.6980E-04	2.1847E-04	1.2689E-04	9.5144E-05	3.7658E-04
4 6801	1.0145E-03	8.8454E-04	1.2662E-04	5.5045E-04	3.4942E-04	3.3766E-04	4.8939E-04	3.3937E-04	2.3070E-04	6.2881E-04
5 6802	8.3911E-04	7.5317E-04	9.1339E-05	5.6874E-04	2.9999E-04	3.0916E-04	5.2165E-04	2.6410E-04	1.8377E-04	9.0080E-04
TCPCGU										
1	7.6078E-04	7.7651E-04	1.0595E-04	5.6528E-04	2.8741E-04	2.5000E-04	5.3411E-04	2.4841E-04	1.8057E-04	6.4677E-04
TCPCGP										
1	8.0680E-04	8.0658E-04	1.5260E-04	5.9053E-04	3.3144E-04	2.9817E-04	5.5741E-04	2.9699E-04	2.2746E-04	6.6855E-04
PCGTOT										
1 700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 3101	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4 6801	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5 6802	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GDOBTU										
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GDODOL										
1	5.7830E 05	6.8530E 05	1.1230E 05	4.1050E 05	3.0030E 05	4.2320E 05	4.4350E 05	2.0090E 05	1.5790E 05	1.1571E 06
TFDDOL										
1	4.2410E 05	6.0640E 05	1.0110E 05	3.5330E 05	2.0830E 05	2.7610E 05	3.0780E 05	1.5590E 05	1.3760E 05	1.8670E 05

Table 5 continued

CODE	111 2402	112 2403	113 2404	114 2405	115 2406	116 2407	117 2500	118 2601	119 2602	120 2603
DIRBTU										
1 700	4.8298E-02	6.5473E-02	0.0	7.6306E-04	1.0671E-01	2.3835E-03	8.1799E-04	0.0	1.9395E-04	1.6447E-04
2 800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 3101	1.8285E-02	3.2747E-02	4.5450E-04	9.7107E-04	2.3083E-02	3.4843E-03	2.0290E-03	1.8422E-03	7.7682E-04	1.1106E-03
4 6801	6.8444E-03	4.4070E-03	8.2304E-04	6.7336E-04	1.2874E-04	1.3073E-03	9.3275E-04	8.4814E-04	2.6084E-04	4.0404E-04
5 6802	2.4887E-02	3.4229E-02	1.4930E-03	9.2235E-05	1.5258E-01	2.3124E-03	2.2269E-03	8.6317E-04	2.1261E-04	5.3286E-04
INVBTU										
1 700	8.3040E-02	9.2607E-02	3.3218E-02	4.3517E-02	1.2571E-01	4.2039E-02	4.4555E-02	2.1165E-02	1.9337E-02	1.5107E-02
2 800	8.7888E-02	1.0421E-01	4.4623E-02	5.1133E-02	2.0551E-01	5.9098E-02	6.0456E-02	2.9797E-02	3.0210E-02	2.6698E-02
3 3101	3.9211E-02	5.1403E-02	1.9964E-02	2.5234E-02	4.0357E-02	2.8129E-02	2.9531E-02	1.4874E-02	1.5386E-02	1.3706E-02
4 6801	1.1165E-02	8.2427E-03	5.4117E-03	6.4184E-03	3.8810E-03	7.1470E-03	5.5248E-03	3.9764E-03	3.6115E-03	3.2488E-03
5 6802	5.2613E-02	5.7632E-02	2.4960E-02	2.8070E-02	1.7195E-01	3.1890E-02	3.2322E-02	1.5893E-02	1.5500E-02	1.3318E-02
TCINBU										
1	1.5933E-01	1.8825E-01	7.2219E-02	8.7982E-02	3.2719E-01	9.3713E-02	9.9272E-02	4.6831E-02	4.5795E-02	3.8430E-02
TCINBP										
1	1.7760E-01	2.0174E-01	8.1073E-02	9.8483E-02	3.3354E-01	1.0541E-01	1.0831E-01	5.3336E-02	5.1704E-02	4.3745E-02
PCGDOB										
1 700	1.3980E-03	8.1363E-04	8.8592E-05	2.6425E-03	8.6587E-05	1.9020E-03	7.0833E-04	1.9826E-03	1.0116E-03	1.6493E-03
2 800	5.3970E-04	3.3397E-04	4.3411E-05	1.1326E-03	5.1633E-05	9.7530E-04	3.5059E-04	1.0181E-03	5.7649E-04	1.0633E-03
3 3101	3.7295E-04	2.5516E-04	3.0082E-05	8.6571E-04	1.5705E-05	7.1902E-04	2.6524E-04	7.8720E-04	4.5477E-04	8.4541E-04
4 6801	7.5026E-04	2.8907E-04	5.7611E-05	1.5558E-03	1.0670E-05	1.2907E-03	3.5060E-04	1.4868E-03	7.5417E-04	1.4158E-03
5 6802	8.0139E-04	4.5814E-04	6.0231E-05	1.5422E-03	1.0716E-04	1.3054E-03	4.6492E-04	1.3470E-03	7.3368E-04	1.3156E-03
TCPCGU										
1	7.7141E-04	4.8347E-04	5.5225E-05	1.5337E-03	6.7164E-05	1.2146E-03	4.5796E-04	1.2499E-03	6.8523E-04	1.1958E-03
TCPCGP										
1	7.8807E-04	4.9295E-04	1.0190E-04	1.5256E-03	1.0718E-04	1.2245E-03	4.7759E-04	1.2754E-03	7.1469E-04	1.2215E-03
PCGTOT										
1 700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 3101	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4 6801	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5 6802	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GCOBTU										
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GCODOL										
1	5.0544E 06	2.5574E 06	3.6290E 05	1.0018E 06	3.5390E 05	3.6154E 06	4.7483E 06	4.4950E 06	2.3018E 06	2.4678E 06
TFDDOL										
1	2.1020E 05	1.0970E 05	3.3300E 04	7.5820E 05	8.6000E 03	5.6490E 05	1.9850E 05	1.1696E 06	6.5320E 05	1.3632E 06

Table 5 continued

CODE	121 2604	122 2605	123 2606	124 2607	125 2608	126 2701	127 2702	128 2703	129 2704	130 2801
DIRBTU										
1 700	0.0	3.5446E-04	0.0	0.0	0.0	4.9218E-02	0.0	0.0	8.8722E-03	1.5800E-02
2 800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.0927E-02	0.0
3 3101	8.7752E-04	1.6233E-03	9.2271E-04	8.2906E-04	6.0418E-04	3.1126E-02	1.8514E-02	1.6041E-02	3.1598E-02	2.3352E-02
4 6801	3.7566E-04	9.8594E-04	6.4777E-04	9.0269E-04	9.7892E-04	2.3213E-02	2.7771E-03	6.3327E-04	1.8083E-03	3.0020E-03
5 6802	4.1825E-04	1.5866E-03	4.0718E-04	1.4882E-03	0.0	7.6123E-02	8.7333E-03	4.6817E-03	7.5208E-02	7.7447E-03
INVBTU										
1 700	1.6406E-02	2.7729E-02	2.4841E-02	1.8057E-02	1.2743E-02	1.1825E-01	5.1096E-02	5.9916E-02	4.6846E-02	7.8720E-02
2 800	2.5541E-02	4.3417E-02	3.2984E-02	2.9451E-02	1.8725E-02	1.8642E-01	1.1978E-01	1.2951E-01	2.3304E-01	1.2897E-01
3 3101	1.2499E-02	1.8968E-02	1.6287E-02	1.3390E-02	9.2334E-03	6.0283E-02	5.3911E-02	5.5603E-02	5.9870E-02	5.9284E-02
4 6801	3.2732E-03	5.5101E-03	4.3565E-03	3.7498E-03	3.2573E-03	3.0403E-02	1.5028E-02	1.5494E-02	9.9017E-03	1.7489E-02
5 6802	1.3502E-02	2.4292E-02	1.7756E-02	1.6034E-02	9.9870E-03	1.3110E-01	7.0962E-02	7.5076E-02	1.1645E-01	7.4003E-02
TCINBU										
1	3.8547E-02	6.5421E-02	5.3300E-02	4.3613E-02	2.8084E-02	2.7309E-01	1.5526E-01	1.7333E-01	2.6960E-01	1.8953E-01
TCINBP										
1	4.3902E-02	7.4436E-02	6.0427E-02	4.9747E-02	3.3413E-02	3.2283E-01	1.7985E-01	1.9868E-01	2.8580E-01	2.1814E-01
PCGDOB										
1 700	1.0840E-04	8.0014E-04	1.0723E-04	3.8236E-04	5.2457E-05	1.9314E-02	6.4945E-04	6.0175E-04	2.1063E-03	1.8889E-03
2 800	6.1557E-05	4.5700E-04	5.1939E-05	2.2749E-04	2.8118E-05	1.1106E-02	5.5531E-04	4.7445E-04	3.8221E-03	1.1289E-03
3 3101	4.6660E-05	3.0924E-04	3.9722E-05	1.6019E-04	2.1475E-05	5.5627E-03	3.8714E-04	3.1550E-04	1.5209E-03	8.0369E-04
4 6801	8.6329E-05	6.3468E-04	7.5068E-05	3.1695E-04	5.3524E-05	1.9821E-02	7.6246E-04	6.2116E-04	1.7771E-03	1.6751E-03
5 6802	8.0718E-05	6.3423E-04	6.9351E-05	3.0721E-04	3.7198E-05	1.9373E-02	8.1606E-04	6.8221E-04	4.7373E-03	1.6066E-03
TCPCGU										
1	7.2570E-05	5.3814E-04	6.5690E-05	2.6297E-04	3.2298E-05	1.2498E-02	5.5808E-04	4.9461E-04	3.5587E-03	1.2898E-03
TCPCGP										
1	1.1978E-04	5.7616E-04	1.1270E-04	3.0709E-04	8.1839E-05	1.2837E-02	6.0670E-04	5.3747E-04	3.2827E-03	1.3293E-03
PCGTOT										
1 700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 3101	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4 6801	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5 6802	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GCOBTU										
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GDODOL										
1	4.5630E 05	5.3072E 06	9.2240E 05	3.4600E 05	9.7770E 05	1.2613E 07	1.4246E 06	5.8330E 05	2.7153E 06	3.2390E 06
TFDDOL										
1	8.2500E 04	3.6030E 05	5.3900E 04	2.6440E 05	5.1400E 04	2.0393E 06	1.5870E 05	1.2540E 05	5.6140E 05	2.9960E 05

Table 5 continued

CODE	131 2802	132 2803	133 2804	134 2901	135 2902	136 2903	137 3000	138 3101	139 3102	140 3103
DIRBTU										
1 700	0.0	8.9094E-02	0.0	3.4037E-03	2.3768E-03	0.0	6.0239E-04	9.1173E-04	0.0	4.9840E-03
2 800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	(9.4930E-01)	0.0	0.0
3 3101	7.5809E-02	1.1572E-02	1.4269E-02	1.9397E-02	1.8103E-02	1.5640E-02	2.3667E-02	6.8090E-02	3.6686E-01	3.3069E-01
4 6801	3.6337E-03	1.0594E-03	2.0669E-03	1.0219E-03	5.4599E-04	2.4030E-04	5.3308E-04	1.7823E-03	1.6199E-03	1.4037E-03
5 6802	1.8400E-02	1.0304E-02	1.1435E-02	1.4544E-03	3.8587E-03	2.3770E-04	1.2260E-03	3.4463E-02	1.5571E-02	1.6438E-02
INVBTU										
1 700	6.4401E-02	1.2176E-01	4.0238E-02	1.9858E-02	3.6506E-02	2.3280E-02	4.0677E-02	1.3728E-02	1.6183E-02	4.3523E-02
2 800	1.9741E-01	7.6026E-02	8.3192E-02	4.9604E-02	8.2715E-02	5.9162E-02	9.4881E-02	1.8003E-01	4.2869E-01	4.0961E-01
3 3101	1.1526E-01	3.4117E-02	3.4928E-02	3.3628E-02	4.3574E-02	3.5974E-02	5.3673E-02	8.6053E-02	4.1624E-01	3.6887E-01
4 6801	1.8517E-02	8.1616E-03	1.0991E-02	4.4703E-03	8.1137E-03	5.4301E-03	9.6511E-03	4.8525E-03	5.2336E-03	5.3767E-03
5 6802	8.9990E-02	4.5451E-02	5.1714E-02	1.8766E-02	4.0876E-02	2.5455E-02	4.4006E-02	6.6697E-02	4.6522E-02	7.3508E-02
TCINBU										
1	2.4258E-01	1.8931E-01	1.1201E-01	6.4818E-02	1.1079E-01	7.6801E-02	1.2553E-01	1.8872E-01	4.3944E-01	4.4755E-01
TCINBP										
1	2.7287E-01	2.0266E-01	1.2999E-01	7.2132E-02	1.2407E-01	8.5684E-02	1.4132E-01	1.9666E-01	4.4800E-01	4.5635E-01
PCGDOB										
1 700	8.1082E-04	3.9788E-04	4.3667E-04	4.1684E-03	6.0539E-03	3.0942E-03	3.2253E-04	1.1088E-02	7.5175E-06	3.1023E-05
2 800	9.0661E-04	9.0618E-05	3.2932E-04	3.7982E-03	5.0035E-03	2.8684E-03	2.7441E-04	5.3042E-02	7.2639E-05	1.0650E-04
3 3101	8.1988E-04	6.2986E-05	2.1415E-04	3.9881E-03	4.0826E-03	2.7015E-03	2.4044E-04	3.9269E-02	1.0924E-04	1.4855E-04
4 6801	9.3058E-04	1.0646E-04	4.7612E-04	3.7457E-03	5.3709E-03	2.8810E-03	3.0545E-04	1.5645E-02	9.7043E-06	1.5298E-05
5 6802	1.0251E-03	1.3438E-04	5.0777E-04	3.5643E-03	6.1332E-03	3.0613E-03	3.1570E-04	4.8742E-02	1.9553E-05	4.7407E-05
TCPCGU										
1	8.7491E-04	1.8089E-04	3.4348E-04	3.9158E-03	5.2736E-03	2.9346E-03	2.8504E-04	4.5050E-02	6.0834E-05	9.5066E-05
TCPCGP										
1	8.9568E-04	2.1465E-04	3.9279E-04	3.7959E-03	5.1296E-03	2.8647E-03	3.2477E-04	4.0269E-02	1.0166E-04	1.3156E-04
PCGTOT										
1 700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 3101	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4 6801	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5 6802	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GDOBTU										
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2100E 07	0.0	0.0
GDODOL										
1	9.4550E 05	8.1030E 05	1.4953E 06	4.0575E 06	3.3101E 06	2.0569E 06	2.4621E 06	2.0858E 07	4.6300E 05	5.2970E 05
TFDDOL										
1	1.5720E 05	4.0800E 04	1.3550E 05	2.6210E 06	2.0706E 06	1.6596E 06	9.9000E 04	1.0085E 07	5.8000E 03	8.9000E 03

Table 5 continued

CODE	141 3201	142 3202	143 3203	144 3204	145 3300	146 3401	147 3402	148 3403	149 3501	150 3502
DIRBTU										
1 700	1.0968E-02	5.5649E-04	6.5251E-03	1.1316E-03	8.7779E-03	6.0371E-04	6.0255E-04	0.0	6.5774E-03	1.6701E-03
2 800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 3101	1.8465E-03	4.8661E-03	4.7464E-03	2.6616E-03	8.2075E-03	4.0995E-04	1.5727E-03	4.5165E-04	1.9301E-03	1.3588E-02
4 6801	2.0199E-03	1.9725E-03	2.3488E-03	2.3393E-03	9.8574E-04	6.8753E-04	5.4335E-04	4.8416E-04	3.2775E-03	4.9544E-03
5 6802	3.7075E-03	6.6773E-04	3.2104E-03	2.3555E-03	5.0366E-03	7.6758E-04	2.6953E-04	5.0344E-05	4.4142E-02	7.2086E-02
INVBTU										
1 700	3.7270E-02	1.9108E-02	3.4649E-02	3.7960E-02	2.0161E-02	2.1237E-02	1.4030E-02	1.5876E-02	2.3219E-02	3.0343E-02
2 800	5.7381E-02	3.5149E-02	5.8524E-02	6.2035E-02	3.6317E-02	3.0829E-02	2.4414E-02	2.7432E-02	7.3853E-02	1.2688E-01
3 3101	2.7854E-02	2.0127E-02	2.9826E-02	2.8853E-02	1.9528E-02	1.6290E-02	1.3869E-02	1.5081E-02	1.2251E-02	3.0120E-02
4 6801	7.3893E-03	5.7758E-03	8.1759E-03	9.7062E-03	2.9830E-03	3.9053E-03	3.0949E-03	3.8666E-03	6.1374E-03	9.7667E-03
5 6802	3.0255E-02	1.6454E-02	3.0366E-02	3.5274E-02	1.6899E-02	1.5367E-02	1.1269E-02	1.3268E-02	6.3712E-02	1.0097E-01
TCINBU										
1	8.6975E-02	4.8257E-02	8.4680E-02	8.9912E-02	5.3379E-02	4.8009E-02	3.5228E-02	3.9290E-02	9.0697E-02	1.4708E-01
TCINBP										
1	9.9064E-02	5.7706E-02	9.8056E-02	1.0579E-01	5.8259E-02	5.4398E-02	4.0291E-02	4.5616E-02	1.0074E-01	1.6306E-01
PCGDOB										
1 700	4.0509E-03	5.2567E-04	1.2785E-03	1.1322E-03	5.5221E-05	1.1736E-05	2.6129E-03	8.5773E-04	7.4086E-04	1.2102E-04
2 800	2.2750E-03	3.5272E-04	7.8768E-04	6.7490E-04	3.6285E-05	6.2143E-06	1.6585E-03	5.4062E-04	8.5957E-04	1.8460E-04
3 3101	1.7104E-03	3.1284E-04	6.2175E-04	4.8619E-04	3.0220E-05	5.0860E-06	1.4593E-03	4.6035E-04	2.2085E-04	6.7872E-05
4 6801	3.2059E-03	6.3427E-04	1.2042E-03	1.1556E-03	3.2614E-05	8.6147E-06	2.3008E-03	8.3390E-04	7.8169E-04	1.5549E-04
5 6802	2.9753E-03	4.0955E-04	1.0138E-03	9.5190E-04	4.1880E-05	7.6836E-06	1.8990E-03	6.4860E-04	1.8393E-03	3.6437E-04
TCPCGU										
1	2.6935E-03	3.7000E-04	8.8375E-04	7.5302E-04	4.2420E-05	7.5765E-06	1.8660E-03	5.9972E-04	8.3352E-04	1.6909E-04
TCPCGP										
1	2.6924E-03	4.3215E-04	9.3207E-04	8.1501E-04	8.8303E-05	5.5941E-05	1.8886E-03	6.4988E-04	8.4456E-04	2.0971E-04
PCGTOT										
1 700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 3101	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4 6801	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5 6802	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GDOBTU										
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GDODOL										
1	3.1553E 06	3.7040E 05	2.8564E 06	3.8146E 06	9.6700E 05	2.4230E 05	2.3688E 06	8.1990E 05	1.9210E 06	1.0192E 06
TFDDOL										
1	1.3571E 06	3.4350E 05	4.6070E 05	3.7240E 05	3.4200E 04	6.9000E 03	2.3254E 06	6.7460E 05	3.9840E 05	4.9800E 04

Table 5 continued

CODE	151 3601	152 3602	153 3603	154 3604	155 3605	156 3606	157 3607	158 3608	159 3609	160 3610
DIRBTU										
1 700	1.6376E-01	0.0	0.0	0.0	5.0846E-02	7.3413E-03	0.0	7.9411E-03	0.0	0.0
2 800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 3101	2.1632E-02	1.5316E-02	4.1896E-03	4.9872E-03	4.5887E-03	2.9107E-03	1.9101E-03	6.6943E-03	1.9663E-03	8.4031E-03
4 6801	1.6068E-02	5.3571E-03	2.0889E-03	3.2776E-03	3.1227E-03	2.0866E-03	1.7748E-03	2.3535E-03	1.9117E-03	1.2569E-03
5 6802	1.5029E-01	1.8363E-01	3.6655E-02	9.8653E-02	1.4315E-01	2.6524E-02	3.1404E-02	1.7241E-02	2.4515E-02	8.3414E-03
INVBTU										
1 700	2.0322E-01	1.7716E-02	2.0381E-02	1.9647E-02	6.5803E-02	2.8734E-02	1.8659E-02	2.3753E-02	2.0266E-02	4.1102E-02
2 800	2.0752E-01	2.2620E-01	7.3344E-02	1.3650E-01	1.7729E-01	6.3078E-02	6.6476E-02	5.0132E-02	6.3726E-02	7.4009E-02
3 3101	3.8789E-02	2.7520E-02	1.7985E-02	1.9176E-02	1.4661E-02	1.6192E-02	1.4518E-02	1.6500E-02	1.5311E-02	3.0803E-02
4 6801	1.9128E-02	7.5294E-03	6.0971E-03	6.4817E-03	5.3927E-03	6.4527E-03	5.6433E-03	5.5597E-03	6.2530E-03	6.3670E-03
5 6802	1.7609E-01	2.0517E-01	5.7633E-02	1.2099E-01	1.6703E-01	4.8595E-02	5.3734E-02	3.5451E-02	5.0081E-02	4.6522E-02
TCINBU										
1	3.9088E-01	2.3609E-01	8.7391E-02	1.4942E-01	2.3749E-01	8.5110E-02	7.9273E-02	6.8110E-02	7.7456E-02	1.0850E-01
TCINBP										
1	4.2217E-01	2.4841E-01	9.7366E-02	1.6002E-01	2.4631E-01	9.5666E-02	8.8505E-02	7.7205E-02	8.7726E-02	1.1891E-01
PCGDCB										
1 700	2.2787E-05	3.4053E-06	1.0610E-05	3.1628E-05	1.9500E-05	1.5649E-05	1.2971E-04	1.9594E-05	7.1740E-05	1.9422E-05
2 800	8.4876E-06	1.5860E-05	1.3927E-05	8.0155E-05	1.9163E-05	1.2531E-05	1.6857E-04	1.5085E-05	8.2287E-05	1.2757E-05
3 3101	2.4572E-06	2.9885E-06	5.2897E-06	1.7440E-05	2.4545E-06	4.9822E-06	5.7022E-05	7.6901E-06	3.0623E-05	8.2234E-06
4 6801	8.5611E-06	5.7770E-06	1.2670E-05	4.1650E-05	6.3788E-06	1.4028E-05	1.5660E-04	1.8307E-05	8.8358E-05	1.2009E-05
5 6802	1.7864E-05	3.5683E-05	2.7146E-05	1.7622E-04	4.4782E-05	2.3945E-05	3.3798E-04	2.6460E-05	1.6041E-04	1.9890E-05
TOPCGU										
1	1.2770E-05	1.3362E-05	1.3086E-05	7.0326E-05	2.0837E-05	1.3283E-05	1.5838E-04	1.6042E-05	7.8374E-05	1.4849E-05
TCPCGP										
1	6.0383E-05	6.0596E-05	6.1086E-05	1.1315E-04	6.7060E-05	6.1397E-05	2.0065E-04	6.4211E-05	1.2496E-04	6.2526E-05
PCGTOT										
1 700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 3101	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4 6801	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5 6802	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GDOBTU										
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GDODOL										
1	1.1968E 06	3.1920E 05	1.9030E 05	2.0440E 05	1.6410E 05	1.5350E 05	1.1570E 05	1.3660E 05	9.9200E 04	5.3350E 05
TFDOOL										
1	1.4000E 03	2.4000E 03	6.5000E 03	2.0100E 04	3.7000E 03	6.8000E 03	8.6800E 04	1.0300E 04	4.4200E 04	5.9000E 03

Table 5 continued

CODE	161 3611	162 3612	163 3613	164 3614	165 3615	166 3616	167 3617	168 3618	169 3619	170 3620
DIRBTU										
1 700	1.4605E-03	0.0	0.0	6.9822E-03	2.0035E-03	3.9750E-03	0.0	2.9636E-03	0.0	0.0
2 800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 3101	4.5385E-03	6.9734E-03	2.2605E-02	1.8025E-02	8.0529E-03	4.0861E-03	6.0034E-03	7.7748E-03	1.2830E-02	4.7621E-03
4 6801	8.4745E-04	6.5007E-04	7.2816E-03	4.1908E-03	3.0734E-03	2.5625E-03	2.4797E-03	1.3599E-03	4.3440E-03	4.4518E-03
5 6802	5.0545E-03	2.2456E-03	1.0455E-01	4.0721E-02	5.5736E-04	6.2506E-03	5.2339E-03	2.2911E-03	2.8272E-02	4.3791E-02
INVBTU										
1 700	3.8599E-02	5.6221E-02	2.8803E-02	3.6480E-02	1.8827E-02	2.0633E-02	3.2024E-02	2.4479E-02	2.8831E-02	2.6688E-02
2 800	5.2740E-02	8.2673E-02	1.6513E-01	9.9430E-02	4.0854E-02	3.4325E-02	7.9558E-02	5.1630E-02	9.9087E-02	9.0545E-02
3 3101	2.2697E-02	3.2998E-02	4.2304E-02	3.7836E-02	2.3676E-02	1.4664E-02	4.4716E-02	2.8316E-02	3.7410E-02	2.0437E-02
4 6801	4.9636E-03	7.0397E-03	1.1249E-02	7.8714E-03	5.7355E-03	6.5464E-03	8.5619E-03	5.3453E-03	9.9690E-03	8.4081E-03
5 6802	3.2366E-02	5.3070E-02	1.2911E-01	6.5899E-02	1.6451E-02	2.0684E-02	3.7621E-02	2.3591E-02	6.5508E-02	6.9197E-02
TCINBU										
1	8.6182E-02	1.3158E-01	1.8225E-01	1.2773E-01	5.3723E-02	4.8157E-02	1.0269E-01	7.0556E-02	1.1756E-01	1.0850E-01
TCINBP										
1	9.4303E-02	1.4310E-01	2.0065E-01	1.4061E-01	6.3106E-02	5.8867E-02	1.1670E-01	7.9301E-02	1.3387E-01	1.2225E-01
PCGDOB										
1 700	2.0403E-05	-1.1257E-05	2.5375E-06	1.2855E-05	9.4543E-05	1.5946E-04	8.7202E-05	9.0183E-06	2.3091E-06	4.1252E-05
2 800	1.0169E-05	-6.0381E-06	5.3067E-06	1.2781E-05	7.4833E-05	9.6768E-05	7.9024E-05	6.9383E-06	2.8947E-06	5.1052E-05
3 3101	6.7783E-06	-3.7328E-06	2.1056E-06	7.5330E-06	6.7171E-05	6.4032E-05	6.8794E-05	5.8938E-06	1.6927E-06	1.7848E-05
4 6801	1.0473E-05	-5.6264E-06	3.9558E-06	1.1072E-05	1.1497E-04	2.0196E-04	9.3064E-05	7.8608E-06	3.1870E-06	5.1878E-05
5 6802	1.5479E-05	-9.6141E-06	1.0291E-05	2.1011E-05	7.4745E-05	1.4464E-04	9.2689E-05	7.8638E-06	4.7469E-06	9.6775E-05
TCPCGU										
1	1.3203E-05	-7.6551E-06	4.6417E-06	1.3014E-05	7.5812E-05	1.0265E-04	7.9751E-05	7.4492E-06	2.6830E-06	4.8009E-05
TCPCGP										
1	6.0955E-05	4.1400E-05	5.2938E-05	6.0855E-05	1.2557E-04	1.5771E-04	1.2663E-04	5.5753E-05	5.1180E-05	9.5117E-05
PCGTOT										
1 700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 3101	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4 6801	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5 6802	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GDOBTU										
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GDODOL										
1	9.5890E 05	2.2386E 06	1.6930E 05	4.2310E 05	2.3400E 05	7.4480E 05	5.5040E 05	3.2340E 05	2.7130E 05	3.9970E 05
TFDDOL										
1	6.6000E 03	-2.5000E 03	1.1000E 03	4.4000E 03	6.2700E 04	9.6500E 04	3.4000E 04	4.6000E 03	1.0000E 03	1.9300E 04

Table 5 continued

	171	172	173	174	175	176	177	178	179	180
CODE	3621	3622	3701	3702	3703	3704	3801	3802	3803	3804
DIRBTU										
1 700	0.0	0.0	1.1397E-01	1.7690E-02	1.2240E-02	0.0	4.2026E-03	0.0	4.6894E-02	0.0
2 800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 3101	6.4464E-03	4.0513E-03	1.7155E-02	3.3367E-03	1.1161E-02	4.8916E-03	1.1656E-02	4.8629E-03	5.7096E-03	6.4312E-03
4 6801	3.3775E-03	1.6116E-03	4.7352E-03	3.7107E-03	1.9695E-03	4.8197E-03	1.6608E-03	1.1008E-03	1.4223E-02	5.8931E-02
5 6802	2.6490E-02	3.9549E-03	2.8037E-02	1.1163E-02	1.6989E-02	3.9310E-02	1.8402E-02	1.7366E-02	8.8597E-02	7.4454E-02
INVBTU										
1 700	2.1148E-02	1.6092E-02	1.6940E-01	5.6093E-02	9.2915E-02	3.3397E-02	3.2926E-02	2.6433E-02	8.7839E-02	1.4111E-01
2 800	9.1177E-02	4.6021E-02	8.7342E-02	4.3059E-02	7.8700E-02	8.3037E-02	8.1163E-02	7.5130E-02	1.3629E-01	1.9081E-01
3 3101	2.7603E-02	2.1375E-02	3.7373E-02	1.5976E-02	3.3390E-02	1.8004E-02	3.1649E-02	2.4919E-02	2.2780E-02	3.5437E-02
4 6801	8.2636E-03	4.8534E-03	9.6192E-03	6.9697E-03	7.7864E-03	1.1544E-02	1.0513E-02	8.4549E-03	1.9529E-02	7.7441E-02
5 6802	6.6919E-02	2.6467E-02	5.4114E-02	2.8626E-02	4.8701E-02	6.7624E-02	5.2910E-02	5.3478E-02	1.1832E-01	1.6177E-01
TCINBU										
1	1.0374E-01	5.7071E-02	2.4675E-01	9.1912E-02	1.6353E-01	1.0444E-01	1.0317E-01	9.2779E-02	2.0384E-01	2.5148E-01
TOINBP										
1	1.1726E-01	6.5012E-02	2.6248E-01	1.0331E-01	1.7627E-01	1.2333E-01	1.2037E-01	1.0661E-01	2.3579E-01	3.7817E-01
PCGDOB										
1 700	3.9464E-05	1.4564E-05	8.0832E-03	1.9767E-04	4.6137E-05	1.8189E-05	5.5167E-04	-3.8741E-05	-6.0501E-05	8.4311E-04
2 800	6.2063E-05	1.5192E-05	1.5202E-03	5.5349E-05	1.4255E-05	1.6496E-05	4.9604E-04	-4.0166E-05	-3.4241E-05	4.1584E-04
3 3101	2.9102E-05	1.0929E-05	1.0075E-03	3.1808E-05	9.3675E-06	5.5398E-06	2.9959E-04	-2.0634E-05	-8.8646E-06	1.1962E-04
4 6801	6.1554E-05	1.7533E-05	1.8322E-03	9.8039E-05	1.5433E-05	2.5096E-05	7.0310E-04	-4.9465E-05	-5.3691E-05	1.8469E-03
5 6802	1.1299E-04	2.1672E-05	2.3363E-03	9.1272E-05	2.1880E-05	3.3322E-05	8.0208E-04	-7.0917E-05	-7.3734E-05	8.7449E-04
TGPCGU										
1	5.5343E-05	1.4716E-05	3.4518E-03	9.2816E-05	2.3679E-05	1.5946E-05	4.8726E-04	-3.8594E-05	-3.9730E-05	3.6804E-04
TCPCGP										
1	1.0242E-04	6.2593E-05	3.1970E-03	1.3834E-04	7.0447E-05	6.4843E-05	5.3981E-04	1.0292E-05	8.8734E-06	5.5821E-04
PCGTOT										
1 700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 3101	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4 6801	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5 6802	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GCOBTU										
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GDODOL										
1	3.1160E 05	1.0720E 05	1.9989E 07	3.4210E 06	1.1820E 06	3.2290E 05	2.1631E 06	5.1390E 05	3.6440E 05	1.9698E 06
TFDDOL										
1	2.3300E 04	1.1300E 04	5.5580E 05	4.4000E 04	6.2000E 03	6.8000E 03	2.0920E 05	-1.8300E 04	-8.6000E 03	7.4600E 04

Table 5 continued

CODE	181 3805	182 3806	183 3807	184 3808	185 3809	186 3810	187 3811	188 3812	189 3813	190 3814
DIRBTU										
1 700	0.0	1.7640E-03	3.8102E-03	2.8803E-03	1.5548E-03	1.3395E-03	1.1508E-03	0.0	1.3972E-03	0.0
2 800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 3101	5.8000E-03	8.6909E-03	5.8611E-03	2.2074E-03	1.4337E-03	3.5816E-03	2.3320E-03	2.6938E-03	1.4507E-03	2.9621E-03
4 6801	2.2044E-02	9.9409E-04	2.3060E-03	3.7378E-03	2.8912E-03	1.8270E-03	2.9697E-03	1.6333E-03	2.1266E-03	3.8125E-03
5 6802	2.9651E-02	8.8721E-03	4.9417E-03	1.2892E-02	9.1794E-03	1.5165E-03	1.4925E-02	9.5560E-03	9.5871E-03	1.0447E-02
INVBTU										
1 700	5.0539E-02	1.6195E-02	3.1024E-02	8.3501E-02	3.3847E-02	3.2442E-02	5.4414E-02	2.6247E-02	4.0006E-02	5.7195E-02
2 800	7.9163E-02	4.4825E-02	6.2440E-02	1.2216E-01	5.6425E-02	5.7441E-02	8.8917E-02	5.4697E-02	6.6993E-02	7.8101E-02
3 3101	2.0470E-02	2.0753E-02	2.6366E-02	2.4771E-02	1.6119E-02	2.5471E-02	1.9976E-02	1.9078E-02	1.6149E-02	2.4309E-02
4 6801	2.5896E-02	6.3711E-03	1.0279E-02	4.3603E-02	1.2343E-02	1.0810E-02	2.5284E-02	8.3793E-03	1.3834E-02	1.8132E-02
5 6802	6.2136E-02	2.6306E-02	3.8928E-02	1.0155E-01	4.2369E-02	3.4463E-02	7.1475E-02	3.6990E-02	5.2574E-02	5.6765E-02
TCINBU										
1	1.0280E-01	5.4402E-02	8.2786E-02	1.6037E-01	7.7450E-02	7.8654E-02	1.1707E-01	7.2239E-02	9.2628E-02	1.1646E-01
TCINBP										
1	1.4517E-01	6.4825E-02	9.9603E-02	2.3170E-01	9.7643E-02	9.6340E-02	1.5843E-01	8.5948E-02	1.1526E-01	1.4612E-01
PCGDOB										
1 700	3.6267E-04	9.4687E-06	6.9324E-05	8.7874E-04	-1.5479E-04	3.7701E-04	8.1930E-05	2.5225E-05	3.8448E-06	1.4200E-05
2 800	2.0722E-04	9.5595E-06	5.0893E-05	4.6895E-04	-9.4124E-05	2.4349E-04	4.8835E-05	1.9175E-05	2.3486E-06	7.0731E-06
3 3101	8.2992E-05	6.8551E-06	3.3286E-05	1.4728E-04	-4.1647E-05	1.6723E-04	1.6993E-05	1.0359E-05	8.7689E-07	3.4098E-06
4 6801	7.4178E-04	1.4869E-05	9.1687E-05	1.8316E-03	-2.2531E-04	5.0146E-04	1.5196E-04	3.2146E-05	5.3071E-06	1.7970E-05
5 6802	4.0343E-04	1.3915E-05	7.8703E-05	9.6692E-04	-1.7531E-04	3.6236E-04	9.7372E-05	3.2165E-05	4.5716E-06	1.2752E-05
TOPCGU										
1	1.8811E-04	8.8792E-06	5.1407E-05	4.2432E-04	-9.6194E-05	2.5183E-04	4.6082E-05	1.9395E-05	2.4337E-06	7.8719E-06
TOPCGP										
1	2.8775E-04	5.7715E-05	1.0222E-04	6.0478E-04	-5.7548E-05	3.1699E-04	1.0401E-04	6.8539E-05	5.1190E-05	5.7180E-05
PCGTOT										
1 700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 3101	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4 6801	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5 6802	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GDOBTU										
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GDODOL										
1	1.0025E 06	9.2830E 05	1.8415E 06	2.3101E 06	7.4290E 05	2.3757E 06	7.4210E 05	3.5110E 05	3.7710E 05	2.5490E 05
TFDDOL										
1	8.9600E 04	7.3000E 03	2.7900E 04	1.3140E 05	-5.7100E 04	1.4510E 05	1.8800E 04	1.2000E 04	1.2000E 03	3.1000E 03

Table 5 continued

	CODE	191 3901	192 3902	193 4001	194 4002	195 4003	196 4004	197 4005	198 4006	199 4007	200 4008
DIRBTU											
1	700	8.6747E-05	0.0	5.9714E-03	0.0	1.4658E-03	4.4931E-04	4.4496E-04	1.4262E-03	2.9377E-04	0.0
2	800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	3101	2.0847E-03	3.4621E-03	5.1928E-03	2.6025E-03	2.2642E-03	1.7380E-03	1.3655E-03	2.9014E-03	1.4028E-03	2.0107E-03
4	6801	9.4704E-04	1.1563E-03	1.9799E-03	1.2012E-03	7.6114E-04	1.0077E-03	9.1561E-04	1.2592E-03	7.0407E-04	1.6694E-02
5	6802	4.4152E-04	4.5659E-03	1.3344E-02	3.0558E-03	2.3426E-03	1.8211E-03	1.9496E-03	3.8311E-03	2.5435E-03	1.8064E-03
INVBTU											
1	700	7.9224E-02	7.1821E-02	3.9276E-02	2.8479E-02	3.5072E-02	7.1742E-02	4.4574E-02	6.2621E-02	5.8782E-02	7.2994E-02
2	800	5.3663E-02	5.7092E-02	6.0628E-02	4.5658E-02	3.5493E-02	4.7942E-02	5.6584E-02	4.9088E-02	5.0877E-02	5.5175E-02
3	3101	2.5115E-02	2.6338E-02	2.1823E-02	1.9503E-02	1.6601E-02	2.1875E-02	1.7244E-02	2.1880E-02	2.0073E-02	2.0716E-02
4	6801	6.8524E-03	6.7251E-03	5.7230E-03	6.9132E-03	4.9228E-03	6.2064E-03	1.4656E-02	6.5489E-03	8.8542E-03	2.2875E-02
5	6802	3.0852E-02	3.3191E-02	3.6914E-02	2.7507E-02	2.0258E-02	2.8257E-02	4.1339E-02	2.9357E-02	3.2695E-02	3.6754E-02
TCINBU											
1		1.2577E-01	1.2193E-01	9.3959E-02	6.6956E-02	6.5452E-02	1.1324E-01	8.5933E-02	1.0491E-01	1.0046E-01	1.0441E-01
TCINBP											
1		1.3698E-01	1.3293E-01	1.0332E-01	7.8266E-02	7.3506E-02	1.2339E-01	1.0991E-01	1.1562E-01	1.1455E-01	1.4183E-01
PCGDOB											
1	700	2.7791E-04	1.3920E-04	2.4221E-05	2.6914E-05	3.1404E-04	4.9988E-04	1.4994E-05	3.2098E-03	5.2398E-04	6.6060E-05
2	800	6.8666E-05	4.0363E-05	1.3638E-05	1.5740E-05	1.1593E-04	1.2185E-04	6.9428E-06	9.1780E-04	1.6543E-04	1.8214E-05
3	3101	4.9775E-05	2.8841E-05	7.6037E-06	1.0413E-05	8.3980E-05	8.6113E-05	3.2772E-06	6.3362E-04	1.0109E-04	1.0592E-05
4	6801	9.5951E-05	5.2029E-05	1.4088E-05	2.6079E-05	1.7595E-04	1.7262E-04	1.9679E-05	1.3399E-03	3.1505E-04	8.2636E-05
5	6802	9.7922E-05	5.8205E-05	2.0597E-05	2.3520E-05	1.6412E-04	1.7814E-04	1.2581E-05	1.3615E-03	2.6369E-04	3.0095E-05
TOPCGU											
1		1.2811E-04	6.8595E-05	1.6759E-05	1.7822E-05	1.6801E-04	2.2907E-04	7.7925E-06	1.5538E-03	2.5464E-04	2.4651E-05
TCPCGP											
1		1.6835E-04	1.1276E-04	6.4380E-05	6.6553E-05	2.1093E-04	2.6287E-04	5.7292E-05	1.5201E-03	2.9976E-04	7.8357E-05
PCGTOT											
1	700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	3101	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	6801	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	6802	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GDOBTU											
1		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GDODOL											
1		2.1097E 06	3.5370E 05	2.4360E 05	3.8260E 05	1.1531E 06	1.9545E 06	1.2737E 06	1.8391E 06	1.5187E 06	3.4700E 05
TFDDOL											
1		4.3800E 04	2.4200E 04	7.7000E 03	1.1800E 04	1.1180E 05	8.7000E 04	4.2000E 03	6.4000E 05	1.1130E 05	1.1300E 04

Table 5 continued

1 coal
2 crude oil & gas extraction
3 refined petrol
4 electric
5 gas [illegible]

	CODE	201 4009	202 4101	203 4102	204 4201	205 4202	206 4203	207 4204	208 4205	209 4206	210 4207
DIRBTU											
1	700	5.5624E-05	9.2569E-04	1.1269E-03	0.0	1.6884E-03	2.7746E-03	1.1499E-03	4.0191E-04	0.0	0.0
2	800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	3101	1.3116E-03	3.0659E-03	2.8507E-03	3.9386E-03	4.6476E-03	3.3402E-03	6.8057E-03	2.2345E-03	1.3693E-03	9.7657E-04
4	6801	9.1617E-04	1.2845E-03	1.3239E-03	1.1789E-03	1.2443E-03	1.3545E-03	3.1097E-03	9.7453E-04	6.3550E-04	1.2282E-03
5	6802	1.8432E-04	2.7171E-03	3.0664E-03	4.8962E-04	3.8681E-03	2.5424E-03	1.2971E-02	2.6934E-03	1.7168E-03	1.6625E-02
INVBTU											
1	700	7.6564E-02	4.5679E-02	5.3094E-02	1.9797E-02	2.9014E-02	3.5516E-02	2.4088E-02	8.4207E-02	4.0289E-02	7.8058E-02
2	800	5.2273E-02	3.8334E-02	4.7796E-02	2.7800E-02	3.2708E-02	3.7332E-02	6.0962E-02	5.6256E-02	3.7955E-02	6.7114E-02
3	3101	2.2908E-02	1.7526E-02	2.0582E-02	1.5925E-02	1.5779E-02	1.6217E-02	2.2068E-02	2.4849E-02	1.6747E-02	2.2749E-02
4	6801	8.1144E-03	5.2739E-03	7.3211E-03	4.0758E-03	4.2935E-03	5.6300E-03	8.1852E-03	7.0176E-03	5.3243E-03	6.7319E-03
5	6802	3.1648E-02	2.2384E-02	2.8854E-02	1.3039E-02	1.8253E-02	2.2456E-02	3.8422E-02	3.3987E-02	2.2679E-02	4.6980E-02
TCINBU											
1		1.2041E-01	7.8535E-02	9.3285E-02	4.3363E-02	5.7261E-02	6.7000E-02	7.6548E-02	1.3317E-01	7.2713E-02	1.3818E-01
TCINBR											
1		1.3368E-01	8.7163E-02	1.0526E-01	5.0031E-02	6.4286E-02	7.6211E-02	8.9939E-02	1.4465E-01	8.1424E-02	1.4919E-01
PCGDOB											
1	700	2.2075E-04	2.9853E-04	1.3743E-03	4.2333E-04	5.6606E-04	4.6848E-04	2.1221E-06	4.0599E-04	1.9522E-04	1.9380E-05
2	800	5.4976E-05	9.1384E-05	4.5129E-04	2.1635E-04	2.3277E-04	1.7963E-04	1.9590E-06	9.8937E-05	6.7084E-05	6.0781E-06
3	3101	3.7317E-05	6.4713E-05	3.0100E-04	1.9240E-04	1.7392E-04	1.2086E-04	1.0984E-06	6.7687E-05	4.5846E-05	3.1910E-06
4	6801	9.3388E-05	1.3758E-04	7.5645E-04	3.4790E-04	3.3437E-04	2.9644E-04	2.8784E-06	1.3506E-04	1.0298E-04	6.6717E-06
5	6802	8.2561E-05	1.3236E-04	6.7578E-04	2.5227E-04	3.2220E-04	2.6800E-04	3.0626E-06	1.4826E-04	9.9428E-05	1.0554E-05
TCPCGU											
1		1.0001E-04	1.4788E-04	6.9081E-04	2.6270E-04	3.2031E-04	2.5196E-04	1.8949E-06	1.8666E-04	1.0113E-04	9.9977E-06
TCPCGP											
1		1.4401E-04	1.8965E-04	7.1971E-04	3.1012E-04	3.5802E-04	2.9550E-04	5.0472E-05	2.2259E-04	1.4598E-04	5.7810E-05
PCGTOT											
1	700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	3101	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	6801	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	6802	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GCOBTU											
1		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GDODOL											
1		8.9370E 05	1.9656E 06	3.0017E 06	3.2310E 05	7.7040E 05	1.8982E 06	8.3550E 05	1.5685E 06	8.0300E 04	2.2640E 05
TFDDOL											
1		3.6000E 04	8.1600E 04	3.2320E 05	2.6700E 05	2.4360E 05	1.6470E 05	1.1000E 03	6.0200E 04	6.0500E 04	3.1000E 03

Table 5 continued

CODE	211 4208	212 4209	213 4210	214 4211	215 4301	216 4302	217 4400	218 4501	219 4502	220 4503
DIRBTU										
1 700	1.8490E-03	0.0	0.0	4.1232E-04	9.4521E-03	2.9072E-03	4.7503E-03	3.5388E-03	2.7325E-03	0.0
2 800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 3101	2.6331E-03	1.1357E-03	5.4668E-04	6.8825E-04	1.5628E-02	2.9601E-03	1.6525E-03	1.6636E-03	1.3722E-03	1.3065E-03
4 6801	1.1587E-03	1.9880E-03	1.2738E-03	1.2012E-03	1.4418E-03	1.0511E-03	7.5662E-04	1.3096E-03	1.0354E-03	1.4897E-03
5 6802	3.4937E-03	4.2587E-03	0.0	1.6582E-03	1.3811E-03	1.7186E-03	3.7035E-03	1.7025E-03	2.7552E-03	6.6796E-03
INVBTU										
1 700	3.2261E-02	3.3432E-02	5.3620E-02	4.6822E-02	3.7413E-02	2.6660E-02	3.8715E-02	3.7154E-02	3.1517E-02	3.2966E-02
2 800	3.8217E-02	5.9059E-02	7.8205E-02	4.1256E-02	4.3799E-02	3.0650E-02	3.5725E-02	3.2947E-02	3.0419E-02	3.5843E-02
3 3101	1.6693E-02	2.0622E-02	2.1482E-02	1.7273E-02	2.8979E-02	1.4623E-02	1.6031E-02	1.5371E-02	1.3445E-02	1.3779E-02
4 6801	5.4656E-03	1.4258E-02	2.4183E-02	6.5560E-03	5.0587E-03	5.0274E-03	4.4717E-03	5.0023E-03	4.3461E-03	4.9057E-03
5 6802	2.2684E-02	4.0298E-02	5.9251E-02	2.5193E-02	1.7236E-02	1.7202E-02	2.1016E-02	1.8851E-02	1.7978E-02	2.3279E-02
TCINBU										
1	6.4800E-02	7.7679E-02	1.0670E-01	8.1268E-02	7.5956E-02	5.2087E-02	6.9796E-02	6.4905E-02	5.7422E-02	6.3714E-02
TCINBP										
1	7.3742E-02	1.0101E-01	1.4627E-01	9.1993E-02	8.4232E-02	6.0312E-02	7.7111E-02	7.3089E-02	6.4532E-02	7.1739E-02
PCGDOB										
1 700	8.1440E-04	1.0710E-06	1.9926E-04	2.2350E-04	1.3544E-03	1.2166E-03	7.0377E-03	6.6375E-03	5.2175E-04	1.1865E-03
2 800	3.5192E-04	6.9014E-07	1.0601E-04	7.1834E-05	5.7835E-04	5.1020E-04	2.3689E-03	2.1470E-03	1.8369E-04	4.7058E-04
3 3101	2.3809E-04	3.7325E-07	4.5101E-05	4.6583E-05	5.9269E-04	3.7703E-04	1.6464E-03	1.5514E-03	1.2575E-04	2.8019E-04
4 6801	5.5075E-04	1.8233E-06	3.5872E-04	1.2492E-04	7.3099E-04	9.1580E-04	3.2447E-03	3.5672E-03	2.8719E-04	7.0480E-04
5 6802	5.1812E-04	1.1681E-06	1.9922E-04	1.0881E-04	5.6455E-04	7.1025E-04	3.4565E-03	3.0471E-03	2.6928E-04	7.5807E-04
TOPCGU										
1	4.6627E-04	6.6506E-07	1.0291E-04	1.1083E-04	7.9249E-04	6.7234E-04	3.6625E-03	3.3202E-03	2.7243E-04	6.5667E-04
TOPCGP										
1	5.0579E-04	4.9308E-05	1.7445E-04	1.5660E-04	8.0409E-04	7.2068E-04	3.5262E-03	3.2671E-03	3.1205E-04	6.8503E-04
PCGTOT										
1 700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 3101	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4 6801	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5 6802	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GDOBTU										
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GDODOL										
1	2.1162E 06	5.0900E 04	3.6410E 05	8.4010E 05	7.3370E 05	1.6738E 06	3.0798E 06	2.9604E 06	4.5720E 05	6.8870E 05
TFDDOL										
1	3.1520E 05	4.0000E 02	4.6400E 04	5.9600E 04	4.5200E 05	5.6980E 05	2.2697E 06	2.2306E 06	2.0670E 05	4.4940E 05

Table 5 continued

	221	222	223	224	225	226	227	228	229	230
CODE	4601	4602	4603	4604	4701	4702	4703	4704	4801	4802
DIRBTU										
1 700	0.0	1.1095E-03	2.2165E-03	1.3199E-03	1.7538E-03	0.0	1.0630E-04	1.3089E-03	0.0	2.2347E-03
2 800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 3101	1.0679E-03	9.9070E-04	1.8288E-03	8.7053E-04	3.0145E-03	3.3176E-03	1.8410E-03	2.4153E-03	8.4650E-04	9.4338E-04
4 6801	7.1008E-04	6.9745E-04	8.8542E-04	8.6024E-04	1.1487E-03	9.9615E-04	1.2623E-03	1.0716E-03	7.4845E-04	1.0692E-03
5 6802	0.0	1.4486E-03	1.5634E-03	1.2022E-03	1.2065E-03	0.0	5.4688E-04	4.9219E-03	1.0498E-03	9.7200E-04
INVBTU										
1 700	2.7662E-02	3.1570E-02	3.8378E-02	3.1268E-02	2.1558E-02	2.9172E-02	2.4862E-02	2.3623E-02	2.5204E-02	2.6583E-02
2 800	2.9070E-02	3.0260E-02	3.4200E-02	3.0265E-02	2.4763E-02	2.9452E-02	2.5725E-02	3.1166E-02	2.6854E-02	2.6492E-02
3 3101	1.4831E-02	1.3942E-02	1.6212E-02	1.4169E-02	1.2810E-02	1.5662E-02	1.2146E-02	1.3280E-02	1.2240E-02	1.2370E-02
4 6801	4.3134E-03	4.2777E-03	4.7453E-03	4.5983E-03	3.8954E-03	4.1575E-03	4.4647E-03	4.2947E-03	4.0657E-03	4.3166E-03
5 6802	1.5307E-02	1.7414E-02	1.9300E-02	1.7216E-02	1.2841E-02	1.4777E-02	1.4525E-02	1.8801E-02	1.5394E-02	1.4911E-02
TCINBU										
1	5.2252E-02	5.7385E-02	6.7649E-02	5.6756E-02	4.2274E-02	5.4305E-02	4.5950E-02	5.0328E-02	4.7835E-02	4.8591E-02
TCINBP										
1	5.9308E-02	6.4384E-02	7.5412E-02	6.4279E-02	4.8647E-02	6.1107E-02	5.3254E-02	5.7354E-02	5.4486E-02	5.5653E-02
PCGDOB										
1 700	3.5448E-06	8.5839E-04	3.2397E-04	9.9495E-04	1.4866E-03	8.6938E-04	9.7909E-04	1.1518E-03	1.0026E-03	8.9440E-04
2 800	1.3588E-06	3.0012E-04	1.0531E-04	3.5128E-04	6.2286E-04	3.2016E-04	3.6954E-04	5.5430E-04	3.8967E-04	3.2514E-04
3 3101	1.0737E-06	2.1418E-04	7.7321E-05	2.5472E-04	4.9906E-04	2.6370E-04	2.7024E-04	3.6584E-04	2.7509E-04	2.3514E-04
4 6801	2.2063E-06	4.6428E-04	1.5990E-04	5.8405E-04	1.0722E-03	4.9457E-04	7.0182E-04	8.3588E-04	6.4561E-04	5.7973E-04
5 6802	1.7748E-06	4.2840E-04	1.4741E-04	4.9554E-04	8.0115E-04	3.9845E-04	5.1753E-04	8.2941E-04	5.5408E-04	4.5391E-04
TCPCGU										
1	1.9107E-06	4.4749E-04	1.6422E-04	5.1584E-04	8.2684E-04	4.6355E-04	5.1162E-04	6.9901E-04	5.4217E-04	4.6468E-04
TCPCGP										
1	5.0415E-05	4.8060E-04	2.0600E-04	5.5174E-04	8.6944E-04	4.9754E-04	5.6053E-04	7.3510E-04	5.8076E-04	5.0748E-04
PCGTOT										
1 700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 3101	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4 6801	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5 6802	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GCOBTU										
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GCODOL										
1	2.8330E 05	5.3020E 05	2.8740E 05	5.2830E 05	1.2241E 06	5.4720E 05	2.7188E 06	8.5410E 05	7.0020E 05	6.1430E 05
TFDOOL										
1	1.6000E 03	3.3950E 05	1.0540E 05	3.9730E 05	8.6100E 05	3.7210E 05	4.9170E 05	6.0880E 05	4.9670E 05	4.2010E 05

Table 5 continued

	231	232	233	234	235	236	237	238	239	240
CODE	4803	4804	4805	4806	4901	4902	4903	4904	4905	4906
DIRBTU										
1 700	0.0	0.0	0.0	4.8277E-04	2.2334E-03	2.1236E-03	0.0	0.0	1.7713E-03	0.0
2 800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 3101	7.6931E-04	7.5634E-04	8.2960E-04	3.6653E-03	1.9974E-03	4.8205E-03	3.4747E-03	6.5087E-04	2.3039E-03	9.5761E-04
4 6801	1.1350E-03	8.7630E-04	6.6507E-04	9.3227E-04	9.2033E-04	1.9860E-03	7.7477E-04	7.7345E-04	1.3755E-03	7.5228E-04
5 6802	2.3165E-03	1.3813E-03	7.6982E-04	2.0448E-03	2.3642E-03	4.3913E-03	1.9467E-03	1.5999E-03	3.4898E-03	1.4299E-03
INVBTU										
1 700	2.6096E-02	2.8820E-02	1.6985E-02	2.8955E-02	2.5760E-02	4.1262E-02	2.8254E-02	1.7083E-02	2.9651E-02	2.6937E-02
2 800	2.8405E-02	2.8914E-02	2.3142E-02	3.3378E-02	2.9876E-02	3.8091E-02	3.2269E-02	2.2470E-02	3.3892E-02	3.2554E-02
3 3101	1.2310E-02	1.3333E-02	1.0758E-02	1.6490E-02	1.3619E-02	1.8217E-02	1.5625E-02	8.4724E-03	1.4653E-02	1.3707E-02
4 6801	4.4954E-03	3.9891E-03	3.4935E-03	4.6015E-03	4.3850E-03	5.1389E-03	4.6912E-03	4.3054E-03	4.7485E-03	4.4378E-03
5 6802	1.6869E-02	1.6264E-02	1.2822E-02	1.8060E-02	1.7210E-02	2.1452E-02	1.7958E-02	1.4713E-02	2.0245E-02	1.9196E-02
TCINBU										
1	4.9831E-02	5.3590E-02	3.6498E-02	5.7552E-02	5.1080E-02	7.4015E-02	5.5650E-02	3.5080E-02	5.8610E-02	5.4882E-02
TCINBP										
1	5.7186E-02	6.0116E-02	4.2214E-02	6.5080E-02	5.8254E-02	8.2422E-02	6.3324E-02	4.2124E-02	6.6378E-02	6.2142E-02
PCGDOB										
1 700	4.2198E-04	7.6654E-04	5.1530E-04	1.9155E-03	1.6676E-03	2.5578E-04	2.8195E-04	1.2314E-06	1.8357E-04	4.7679E-04
2 800	1.6754E-04	2.8052E-04	2.5610E-04	8.0543E-04	7.0548E-04	8.6131E-05	1.1746E-04	5.9079E-07	7.6536E-05	2.1018E-04
3 3101	1.1246E-04	2.0036E-04	1.8439E-04	6.1631E-04	4.9813E-04	6.3799E-05	8.8094E-05	3.4503E-07	5.1253E-05	1.3707E-04
4 6801	2.9016E-04	4.2352E-04	4.2306E-04	1.2151E-03	1.1331E-03	1.2716E-04	1.8687E-04	1.2388E-06	1.1735E-04	3.1354E-04
5 6802	2.4680E-04	3.9140E-04	3.5196E-04	1.0810E-03	1.0080E-03	1.2032E-04	1.6215E-04	9.5953E-07	1.1340E-04	3.0742E-04
TCPCGU										
1	2.2883E-04	4.0881E-04	3.1336E-04	1.0882E-03	9.4166E-04	1.3201E-04	1.5830E-04	7.0335E-07	1.0364E-04	2.7749E-04
TOPCGP										
1	2.7504E-04	4.4319E-04	3.6141E-04	1.1083E-03	9.7416E-04	1.7497E-04	2.0377E-04	4.9279E-05	1.4965E-04	3.1916E-04
PCGTOT										
1 700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 3101	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4 6801	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5 6802	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GCOBTU										
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GDODOL										
1	3.0230E 05	4.5210E 05	4.7980E 05	1.2661E 06	1.5465E 06	1.0306E 06	3.6420E 05	1.7410E 05	1.0642E 06	3.0750E 05
TFDDOL										
1	2.0190E 05	3.3210E 05	3.7880E 05	8.2600E 05	8.0830E 05	7.7400E 04	1.2460E 05	9.0000E 02	7.7300E 04	2.2100E 05

Table 5 continued

	241	242	243	244	245	246	247	248	249	250
CODE	4907	5000	5101	5102	5103	5104	5201	5202	5203	5204
DIRBTU										
1 700	0.0	4.1992E-04	9.0146E-04	0.0	0.0	1.7961E-03	2.1492E-03	1.9147E-03	0.0	0.0
2 800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 3101	2.0576E-03	2.0356E-03	1.6318E-03	7.1265E-04	9.1954E-04	7.4183E-04	4.7032E-04	5.4705E-04	1.1227E-03	3.9901E-04
4 6801	1.3817E-03	1.3085E-03	5.7995E-04	9.0249E-04	6.5794E-04	8.2095E-04	9.5428E-04	9.1917E-04	5.7676E-04	6.5671E-04
5 6802	1.6329E-03	1.8795E-03	4.1643E-04	2.5919E-03	6.2811E-04	7.7584E-04	2.4383E-03	1.4667E-03	0.0	1.5171E-03
INVBTU										
1 700	2.6939E-02	2.4506E-02	1.0238E-02	1.2204E-02	2.3984E-02	2.4977E-02	3.0212E-02	3.1009E-02	2.8761E-02	2.6743E-02
2 800	3.2311E-02	2.7880E-02	1.5689E-02	1.9904E-02	2.9633E-02	2.7650E-02	3.3043E-02	3.4610E-02	3.2150E-02	3.3343E-02
3 3101	1.4271E-02	1.2504E-02	8.7819E-03	8.6647E-03	1.3232E-02	1.2719E-02	1.4156E-02	1.5328E-02	1.5086E-02	1.4967E-02
4 6801	5.4375E-03	4.9908E-03	2.5653E-03	3.0740E-03	4.3453E-03	4.4275E-03	5.0699E-03	5.2912E-03	5.1978E-03	5.1463E-03
5 6802	1.9163E-02	1.6415E-02	7.5682E-03	1.1789E-02	1.6921E-02	1.5842E-02	1.9959E-02	2.0240E-02	1.8249E-02	1.9416E-02
TCINBU										
1	5.3601E-02	4.7202E-02	2.3263E-02	2.8915E-02	4.9103E-02	4.8028E-02	5.7988E-02	6.0123E-02	5.5512E-02	5.4740E-02
TCINBP										
1	6.2497E-02	5.5367E-02	2.7460E-02	3.3944E-02	5.6211E-02	5.5271E-02	6.6283E-02	6.8779E-02	6.4015E-02	6.3159E-02
PCGDOB										
1 700	1.6080E-03	2.1433E-04	1.6354E-03	2.8501E-04	1.5924E-04	5.0109E-04	4.2780E-04	2.7641E-04	2.6131E-03	2.4481E-04
2 800	7.0351E-04	8.8943E-05	9.1414E-04	1.6956E-04	7.1766E-05	2.0235E-04	1.7067E-04	1.1254E-04	1.0655E-03	1.1134E-04
3 3101	4.8126E-04	6.1785E-05	7.9251E-04	1.1433E-04	4.9636E-05	1.4417E-04	1.1325E-04	7.7197E-05	7.7438E-04	7.7407E-05
4 6801	1.2956E-03	1.7423E-04	1.6356E-03	2.8656E-04	1.1516E-04	3.5457E-04	2.8656E-04	1.8827E-04	1.8850E-03	1.8805E-04
5 6802	1.0350E-03	1.2989E-04	1.0938E-03	2.4910E-04	1.0165E-04	2.8756E-04	2.5570E-04	1.6324E-04	1.5001E-03	1.6081E-04
TOPCGU										
1	9.0216E-04	1.1609E-04	1.0419E-03	1.8982E-04	9.2683E-05	2.7329E-04	2.3359E-04	1.5241E-04	1.4292E-03	1.4196E-04
TOPCGP										
1	9.5746E-04	1.6629E-04	1.1129E-03	2.4126E-04	1.4003E-04	3.1989E-04	2.7873E-04	1.9887E-04	1.4708E-03	1.8991E-04
PCGTOT										
1 700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 3101	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4 6801	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5 6802	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GCOBTU										
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GDODOL										
1	8.9040E 05	2.2573E 06	3.0820E 06	3.6240E 05	1.0360E 05	3.9920E 05	2.5530E 05	1.4510E 05	2.4248E 06	1.7280E 05
TFDDOL										
1	7.4530E 05	1.0920E 05	1.9944E 06	2.9160E 05	8.2900E 04	2.5050E 05	1.7680E 05	1.1130E 05	1.1344E 06	1.1430E 05

Table 5 continued

CODE	251 5205	252 5301	253 5302	254 5303	255 5304	256 5305	257 5306	258 5307	259 5308	260 5401
DIRBTU										
1 700	2.2934E-04	0.0	3.9915E-03	3.9204E-04	1.7323E-03	0.0	8.0093E-04	5.7653E-03	0.0	2.8040E-03
2 800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 3101	5.6088E-04	6.2646E-04	6.3845E-04	5.7213E-04	1.0520E-03	4.5354E-04	3.5141E-04	7.2891E-03	3.7388E-04	2.9804E-04
4 6801	1.1808E-03	1.0296E-03	1.8398E-03	8.8789E-04	1.4290E-03	1.0434E-03	9.2708E-04	1.4094E-02	1.1408E-03	1.3701E-03
5 6802	9.9775E-04	7.7873E-04	2.3434E-03	1.0356E-03	1.8109E-03	1.4393E-03	2.7838E-03	2.2196E-02	3.1830E-03	3.8763E-03
INVBTU										
1 700	2.8841E-02	1.4772E-02	3.9107E-02	2.0686E-02	3.0639E-02	1.5555E-02	3.8753E-02	5.7425E-02	2.6297E-02	3.7133E-02
2 800	3.3225E-02	2.1186E-02	3.8158E-02	2.5528E-02	3.1421E-02	2.0876E-02	3.6568E-02	8.6102E-02	3.8980E-02	3.7813E-02
3 3101	1.4416E-02	9.9116E-03	1.6672E-02	1.1474E-02	1.4100E-02	9.3405E-03	1.5247E-02	2.7791E-02	1.3746E-02	1.4968E-02
4 6801	5.4231E-03	3.9099E-03	6.3381E-03	4.3031E-03	5.5568E-03	3.7250E-03	5.3299E-03	2.0913E-02	8.7410E-03	5.9122E-03
5 6802	1.9843E-02	1.1964E-02	2.2678E-02	1.4911E-02	1.8573E-02	1.2226E-02	2.2708E-02	5.9949E-02	2.6464E-02	2.4073E-02
TCINBU										
1	5.6433E-02	3.1896E-02	7.0681E-02	4.1744E-02	5.6288E-02	3.2562E-02	6.9784E-02	1.2180E-01	5.6197E-02	6.8804E-02
TCINBP										
1	6.5305E-02	3.8293E-02	8.1050E-02	4.8784E-02	6.5378E-02	3.8656E-02	7.8503E-02	1.5602E-01	7.0497E-02	7.8477E-02
PCGDOB										
1 700	6.7287E-04	7.9643E-04	1.6882E-03	8.1644E-04	1.3530E-03	1.9085E-04	5.2949E-04	1.0302E-04	2.7506E-04	1.6110E-03
2 800	2.8275E-04	4.1666E-04	6.0085E-04	3.6752E-04	5.0616E-04	9.3434E-05	1.8225E-04	5.6345E-05	1.4872E-04	5.9840E-04
3 3101	1.9002E-04	3.0192E-04	4.0663E-04	2.5585E-04	3.5179E-04	6.4750E-05	1.1770E-04	2.8168E-05	8.1232E-05	3.6688E-04
4 6801	5.0503E-04	8.4147E-04	1.0922E-03	6.7794E-04	9.7955E-04	1.8244E-04	2.9069E-04	1.4976E-04	3.6495E-04	1.0239E-03
5 6802	4.1886E-04	5.8366E-04	8.8574E-04	5.3246E-04	7.4213E-04	1.3573E-04	2.8073E-04	9.7308E-05	2.5045E-04	9.4496E-04
TCPCGU										
1	3.7250E-04	4.7839E-04	8.6678E-04	4.6408E-04	7.0212E-04	1.1173E-04	2.7314E-04	5.8863E-05	1.6004E-04	8.5000E-04
TOPCGP										
1	4.2068E-04	5.4679E-04	9.0574E-04	5.1731E-04	7.5289E-04	1.6342E-04	3.1303E-04	1.1472E-04	2.2402E-04	8.8418E-04
PCGTOT										
1 700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 3101	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4 6801	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5 6802	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GDOBTU										
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GDODOL										
1	4.0520E 05	9.3850E 05	7.8170E 05	1.2061E 06	1.9876E 06	8.1910E 05	3.6180E 05	2.4420E 05	3.1950E 05	6.4970E 05
TFDDOL										
1	2.9130E 05	6.7320E 05	5.3900E 05	4.9280E 05	5.5140E 05	1.5320E 05	1.7060E 05	2.2400E 04	1.3060E 05	5.4170E 05

Table 5 continued

	261	262	263	264	265	266	267	268	269	270
CODE	5402	5403	5404	5405	5406	5407	5501	5502	5503	5601
DIRBTU										
1 700	5.1732E-03	2.3661E-03	0.0	0.0	0.0	9.2715E-04	0.0	1.7025E-03	5.1415E-04	4.3340E-04
2 800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 3101	7.6602E-04	2.5072E-04	3.3800E-04	2.8170E-04	5.1378E-04	2.7701E-04	3.4020E-04	2.2658E-03	2.3672E-03	2.0834E-04
4 6801	1.5905E-03	1.1575E-03	8.5668E-04	9.6702E-04	1.2426E-03	8.3677E-04	1.1593E-03	9.8441E-04	4.9053E-04	4.5020E-04
5 6802	2.7222E-03	3.7890E-03	1.6787E-03	1.8044E-03	0.0	4.0723E-03	3.3940E-03	2.1000E-03	1.2578E-03	0.0
INVBTU										
1 700	3.8604E-02	3.7281E-02	2.9977E-02	2.3774E-02	1.5116E-02	3.6652E-02	1.4155E-02	3.0134E-02	3.2784E-02	1.4416E-02
2 800	3.8716E-02	3.8945E-02	4.0187E-02	2.9497E-02	2.0627E-02	3.8553E-02	2.7915E-02	4.2902E-02	3.8118E-02	2.1861E-02
3 3101	1.6468E-02	1.5746E-02	1.7429E-02	1.3090E-02	1.0251E-02	1.5567E-02	9.8939E-03	1.8661E-02	1.7217E-02	1.1063E-02
4 6801	6.3154E-03	6.2294E-03	6.5209E-03	4.9591E-03	3.5290E-03	5.4255E-03	4.2668E-03	6.0384E-03	5.6606E-03	3.4451E-03
5 6802	2.3616E-02	2.4535E-02	2.4028E-02	1.7344E-02	1.0523E-02	2.4302E-02	1.8929E-02	2.5142E-02	2.2282E-02	1.1637E-02
TCINBU										
1	7.0760E-02	6.9755E-02	6.3390E-02	4.8119E-02	3.2077E-02	6.9569E-02	3.7678E-02	6.6764E-02	6.5022E-02	3.2699E-02
TCINBP										
1	8.1092E-02	7.9946E-02	7.4058E-02	5.6232E-02	3.7851E-02	7.8445E-02	4.4658E-02	7.6642E-02	7.4282E-02	3.8335E-02
PCGDOB										
1 700	2.7393E-03	2.1796E-03	1.5862E-03	3.4521E-04	1.1368E-04	5.4657E-04	3.5993E-04	6.7624E-04	1.4677E-04	2.5993E-03
2 800	1.0021E-03	8.3056E-04	7.7568E-04	1.5623E-04	5.6585E-05	2.0972E-04	2.5819E-04	3.5119E-04	6.2250E-05	1.4378E-03
3 3101	6.6023E-04	5.2011E-04	5.2105E-04	1.0739E-04	4.3553E-05	1.3116E-04	1.4174E-04	2.3660E-04	4.3549E-05	1.1270E-03
4 6801	1.7888E-03	1.4538E-03	1.3774E-03	2.8743E-04	1.0594E-04	3.2296E-04	4.3186E-04	5.4090E-04	1.0116E-04	2.4795E-03
5 6802	1.5162E-03	1.2979E-03	1.1504E-03	2.2786E-04	7.1604E-05	3.2790E-04	4.3427E-04	5.1049E-04	9.0258E-05	1.8985E-03
TOPCGU										
1	1.4268E-03	1.1588E-03	9.4496E-04	1.9681E-04	6.7650E-05	2.9689E-04	2.6726E-04	4.2542E-04	8.2833E-05	1.6583E-03
TCPCGP										
1	1.4586E-03	1.1939E-03	1.0027E-03	2.4734E-04	1.1763E-04	3.3677E-04	3.2296E-04	4.6577E-04	1.3013E-04	1.7296E-03
PCGTOT										
1 700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 3101	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4 6801	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5 6802	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GDOBTU										
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GDODOL										
1	1.3390E 06	8.6990E 05	9.8320E 05	2.1570E 05	1.2770E 05	5.2880E 05	6.1780E 05	1.2432E 06	1.2378E 06	2.7870E 06
TFDDOL										
1	8.8600E 05	7.3000E 05	6.6070E 05	1.8130E 05	9.3900E 04	1.8620E 05	3.1660E 05	2.8020E 05	5.5900E 04	2.2513E 06

Table 5 continued

CODE	271 5602	272 5603	273 5604	274 5701	275 5702	276 5703	277 5801	278 5802	279 5803	280 5804
DIRBTU										
1 700	0.0	3.0546E-03	1.5393E-04	0.0	4.2851E-04	4.1775E-04	5.3143E-04	2.4160E-03	0.0	2.1074E-03
2 800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 3101	4.4244E-04	2.3746E-03	2.3544E-03	1.8478E-03	5.0634E-03	2.7582E-03	5.3572E-04	4.2173E-04	6.6411E-04	4.0039E-04
4 6801	1.4891E-03	9.1356E-04	8.7627E-04	2.1727E-03	2.9270E-03	1.2485E-03	2.3683E-03	9.4535E-04	9.1647E-04	1.1132E-03
5 6802	4.0875E-03	1.2539E-03	3.3505E-04	1.6903E-03	1.4028E-03	1.4009E-03	3.0237E-03	1.9201E-03	4.3703E-04	1.6758E-03
INVBTU										
1 700	2.2289E-02	1.7403E-02	1.2053E-02	1.6010E-02	2.2789E-02	2.0291E-02	2.4660E-02	1.7367E-02	1.3360E-02	2.5947E-02
2 800	4.1460E-02	2.3088E-02	1.9099E-02	2.8995E-02	3.6267E-02	3.0852E-02	4.6416E-02	2.6214E-02	2.0179E-02	2.8334E-02
3 3101	1.8371E-02	1.1732E-02	1.0349E-02	1.1149E-02	1.6971E-02	1.4850E-02	1.7387E-02	9.9632E-03	9.4539E-03	1.2284E-02
4 6801	6.0063E-03	3.9023E-03	3.3754E-03	5.0242E-03	7.2559E-03	5.2454E-03	8.0493E-03	4.7157E-03	3.8595E-03	4.9360E-03
5 6802	2.4255E-02	1.2335E-02	9.5343E-03	1.8874E-02	2.0796E-02	1.7192E-02	3.0591E-02	1.7117E-02	1.1376E-02	1.7106E-02
TCINBU										
1	5.7510E-02	3.6437E-02	2.7645E-02	3.9786E-02	5.1518E-02	4.5694E-02	6.2715E-02	3.8683E-02	2.9530E-02	4.9153E-02
TCINBP										
1	6.7336E-02	4.2821E-02	3.3167E-02	4.8005E-02	6.3389E-02	5.4276E-02	7.5884E-02	4.6398E-02	3.5844E-02	5.7228E-02
PCGDOB										
1 700	3.3936E-04	1.4818E-03	5.6248E-03	3.6107E-04	1.0184E-04	8.5709E-04	6.2431E-04	1.6135E-04	1.1780E-04	3.8070E-04
2 800	2.3025E-04	7.1704E-04	3.2513E-03	2.3853E-04	5.9120E-05	4.7535E-04	4.2863E-04	8.8835E-05	6.4907E-05	1.5164E-04
3 3101	1.5802E-04	5.6435E-04	2.7288E-03	1.4206E-04	4.2850E-05	3.5439E-04	2.4869E-04	5.2295E-05	4.7099E-05	1.0183E-04
4 6801	3.6502E-04	1.3263E-03	6.2880E-03	4.5231E-04	1.2944E-04	8.8440E-04	8.1343E-04	1.7488E-04	1.3585E-04	2.8909E-04
5 6802	3.3412E-04	9.5028E-04	4.0259E-03	3.8513E-04	8.4086E-05	6.5705E-04	7.0071E-04	1.4388E-04	9.0759E-05	2.2709E-04
TCPCGU										
1	2.4642E-04	8.7163E-04	3.5902E-03	2.4901E-04	6.3294E-05	5.3961E-04	4.4003E-04	1.0002E-04	7.2057E-05	2.0349E-04
TCPCGP										
1	2.9798E-04	9.3455E-04	3.7848E-03	3.0940E-04	1.1637E-04	6.0372E-04	5.1099E-04	1.5260E-04	1.2455E-04	2.5323E-04
PCGTOT										
1 700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 3101	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4 6801	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5 6802	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GDOBTU										
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GDODOL										
1	2.0790E 05	1.8165E 06	7.7385E 06	1.0317E 06	7.2000E 05	2.8539E 06	5.4800E 05	2.1270E 05	1.5460E 05	1.0953E 06
TFDOOL										
1	1.9010E 05	1.0631E 06	5.8271E 06	2.8160E 05	5.5800E 04	5.2740E 05	3.1610E 05	1.1600E 05	1.1010E 05	1.8320E 05

Table 5 continued

	281	282	283	284	285	286	287	288	289	290
CODE	5805	5901	5902	5903	6001	6002	6003	6004	6101	6102
DIRBTU										
1 700	0.0	9.1085E-04	3.6455E-04	1.9642E-03	3.9134E-04	9.1189E-04	0.0	6.8656E-04	8.8627E-04	1.2463E-03
2 800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 3101	5.0107E-04	2.3188E-03	3.0653E-03	6.5059E-04	1.2068E-03	2.7865E-03	7.8547E-04	1.3032E-03	4.0779E-03	1.5449E-03
4 6801	1.0373E-03	9.7148E-04	6.0813E-04	8.1215E-04	9.8731E-04	1.5133E-03	1.6494E-03	1.3876E-03	1.7061E-03	6.9541E-04
5 6802	1.6611E-03	2.0284E-03	9.4160E-04	1.1038E-03	1.2128E-03	7.2211E-04	0.0	0.0	1.0210E-03	1.1822E-03
INVBTU										
1 700	2.3175E-02	3.7769E-02	3.7367E-02	3.4299E-02	1.3205E-02	2.2135E-02	2.4501E-02	1.7707E-02	2.9591E-02	2.1794E-02
2 800	3.4867E-02	4.0391E-02	4.2115E-02	3.2765E-02	2.0401E-02	2.8975E-02	2.9037E-02	2.2747E-02	3.0012E-02	3.4882E-02
3 3101	1.5235E-02	1.8518E-02	1.9178E-02	1.5136E-02	9.8297E-03	1.4223E-02	1.2373E-02	1.0722E-02	1.5764E-02	1.6583E-02
4 6801	6.1734E-03	6.0749E-03	7.4012E-03	4.9428E-03	4.0210E-03	5.5467E-03	6.4181E-03	5.1349E-03	4.8191E-03	5.7163E-03
5 6802	2.0843E-02	2.3403E-02	2.4572E-02	1.8926E-02	1.1290E-02	1.5660E-02	1.7732E-02	1.2689E-02	1.5611E-02	1.9546E-02
TCINBU										
1	5.1629E-02	7.1850E-02	7.1793E-02	6.1929E-02	2.9429E-02	4.5348E-02	4.6871E-02	3.5120E-02	5.4597E-02	5.0738E-02
TCINBP										
1	6.1728E-02	8.1788E-02	8.3902E-02	7.0015E-02	3.6008E-02	5.4423E-02	5.7371E-02	4.3521E-02	6.2481E-02	6.0090E-02
PCGDOB										
1 700	1.2491E-04	9.1051E-04	1.5861E-03	6.4626E-02	4.6025E-03	5.0256E-03	1.5934E-04	2.7768E-03	3.1826E-03	5.6536E-04
2 800	6.8552E-05	3.5518E-04	6.5208E-04	2.2519E-02	2.5937E-03	2.3997E-03	6.8881E-05	1.3012E-03	1.1774E-03	3.3007E-04
3 3101	4.6396E-05	2.5221E-04	4.5992E-04	1.6112E-02	1.9356E-03	1.8245E-03	4.5460E-05	9.5001E-04	9.5789E-04	2.4304E-04
4 6801	1.3282E-04	5.8457E-04	1.2540E-03	3.7176E-02	5.5941E-03	5.0270E-03	1.6661E-04	3.2144E-03	2.0689E-03	5.9192E-04
5 6802	1.0165E-04	5.1045E-04	9.4371E-04	3.2264E-02	3.5603E-03	3.2170E-03	1.0434E-04	1.8004E-03	1.5191E-03	4.5877E-04
TCPCGU										
1	7.7563E-05	4.9364E-04	8.5839E-04	3.3354E-02	2.8275E-03	2.8647E-03	8.4009E-05	1.5088E-03	1.6696E-03	3.6848E-04
TCPCGP										
1	1.2895E-04	5.3278E-04	9.1561E-04	3.2523E-02	3.0587E-03	3.0309E-03	1.3803E-04	1.6790E-03	1.6960E-03	4.2640E-04
PCGTOT										
1 700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 3101	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4 6801	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5 6802	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GDOBTU										
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GDODOL										
1	2.4940E 05	5.4150E 05	5.8990E 05	3.9067E 07	6.3469E 06	4.3638E 06	2.1000E 05	4.7509E 06	1.6868E 06	3.7310E 05
TFDDOL										
1	6.7300E 04	3.0100E 05	5.3000E 05	2.3526E 07	4.3518E 06	2.8349E 06	8.1200E 04	1.9581E 06	1.3429E 06	3.2390E 05

Table 5 continued

CODE	291 6103	292 6104	293 6105	294 6106	295 6107	296 6201	297 6202	298 6203	299 6204	300 6205
DIRBTU										
1 700	1.0029E-02	2.8739E-03	0.0	0.0	0.0	2.4148E-04	3.1080E-04	0.0	0.0	2.9208E-04
2 800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 3101	2.3392E-03	2.2563E-03	3.2672E-04	3.1214E-04	3.0695E-04	4.4655E-04	7.1402E-04	6.2115E-04	3.4112E-04	4.9483E-04
4 6801	7.7944E-04	7.1334E-04	1.1452E-03	2.0310E-04	5.7885E-04	9.4319E-04	9.2958E-04	9.6687E-04	6.6694E-04	8.0432E-04
5 6802	7.0978E-04	2.0733E-03	4.0526E-03	4.5596E-04	1.0945E-03	2.0866E-03	1.2090E-03	1.7036E-03	1.0474E-03	0.0
INVBTU										
1 700	3.0785E-02	6.1146E-02	2.5099E-02	2.7120E-02	4.5153E-02	1.5708E-02	1.8643E-02	1.7479E-02	2.8727E-02	1.9675E-02
2 800	2.5457E-02	4.5867E-02	3.2339E-02	3.8558E-02	4.1928E-02	2.2992E-02	2.5314E-02	2.4774E-02	3.0439E-02	2.8169E-02
3 3101	1.3522E-02	2.0924E-02	1.4458E-02	1.6038E-02	1.9901E-02	1.0476E-02	1.1491E-02	1.0919E-02	1.4759E-02	1.4009E-02
4 6801	3.9394E-03	6.0211E-03	4.1787E-03	6.2817E-03	5.6428E-03	4.0282E-03	4.3295E-03	4.1433E-03	4.1275E-03	4.4183E-03
5 6802	1.2939E-02	2.6917E-02	1.8879E-02	2.3766E-02	2.3707E-02	1.3274E-02	1.4696E-02	1.4625E-02	1.6966E-02	1.5168E-02
TCINBU										
1	5.2150E-02	1.0076E-01	5.3098E-02	5.9153E-02	8.1219E-02	3.4516E-02	3.9460E-02	3.7948E-02	5.4879E-02	4.3255E-02
TCINBP										
1	5.8595E-02	1.1061E-01	5.9934E-02	6.9430E-02	9.0451E-02	4.1106E-02	4.6543E-02	4.4727E-02	6.1631E-02	5.0483E-02
PCGDOB										
1 700	6.2724E-04	4.1842E-03	3.6525E-04	1.5046E-03	5.8077E-04	7.5206E-04	7.6178E-04	5.1935E-05	5.9728E-04	4.1459E-04
2 800	1.8920E-04	1.1449E-03	1.7166E-04	7.8029E-04	1.9672E-04	4.0154E-04	3.7731E-04	2.6851E-05	2.3085E-04	2.1652E-04
3 3101	1.5566E-04	8.0893E-04	1.1887E-04	5.0271E-04	1.4462E-04	2.8337E-04	2.6529E-04	1.8331E-05	1.7337E-04	1.6678E-04
4 6801	3.2039E-04	1.6447E-03	2.4273E-04	1.3911E-03	2.8972E-04	7.6984E-04	7.0617E-04	4.9142E-05	3.4255E-04	3.7163E-04
5 6802	2.3852E-04	1.6665E-03	2.4857E-04	1.1929E-03	2.7589E-04	5.7500E-04	5.4334E-04	3.9318E-05	3.1916E-04	2.8918E-04
TOPCGU										
1	3.0454E-04	1.9956E-03	2.2103E-04	9.2255E-04	3.0055E-04	4.6144E-04	4.5225E-04	3.1638E-05	3.2709E-04	2.5689E-04
TOPCGP										
1	3.4305E-04	1.9305E-03	2.6336E-04	9.8497E-04	3.3640E-04	5.2473E-04	5.1016E-04	8.0812E-05	3.6469E-04	3.0764E-04
PCGTOT										
1 700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 3101	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4 6801	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5 6802	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GDOBTU										
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GDODOL										
1	4.6950E 05	1.1869E 06	2.6430E 05	7.1390E 05	2.2720E 05	8.6460E 05	1.2790E 06	5.6100E 05	3.5000E 05	6.1650E 05
TFDDOL										
1	2.5440E 05	8.5440E 05	1.8170E 05	6.9270E 05	1.6060E 05	5.9780E 05	5.1020E 05	3.7100E 04	2.5960E 05	2.6210E 05

Table 5 continued

CODE	301 6206	302 6207	303 6301	304 6302	305 6303	306 6401	307 6402	308 6403	309 6404	310 6405
DIRBTU										
1 700	0.0	1.3954E-03	0.0	0.0	6.6050E-03	2.4503E-04	1.8982E-03	1.2872E-04	6.5626E-04	6.0075E-04
2 800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 3101	4.3652E-04	3.8527E-04	3.9325E-04	4.7757E-04	5.4196E-03	2.9780E-04	5.0662E-04	5.4068E-03	5.4711E-03	2.6992E-03
4 6801	5.8060E-04	6.0826E-04	7.8674E-04	1.5019E-03	6.2993E-04	5.9928E-04	6.5817E-04	7.8138E-04	8.1603E-04	7.3908E-04
5 6802	9.3370E-04	2.9576E-04	1.0821E-03	3.2013E-03	1.0119E-03	4.1131E-04	1.3683E-03	7.6238E-04	1.2577E-03	8.0585E-04
INVBTU										
1 700	2.5728E-02	1.5460E-02	1.4000E-02	2.2108E-02	2.5884E-02	1.5055E-02	1.8236E-02	2.4189E-02	2.1534E-02	2.3928E-02
2 800	2.8539E-02	1.9777E-02	2.4337E-02	3.5319E-02	3.5762E-02	2.2891E-02	2.3670E-02	3.9905E-02	3.4716E-02	3.4202E-02
3 3101	1.2124E-02	9.7780E-03	1.0124E-02	1.4416E-02	1.6913E-02	9.8446E-03	1.2268E-02	2.2375E-02	1.9700E-02	1.7675E-02
4 6801	5.2748E-03	3.1748E-03	3.8043E-03	5.6954E-03	5.1667E-03	4.0955E-03	3.2753E-03	4.9511E-03	4.5239E-03	4.5822E-03
5 6802	1.7524E-02	1.0569E-02	1.5097E-02	2.2206E-02	1.9737E-02	1.3745E-02	1.2318E-02	1.9318E-02	1.6547E-02	1.7658E-02
TCINBU										
1	4.8788E-02	3.1939E-02	3.4385E-02	5.1510E-02	5.6279E-02	3.3692E-02	3.8504E-02	5.8950E-02	5.1551E-02	5.3370E-02
TCINBP										
1	5.7417E-02	3.7133E-02	4.0609E-02	6.0828E-02	6.4731E-02	4.0392E-02	4.3862E-02	6.7050E-02	5.8952E-02	6.0867E-02
PCGDOB										
1 700	1.7989E-04	3.3741E-04	2.2347E-04	4.0830E-04	1.8597E-03	1.3502E-03	4.9731E-04	2.0490E-03	1.0346E-03	3.9651E-04
2 800	7.2786E-05	1.5744E-04	1.4170E-04	2.3793E-04	9.3724E-04	7.4885E-04	2.3545E-04	1.2331E-03	6.0842E-04	2.0673E-04
3 3101	4.7894E-05	1.2057E-04	9.1299E-05	1.5043E-04	6.8655E-04	4.9882E-04	1.8902E-04	1.0709E-03	5.3475E-04	1.6548E-04
4 6801	1.4722E-04	2.7657E-04	2.4239E-04	4.1987E-04	1.4818E-03	1.4662E-03	3.5653E-04	1.6742E-03	8.6761E-04	3.0309E-04
5 6802	1.1086E-04	2.0870E-04	2.1803E-04	3.7107E-04	1.2831E-03	1.1154E-03	3.0394E-04	1.4806E-03	7.1930E-04	2.6474E-04
TOPCGU										
1	9.5776E-05	1.9680E-04	1.5386E-04	2.6669E-04	1.1471E-03	8.4111E-04	2.9916E-04	1.4237E-03	7.0446E-04	2.5184E-04
TOPCGP										
1	1.4606E-04	2.4619E-04	2.0581E-04	3.2112E-04	1.1868E-03	9.2316E-04	3.4224E-04	1.4439E-03	7.4311E-04	2.9610E-04
PCGTOT										
1 700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 3101	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4 6801	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5 6802	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GDOBTU										
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GDODOL										
1	1.5790E 05	5.5700E 05	3.1590E 05	3.0800E 05	1.9359E 06	1.4396E 06	3.9370E 05	1.2002E 06	7.5060E 05	6.1740E 05
TFDDOL										
1	8.7300E 04	2.7250E 05	1.9930E 05	2.3060E 05	8.9710E 05	1.1198E 06	3.4050E 05	1.0577E 06	5.9990E 05	2.0690E 05

Table 5 continued

CODE	311 6406	312 6407	313 6408	314 6409	315 6410	316 6411	317 6412	318 6501	319 6502	320 6503
DIRBTU										
1 700	0.0	0.0	3.1815E-04	1.1616E-02	2.1357E-03	0.0	1.3355E-03	3.5685E-03	0.0	0.0
2 800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 3101	1.9837E-04	3.4284E-04	6.2313E-04	5.6774E-04	7.8644E-04	5.8455E-03	9.6874E-03	5.1155E-02	5.3654E-02	6.1304E-02
4 6801	8.6330E-04	1.1739E-03	8.6719E-04	2.1025E-03	5.6124E-04	6.8893E-04	8.0090E-04	6.2189E-04	6.3729E-04	5.1670E-04
5 6802	0.0	8.2120E-04	6.5817E-04	1.5078E-03	1.2006E-03	1.7474E-03	8.1628E-04	1.7943E-03	8.2458E-04	1.2867E-03
INVBTU										
1 700	1.6142E-02	2.5264E-02	2.2557E-02	3.9720E-02	2.4981E-02	3.1416E-02	2.1786E-02	1.0576E-02	1.0063E-02	4.5007E-03
2 800	3.1619E-02	3.0430E-02	3.9302E-02	4.7556E-02	2.7036E-02	4.4970E-02	4.3501E-02	6.7869E-02	7.5059E-02	7.8561E-02
3 3101	1.8002E-02	1.3402E-02	2.1100E-02	1.6416E-02	1.3984E-02	2.4207E-02	2.6427E-02	6.4417E-02	6.6936E-02	7.6798E-02
4 6801	4.6157E-03	5.6111E-03	5.3838E-03	5.1934E-03	3.6123E-03	5.6369E-03	4.3750E-03	1.8075E-03	4.3847E-03	1.6330E-03
5 6802	1.5087E-02	1.8159E-02	1.9516E-02	3.2735E-02	1.4163E-02	2.2813E-02	1.7770E-02	8.9409E-03	1.2839E-02	8.1606E-03
TCINBU										
1	4.2966E-02	4.9865E-02	5.6266E-02	8.1881E-02	4.8265E-02	7.0530E-02	6.0742E-02	7.6567E-02	8.0567E-02	8.1366E-02
TCINBP										
1	5.0518E-02	5.9045E-02	6.5074E-02	9.0378E-02	5.4174E-02	7.9752E-02	6.7900E-02	7.9524E-02	8.7740E-02	8.4037E-02
PCGDOB										
1 700	5.4816E-05	1.7947E-04	1.8951E-04	4.2119E-04	1.2204E-05	4.4736E-04	5.1053E-04	2.7174E-03	2.1329E-03	1.3896E-03
2 800	3.9166E-05	7.8853E-05	1.2044E-04	1.8395E-04	4.8180E-06	2.3359E-04	3.7185E-04	6.3610E-03	5.8032E-03	8.8476E-03
3 3101	3.4537E-05	5.3788E-05	1.0015E-04	9.8345E-05	3.8599E-06	1.9475E-04	3.4989E-04	9.3513E-03	8.0157E-03	1.3396E-02
4 6801	6.2565E-05	1.5911E-04	1.8055E-04	2.1982E-04	7.0445E-06	3.2041E-04	4.0925E-04	1.8539E-03	3.7098E-03	2.0125E-03
5 6802	4.6355E-05	1.1672E-04	1.4835E-04	3.1407E-04	6.2603E-06	2.9393E-04	3.7677E-04	2.0786E-03	2.4622E-03	2.2796E-03
TOPCGU										
1	4.0985E-05	9.9182E-05	1.3378E-04	2.5074E-04	6.7611E-06	2.8707E-04	4.0888E-04	5.8218E-03	4.5591E-03	7.4499E-03
TCPCGP										
1	9.0229E-05	1.5023E-04	1.8211E-04	2.8639E-04	5.5078E-05	3.2809E-04	4.4174E-04	5.2286E-03	4.6854E-03	6.6393E-03
PCGTOT										
1 700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 3101	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4 6801	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5 6802	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GDOBTU										
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GDODOL										
1	1.2890E 05	4.6150E 05	3.1110E 05	2.0710E 05	2.8850E 05	6.6930E 05	7.3690E 05	1.1143E 07	3.8402E 06	1.3486E 07
TFDDOL										
1	4.2400E 04	8.8700E 04	1.0490E 05	1.3240E 05	6.1000E 03	1.7780E 05	2.9260E 05	3.2082E 06	2.6465E 06	3.8550E 06

Table 5 continued

CODE	321 6504	322 6505	323 6506	324 6507	325 6600	326 6700	327 6801	328 6802	329 6803	330 6901
DIRBTU										
1 700	3.4888E-03	0.0	0.0	0.0	0.0	0.0	(3.5600E-01)	1.0675E-03	5.6711E-03	0.0
2 800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	(1.1858E-00)	0.0	0.0
3 3101	1.1185E-01	1.2823E-01	4.8190E-04	2.2430E-02	5.4491E-03	1.4595E-03	(3.5230E-02)	3.5096E-03	2.9126E-02	9.7139E-03
4 6801	3.5660E-04	2.4103E-04	3.6300E-03	1.5697E-03	1.1938E-03	1.1174E-03	1.9676E-02	1.4208E-04	1.5541E-03	9.1206E-04
5 6802	9.0114E-04	1.6921E-03	4.7223E-01	3.2014E-03	2.5025E-03	2.2899E-03	(1.4400E-01)	7.2898E-02	1.1092E-02	2.0186E-03
INVBTU										
1 700	8.5267E-03	4.8690E-03	9.5070E-03	5.2606E-03	3.9993E-03	5.2478E-03	4.3659E-02	5.8159E-03	2.1762E-02	6.4574E-03
2 800	1.2945E-01	1.4651E-01	4.7569E-01	3.1120E-02	1.4420E-02	1.4387E-02	3.9862E-02	1.5607E-01	9.0706E-02	2.5502E-02
3 3101	1.3462E-01	1.4553E-01	7.5688E-03	2.6172E-02	9.3315E-03	7.5211E-03	1.6821E-02	1.3010E-02	4.6156E-02	1.7961E-02
4 6801	1.4927E-03	1.6595E-03	4.7250E-03	2.4249E-03	1.7865E-03	2.3694E-03	2.2491E-02	1.6151E-03	7.0224E-03	2.1798E-03
5 6802	7.7035E-03	1.2701E-02	4.8058E-01	7.4955E-03	5.8005E-03	7.4716E-03	2.3773E-02	1.2830E-01	4.8917E-02	8.6245E-03
TCINBU										
1	1.3643E-01	1.4965E-01	4.8029E-01	3.3862E-02	1.6563E-02	1.7173E-02	6.0157E-02	1.6021E-01	1.0517E-01	2.9695E-02
TCINBP										
1	1.3887E-01	1.5237E-01	4.8802E-01	3.7829E-02	1.9486E-02	2.1049E-02	9.6952E-02	1.6285E-01	1.1666E-01	3.3261E-02
PCGDOB										
1 700	1.6531E-03	8.5405E-04	2.1396E-04	4.7567E-05	2.1637E-03	1.8577E-05	2.4706E-02	1.8590E-03	2.5378E-03	1.3315E-02
2 800	9.1547E-03	9.3739E-03	3.9050E-03	1.0264E-04	2.8457E-03	1.8577E-05	8.2282E-03	1.8197E-02	3.8585E-03	1.9181E-02
3 3101	1.4745E-02	1.4422E-02	9.6236E-05	1.3370E-04	2.8523E-03	1.5042E-05	5.3778E-03	2.3494E-03	3.0411E-03	2.0924E-02
4 6801	1.1552E-03	1.1619E-03	4.2447E-04	8.7521E-05	3.8581E-03	3.3481E-05	5.0804E-02	2.0607E-03	3.2689E-03	1.7941E-02
5 6802	1.3513E-03	2.0157E-03	9.7858E-03	6.1322E-05	2.8394E-03	2.3931E-05	1.2172E-02	3.7105E-02	5.1614E-03	1.6090E-02
TOPCGU										
1	7.8871E-03	7.8268E-03	3.2253E-03	8.7972E-05	2.5164E-03	1.6744E-05	7.9365E-03	1.5278E-02	3.5346E-03	1.7573E-02
TCPCGP										
1	6.9233E-03	6.8724E-03	2.8548E-03	1.3309E-04	2.6095E-03	6.6409E-05	1.2195E-02	1.3347E-02	3.4193E-03	1.6985E-02
PCGTOT										
1 700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 3101	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4 6801	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5 6802	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GCOBTU										
1	0.0	0.0	0.0	0.0	0.0	0.0	3.1280E 06	1.3800E 07	0.0	0.0
GDODOL										
1	5.0339E 06	4.3688E 06	1.0265E 06	5.5720E 05	1.3495E 07	2.3080E 06	1.5427E 07	1.1302E 07	2.9467E 06	4.8440E 07
TFDDOL										
1	2.4207E 06	2.1501E 06	2.8100E 05	1.1290E 05	6.7552E 06	4.4200E 04	7.0657E 06	3.9910E 06	1.4561E 06	2.5746E 07

Table 5 continued

	331	332	333	334	335	336	337	338	339	340
CODE	6902	7001	7002	7003	7004	7005	7101	7102	7201	7202
DIRBTU										
1 700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 3101	9.4570E-03	2.5911E-03	9.6591E-03	3.5154E-03	2.5740E-03	3.1964E-03	0.0	8.0978E-04	9.5015E-03	9.3421E-03
4 6801	2.2094E-03	1.4457E-03	3.1427E-03	1.3600E-03	1.6704E-03	1.4296E-03	0.0	3.5236E-04	1.6467E-03	9.7087E-04
5 6802	5.1955E-03	3.4129E-03	7.4443E-03	3.2831E-03	3.9880E-03	3.3991E-03	0.0	1.2021E-03	8.5831E-03	2.3474E-03
INVBTU										
1 700	7.0719E-03	5.0932E-03	1.7009E-02	6.1150E-03	8.2063E-03	6.2483E-03	2.3096E-03	4.7528E-03	6.8113E-03	9.8920E-03
2 800	2.3718E-02	1.2771E-02	4.5975E-02	1.8126E-02	2.1115E-02	1.7350E-02	7.0896E-03	1.5778E-02	3.1774E-02	2.8550E-02
3 3101	1.3898E-02	5.9333E-03	2.4796E-02	9.8782E-03	1.0011E-02	9.0227E-03	4.7649E-03	8.6661E-03	1.7798E-02	1.8472E-02
4 6801	3.2281E-03	2.2504E-03	6.7519E-03	2.7083E-03	3.5341E-03	2.6254E-03	6.3610E-04	1.5654E-03	2.9273E-03	2.9353E-03
5 6802	1.0960E-02	7.3781E-03	2.3288E-02	9.0867E-03	1.1914E-02	8.9667E-03	2.6782E-03	7.2778E-03	1.5480E-02	1.1318E-02
TCINBU										
1	2.7437E-02	1.5527E-02	5.5970E-02	2.1428E-02	2.5651E-02	2.0871E-02	8.7384E-03	1.8904E-02	3.5545E-02	3.5393E-02
TCINBP										
1	3.2718E-02	1.9208E-02	6.7016E-02	2.5858E-02	3.1432E-02	2.5166E-02	9.7791E-03	2.1465E-02	4.0334E-02	4.0195E-02
PCGDOB										
1 700	3.5572E-02	2.3301E-03	2.2197E-03	8.4643E-04	5.3577E-03	0.0	7.1634E-03	6.6288E-03	1.4092E-03	5.7235E-03
2 800	4.3518E-02	2.1312E-03	2.1885E-03	9.1519E-04	5.0286E-03	0.0	8.0208E-03	8.0267E-03	2.3979E-03	6.0257E-03
3 3101	3.9496E-02	1.5336E-03	1.8282E-03	7.7251E-04	3.6928E-03	0.0	8.3497E-03	6.8287E-03	2.0804E-03	6.0383E-03
4 6801	6.4814E-02	4.1095E-03	3.5171E-03	1.4964E-03	9.2101E-03	0.0	7.8752E-03	8.7149E-03	2.4174E-03	6.7793E-03
5 6802	4.9878E-02	3.0540E-03	2.7497E-03	1.1380E-03	7.0377E-03	0.0	7.5157E-03	9.1838E-03	2.8977E-03	5.9250E-03
TCPCGU										
1	3.8513E-02	1.9475E-03	2.0344E-03	8.2305E-04	4.6130E-03	0.0	7.7813E-03	7.5224E-03	2.0987E-03	5.8423E-03
TCPCGP										
1	3.9851E-02	2.1489E-03	2.1609E-03	9.1088E-04	4.9684E-03	4.8547E-05	7.5406E-03	7.4074E-03	2.1001E-03	5.7649E-03
PCGTOT										
1 700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 3101	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4 6801	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5 6802	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GDOBTU										
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GDODOL										
1	7.2173E 07	1.0746E 07	2.1920E 06	2.9720E 06	1.3629E 07	4.3146E 06	3.8726E 07	4.5161E 07	3.7572E 06	8.7998E 06
TFDDOL										
1	6.2805E 07	5.7122E 06	1.6294E 06	1.7283E 06	8.1518E 06	0.0	3.8726E 07	1.7414E 07	2.5832E 06	7.2244E 06

Table 5 continued

	CODE	341 7203	342 7301	343 7302	344 7303	345 7500	346 7601	347 7602	348 7701	349 7702	350 7703
DIRBTU											
1	700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	3101	3.1441E-03	3.8154E-03	6.6051E-04	5.0092E-03	5.0159E-03	2.0808E-03	2.3260E-03	3.4609E-03	6.3314E-03	7.5652E-03
4	6801	9.9622E-04	1.5542E-03	5.7134E-05	1.4543E-03	6.4600E-04	6.8656E-04	1.3659E-03	5.0405E-04	2.5474E-03	5.5727E-03
5	6802	5.2708E-03	3.8857E-03	5.6828E-04	4.4764E-03	1.5251E-03	1.6759E-03	2.6452E-03	2.3645E-03	4.9967E-03	1.1893E-02
INVBTU											
1	700	3.9852E-03	8.5683E-03	1.5135E-02	5.1841E-03	9.3985E-03	6.5632E-03	6.2334E-03	2.9081E-03	9.5642E-03	1.5143E-02
2	800	1.5005E-02	2.1613E-02	2.6770E-02	1.9919E-02	2.2795E-02	1.8747E-02	1.7793E-02	1.1862E-02	2.6401E-02	3.6529E-02
3	3101	6.7201E-03	1.1282E-02	1.3451E-02	1.1405E-02	1.3537E-02	1.0829E-02	9.2068E-03	7.0317E-03	1.5159E-02	1.5901E-02
4	6801	1.6709E-03	3.1575E-03	3.4066E-03	2.4291E-03	2.4469E-03	2.4270E-03	2.6046E-03	1.1905E-03	4.0327E-03	7.4054E-03
5	6802	8.9070E-03	1.1206E-02	1.3993E-02	9.4358E-03	1.0050E-02	8.7180E-03	8.8673E-03	5.4222E-03	1.2604E-02	2.2219E-02
TOINBU											
1		1.7255E-02	2.6902E-02	3.8366E-02	2.2580E-02	2.9652E-02	2.2789E-02	2.1321E-02	1.3533E-02	3.1776E-02	4.3979E-02
TCINBP											
1		1.9988E-02	3.2067E-02	4.3939E-02	2.6554E-02	3.3655E-02	2.6759E-02	2.5582E-02	1.5481E-02	3.8374E-02	5.6094E-02
PCGDOB											
1	700	8.9221E-04	1.9833E-03	2.0594E-04	1.2655E-03	5.1282E-03	6.9538E-04	1.8781E-03	2.1037E-03	5.3874E-03	2.9903E-03
2	800	1.2254E-03	1.8249E-03	1.3287E-04	1.7737E-03	4.5368E-03	7.2451E-04	1.9555E-03	3.1300E-03	5.4247E-03	2.6313E-03
3	3101	8.5002E-04	1.4755E-03	1.0341E-04	1.5729E-03	4.1729E-03	6.4825E-04	1.5672E-03	2.8739E-03	4.8244E-03	1.7741E-03
4	6801	1.4932E-03	2.9175E-03	1.8503E-04	2.3669E-03	5.3293E-03	1.0264E-03	3.1325E-03	3.4377E-03	9.0675E-03	5.8374E-03
5	6802	1.8042E-03	2.3469E-03	1.7228E-04	2.0840E-03	4.9613E-03	8.3573E-04	2.4172E-03	3.5489E-03	6.4238E-03	3.9699E-03
TCPCGU											
1		1.0924E-03	1.7381E-03	1.4839E-04	1.5481E-03	4.6168E-03	6.7863E-04	1.7875E-03	2.7841E-03	4.9653E-03	2.3446E-03
TCPCGP											
1		1.1412E-03	1.8440E-03	1.9509E-04	1.6234E-03	4.5629E-03	7.3772E-04	1.9090E-03	2.7944E-03	5.2551E-03	2.6709E-03
PCGTOT											
1	700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	3101	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	6801	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	6802	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GDOBTU											
1		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GDODOL											
1		2.8128E 06	1.3373E 07	1.2699E 07	1.0943E 07	1.0866E 07	3.2013E 06	4.4957E 06	9.2282E 06	7.0478E 06	2.8711E 06
TFDDOL											
1		2.7954E 06	2.8902E 06	1.6950E 05	3.0479E 06	6.8128E 06	1.3229E 06	3.7619E 06	9.0324E 06	7.0332E 06	2.4657E 06

Table 5 continued

CODE	351 7704	352 7705	353 7801	354 7802	355 7804	356 7901	357 7902	358 7903	359 8001	360 8002
DIRBTU										
1 700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 3101	8.1719E-03	6.2831E-03	1.6280E-03	4.7699E-04	6.4763E-05	1.4234E-02	3.7846E-02	3.5520E-03	0.0	0.0
4 6801	4.0240E-03	4.2392E-03	7.1503E-04	0.0	1.4727E-03	1.3339E-02	0.0	5.1142E-03	0.0	0.0
5 6802	8.9860E-03	4.5348E-03	1.1158E-03	1.1304E-03	9.8032E-03	8.8090E-03	0.0	3.6478E-02	0.0	0.0
INVBTU										
1 700	1.2254E-02	1.1528E-02	3.4483E-03	1.3635E-02	4.7830E-03	3.2000E-02	1.3153E-02	1.6778E-02	0.0	0.0
2 800	3.4134E-02	2.4784E-02	1.9238E-02	2.0081E-02	1.7172E-02	4.6844E-02	5.5916E-02	6.9101E-02	0.0	0.0
3 3101	1.7260E-02	1.3590E-02	1.6120E-02	1.4248E-02	3.5551E-03	2.3999E-02	4.8314E-02	1.9115E-02	0.0	0.0
4 6801	5.7262E-03	5.7263E-03	1.2853E-03	2.7302E-03	2.2209E-03	1.5481E-02	5.1625E-03	7.3755E-03	0.0	0.0
5 6802	1.8348E-02	1.2303E-02	4.3717E-03	6.8512E-03	1.4086E-02	2.5236E-02	1.1365E-02	5.1691E-02	0.0	0.0
TCINBU										
1	4.0439E-02	3.0363E-02	2.1351E-02	3.0880E-02	1.9648E-02	6.2762E-02	6.3706E-02	7.8217E-02	0.0	0.0
TCINBP										
1	4.9807E-02	3.9732E-02	2.3454E-02	3.5346E-02	2.3281E-02	8.8089E-02	7.2152E-02	9.0284E-02	0.0	0.0
PCGDOB										
1 700	5.1876E-03	7.0992E-03	3.3232E-04	0.0	2.7696E-05	0.0	0.0	1.1528E-03	0.0	0.0
2 800	5.2710E-03	5.5671E-03	6.7628E-04	0.0	3.6270E-05	0.0	0.0	1.7319E-03	0.0	0.0
3 3101	4.1284E-03	4.7283E-03	8.7769E-04	0.0	1.1631E-05	0.0	0.0	7.4203E-04	0.0	0.0
4 6801	9.6765E-03	1.4076E-02	4.9443E-04	0.0	5.1334E-05	0.0	0.0	2.0228E-03	0.0	0.0
5 6802	7.0279E-03	6.8547E-03	3.8119E-04	0.0	7.3797E-05	0.0	0.0	3.2135E-03	0.0	0.0
TOPCGU										
1	4.7040E-03	4.9802E-03	5.9541E-04	0.0	3.1843E-05	0.0	0.0	1.5223E-03	0.0	0.0
TCPCGP										
1	5.0955E-03	5.7953E-03	6.1042E-04	4.8547E-05	8.1218E-05	4.8547E-05	4.8547E-05	1.5650E-03	4.8547E-05	4.8547E-05
PCGTOT										
1 700	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2 800	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3 3101	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4 6801	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5 6802	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GDOBTU										
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GDODOL										
1	5.3551E 06	8.7088E 06	4.1412E 06	4.5730E 05	1.2651E 06	6.7500E 05	1.7330E 06	4.8280E 06	0.0	0.0
TFDDOL										
1	5.2859E 06	7.6890E 06	1.2033E 06	0.0	7.2300E 04	0.0	0.0	8.5790E 05	-3.4773E 06	-1.4318E 06

Table 5 continued

CODE	361 8100	362 8200
DIRBTU		
1 700	0.0	0.0
2 800	0.0	0.0
3 3101	0.0	0.0
4 6801	0.0	0.0
5 6802	0.0	0.0
INVBTU		
1 700	9.6138E-03	2.8814E-02
2 800	6.3842E-02	4.1196E-02
3 3101	5.5016E-02	1.9434E-02
4 6801	2.8337E-03	5.2121E-03
5 6802	1.3106E-02	2.2265E-02
TCINBU		
1	7.0512E-02	6.4595E-02
TCINBP		
1	7.5148E-02	7.3122E-02
PCGDOB		
1 700	0.0	8.8939E-04
2 800	0.0	4.6383E-04
3 3101	0.0	3.3891E-04
4 6801	0.0	6.4218E-04
5 6802	0.0	6.2180E-04
TOPCGU		
1	0.0	5.6962E-04
TCPCGP		
1	4.8547E-05	6.0391E-04
PCGTOT		
1 700	0.0	0.0
2 800	0.0	0.0
3 3101	0.0	0.0
4 6801	0.0	0.0
5 6802	0.0	0.0
GDOBTU		
1	0.0	0.0
GDODOL		
1	7.7935E 06	2.1062E 06
TFDDOL		
1	0.0	3.8540E 05

Table 6. The matrix $\underline{\underline{S}}$, which accounts for energy sold directly to final demand.

$\underline{\underline{S}}$ is actually 5 x 362, but entries in all but the energy sector-column are zero, so I adopt the shorthand of expressing it as 5 x 5.

$$\underline{\underline{S}} = \begin{array}{r} \\ 7.00 \\ 8.00 \\ 31.01 \\ 68.01 \\ 68.02 \end{array} \begin{array}{c} \begin{array}{ccccc} 7.00 & 8.00 & 31.01 & 68.01 & 68.02 \end{array} \\ \begin{pmatrix} 4.094 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 1.060 & 0 & 0 \\ 0 & 0 & 0 & 0.1435 & 0 \\ 0 & 0 & 0 & 0 & 0.9925 \end{pmatrix} \end{array} \times 10^6 \text{ Btu/\$(1963)}$$

(No output of crude and natural gas extraction is sold to final demand.)

$$\underline{\underline{C}} = \begin{pmatrix} 1 & 0 & 0 & 1.754 & 0 \\ 0 & 1 & 0.896 & 0.843 & .970 \\ 0 & 0 & 1 & 0.173 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0.709 & 1 \end{pmatrix}$$

$$\underline{\underline{C}}\,\underline{\underline{S}} = \begin{pmatrix} 4.094 & 0 & 0 & 0.2517 & 0 \\ 0 & 0 & 0.9498 & 0.12097 & 0.9627 \\ 0 & 0 & 1.060 & 0.02483 & 0 \\ 0 & 0 & 0 & 0.1435 & 0 \\ 0 & 0 & 0 & 0.1017 & 0.9925 \end{pmatrix}$$

Now primary energy (which is used to produce secondary energy delivered to final demand) is also allocated to final demand. For example, \$1 FD for refined petroleum products results in 1.060 x 10^6 Btu being delivered to FD, and in 0.9498 x 10^6 Btu of crude oil and gas being allocated to FD. The latter is smaller because of a net importation of refined petroleum products in 1963. Refer to Section II.C.

Table 7. Breakdown of total energy requirements by sectors. $(PCINVB)_{isj}$ is the fraction of total energy i demanded by $1 TFD(j) which is supplied to s. E.g., 65% of the coal required to deliver a car to final demand was used by the primary metals industries. $(TOTPCP)_{isj}$ is the corresponding fraction for primary energy, and $(TOTPLP)_{isj}$ for primary energy corrected for energy lost in electricity generation. Some sectors were omitted, so columns may add to less than unity. See Table 8 for definitions of the sectors.

APPAREL MADE FROM PURCHASED MATERIALS (18.04)

RCW	DESCRIPTION	PCINVB COL 1	COL 2	COL 3	COL 4	COL 5	TOTPCU	TOTPCP
1	FOOD	0.02403766	0.05819343	0.10337794	0.03427364	0.01475514	0.05307137	0.05076722
2	CONSTRUCTION	0.00051482	0.00806491	0.01530776	0.00115607	0.00102906	0.00720063	0.00672473
3	TEXTILES	0.32246470	0.18720484	0.17498326	0.36393434	0.21070105	0.18886352	0.19197059
4	PAPER AND LUMBER	0.05961297	0.04392709	0.03549445	0.02830514	0.05521058	0.04634435	0.04425637
5	FURNITURE	0.00004977	0.00003809	0.00002686	0.00005741	0.00005194	0.00003728	0.00003722
6	CHEMICALS	0.36575532	0.27946651	0.18280542	0.25303650	0.38164270	0.28693998	0.27764720
7	RUBBER	0.00385064	0.00222231	0.00192922	0.00401557	0.00265458	0.00226974	0.00229035
8	LEATHER	0.00240198	0.00195073	0.00226452	0.00088760	0.00173877	0.00204910	0.00193578
9	STONE, CLAY, GLASS	0.00332654	0.00710142	0.00161983	0.00318717	0.01319243	0.00661685	0.00627882
10	PRIMARY METALS	0.05180266	0.02073919	0.01112732	0.02434834	0.03189899	0.02470296	0.02402274
11	FABRICATED METAL	0.00091333	0.00123489	0.00105755	0.00149694	0.00149015	0.00112804	0.00111497
12	MACHINERY	0.00208268	0.00147159	0.00129024	0.00224974	0.00174468	0.00146255	0.00146004
13	INSTRUMENTS	0.00128856	0.00094906	0.00076753	0.00172803	0.00119207	0.00091269	0.00092627
14	TRANSPORT. EQUIPMENT	0.00056167	0.00031891	0.00028141	0.00064349	0.00037622	0.00032492	0.00033108
15	TRANSPORT. SERVICES	0.00517489	0.10066992	0.17917055	0.00520271	0.02518285	0.09041911	0.08400792
16	MINING(METAL, STONE, FERT)	0.00486328	0.00937431	0.00405356	0.00626886	0.01543031	0.00864459	0.00830134
17	COAL MINING	0.00737753	0.00121606	0.00151986	0.00376453	0.00097155	0.00194072	0.00197380
18	CRUDE GAS	0.00133203	0.02452655	0.00159576	0.00299118	0.00595474	0.02190334	0.02043116
19	PETR.REFINING, ETC.	0.00322705	0.05243285	0.07011527	0.00555166	0.03715599	0.04695118	0.04375529
20	ELECTRIC UTILITIES	0.02696154	0.00845973	0.00314413	0.06054444	0.01445238	0.00696665	0.00928313
21	GAS UTILITIES	0.00046057	0.01689342	0.00146165	0.00019575	0.03386181	0.01516335	0.01405657
22	WATER	0.00099092	0.00294041	0.00410138	0.00072235	0.00190819	0.00272686	0.00255993
23	WHOLSALE & RETAIL TRADE	0.00900522	0.03774178	0.05687203	0.02022198	0.02011089	0.03355076	0.03202659
24	FINANCE INSUR & BUSINESS	0.00816594	0.01680208	0.01371900	0.01833733	0.02096979	0.01484403	0.01460848
25	MEDICAL	0.00005753	0.00009101	0.00006456	0.00012919	0.00012369	0.00008011	0.00008025
26	EDUCATION	0.00105857	0.00144951	0.00140547	0.00237711	0.00157904	0.00127273	0.00129014
27	ADVERTISING	0.00009845	0.00076403	0.00077871	0.00022108	0.00079314	0.00068105	0.00064126
28	RADIO, TV, COMMUNICATIONS	0.00182764	0.00418891	0.00487047	0.00400132	0.00372554	0.00371353	0.00362722

Table 7 continued

HOUSEHOLD REFRIGERATORS AND FREEZERS (54.02)

ROW	DESCRIPTION	PCINVB COL 1	COL 2	COL 3	COL 4	COL 5	TOTPCU	TOTPCP
1	FOOD	0.00231421	0.00503170	0.00879716	0.00260516	0.00283729	0.00486923	0.00473309
2	CONSTRUCTION	0.00024931	0.00640194	0.01584429	0.00086884	0.00061391	0.00611635	0.00588072
3	TEXTILES	0.00147144	0.00139427	0.00169892	0.00262833	0.00126191	0.00132255	0.00133722
4	PAPER AND LUMBER	0.03954635	0.03956627	0.04331825	0.02706983	0.03896591	0.03947876	0.03853487
5	FURNITURE	0.00004150	0.00004669	0.00004482	0.00007018	0.00005004	0.00004454	0.00004454
6	CHEMICALS	0.11142856	0.18718439	0.16725057	0.16377169	0.19169122	0.17994189	0.17672569
7	RUBBER	0.01482244	0.01613455	0.01832195	0.03195031	0.01546478	0.01508376	0.01530410
8	LEATHER	0.00007837	0.00009721	0.00014649	0.00004495	0.00006993	0.00009665	0.00009376
9	STONE, CLAY, GLASS	0.03807147	0.04293858	0.01213944	0.02246334	0.06474930	0.04073159	0.03961079
10	PRIMARY METALS	0.52726626	0.27300143	0.21053314	0.28841335	0.32576561	0.28555590	0.28121877
11	FABRICATED METAL	0.00325898	0.00642443	0.00730503	0.00779483	0.00615190	0.00604050	0.00599430
12	MACHINERY	0.00332691	0.00523917	0.00684652	0.00717177	0.00444409	0.00493647	0.00492027
13	INSTRUMENTS	0.01271190	0.01560337	0.01606088	0.03281128	0.01602336	0.01439001	0.01466288
14	TRANSPORT. EQUIPMENT	0.00157631	0.00102139	0.00116936	0.00221923	0.00097285	0.00099044	0.00100817
15	TRANSPORT. SERVICES	0.00407437	0.09691834	0.22819829	0.00541661	0.01680961	0.09295779	0.08916718
16	MINING(METAL, STONE, FERT)	0.01421364	0.01757137	0.01456317	0.02298678	0.02031498	0.01681533	0.01672134
17	COAL MINING	0.00846904	0.00213209	0.00345914	0.00670670	0.00137479	0.00233509	0.00241654
18	CRUDE GAS	0.00071494	0.02010571	0.00169811	0.00249157	0.00393972	0.01921459	0.01846794
19	PETR.REFINING, ETC.	0.00154988	0.03884034	0.06790823	0.00412765	0.02190134	0.03716089	0.03569831
20	ELECTRIC UTILITIES	0.01614726	0.00773814	0.00373332	0.05627342	0.01066938	0.00605064	0.00730746
21	GAS UTILITIES	0.00042561	0.02384308	0.00267796	0.00028073	0.03857220	0.02287525	0.02191415
22	WATER	0.00064678	0.00293123	0.00530747	0.00073171	0.00153527	0.00282266	0.00272281
23	WHOLSALE & RETAIL TRADE	0.00403803	0.02532993	0.04916930	0.01407259	0.01113718	0.02394149	0.02330607
24	FINANCE INSUR & BUSINESS	0.00349216	0.01096860	0.01183556	0.01217021	0.01091339	0.01021967	0.01011414
25	MEDICAL	0.00000842	0.00002122	0.00002092	0.00002936	0.00002239	0.00001963	0.00001959
26	EDUCATION	0.00043663	0.00089836	0.00112611	0.00152166	0.00079283	0.00082426	0.00083027
27	ADVERTISING	0.00010553	0.00125078	0.00165485	0.00036777	0.00104795	0.00119017	0.00114966
28	RADIO, TV, COMMUNICATIONS	0.00118109	0.00356243	0.00508474	0.00382020	0.00274530	0.00332830	0.00329008

Table 7 continued

MOTOR VEHICLES AND PARTS (59.03)

ROW	DESCRIPTION	PCINVB COL 1	COL 2	COL 3	COL 4	COL 5	TOTPCU	TOTPCP
1	FOOD	0.00182209	0.00473944	0.00814805	0.00276412	0.00243944	0.00375934	0.00355243
2	CONSTRUCTION	0.00029032	0.00798706	0.01822392	0.00114857	0.00079247	0.00577839	0.00525714
3	TEXTILES	0.00605153	0.00561408	0.00573410	0.01323273	0.00573300	0.00465228	0.00503942
4	PAPER AND LUMBER	0.01606276	0.01770046	0.01642363	0.01309536	0.01945784	0.01692072	0.01603230
5	FURNITURE	0.00010644	0.00011134	0.00013816	0.00018412	0.00009664	0.00009659	0.00009869
6	CHEMICALS	0.06253487	0.12235790	0.10338336	0.10443318	0.12675792	0.09860235	0.09526873
7	RUBBER	0.01345425	0.01000244	0.00963317	0.01912288	0.01073449	0.00972520	0.00997474
8	LEATHER	0.00008995	0.00011713	0.00016253	0.00005856	0.00008899	0.00010956	0.00010209
9	STONE,CLAY,GLASS	0.00860091	0.03117183	0.00720984	0.01609363	0.05030763	0.02379638	0.02239468
10	PRIMARY METALS	0.65114659	0.34291571	0.24607819	0.34779626	0.43021917	0.43447876	0.41242307
11	FABRICATED METAL	0.00623930	0.01277688	0.01319797	0.01700672	0.01305296	0.00949337	0.00962812
12	MACHINERY	0.00870196	0.01394391	0.01589028	0.02324948	0.01314651	0.01047485	0.01091750
13	INSTRUMENTS	0.00685941	0.00842491	0.00651314	0.01861169	0.01022390	0.00635704	0.00692078
14	TRANSPORT. EQUIPMENT	0.15121984	0.11011714	0.08140337	0.25227779	0.13638180	0.10333025	0.10920006
15	TRANSPORT. SERVICES	0.00475569	0.11333966	0.24784762	0.00692079	0.01919273	0.08329719	0.07515156
16	MINING(METAL,STONE,FERT)	0.01454443	0.01704729	0.01459341	0.02341993	0.01964339	0.01473218	0.01474649
17	COAL MINING	0.00892688	0.00235943	0.00352480	0.00802499	0.00160661	0.00387799	0.00400368
18	CRUDE GAS	0.00068425	0.02020228	0.00157113	0.00270701	0.00418042	0.01462126	0.01328925
19	PETR.REFINING, ETC.	0.00162378	0.05388957	0.09637767	0.00498077	0.02498338	0.03925960	0.03553305
20	ELECTRIC UTILITIES	0.01519378	0.00764433	0.00339597	0.06010916	0.01113052	0.00389260	0.00743099
21	GAS UTILITIES	0.00039213	0.02306287	0.00238517	0.00029361	0.03940021	0.01687910	0.01515579
22	WATER	0.00053961	0.00256750	0.00428068	0.00069300	0.00142010	0.00197449	0.00181608
23	WHOLSALE & RETAIL TRADE	0.00384094	0.02491595	0.04427470	0.01519540	0.01176126	0.01770365	0.01687206
24	FINANCE INSUR & BUSINESS	0.00357606	0.01172556	0.01164225	0.01414749	0.01232606	0.00813723	0.00822455
25	MEDICAL	0.00000758	0.00002005	0.00001820	0.00003000	0.00002234	0.00001375	0.00001430
26	EDUCATION	0.00040120	0.00087188	0.00100791	0.00158721	0.00081143	0.00059021	0.00063332
27	ADVERTISING	0.00005375	0.00066879	0.00081476	0.00021263	0.00059173	0.00048062	0.00044494
28	RADIO,TV,COMMUNICATIONS	0.00111904	0.00316713	0.00435150	0.00389808	0.00243777	0.00224200	0.00226606

Table 8. Definition of I/O sectors used in Table 7

TITLE	S	I/O SECTORS INCLUDED (Listed by digits to left of decimal unless otherwise noted)
Food	1	01-04, 14, 15
Construction	2	11, 12
Textiles	3	16, 17, 19
Paper, lumber	4	20, 21, 24, 25
Furniture	5	22, 23
Chemicals	6	27, 28, 30
Rubber	7	32
Leather	8	33
Stone, clay, glass	9	35, 36
Primary metals	10	37, 38
Fabr. metal	11	39, 40, 41, 42
Machinery	12	43-50
Instruments	13	51-53, 55, 57, 58, 62, 63
Transp. eqt.	14	59, 60, 61
Transp. services	15	65, 75
Mining (metals, stone, fert.)	16	05, 06, 09, 10
Coal mining	17	07
Crude and gas	18	08
Pet. ref. and related	19	31
Elect. util.	20	68.01
Gas util	21	68.02
Water	22	68.03
Whsle and retail trade	23	69
Finance, ins., business	24	70, 71, 73.01, 73.03
Medical	25	77.01, 77.02, 77.03
Educational	26	77.04, 77.05
Advertising	27	73.02
Radio, TV, communications	28	56, 66, 67

Not used:
13 Ordnance
18 Apparel
29 Drugs
34 Footwear
54 Hshld appliances
64 Misc. manuf.
72 Hotels
74 R and D
76 Amusements
78 Fed. govt enterprises
79 State and local govt enterprises

Table 9. Comparison of dollar and electrical energy Input-Output coefficients for six selected sectors

Sector	A	$(1-A)^{-1}$	$(1-A)^{-1}/A$	$(1-A)^{-1}/\langle(1-A)^{-1}\rangle$	R (10^3Btu/\$)	T (10^3Btu/\$)	T/R	T/<T>
14.01 Meat products	0.00256	0.01329	5.19	0.94	0.503	3.532	7.02	0.97
14.06 Fluid milk	0.00483	0.01670	3.46	1.18	0.988	4.247	4.30	1.17
54.01 Household cooking equipment	0.00389	0.01651	4.24	1.17	1.370	5.912	4.32	1.63
54.03 Household laundry equipment	0.00382	0.01742	4.56	1.23	1.158	6.229	5.38	1.72
59.03 Motor vehicles and parts	0.00295	0.01510	5.12	1.07	0.812	4.943	6.09	1.36
72.02 Personal and repair services (except auto), barber, and beauty shops	0.00731	0.01383	1.89	0.98	0.971	2.935	3.02	0.81

$$\langle(1-A)^{-1}\rangle = \frac{\left(\text{Dollar output of electric utilities to everything but final demand}\right)}{\left(\text{GNP - electricity to final demand}\right)} = 0.014132$$

$$\langle T\rangle = \frac{\left(\text{Electricity sold to everything but final demand}\right)}{\left(\text{GNP - electricity to final demand}\right)} = 3.627 \times 10^3 \text{Btu/\$}$$

Table 10. Energy Use vs. GNP, 1960-70

	1960		
	Use (10^{15} Btu)	Use/GNP (10^4 Btu/$(1960))	Use/GNP (10^4 Btu/$(1958))
Coal	11.4	2.26	2.34
Refined petroleum	20.6	4.09	4.22
Electricity	2.58	0.512	0.529
Gas	12.7	2.52	2.60
Total primary	46.5	9.23	9.54

	1963		
	Use (10^{15} Btu)	Use/GNP (10^4 Btu/$(1963))	Use/GNP (10^4 Btu/$(1958))
Coal	12.5	2.12	2.27
Refined petroleum	22.6	3.83	4.10
Electricity	3.13	0.530	0.567
Gas	14.2	2.41	2.57
Total primary	51.2	8.67	9.28

	1970		
	Use (10^{15} Btu)	Use/GNP (10^4 Btu/$(1970))	Use/GNP (10^4 Btu/$(1958))
Coal	15.0	1.54	2.07
Refined petroleum	30.3	3.10	4.19
Electricity	5.22	0.535	0.721
Gas	22.1	2.26	3.05
Total primary	70.2	7.19	9.70

	GNP (10^9 Current Dollars)	GNP (10^9 1958 Dollars)
1960	503.7	487.6
1963	590.4	551.8
1970	976.5	723.9

Comparison of energy/GNP ratios in current dollars

	1960	1963	1970
Coal	1.07	1.00	0.73
Refined petroleum	1.07	1.00	0.81
Electricity	0.97	1.00	1.01
Gas	1.05	1.00	0.94
Total primary	1.06	1.00	0.83

Sources for Table 10:

Use figures from Bureau of Mines data, refs. 2 and 15. GNP data from ref. 14. Use figures differ somewhat from those in Tables 1 and 3. Part of the discrepancy is due to different treatment of exports, which here are included. Primary energy includes a conversion for hydropower and nuclear.

Table 11. Energy Impact of the Automobile, 1963[a]

	Dollar Flow (10^9 $)	I/O Sector	I/O Coefficient[8] (Btu/$)	Energy (10^{12} Btu)	% of Total
Gasoline					
production	5.86[c]	31.01	(0.208 Btu/Btu)[c]	5860	57.2
refining	---	31.01		1220	11.9
retail markup[d]	4.05	69.02	32700	130	1.3
Oil					
production	0.83[b]	31.01	---	50[f]	0.5
retail markup	0.55[f]	69.02	32700	20	0.2
Auto					
manufacture	14.43[b]	59.03	70000	1010	9.9
retail markup	10.67[b]	69.02	32700	350	3.4
Repairs, maintenance, parts	10.0[b]	75.00	33700	340	3.3
Parking, garaging	11.7[b]	75.00	33700	390	3.8
Tires					
manufacture	0.83[b]	32.01	99100	80	0.8
retail markup	0.55[f]	69.02	32700	20	0.2
Insurance	8.96[b]	70.04	31400	280	2.7
Taxes (highway const.)	4.9[d]	11.04	98500	490	4.8
Total	73.3 (12.4% of GNP)			10240 (20.5% of U.S. energy)	100.0

[a] The analysis is described in ref. 16. The numbers here differ somewhat since the calculation in ref. 16 was for 1970.

[b] Figures obtained from ref. 3, pp. 306, 307, 322, and ref. 14, pp. 536-37. There were 69 x 10^6 autos registered in 1963, and 7.64 x 10^6 produced domestically at an average producer's price of $1890. 0.41 x 10^6 were imported.

[c] See Table 12.

[d] Retail gasoline markup and taxes from ref. 14, pp. 458-59.

[e] Oil/gasoline ratio = 128 on a Btu basis, from ref. 3, p. 537.

[f] Markup of oil and tires assumed to be 40% of purchaser's price.

Table 12. Inverse energy efficiency (I.E.E.) of the energy producing sectors; i.e., the total primary energy required to deliver 1 Btu of energy of various types to final demand, 1963. See Section IV.B.

I/O Sector	Title	I.E.E. (Btu/Btu)	I.E.E.[a] Corrected for Imports	E.E.[b] (reciprocal)
7.00	Coal mining	1.024	1.024	0.977
31.01	Petroleum refining	1.082	1.208	0.828
68.01	Electric utilities	3.870	3.870	0.258
68.02	Gas utilities	1.134	1.169	0.855

[a]10.4% of refined petroleum, 3.0% of gas were imported in 1963; the energy to produce them was expended outside the U.S. economy.

[b]These results are based on producers' prices, so additional energy would be expended in delivering coal and refined petroleum to most consumers. For electric and gas utilities, sales go directly to final demand.

REFERENCES

1. Earl Cook, "The Flow of Energy in an Industrial Society," Scientific American, September 1971.

2. U.S. Bureau of Mines news release, March 31, 1972.

3. Petroleum Facts and Figures, 1971 Edition, American Petroleum Institute, New York.

4. Statistical Yearbook of the Electric Utility Industry. Published yearly. Edison Electric Institute, New York.

5. Input-Output Structure of the U.S. Economy: 1963, Volumes 1-3, Bureau of Economic Analysis, U.S. Department of Commerce, 1969. Available from U.S. Government Printing Office. BEA has published several amplifying articles: "Input-Output Structure of the U.S. Economy: 1963," Survey of Current Business, November 1969; "Personal Consumption Expenditures in the 1963 Input-Output Study," SCB, January 1971; "Interindustry Transactions in New Structures and Equipment, 1963," SCB, August 1971. In addition, they have an unpublished report, available on request: "Definitions and Conventions of the 1963 Input-Output Study," April 1972. The complete tables are also available on tape from BEA.

6. E. Hirst, "Energy Consumption for Transportation in the U.S.," ORNL-NSF-EP-15, Oak Ridge, Tennessee 37830, March 1972.

7. References center on the work of Wassily Leontief. The one I found most useful is W. Leontief, "Environmental Repercussions and the Economic Structure: An Input Output Approach," Review of Economics and Statistics, 52, No. 3, 262-71 (1970). Also see Leontief's book, Input-Output Economics, Oxford University Press, New York, 1966. Some of the chapters in this book originally appeared in Scientific American. A rather non-technical introduction, with a very helpful sample I/O table, is W. H. Miernyk, The Elements of Input-Output Economics, Random House, New York, 1965.

8. Other I/O tables:

   A. "Fortune's - 1966 Input/Output Matrix." By the publishers of Fortune magazine. 106 sectors; based on BEA data but updated to 1966.

   B. "Input Output Structure of the United States," prepared by the editors of Scientific American. 96 sectors; based on 1963 OBE data, updated and projected to 1970. Graphic and very useful.

9. Standard Industrial Classification Manual, U.S. Bureau of the Budget, 1957.

10. W. A. Reardon, "An Input/Output Analysis of Energy Use Changes from 1947 to 1958 and 1958 to 1962," Battelle Institute, Richland, Wash., 99352, June 1972.

11. 1963 Census of Manufactures, U.S. Department of Commerce. See also U.S. Bureau of the Census publication MC 63 (1) - 7, Fuels and Electric Energy Consumed in Manufacturing Industries, 1962.

12. 1963 Census of Mineral Industries, u.S. Department of Commerce.

13. "Energy Consumption and Gross National Product in the United States; an Examination of a Recent Change in the Relationship," National Economic Research Associates, New York, March 1971.

14. Statistical Abstract of the United States, 1971, U.S. Department of Commerce.

15. "An Energy Model for the United States, Featuring Energy Balances for the Years 1947 to 1965 and Projections and Forecasts for the Years 1980 and 2000," U.S. Bureau of Mines Information Circular 8384, July 1968.

16. E. Hirst and R. A. Herendeen, "Total Energy Demand for Automobiles," paper presented at the Society of Automotive Engineers International Automotive Engineering Congress and Exposition, Detroit, January 1973.

17. R. S. Berry and Margaret Fels, "The Production and Consumption of Automobiles," Illinois Institute for Environmental Quality, July 1972.

18. Merchandising Week, Vol 104, No. 9, February 28, 1972, (Annual Statistical issue).

19. Phone conversation with J. Schleuter, USDA, May 9, 1972.

20. Phone conversation with John Tunnel, Farm Electrification Council, Chicago, May 9, 1972.

21. This based on data from a single month, usually June. The Crop Reporting Board publishes Agricultural Prices yearly.

22. Phone conversation with R. Doelger, Edison Electric Institute, New York, March 24, 1972.

23. Phone conversation with M. Stark, American Transit Association, Washington, D.C., March 24, 1972.

24. "Glossary of Electric Utility Terms," Publication No. 70-40, Edison Electric Institute, New York.

25. "Consumption of Refined Petroleum Products in 1973 Input-Output Industries," JACKFAU-71-73(1), October 1971. Jack Faucett Associates, Chevy Chase, Md. The report is only disaggregated to 80 sectors, but 360 sector worksheets are available from Jack Faucett Associates.

26. W. E. Mooz, "The Effect of Fuel Price Increases on Energy Intensiveness of Freight Transport," Report No. R-804-NSF, Rand Corporation, Santa Monica, Calif., December 1971.

27. Ref. 15, and conversation with W. Readling, Bureau of Mines, April 7, 1972.

28. Gas Facts, 1969 edition. American Gas Association, Arlington, Va.