



Energy in Release 7 of the GTAP Data Base

Robert McDougall

**Center for Global Trade Analysis
Purdue University**

Objectives

- **conformity with IEA data**
- **conformity with stakeholders' local knowledge**
- **minimum effort**
- **plausibility, conformity with other contributed data, truth**
- **support for climate change analysis *et cetera***

Data Hierarchy

- 1. energy**
- 2. macro, trade, protection**
- 3. I-O tables**

Energy Data Set

- **volumes and money values:**
 - **bilateral trade**
 - **absorption**
- **commodity tax rates**
- **22 industries**
- **no domestic/import distinction**

Energy Data Set Construction

- **Assemble price and tax data.**
- **Convert volume, price, and tax data to GTAP concepts and categories.**
- **Bilateralize trade volumes.**
- **Calculate money values as price \times volume.**

IEA, *Extended Energy Balances*

Beyond 20/20 Professional Browser - [Extended Energy Balances (ktoe) (Read-only)]

File Edit View Dimension Item Window Help

PRODUCT

COUNTRY: Chile TIME: 2004

FLOW	Production	Imports	Exports	International Marine Bu...	Stock Changes	Total Primary Energy Supply	Transfers
PRODUCT							
Hard Coal (if no detail)	x	x	x	x	x	x	:
Brown Coal (if no detail)	x	x	x	x	x	x	:
Anthracite	0	0	0	0	0	0	:
Coking Coal	0	777	0	0	0	777	:
Other Bituminous Coal	128	2,410	0	0	-6	2,532	:
Sub-Bituminous Coal	0	0	0	0	0	0	:
Lignite/Brown Coal	0	0	0	0	0	0	:
Peat	0	0	0	0	0	0	:
Patent Fuel	0	0	0	0	0	0	:
Coke Oven Coke	0	380	-25	0	-58	297	:
Gas Coke	0	0	0	0	0	0	:
Coal Tar	0	0	0	0	0	0	:
BKB/Peat Briquettes	0	0	0	0	0	0	:
Gas Works Gas	0	0	0	0	0	0	:
Coke Oven Gas	0	0	0	0	0	0	:
Blast Furnace Gas	0	0	0	0	0	0	:
Oxygen Steel Furnace ...	0	0	0	0	0	0	:
Elec/Heat Output from ...	0	0	0	0	0	0	:

EEB: Virtues

- **detailed: annual time series, 61 products, 75 flows, 149 countries**
- **consistent within countries**
- **complete**
- **documented**
- **prepared with TLC**

EEB: Vices

- **difficult categories: “international marine bunkers”, “transfers”, “heat”, “road”, *etc.***
- **residual categories, “non-specified petroleum products”, “non-specified energy sector”, “non-specified industry”**
- **incomplete country detail**
- **bad reporting**
- **imports and exports unbalanced**

Non-Specified Industry

[ISIC Divisions 25, 33, 36 and 37] Any manufacturing industry not included above. Note: Most countries have difficulties supplying an industrial breakdown for all fuels. In these cases, the *non-specified* industry row has been used. Regional aggregates of industrial consumption should therefore be used with caution.

Incomplete Country Detail

Other Latin America includes Antigua and Barbuda, Aruba, Bahamas, Barbados, Belize, Bermuda, Dominica, French Guyana, Grenada, Guadeloupe, Guyana, Martinique, St. Kitts and Nevis, Saint Lucia, St. Vincent and Grenadines and Suriname.

2001 vs 2004 Edition

Country	Product	Flow	2001	2004
Japan	Electricity	Transport equipt	5157	421
Middle East	Petroleum prods	Services	5863	1093
France	Gas	Services	1138	8
Middle East	Gas	Services	1708	137
Japan	Electricity	Other equipment	8229	14458
USA	Electricity	Electricity	15642	9164
Italy	Gas	Services	8	712
Taiwan	Petroleum prods	Petroleum prods	6458	3003

Prices and Taxes: History

- **first implementation: GTAP 4, 1995**
- **since then, no full updates**
- **some data collected for 2001**
- **price indices updated**
- **price indices applied to old observations**
- **for GTAP 7, first full update**

Prices and Taxes: Sources

- **IEA, *Energy Prices and Taxes***
- **EIA, *Energy Information Annual***
- **OLADE, *Sistema de Información Económica-Energetica***
- **LBNL, *China Energy Databook***
- **EIA, *Petroleum Marketing Monthly***
- **TERI, *TERI Energy Data Directory and Yearbook***

Commodity Detail

	volumes	prices
coal	5	2
petroleum products	17	4

Basic Prices: Methods

- **observed**
 - **$(1 + \text{duty_rate}) \times \text{import_price}$**
 - **$(\text{user_price} - \text{tax}) / (1 + \text{margin_rate})$, where **user_price**:**
 - **observed for reference year**
 - **$\text{price_index} \times \text{old_observation}$**
 - **cross-country average**
- **cross-country average**

User Prices: Sources

	EPT	IEA	SIEE	CED	PMM	TEDDY	Total
1994	11	0	1	0	0	0	12
1995	5	23	3	0	0	0	31
1996	3	31	1	0	0	0	35
1997	11	42	1	0	0	0	54
1998	18	1	3	0	0	0	22
1999	15	2	4	0	0	0	21
2000	15	0	1	0	0	0	16
2001	13	50	14	0	0	0	77
2002	10	47	7	0	0	0	64
2003	16	0	3	0	0	0	19
2004	414	0	116	2	1	1	534
Total	531	196	154	2	1	1	885

2001 Price Updates (USD/toe)

		Old	New
usa	gas	102	173
gbr	gas	82	244
chn	coa	14	33
zaf	ely	638	215
tur	ely	328	886
can	ely	699	476
chn	ely	336	434
usa	ely	700	789

Prices and Taxes: Issues

- **observations scarce for some major countries, *e.g.*, China, India, Russia**
- **observations scarce for gas, and, in developing countries, for electricity**
- **margin rate estimates volatile**
- **method preferences sometimes questionable**
- **implicit subsidies not identified**
- **gas distribution margins neglected**

Future

- **Levent Aydin to Center for two-year term**
- **many minor defects ready to be addressed**
- **compositional differences in petroleum products ready to be addressed**
- **better domestic margins data should help**
- **greater interest in climate change and energy security issues may promote energy data collection**