



EWG 45

20 March 2013

# Alternative Approaches for Calculation of Final Energy Intensity

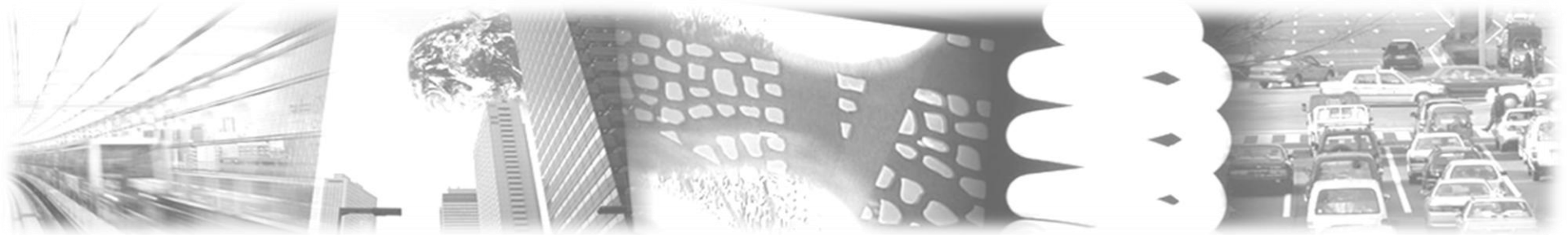
Ralph D. Samuelson  
Asia Pacific Energy Research Centre (APEREC)

Table 7.2 • IEA Energy Balance Table for Spain, 1999

Million tonnes of oil equivalent											
SUPPLY AND CONSUMPTION	Coal	Crude Oil	Petroleum Products	Gas	Nuclear	Hydro	Geotherm. Solar etc.	Combust. Renew. & Waste	Electricity	Heat	Total
Production	8.60	0.30	-	0.13	15.34	1.97	0.27	4.08e	-	-	30.70
Imports	11.30	60.01	16.85	13.90	-	-	-	1.03	-	-	103.09
Exports	-0.28	-	-7.09	-	-	-	-	-0.54	-	-	-7.90
Intl. Marine Bunkers	-	-	-5.88	-	-	-	-	-	-	-	-5.88
Stock Changes	-0.36	0.54	-0.97	-0.74	-	-	-	-	-	-	-1.54
<b>TPES</b>	<b>19.26</b>	<b>60.85</b>	<b>2.91</b>	<b>13.29</b>	<b>15.34</b>	<b>1.97</b>	<b>0.27</b>	<b>4.08</b>	<b>0.49</b>	<b>-</b>	<b>118.46</b>
Transfers	-	-1.56	-1.52	-	-	-	-	-	-	-	0.05
Shortfall Differences	-0.35	-	-0.74	-	-	-	-	-	-	-	-1.08
Electricity Plants	-16.27	-	-3.44	-0.59	-15.34	-1.97	-0.24	-0.28	15.30	-	-22.82
CHP Plants	-0.04	-	-1.58	-2.37	-	-	-	-0.75e	2.44e	0.07	-2.22
Heat Plants	-	-	-	-	-	-	-	-	-	-	-
Gas Works	-	-	-0.14e	0.03	-	-	-	-	-	-	-0.11
Petroleum Refineries	-	-62.44	62.16	-	-	-	-	-	-	-	-0.27
Coal Transformation	-1.05 e	-	-	-	-	-	-	-	-	-	-1.05
Liquefaction Plants	-	-	-	-	-	-	-	-	-	-	-
Other Transformation	-	0.03	-0.03	-	-	-	-	-	-	-	-0.00
Own Use	-0.23	-	4.27	0.02	-	-	-	-	-	-	-5.81
Distribution Losses	-	-	-	-0.25	-	-	-	-0.00e	-1.71	-	-1.96
<b>TFC</b>	<b>1.32</b>	<b>0.01</b>	<b>53.37</b>	<b>10.09</b>	<b>-</b>	<b>-</b>	<b>0.03</b>	<b>3.04</b>	<b>15.24</b>	<b>0.07</b>	<b>83.18</b>
<b>INDUSTRY SECTOR</b>	<b>1.17</b>	<b>0.01</b>	<b>9.78</b>	<b>7.69</b>	<b>-</b>	<b>-</b>	<b>-0.00</b>	<b>1.02</b>	<b>6.57</b>	<b>0.07</b>	<b>26.33</b>
Iron and Steel	0.89e	-	0.37	0.68	-	-	-	-	1.14	-	3.08
Chemical & Petrochemicals	0.04	0.01	5.35	1.78	-	-	-	0.92	0.02	-	8.15
of which: Feedstocks	-	-	4.60	0.43	-	-	-	-	-	-	5.03
Non-ferrous Metals	0.05	-	0.14	0.13	-	-	-	0.77	-	-	1.09
Non-metallic Minerals	0.15	-	1.94	2.28	-	-	-	0.08e	0.76	-	5.21
Transport Equipment	-	-	0.13	0.35	-	-	-	-	0.28	-	0.76
Machinery	0.02	-	0.23	0.21	-	-	-	0.46	-	-	0.93
Mining and Quarrying	0.00	-	0.13	0.08	-	-	-	0.13	-	-	0.34
Food and Tobacco	0.01	-	0.59	0.75	-	-	0.00	-	0.66	0.01	2.01
Paper, Pulp and Printing	0.00	-	0.31	0.83	-	-	-	0.47	-	-	1.61
Wood and Wood Products	-	-	0.04	0.07	-	-	-	0.12	-	-	0.23
Construction	-	-	0.11	0.00	-	-	-	0.11	-	-	0.22
Textile and Leather	-	-	0.18	0.53	-	-	-	0.34	0.01	-	1.06
Non-specified	-	-	0.25	0.01	-	-	0.00	0.94 e	0.40	0.04	1.65
<b>TRANSPORT SECTOR</b>	<b>-</b>	<b>-</b>	<b>32.33</b>	<b>0.01</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>0.31</b>	<b>-</b>	<b>32.65</b>
International Civil Aviation	-	-	2.62	-	-	-	-	-	-	-	2.62
Domestic Air Transport	-	-	1.75	-	-	-	-	-	-	-	1.75
Road	-	-	25.86	0.01	-	-	-	-	-	-	25.87
Rail	-	-	0.50	-	-	-	-	0.21	-	-	0.70
Pipeline Transport	-	-	-	-	-	-	-	-	-	-	-
Internal Navigation	-	-	1.62	-	-	-	-	-	-	-	1.62
Non-specified	-	-	-	-	-	-	-	0.10	-	-	0.10
<b>OTHER SECTORS</b>	<b>0.14</b>	<b>-</b>	<b>7.28</b>	<b>2.39</b>	<b>-</b>	<b>-</b>	<b>0.03</b>	<b>2.02</b>	<b>8.36</b>	<b>-</b>	<b>20.23</b>
Agriculture	-	-	1.75	0.08	-	-	0.00	0.00e	0.39	-	2.23
Comm. and Publ. Services	0.01	-	1.47	0.54	-	-	0.02	-	3.87	-	5.91
Residential	0.13	-	4.06	1.77	-	-	0.01	2.00e	3.91	-	11.88
Non-specified	-	-	-	-	-	-	-	0.02e	0.19	-	0.21
<b>NON-ENERGY USE</b>	<b>0.01</b>	<b>-</b>	<b>3.97</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>3.97</b>
In Industry/Transf./Energy	0.01	-	3.64	-	-	-	-	-	-	-	3.65
In Transport	-	-	0.31	-	-	-	-	-	-	-	0.31
In Other Sectors	-	-	0.02	-	-	-	-	-	-	-	0.02

Primary Energy Supply

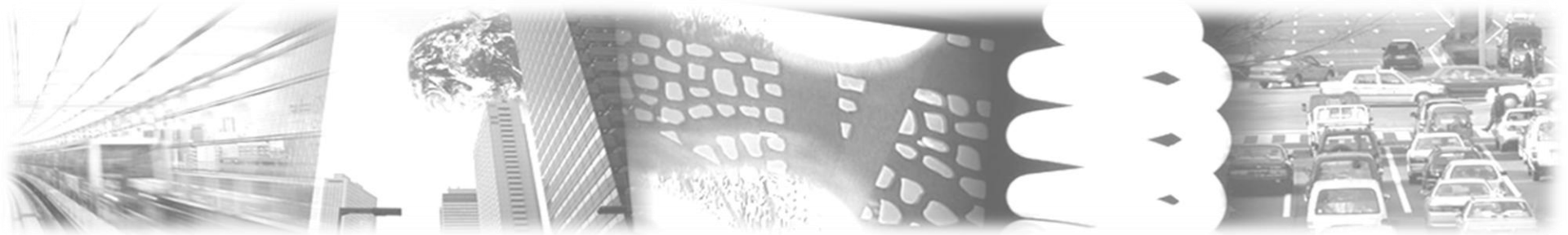
Final Consumption



INTERNATIONAL  
ENERGY AGENCY

# Energy Statistics **MANUAL**





## Non-energy uses of fuels

A number of fuels may be used for non-energy purposes. These are:

- As raw materials for the manufacture of non-fuel products (feedstock use). The use of the hydrocarbon content of fuels as raw material is an activity which is almost entirely confined to the refining and petrochemical industries.
- For their physical properties. Lubricants and greases are used in engines for their "slippery" qualities, and bitumen on roofs and roads for its waterproofing and wear qualities.
- For their solvent properties. White spirit and other industrial spirits are used as diluents in paint manufacture and for industrial cleaning purposes.

The petrochemical industry represents, by far, the most important user of fuels for non-energy purposes. It converts fossil fuels (oil, natural gas and coke-oven by-products) and biomass carbon to synthetic organic products.

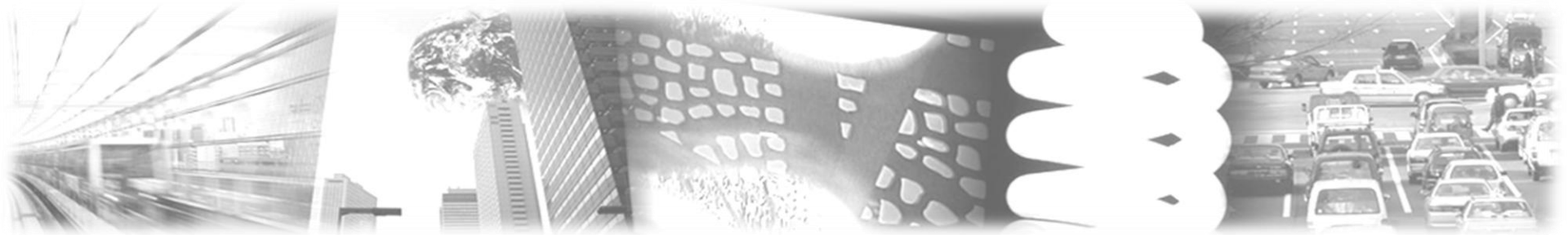


Figure 1.3 • Commodity Balance Structure

Sources of supply (Fig. 1.4)  
+ Transfers between commodities  
= **DOMESTIC SUPPLY**  
*statistical difference*  
**TOTAL DEMAND =**  
Transformation input  
+ Energy sector own use  
+ Distribution and other losses  
+ **FINAL CONSUMPTION =**  
Non-energy use  
+ Final energy consumption

Two Possible Ways  
To Calculate Final  
Energy Intensity!

# Questions and Discussion

