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## Economic and Social Commission for Western Asia (ESCWA)

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### STATUS OF ENERGY STATISTICS AND INDICATORS IN THE ESCWA REGION

#### Summary

This paper provides a brief overview on the status of energy statistics and highlights the main indicators in the ESCWA region. Statistical tables for energy statistics on energy reserves, and on production and consumption of oil, natural gas and electricity are presented. The paper also summarizes the results of the Global Assessment of Energy Statistics. It overlooks the data sources for energy statistics at the national level and the problems associated with data compilation. Main issues discussed are related to the ways and means for data sharing on energy at the national and the international levels and the role of ESCWA in capacity building in energy statistics, indicators and information systems. The paper ends with the ongoing work between organizations and the ways to improve Energy Statistics in the region.

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## I. Introduction

The ESCWA region includes 14 countries: Bahrain, Egypt, Iraq, Jordan, Kuwait, Lebanon, Oman, Palestine, Qatar, Saudi Arabia, Sudan, Syria, United Arab Emirates, and Yemen. The countries are diverse with regard to land area, population, resource endowment and economic attainment. The region covers about 7.3 million Km<sup>2</sup> with more the 70% of the land being arid. The ESCWA region is among the poorest in freshwater resources, with average water resources per capita for most of the member countries of less than 1000 cubic meters (Table 1).

**Table 1. Highlights of ESCWA region (Main Indicators)**

	Year	Indicator
Surface area (thousand km <sup>2</sup> )		7,337
Population, total (thousand)	2006	206,243
Average Annual Population Growth Rate (%)	2000-2005	2.76
Energy Reserves Oil (million barrels)	2007	627,626
Energy Reserves gas (billion cubic meters)	2007	47,520
Production of Oil and Others (thousand barrels/day)	2007	21,923
CO <sub>2</sub> emissions per capita (metric tons)	2003	14.5
Energy use per capita per year (Kg of oil equivalent)	2007	1,932
Electricity use per capita per year (KWH)	2007	2,065
Renewable Fresh Water Resources from Conventional Sources (million cubic meters)*	2003	231,207
Renewable Fresh Water Resources (cubic meters/ capita/ yr)	2003	1,122
GDP (million 2000 cst US\$)	2007	765,299

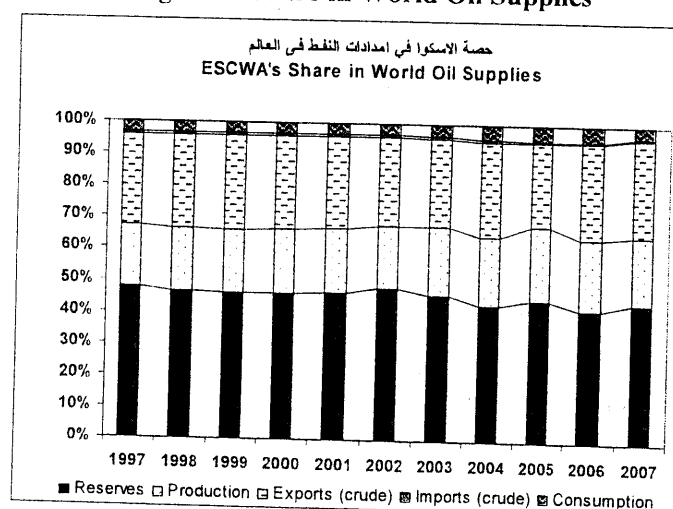
\* Sudan figures added are of 2007

## II. Importance of Energy resources in ESCWA Region

ESCWA countries depend strongly on their natural resources to support their economic growth. Moreover, the world depends largely on the oil and gas supply provided by this region.

ESCWA's resources, in 2007, represented about 51% of the world oil resources, 26% of the world oil production, and 6% of the world oil consumption (Figure 1). Regarding natural gas, ESCWA represented 26% of the world natural gas resources, 10% of the world natural gas production, and 4% of the total gas consumption<sup>1</sup>.

**Figure 1. Share in World Oil Supplies**

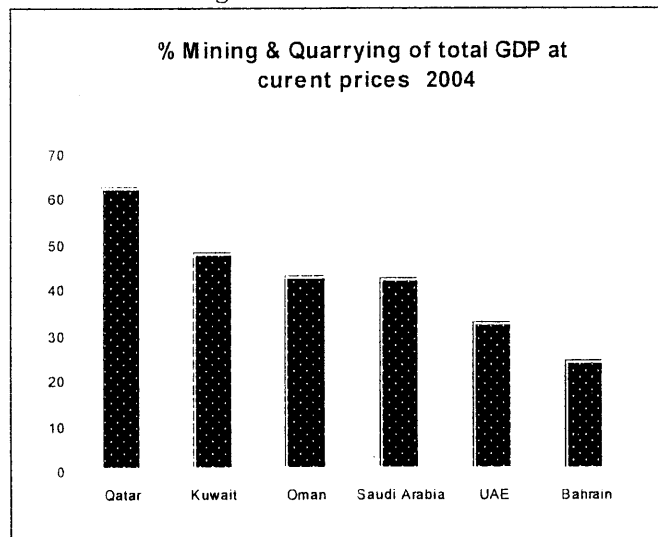


<sup>1</sup> ESCWA. Statistical Abstract of the ESCWA Region, Issue 28, 2008

The sector contributes effectively, up to 60% particularly the oil and gas sector, to the “GDP” of many ESCWA countries<sup>1</sup> (Figure 2).

Oil consumption per capita varied from a maximum of 23 tonnes of oil equivalent in Qatar to a minimum of 0.2 in Yemen. However, the average oil consumption per capita (1.9 tonnes of oil equivalent) is comparable to world average<sup>1</sup>.

Figure 2. Contribution to GDP



### III. Energy on top of political agenda for macroeconomic policy and analysis

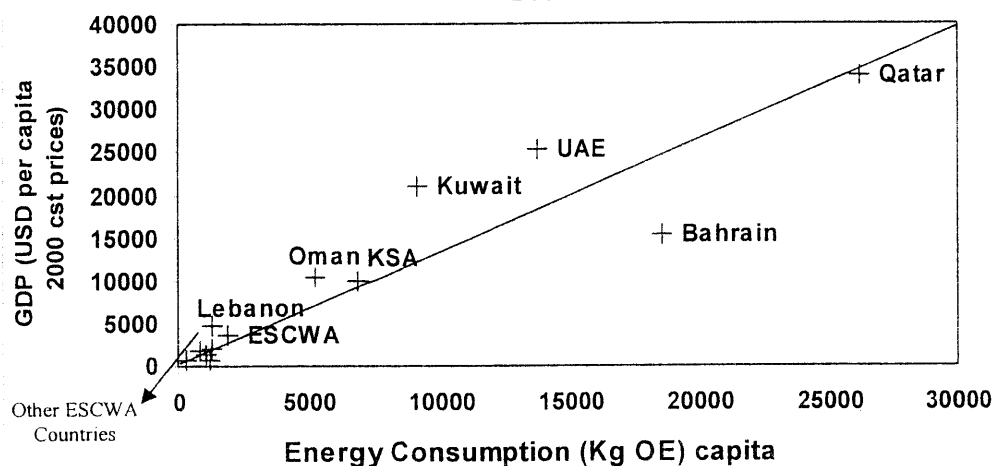
Energy issues are at the top of global and local agendas given that the importance of the energy sector to sustain the growth of economies and due to its impacts on the environment and climate change where the impacts need to be mitigated.

#### – Energy and GDP:

The relationship between energy consumption and economic growth is well established in the literature, yet the direction of causation of this relationship remains controversial. That is, whether economic growth leads to energy consumption or that energy consumption is the engine of economic growth. The direction of causality has significant policy implications.

Figure 2

GDP versus Energy Consumption in ESCWA countries 2006



Empirically, research has been conducted on the direction of causality between energy consumption and economic activities for the developing as well as for the developed countries. To illustrate, the GDP per

<sup>1</sup> Source: National Accounts Studies of the ESCWA Region 2005 No 25

capita in ESCWA countries<sup>1</sup> is plotted against energy consumption per capita (Figure 2). The GDP seems to be directly proportional to energy consumption. The six GCC countries consume between 5000 and 30000. The remaining 8 ESCWA countries are represented in the quadrant limited by 5000 kg oil equivalent per capita and 5000 USD per capita.

In Pakistan, the study showed that economic growth causes total energy consumption. Further investigation indicates that economic growth leads to the growth in petroleum consumption. In the case of the gas sector, neither economic growth nor gas consumption effect each other. In the power sector, electricity consumption was found to lead to economic growth without feedback<sup>1</sup>.

In the ESCWA region, empirical results indicated a unidirectional causality running from GDP to energy consumption with the absence of support for the hypothesis that energy consumption is the source of GDP growth in the GCC countries. Such results suggest that energy conservation policies may be adopted without much concern about their adverse effects on the growth of GCC economies<sup>2</sup>.

#### – **Energy security**

Energy security for consumer countries and for producing countries was topping the military and foreign policy agenda as stated in the International Herald Tribune<sup>3</sup>. Energy security concerns supply sources, demand centers, geopolitics, market structures and responsiveness of related institutions to ensure that economies have sufficient energy to meet their needs.

#### – **Climate change and energy**

Climate change and energy are priorities on the political agenda at the global and national levels. The energy sector is a major contributor to global greenhouse gas emissions. Global efforts are required to meet the challenges of meeting the rising demand for energy whilst reducing greenhouse gas emissions and adapting to the impacts of a changing climate<sup>4</sup>. Renewable energy, clean energy, and carbon trading are alternatives related to decreasing climate changes.

– **Other issues** such as energy research, volatility of oil prices, investments in the energy sector, and energy statistics are also among the priorities on the global and local agendas<sup>5</sup>.

#### – **Links between energy statistics and macroeconomic statistics**

There is a close relationship between energy statistics, national accounts and energy balances. Energy statistics enters into several national level statistics such as indicators, external trade, energy balances, environmental statistics, and national accounts. Energy statistics need to be harmonized with respect to definitions, concepts and methods on energy industry activities, service activities related to energy industry, transport via pipelines, investment and others.

Transparency of oil and gas metadata should be increased—GDDS and SDDS on 7 data sets: (national accounts, production index, consumer prices, producer prices, government finance statistics, balance of payments, merchandise trade data).

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<sup>1</sup> Anjum Aqeel and Mohammad Sabihuddin Butt. 2001 \*The Relationship Between Energy Consumption and Economic Growth in Pakistan. Asia-Pacific Development Journal Vol. 8, No. 2, December 2001.

<sup>2</sup> Al-Iriani Mahmoud A. 2006. Energy-GDP Relationship Revisited: An Example From GCC Countries Using Panel Causality. Energy Policy. 2006, Vol.34, N17, p.3342-3350.

<sup>3</sup> International Herald Tribune. October 28, 2007

<sup>4</sup> Survey of Energy Resources. 2007. World Energy Council

<sup>5</sup> EU Regulation on Energy. Statistics. An update. Eurostat. Roeland Mertens – Paris, 19/11/2007 ... 10/1/2007

There should be a recording of oil-related transactions in macroeconomic statistics: Output, subsidies, imports, exports, a definition of oil sector in macroeconomic statistics and data sources, techniques for disaggregating oil and non-oil transactions in national accounts and balance of payments.

#### **IV. Global Assessment of Energy Statistics**

UNSD conducted “the Global Assessment of Energy Statistics and Balances” in 2007. The main objectives of the assessment were: 1) to identify the role of national statistical offices in the national statistical system in collecting, compiling and disseminating energy statistics and energy balances; 2) to assess the scope of energy statistics and balances in national statistical offices by identifying the energy sources covered, data collection practices, the use of international guidelines and classifications as well as the use of the statistics provided; and 3) to assess the impeding factors in the collection, compilation and dissemination of energy statistics and balances<sup>1</sup>.

The Global Assessment was sent to national statistical offices of the 210 countries/territories in June 2007, including eight countries from the ESCWA region. The report of the Assessment provided an overview of the current status of energy statistics systems in the UN member countries<sup>1</sup>.

##### ***Legal framework for the collection of energy statistics***

Most of the responding countries, 86 per cent, indicated the existence of a legal framework for the collection of energy statistics.

##### ***Existence of a programme on energy statistics in countries***

Ninety three per cent of total countries and 85 per cent of Western Asia countries indicated the existence of energy statistics programmes (a programme herein is defined as efforts with which energy data are collected, compiled or disseminated on a regular basis).

##### ***Coordination mechanisms***

A coordination mechanism was defined as a formal or informal agreement between institutions/agencies for data sharing. Sixty-seven countries indicated the existence of coordination among institutions collecting energy statistics, 31 countries indicated the lack of a coordination mechanism and 9 did not respond to the question. When the energy statistics programme is located in more than one institution, there is a coordination mechanism between institutions for data sharing in 85 per cent of the cases.

##### ***Plans for the future***

Eighty five per cent of the institutions with an energy statistics programme explicitly indicated their plans (defined as the upcoming two years) to continue the current programme and/or further expand it. The further expansion of the energy statistics programme consists most commonly of the increase of the scope (in 37 countries) and frequency (in 18 countries) of data collection and compilation.

##### ***International Classification, standards and guidelines***

Most respondents indicated that the use of the *Energy Statistics Manual* (OECD, IEA and Eurostat) as reference is important, followed by the *Joint Oil Data Initiative Manual* and the UN handbooks on energy statistics.

##### ***Impeding factors***

During the collection, compilation and dissemination of energy statistics, countries encountered impeding factors that are stated in order of importance as: (1) the lack of a coordination mechanism/data sharing; (2)

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<sup>1</sup> UNSD, 2008. Preliminary report on the Global Assessment of Energy Statistics and Balances, Background document, Statistical Commission 39<sup>th</sup> session from 26 – 29 February 2008.

the data quality; (3) the low response rate; (4) the confidentiality; and (5) the classification and definition of new energy sources.

#### ***Reporting to international organizations***

Most of the responding institutions (92 per cent) reported to international/regional organizations. Some constraints in reporting were attributed to the following reasons: a) the questionnaires being too detailed and cannot be completed; b) the classification of products does not match national classification; c) and the classification of energy uses does not match national classification.

#### ***Dissemination and use***

The questions attributed to the dissemination and use of basic energy statistics indicated that most of these statistics are freely available to users (90 per cent of respondents in Western Asia) and the uses were for the compilation and/or calculation of the following: (1) overall energy balances; (2) national accounts; (3) environment statistics; (4) greenhouse gas emissions; (5) indicators; (6) commodity balances; and (7) energy accounts.

### **V. Energy Statistics in the ESCWA Region**

The development of national policies and programmes is highly dependent on the availability, accuracy and reliability of statistical energy production and sectoral consumption information in the ESCWA region. However, the quality of energy statistical information, in most of ESCWA member countries, still needs capacity building to meet the appropriate statistical requirements for formulating national development plans and international reporting.

Statistical energy tables for ESCWA member countries are included in a chapter in the yearly published Statistical Abstract of the ESCWA Region<sup>1</sup>. The chapter covers data on fourteen member countries on oil and natural gas reserves; production; refining capacity and output; domestic consumption; electric power generation; peak load, installed capacity of power stations; electricity generated by different types of turbines; and the trends of total and per capita electricity consumption, between 2004 and 2007.

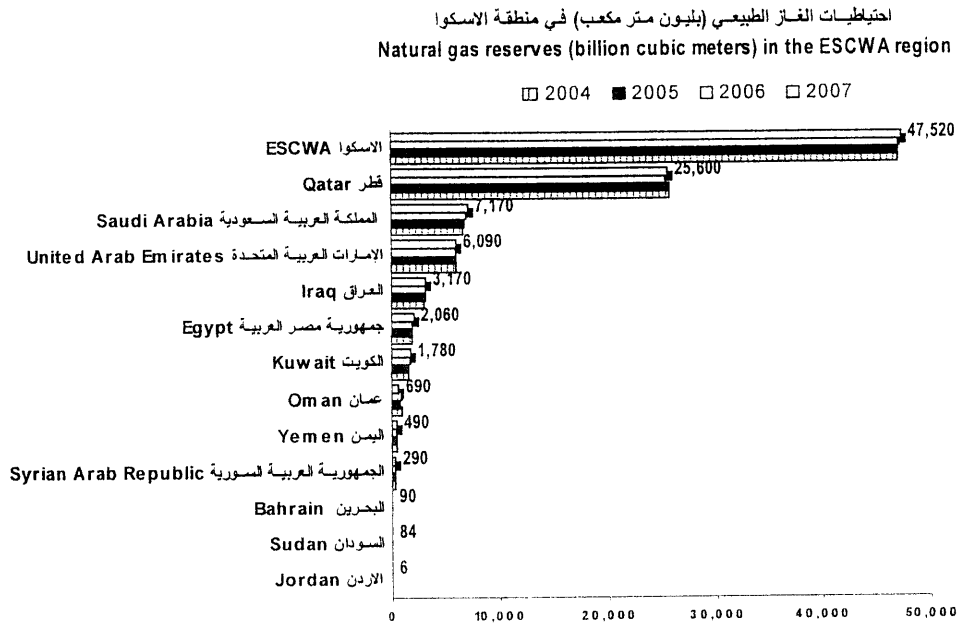
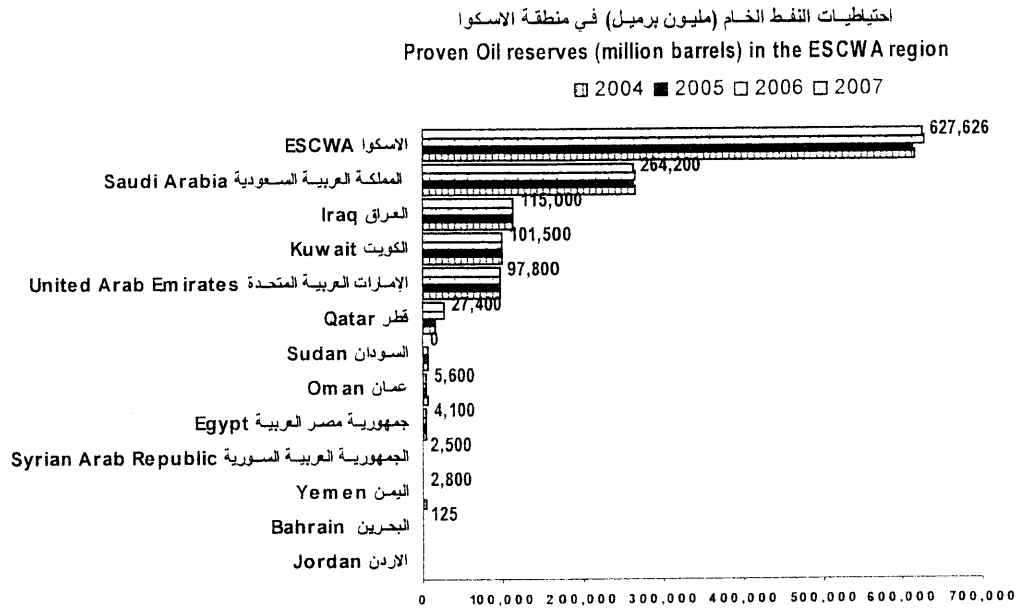
#### **Oil and natural gas reserves**

In terms of global energy provision, ESCWA countries represent some 51 per cent of the world total oil reserves and approximately 26 per cent of the world total natural gas reserves in 2007. At the top, Saudi Arabia holds 22% of the world's proven petroleum reserves, followed by Iraq, Kuwait, United Arab Emirates (UAE) and Qatar, which possess all together 314,300 million barrels of hydrocarbon reserves that represent more than 27% of world's reserves as shown in Figure 3.

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<sup>1</sup> Statistical Abstract of the ESCWA Region 2008.

Figure 3. Oil and Natural Gas Reserves in the ESCWA Countries

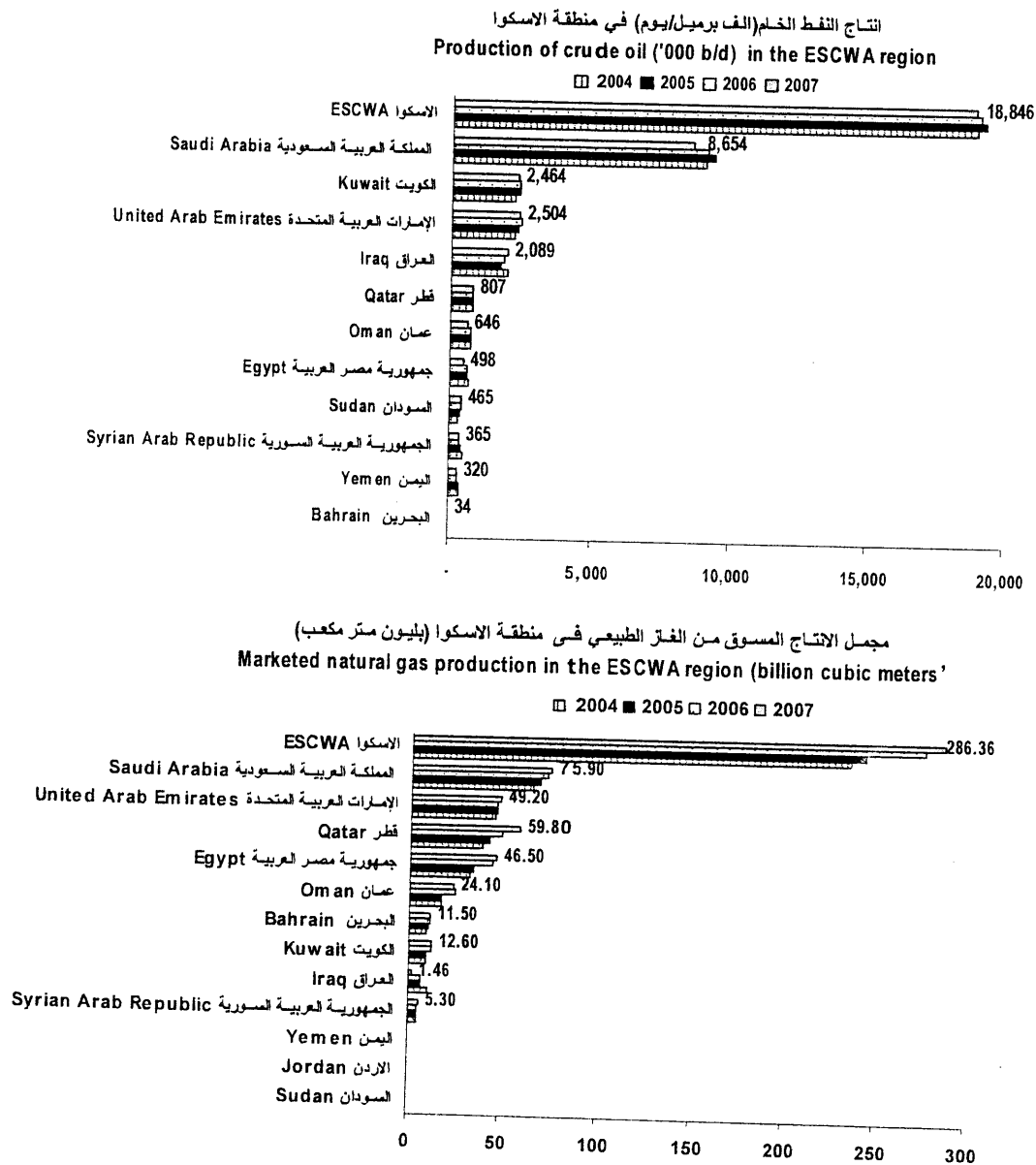




## Energy production

In 2007, the ESCWA region energy production reached 18,846 thousand barrels per day which accounts for 26 % of total world crude oil production and 286.36 billion cubic meters of natural gas which accounts for 10% of world natural gas production (Figure 4).

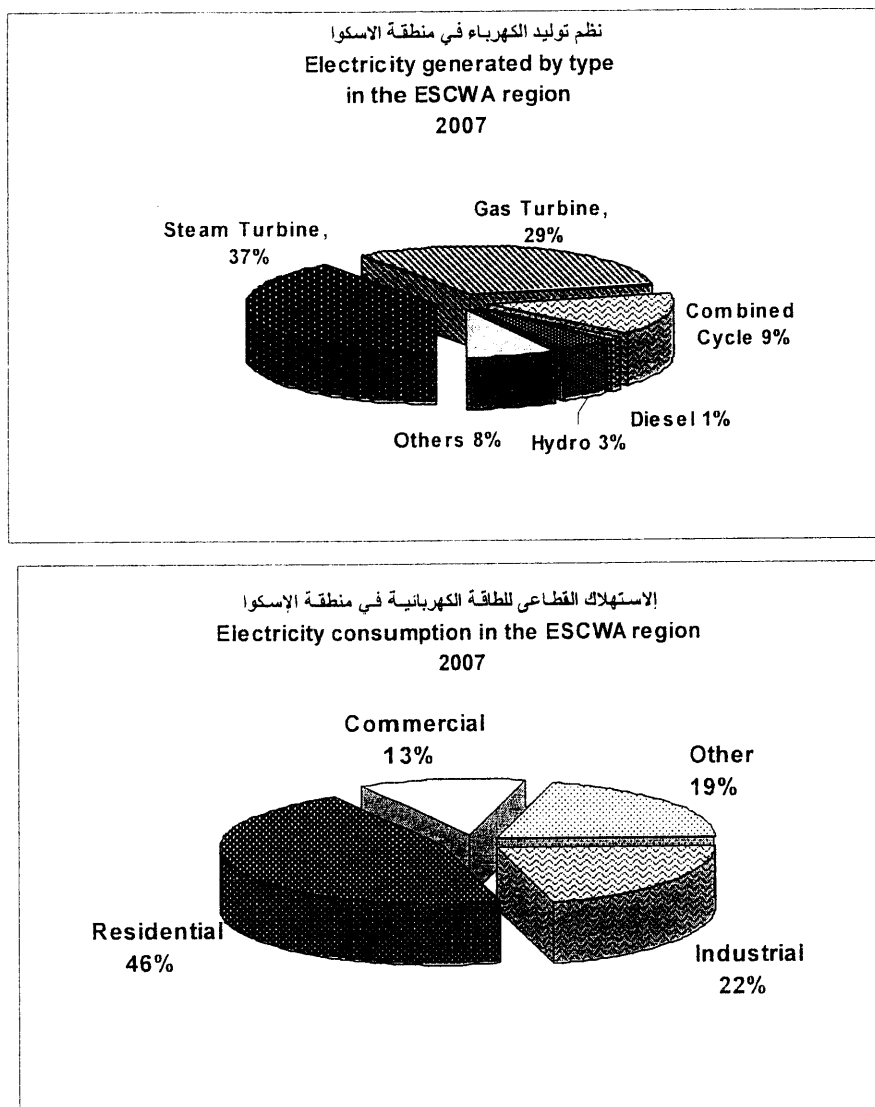
Figure 4. Oil and Natural Gas Production<sup>1</sup>



<sup>1</sup> Lebanon and Palestine were not represented because there is no oil or natural gas production

Hydroelectricity represented 3 per cent of the total installed capacity of electric power stations in the region in 2007. The remaining 97 percent represent thermal electricity, including steam turbines (37 per cent), gas turbines (29 per cent) and combined cycle turbines (9 per cent). Consumption is divided as 46 per cent for residential usages, 22 per cent for Industrial, 13 per cent for commercial, and 19 per cent for others (Figure 5).

**Figure 5. Electricity Production and Consumption**



The total energy production also shows that crude oil constituted about 78 per cent of total energy production within the ESCWA region in 2007, while natural gas represented about 21 per cent and hydroelectricity less than 1 per cent of that production. Coal consumption was negligible (Table 2).

**Table 2**  
انتاج الطاقة في منطقة الاسكوا (الف طن مكافئ نفط)  
**Total energy production in the ESCWA region (000'TOE)**  
**2004-2007**

Country	2004	2005	2006	2007	Share of		البلد
					World total نسبة المنوية من مجموع العالم 2007	% change نسبة التغيير 2006/2007	
<b>Bahrain</b>							البحرين
Crude oil	1,887	1,887	1,787	1,734	0.05%	-2.97%	النفط الخام
Marketed N. Gas	8,820	9,630	9,990	10,350	0.40%	3.60%	الغاز الطبيعي المسوق
Total	10,707	11,517	11,777	12,084	0.17%	2.61%	المجموع
<b>Egypt</b>							مصر
Crude oil	35,241	33,456	32,643	25,398	0.87%	-22.19%	النفط الخام
Marketed N. Gas	29,160	31,230	40,320	41,850	1.62%	3.79%	الغاز الطبيعي المسوق
Hydro	3,199	3,107	3,107	3,176		2.22%	الكهرمائية
Total	67,600	67,793	76,070	70,424	1.10%	-7.42%	المجموع
<b>Iraq</b>							العراق
Crude oil	105,570	93,330	98,532	106,539	2.63%	8.13%	النفط الخام
Marketed N. gas	9,360	6,401	6,401	1,314	0.26%	-79.47%	الغاز الطبيعي المسوق
Hydro	1,437	1,474	1,498	1,409	0.21%	-5.91%	الكهرمائية
Total	116,367	101,205	106,431	109,262	1.54%	2.66%	المجموع
<b>Jordan</b>							الأردن
Crude oil	1	1	1	1	0.00%	-16.67%	النفط الخام
Marketed N. Gas	262	216	224	...	0.01%		الغاز الطبيعي المسوق
Hydro	13	14	13	15	0.00%	19.61%	الكهرمائية
Total	276	231	238	16	0.00%		المجموع
<b>Kuwait</b>							الكويت
Crude oil	117,045	127,704	127,704	125,664	3.41%	-1.60%	النفط الخام
Marketed N. Gas	8,730	8,730	11,610	11,340	0.47%	-2.33%	الغاز الطبيعي المسوق
Total	125,775	136,434	139,314	137,004	2.01%	-1.66%	المجموع
<b>Lebanon</b>							لبنان
Hydro	282	257	171	144	0.02%	-15.56%	الكهرمائية
Total	282	257	171	144	0.00%	-15.56%	المجموع
<b>Oman</b>							عمان
Crude oil	39,780	39,015	37,638	32,966	1.00%	-12.41%	النفط الخام
Marketed N. Gas	15,840	15,750	22,590	21,690	0.91%	-3.98%	الغاز الطبيعي المسوق
Total	55,620	54,765	60,228	54,656	0.87%	-9.25%	المجموع
<b>Qatar</b>							قطر
Crude oil	39,882	40,545	41,922	41,157	1.12%	-1.82%	النفط الخام

Marketed N. Gas	35,280	39,150	44,550	53,820	1.79%	20.81%	الغاز الطبيعي المسوق
Total	75,162	79,695	86,472	94,977	1.25%	9.84%	المجموع
<b>Saudi Arabia</b>							المملكة العربية السعودية
Crude oil	461,499	478,890	464,661	441,354	12.40%	-5.02%	النفط الخام
Marketed N. Gas	59,130	62,550	66,330	68,310	2.67%	2.99%	الغاز الطبيعي المسوق
Total	520,629	541,440	530,991	509,664	7.66%	-4.02%	المجموع
<b>Sudan</b>							السودان
Crude oil	461,499	478,890	464,661	441,354	6.70%	-5.02%	النفط الخام
Marketed N. Gas	-	-	-	-			الغاز الطبيعي المسوق
Hydro	272	304	336	358	0.00%	6.51%	الكهرمائية
Total	479,356	497,162	484,398	465,483	6.99%	-3.90%	المجموع
<b>Syrian Arab Republic</b>							الجمهورية العربية السورية
Crude oil	25,704	20,961	19,533	18,600	0.52%	-4.78%	النفط الخام
Marketed N. Gas	4,680	3,890	4,014	4,770	0.16%	18.83%	الغاز الطبيعي المسوق
Hydro	1,044	846	981	866	0.14%	-11.72%	الكهرمائية <sup>(3)</sup>
Total	31,428	25,697	24,528	24,236	0.35%	-1.19%	المجموع
<b>United Arab Emirates</b>							الإمارات العربية المتحدة
Crude oil	119,524	124,797	129,540	127,704	3.46%	-1.42%	النفط الخام
Marketed N. Gas	41,220	41,940	42,660	44,280	1.72%	3.80%	الغاز الطبيعي المسوق
Total	160,744	166,737	172,200	171,984	2.48%	-0.13%	المجموع
<b>Yemen</b>							اليمن
Crude oil	20,551	20,394	17,526	16,330	0.47%	-6.82%	النفط الخام
Total	20,551	20,394	17,526	16,330	0.25%	-6.82%	المجموع
<b>ESCWA<sup>(1)</sup></b>							الإسكوا <sup>(1)</sup>
Crude oil	966,682	980,979	971,486	937,446	25.93%	-3.50%	النفط الخام
Marketed N. Gas	212,482	219,487	248,689	257,724	10.00%	3.63%	الغاز الطبيعي المسوق <sup>(5)</sup>
Hydro	5,975	5,699	5,769	5,611	0.83%	-2.75%	الكهرمائية
Total	1,185,139	1,206,164	1,225,944	1,200,781	17.69%	-2.05%	المجموع
<b>World<sup>(1)</sup></b>							العالم
Crude oil	3,599,345	3,674,897	3,746,970	3,736,770	...	...	النفط الخام
Marketed N. Gas	2,425,250	2,433,420	2,486,700	2,578,770	...	...	الغاز الطبيعي المسوق
Hydro	644,700	670,400	697,200	709,200	...	...	الكهرمائية
Total	6,669,295	6,778,717	6,930,870	7,024,740	...	...	المجموع

(1) Total figures do not include coal

## Energy Consumption

Energy consumption is in the form of commercial energy particularly crude oil. In comparison with the 2006 figures, it can be noted that oil consumption in the region increased by 6 per cent (Table 3) while natural gas consumption decreased by 4 per cent (Table 4).

In 2007, oil consumption accounted for approximately 58 per cent of the primary energy consumption in the region, natural gas consumption for some 41 per cent. Hydroelectricity is limited and accounted for less than 2 per cent, while coal consumption was negligible and nuclear non-existent (Table 5).

**Table 3**  
استهلاك المشتقات النفطية في منطقة الاسكوا (الف برميل يوميا)  
**Consumption of Oil Products<sup>(1)</sup> in the ESCWA region (000'b/d)**  
**2004-2007**

Country	2004	2005	2006	2007	Share of World total النسبة المئوية من مجموع العالم	% change نسبة التغيير 2006/2007	البلد
Bahrain	29	33	33	35*	0.04%	6.1%	البحرين
Egypt	566	616	610	651	0.76%	6.7%	مصر
Iraq <sup>(2)</sup>	565	500	570	584	0.68%	2.4%	العراق <sup>(2)</sup>
Jordan	94	107	99	112*	0.13%	12.6%	الأردن
Kuwait	230	280	275	276	0.32%	0.4%	الكويت
Lebanon	118	106	98	106*	0.12%	8.2%	لبنان
Oman	48	66	69	72*	0.08%	4.2%	عمان
Qatar	55	65	79	95	0.11%	20.3%	قطر
Saudi Arabia <sup>(3)</sup>	1,187	1,891	2,005	2,154	2.53%	7.4%	المملكة العربية السعودية <sup>(3)</sup>
Sudan	71	72	94	80*	0.09%	-14.9%	السودان
Syrian Arab	236	309	261	273	0.32%	4.6%	الجمهورية العربية
United Arab Emirates <sup>(3)</sup>	355	376	419	450	0.53%	7.4%	الإمارات العربية المتحدة <sup>(3)</sup>
Yemen	86	97	135	143*	0.17%	5.6%	اليمن
ESCWA	3,639	4,518	4,748	5,031	5.90%	6.0%	الاسكوا
World	82,111	83,317	84,230	85,220	100%	1.2%	العالم

(1) Oil products include gasoline, kerosene, fuel oil, distillates & others.

(2) Iraq figures include oil consumed in electricity generation

(3) Including barrels in bunkers

**Table4**  
استهلاك الغاز الطبيعي في الاسكوا (الف طن مكافئ نفط)  
**Natural gas consumption in ESCWA region (000' TOE)**  
**2004-2007**

Country	2004	2005	2006	2007	Share of World total النسبة المئوية السنوية	% change نسبة التغير 2007/06	البلد
Bahrain	8,820	9,630	12,060	12,264	0.46%	1.7%	البحرين
Egypt	23,100	23,000	25,800	28,800	1.09%	11.6%	مصر
Iraq	9,121	4,139	4,344	4,344	0.16%	0.0%	العراق
Jordan	1,196	1,384	2,106	256	0.01%	-87.9%	الأردن
Kuwait	8,700	8,700	11,600	11,300	0.43%	-2.6%	الكويت
Oman	3,805		9,880	10,088	0.38%	2.1%	عمان
Qatar	9,823	14,300	17,600	18,500	0.70%	5.1%	قطر
Saudi Arabia	57,600	62,600	66,300	68,300	2.59%	3.0%	المملكة العربية السعودية
Sudan	-	-	-	-	-	-	السودان
Syrian Arab Republic	2,978	3,758	3,881	6,132	0.23%	58.0%	الجمهورية العربية السورية
United Arab Emirates	35,600	36,400	37,500	38,900	1.47%	3.7%	الإمارات العربية المتحدة
ESCWA	160,743	167,694	191,070	198,883	7.54%	4.1%	الاسكوا
World	2,420,400	2,474,700	2,574,900	2,637,700	100.00%	2.4%	العالم

**Table 5**  
استهلاك الطاقة الأولية في منطقة الاسكوا (الف طن مكافئ نفط)<sup>1</sup>  
**Total primary energy consumption in the ESCWA region (000' TOE)<sup>1</sup>**  
**2004-2007**

Country	2004	2005	2006	2007	% of total consumption % من الاستهلاك 2007	% change نسبة التغير 2006/2007	البلد
<b>Bahrain</b>							
Oil	1,419	1,643	1,643	1,743	100.0%	6.06%	النفط الخام
N. gas	8,820	9,630	12,060			-100.00%	الغاز الطبيعي
Total <sup>(2)</sup>	10,239	11,273	13,703	1,743	100.0%	-87.28%	المجموع <sup>(2)</sup>
<b>Egypt</b>							
Oil	28,189	30,677	30,378	32,420	49.7%	6.72%	النفط الخام
N. gas	23,100	23,000	25,800	28,800	44.1%	11.63%	الغاز الطبيعي
Hydro	3,199	3,107	3,107	3,176	4.9%	2.22%	الكهرمائية
Coal	740	740	900	900	1.4%	0.00%	الفحم
Total	55,228	57,524	60,185	65,296	100.0%	8.49%	المجموع
<b>Iraq</b>							
Oil	28,137	24,900	28,386	29,058	95.4%	2.37%	النفط الخام
N. gas	9,121	4,139	4,344		0.0%	-100.00%	الغاز الطبيعي
Hydro	1,437	1,474	1,498	1,409	4.6%	-5.91%	الكهرمائية
Total	38,695	30,513	34,227	30,468	100.0%	-10.98%	المجموع
<b>Jordan</b>							
Oil	4,681	5,325	4,953	5,578	99.7%	12.60%	النفط الخام
N. gas	1,196	1,384	2,106		0.0%	-100.00%	الغاز الطبيعي

Hydro	13	14	13	15	0.3%	19.61%	الكهرمائية
Total <sup>(2)</sup>	5,890	6,723	7,072	5,593	100.0%	-20.92%	المجموع <sup>(2)</sup>
<b>Kuwait</b>							الكويت
Oil	11,443	13,944	13,695	13,745	54.9%	0.36%	النفط الخام
N. gas	8,700	8,700	11,600	11,300	45.1%	-2.59%	الغاز الطبيعي
Total	20,143	22,644	25,295	25,045	100.0%	-0.99%	المجموع
<b>Lebanon</b>							لبنان
Oil	5,861	5,279	4,880	5,279	97.34%	8.16%	النفط الخام
Hydro	282	257	171	144	2.66%	-15.56%	الكهرمائية
Coal	2.6	2.6	2.6	...			الفحم
Total	6,146	5,538	5,054	5,423	100.00%	7.31%	المجموع
<b>Oman</b>							عمان
Oil	2,370	3,287	3,441	3,586	26.22%	4.20%	النفط الخام
N. gas	3,805	...	9,880	10,088	73.78%	2.11%	الغاز الطبيعي
Total	6,175	3,287	13,321	13,674	100.00%	2.65%	المجموع
<b>Qatar</b>							قطر
Oil	2,739	3,237	3,934	4,731	20.4%	20.25%	النفط الخام
N. gas	9,823	14,300	17,600	18,500	79.6%	5.11%	الغاز الطبيعي
Total <sup>(2)</sup>	12,562	17,537	21,534	23,231	100.0%	7.88%	المجموع <sup>(2)</sup>
							المملكة العربية
<b>Saudi Arabia</b>							السعودية
Oil	59,113	94,172	99,849	107,269	61.1%	7.43%	النفط الخام
N. gas	57,600	62,600	66,300	68,300	38.9%	3.02%	الغاز الطبيعي
Total	116,713	156,772	166,149	175,569	100.0%	5.67%	المجموع
<b>Sudan</b>							السودان
Oil	3,536	3,586	4,681	3,984	91.8%	-14.89%	النفط الخام
N. gas	-	-	-	-	0.0%		الغاز الطبيعي
Hydro	272	304	336	358	8.2%	6.51%	الكهرمائية
Total	3,808	3,890	5,017	4,342	100.0%	-13.46%	المجموع
<b>Syrian Arab Republic</b>							الجمهورية العربية السورية
Oil	11,753	15,388	12,998	13,595	94.0%	4.60%	النفط الخام
N. gas	2,978	3,758	3,881		0.0%	-100.00%	الغاز الطبيعي
Hydro	1,044	846	981	866	6.0%	-11.72%	الكهرمائية
Total	15,775	19,993	17,860	14,462	100.0%	-19.03%	المجموع
<b>United Arab Emirates</b>							الإمارات العربية المتحدة
Oil	17,679	18,725	20,866	22,410	36.6%	7.40%	النفط الخام
N. gas	35,600	36,400	37,500	38,900	63.4%	3.73%	الغاز الطبيعي
Total	53,279	55,125	58,366	61,310	100.0%	5.04%	المجموع
<b>Yemen</b>							اليمن
Oil	4,283	4,816	6,743	7,121	100.0%	5.61%	النفط الخام
Total	4,283	4,816	6,743	7,121	100.0%	5.61%	المجموع
<b>ESCWA<sup>(3)</sup></b>							الاسكوا <sup>(1)</sup>
Oil	181,203	224,978	236,449	250,519	57.9%	5.95%	النفط الخام
N. gas	160,743	163,911	191,070	175,888	40.7%	-7.95%	الغاز الطبيعي
Hydro	6,247	6,003	6,105	5,969	1.4%	-2.24%	الكهرمائية
Total <sup>(2)</sup>	348,192	394,892	433,624	432,376	100.0%	-0.29%	المجموع <sup>(2)</sup>
<b>World<sup>(1)</sup></b>							العالم <sup>(3)</sup>
Oil	4,075,990	4,135,856	4,181,177	4,230,321	39.3%	1.18%	النفط الخام
N. gas	2,420,400	2,474,700	2,574,900	2,637,700	24.5%	2.44%	الغاز الطبيعي
Hydro	644,700	670,400	697,200	709,200	6.6%	1.72%	الكهرمائية
Coal	2,768,100	2,892,400	3,041,700	3,177,500	29.5%	4.46%	الفحم
Total	9,909,190	10,173,356	10,494,977	10,754,721	100.0%	2.47%	المجموع

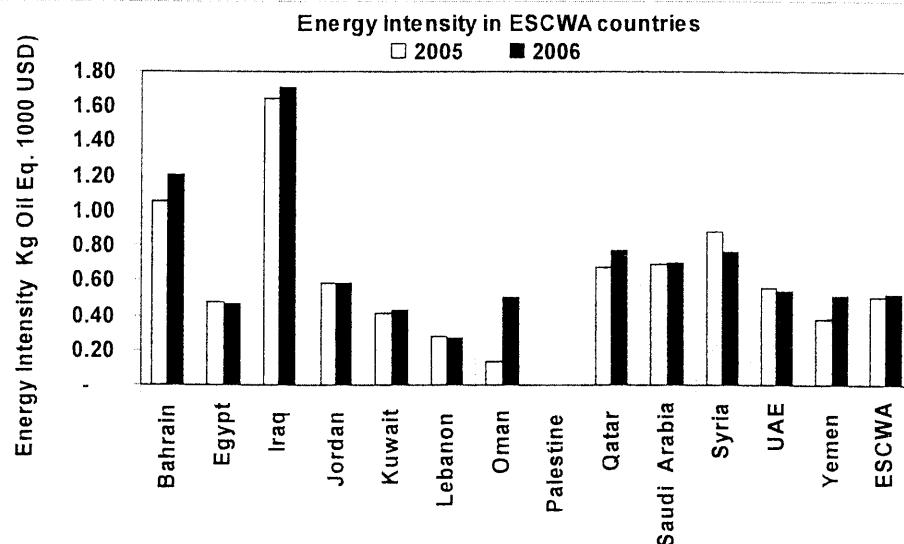
(1)Consumption of oil products instead of crude oil is reported

(2)Total energy consumption includes other energy sources

(3)Total ESCWA figures do not include coal energy consumption

## VI. Energy Intensity

The average energy intensity in the ESCWA region reached 0.51 Kgoe/US\$ in 2006 compared to a world average of 0.32 Kgoe/US\$. This means that energy consumption pattern in the Arab region is not sustainable; consequently there is a need for energy efficiency and energy conservation programs.



In 2006, there was a strong reduction in the energy intensity worldwide due to the high oil prices. The Middle East is the only region where energy consumption has always been increasing faster than GDP. This energy intensity increase is however slowing down over time. In the Middle East, the transformation sector explains most of the increase in the energy intensity due to the rapid development of electricity uses (e.g. air-conditioning), and the fact that electricity production is 100% thermal.

## VII. Data Sources for Energy Statistics

In general, energy statistics data for the ESCWA region is collected from primary sources such as statistical abstracts and bulletins issued by authorities in member countries and from specialized sources, including the Organization of Petroleum Exporting Countries (OPEC) and the Organization of Arab Petroleum Exporting Countries (OAPEC), Arab Union of Producers, Transporters and Distributors of Electricity, and also from highly reputable international sources, namely, the Oil and Gas Journal and the BP Statistical Review of World Energy. Other sources of data include specialized studies published by ESCWA and international organizations, with priority given to United Nations sources.

Statistical data is available on national governmental websites. More specifically, a designated department or governmental entity is responsible for all official national statistics. However, some of the entities do not disseminate detailed information related to energy and electricity statistics. On the other hand, few oil companies publish a report for all the activities undergone throughout the year.

Data is also found at regional or international organizations that publish data. For instance, data related to electricity could be retrieved, for the Middle East and North Africa countries, on the Arab Union of producers, transporters and distributors of electricity website. In the case of energy, the biggest oil producing companies publish data that is related to countries worldwide. Moreover, some general websites are useful for information retrieving, such as the Energy Information Administration that contains country profiles. Table 7 shows the different categories of sources where energy and electricity data could be retrieved.



Type of Data	Type of Reports	Origin of Reports	Countries
Oil and electricity Data	Detailed statistical yearbooks for oil and electricity data	National statistical offices	Bahrain, Egypt, Iraq, Jordan, Oman, Saudi Arabia, Sudan, Yemen
	Restricted statistical yearbooks for oil and electricity data	National statistical offices	Kuwait, Qatar, Palestine, Lebanon, Syria, UAE
Oil data	Oil Company reports		Bahrain
	Regional Reports	Arab Petroleum Research Center	Middle East and North Africa
	International Reports	BP, OAPEC	Worldwide
Electricity Data	Company report	National Company	Egypt
	Regional reports	Arab Union of Producers, Transporters and Distributors of Electricity	ESCWA countries
	Country Profiles	Energy Information Administration	Worldwide

### VIII. Problems of Energy Statistics in the ESCWA Region

Although energy statistics is more available and more developed than statistics in other sectors, many of problems associated with data compilation and dissemination are listed below:

1. Inconsistency;
2. Non-unified units of measurements within the same country and across countries;
3. Lack of implementation of new technologies in information systems to collect, organize and disseminate data;
4. Incomplete questionnaires;
5. The estimation of energy reserves between “proven”, “probable” and “possible”;
6. Data gaps on final consumption in the different sectors mainly on road transport, air transport and shipping.

Further efforts should be employed to meet important data quality criteria established by Eurostat such as relevance, accuracy, timeliness, comparability and coherence (Table 8).

**Table 8. Data quality criteria**

Relevance	Degree to which statistics meet users' needs.
Accuracy	Closeness of estimates to the exact or true values
Timeliness	Time lag between the release date of data and the target date of delivery
Accessibility and clarity;	How users can obtain data, metadata, illustrations
Comparability	Impact of differences in applied statistical concepts when compared between geographical areas, non-geographical domains, or over time.
Coherence	Adequacy to be reliably combined in different ways and for various uses

## IX. Role of ESCWA in Capacity Building in Energy Statistics

ESCWA planned and implemented in its 2004-2008 Work Programmes many activities related to building capacity of member countries in energy statistics.

1. ESCWA EGM on Compilation and Analysis of Energy Statistics and Indicators, 3-5 March 2009, UN House, Beirut, Lebanon in cooperation with UNSD, MEDSTAT, IEA;
2. Workshop on Energy Data in ESCWA Member Countries with Special Focus on Oil Statistics, Beirut Workshop on Energy Statistics in ESCWA Member Countries 2004;
3. Seminar on Application of the UNFC for Energy Reserves/Resources in ESCWA/OPEC Member Countries UN-House, Beirut, 31 May - 2 June 2004 in collaboration with UNSD, OPEC and ECE, Follow-up in Geneva with ECE in 2005;
4. Workshop on Environment and Energy Statistics for GCCs in Qatar in collaboration with the Qatar Planning Council and UNSD in 2005;
5. United Nations Workshop on International Economic and Social Classifications, UN-House, Beirut, 19-23 July 2004 in collaboration with UNSD.

## X. Information System for Energy Indicators

ESCWA developed an Information System on Indicators (ESIS) for storing and retrieving selected statistical indicators on energy and other sectors for a specified group of countries /regions and a specified time series <http://esis.escwa.org.lb/>

- Indicators are organized into modules or sectors, categories and sub-categories. Reports can be generated and exported to Microsoft Excel in tables or charts, by country, by indicator and by year.
- Modules on environment, water resources, agriculture and energy resources with selected indicators and available data are linked to the energy module.

The screenshot displays the ESCWA Statistical Information System (ESIS) web interface. The interface includes a navigation menu with 'Home', 'Statistics/Indicators', 'Regions/Countries', 'Years', and 'Data/Information'. The 'Statistics/Indicators' section is active, showing a tree view of categories and sub-categories. The 'Selected Statistics/Indicators' section displays 'Proven Oil Reserves (Millions barrels)'. Below the interface, there are two data tables. The first table shows 'Proven Oil Reserves (Millions barrels)' for various regions in 2004, 2005, and 2006. The second table shows 'Kuwait' data for 'Proven Oil Reserves (Millions barrels)' in 2004, 2005, and 2006.

Region	2004	2005	2006
Arab World	130	130	125
Asia	3720	3700	4100
Latin America	115000	115000	115000
Europe	1	1	1
North America	101500	101500	101500
OECD	615443	628331	627626

Indicator	2004	2005	2006
Proven Oil Reserves (Millions barrels)	2504	2504	2454000
Crude Oil Production (Millions barrels)	101500	101500	101500
Crude Oil Imports (Millions barrels)	855.2	1004.0	

## **XI. Improving Energy Statistics in the ESCWA Region**

Recommendations to improve energy statistics in the ESCWA region can be classified under six categories:

### **1-Institutional and Legal**

Legal provisions on energy statistics such as Statistics Act and National Strategy for Statistics are at the basis of development and improvement of energy statistics systems. The legal provisions among others should:

1. Determine clearly the responsibilities of different governmental bodies involved in collection, compilation and dissemination of data;
2. Cooperation among the different governmental bodies; and
3. Allocation of human and financial resources necessary to implement the programmes.

### **2-Human Resources**

Adequate human resources should be allocated to work on energy statistics namely:

1. Sufficient units and staff in the National Statistical Offices and Energy Departments;
2. Appropriate training to cover general statistical issues, like sampling, non-response evaluation, as well as subject matter issues, to analyse and calculate relevant indicators;
3. Training of trainers; and
4. Training on Information technology and information systems.

### **3- Methodologies**

Manuals and guidelines should be made available to staff working on energy statistics:

1. Manuals: covering basic concepts and definitions, methods for data collection, tabulation and calculation of indicators;
2. UNSD manuals, IEA manuals and others;
3. Classifications (UNSD, IEA, UNFC, ...);
4. Tools; and
5. Establishment of more harmonized information systems and production of comparable data in the ESCWA countries.

### **4-Designing a full scope system for official energy statistics, and identify a system for the supply and use in energy terms and value terms that takes care of the important user needs<sup>1</sup>:**

1. Users interested in energy markets;
2. Economic statistics for non-energy sector (but users of energy);
3. Households as energy users;
4. National accounts;
5. Emission statistics (computations);
6. Other environment statistics;
7. National wealth; and
8. Sustainable development indicators.

### **5-Dissemination**

Policy makers, researchers, general public and specialized organizations use information through:

1. Disseminating recurrent publications on energy;
2. Preparing energy balance regularly and accurately; and
3. Emphasizing the importance of providing detailed, comprehensive data and information at all levels.

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<sup>1</sup> Olav Ljones, 2006. Coordination of official statistics. Statistics Norway

## **6-Data sharing on Energy**

Data sharing within countries, within organizations, among countries, among organizations and between countries and organizations is essential for developing and disseminating energy information. In that context, the mechanisms of collaboration are listed as follows:

1. Collaboration within ESCWA: Statistics and Energy within ESCWA, sharing data and information;
2. Collaboration with Member States;
3. Regional Mechanism for Sustainable Energy, Questionnaires for UNSD and specific studies on Energy at ESCWA;
4. Collaboration with UN agencies: Collaboration with UNSD on the translation of the Energy Questionnaire, sharing of data with UNSD and collaboration UNECE on UNFC;
5. Collaboration with OPEC: Organization of workshops, data sharing and introduction of methodologies; and
6. Cooperation with international organizations such as JODI, InterEnerStat and Oslo City Group on Energy Statistics.

## **XII-Conclusion**

This paper provided a brief overview on the importance of energy sector in the region and the status of energy statistics and main indicators in the ESCWA region. The problems associated with data compilation were discussed based on the results of the Global Assessment of Energy Statistics, related to the countries of the region and from the compilation exercise that ESCWA conducts yearly. Data sharing on energy at the national and the international levels was presented as important exercise in improving energy information. The role of ESCWA and other organizations in capacity building in energy statistics and information systems was discussed. The paper proposed a series of detailed recommendations to improve energy statistics in the ESCWA region.