

COAL

By Lawrence Metzroth
Principal Administrator, Coal, Electricity & Renewable Sources
International Energy Agency, Paris

Total world coal production declined in 2000, following a trend which began in 1998. Estimated total production was 4.533 Mt, a decrease of 12 Mt from the 1999 level. Hard coal production declined by nearly 32 Mt, (less than 1%), while brown coal production experience the first increase since 1997, rising by 20 Mt to 896 Mt.

A number of factors explain the respective decline and increase. The decline in hard coal production is particularly affected by ongoing efforts to reduce production of expensive, subsidised coal by several former 'coal producing powers' in western Europe. For example, hard coal production in the European Union declined by 13.1% from 98.2 to 85.3 Mt.

Similar programmemes to rationalise hard coal production with demand in central Europe and China resulted in sharp declines in hard coal production in several countries, which were not offset by increased production in major competitive coal-producing countries like Australia, Colombia, Indonesia and South Africa.

Finally, low coal prices at the end of 1999 and in the first half of 2000 dampened hard coal production in several major coal-producing countries which supply both large domestic and international markets. A price rebound in mid-2000 stimulated more coal production in traditional competitive coal producing countries, but it remains to be seen if there will be a substantial and sustained increase in competitive coal-production capacity.

Brown coal, which is used primarily for electricity generation, experienced the benefits of prior year's rationalisation programmemes and higher prices for competing fuels in the electricity sector.

Brown coal consumption strengthened throughout Europe, and was especially strong in Russia, where more brown coal is being shipped to electricity generators. Efforts to close uncompetitive mines and invest in the more efficient survivors have left the brown coal segment in a strong competitive position in many areas of the world. While there will likely be more rationalisation in the brown coal segment in the future-especially in eastern Europe-it is likely that brown coal production will stabilise, and could even show an increasing trend for several years.

Coal supply and demand trends for individual regions and countries are discussed in more detail in relative descending order, starting with the largest coal producers and consumers.

Supply and Demand China

Despite remaining the largest coal producer, Chinese hard coal production declined 5% in 2000 1,171.1 Mt. It is the fourth consecutive year of decline for China since 1996, when the country set a hard coal production record. Closure of small, inefficient mines, coupled with a programme to improve environmental quality-especially in urban areas-and close small power generating units have all coalesced to reduce Chinese reliance on coal.

Reduction of hard coal production was most pronounced in the southern regions of the country, and in traditional coal-producing regions like Shanxi and Shandong. Coal production increased in Jiangsu, Anhui, Hebei and Jiangxi-all regions with short rail transportation distances to ports of exit at Lianyungang, Qinhuangdao and Qingdao, which would enable coal to move in both domestic coastal and international markets.

Production was also higher in Jilin, Inner Mongolia, Hunan and Ningxia as mines in these regions moved to replace lost production in the regions affected by rationalisation.

Despite declining production, hard coal exports from China have increased dramatically in the past three years. In 1999, exports increased 15% from 32.3 to 37.4 Mt. In 2000, exports increased 57% to 58.8 Mt as Chinese thermal coal expanded market share in Korea, Japan, Chinese Taipei and the Philippines. At the same time, traditional

coking coal exports to Japan were expanded moderately. China is currently the third largest coal exporting country.

Domestic demand for coal in China has also been on the decline, however this generalisation does not apply across all sectors. Coal demand for power generation is increasing, albeit at a slower rate as old, polluting, less efficient small power stations are closed. Currently, about 47% of Chinese hard coal consumption is in the electricity and heat generation sectors.

World Hard Coal Production (Mt) ⁽¹⁾							
	1998	1999	2000 ^e		1998	1999	2000 ^e
Algeria	0	0	0	Mozambique	0	0	0
Argentina	0.3	0.3	0.3	Myanmar	0	0	0
Australia (3)	221.1	223.7	238.1	Netherlands	0	0	0
Austria	0	0	0	New Zealand	3	3.5	3.4
Belgium	0.3	0.4	0.4	Nigeria	0.1	0.1	0.1
Brazil	5.5	5.6	5.6	Norway	0.3	0.5	0.5
Bulgaria	0.1	0.1	0.1	Other Africa	1.2	1.2	1.1
Canada	38.1	36.5	33.8	Pakistan	3.2	3.5	3.5
Chile	0.9	0.5	0.5	Peru	0	0	0
Chinese Taipei	0.1	0.1	0.1	Philippines	1	1	1.5
Colombia	33.7	32.7	37.1	Poland	115.7	110.2	102.2
Croatia	0.1	0	0	Portugal	0	0	0
Czech Republic	16.1	14.3	14.9	PR of China	1,305.50	1,238.30	1,171.10
Denmark	0	0	0	Romania	1.4	1.1	1.3
DPR of Korea	66.5	67.2	67.2	Russia	140.5	152.4	169.2
DR Congo	0.1	0.1	0.1	Serbia/Montenegro	0.1	0.1	0.1
Former USSR	284.5	290.5	321.6	Slovenia	0.7	0.6	0.8
Former Yugoslavia	0.2	0.1	0.1	South Africa	223	223.5	225.3
France	5.4	5.1	4.4	Spain	12.3	11.8	11.3
Georgia	0	0	0	Sweden	0	0	0
Germany	45.3	43.8	37.4	Tajikistan	0	0	0
Hungary	0	0	0	Tanzania	0	0	0
India	297.9	291	309.9	Thailand	0	0	0
Indonesia	61.2	72	78.6	Turkey	2.2	2	2.3
Iran	1.2	1.3	1.2	UK	41.2	37.1	32
Ireland	0	0	0	Ukraine	75.8	81.2	80.8
Italy	0	0	0	US	935.7	916	899.1
Japan	3.7	3.9	3.1	Uzbekistan	0.1	0.1	0.1
Kazakhstan	68.1	56.6	71.1	Venezuela	7.5	7	8.9
Korea	4.4	4.2	4.1	Vietnam	10.8	9.1	9.1
Kyrgyzstan	0.1	0.1	0.4	Zambia	0.2	0.2	0.2
Mexico	2.1	2.3	2.6	Zimbabwe	4.2	4	4.2
Morocco	0.3	0.1	0				
OECD Total (2)	1,446.90	1,415.30	1,389.50				
Non OECD Total (4)	2,311.10	2,251.20	2,249.20				
World	3,758.00	3,666.50	3,638.70				

¹ Hard coal includes anthracite and bituminous coal, and for the US, Australia and New Zealand, sub-bituminous coal.

² For OECD countries, source: IEA/OECD Energy Statistics of OECD Countries

³ For Australia and Japan, data are in fiscal year 1999 = 1998-99.

⁴ For Non-OECD countries, source: IEA/OECD Energy Statistics of Non-OECD Countries and Energy Balances of Non-OECD Countries and Secretariat estimates.

^e estimate.

Consumption in most other sectors is declining. About 25% is consumed directly by industry, with the cement, petrochemical and iron and steel industries being the largest users. In addition to direct consumption, another 13% of hard coal consumption serves as input for coke ovens. Consumption by residential, agricultural and commercial and public services consumers accounts for another 9%.

Total consumption has declined by 3% to 4% annually since the mid-1990s, due primarily to sharp declines in household and direct use in industry. Coking coal consumption has also declined modestly as more efficient steel making technology is installed in China.

The US

US total coal production slipped for the second consecutive year, declining to 975.7 Mt from 994.4 Mt. Total coal production has declined about 2% per year since setting a record in 1998. It is the first time in forty years that there have been two years of declining coal production in a row. Both hard coal and brown coal production declined 1.8% and 2.3% respectively.

An ongoing trend of declining coal production in the eastern US and increasing production in the western US ended last year, as there was a decline in the western coal-producing regions as well. In the last ten years production in the eastern US has declined from 570.3 Mt to 467.2 Mt. At the same time, production of hard and sub-bituminous coal in the western US has increased from 261.6 Mt to 441.7 Mt. Lignite production increased through 1993 but has since begun to decline slowly.

Two factors have contributed to the decline of the eastern US coal industry. First, as more stringent sulphur emission standards were imposed, utility coal consumers switched to lower sulphur western coal rather than install scrubbers. Second, western coal—especially western sub-bituminous—is much less expensive to produce than most eastern low

sulphur coals. As utilities were pushed to reduce electricity prices by both regulators and liberalisation, they switched to the less expensive fuel alternative.

A more recent development has been a combination of low prices and court rulings which has reduced the incentive to develop production capacity in the eastern US. While both the price and the legal problems have, at least temporarily subsided, it remains to be seen whether or not eastern US coal production will rebound.

Chinese Hard Coal Production Statistics

Chinese coal production figures have been revised from 1990 onwards. A substantial revision has been made especially after 1997. Since 1997 Chinese coal production has been declining for several reasons. Among these are: a switch to higher quality coal, implementation of environmental regulations—especially in urban areas, changes in economic structure, new fuel mix policies in power generation, shutdown of thousands of small mines and the strict implementation of state supported energy efficiency policies. However, analyses of original Chinese coal production and consumption data show that the drop in production is much more significant than the drop in consumption which creates very big statistical differences after 1997. Based upon the assumption that coal consumption statistics are more reliable than coal production statistics, that the production-consumption relationship should maintain a better balance over time, that changes in miners in the work force and coal productivity trends reflect higher production; the IEA has revised Chinese coal production statistics upward. It should be noted that these data are IEA estimates and not official data released by the Chinese government.

US hard coal exports declined steeply in 1999 as low international prices for steam and coking coal discouraged US producers from shipping in spot coal markets. A price rebound in mid-2000 has done little to stimulate more US hard coal export activity. However 2000 exports stabilised at the 1999 level of 53.1 Mt.

In fact, tight supplies of high quality steam and coking coal in the US have resulted in strong domestic price increases—a factor that has encouraged growth of hard coal imports. Coal imports increased nearly 38% to 11.3 Mt. Although about 10% of the imported coal was coking coal, the vast majority was steam coal imported by US electricity generators.

Although coal production declined in the US, coal consumption increased a respectable 2.4% to 971.3 Mt. This growth was underpinned by stronger consumption in the electric power sector, which consumed 880.7 Mt of coal—an increase of 2.5% over 1999. About 91% of the coal consumed in the US is used for electricity generation. Consumption of coking coal in the steel sector increased 4.3%, and industrial steam coal maintained the same level as in 1999. The only decline was in the residential-commercial sector, which experienced a marginal decrease of consumption.

European Union

Total coal production in the European Union (EU) declined from 335.9 Mt to 329.6 Mt in 2000. There was a sharp, 13.1% decline in hard coal production from 98.2 to 85.3 Mt. However, brown coal production increased 2.8% from 237.7 to 244.3 Mt. Hard coal production is seriously affected by efforts to reduce subsidised coal production in the EU. Brown coal production is not subsidised in most of the major EU producing countries.

Stimulated by a higher brown coal burn, and by strong demand in the steel sector, coal consumption in the EU increased from 482.8 Mt to 493.0 Mt. The 2.1% increase is the first

in many years, and likely will prove an exception rather than a rule. Despite the decline of hard coal production, EU hard coal imports increased by 15.1 Mt as coal consumers moved to replace domestic coal and meet higher demand.

Germany

The largest coal consuming and producing country in the EU is Germany. Germany recorded total coal production that was level with 1999 last year at 205.1 Mt. The mix of production was quite different than 1999 however, with hard coal production declining 14.6%, or 6.4 Mt, while brown coal production made up the loss, and increased 4.0%. In 2000, Germany produced 167.7 Mt of brown coal.

Total German coal consumption increased 1.2% or 2.8 Mt; however, hard coal consumption slipped 5.9%—from 66.3 to 62.3 Mt—while brown coal consumption increased 4.2% from 163.0 Mt to 169.7 Mt. About 74% of German hard coal is consumed in the electric power sector, while over 17% is consumed in the steel sector as coking coal or for carbon injection. The remaining 8% is consumed directly in the industrial sector—primarily in iron and steel and cement manufacturing, with a small amount used in the residential and commercial and public services sector. About 92% of the brown coal consumed was used to generate electricity. Nearly 5% of the brown coal was used to manufacture brown coal briquettes that are used in the industrial and household sectors. The remainder was consumed directly in the industrial and residential sectors.

Greece

In volume terms, Greece was the second largest coal consumer in the EU, using 62.8 Mt of hard and brown coal. The vast majority of Greek coal consumption is brown coal used for electricity. A small volume of hard coal is imported primarily for use in the cement and non-ferrous metallurgical sector.

Brown coal production was up moderately as more was mined to supply electricity and heat generation plants. Two units added to the generation base in the late 1990s have entered full production, resulting in a significant increase of brown coal demand. About 99% of the brown coal is used in the electricity and heat sectors.

About 1.2 Mt of hard coal, which is all imported, was consumed in the industrial sector.

United Kingdom

Total coal consumption, which was exclusively hard coal, increased in the UK last year from 56.1 Mt to 59.7 Mt. Supply was composed of domestic production of 32.0 Mt, down 11.6% from 1999, and 23.4 Mt of imports, up nearly 13.0% from 1999. For the first time since 1998, some UK hard coal producers received government financial assistance in 2000. Financial aid was justified due to weak market conditions, and unfair competition from other subsidised coal producing countries. Six mines were granted aid in 2000, but are expected to produce without subsidies in the future.

Expanded hard coal consumption was stimulated by higher utilization of coal-fired electricity and heat generation facilities, and by strong iron and steel industry markets. About 72% of the UK's hard coal consumption in the power and heat sectors. Another 15% is used for coke oven input and carbon injection in the steel industry. The remainder is burned directly in the industrial, household and public and commercial services sectors.

Spain

Total coal consumption in Spain increased 4.6% in 2000, rising from 43.7 to 45.7 Mt. Consumption consisted of 12.9 Mt of brown coal and 32.8 Mt of hard coal.

Both brown and hard coal production are subsidised in Spain, which produced 11.3 Mt and 12.6 Mt of hard coal and brown coal

Brown Coal Production by Countries (Mt) ¹			
	1998	1999	2000^e
Australia	66.30	67.30	67.80
Austria	1.10	1.10	1.20
Canada ³	37.10	36.00	35.40
Czech Republic	51.40	44.80	50.30
France	0.70	0.60	0.30
Germany	166.00	161.30	167.70
Greece	60.90	62.10	63.00
Hungary	14.70	14.50	13.90
Italy	0.20	0.10	0.00
Japan	0.00	0.00	0.00
Mexico	9.10	8.80	6.70
New Zealand	0.30	0.30	0.20
Poland	62.80	60.80	59.50
Slovak Republic	4.00	3.70	3.60
Spain ³	13.70	12.50	12.10
Turkey ³	65.20	65.00	65.00
US	78.40	78.40	76.60
Chile	0.00	0.00	0.00
India	23.20	23.60	22.20
Malaysia	0.30	0.20	0.20
Myanmar	0.00	0.10	0.10
DPR Korea	23.80	24.00	24.00
Philippines	0.00	0.00	0.00
Thailand	20.20	18.30	17.80
Albania	0.00	0.00	0.00
Bulgaria	30.00	25.20	26.80
Romania	24.80	21.80	27.90
<i>Bosnia and Herzegovina</i>	<i>1.80</i>	<i>1.80</i>	<i>1.90</i>
<i>Croatia</i>	<i>0.00</i>	<i>0.00</i>	<i>0.00</i>
<i>FYROM</i>	<i>8.20</i>	<i>7.40</i>	<i>7.10</i>
<i>Slovenia</i>	<i>4.20</i>	<i>4.00</i>	<i>5.20</i>
<i>Serbia/Montenegro</i>	<i>44.00</i>	<i>33.30</i>	<i>34.20</i>
Former Yugoslavia	58.10	46.50	48.40
<i>Estonia</i>	<i>12.50</i>	<i>10.70</i>	<i>10.80</i>
<i>Kazakhstan</i>	<i>1.70</i>	<i>1.80</i>	<i>2.60</i>
<i>Kyrgyzstan</i>	<i>0.30</i>	<i>0.30</i>	<i>0.30</i>
<i>Russia</i>	<i>78.10</i>	<i>82.70</i>	<i>86.10</i>
<i>Tajikistan</i>	<i>0.00</i>	<i>0.00</i>	<i>0.00</i>
<i>Ukraine</i>	<i>1.40</i>	<i>1.50</i>	<i>1.10</i>
<i>Uzbekistan</i>	<i>2.90</i>	<i>2.90</i>	<i>2.90</i>
Former USSR	96.90	99.90	103.70
Israel	0.50	0.50	0.40
OECD Total ²	631.80	617.30	623.50
Non OECD Total ⁴	277.80	260.10	271.70
World	909.60	877.50	895.10

¹ Brown coal represents lower grade coal and includes lignite

² For OECD countries, **source:** IEA/OECD Energy Statistics of OECD Countries.

³ Includes sub-bituminous coal.

⁴ For Non-OECD countries, **source:** IEA/OECD Energy Statistics of Non-OECD Countries and Energy Balances of Non-OECD Countries and Secretariat estimates.

^e estimate

respectively. Additional coal supply came from the importation of about 21.6 Mt of hard coal, an increase of 7% above the 1999 level. Brown coal is used almost exclusively for electricity generation. About 85% of hard coal is used in the electricity and heat sector. The steel industry consumes 12% of hard coal volume in coke ovens and for carbon injection to blast furnaces. The remaining 3% is burned directly, primarily in the industrial sector.

France

Last year, total coal consumption remained the same in France, at 22.8 Mt. A small component of consumption-0.4 Mt-consisted of brown coal produced in France and used to generate electricity. The balance of consumption was hard coal.

Coal production in France is scheduled to end in 2005, and as closures are implemented, production has declined steadily. In 2000, French hard coal production dropped from 5.1 Mt to 4.4 Mt, and brown coal production declined from 0.6 Mt to 0.3 Mt. Despite declining production, consumption was maintained above 22 Mt by importing 19.0 Mt of coal-an increase of 9% above the 1999 import level.

Due to a heavy reliance on nuclear power for electricity supply, coal plays a minor role in power generation. Nevertheless, about 46% of hard coal consumption is in the electric power sector. Coal-fired units provide the reserve capacity to cover nuclear outages, and are used for meeting peak demand.

About 40% of hard coal is used for coke oven inputs and carbon injection to blast furnaces. The remainder is burned directly in the industrial and household sectors.

Italy

Total Italian coal consumption reached 18.0 Mt in 2000, up 4.7% from the 1999 level. A small fraction-about 5,000 t in 2000-of consumption consists of locally produced brown coal used for electricity generation.

The remainder is imported hard coal. Italian hard coal imports increased 8.9% from 17.3 Mt to 19.0 Mt last year.

Hard coal is used for electricity generation (49%) coke inputs and carbon injection in steel manufacture (45%) and direct consumption in the industrial sector (6%). Most direct consumption is at cement plants.

Belgium-Netherlands-Luxembourg

The three small countries in northwestern Europe are densely populated centres of industry. Total consumption of coal increased 12% from 22.4 Mt to 25.2 Mt in 2000. Consumption increased in all three countries. Increased consumption was primarily stimulated by strong steel industry performance in Belgium and the Netherlands.

In the Netherlands, about 62% of coal consumption is for electric power and heat generation. This share has been declining steadily as coal-fired power is replaced with gas generation. Steel production using coking coal and steam coal for carbon injection is accountable for about 38% of the Netherlands hard coal consumption. The remaining 10% is burned directly in the industrial sector.

In Belgium, which has a large nuclear generating base, only about 38% of hard coal is used for power and heat generation. Another 45% is used for coke oven charging and blast furnace carbon injection in the steel sector. Remaining hard coal is burned directly in industry-primarily iron and steel, and cement manufacture-with a small component used in the household sector.

Coal consumption in Luxembourg increased for the first time since 1996 last year, however the country consumes only a fraction of the total in the three countries. Hard coal consumed in Luxembourg, which is all imported, is burned directly in the iron and steel and cement sectors.

Scandinavia

The three Scandinavian members of the EU, Denmark, Finland and Sweden, accounted for 15.0 Mt of coal consumption in 2000—down 6% from the previous year. Coal consumption decreased 13% in Denmark, as well as increasing 2% in Finland and 4% in Sweden. There is currently no hard or brown coal production in these three countries. Coal supply is entirely from imports which increased from 12.4 Mt to 13.1 Mt in 2000.

In Denmark, 96% of the coal consumed is used to generate heat and power. The balance is burned directly—primarily in the cement industry. Coal consumption has declined steadily as the country shifts power generation to more renewables sources.

In Finland, 66% of coal is consumed to generate power and heat. Another 24% is used for coke ovens in the steel sector. The remaining 10% is consumed directly in the industry sector. As in Denmark, the largest industrial consumer is the cement sector.

In Sweden, most electricity is generated with hydro and nuclear plants, therefore electricity and heat generation account for only 19% of coal consumption. Another 68% of coal consumption is attributable to coke oven input and carbon injection in the steel sector. The remaining 12% is burned directly in industry, where, similar to its Scandinavian counterparts, most is used in cement manufacture.

Portugal

Total coal consumption in Portugal, which consisted entirely of hard coal, increased from 6.1 Mt to 6.2 Mt in 2000. Coal imports rose from 6.0 Mt to 6.4 Mt.

Nearly all of the coal consumed in Portugal is used for three purposes: 86% is used to generate electricity, 8% is used to charge coke ovens and 6% is used to manufacture cement.

Austria

Total coal consumption declined nearly 1% from 4.8 to 4.7 Mt in 2000. Both brown coal and hard coal are consumed in Austria.

Brown coal production in Austria increased 9% from 1.1 to 1.2 Mt. Most brown coal, about 91%, is consumed to generate heat and electricity. The remaining consumption is direct use in the pulp and paper industry (5%) and in the household sector (4%).

Hard coal consumed in Austria is imported. In 2000, hard coal imports increased about 1%. The largest component of hard coal consumption is coking coal used to make coke for the steel sector. This accounts for about 62% of consumption. Electricity and heat generation account for 28% of consumption. The remainder is burned directly in the chemical and cement sectors and in the household sector.

Ireland

Irish coal consumption increased about 1% in 2000. Nearly all consumption is hard coal, which is imported. A small volume of brown coal is imported and used primarily in the household sector. In 2000, hard coal imports increased from 2.8 Mt to 3.0 Mt.

About 84% of the hard coal used in Ireland is consumed to generate electricity. Growth of electricity generation is attributable for the increase of consumption last year. Another 14% of coal volume is consumed in the residential sector. The remainder is consumed by industry—primarily the cement and food sectors.

Non-EU Western Europe

In addition to coal consumption in the European Union, three countries in Western Europe that are not EU members consumed a small amount of coal. Coal consumption in these countries was virtually unchanged in 2000 compared to 1999.

Norway

Consumption of hard coal in Norway was down fractionally, from 1.0 Mt to 951,000 t. All of the coal used in Norway is hard coal. The country produces hard coal on the island of Spitzbergen, where production increased from 0.5 Mt to 0.6 Mt. Exports from Spitzbergen increased from 0.3 Mt to 0.6 Mt. Norwegian imports also increased from 0.8 Mt to 0.9 Mt.

Hard coal is burned directly in the industrial sector in Norway. About 48% is used in the iron and steel sector, 27% in the cement sector and 22% in the chemical sector. About 3% of the hard coal volume is consumed generating electricity.

Coal consumption in **Switzerland** reached 178,000 t in 2000. About 95% of the coal consumption, which is solely hard coal, is used directly in the cement sector. Coal consumption in **Iceland** reached 101,000 t in 2000. About 68% of the coal, which is solely hard coal, is burned directly in the iron and steel sector. The remaining 32% is used directly in the cement sector. Neither Switzerland nor Iceland produce coal, so the entire volume is imported.

India

India is the third largest world coal consumer. In 2000, consumption increased 14% from 330.1 Mt to 375.74 Mt. Coal consumption was stimulated by strong economic growth, demand in the steel sector and expanding electricity demand.

Both hard and brown coal are produced in India. In 2000, hard coal production increased 5% from 294.5 Mt to 309.2 Mt. Brown coal production increased 3.2% from 22.2 Mt to 22.9 Mt. In addition to domestic production, India imported 22.8 Mt of hard coal in 2000 an increase of 25.8% over the 18.1 Mt imported in 1999.

Hard coal is used extensively for electricity generation in India, with about 87% consumed in the electricity generation sector.

Another 10% is used for coke oven charging in the steel sector. The remainder of the coal is consumed directly in industry and households, with the largest industry sectors being iron and steel, cement and chemicals.

Nearly all brown coal is consumed by minemouth power plants to generate electricity. A small component of brown coal is used to manufacture fertilizer and also, some is fabricated into briquettes for final consumption in the household and industrial sectors.

Russia

The fourth largest coal consumer in 2000 was Russia with total coal consumption of 246.3 Mt up nearly 9% from 226.2 Mt in 1999. Hard and brown coal consumption in Russia increased in 2000 by 11% and 5% respectively.

Both hard and brown coal are produced in Russia. In 2000, hard coal production rose 4.8% from 152.4 Mt to 169.2 Mt. Brown coal production rose from 82.7 to 86.7 Mt. Russia increased hard coal exports from 26.7 Mt to 34.3 Mt.

Hard coal is consumed primarily in the electricity generation sector (57%) and as coking coal in the steel industry (23%). Another large component of consumption is direct use in the residential sector (12%). The remaining volume is burned directly in a number of industrial sectors.

Around 88% of brown coal is consumed to generate power and heat. Another 6% is consumed in the industrial sector, while about 5% is consumed for household heating.

South Africa

South Africa is the sixth largest coal consumer and the second largest hard coal exporting country. Total coal consumption decreased 1.3% in 2000. Coal consumption increased from 153.0 Mt to 157.2 Mt stimulated by higher consumption in the electricity and steel production sectors.

Hard Coal Demand ('000 t)							
	1998	1999	2000 ^e		1998	1999	2000 ^e
Australia	59,294	60,643	63,257	Honduras	0	56	96
Austria	3,731	3,248	3,502	Jamaica	71	72	72
Belgium	11,401	10,021	11,048	Panama	59	60	59
Canada	19,708	20,230	20,923	Peru	449	452	449
Czech Republic	11,692	10,533	10,612	Venezuela	1,327	50	491
Denmark	9,399	7,672	6,671	Bangladesh	186	92	173
Finland	5,203	5,255	5,160	Hong Kong (China)	7,102	6,393	6,064
France	24,612	22,146	22,366	India	314,086	306,477	353,496
Germany	71,510	66,268	62,343	Indonesia	15,364	18,818	22,809
Greece	1,278	1,032	886	Malaysia	993	630	630
Hungary	1,346	1,248	1,282	Myanmar	12	13	13
Iceland	70	60	101	Nepal	323	351	351
Ireland	2,877	2,474	2,752	DPR of Korea	68,238	68,920	68,920
Italy	16,988	17,069	18,001	Pakistan	4,119	4,371	4,371
Japan	132,819	137,462	148,135	Philippines	4,709	6,188	6,696
Korea	58,124	61,459	62,414	Sri Lanka	1	1	1
Luxembourg	152	153	171	Chinese Taipei	36,865	38,679	43,668
Mexico	2,687	2,754	3,917	Thailand	1,388	2,236	4,180
Netherlands	14,987	12,089	12,930	Vietnam	5,524	5,772	5,506
New Zealand	1,798	1,882	1,778	Other Asia	256	256	228
Norway	1,023	1,045	951	PR of China	1,283,552	1,229,109	1,144,789
Poland	93,407	89,040	86,032	Bulgaria	3,589	3,211	3,388
Portugal	5,099	6,126	6,154	Cyprus	26	30	30
Slovak Republic	4,757	5,525	5,704	Romania	5,594	3,651	4,427
Spain	27,298	31,466	32,810	Croatia	355	316	67
Sweden	3,160	3,011	3,064	Macedonia	209	181	137
Switzerland	108	111	178	Slovenia	1,159	1,059	1,266
Turkey	13,146	11,362	16,866	Yugoslavia	142	145	137
UK	62,674	56,090	59,708	Former Yugoslavia	1,865	1,701	1,607
US	882,978	884,033	891,586	Armenia	5	3	4
Algeria	796	737	730	Azerbaijan	1	0	1
DR Congo	142	142	132	Belarus	757	519	519
Egypt	1,880	1,880	1,876	Estonia	75	79	75
Kenya	75	73	73	Georgia	19	28	19
Morocco	3,438	3,367	3,824	Kazakhstan	45,690	43,364	48,237
Namibia	65	6	0	Kyrgyzstan	818	878	987
Nigeria	59	60	59	Latvia	146	126	146
South Africa	150,625	156,463	154,468	Lithuania	219	174	219
Tanzania	5	5	5	Moldova	546	229	546
Zambia	172	177	172	Russia	140,776	144,248	160,058
Zimbabwe	3,991	3,840	3,990	Tajikistan	106	102	102
Other Africa	1,376	1,376	1,195	Ukraine	82,276	87,745	84,070
Argentina	1,200	1,250	1,284	Uzbekistan	68	69	68
Brazil	17,599	19,296	20,370	Former USSR	271,502	277,564	295,051
Chile	5,374	6,054	6,054	Iran	1,861	2,067	1,862
Colombia	5,110	3,945	3,755	Israel	9,297	9,075	9,284
Cuba	14	16	15	Lebanon	200	200	200
Dominican Republic	270	234	234				
EU(15)	260,369	244,120	247,566				
OECD Europe	385,918	363,044	369,292				
OECD Total	1,543,326	1,531,507	1,561,302				
IEA* Total	1,442,405	1,434,128	1,465,548				
Non OECD Total	2,230,749	2,185,416	2,177,147				
World	3,774,075	3,716,923	3,738,449				

Source: IEA/OECD Energy Statistics.

'Coal' refers to all coal types, primary (including hard and brown coal), peat and derived fuels (including patent fuel, coke oven coke, gas coke, BKB, coke oven gas, blast furnace gas and oxygen steel gas). Quantities have been converted to Mtce units using calorific values largely submitted in annual questionnaires to the IEA Secretariat by OECD Member Countries.

*Includes Korea (IEA membership pending).

^e estimated

South Africa produces exclusively hard coal, output of which increased 2.2% from 223.5 Mt to 225.2 Mt in 2000. Hard coal exports, which consist primarily of steam coal, increased about 3.6% to 68.6 Mt. South Africa also imports about 1.6 Mt/y of coking coal which is used in the steel sector.

Hard coal consumption is used for electric power generation (63%), for liquid fuel manufacture (18%) and for direct use in the industrial, residential and commercial and public services sectors. The largest industrial sectors are chemicals, iron and steel, cement and mining. About 3% of consumption is used to produce gas for distribution and 2% used to charge coke ovens.

Other Africa

In addition to the production and consumption in the Republic of South Africa, at least nine other African countries report coal consumption, which increased 4% in 2000 from 11.6 Mt to 12.1 Mt.

Total coal consumption in **Zimbabwe** is estimated to have remained flat at 4.0 Mt. Hard coal is mined and consumed in Zimbabwe. About 4.2 Mt of production is estimated for 2000. Of the coal consumption 59% is for electricity generation, and 14% is used for coke oven input. The remaining fraction is used in the agricultural, commercial and public services and transport sectors.

In Morocco, total coal consumption, which consists solely of hard coal increased 14% from 3.4 Mt to 3.8 Mt. Although a small volume of hard coal is produced in Morocco, output fell from 129,000 t to 29,000 t in 2000. Hard coal imports increased 16.9% from 3.3 Mt to 3.8Mt.

Hard coal consumption in Morocco is primarily used for electric power generation (77%) and burned directly in the industrial sector.

Total coal consumption in **Egypt** remained at about 1.9 Mt in 2000. Consumption is

exclusively hard coal, which is imported to charge coke ovens. Total coal consumption in **Algeria** declined fractionally from 737,000 t to 730,000 t. Hard coal is imported and used as input for coke ovens. **Zambia** produces and consumes about 172,000 t of hard coal annually. Coal is used for electricity generation, coke oven input and burned directly in the industrial sector. The **Democratic Republic of Congo** consumes hard coal directly in its industrial sector. About 88,000 t is domestically produced and 44,000 t imported. **Kenya** imports and consumes about 88,000 t of hard coal annually. The coal is used by the cement industry. **Nigeria** produces and consumes about 59,000 t of hard coal annually. Consumption is primarily in the cement industry. **Tanzania** produces and consumes about 5,000 t of hard coal, which is used in the industrial sector.

Japan

The seventh largest coal-consuming, and largest coal-importing country is Japan. Total coal consumption surged 10.7 Mt in 2000 (7.8%), rising from 137.8 Mt to 148.1 Mt. Coal consumption was stimulated by expanding coal-fired electric power generation and by strong performance of Japan's huge steel manufacturing sector.

All of the coal consumed in Japan is hard coal. Although the country maintains a small hard coal producing sector, it is heavily subsidised, and only produced about 3.1 Mt in 2000. The balance of hard coal demand is met with imports, which increased 9% from 133.2 Mt 145.4 Mt.

Currently, about 49% of coal consumption is for coke oven input and carbon injection to blast furnaces. Another 43% of hard coal consumption is for electric power generation, although this component should increase gradually as more capacity is added to the coal-fired generating base. The remaining 8% is burned directly in the industrial sector, primarily for cement, paper and pulp and chemical manufacture.

Poland

In 2000, Poland was the eighth largest coal consumer, and a significant coal producer. Total coal consumption fell for the fourth consecutive year in Poland, declining from 149.9 Mt to 145.3 Mt. The 3% fall continues a trend evident since 1989 as economic liberalisation and industrial restructuring have changed the character of the Polish economy. Coal consumption consisted of both hard and brown coal components. Brown coal consumption declined 2.5% from 60.8 Mt to 59.3Mt. Consumption of hard coal fell 3.4% from 89.0 Mt to to 86.0 Mt.

Hard coal production in Poland is subsidised, although the government is moving to restructure by closing loss-making mines and

concentrating production in the remaining competitive operations. Hard coal production declined 7.3% to 119.2 Mt to 102.2 Mt. Hard coal exports declined less-1.6%-from 24.1 Mt to 23.7 Mt Brown coal production, which is not subsidised, declined 2.2% from 60.8 Mt to 59.5 Mt.

Hard coal consumption is distributed to electricity and heat generation (59%), coke oven charging (13%), direct industrial use (13%), residential, commercial and public services (12%) and agriculture (3%). Brown coal consumption is almost exclusively centred in the power and heat generation sector, where 99% of the total is used. The remaining fraction is burned directly in the household and industrial sectors.

Brown Coal Demand ('000 t)							
	1998	1999	2000e		1998	1999	2000e
Australia	66,259	67,281	67,800	Philippines	3	3	0
Austria	883	1,535	1,242	Singapore	0	0	1
Belgium	195	159	219	Thailand	20,580	18,844	18,203
Canada	39,472	36,806	39,761	Albania	49	33	45
Czech Republic	47,950	41,700	47,628	Bulgaria	29,631	25,559	27,216
France	1,089	653	354	Romania	25,857	24,092	30,201
Germany	168,364	162,961	169,733	Bosnia & Herzegovina	1,794	1,848	1,904
Greece	60,624	60,947	61,906	Croatia	39	31	80
Hungary	15,261	15,451	14,459	Macedonia	8,292	7,529	7,242
Ireland	42	40	20	Slovenia	4,178	3,884	5,114
Italy	265	150	21	Yugoslavia	44,036	33,334	34,343
Mexico	9,347	9,473	8,506	Former Yugoslavia	58,339	46,626	48,683
Netherlands	19	35	44	Estonia	13,888	12,685	12,198
New Zealand	275	259	261	Kazakhstan	1,620	1,740	2,320
Poland	62,786	60,826	59,308	Kyrgyzstan	401	339	314
Slovak Republic	5,566	5,134	4,242	Lithuania	3	4	3
Spain	12,598	12,156	12,885	Russia	76,624	81,974	86,218
Turkey	64,527	64,078	65,030	Tajikistan	20	20	20
US	78,643	81,484	79,572	Ukraine	1,430	1,532	1,076
India	23,170	23,646	22,157	Uzbekistan	2,852	2,829	2,852
Malaysia	1,376	1,332	1,332	Former USSR	96,838	101,123	105,001
Myanmar	21	95	95	Israel	471	495	444
DPR Korea	23,750	23,988	23,988				
EU(15)	244,079	238,636	246,424				
OECD Europe	440,169	425,825	437,091				
OECD Total	634,165	621,128	632,991				
IEA* Total	556,466	545,695	560,935				
Non OECD Total	280,085	265,836	277,366				
World	914,250	886,964	910,357				

Source: IEA/OECD Energy Statistics.

*Includes Korea (IEA membership pending).

^e estimate

Australia

The ninth largest coal consumer, and the largest coal exporter is Australia. Total coal consumption in Australia increased 2.5% in 2000 from 127.9 Mt to 131.1 Mt. Hard coal consumption increased 8.7% from 60.6 Mt to 63.3 Mt, while brown coal consumption was up 1% from 67.3 to 67.8 Mt. Demand-especially for hard coal-was stimulated by expansion in the electricity sector.

Hard coal production increased 6% from 223.7 to 238.1 Mt. Hard coal production was stimulated by export demand and stronger demand in the domestic electricity sector. In 2000, Australia exported 99.0 Mt of coking coal and 87.8 Mt of steam coal. Total exports reached 186.8 Mt, a 9% increase from 1999. Brown coal production was virtually flat at 67.8 Mt.

For domestic use, about 83% of hard coal is consumed for electricity generation, and 9% for coke oven charging. The remaining 8% is burned directly, with the aluminium, cement and food processing sectors being the largest consumers. About 99% of brown coal is used to generate electricity. The remaining 1.0% is fabricated into briquettes for use in the household sector.

Canada

Canada was the fifteenth largest coal consumer and a significant coal importer and exporter in 2000. Total coal consumption increased from 6.4% from 57.0 Mt to 60.7 Mt. This consisted of 20.9 Mt of hard coal and 39.8 Mt of brown coal. Consumption of hard coal and brown coal were up 3.4% and 8.0% respectively in 2000.

Canada produces both hard and brown coal. Production of brown coal declined 1.7% from 36.0 Mt to 35.4 Mt. Production of hard coal fell 7.4% from 36.5 to 33.8 Mt. Canada is a significant exporter of coal-primarily coking coal-which is shipped widely in Asian, South American and European markets from western Canada. In 2000, hard coal exports declined 5.5% from 33.6 Mt to 31.7 Mt.

Canada is also a significant coal importer. Coal is imported into eastern Canada for consumption in the electric power, steel and other industrial sectors. Some sub-bituminous coal, which Canada classifies as brown coal, is imported. In 2000, imports of sub-bituminous coal increased 29.2% from 3.4 Mt to 4.4 Mt. Imports of hard coal increased 10.8% from 15.7 Mt to 17.4 Mt.

A little less than 1% of brown coal consumption is attributable to direct use in the paper and pulp, and residential sectors. The remaining 99% is used for electricity generation. As with brown coal, most hard coal is used for electricity generation, however the proportion is only 68%. Another 22% of hard coal consumption is input into coke ovens in the steel sector. The remaining 8% is consumed directly by industry, with the cement and non-ferrous metal sectors being the largest consumers.

South Korea

The fourteenth largest coal consumer, and the second largest coal importer in 2000 was the Republic of Korea (South Korea), which consumed 62.4 Mt of coal, an increase of 1.6% from the 1999 level. All of the coal consumed was hard coal.

South Korea has a small indigenous coal industry which produces anthracite for electric power generation and household use. The industry is heavily subsidised, and production has been declining for several years. In 2000, domestic hard coal production was 4.1 Mt, down 3.2% from 4.2 Mt in 1999.

The vast majority of hard coal is imported. In 2000, South Korea imported 61.6 Mt of hard coal, up 13% from 54.6 Mt in 1999. Both steam coal and coking coal are imported.

The largest component of coal consumption is for electric power generation, where 52% of hard coal consumption occurs. Another 31% is used for input into coke ovens and carbon injection into blast furnaces. The remaining 17% is burned directly in industry and

households, with the largest consumer being the cement industry. Household consumption of hard coal amounts to about 2% of total consumption.

North Korea

There are very limited statistical data available on the Democratic People's Republic of Korea (North Korea). Based upon this limited knowledge, it is estimated that coal consumption in North Korea reached about 93.0 Mt in 2000. This was supplied as 67.2 Mt of domestic hard coal production and 24.0 Mt of brown coal production. About 2.1 Mt of hard coal was imported. It is impossible to determine the breakdown of coal consumption in North Korea. Assuming that all production and imports are consumed, the country would be the tenth largest coal consumer in 2000.

Indonesia

The fourth largest coal exporter and the twenty-sixth largest coal consumer is Indonesia. Last year, total coal consumption reached 22.8 Mt, up 21.3% from 18.8 Mt in 1999. Coal consumption has increased rapidly in Indonesia as a number of coal-fired power plants have been placed into

operation. All of the coal consumed is hard coal.

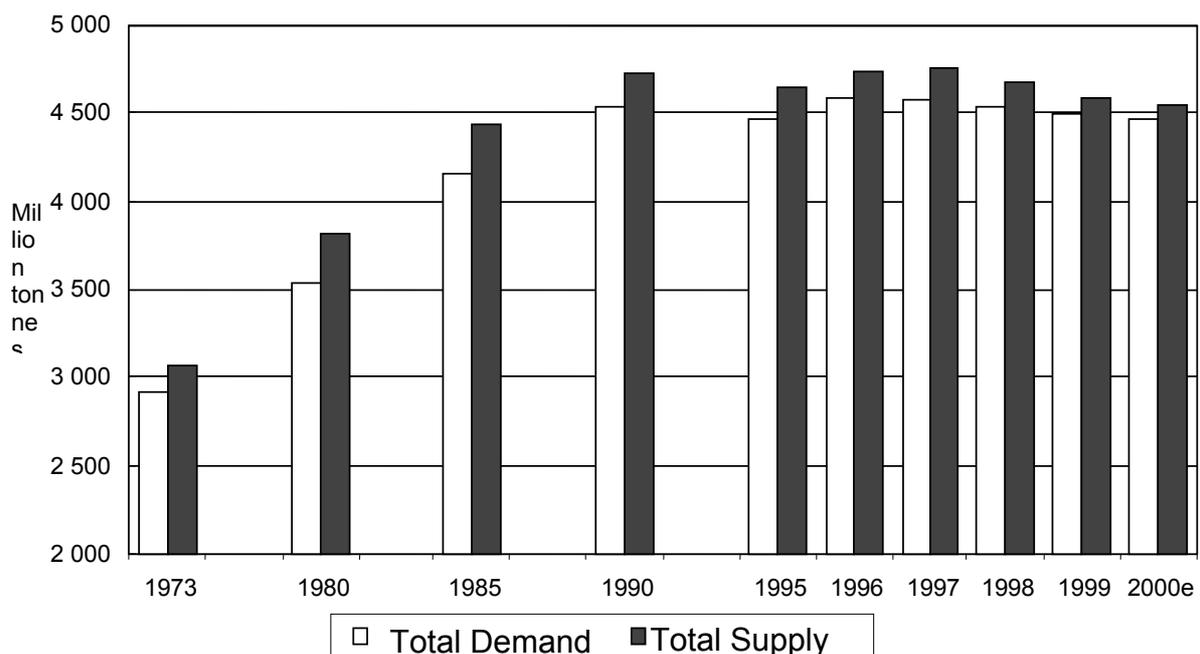
Indonesia also produced 78.6 Mt of hard coal in 2000, and exported 56.8 Mt. Production was up by 9% from the 1999 level, while exports increased about 5%. Indonesia also imported about 285,000 t of coal in 2000 as local production was unable to meet rapidly expanding domestic demand. Indeed, Indonesian coal imports look set to increase again in 2001 as the country seeks to meet its rapidly expanding coal demand.

The largest component of coal consumption is for electric power generation, which uses about 75% of coal volume. The remainder is burned directly, with about 14% consumed for household use, and 11% used in the industrial sector. The largest industrial consumer is the cement sector.

Chinese Taipei

Chinese Taipei was the twenty-first largest coal consumer, and a significant coal importer in 2000. Coal consumption reached 43.7 Mt in 2000, an increase of 12.9% over the 38.7 Mt consumed in 1999. All of the coal consumed was hard coal.

Total Coal Supply and Demand in Selected Years



Although there is a small indigenous coal-producing industry on the island, production decreased 10% in 2000 to just 83,000 t. The vast majority of coal used is imported. Hard coal imports increased 11.0% from 41.1 Mt to 45.4 Mt.

About 70% of total coal consumption is for electricity and heat generation. Another 16% is burned directly in the industrial sector, with the cement, plastics, iron and steel, and pulp and paper sectors being the largest direct consumers. Another 14% of consumption is inputs to coke ovens in the steel sector.

Other Eastern Europe and Western Asia

A large swath of the globe running from the Baltic Sea down through the Middle East uses coal for part of its energy needs. In 2000, total coal consumption in this area increased from 412.0 Mt to 440.2 Mt—a 7% rise from 1999.

Turkey

Total coal consumption increased in Turkey 8.5% from 75.5 Mt to 81.9 Mt. Hard coal consumption increased from 11.4 Mt to 11.9 Mt and brown coal consumption increased from 64.1 Mt to 67.2 Mt. Turkey is both a significant coal producer and a significant coal importer.

Brown coal production remained the same at 65.0 Mt and hard coal production increased from 2.0 Mt to 2.3 Mt. Domestic production is supplemented by hard coal imports, which increased from 7.7 Mt to 8.7 Mt in 2000.

Currently, about 43% of hard coal consumption is for direct use in the industrial sector, while 36% is used to charge coke ovens in the steel sector. About 15% of hard coal consumption is for electric power generation. The remaining 6% is consumed in the household sector. Brown coal is consumed in the electricity sector (84%), directly in industry (8%) and in the household sector (8%).

Czech Republic

In the Czech Republic, total coal consumption increased 11.5% from 52.2 Mt to 58.2 Mt. The majority of coal consumption is brown coal, which increased from 41.7 Mt to 47.6 Mt.

The Czech Republic is a significant producer and exporter of brown and hard coal. Brown coal production increased 12.3% from 44.8 Mt to 50.3 Mt. Exports of brown coal declined 13% from 3.2 Mt to 2.8 Mt. Production of hard coal increased 3.6% from 14.3 Mt to 14.9 Mt, but exports declined from 6.1 Mt to 5.9 Mt. About two-thirds of hard coal production, and nearly all of hard coal exports are coking coal. 1.1 Mt of hard coal was imported—mostly coking coal used in the steel sector.

The largest proportion of brown coal consumption is in the electricity and heat generation sector, which uses about 86%. A small component (4%) is transformed into gas for distribution, and fabricated into briquettes for distribution to the industrial and household sectors. The remaining 10% is burned directly in the household and industrial sectors. Hard coal is primarily consumed for coke making in the steel sector, where 42% of the volume is used. About 39% is used for electric power and heat generation, while of the remainder 15% is consumed in the industrial sector and 4% in the household sector.

Hungary

Hungarian total coal consumption declined 6.0% in 2000 from 16.7 Mt to 15.7 Mt. Hard coal consumption increased 6.7% from 1.2 Mt to 1.3 Mt. Brown coal consumption declined 6.4% from 15.5 Mt to 14.5 Mt. Hungary produces brown coal, but imports hard coal. Hard coal imports in 2000 rose from 1.2 Mt to 1.3 Mt. Brown coal production declined 4.6% from 14.5 to 13.9 Mt.

All hard coal consumption is for coke oven input in the steel sector. Brown coal consumption is concentrated in the electricity and heat generation sectors, where 94% of the volume is used. About 1% of the volume

of brown coal is converted into briquettes for consumption in the industrial and residential sectors. The remaining 5% is burned directly in those sectors, with about 4% used in the household sector and 1% used for industry.

Slovak Republic

Total coal consumption in the Slovak Republic declined 7.5% from 10.7 Mt to 9.9 Mt in 2000. Brown coal consumption dropped 17.4% from 5.1 Mt to 4.2 Mt. Hard coal consumption rose marginally from 5.5 Mt to 5.7 Mt.

Although the Slovak Republic is a significant producer of brown coal, all hard coal is imported. Imports of hard coal rose 5.3% in 2000 from 5.5 Mt to 5.8 Mt. Brown coal production declined 2.7% from 3.7 Mt to 3.6 Mt.

The largest proportion of hard coal is consumed for coke making in the steel sector, where about 38% of the volume is used. Generation of electricity and heat uses 31% of the hard coal volume, while direct industrial use takes 22%. The remaining 8% is consumed in the household and commercial and public services sectors. The largest component of brown coal consumption is for electricity and heat generation which accounts for about 69% of use. The remainder is burned directly in the industrial sector (14%), commercial and public services sector (12%) and residential sector (4%).

Ukraine

Total coal consumption in the Ukraine declined from 89.3 Mt to 85.1 Mt in 2000—a 4.7% decrease. Hard coal consumption dropped 4.2% from 87.7 Mt to 84.1 Mt. Brown coal consumption dropped 29.8% from 1.5 Mt to 1.1 Mt. Ukraine is a significant producer of hard coal, and also supplies most of its domestic needs of brown coal.

Hard coal production was down 1.1% from 81.1 Mt to 80.8 Mt, and exports declined 37.9% from 8.8 to 8.4 Mt. Brown coal production declined from 1.5 Mt to 1.1 Mt.

The Ukraine has embarked upon a rationalisation of coal production that will result in closure of uncompetitive mines and a refocus of efforts on competitive mines. Given past experience in other countries, this likely portends a decline in coal production in the future.

Hard coal is used primarily for coke oven input (43%), and electricity and heat generation (36%). The remainder is used directly in industry (6%), and for residential heating (5%). About 30% of brown coal consumption is in the electricity sector, while the remaining 70% is used in the residential sector.

Romania

Total coal consumption in Romania increased 24.8% from 27.7 Mt to 34.6 Mt. Hard coal consumption rose 21.3% from 3.7 Mt to 4.4 Mt, while brown coal consumption was up 25.4% from 24.1 Mt to 30.2 Mt. Romania produces both hard and brown coal, and imports a small volume of hard coal.

Brown coal production rose 28% from 21.8 Mt to 27.9 Mt. Hard coal production increased for the first time since 1997 from 1.1 Mt to 1.3 Mt. Hard coal imports also increased from 2.4 Mt to 3.0 Mt.

The primary brown coal consumption is for electricity and heat generation, where 99% of the volume is used. About 1% is used in the industrial and residential sectors. About 85% of hard coal is used for coke oven input in the steel sector. Another 12% is used to generate electricity and heat. The remaining 3% is consumed directly in the industrial and household sectors.

Bulgaria

Total Bulgarian coal consumption rose to 30.6 Mt in 2000 from 28.8 Mt in 1999. Brown coal consumption increased 6.5% from 25.6 Mt to 27.2 Mt. Hard coal consumption increased 6.3% from 3.2 Mt to 3.4 Mt. Bulgaria produces both hard and brown coal.

Although hard coal is produced in Bulgaria, less than 100,000 t has been produced annually since the mid-1990s, and most hard coal is imported. Hard coal imports declined 57% in 2000 from 3.5 Mt to 1.2 Mt. Brown coal production increased 6.6% from 25.2 Mt to 26.8 Mt.

About 54% of hard coal consumption is for heat and power generation, and another 34% is used to charge coke ovens. The remaining 12% is consumed directly in the industrial and household sectors. The largest industrial consumers are the chemical, cement and food processing sectors. About 84% of brown coal consumption is in the electricity and heat generation sectors. Another 14% of brown coal is used to manufacture briquettes which are distributed in the household and industrial sectors. The remaining 2% is burned directly in the household sector.

Kazakhstan

Total coal demand jumped sharply in Kazakhstan in 2000, from 45.1 Mt to 50.6 Mt—a 12.2% increase. Brown coal consumption rose 35.3% from 1.7 Mt. to 2.3 Mt. Hard coal consumption rose from 43.4 Mt to 48.2 Mt. Kazakhstan is a significant coal producing and exporting country.

Hard coal production increased from 56.6 Mt to 71.1 Mt, and hard coal exports increased 47.5% from 16.2 Mt to 23.5 Mt. About 13% of Kazakh production is coking coal, while the remainder is steam coal. Hard coal exports consist primarily of steam coal shipped to Russia. Brown coal production increased from 1.8 Mt to 2.7 Mt.

Nearly all brown coal is burned directly in the industrial sector. Hard coal consumption consists of electricity and heat generation (65%), direct use in the industrial sector (30%) and inputs for coke ovens in the steel sector (5%).

Israel

Total coal demand in Israel increased 1% from 9.6 Mt to 9.7 Mt. Hard coal demand

increased from 9.1 Mt to 9.3 Mt, and brown coal demand remained flat at about 450,000t.

Although Israel produces about 450,000 t of oil shale each year, which is classified as brown coal, the remainder of consumption is hard coal, which is imported.

Both hard and brown coal are consumed to generate electricity.

Cyprus

Coal consumption in Cyprus consists solely of hard coal that is imported. In 2000, there was estimated consumption of 30,000 t of hard coal, which was burned directly in the cement sector.

Lebanon

Coal consumption in Lebanon consists solely of hard coal that is imported. In 2000, there was estimated consumption of 200,000 t of hard coal, which was burned directly in the cement sector.

Other Balkans

Seven countries, five of which formerly comprised Yugoslavia, had total coal demand of 49.4 Mt in 2000, up 4% from 47.0 Mt in 1999. The largest coal consumer, is the remainder of Yugoslavia, comprising of **Serbia and Montenegro**. The country consumes primarily brown coal that is produced domestically. Less than 100,000 t of hard coal is imported and consumed annually. About 91% of the brown coal is consumed for electricity and heat generation. The remaining 9% is burned directly in the industrial and household sectors.

The **Former Yugoslav Republic of Macedonia** consumed 7.2 Mt of brown coal, down 4% from the 1999 level of 7.5 Mt. About 99% of the coal is used for heat and power generation. The small remaining fraction is burned directly in the industrial and residential sector.

Slovenia consumed 6.4 Mt of coal in 2000, up 29% from the 4.9 Mt level of 1999. Slovenia produces brown coal and hard coal,

and also imports hard coal. 99% of the brown coal is burned for electricity and heat production. About 91% of the hard coal is used for electricity and heat production, with the remainder burned directly in the industrial and residential sectors.

Croatia consumed 100,000 t of hard coal in 2000, down 66.7% from 300,000 t in 1999. Most hard coal is used to generate electricity in Croatia, although about 5% is used in the cement sector.

Total coal consumption in **Bosnia-Herzegovina** increased 3% from 1.8 Mt to 1.9 Mt. Domestically produced brown coal is used for electricity and heat generation (82%) and burned directly in the industrial and residential sectors.

Total coal consumption in **Albania** increased from 33,000 t to 45,000 t. Domestically produced brown coal is consumed in the residential sector.

The **Republic of Moldova** consumes about 500,000 t of coal annually which is imported. Two-thirds of the coal is used to generate power and heat. The remaining one-third is used in the household sector.

The Baltics and Belarus

Four countries located generally west of Russia had virtually unchanged total coal demand in 2000. The largest consumer is **Estonia**, which actually produces and uses oil shale that is classified as brown coal. Production is estimated to have remained at 10.8 Mt in 2000. Another 1.3 Mt of brown coal and 80,000 t of hard coal is estimated to have been imported. About 90% of the brown coal is used to generate electricity. The remaining 10% is used for gas production, coke ovens and burned directly in the industrial sector.

Belarus imports about 600,000 t/y of hard coal. About two-thirds of the coal is used to generate electricity and heat. The remaining one-third is burned directly in the industrial and residential sectors.

Lithuania imports about 250,000 t/y of hard coal. The bulk of the coal is burned directly in the industrial and residential sectors, although about 10% is used to generate electricity and heat.

Latvia imports about 150,000 t/y of hard coal. Two-thirds of the coal is consumed directly in the commercial and public services and residential sectors. The remaining one-third is consumed by industry.

Caucaseus and Other Western Asia

Five countries located generally south of Russia and east of Turkey had estimated total coal consumption of 6.2 Mt, down 4% from 6.5 Mt in 1999.

Coal consumption in **Uzbekistan** remained level in 2000 at 1.9 Mt. Domestically produced hard coal is fabricated into patent fuel that is consumed in the household sector. Domestically produced brown coal is used for electricity and heat generation (82%) and burned directly in the industrial and household sectors.

Coal consumption in **Iran** declined 10% from 2.1 to 1.9 Mt. Iran produced about 1.2 Mt of hard coal and imported another 0.7 Mt. Hard coal consumption in Iran is centred in the steel industry where it is used to charge coke ovens.

Coal consumption in **Kyrgyzstan** declined 6% from 1.4 to 1.3 Mt. There are about 375,000 t of Kyrgyz hard coal production and 750,000 t of imports. About 53% of the coal is used for electricity and heat generation. The remainder is burned directly in the industrial sector.

Total coal consumption in **Tajikistan** is estimated to have remained level in 2000. About 20,000 t of domestically produced brown coal is burned directly in the residential sector. Another 100,000 t of imported hard coal is also burned in the residential sector.

About 15,000 t is imported into **Georgia**. Most of the coal is burned directly in the residential sector. About 5,000 t of hard coal is imported annually into **Armenia**. About 1,000 t of hard coal is imported annually into **Azerbaijan** where it is burned in the household sector.

Other Asia and Pacific

In eastern Asia, and the Pacific apart from the individual countries that have been reported, coal consumption increased about 2% from 47.8 Mt to 48.7 Mt. Many countries in the region have rapidly expanding economies, which causes coal consumption to shift from direct use to use as an electric generating fuel.

Thailand

Total coal consumption in Thailand increased 6.2% from 21.1 Mt to 22.4 Mt in 2000. Hard coal consumption was up from 2.2 Mt to 4.2 Mt-an 87% increase. Brown coal consumption declined 3.4% from 18.8 Mt to 18.2 Mt.

Thailand is a significant brown coal producer. In 2000, brown coal production declined 2.6% from 18.2 Mt to 17.8 Mt. Hard coal for consumption is imported, and imports increased 87% in 2000 from 2.2 to 4.2 Mt.

Previously, 95% of hard coal consumption was for direct use in the industrial sector, where the cement and food processing sectors are the most important consumers. However, in 2000, privately owned coal-fired power plants began operating and significantly increased the import of hard coal. The current hard coal consumption mix is 50% for electricity generation and 50% direct consumption in industry. The proportion of hard coal used for electricity generation will grow for the next five years.

About 76% of the brown coal consumed is used for electricity generation. The remaining 26% is burned directly in the industrial sector, with the cement sector and food sector the largest consumers.

Hong Kong (China)

Coal consumption declined from 6.4 Mt to 6.1 Mt in Hong Kong in 2000. All of the coal, which is hard coal, is imported. Hard coal imports declined in generally the same proportion as consumption. Hard coal is used for electricity generation in Hong Kong.

The Philippines

The Philippines increased total coal consumption 8.1% from 6.2 Mt to 6.7 Mt. Although brown coal was produced in the past in the Philippines, production has ceased, and all consumption is now Hard coal. Hard coal production increased from 22.8% from 1 Mt to 1.5 Mt, and imports remained flat at 4.0 Mt.

About 42% of the hard coal consumption is at electric power plants. The remaining coal is burned directly to produce cement (38%) and to provide power at coal mines (16%). A small fraction is also consumed in the food processing sector.

Vietnam

Coal consumption in Vietnam declined 5% from 5.8 Mt to 5.5 Mt. All of the coal consumed is hard coal.

Vietnamese coal production was flat in 2000 at about 9.1 Mt. Exports of hard coal increased from 3.3 Mt to 3.5 Mt.

Hard coal consumption is centred in the industrial sector, where 51% of the coal is burned directly. About 32% is used for electricity generation. The remaining 17% is consumed directly in the household, agricultural and commercial and public services sectors.

Pakistan

Coal consumption in Pakistan is estimated to have remained flat in 2000 at 4.4 Mt. All of the coal used is hard coal.

Coal production in Pakistan is about 3.5 Mt, while imports are about 0.9 Mt. The major coal consumer is the cement industry, which

accounts for 70% of consumption. Another 21% is used to charge coke ovens in the steel sector. The remaining 9% is consumed by electricity generating plants.

New Zealand

Coal consumption in New Zealand declined 5% from 2.1 Mt to 2.0 Mt in 2000. Brown coal consumption remained virtually the same at 260,000 t. Hard coal consumption declined 5.5% from 1.9 Mt to 1.8 Mt.

Both brown and hard coal are produced in New Zealand. Brown coal production declined from 255,000 t to 213,000 t. Hard coal production declined 2.4% from 3.5 Mt to 3.4 Mt. Hard coal exports-primarily of coking coal-increased 14.7% from 1.3 Mt to 1.5 Mt.

About 65% of brown coal is consumed directly in the industrial sector. The remaining 35% is consumed directly in the residential and commercial and public services sectors. About 60% of hard coal is consumed directly in the industrial, residential and commercial and public services sectors. The largest industrial consumer is the iron and steel sector, which uses about 30% of the volume. 40% of consumption is for electricity and heat generation.

Malaysia

Total coal consumption in Malaysia remained the same in 2000 at 2 Mt. Both brown and hard coal consumption, which are 1.4 Mt and 0.6 Mt respectively, remained the same. Hard coal is imported, and consumed for electricity generation and directly in the industrial sector.

About 248,000 t of brown coal is produced domestically and another 1.1 Mt is imported. All brown coal is used for electricity generation.

Other Asia

In addition to the seven countries mentioned in this section, there is coal consumption in at least four other countries. About 351,000 t is consumed in **Nepal**. The hard coal is burned

directly in the industrial and household sectors. In **Bangladesh**, 173,000 t of hard coal is consumed by the cement industry. In **Myanmar**, about 13,000 t of hard coal, and 95,000 t of brown coal are produced and consumed annually. The coal is burned directly in the industrial sector. In **Sri Lanka**, about 1,000 t/y of hard coal is burned in the transport sector to power steam locomotives.

Latin America

There are eleven notable coal consuming countries in Latin America. Coal consumption in the region increased 9% from 42.5 Mt to 46.4 Mt in 2000. In addition to being an important coal consuming region, two of the largest coal exporters-Colombia and Venezuela-are located in Latin America.

Brazil

The largest coal consumer in Latin America is Brazil, where consumption increased 6% from 19.3 Mt to 20.4 Mt. All of the coal consumed in Brazil is hard coal.

Coal production in Brazil remained virtually unchanged in 2000 at 5.6 Mt. Brazil is a significant hard coal importer. Hard coal imports increased from 12.8 Mt to 14.5 Mt.

Brazil hosts Latin America's largest steel industry, and the largest use of hard coal is as input to coke ovens, where 49% of the volume is currently consumed. Another 31% of the hard coal volume is used for electricity generation. The remaining 20% is consumed directly in the industrial sector, with iron and steel, and chemicals being the largest consuming sectors.

Mexico

Total coal consumption in Mexico increased from 12.2 Mt to 12.4 Mt-adding about 2% to volume in 2000. Brown coal consumption increased 2.9% from 9.5 Mt to 9.8 Mt. Hard coal consumption was up by 8% from 2.8 Mt to 3.0 Mt.

Mexico is a significant coal producer and hard coal importer. Brown coal production

increased from 8.8 Mt to 9.0 Mt. Hard coal production increased from 2.3 Mt to 2.4 Mt. Hard coal imports increased from 1.2 Mt to 1.4 Mt-about 16% higher than in 1999.

All of the hard coal consumption is for input to coke ovens. Brown coal is used exclusively for electricity generation.

Chile

Total coal consumption in Chile remained the same at 6.1 Mt. All of the coal consumed in Chile is hard coal.

There is a small coal production sector in Chile which produced about 485,000 t in 2000, the same as in 1999. Hard coal imports increased modestly from 6.1 Mt to 6.3 Mt.

Coal in Chile is primarily consumed in the electricity generating sector (72%) and for inputs to coke ovens in the steel sector (14%). The remainder is burned directly by industry, with the cement, food products and iron and steel sectors being the largest consumers.

Colombia

Colombia is both a significant coal consumer and a large hard coal exporter. Coal consumption in Colombia fell 3% in 2000 from 3.9 Mt to 3.8 Mt. All of the coal used in Colombia is hard coal.

Coal production increased 13.1% from 32.7 Mt to 37.1 Mt. Nearly all of the coal produced is steam coal. Colombia exported 34.5 Mt of coal in 2000, up 15.4% from the 29.9 Mt exported in 1999.

About 36% of Colombian coal consumption is attributable to heat and electricity generation. Another 19% is used to charge coke ovens and for carbon injection to blast furnaces in the steel sector. The remaining is burned directly in industry and households. The largest consuming industry sectors are cement, iron and steel, paper and pulp, textiles and chemicals. About 2% of the volume is consumed directly in the residential sector.

Argentina

Coal consumption in Argentina remained virtually unchanged in 2000 at 1.3 Mt. All of the coal used is hard coal.

There is a small domestic coal sector in Argentina, which produced 312,000 t in 2000-down about 7% from 1999. Argentina imported 1.1 Mt in 2000, up 13% from the 0.9 Mt imported the prior year.

About 52% of the coal consumed is used to charge coke ovens. The remaining 48% is used to generate electricity.

Venezuela

Coal consumption jumped sharply in Venezuela, from 50,000 t to 0.5 Mt. Hard coal consumed in Venezuela is used almost exclusively in the cement industry.

Venezuela is a significant coal producer and exporter. Hard coal production increased 27.5% from 7.0 Mt to 8.9 Mt. Hard coal exports increased 13.1% from 6.8 Mt to 7.7 Mt.

Other Latin America

Coal consumption in **Peru** increased by 26,000 t in 2000. Although the country boasts a small production sector, mining amounts to only about 25,000 t. The remaining 450,000 t is imported and burned directly in the industrial and household sectors.

The **Dominican Republic** imports about 250,000 t of hard coal to generate electricity.

In **Panama**, about 50,000 t/y of hard coal per year are imported and consumed directly in the industrial sector. While in **Jamaica**, about 30,000 t/y of hard coal are imported and used in the non-ferrous metal sector. **Cuba** imports about 15,000 t/y of hard coal for direct use in foundries.

Guatemala is set to become a major coal consumer. The San Jose coal-fired power plant was placed into operation in 1999, and will eventually burn 1.0 Mt/y to 1.5 Mt/y for electric power generation.