

COAL

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Today, coal is the base for 40% of world power generation and according to RAG Coal International, one of the world's largest producers, "the dynamics of the coal business lies in its powerful worldwide growth". In order to satisfy energy demand by the industrially developing countries, it estimates that worldwide demand for coal will have to increase by about 40%. Thus, by 2010, worldwide coal trade is likely to have risen to more than 600 Mt/y from around 500 Mt/y currently.

Last year, the global economic slowdown caused energy consumption to increase by a relatively low amount. Nevertheless, RAG considers the mid- to long-term trend is "towards higher world energy consumption, fuelled primarily by continuing population growth and the growing energy requirements of developing and threshold economies". Coal is likely to continue to feature prominently because the resource base is large (coal accounts for some two-thirds of known fossil energy reserves) is widely distributed geographically and because coal is located mainly in politically stable regions.

Last year saw better coal prices, for a short period, than had been seen for some time, owing to oil price rises that were followed by gas price rises. However, by the end of the year, coal prices once again came under pressure because of instability in oil pricing. Higher coal exports from China were also an influence. China became the world's second biggest coal exporter after Australia, increasingly assuming the role of swing supplier in the international market. Despite a downturn late last year, figures from BP show that total world production rose by over 200 Mt in 2001, to 4,563.7 Mt, compared with 4,339.1 Mt in 2000 and 4,357.6 Mt in 1999.

World Coal Production (Mt)

	1999	2000	2001
US	998.4	974.0	1,017.3
Canada	72.5	69.2	70.5
Mexico	10.3	11.3	12.0
Total North America	1,081.2	1,054.5	1,099.8
Brazil	5.6	5.7	5.8
Colombia	32.7	38.1	42.4
Venezuela	6.6	7.8	8.1
Other South and Central America	0.8	0.9	0.9
Total South and Central America	45.7	52.5	57.2
Bulgaria	25.9	27.1	28.2
Czech Republic	59.1	65.2	66.1
France	5.1	3.5	2.4
Germany	200.8	201.0	202.5
Greece	61.5	63.3	67.3
Hungary	14.6	14.0	13.8
Poland	172.7	162.8	163.4
Romania	22.9	29.3	33.3
Spain	24.3	23.5	23.1
Turkey	67.0	66.6	67.7
UK	37.1	31.2	32.1
Other Europe	49.6	53.2	52.0
Total Europe	740.6	740.7	751.9
Kazakhstan	58.4	74.9	79.0
Russian Federation	249.4	257.9	269.0
Ukraine	82.8	81.3	83.9
Other FSU	3.4	3.0	3.2
Total FSU	394.0	417.1	435.1
Total Middle East	1.1	1.0	0.8
South Africa	222.3	224.1	224.7
Zimbabwe	5.0	4.4	5.0
Other Africa	2.1	1.9	1.9
Total Africa	229.4	230.4	231.6
Australia	294.2	291.0	315.0
China	1,043.6	998.0	1,089.7
India	314.4	334.8	343.5
Indonesia	73.7	77.0	92.6
Japan	3.9	3.1	3.2
New Zealand	3.7	3.6	4.1
Pakistan	3.3	3.2	3.3
South Korea	4.2	4.2	3.8
Other Asia Pacific	124.6	128.0	132.1
Total Asia Pacific	1,865.6	1,842.9	1,987.3
Total World	4,357.6	4,339.1	4,563.7

Source: BP Statistical Review of World Energy - includes bituminous coal and anthracite (hard coal) and lignite and brown (sub-bituminous) coal.

Historically, growth in coal demand is linked to growth in electricity demand, which in turn is primarily driven by growth in GDP. Jon Dundas, marketing director of BHP Billiton's Energy Coal customer sector group noted in a presentation in July that: "There is no reason to expect any change to this relationship in the foreseeable future. Electricity is forecast to grow at a healthy 2.7% annualised over the period 2000 to 2020. On a basis of life-cycle costing, little expansion is seen in the nuclear sector and whilst gas will capture most of the growth, coal will retain its common dominant position with 32% of supply in 2020."

"A critical strategic issue facing coal over this period is emissions in greenhouse gases, given the public perception that gas is a relatively cleaner fuel. However, on the face of it coal does have a secure future. It is derived from a cheap and globally diversified production base and mostly from secure regions. It cannot be substituted for on a large scale given the sunk cost in current generating capacity and the cost of alternative fuels in certain regions of the globe. There is still, though, a need to recognise the environmental concerns and participate in industry developments to enhance the attractiveness of coal, such as zero plant emission research and clean coal solutions."

"On what base does this growth occur? The total Energy Coal market is around 3,100 Mt annually. Of this around 2,000 Mt is consumed domestically in roughly equal proportions between the US and China. In comparison, the seaborne trade in thermal coal was around 385 Mt in 2001. However, this market sector has seen significant volumetric growth over the past few years, especially in the Far East despite continued depressed economic conditions. Asia is also forecast to remain the growth engine through to at least 2005, whilst Europe essentially shows no growth in total coal consumption. The domestic markets themselves are also sources of high growth with the US and China looking at volumetric growth rates which are multiples of the seaborne market growth rate." In Europe he

expects import levels to remain constant as substitution of uneconomic domestic production continues.

Looking in more detail at Asia, Mr Dundas noted that the region "is characterised by strong demand growth but can be segmented regionally. There are markets with domestic production such as India, where imported coal competes on a landed or at plant cost basis, taking into account levies, taxes, rail costs etc. There are also markets with no domestic production such as Japan, South Korea and Taiwan. In these markets imported coal competes mostly with gas. From this perspective the outlook for coal is positive since there is a lack of adequate infrastructure to support large substitution by pipeline gas whilst LNG, once committed, has a long lead time and little optionality or flexibility once deliveries commence. Signs such as increasing spot sales in the region, the relaxation of legally bounded sales areas for generators are all indications of an embryonic deregulation process. This process is being led currently by South Korea. Ironically, Kyoto is far less of an issue in the Far East, with Japan being the only signatory to date, indirectly confirming coal's superior position in this region."

"China, the world's largest coal mining region, supports the world's fastest growing economy. Coal is mostly mined in the north whilst economic growth is surging in the south. As a result, volumes far exceeding exports are currently trans-shipped between these two regions. After two years of rapid growth in exports, the levels have now stabilised and reduced even more recently. Any potential to increase exports must be weighed up against potential domestic sales. In China it is common for the domestic price to exceed the achievable export price in contrast to production sourced, for example, from South Africa or from Australia. Further, coal currently accounts for about 40% of all cargo moved on the internal rail infrastructure. That very same infrastructure must support the high internal growth rate. Should increases in coal carriage be

achievable on the rail system, huge investment is also needed to boost port capacity."

However, Mr Dundas points out that "a reduction in overall demand for energy is often amplified in the coal demand arena. This is because coal, in order of merit, is generally consumed last after base load units such as nuclear, gas and opportunistic energy supplies such as wind or run of river hydro. Thus any reduction is taken off the marginal supply field; often coal."

AME Mineral Economics notes that the industry's fob cash-cost curve is much improved and expects that future cost gains combining with this will finally see coal producers' profit margins increasing, even as prices continue to decline in real terms. AME's analysis considered 162 mines around the worldwide and showed that average fob cash costs for export thermal and semi-coking coal mines had been reduced 17% from US\$21.70/t in 1999 to US\$18.00/t in 2001. Costs at hard coking coal mines had fallen 18% from US\$29.80/t to US\$24.50/t over the same period.

European Decline

The decline in the European Union's (EU) use and production of coal over the past 50 years has been documented in a detailed paper issued by Eurostat (<http://europa.eu.int/comm/eurostat>), to mark the end of the European Coal and Steel Community. It shows that in 1962, the total consumption of hard coal in the original six EU members (Germany, France, Italy, Belgium, the Netherlands and Luxembourg) exceeded the 1999 total for the current 15 member states (254 Mt, compared with 248 Mt). In the interim however, consumption rose, amounting to 323 Mt in 1990 (12 member states).

Consumption of hard coal in EU power stations rose between 1962 and 1990, before tailing off towards the end of the past decade, the totals being 64.5 Mt, 211.5 Mt and 170 Mt, respectively. The rise in consumption for electricity since 1962 was mirrored by a fall in

demand from households and services, from 31.5 Mt in 1962 to 5 Mt in 1999, and in iron and steel, from 56 Mt to 43 Mt over the same period (peaking at 71 Mt in 1973). Demand from other industrial users also fell, from 29 Mt in 1962 to 23 Mt in 1999.

Predictably, production took a steeper decline, with the EU's original six countries producing 233 Mt in 1962, compared with just 100 Mt in 1999 for the current 15 members. The rise in efficiency in countries still producing coal is demonstrated. Productivity grew from 0.485 t per man-hour in 1981 (average for Germany, France, Belgium and Britain) to 0.704 t in 1999 (plus Spain, minus Belgium). The UK's gains were the most marked, rising from 0.392 t to 1.221 t over the same period. Conversely, Spain's performance rose in the 1980s but then declined, falling from 0.529 t to 0.331 t between 1997 and 1999.

Coal imports have risen steadily as Europe's coal production has dwindled, with the nine members in 1973 importing 48.5 Mt, compared with 154.4 Mt for the current EU of 15 countries. UK imports have risen particularly sharply, as have those of Germany, the Netherlands and Spain.

Examining Europe as a continent, we can see more of how the global balance of coal power has shifted. In 1981, according to the BP Statistical Review of World Energy, Europe was the top producer with 1,204.4 Mt, followed by Asia Pacific (974.3 Mt), North America (790.5 Mt), Former Soviet Union (FSU - 710.5 Mt), and then Africa (135.9 Mt). In the 20 years since, as the global production table shows, Europe's output has been cut by almost 38% and the FSU's by 39%. South and Central American output has rocketed by almost five times from 11.5 Mt in 1981 to 57.2 Mt in 2001. North America has steadily increased over the period, gaining 39%, as has Africa, gaining 70%, and Asia Pacific has more than doubled.

The year of the highest global output since 1981 was 1990, according to BP, when

4,760.7 Mt were produced. In that year, North American output was 1,009 Mt; Central and South America was well on its way with 30.4 Mt; Europe was still strong with 1,162.7 Mt; as was the FSU with 703.3 Mt; Africa was building up with 182.6 Mt and Asia Pacific was well established at 1,671.4 Mt.

Poland is Europe's only remaining major hard coal producer and in 2001, achieved some economic improvement through reducing manpower, which fell by 17,000 to 222,000 in the hard-coal sector and by 14,000 to 176,000 in the brown coal sector. Production of hard coal rose by just 0.7% to 103.9 Mt. The production of raw hard coal in underground mines per man-shift in 2000 was 6,115 kg as compared with 5,621 kg in 1999.

Industry restructuring continues and an optimal situation has been proposed involving reducing employment to 120,000 by the end of 2002 and decreasing hard coal production to 85-90 Mt/y by closing more mines and initiating the process of branch privatisation.

Extraction of brown coals in 2001 was at the same level as in the previous year and totalled 59.54 Mt. All output came from the Turów, Konin and Belchatów open pits and was mostly delivered to domestic power stations.

Australia

Australia is the world's biggest exporter and coal exports are its most valuable commodity, in 2000/2001 worth just under A\$11 billion and forecast to be worth A\$13.2 billion for the current year on the back of output of 267.8 Mt - an 11 Mt increase on the 2000/2001 total of 256.8 Mt. Of that, domestic demand accounts for around 65 Mt, with the balance being exported.

ABARE identifies some seven development projects scheduled for completion in 2002, costing around A\$770 million and expected to deliver around 27 Mt when at full capacity. Four of the developments are in the New South Wales, of which the biggest is Xstrata's new Beltana longwall mine near Wollongong

at 6 Mt/y. The other three are in Queensland's Bowen Basin.

Total new production of some 25 hard coal projects that could be developed over the next three to four years is put at 116 Mt/y. However, a more realistic number (says ABARE) may be 44 Mt, costing various developers an estimated total of A\$2.4 billion.

The vast bulk of Australia's coal comes from the Hunter Valley in New South Wales and the Bowen Basin in Queensland, with total resources put at 77,000 Mt. Australia's big-five coal producers - Anglo Coal, BHP Billiton, Xstrata, MIM and Rio Tinto - between them produce about 70% of the country's hard coal.

Recent expansion of Anglo Coal interests in Australia include its purchase last year of the Capricorn Coal Developments Joint Venture (German Creek) in central Queensland, and its move (in April 2002) to acquire a 51% stake in the Moura mine formerly held by Rio Tinto. As part of the latter deal, Anglo Coal divested to Mitsui Coal - which had pre-emptive rights over the 55% interest Moura that Rio Tinto was selling - a number of stakes in operating mines, including a 30% interest in German Creek. Anglo Coal will manage all the joint venture mines. Plans at Moura include the development of the adjacent Theodore project, with potential future sales from the combined operation of 12 Mt/y. Further south, Anglo Coal flagged the staged development of an additional 10 Mt/y from Dawson and Taroom.

BHP Billiton has various coal interests throughout Queensland and NSW. An alliance with Mitsubishi covers nine open pits and one underground mine and a port in the Bowen Basin. Most of the mines yield high quality metallurgical coal. Current production is some 25 Mt/y. BHP Billiton is also in partnership with Mitsui covering two other mines in Queensland, and in its own right owns and operates five underground mines in the Illawarra region of NSW. BHP Billiton recently approved the development of Dendrobium, the first new mine in the Illawarra region for

many years. Dendrobium will cost some A\$151 million and have annual output of 2.6 Mt of coking and 1 Mt of thermal coal.

Xstrata has interests in and manages, a dozen mines in the Hunter Valley, and the Western and Newcastle coalfields of NSW, as well as Queensland's Bowen Basin. Output is currently around 27 Mt/y, following its acquisition of the Ravensworth and Narama mines in the Hunter Valley in December 2001. Operational initiatives during the year included its conversion of the United mine from a bord and pillar operation to a longwall in April/May 2002, with production to rise from 1-2 Mt/y to 2.7 Mt/y.

MIM mines coking coal at Oakey Creek and Collinsville and steaming coal at Newlands and Collinsville. Combined production for the year ended June 30, 2001, came in at just over 14 Mt - with the mix roughly 50:50. Production for calendar 2002 was forecast at around 22 Mt - with 16 Mt attributable to MIM. The company was looking to grow its coal business - it has doubled output since 1995 whilst reducing costs from A\$51/t to A\$39/t last financial year - and early in 2002, attempted, but failed, to acquire Rio's stake in the Moura mine. A feasibility study was being carried out on the 300 Mt Rolleston thermal coal deposit in the Bowen Basin, and consideration was being given to the 2,000 Mt Wandoan thermal coal deposit in the Surat Basin. MIM is spending A\$25 million on coal exploration in 2002, with significant acreage taken up in the Bowen Basin. The company has a stated aim of doubling its production - via expansions and acquisitions - within five years.

Through 72.7% owned-subsidary Coal & Allied, Rio Tinto is a major player in the Hunter Valley with capacity to produce more than 36 Mt/y - which equates to managing roughly one-third of all exports from that region. It acquired (and sold) a number of mines through 2001, including picking up Peabody's Australian coal operations (which was where its Moura stake originated). In Queensland, it owns the Tarong mine and has stakes in the Blair Athol and Kestrel mines through subsidiary Pacific Coal.

Production from these operations in 2001 came in at just under 20 Mt.

United States

Coal production in 2001 rose to an all-time high of 1,017 Mt, a one-year increase of 43.3 Mt, or 4.5%, according to the Energy Information Administration's preliminary production estimate. It was the fifth year of increase in a nine-year period characterised by a general, but fluctuating rise, of 159.5 Mt, or 18.6%. A key to the major increase in 2001 production was ongoing demand from the electric-power sector.

Eastern production was 46.9% (477 Mt) of 2001 output and Western production was 53.1% (540 Mt). Increases were reported both East (16.5 Mt) and West (26.8 Mt) of the Mississippi River. The production increases came primarily from mines in Wyoming and Colorado in the West; and from mines in Pennsylvania, West Virginia, Kentucky and Indiana in the East.

Sales and consolidation continued last year with Westmoreland Mining, a wholly-owned subsidiary of Westmoreland Coal, purchasing Montana Power's Western Energy Co and Northwestern Resources coal business units in April 2001. Westmoreland Coal then purchased Knife River's North Dakota and Montana coal operations in May. In June, American Electric Power's (AEP) Southwestern Electric Power subsidiary assumed the mine assets of Dolet Hills as a result of a litigation settlement involving the mine. The mine produces lignite used by the Dolet Hills power station. AEP provides overall direction and support to the mining operations. AEP sold its affiliate coal mining companies in Ohio and West Virginia in July to Consol Energy. AEP then acquired most of the coal assets of Quaker Coal in October through resolution of Quaker's bankruptcy proceedings.

In 2001, Peabody Energy again was the largest coal producer in the US with output (including sales) of 176.3 Mt, 17.3% of total US coal production. The second largest was Arch Coal, with 107.4 Mt, 10.6% of the total.

Only just beaten into third was Kennecott Energy with 106.6 Mt, 10.5% of the total, and fourth was Consol Energy with 66.8 Mt, 6.6% of US production. The fifth largest producer was RAG American Coal at 59.5 Mt (5.8%).

Two of Consol's mines shared the honour of being the nation's largest underground producer. Both Bailey and Enlow Fork, in Pennsylvania, produced 9.3 Mt. The largest open pits are in Wyoming, Peabody's North Antelope/Rochelle producing 68.4 Mt and Arch Coal's Black Thunder producing 61.9 Mt. Across the nation the industry averaged 6.4 t per miner per hour. Underground mines averaged 3.8 t and surfaced mines 10.2 t.

South Africa

South Africa has coal reserves sufficient for a further 40 years of full production, according to estimates by Xavier Prevost, chief minerals economist at the coal and hydrocarbons division of South Africa's Mineral Bureau. Addressing the Coaltrans conference in Cape Town early in 2002, Mr Prevost estimated that the country's coal reserves were some 34,400 Mt. Given an output of about 297 Mt/y and incorporating an annual 3% compound growth rate, Mr Prevost believed that only some 20% of these reserves will be left by 2042. He added that it was likely that these residual reserves would remain un-mined because of the methods used when they were mined earlier, as well as a lack of operational infrastructure.

South African coal exporters are working on expansion plans that, over the next four years, should allow an extra annual 20 Mt to be exported through the Richards Bay Coal Terminal (RBCT), the port of Durban and the port of Matola in Mozambique. The largest expansion will be RBCT's R700 million phase-five expansion, which will lift RBCT's annual export capacity to 82 Mt and will come on stream in 2004. Annual capacity could be increased to 85 Mt at comparatively little additional capital cost. However, this is likely to be the upper limit, at least for the foreseeable future, given the current estimates of South Africa's remaining coal

reserves. Durban's coal export capacity stands at 3.5 Mt a year and is not set to increase appreciably. At Matola in Mozambique, expansion work is in hand to lift annual capacity from its current 1.0 Mt to 6.5 Mt by the middle of the current decade.

World Coal Exports 2001

Australia	86,658,000 t (steam coal)
	105,757,000 t (metallurgical coal)
China	71,768,000 t (steam)
	11,470,000 t (coking)
	7,650,000 t (anthracite)
Indonesia	64,053,000 t
South Africa	62,265,965 t (bituminous)
	1,515,101 t (anthracite)
US	20,947,919 t (steam)
	23,409,360 t (coking)
Colombia	37,098,000 t
Canada	2,941,269 t (thermal)
	25,613,428 t (metallurgical)
Poland	19,207,600 t (steam)
	3,018,400 t (metallurgical)
Venezuela	8,100,176 t

Source McCloskey's Big Coal Book

India/Indonesia

India, the world's third largest coal producer, has resources estimated at 212,000 Mt to a depth of 1,200 m. Most of the production comes from open pits, which contribute about 80% of the output. By geographic location, Bihar is the largest repository (69,130 Mt), followed by Orissa (50,450 Mt), Madhya Pradesh (43,430 Mt), West Bengal (25,900 Mt) and Andhra (13,600 Mt).

Geologically, the Gondwana deposits in the Bengal-Bihar-Orissa region account for 2,000 Mt, while the Tertiary deposits in Assam and northeast India total 890 Mt. Much of this is thermal coal and resources of metallurgical grade coking coal are limited, being estimated at 33,900 Mt with a high ash content. Output

of metallurgical grade coal is around 40 Mt/y and annual imports of over 12 Mt are necessary in order to satisfy fully the needs of India's steel and other metallurgical industries. India's thermal power plants consume about 220 Mt/y. Current coal production is around 300 Mt/y and this is expected to increase to 350 Mt/y by the end of 2002/03. Imports, mostly of coking coal, total 20 Mt/y.

Coal production was a preserve of the public sector for well over 25 years but the sector has now been partially opened to private enterprise. The government, according to the Minister for Coal and Mines, will be setting up a new regulatory body to ensure fair competition between private companies and the public sector. State-owned Coal India Ltd (CIL) plans to diversify into value-added products and streamline its product-mix through mergers and demergers of its subsidiaries. KPMG was asked to draw up a corporate plan for CIL, including measures for further expansion into downstream value-added products such as establishing coal washeries to produce energy-grade coal. The government has mandated the use of low-grade coal containing less than 34% ash for power stations located more than 1,000 km from the production centres.

CIL and its seven coal-producing subsidiaries together extract around 280 Mt/y of which over 200 Mt are supplied to power plants, while another 20 Mt goes to linked customers in steel, cement and fertiliser sectors. Bharat Coking Coal, Eastern Coalfields and Central Coalfields, which produce the bulk of the prime-grade coal, are incurring heavy financial losses.

Indonesian production and exports continued the uninterrupted annual increases achieved since 1980, with output rising by 20% to 92 Mt, and exports increasing by 15% to 66.5 Mt. There were ownership changes for some mines. PT Bumi Resources purchased an 80% shareholding in PT Arutmin's mine in South Kalimantan from BHP Minerals Exploration. PT Bumi also intends to acquire the remaining

20% from Indonesia's Bakrie Group. PT United Tractors, the 90% owner of PT Berau Coal in East Kalimantan, intends to sell 60% of its shares in the coal-mining company.

The dispute that has lasted for more than two years between the East Kalimantan provincial government and PT Kaltim Prima Coal (KPC), regarding the sale of 51% of the latter's shares, came to a head during 2001 when the provincial government sued the coal company for US\$766 million for unpaid dividends and other expenses. The suit was without foundation since the province does not own any shares in KPC. Under the original Coal Co-operation Contract between central government and KPC it was stipulated that KPC must offer 51% of the shares in the company for sale. The price was finally agreed at US\$419 million.

Latin America

Colombia is the largest producer in Latin America, and its reserves consist of high-quality bituminous coal and a small amount of metallurgical coal. Its coal is relatively clean-burning, with a sulphur content of less than 1%. In 2001, coal was Colombia's second-largest export in terms of revenue, after oil and before coffee. Coal exports over the next five to six years are expected to increase significantly, and private investment over that period also is slated to increase. In May 2002, the Colombian Mining Association started a regional campaign to promote use of Colombian coal. Last year the country produced 43.4 Mt of coal, of which 38.3 Mt were exported.

Cerrejon, the biggest coal mine in Latin America is a joint venture between Anglo Coal, BHP Billiton and Glencore. The partners' the aim is for this operation to be one of the largest and most efficient mines, aimed at markets in Europe and the US. It is capable of producing 21 Mt/y and is currently producing about 18 Mt. It can grow to 40 Mt/y or higher. As this issue went to print, the Colombian Government's transport ministry was awaiting solutions to certain environmental problems

before giving the go ahead to operations at three new coal-export ports on the Atlantic coast - Bahia Concha, close to Santa Marta, Cienaga and Santa Marta itself, all in the department of Magdalena.

Venezuela possesses coal resources in excess of 8,700 Mt. Currently, there are 34 registered and updated coal-mining concessions allocated by the Ministry of Energy and Mines (MEM) and production exceeded 8 Mt in 2001, all destined for export. Expansion projects could see Venezuela reach annual production of 20 Mt within five years. Washington Group (WG) operates the Paso del Diablo mine owned by Carbones del Guasare, producing some 7 Mt during 2001. WG has also signed a contract to manage Mina Norte, the property of Carbones de La Guajira, which is currently producing over 1.2 Mt/y. Development of a new project called COSILA is expected to begin this year. Located in the Guasare region, it will produce 2 Mt/y.

CIS

Russia's current commercial coal reserves exceed 200,000 Mt, about half of which are bituminous and 38,000 Mt coking coal. Deposits are characterised by complex mining and geological conditions, such as disrupted and flooded seams, a high gas content and risk of explosion, a tendency to self-ignition and a significant share of reserves with inclined seams.

Coal companies in Russia produced 269 Mt of coal in 2001, up 4.2% year-on-year. The launch of new production capacities in 2001 amounted to 21.45 Mt of coal, including 5.95 Mt from new construction (2.44 Mt at four underground mines and 3.51 Mt at 10 pits); and 15.5 Mt from technical upgrades (7.2 Mt underground and 8.3 Mt at open pits).

Russia plans to develop ten new deep mines and 47 new strip mines and open-pit workings in the coal sector in 2002-2005. The country plans during the period to introduce new capacity to mine 49.33 Mt of coal - 16.18 Mt of it at deep mines and 33.15 Mt at strip mines -

and to process 3.3 Mt, as part of a federal programme on energy efficiency for 2002 to 2005. The new capacity will include 21.2 Mt in the Kuznetsk basin, 11.6 Mt in the Kansk-Achinsk basin, 9.8 Mt in the Far East and 1 Mt in the North Caucasus.

Ukraine produced 83.9 Mt of coal in 2001 against 81.0 Mt in 2000. The state programme for 2001-2010 provides for a reduction in the number of coal mines from 196 in 2001 to 157 in 2010. In addition, it is planned to increase the number of the mines producing around 1 Mt/y from 22 in 2001 to 40 in 2010. It is also planned to more than double budgetary financing of the coal industry between 2001 and 2003. The programme outlines measures aimed at improving the quality of coal products, in particular, reducing ash content from 23.1% to 22.7%. The programme should generate an increase in raw coal production to 110 Mt in 2010, including 63 Mt of power-generating coal, and 47.1 Mt of coking coal.

By 2010, coal consumption in Ukraine will rise by almost 1.8 times to 123.1 Mt, and by 2030 - to 180.6 Mt. Ukraine's Energy Strategy until 2030 stresses that there are reserves enough for several hundred years, and that coal should remain the main energy source for power generation. Developing prospects include brown coal extraction and the use of mine methane.

Between 1992 and 1999, Kazakh coal production, which is centered in the Karaganda and Ekibastuz basins, declined by 54%, from 126.5 Mt to 68.3 Mt. Coal production declined in large part because of non-payment by customers and the lack of incentives to export to Russia (due to high rail tariffs for transporting coal within Russia), as well as due to the collapse of domestic demand. However, after nearly a decade of decline, output increased to approximately 74.7 Mt in 2000. According to Kazakhstan's official state statistics agency, Bogatyr Access Komir (BAK), the country's main coal mining enterprise, a subsidiary of Access Industries of the US, maintained its coal production level

from 2000 in 2001, with production of about 35 Mt of coal at the Bogatyr and Severny coal fields in northern Kazakhstan. Maikuben-Vest, which mines coal in the Pavlodar region, produced 1.8 Mt of brown coal in the first ten months of 2001, 57.6% more than in the same period of 2000. Through the first six months of 2001, the Vostochny strip mine increased production 25.2% year-on-year, to 8.2 Mt.

Coal accounted for about half of all primary energy consumption in Kazakhstan during the 1990s. From 1992 to 1999, Kazakhstan's coal consumption fell nearly 47% - from 85.4 Mt to 45.6 Mt. In 2000, the country's coal consumption increased for the first time since independence, with robust economic growth contributing to a 34% increase in coal consumption, to 61.3 Mt. Net coal exports to other former Soviet republics declined by two-thirds from 1991 to 1995 before making a modest recovery from 1996 to 2000. This decline in markets forced a severe cut in both coal production from Karaganda, which has a number of underground mines that produce high-quality coking coal. The high cost of extraction, combined with the drop in demand, forced a number of mines to close between 1991 and 1997. However, mines in Ekibastuz, the largest-producing area in Kazakhstan and the third largest coal basin in the former Soviet Union, have remained open and competitive after being privatised.

Kazakhstan is still the largest exporter of coal to the other former Soviet republics, accounting for almost half of the coal shipments among the republics. Russia remains the largest importer of Kazakh coal, followed by Ukraine. The Russian utilities Sverdlovskenergo and Chelyabenergo are major consumers of sub-bituminous coal from the Ekibastuz basin, and Sverdlovskenergo likely will continue to import coal from Kazakhstan since it acquired two Kazakh mines in 1996 as payment for unpaid debts for power supplied to Kazakhstan. In March 2001, Russia announced plans to import 30-35 Mt/y of Kazakh coal, possibly more, depending on the scale of Russia's economic

growth. In August 2001, Kazakh officials announced plans to increase the country's annual coal production to over 85 Mt by 2005, of which about 55 Mt will be used domestically and over 30 Mt will be exported. BAK plans to produce 36 Mt this year and 45 Mt by 2005.

China's output jumps

According to the Resources Strategy Division at China's Ministry of Land and Resources, the country's raw coal production in 2001 was 1,090 Mt, an increase of 9.1% or 90.5 Mt over the previous year. Restructuring of the industry continued according to the directions of the State Council; the production share of the major state-owned coal mines increased and there were further closures of more small, illegal coal mines. Of the total output, some 618 Mt were produced by the major state-owned mines, an increase of 82.6 Mt or 15.4% on the previous year; 225.4 Mt were produced by provincially-owned mines (31.15 Mt or 16% higher than 2000); and 246 Mt were produced by township coal mines (23.2 Mt, or 8.6% lower).

Coal supply and demand in 2001 were basically in balance, and the growth in production generally matched the growth in industrial production. Coal exports maintained their momentum and the State Planning Committee and the Ministry of Finance have postponed the expiry date of the incentive policy for coal exports from March 31, 2001 until March 31, 2003, in order to encourage the export of coal and to ease the excessive supply in the domestic market. Exports in 2001 hit a record high of 85.9 Mt, an increase of 27 Mt, or 46%, over the previous year, making China the second largest coal exporter in the world. Although world economic growth slowed down, and China's foreign trade growth rate dropped, coal exports became a prominent new growth point in China's foreign trade.

By the end of 2001, China's coal stocks stood at 115.2 Mt, 19%, lower than the stock level at the start of the year, and stocks held by coal

enterprises fell by 47%, to 28.1 Mt. Coal prices improved and sales income increased. The average coal price received was Yu150.59/t, or Yu10.90/t more than in 2000.

In 2001, major state-owned coal mines completed 664,324 m of development, a 20%

increase on the previous year. Washed coal production rose by 12% to 78 Mt, and the average unit production at the coal face was 30,109 t/mth, a 12.5% improvement on 2000. The average unit development of face advance was 144.4 m/mth, 4.9 m/mth or 3.5% higher than in the previous year.