



RESTRUCTURING AND PRIVATIZING THE COAL INDUSTRIES IN CENTRAL AND EASTERN EUROPE AND THE CIS

Abstract

This paper reviews coal industry reforms in central and Eastern Europe (CEE), including the former GDR and Estonia (oil shale), and the Commonwealth of Independent States (CIS). It describes achievements and failures during the last ten years on the road to an efficient, viable and environmentally acceptable coal industry playing the various roles assigned to it by governments as part of their energy policies.

Obedying to conflicting objectives, coal-restructuring policies can best be described as stop-go policies. As a result, between 1990 and 1998, production declined by 41 %, the number of pits by 26 % and the number of employees by 45 %. Productivity rose by only 8 % in the region as a whole. At present, 80 to 90 % of coal production is actually or virtually profitable under local or national circumstances. Turning virtual into actual profitability depends as much on continued reforms (unbundling of profitable from unprofitable mines, customerization of mines, equity privatisation) as on a fresh assessment, by investors, of two major opportunities: mine-utility partnerships and untapped productivity gains. These opportunities are growingly recognised by the business community: by 1998, 20 % of coal production in the region are owned by equity investors, - domestic and foreign.

With these opportunities in mind and assuming economic recovery, WEC, IASA, IEA, DOE¹ and national governments project a medium-term (2010, 2020) increase of coal production against 1998 of about 20 %, mostly in the CIS.

RESTRUKTURIRANJE I PRIVATIZACIJA PROIZVODNJE UGLJENA U ZEMLJAMA EKONOMSKE TRANZICIJE

Sažetak

U referatu se iznosi pregled reformi u proizvodnji ugljena u središnjoj i istočnoj Europi (CEE), uključujući bivšu Istočnu Njemačku i Estoniju (naftni škriljevac), kao i Savez nezavisnih država (CIS). Opisani su usponi i padovi tijekom posljednjih deset godina na putu prema djelotvornoj, održivoj i ekološki prihvatljivoj proizvodnji ugljena preuzimanjem niza uloga dodijeljenih od strane vlada kao dijela njihove energetske politike.

Priklanjajući se suprotnim ciljevima, smjerove restrukturiranja proizvodnje ugljena najbolje je moguće opisati kao tendencije stani-i-nastavi. Ishod toga bio je pad proizvodnje za

¹ World Energy Council, International Institute for Applied Systems Analysis, International Energy Agency, US Department of Energy

41% u periodu od 1990. do 1998. godine, broj jama smanjen je za 26%, a zaposlenika za 45%. U cjelokupnoj regiji produktivnost je porasla za samo 8%. Trenutno 80 do 90% proizvodnje ugljena stvarno ili praktično donosi dobit u okviru lokalnih ili nacionalnih okolnosti. Pretvaranje praktične u stvarnu dobit ovisi kako o nastavku reformi (razdvajanje profitabilnih od neprofitabilnih ugljenokopa, uključivanje potrošača, pravedna privatizacija), tako i o tome koliko dobro ulagači mogu procijeniti dvije stvari: partnerstvo komunalnih službi i ugljenokopa, te neiskorištenu proizvodnu dobit. Poslovna zajednica sve više prepoznaje ove mogućnosti; do 1998. godine 20% proizvodnje ugljena u regiji u vlasništvu je ravnopravnih ulagača, domaćih i stranih.

Imajući u vidu ove mogućnosti i uzimajući u obzir gospodarski oporavak, WEC, IASA, IEA, DOE i vlade država predviđaju srednjoročni (2010., 2020.) porast proizvodnje ugljena od 20% u odnosu na 1998. godinu, većinom u zemljama Saveza (CIS).

1 COAL INDUSTRY REFORMS: LAGGING BEHIND

Coal industry restructuring lags behind the restructuring of the oil, gas and electricity industries, which in turn lag behind macro-economic reforms. After a vigorous reduction of coal production capacities and manpower in the early 1990s by one third, governments had to opt for a temporary stop in the mid 1990s confronted as they were by the extraordinary size of the task and by its budgetary, social and regional ramifications.

The next "go" was conceptualised in the mid 1990s and is being implemented at present, although not everywhere and not at the speed originally envisaged. These policies de-emphasise the role of coal as a commodity and assign to it a strategic medium- and long-term role in securing and diversifying energy supplies, tempering import dependence, softening regional conversion and stabilising labour markets. Mostly they still foster the bundling of profitable with unprofitable mines and state ownership rather than equity or customer privatisation; they therefore delay the emergence of a competitive hard core of the coal industry.

As a result, by 1999, no country could claim to have achieved the double objectives of a restructured and profitable coal industry, with the possible exception of the new German Länder. Kazakhstan and Hungary could claim to have attained the goal of equity privatisation, while facing continued problems of rendering the industry competitive and profitable. In most countries (except Albania, Croatia, Slovakia and largely Ukraine), coal mining is virtually competitive and viable (under local and national conditions), but the industry has not (yet) been truly restructured. For example, in Poland, the Czech Republic, Romania and the FYR of Macedonia, brown coal/lignite mines are profitable, but are not privatised; oil shale mining in Estonia is competitive with imported coal; privatisation is foreseen for 2000.

Closing unprofitable mines, reducing subsidies and cross-subsidies, customerising mines with power and steel plants, deregulating coal prices, indiscriminatory treatment of coal and competing fuels, equity privatisation, recognition of state liability for past debt and damage, redeployment of miners, devolution of non-core activities and reconversion of mining regions, - all these issues continue to be on the agenda of the majority of coal

producing countries in CEE/CIS. The time horizon for concluding reforms differs between countries but is generally 2005-2010.

2 PRODUCTION: A DECLINE OF 41 % SO FAR

Between 1990 and 1998, total fossil fuel production decreased by 41 % in CEE/CIS. The decline was practically the same in CEE and CIS, but bigger for brown coal, lignite and shale than for hard coal. The number of pits dropped by 26 % and the number of employees by 45 %. Despite these adjustments, the industry remained important: in 1998, it produced 760 mill. t covering 25 % of primary energy needs, and operated 721 pits with 1.2 mill. employees.

The forces driving (or slowing) this adjustment process are numerous. Surely, the main reason for the decline was a deliberate coal adjustment policy. Less clear is the role played by the deep recession: in CEE, the correlation between declining coal production and declining GDP is too weak to be significant, but is notable in the CIS. The policy message appears to be that an economic recovery could be significant for coal's future in the CIS, but not in CEE.

Also, the initial size of the coal industry, in terms of tonnage, played a role: the decline of coal production during 1990-1998 in the four smallest coal producing countries (Croatia, Georgia, Kyrgistan, Albania) was nearly double the decline in the four biggest coal producers (Russian Federation, ex-GDR, Poland, Ukraine): -89 % compared with -51 %.

3 PRODUCTIVITY: + 22 % IN CEE, - 2 % IN CIS

Between 1990 and 1998, productivity (output per employee and year in t) increased in CEE (+ 22 %), but stagnated in the CIS (- 2 %). The overall improvement was only 8 %. At the same time, productivity rose by 84 % in an international selection of performing coal industries, output per employee in CEE/CIS at 614 t compared with 7,686 t in the international selection. The productivity gap between CEE and CIS is of great business relevance.

3.1 lay-offs: the overriding productivity driver in CEE

In CEE, output per employee increased by 22 % during 1990-1998 or 2.6 % annually. Had employment and all other factors remained unchanged, this rate of productivity growth would have raised production to 760 mill. t. However, employment decreased actually by 51 %, which, all other conditions unchanged, implied a production of 380 mill t, - very close to actual production of 373 mill. t.

This suggests that lay-offs have been the dominating factor for productivity growth. Positive influences from other factors such as the reduction of the number of pits by 30 % and fresh investments were unfortunately offset by negative factors (delayed restructuring, disinvestments, labour disputes).

3.2 inaction: the main impediment in the CIS

By contrast, in the CIS, lay-offs did not generate productivity growth: the number of employees and production declined at practically the same rate (-41 and -42 % respectively). The closure of pits (-23 %) could have generated a productivity gain, but did not (actually there was a loss of productivity of 2 %). This means, that productivity gains from mine closures were neutralised, indeed overcompensated by other negative factors such as legislative inaction, defensive industry and trade union attitudes, disorganisation of mining activities (social unrest, unprecedented unpaid salaries, rising mortality) and disinvestments (ever-rising obsolescence of facilities and equipment).

A case in point is the Ukraine where productivity even fell by 13 % despite an outflow of labour by 34 %. The reasons: lack of mine closures, social unrest, highly obsolete equipment, absence of coal industry restructuring policies, lack of profitability, hence of investments.

The bad message for the CIS coal industries is that (further) lay-offs in the absence of investments would not raise productivity. The good message is, that investments would prompt a significant productivity gain quickly, as the employment surplus has already been drastically reduced.

4 PROFITABILITY: FROM VIRTUAL TO REAL VIABILITY

4.1 actual versus virtual

Most coal mining in CEE/CIS is (still) not profitable in the straightforward sense employed in developed and integrated market economies where profitability implies a rate of return on investments that compares favourably with rates of return in other sectors of the economy or internationally. However, cases of actual (locally/nationally restricted) profitability exist in CEE/CIS, but in 1999 most coal production must still be qualified as virtually profitable only.

The reasons for the lack of actual profitability lie in delays in restructuring. By imposing regulated (low) coal prices and granting insufficient compensatory subsidies, and by bundling economic with uneconomic mines, CEE/CIS governments impeded the profitable mines to gain the rent that geology and management could earn in their favour and which could and would have been used to invest in productivity-generating equipment.

4.2 regional assessment of viability

In attempting to measure the level of virtual profitability of CEE/CIS coal mining, the following cost items, induced by incomplete reforms, are disregarded:

- accumulated debt resulting from forgone revenues,
- past environmental liabilities,
- cross-subsidies paid by parent power companies to integrated mines or under government-brokered supply contracts.

When restructuring is concluded, virtual viability turns into actual. While this kind of approach can be justified for a macro-economic analysis as the present one, it should not be applied when appraising a particular project: the potential investor ought to watch for these cost items.

Whatever the uncertainties associated with the above notion of virtual viability, regional trends appear very forcefully:

- most of the coal production in the region is now actually or potentially viable, except in Albania, Croatia, Slovakia and Ukraine,
- in numbers: 80 to 90 % of total fossil fuel production in 1997 is actually or virtually viable (98 % of brown coal, 71 to 74 % of hard coal),
- coal production is less viable in CEE than in the CIS which reflects the more favourable mining conditions in the latter area,
- viable coal production in 1997 amounts to about half (55 %) the production of 1990.

Thus, a long way had been gone, - successfully. But there is still a further way to go seeing the implied contention that 10 to 20 % of fossil fuel production (mainly: hard coal) in CEE/CIS was not viable in 1997.

4.3 country profiles

Viability differs between countries:

- in Albania, only the Memaliaj mine might achieve viability by 2005-2010, if restructured,
- in Bulgaria, 78 % of coal production (mostly from the Maritza East power-mining complex) would be competitive with imported coal; in 1997, production cost in opencast mines ranged between \$18/tce and \$33.5/tce, in underground mines between \$ 47.5/tce and \$63.7/tce,
- in Croatia, mining will be abandoned in 1999 for lack of viability,
- in the Czech Republic, in particular hard coal mines, will not be able to cope without further state support, but one company - OKD - can already do without direct or indirect state subsidies,
- in Estonia in 1997, the cost of shale production underground was at 7.07 \$/t, in opencast mines at 5.98 \$/t; four underground mines will be closed; shale production, at \$ 1.04/GJ by 2000 is expected to remain competitive with imported coal and gas at \$ 1.7/GJ, but generating cost would be affected as a result of lower combustion efficiency if fluidised bed boilers were installed,
- in the former GDR, brown coal mining is competitive except for two state-owned opencast mines (1998: 5.9 mill. t) that will be closed in 2000 or 2001; until 2003, electricity generation from brown coal is exempted from electricity market liberalisation in Germany; state funding is directed at the closure of mines and the recultivation of land: during 1992-2002 DM 9.2 bill. (\$5.2 bill.) are required,
- in Hungary, the liquidation of loss-making mines has almost been completed,
- in FYR of Macedonia, lignite mining is competitive,
- in Kazakhstan, except for three opencast mines in state ownership, all mines remaining after the closure programme have been privatised and associated with power plants and steel works,
- in Poland, brown coal mining is competitive and on the increase; average production cost of hard coal stood in December 1996 at Zl. 124.48 (\$ 33); the Government

intends to render hard coal mining as a whole competitive by 2000, when production would have been reduced from 133 mill. t (1996) to 110 mill. t; this implies the continued cross-subsidisation of uneconomic mines by economic ones; assuming that exports remain loss-making and that residential markets are largely lost to competing fuels, a range of 80 to 90 mill. t of production is estimated to be viable in the long term (power generation 45 mill. t compared with 43 mill. t in 1996, district heating 5/5, coking plants 10/13, residential 20/44, exports 5/29) ,

- in Romania, lignite is produced in Oltenia at 42.000 to 111.000 lei (\$/t 3.3-8.7), supplied at world market prices and not subsidised; hard coal (at production costs of 212.000-375.000 lei or \$/t 16.5-29.3) is sold at prices 50 % above world market prices,
- in Russia, with average production cost at \$ 13/t, opencast mining as a whole became economically viable as of 1996; average production cost of underground mines are at \$ 30/t; a major means of achieving profitability is the replacement of old by new and European by eastern capacities; at present 57 mill. t. are under construction; by the beginning of the 21st century coal mining in Russia will be completely renovated into a profitable branch of the national economy,
- in Slovakia, coal production is at loss and will be phased-out by about 2020, together with the power station - Novaky - it is supplied to,
- in Slovenia, in the absence of state support for the upgrading of the Trbovlje power station, the sub-bituminous coal mines will be closed by 2004; lignite production at Velenje (4 mill. t) is considered viable,
- in Ukraine, 71 of the 271 (end 1997) underground mines with a production of 50 mill. t are profitable at average production cost of \$/t 35 (with the cheapest mine at \$/t 17.7); there is no viable option for the remaining mines.

5 INVESTMENTS: \$12 BILL. REQUIRED

5.1 needs

Totally funded from the state budget under socialist regime, the coal industries since 1990 had to rely increasingly on their own resources and on investors, for investments proper. Today, state funding remains important but is re-directed to restructuring, regional economic re-development, environmental and social projects.

Official funding estimates suggest that \$12 bill. or 14 \$/t are required to render the CEE/CIS coal industries viable in a socially acceptable manner. That sum would be almost equally divided between CEE and the CIS. 72 % would be needed for winding up (closing/subsidising of unprofitable mines, remitting debt, securing social protection, and undertaking environmental projects) and 28 % for investments proper. Another \$35 - 40 bill. would be needed to clean up the environmental heritage of coal mining, and a further \$38 bill. for upgrading coal-based power plants.

5.2 deeds

Are \$12 bill. much? Certainly not from the perspective of a western multinational company: the development of the new high-capacity Airbus A3XX designed to compete

the Boeing 747 is at that price. Also not from a macro-economic perspective: \$ 12 bill. equals 1 % of one year's (1995) GDP in the economies in transition (\$1369 bill.).

Will \$12 bill. be forthcoming? Certainly not in countries with delayed reform:

- the state budgets are operated under severe monetary and budgetary discipline,
- allocation of government funds is undertaken centrally, at the political level, and obeys to different objectives than funding determined by the company itself,
- the coal industries suffer from non-payment of bills, bundling of economic with uneconomic mines and continued price controls (Russia, Ukraine, Bulgaria, Slovakia),
- the domestic capital markets lack volume and long-term orientation,
- foreign capital markets cannot be accessed for lack of internationally tradable products and attractive risk/reward ratios.

However, in countries that concluded restructuring and privatisation or offered attractive projects, private investors have been forthcoming in coal mining, preparation and use : it is significant that **about 20 % of coal production have already been acquired by domestic and foreign equity investors, primarily in Kazakhstan, Hungary and the ex-GDR:**

- investments in coal mining
 - power generators acquired equity in the former GDR (MIBRAG), Hungary (Tractebel, AES, RWE/EVS(EnBW)/Rheinbraun ...) and Kazakhstan (Ispat-Karmet, Access Industries, Sverdloenergo, Samsung, NTD, US Global Mineral Reserves),
 - in Poland and Ukraine joint ventures in methane extraction were initiated (but were not successful),
 - in Russia, Japanese investors are reported to contemplate a loan of \$400 for investment in Siberian mines,
- investments in coal preparation
 - in Poland, as most of the equipment for the refurbished or new coal preparation plants was foreign, joint ventures have been formed,
- investments in coal combustion
 - power generators acquired equity in the former GDR (MIBRAG), Hungary (RWE/EVS, AES ...), Poland (EDF - CHP Cracow-Lek) and Kazakhstan (Ispat-Karmet, AES, Access Industries, Sverdloenergo, Samsung, NTD, US Global Mineral Reserves, Ormat/National Power),
 - in Romania and Poland, SEP (NL) initiated Activities implemented jointly@ according to the Kyoto-Protocol,
 - joint ventures in equipment manufacturing for power plants were formed in most CEE/CIS countries, involving western partners such as SIEMENS and ABB,
- investments in infrastructure
 - in Russia, foreign investors participate to 80 % in the financing of the \$166 mill. coal terminal at Ust-Luga near St. Petersburg; Krupp-F`rdertechnik (G) supplies the loading equipment,

- investments in clean coal technologies
 - in the Czech Republic, for flue gas desulphurization, occasionally joint ventures were concluded between Czech companies and foreign suppliers Bischoff, Mitsubishi, SHL (Germany), Marubeni-Chiyoda-Burmeister, Hoogovens, Steinmüller, IVO and Austrian Energy & Environment; for fluidised bed combustion with ABB-PBS Brno, ACC, Vitkovice-Lurgi-Babcock, Lurgi-Tlmač and Austrian Energy & Environment ,
 - in Poland, for flue gas desulphurisation, occasionally joint ventures were formed between Polish companies and foreign suppliers: HTS (NL), Rafako (PL)-Steinmüller (G), FLS Miljo (DK), Holter Industrie Beteiligung (G), ABB-Flakt (PL), Foster Wheeler (US); fluidised bed boilers by Rafako (PL), Babcock, Stork Boilers, Rolls Royce, IVO, Burmeister-Wain Energi, Ecoenergia-Institute of Power Engineering; circulating fluidised bed boilers by Foster Wheeler and Rafako,
 - in Romania, IPROMIN seeks foreign partners to develop its CTT for small and medium-sized enterprises and domestic uses,
 - in Slovakia, foreign and domestic investors financed the desulphurisation of 2 units of the Vojany Power Plant (2 x 210 MW) and the first fluidised bed boiler at the Novaky Power Plant; the main contractor for Vojany was Austrian Energy & Environment, for Novaky: Tlmač-Lurgi.

6 PROSPECTS: A MID-TERM RECOVERY OF PRODUCTION

Assuming economic recovery and conclusion of coal industry restructuring, but also increased competition from gas, what would be coal production in CEE/CIS by 2005, 2010 or 2020? Is there an end to the decline of coal in the region?

6.1 to 2005

A short-term projection results from the present paper's contention that by 1997 80 to 90 % of fossil fuel production had already become actually or virtually profitable. This implies the need for a further reduction (mainly of hard coal) by 10 to 20 % or 130 to 150 mill. t to a level of 700 to 720 mill. t. It also suggests that the decline would be more pronounced in CEE than in the CIS. The suggested adjustment does not preclude, indeed is a precondition, for a possible rise of coal production thereafter, prompted by the hoped-for economic recovery in the CIS.

6.2 to 2010

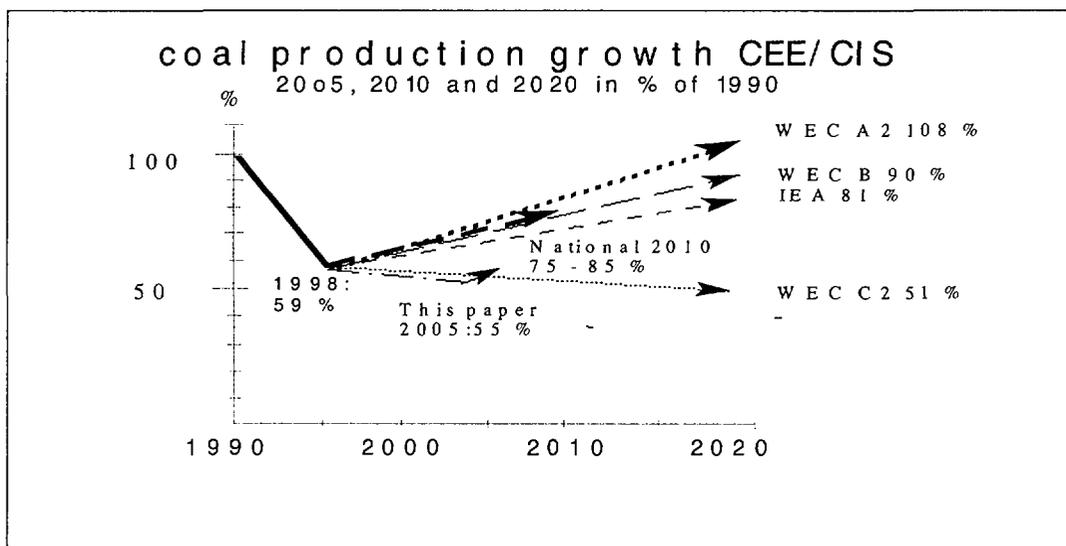
For 2010, national authorities foresee coal production at between 842 and 941 mill. t, - a net increase of 100 to 200 mill. t or by 13 to 26 % in comparison with 1997. However, this overall total covers diverging trends, with production declining in CEE by 12 % and increasing in the CIS by 35 - 55 %:

- the Czech Government has developed two scenarios, one resulting practically in phasing out coal production by 2040, the other anticipating a decline of (only) one third; reserves suffice to support continued production of coal, the use of which depends largely on the application of clean technologies,
- in the new German Länder, brown coal production is expected to stabilize around 65 - 75 mill. t,

- the Government of Kazakhstan anticipates a growth of coal production of 60 to 100 % during 1997-2010,
- the Polish Government, in its 1995 "Energy Policy Guidelines for Poland until 2010" opted for a base-line scenario that projects a minor decline of hard coal (- 6 %) and brown coal (-10 %) production between 1990 and 2010,
- in Russia, the Union of Hard Coal Producers (created after the dissolution of the State Coal Holding Rosugol) projects an increase of coal production from 239 mill. t. in 1997 to 300 mill. t in 2005 ; production for 2010 is estimated to range from 300 to 347 mill. t,
- the Ukrainian Government projects coal production to rise by about 40 % between 1997 and 2010,
- for the CIS as a whole, a group of government experts projects coal production to rise from 426 mill. t in 1995 to 538 - 624 mill. t in 2010 and net exports to range from 12 to 47 mill. t in 2010 compared with 21 mill. t in 1997.

6.3 to 2020 and 2050

The **WEC/IIASA** study Global Energy Perspectives (Cambridge 1998) attempts at an integrated energy outlook for CEE/CIS to 2020 and 2050, assuming that by 2020 the 1990 GDP/capita ratios would have been reached again (CIS) or exceeded (CEE). Six scenarios were designed, of which scenario A₂ (high economic growth, coal-based), C₂ (ecologically driven) and B (business-as-usual).



In the mid-range projection B, production would fall from 440 mill. t in 1990 to 371 mill. t in 2020, but stay at that level through 2050. This would be an overall decline of 16 %. As between 1990 and 1998, production has already fallen by 41 %, this scenario implies an increase of coal production during 1999-2020 of about 30 % or 110 mill. t.

In the coal-based scenario A₂, coal production would rise from 440 mill. t in 1990 to 494 mill. t in 2020 (and 645 mill. t in 2050) implying an increase during 1998-2020 by 234 mill.

t. In the ecologically-driven, carbon-constrained scenario C₂, coal production would fall by 49 % during 1990-2020, reaching 270 mill. t in 2020. Assuming that carbon dioxide emissions would need to be reduced by 2/3, coal would be phased-out by 2050.

IEA's World Energy Outlook 1998 describes a business-as-usual projection for 2020 for CEE/CIS. IEA records a decrease of solid fuel supplies from 412 mill. t in 1990 to 300 mill. t in 1995 and projects an increase to 357 mill. t in 2010 and 360 mill. t in 2020 (for comparison WEC/IIASA, Case B: 371 mill. t.). During the whole of 1990-2020, this implies a decrease of 19 % compared with 16 % of scenario B of the WEC/IIASA study and also 16 % by the US Department of Energy's Energy Outlook 1998.

6.4 synthesis: there is light at the end of the tunnel

Compared with 1998, all forecasters project an increase of coal production, once the reform process has been concluded (2000-2005). The extent of this increase depends on assumptions about GDP growth, competition from gas, and carbon emission constraints. In the longer term and in a business-as-usual perspective, the consensus view is to project an increase against 1997 of the order of 20 %. Forecasters also agree in anticipating developments to diverge in CEE (a continued decrease) and the CIS (a recovery). The difference can be attributed to the adoption of tighter environmental standards in CEE and to better geological conditions in Russia and Kazakhstan.